Zenoss Core Installation Guide

Release 5.0.x

Zenoss, Inc.

www.zenoss.com

Zenoss Core Installation Guide

Part Number: 1051.15.119

Zenoss, Inc.
11305 Four Points Drive
Bldg 1 - Suite 300
Austin, Texas 78726

Contents

Preface 4

Chapter 1: Planning your deployment 5
- Introduction to Control Center 5
- Deployment considerations 5
- Hardware requirements 6
- Operating system requirements 9
- Security considerations 10
- Packaging considerations 11
- Supported clients and browsers 12

Chapter 2: Installing on RHEL or CentOS hosts 13
- Preparing the master host 13
- Installing on the master host 15
- Preparing a resource pool host 17
- Installing on a resource pool host 19

Chapter 3: Installing on Ubuntu hosts 21
- Preparing the master host 21
- Installing on the master host 23
- Preparing a resource pool host 25
- Installing on a resource pool host 26

Chapter 4: Starting and tuning Zenoss Core 28
- Enabling access to the Control Center web interface 28
- Deploying the Zenoss Core application 29
- Changing default passwords 32
- Enabling access to application-level services 33
- Configuring OpenTSDB compaction 35
- Installing the Quilt package 36
- Installing the Percona Toolkit 37
- Starting the Zenoss Core application 37
- Deleting the RabbitMQ guest user account 38
- Configuring periodic maintenance 38
- Stopping Control Center and applications 39

Appendix A: Upgrading your system 40
- Upgrade script 40
- Upgrading Control Center 40
- Upgrading Zenoss Core 42

Appendix B: Mirroring repositories 44
- Mirroring the Zenoss Docker Hub repository 44

Preface

Zenoss Core Installation Guide provides detailed instructions for installing Zenoss Core (Zenoss Core).

Related publications

Title	Description
Zenoss Core Administration Guide	Provides an overview of Zenoss Core architecture and features, as well as procedures and examples to help use the system.
Zenoss Core Release Notes	Describes known issues, fixed issues, and late-breaking information not already provided in the published documentation set.

Additional information and comments

If you have technical questions about this product that are not answered in this guide, visit the *Zenoss Support* site.

Zenoss welcomes your comments and suggestions regarding our documentation. To share your comments, please send an email to `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 Planning your deployment

This release features Control Center, the open-source, application service orchestrator based on *Docker* and built by Zenoss. Control Center greatly simplifies the installation, deployment, and management of Zenoss Core.

This chapter describes the platform considerations and requirements of Control Center and Zenoss Core, for planning purposes.

Introduction to Control Center

A Control Center cluster contains one or more resource pools. A resource pool is a collection of compute, network, and storage resources (real or virtual hosts). The default resource pool includes the Control Center master host. The master host assigns a service to a resource pool and then that service is distributed to one of the hosts contained in the resource pool. Also, the master host maintains the local Docker repository and a distributed file system for application data. This separate volume enables Control Center to start new instances of services on another host in the resource pool if a host fails. Volume drivers create and manage snapshots, and perform rollbacks, so that Docker images and application data stay in sync.

Deployment considerations

The features of Control Center in this release affect deployments of Zenoss Core in the following ways.

- All hosts in a resource pool should have identical hardware resources (real or virtual).
- This release supports Docker version 1.5.0 only. If a more recent version of Docker is installed on a host, the installation process reverts it to 1.5.0. To prevent unnecessary downtime, please ensure that any security or maintenance tools in your environment do not upgrade Docker automatically.
- Docker supports running identical containers under a variety of Linux operating systems. Control Center supports the Ubuntu, RHEL, and CentOS distributions, but combining hosts that are running different operating systems in the same resource pool is currently untested and unsupported.
- Resource pools other than the default pool are known as distributed resource pools. You may create any number of distributed resource pools, and assign specific services to them. A common choice is to create distributed resource pools in different subnets or security zones, in order to deploy Zenoss Core collector instances closer to the monitored devices on the subnets. Currently, the procedures for creating distributed resource pools are identical to the procedures for creating any other resource pool.
- To assign a service to a specific host, create a separate resource pool, add only the desired host to the pool, and then assign the service to the separate pool.
- Zenoss Core collector services are stateless, so their storage requirements are very lightweight, compared to stateful services like MariaDB.

- The internal services of Control Center include Logstash, a Docker repository, and OpenTSDB. If these services are already established in your environment, you may replace their default endpoints with the endpoints of your existing services. However, the performance and availability of the services affects the performance and availability of Control Center (and Zenoss Core).
- By default, Control Center deletes its log files after one day. You may increase the value by setting the *SERVICED_LOGSTASH_MAX_DAYS* variable in the defaults file, `/etc/default/serviced`.
- The default volume type for application data is `rsync`, which is sufficient for development deployments of Control Center only. For all other uses, Zenoss supports only *Btrfs*. The installation procedures include example steps for creating Btrfs file systems.
- Copy-on-write file systems like Brtfs can experience unrecoverable errors when the underlying disk space reaches capacity. Zenoss recommends allocating very large reserves of disk space to Btrfs file systems.
- The amount of disk space that a Btrfs file system is using may not be reported accurately by standard file system utilities such as `df`. To retrieve accurate statistics, use a Btrfs-specific command, such as `sudo btrfs filesystem show /dev/sdb2`.
- By default, Control Center deletes snapshots after 12 hours. You may increase the value by setting the *SERVICED_SNAPSHOT_TTL* variable in the defaults file, `/etc/default/serviced`.
- Using virtual machines for Control Center and Zenoss Core is supported. However, pausing a virtual machine is not supported, because Control Center relies on timestamps and clocks to keep services in sync. Shut down all services cleanly before pausing or stopping a virtual machine.
- The software upgrade process for this release uses *Docker images*. Each upgrade installs a new Zenoss Core image, and removes all layers that are not part of the new image. This ensures that each upgrade brings Zenoss Core to a tested and supported state. However, any customizations of Zenoss Core are lost, unless those customizations are managed with a combination of Control Center scripts and a patch system like *Quilt*. Zenoss recommends Quilt, and the installation procedures include an option to install it.

Hardware requirements

Control Center and Zenoss Core require real or virtual hosts that implement the 64-bit version of the x86 instruction set, and support one of the required operating systems. Hardware requirements vary by role (master or resource pool host) and by the services assigned to a host's pool.

Master host requirements

The default resource pool contains the Control Center master host and, in the default configuration, hosts for all of the services of Zenoss Core. The hosts in the default resource pool should meet the following, minimum requirements:

- 4 CPU cores (64-bit only; real or virtual)
- 20GB RAM
- 1 network interface controller (must support TCP/IP)
- The network latency among all hosts in a resource pool should be less than 5 milliseconds
- Local storage is recommended, and SAN storage is supported

Master host storage requirements vary by collection rate, frequency of backups, and the type of data stored in specific locations. For example, a Zenoss Core collection rate of 25,000 metrics per second can require 1TB of storage in 60 days, depending on OpenTSBD compaction settings.

The Control Center master host requires adequate storage for backup files. The Control Center web interface stores backup files in `/opt/serviced/var/backups`, and uses a subdirectory, `/opt/serviced/var/backups/restore`, for temporary files created during restorations. A typical backup is several gigabytes, and the restore directory uses an equivalent amount. Currently, using a symbolic link for `/opt/serviced/var/backups` is not supported.

Note Copy-on-write file systems like Brtfs can experience unrecoverable errors when the underlying disk space reaches capacity. Zenoss recommends allocating very large reserves of disk space to Btrfs file systems.

The following table associates specific paths on the Control Center master host with the file system types required to support them.

Path	Description	File system type	
		RHEL	Ubuntu
/	Linux (including /tmp, excluding swap)	xfs	ext4
/var/lib/docker	Docker data	btrfs	ext4 (aufs)
/opt/serviced/var	Control Center internal services data	xfs	ext4
/opt/serviced/var/volumes	Application data (DFS volumes, NFS monitoring)	btrfs	btrfs
/opt/serviced/var/backups	Application data backup and restore files	xfs	ext4

For XFS and Ext4 file systems, no special creation or mount options are required. For Btrfs file systems, Zenoss strongly recommends the following options:

- To create a Btrfs file system on a solid-state drive, specify `--nodiscard`, to disable whole-device TRIM operations.
- To mount a Btrfs file system or subvolume, specify the following options:
  - `rw`, read-write (the default)
  - `noatime`, do not update inode access times
  - `nodatacow`, do not copy-on-write data for newly created files

SAN performance and configuration affects Control Center performance and stability. For example, the ZooKeeper service is sensitive to disk latency greater than 1000 milliseconds. Zenoss recommends using only high-performance SAN subsystems, and assigning separate LUNs for each mounted path. Likewise, solid-state drives are recommended for local storage.

The following table shows the order in which specific paths must be mounted, their minimum sizes, and the recommended locations for their underlying storage.

Note The following table shows all of the paths that may be mounted separately. Other than the root file system (/), the only paths that require separate mount points are `/opt/serviced/var/volumes` (RHEL/Centos and Ubuntu) and `/var/lib/docker` (RHEL/Centos only).

Order	Path	Minimum Size		Recommended location
		RHEL	Ubuntu	
1	/	30GB	60GB	Local
2	/var/lib/docker	30GB	n/a	Local
3	/opt/serviced/var	30GB	30GB	Local
4	/opt/serviced/var/volumes	Varies	Varies	Local if small, remote if large
5	/opt/serviced/var/backups	Varies	Varies	Local if small, remote if large

Note An under-resourced master host does not function properly. Please do not deploy Control Center and Zenoss Core on a master host that does not meet the minimum requirements.

The Docker, Control Center, and Zenoss Core packages require approximately 5GB of disk space.

Master host configuration examples

The following table shows an example RHEL/CentOS master host with local and remote Btrfs file systems.

Mount Point	Type	Size	Description
/	xfs	90GB	Local disk. Includes space for internal services data and some backups.
(none)	swap	15GB	Local disk.
/var/lib/docker	btrfs	30GB	Local disk.
/opt/serviced/var/volumes	btrfs	1TB	Remote SAN.

The following table shows an example Ubuntu master host with a remote Btrfs file system. The root file system includes the required minimum space for all other paths.

Mount Point	Type	Size	Description
/	ext4	120GB	Local disk. Includes space for Docker, internal services, and some backups.
(none)	swap	15GB	Local disk.
/opt/serviced/var/volumes	btrfs	1TB	Remote SAN.

Resource pool host requirements

The hosts in resource pools other than the default resource pool need enough RAM, CPU, and storage resources to support the services assigned to the pool. The network latency among all hosts in a resource pool should be less than 5 milliseconds. The hardware specifications of all hosts in a resource pool should be identical.

The storage requirements of hosts other than the master host do not include space for application data, which is stored excusively on the master host and mounted everywhere else. Storage is needed only for Linux, swap, and Docker.

Resource pool host configuration examples

The following table shows an example RHEL/CentOS resource pool host.

Mount Point	Type	Size
/	xfs	30GB
(none)	swap	15GB
/var/lib/docker	btrfs	30GB

The following table shows an example Ubuntu resource pool host.

Mount Point	Type	Size
/	ext4	60GB
(none)	swap	15GB

Docker and Control Center data storage

Internally, Docker uses an abstraction for data storage (volumes), and provides drivers that support specific file system types.

- On Ubuntu platforms, the preferred driver is *aufs*. The mainline Linux kernel does not support `aufs`, so Docker includes the necessary support in its own packaging. No separate primary or logical partition is needed for Docker data storage on Ubuntu platforms, but additional storage space is recommended for the root partition of the master host.
- On RHEL/CentOS platforms, the preferred driver is *btrfs*, which is supported in the mainline kernel. A separate primary or logical partition is needed for Docker data storage.

Docker stores its data in `/var/lib/docker`.

Similarly, Control Center uses the volumes abstraction for data storage, and provides `rsync` and `btrfs` drivers.

- For development deployments only, the `rsync` driver may be used.
- For all other deployment scenarios, Zenoss supports only the `btrfs` driver.

Control Center stores application data in `/opt/serviced/var/volumes`.

Note A backup of data stored in a volume managed by one driver can not be restored into a volume managed by the other driver.

Operating system requirements

Control Center and Zenoss Core require the 64-bit version of the following Linux distributions.

- Red Hat Enterprise Linux (RHEL) 7.0 or 7.1
- CentOS 7.0 or 7.1
- Ubuntu 14.04 LTS or 14.04.1

All versions of the Linux kernel included in these releases, and all subsequent updates, are supported. However, Zenoss encourages you to keep the kernel up-to-date.

Control Center and Zenoss Core are tested on operating system platforms that are installed and configured with standard options.

- The Ubuntu Server distribution provides only one configuration. In addition to the packages included in that configuration, the `openssh-server` and `btrfs-tools` packages are required.
- The RHEL/CentOS 7.x distributions provide a variety of server configurations. Docker and Control Center require no specific pakage groups, and the Minimal Install configuration is tested and supported.

Control Center relies on the system clock to synchronize its actions. The installation procedures include steps to add the Network Time Protocol (NTP) daemon to all hosts. By default, the NTP daemon synchronizes the system clock by communicating with standard time servers available on the internet. You may configure the daemon to use a timeserver in your environment, instead.

Note Because of the reliance on the system clock, pausing a virtual machine that belongs to a Control Center cluster is not supported.

Networking requirements

On startup, Docker creates the `docker0` virtual interface and selects an unused IP address and subnet (typically, 172.17.42.1/16) to assign to the interface. The virtual interface is used as a virtual Ethernet bridge, and automatically

forwards packets among real and virtual interfaces attached to it. The host and all of its containers communicate among one another through this virtual bridge.

Docker can only check directly-connected routes, so the subnet it chooses for the virtual bridge may be inappropriate for your environment. To customize the virtual bridge subnet, refer to Docker's *advanced network configuration* article.

The default configurations of firewall utilities such as *Uncomplicated Firewall* (Ubuntu) and *FirewallD* (RHEL/CentOS) include rules that can conflict with Docker, and therefore, Control Center and Zenoss Core. The following interactions illustrate the conflicts:

- The `ufw` daemon drops all forwarding traffic.
- The `firewalld` daemon removes the DOCKER chain from `iptables` when it starts or restarts.
- Under `systemd`, `firewalld` is started before Docker. However, if you start or restart `firewalld` while Docker is running, you need to restart Docker.

If you are using a firewall utlity, please ensure that it does not conflict with Docker.

If you are not using a firewall utlity, your firewall settings may still prevent communications over the Docker virtual bridge. This occurs when `iptables` INPUT rules restrict most traffic. To ensure that the bridge works properly, append an INPUT rule to your `iptables` configuration that allows traffic on the bridge subnet. For example, if `docker0` is bound to 172.17.42.1/16, then the following, non-specific command ensures that the bridge works.

```
iptables -A INPUT -d 172.17.0.0/16 -j ACCEPT
```

Note The preceding command is only an example. Please consult your networking specialist before modifying your `iptables` configuration.

Additional requirements

Control Center requires a 16-bit, private IPv4 network for communications among hosts in its resource pools. The default network is 10.3/16. If this network is already in use in your environment, you may select any valid IPv4 16-bit address space during installation.

This release of Control Center relies on Network File System (NFS) for its distributed file system implementation. For this reason, hosts in a Control Center cluster may not run a general-purpose NFS server.

All hosts in Control Center resource pools must

- be able to resolve the hostnames of all other resource pool hosts to IPv4 addresses
- respond with an IPv4 address other than `127.x.x.x` when `ping` *`Hostname`* is invoked
- return a unique result from the `hostid` command

Security considerations

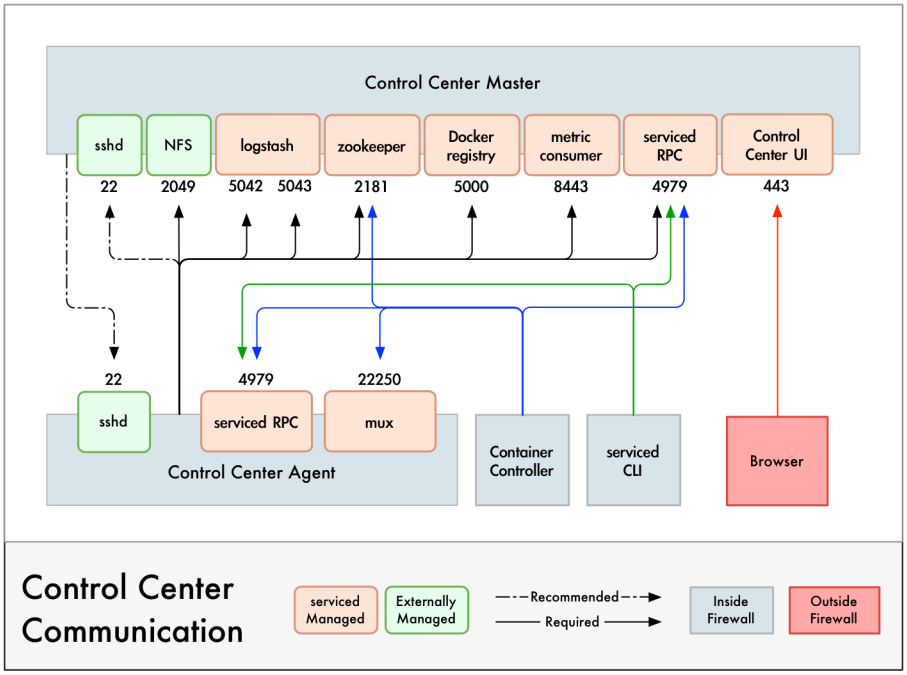
During installation, Control Center has no knowledge of the port requirements of the applications it is to manage, so the installation procedure includes disabling the firewall. After both Control Center and Zenoss Core are installed, you may close unused ports.

Control Center includes a virtual multiplexer (mux), to aggregate the UDP and TCP traffic among the services it manages. The aggregation is opaque to services, and mux traffic is encrypted when it travels among containers on remote hosts. (Traffic among containers on the same host is not encrypted.) The mux, along with the distributed file system, enables Control Center to deploy services to any pool host, rapidly. The mux also reduces the number of open ports required on a Control Center host to a predictable set.

The following illustration identifies the ports that Control Center requires for its operations. All of the ports except 4979 are configurable. All traffic is TCP.

Note Control Center relies on the system clock to synchronize its actions, and indirectly, NTP, to synchronize clocks among multiple hosts. In the default configuration of `ntpd`, the firewalls of master and resource pool hosts must support an incoming UDP connection on port 123.

Figure 1: Port requirements for Control Center hosts



Additional considerations

- To gain access to the Control Center web interface, users must have login accounts on the Control Center master host. (Pluggable Authentication Modules (PAM) is supported.) By default, the users must be members of the `sudo` group (Ubuntu hosts) or the `wheel` group (RHEL/CentOS hosts). The default group may be changed by setting the `SERVICED_ADMIN_GROUP` variable, and the replacement group does not need superuser privileges.
- The `serviced` startup script sets the hard and soft open files limit to 1048576, but does not modify the `/etc/sysconfig/limits.conf` file.
- Control Center does not support *Security Enhanced Linux* in enforcing mode. The installation procedures include steps to set the mode to disabled.
- On RHEL/CentOS systems, the FirewallD service can conflict with Docker, and therefore, Control Center and Zenoss Core. For more information, see *Networking requirements* on page 9.

Packaging considerations

Control Center is designed to support any application that includes one or more services that are built into Docker containers. A service definition template contains the specifications of application services, in JSON format. The definition of each service includes the IDs of the Docker images needed to run the service.

Control Center, and the service definition templates for Zenoss Core, are distributed as Debian (`apt`) and Redhat (`yum`/`rpm`) packages. The packages are available at public repositories maintained by Zenoss. The Docker images that Zenoss Core requires are available at the Zenoss *Docker Hub* repository. So, the default installation process

requires internet access. However, all of the repositories may be mirrored, so offline installations are supported as well.

Note The Docker images for Zenoss Core are available in a public Zenoss repository at Docker Hub. No special permissions are required to pull the images.

Supported clients and browsers

The client operating systems and web browser combinations supported in this release.

- All browsers must have Adobe® Flash® Player 11 installed, or a more recent version.
- Compatibility mode is not supported in Internet Explorer.

Client OS	Supported Browsers
Windows 7 and 8.1	Internet Explorer 11 (enterprise mode is supported)
	Internet Explorer 10
	Firefox 30 and above
	Chrome 30 and above
Windows Server 2012 R2	Firefox 30
	Chrome 36
Macintosh OS/X 10.9	Firefox 30 and above
	Chrome 36 and above
Ubuntu 14.04 LTS	Firefox 30 and above
	Chrome 37 and above
Red Hat Enterprise Linux 6.5, CentOS 6.5	Firefox 30 and above
	Chrome 37 and above

2 Installing on RHEL or CentOS hosts

The procedures in this chapter install Control Center and Zenoss Core on one or more Red Hat Enterprise Linux (RHEL) 7.0 or CentOS 7.0 hosts. Please review the information in *Planning your deployment* on page 5 before performing these procedures.

Note The procedures in this chapter include example steps to create *Btrfs* file systems. The steps may not be appropriate for your environment. To create Btrfs file systems in a different way, please refer to your operating system documentation.

Preparing the master host

Perform this procedure to prepare a Red Hat Enterprise Linux (RHEL) 7.0 or CentOS 7.0 host to function as the Control Center master host.

1. Log in to the master host as `root`.
2. Verify that the host implements the 64-bit version of the x86 instruction set.

   ```
   uname -m
   ```

   - If the output is `x86_64`, the architecture is 64-bit. Proceed to the next step
   - If the output is `i386/i486/i586/i686`, the architecture is 32-bit. Stop this procedure and select a different host.
3. Disable the firewall.

   ```
   systemctl stop firewalld && systemctl disable firewalld
   ```
4. Enable persistent storage for log files, if desired.

   By default, RHEL/CentOS systems store log data only in memory or in a small ring-buffer in the `/run/log/journal` directory. By performing this step, log data persists, and can be saved indefinitely if you implement log file rotation practices. For more information, refer to your operating system documentation.

   ```
   mkdir -p /var/log/journal && systemctl restart systemd-journald
   ```
5. Create two Btrfs file systems, or one Btrfs file system with two subvolumes.

   Note The following example procedure creates two file systems on two partitions, `/dev/sdb1` and `/dev/sdb2`. Modify the steps or values in this procedure as required for your environment.

a. Create mount points for the Btrfs file systems.

```
mkdir -p /var/lib/docker /opt/serviced/var/volumes
```

b. Create the file systems.

Replace the values of the partition variables with device paths that are correct for your environment.

```
DOCKER_PART=/dev/sdb1
APP_PART=/dev/sdb2
mkfs -t btrfs --nodiscard $DOCKER_PART
mkfs -t btrfs --nodiscard $APP_PART
```

c. Add the new file systems to the `/etc/fstab` file.

```
APP_PATH="/opt/serviced/var/volumes"
echo "$DOCKER_PART /var/lib/docker btrfs rw,noatime,nodatacow 0 0" \
  >> /etc/fstab
echo "$APP_PART $APP_PATH btrfs rw,noatime,nodatacow 0 0" \
  >> /etc/fstab
```

d. Mount the file systems, and then verify they mounted correctly.

```
mount -a
mount | egrep 'docker|serviced'
```

The output of the preceding command should be similar to the following example.

```
/dev/sdb1 on /var/lib/docker type btrfs
 (rw,noatime,nodatasum,nodatacow,space_cache)
/dev/sdb2 on /opt/serviced/var/volumes type btrfs
 (rw,noatime,nodatasum,nodatacow,space_cache)
```

6. Disable Security-Enhanced Linux (SELinux), if installed.

a. Determine whether SELinux is installed.

```
test -f /etc/selinux/config && grep '^SELINUX=' /etc/selinux/config
```

If the preceding commands return a result, SELinux is installed.

b. Set the operating mode to `disabled`, and confirm the setting.

```
EXT=$(date +"%j-%H%M%S")
sudo sed -i.${EXT} -e 's/^SELINUX=.*/SELINUX=disabled/g' \
  /etc/selinux/config && \
grep '^SELINUX=' /etc/selinux/config
```

A reboot is required to complete the configuration change, and a reboot is the last step of this procedure.

7. Download and install the Zenoss repository package.

```
rpm -ivh http://get.zenoss.io/yum/zenoss-repo-1-1.x86_64.rpm
yum clean all
```

8. Install and start the Dnsmasq package.

```
systemctl enable dnsmasq && systemctl start dnsmasq
```

9. Install and configure the NTP package.

a. Install the package.

```
yum install -y ntp && systemctl enable ntpd
```

b. Configure `ntpd` to start when the system starts.

Currently, an unresolved issue associated with NTP prevents `ntpd` from restarting correctly after a reboot, and the following commands provide a workaround to ensure that it does.

```
echo "systemctl start ntpd" >> /etc/rc.d/rc.local
chmod +x /etc/rc.d/rc.local
```

c. Start `ntpd`.

```
systemctl start ntpd
```

10. Reboot the host.

```
sudo reboot
```

Installing on the master host

Perform this procedure to install Control Center and Zenoss Core on the master host.

1. Log in to the master host as `root`.
2. Install Control Center, Zenoss Core, and Docker, and then start Docker.

```
yum --enablerepo=zenoss-stable install -y zenoss-core-service
systemctl start docker
```

3. Configure and restart Docker.
   a. Identify the IPv4 address and subnet Docker has selected for its virtual Ethernet bridge.

```
ip addr | grep -A 2 'docker0:' | grep inet
```

Note Typically, the address and subnet is 172.17.42.1/16. For more information about changing the selection, refer to Docker's *advanced network configuration* article.

   b. Add the Btrfs and DNS flags to the Docker startup options.

   If you change the virtual bridge subnet, replace the IP address in the following command.

```
echo 'DOCKER_OPTS="-s btrfs --dns=172.17.42.1"' \
  >> /etc/sysconfig/docker
```

   c. Add the current user to the Docker group.

```
usermod -aG docker $USER
```

   d. Stop and restart Docker.

```
systemctl stop docker && systemctl start docker
```

4. Change the volume type for application data.

The `/etc/default/serviced` file contains variables that define the character of an instance of Control Center. For more information about `serviced` configuration options, refer to the Control Center help.

The following `sed` command changes the value of the SERVICED_FS_TYPE variable from the default, `rsync`, to `btrfs`.

```
EXT=$(date +"%j-%H%M%S")
sudo sed -i.${EXT} \
  -e 's|^#[^S]*\(SERVICED_FS_TYPE=\).*$|\1btrfs|' \
  /etc/default/serviced
```

5 Optional: Configure the master host for a multi-host deployment, if desired.

The default values in `/etc/default/serviced` configure Control Center for a single-host deployment. To enable a multi-host deployment, change the following variables.

HOME

The path `docker` uses to locate the `.dockercfg` authentication file. Docker Hub credentials are stored in the file.

SERVICED_REGISTRY

Determines whether `serviced` uses a local registry to store Docker images. Set the value to 1, true.

SERVICED_AGENT

Determines whether a `serviced` instance acts as a resource pool host. A resource pool host runs application services scheduled for the resource pool to which it belongs. Set the value to 1, true.

SERVICED_MASTER

Determines whether a `serviced` instance acts as the Control Center master host. The master host runs the application services scheduler and other internal services, including the web server for the Control Center web interface. A `serviced` instance may be configured as both an agent and a master. Set the value to 1, true.

The following commands make the required edits to `/etc/default/serviced`.

```
EXT=$(date +"%j-%H%M%S")
sudo sed -i.${EXT} -e 's|^#[^H]*\(HOME=/root\)|\1|' \
  -e 's|^#[^S]*\(SERVICED_REGISTRY=\).|\11|' \
  -e 's|^#[^S]*\(SERVICED_AGENT=\).|\11|' \
  -e 's|^#[^S]*\(SERVICED_MASTER=\).|\11|' \
  /etc/default/serviced
```

6 Optional: Specify an alternate private subnet for Control Center, if necessary.

By default, Control Center uses the 10.3/16 private subnet for virtual IP addresses. If your environment already uses 10.3/16 for other purposes, select an unused subnet for Control Center, and add it to the `/etc/default/serviced` file.

Note *RFC 1918* restricts private networks to the 10/8, 172.16/12, and 192.168/16 address spaces. However, Control Center accepts any valid, 16-bit, IPv4 address space for its private network.

For example, to set the private subnet for Control Center to 10.20/16, uncomment the SERVICED_VIRTUAL_ADDRESS_SUBNET variable, and then set its value to 10.20.

The following commands make the required edits to `/etc/default/serviced`.

```
SUBNET=10.20
EXT=$(date +"%j-%H%M%S")
test ! -z "${SUBNET}" && \
sudo sed -i.${EXT} -e \
  's|^#[^S]*\(SERVICED_VIRTUAL_ADDRESS_SUBNET=\).*|\1'${SUBNET}'|' \
```

```
/etc/default/serviced
```

Note All hosts in a Control Center deployment must have the same value for the SERVICED_VIRTUAL_ADDRESS_SUBNET variable.

7 Start the Control Center service.

```
systemctl start serviced
```

To monitor progress, enter the following command.

```
journalctl -u serviced -f
```

The `serviced` daemon invokes `docker` to pull its internal services image from Docker Hub. The Control Center web interface is unavailable until the image is installed and the services are started. The process takes approximately 5-10 minutes.

8 Configure resource pool hosts or start Zenoss Core.

- To configure resource pool hosts, proceed to *Preparing a resource pool host* on page 17.
- To start Zenoss Core, proceed to *Starting and tuning Zenoss Core* on page 28.

Preparing a resource pool host

Perform this procedure to prepare a Red Hat Enterprise Linux (RHEL) 7.0 or CentOS 7.0 host as a Control Center resource pool host.

1 Log in to the target host as `root`.

2 Verify that the host implements the 64-bit version of the x86 instruction set.

```
uname -m
```

- If the output is `x86_64`, the architecture is 64-bit. Proceed to the next step
- If the output is `i386/i486/i586/i686`, the architecture is 32-bit. Stop this procedure and select a different host.

3 Disable the firewall.

```
systemctl stop firewalld && systemctl disable firewalld
```

4 Enable persistent storage for log files, if desired.

By default, RHEL/CentOS systems store log data only in memory or in a small ring-buffer in the `/run/log/journal` directory. By performing this step, log data persists, and can be saved indefinitely if you implement log file rotation practices. For more information, refer to your operating system documentation.

```
mkdir -p /var/log/journal && systemctl restart systemd-journald
```

5 Create one Btrfs file system for Docker.

Note The following example procedure creates a file system on the `/dev/sdb1` partition. Modify the steps or values in this procedure as required for your environment.

a Create a mount point for the Btrfs file system.

```
mkdir /var/lib/docker
```

b Create the file system.

```
DOCKER_PART=/dev/sdb1
mkfs -t btrfs --nodiscard $DOCKER_PART
```

c Add the new file system to the `/etc/fstab` file.

```
echo "$DOCKER_PART /var/lib/docker btrfs rw,noatime,nodatacow 0 0" \
  >> /etc/fstab
```

d Mount the file system, and then verify it mounted correctly.

```
mount -a
mount | grep docker
```

The output of the preceding command should be similar to the following example.

```
/dev/sdb1 on /var/lib/docker type btrfs
 (rw,noatime,seclabel,nodatasum,nodatacow,ssd,space_cache)
```

6 Disable Security-Enhanced Linux (SELinux), if installed.

a Determine whether SELinux is installed.

```
test -f /etc/selinux/config && grep '^SELINUX=' /etc/selinux/config
```

If the preceding commands return a result, SELinux is installed.

b Set the operating mode to `disabled`, and confirm the setting.

```
EXT=$(date +"%j-%H%M%S")
sudo sed -i.${EXT} -e 's/^SELINUX=.*/SELINUX=disabled/g' \
  /etc/selinux/config && \
grep '^SELINUX=' /etc/selinux/config
```

A reboot is required to complete the configuration change, and a reboot is the last step of this procedure.

7 Download and install the Zenoss repository package.

```
rpm -ivh http://get.zenoss.io/yum/zenoss-repo-1-1.x86_64.rpm
yum clean all
```

8 Install and start the Dnsmasq package.

```
systemctl enable dnsmasq && systemctl start dnsmasq
```

9 Install and configure the NTP package.

a Install the package.

```
yum install -y ntp && systemctl enable ntpd
```

b Configure `ntpd` to start when the system starts.

Currently, an unresolved issue associated with NTP prevents `ntpd` from restarting correctly after a reboot, and the following commands provide a workaround to ensure that it does.

```
echo "systemctl start ntpd" >> /etc/rc.d/rc.local
chmod +x /etc/rc.d/rc.local
```

c Start `ntpd`.

```
systemctl start ntpd
```

10 Reboot the host.

```
sudo reboot
```

Proceed to the next procedure, *Installing on a resource pool host* on page 19.

Installing on a resource pool host

To perform this procedure, you need the Control Center and Zenoss Core package files provided by your Zenoss representative.

1 Log in to the resource pool host as `root`.

2 Install Control Center, Zenoss Core, and Docker, and then start Docker.

```
yum --enablerepo=zenoss-stable install -y zenoss-core-service
systemctl start docker
```

3 Configure the resource pool host for a multi-host deployment.

a Create a variable for the IP address or hostname of the master host.

If you use the hostname, all hosts in your Control Center deployment must be able to resolve the hostname, either through an entry in `/etc/hosts` or through a nameserver on your network.

```
MHOST=XX.XX.XX.XX
```

b Change variables in the Control Center defaults file.

The default values in `/etc/default/serviced` configure Control Center for a single-host deployment. To enable a multi-host deployment, uncomment and change the following variables.

HOME

The path `docker` uses to locate the `.dockercfg` authentication file. Docker Hub credentials are stored in the file.

SERVICED_REGISTRY

Determines whether `serviced` uses a local registry to store Docker images. Set the value to 1, true.

SERVICED_AGENT

Determines whether a `serviced` instance acts as a resource pool host. Set the value to 1, true.

SERVICED_MASTER

Determines whether a `serviced` instance acts as the Control Center master host. Set the value to 0, false.

SERVICED_MASTER_IP

The IP address of the `serviced` instance configured as the master. Set the SERVICED_MASTER_IP variable to the IP address of the master host, then uncomment SERVICED_MASTER_IP and all other variables that reference it (SERVICED_ZK, SERVICED_DOCKER_REGISTRY, SERVICED_ENDPOINT, SERVICED_LOG_ADDRESS, SERVICED_LOGSTASH_ES, and SERVICED_STATS_PORT). Finally, replace the variable that reference SERVICED_MASTER_IP with the IP address of the master host.

The following commands make the required edits to `/etc/default/serviced`.

```
EXT=$(date +"%j-%H%M%S")
```

```
test ! -z "${MHOST}" && \
sed -i.${EXT} -e 's|^#[^H]*\(HOME=/root\)|\1|' \
  -e 's|^#[^S]*\(SERVICED_REGISTRY=\).|\11|' \
  -e 's|^#[^S]*\(SERVICED_AGENT=\).|\11|' \
  -e 's|^#[^S]*\(SERVICED_MASTER=\).|\10|' \
  -e 's|^#[^S]*\(SERVICED_MASTER_IP=\).*|\1'${MHOST}'|' \
  -e '/=$SERVICED_MASTER_IP/ s|^#[^S]*||' \
  -e 's|\($SERVICED_MASTER_IP\)|'${MHOST}'|' \
  /etc/default/serviced
```

4 Optional: Specify an alternate private subnet for Control Center, if necessary.

By default, Control Center uses the 10.3/16 private subnet for virtual IP addresses. If your environment already uses 10.3/16 for other purposes, select an unused subnet for Control Center, and add it to the `/etc/default/serviced` file.

Note *RFC 1918* restricts private networks to the 10/8, 172.16/12, and 192.168/16 address spaces. However, Control Center accepts any valid, 16-bit, IPv4 address space for its private network.

For example, to set the private subnet for Control Center to 10.20/16, uncomment the SERVICED_VIRTUAL_ADDRESS_SUBNET variable, and then set its value to 10.20.

The following commands make the required edits to `/etc/default/serviced`.

```
SUBNET=10.20
EXT=$(date +"%j-%H%M%S")
test ! -z "${SUBNET}" && \
sudo sed -i.${EXT} -e \
  's|^#[^S]*\(SERVICED_VIRTUAL_ADDRESS_SUBNET=\).*|\1'${SUBNET}'|' \
  /etc/default/serviced
```

Note All hosts in a Control Center deployment must have the same value for the SERVICED_VIRTUAL_ADDRESS_SUBNET variable.

---

5 Start the Control Center service.

```
systemctl start serviced
```

To monitor progress, enter the following command.

```
journalctl -u serviced -f
```

6 Configure additional hosts or start Zenoss Core.

- To configure additional hosts, return to *Preparing a resource pool host* on page 17.
- To start Zenoss Core, proceed to *Starting and tuning Zenoss Core* on page 28.

3 Installing on Ubuntu hosts

The procedures in this chapter install Control Center and Zenoss Core on one or more Ubuntu 14.04 LTS hosts. Please review the information in *Planning your deployment* on page 5 before performing these procedures.

In addition, the procedures in this chapter require access to public Zenoss repositories or local mirrors of Zenoss repositories. For information about creating local mirrors, see *Mirroring repositories* on page 44.

Finally, these procedures include example steps to create a *Btrfs* partition on a separate disk, which may not be appropriate for your environment. To create a Btrfs partition in a different way, please refer to your operating system documentation.

Preparing the master host

Follow this procedure to prepare an Ubuntu host for Control Center.

1. Log in to the target host as `root` or as a user with `sudo` privileges.
2. Verify that the host implements the 64-bit version of the x86 instruction set.

   ```
   uname -m
   ```

   - If the output is `x86_64`, the architecture is 64-bit. Proceed to the next step
   - If the output is `i386/i486/i586/i686`, the architecture is 32-bit. Stop this procedure and select a different host.
3. Create Btrfs file systems for internal services and application data.

   Note The following example procedure creates a Btrfs file systes on the `/dev/sdb1` partition. Modify the steps or values in this procedure as required for your environment.

   a. Install the `btrfs-tools` package, if necessary.

   ```
   dpkg -s btrfs-tools >/dev/null 2>&1 \
     || sudo apt-get install -y btrfs-tools
   ```

   b. Format the partition with Btrfs.

   ```
   sudo mkfs.btrfs --nodiscard /dev/sdb1
   ```

c Create a mount point for the Btrfs file system.

```
sudo mkdir -p /opt/serviced/var/volumes
```

d Add the file system to the `/etc/fstab` file.

```
APP_PATH=/opt/serviced/var/volumes
sudo sh -c 'echo \
  "/dev/sdb2 '${APP_PATH}' btrfs rw,noatime,nodatacow 0 0" \
  >> /etc/fstab'
```

e Mount the filesystem, and then verify it mounted correctly.

```
sudo mount -a && mount | grep serviced
```

The output of the preceding commands should be similar to the following example.

```
/dev/sdb1 on /opt/serviced/var/volumes type btrfs
 (rw,noatime,nodatacow)
```

4 Disable the firewall.

```
sudo ufw disable
```

5 Disable Security-Enhanced Linux (SELinux), if installed.

a Determine whether SELinux is installed.

```
test -f /etc/selinux/config && grep '^SELINUX=' /etc/selinux/config
```

If the preceding commands return a result, SELinux is installed.

b Set the operating mode to `disabled`, and confirm the setting.

```
EXT=$(date +"%j-%H%M%S")
sudo sed -i.${EXT} -e 's/^SELINUX=.*/SELINUX=disabled/g' \
  /etc/selinux/config && \
grep '^SELINUX=' /etc/selinux/config
```

A reboot is required to complete the configuration change, and a reboot is the last step of this procedure.

6 Install *Docker*.

```
sudo sh -c 'echo "deb http://get.docker.com/ubuntu docker main" \
  > /etc/apt/sources.list.d/docker.list'
sudo apt-key adv --keyserver hkp://keyserver.ubuntu.com:80 \
  --recv-keys 36A1D7869245C8950F966E92D8576A8BA88D21E9
sudo apt-get update
sudo apt-get install -y lxc-docker-1.5.0
```

7 Configure and restart Docker.

a Identify the IPv4 address and subnet Docker has selected for its virtual Ethernet bridge.

```
ifconfig | grep -A 1 'docker0' | grep inet
```

Note Typically, the address and subnet is 172.17.42.1/16. For more information about changing the selection, refer to Docker's *advanced network configuration* article.

b Add the DNS flag to the Docker startup options.

If you change the virtual bridge subnet, replace the IP address in the following command.

```
DNSOPT='\nDOCKER_OPTS="--dns=172.17.42.1"'
sudo sed -i -e '/^#DOCKER_OPTS=/ s|$|'"${DNSOPT}"'|' \
  /etc/default/docker
```

c Add the current user to the Docker group.

```
sudo usermod -aG docker $USER
```

d Stop and restart Docker.

```
sudo stop docker && sudo start docker
```

8 Install the Zenoss OpenPGP public key.

```
sudo apt-key adv --keyserver keys.gnupg.net --recv-keys AA5A1AD7
```

9 Add the Zenoss repository to the list of repositories.

If you are using a local mirror of the public Zenoss repository, replace the value of the `REPO` variable with your mirror's address in the following commands.

```
REPO=http://get.zenoss.io/apt/ubuntu
sudo sh -c 'echo "deb [ arch=amd64 ] '${REPO}' trusty universe" \
  > /etc/apt/sources.list.d/zenoss.list'
```

10 Update the Ubuntu repository database.

```
sudo apt-get update
```

11 Install the NTP package and start `ntpd`.

```
sudo apt-get install -y ntp
```

12 Reboot the host.

```
sudo reboot
```

Installing on the master host

Perform this procedure to install Control Center and Zenoss Core on the master host.

1 Log in to the target host as a user with `sudo` and `docker` privileges.

2 Install the Zenoss Core service template.

```
sudo apt-get install -y zenoss-core-service
```

3 Change the volume type for application data.

The `/etc/default/serviced` file contains variables that define the character of an instance of Control Center. For more information about `serviced` configuration options, refer to the Control Center help.

The following `sed` command changes the value of the SERVICED_FS_TYPE variable from the default, `rsync`, to `btrfs`.

```
EXT=$(date +"%j-%H%M%S")
sudo sed -i.${EXT} \
  -e 's|^#[^S]*\(SERVICED_FS_TYPE=\).*$|\1btrfs|' \
  /etc/default/serviced
```

4 Optional: Configure the master host for multi-host deployment, if desired.

The default values in the Control Center defaults file, `/etc/default/serviced`, configure Control Center for a single-host deployment. To enable a multi-host deployment, uncomment and change the following variables.

HOME

The path `docker` uses to locate the `.dockercfg` authentication file. Docker Hub credentials are stored in the file.

SERVICED_REGISTRY

Determines whether `serviced` uses a local registry to store Docker images. Set the value to 1, true.

SERVICED_AGENT

Determines whether a `serviced` instance acts as a resource pool host. A resource pool host runs application services scheduled for the resource pool to which it belongs. Set the value to 1, true.

SERVICED_MASTER

Determines whether a `serviced` instance acts as the Control Center master host. The master host runs the application services scheduler and other internal services, including the web server for the Control Center web interface. A `serviced` instance may be configured as both an agent and a master. Set the value to 1, true.

The following commands make the required edits to `/etc/default/serviced`.

```
EXT=$(date +"%j-%H%M%S")
sudo sed -i.${EXT} -e 's|^#[^H]*\(HOME=/root\)|\1|' \
  -e 's|^#[^S]*\(SERVICED_REGISTRY=\).|\11|' \
  -e 's|^#[^S]*\(SERVICED_AGENT=\).|\11|' \
  -e 's|^#[^S]*\(SERVICED_MASTER=\).|\11|' \
  /etc/default/serviced
```

5 Optional: Specify an alternate private subnet for Control Center, if necessary.

By default, Control Center uses the 10.3/16 private subnet for virtual IP addresses. If your environment already uses 10.3/16 for other purposes, select an unused subnet for Control Center, and add it to the `/etc/default/serviced` file.

Note *RFC 1918* restricts private networks to the 10/8, 172.16/12, and 192.168/16 address spaces. However, Control Center accepts any valid, 16-bit, IPv4 address space for its private network.

For example, to set the private subnet for Control Center to 10.20/16, uncomment the SERVICED_VIRTUAL_ADDRESS_SUBNET variable, and then set its value to 10.20.

The following commands make the required edits to `/etc/default/serviced`.

```
SUBNET=10.20
EXT=$(date +"%j-%H%M%S")
test ! -z "${SUBNET}" && \
sudo sed -i.${EXT} -e \
```

```
  's|^#[^S]*\(SERVICED_VIRTUAL_ADDRESS_SUBNET=\).*|\1'${SUBNET}'|' \
  /etc/default/serviced
```

Note All hosts in a Control Center deployment must have the same value for the SERVICED_VIRTUAL_ADDRESS_SUBNET variable.

6 Start the Control Center service.

```
sudo start serviced
```

The `serviced` daemon invokes `docker` to pull its internal services image from Docker Hub. The Control Center web interface is unavailable until the image is installed and the services are started. The process takes approximately 5-10 minutes.

7 Configure resource pool hosts or start Zenoss Core.

- To configure resource pool hosts, proceed to *Preparing a resource pool host* on page 25.
- To start Zenoss Core, proceed to *Starting and tuning Zenoss Core* on page 28.

Preparing a resource pool host

Follow this procedure to prepare an Ubuntu host for Control Center.

1 Log in to the target host as `root` or as a user with `sudo` privileges.

2 Verify that the host implements the 64-bit version of the x86 instruction set.

```
uname -m
```

- If the output is `x86_64`, the architecture is 64-bit. Proceed to the next step
- If the output is `i386/i486/i586/i686`, the architecture is 32-bit. Stop this procedure and select a different host.

3 Disable the firewall.

```
sudo ufw disable
```

4 Disable Security-Enhanced Linux (SELinux), if installed.

a Determine whether SELinux is installed.

```
test -f /etc/selinux/config && grep '^SELINUX=' /etc/selinux/config
```

If the preceding commands return a result, SELinux is installed.

b Set the operating mode to `disabled`, and confirm the setting.

```
EXT=$(date +"%j-%H%M%S")
sudo sed -i.${EXT} -e 's/^SELINUX=.*/SELINUX=disabled/g' \
  /etc/selinux/config && \
grep '^SELINUX=' /etc/selinux/config
```

A reboot is required to complete the configuration change, and a reboot is the last step of this procedure.

5 Install *Docker*.

```
sudo sh -c 'echo "deb http://get.docker.com/ubuntu docker main" \
  > /etc/apt/sources.list.d/docker.list'
sudo apt-key adv --keyserver hkp://keyserver.ubuntu.com:80 \
  --recv-keys 36A1D7869245C8950F966E92D8576A8BA88D21E9
sudo apt-get update
```

```
sudo apt-get install -y lxc-docker-1.5.0
```

6 Add the current user account to the `docker` group.

```
sudo usermod -aG docker $USER
```

7 Install the Zenoss OpenPGP public key.

```
sudo apt-key adv --keyserver keys.gnupg.net --recv-keys AA5A1AD7
```

8 Add the Zenoss repository to the list of repositories.

If you are using a local mirror of the public Zenoss repository, replace the value of the `REPO` variable with your mirror's address in the following commands.

```
REPO=http://get.zenoss.io/apt/ubuntu
sudo sh -c 'echo "deb [ arch=amd64 ] '${REPO}' trusty universe" \
  > /etc/apt/sources.list.d/zenoss.list'
```

9 Update the Ubuntu repository database.

```
sudo apt-get update
```

10 Install the NTP package and start `ntpd`.

```
sudo apt-get install -y ntp
```

11 Reboot the host.

```
sudo reboot
```

Installing on a resource pool host

1 Log in to the target host as a user with `sudo` and `docker` privileges.
2 Install the Zenoss Core service template.

```
sudo apt-get install -y zenoss-core-service
```

3 Configure the resource pool host for a multi-host deployment.

a Create a variable for the IP address or hostname of the master host.

If you use the hostname, all hosts in your Control Center deployment must be able to resolve the hostname, either through an entry in `/etc/hosts` or through a nameserver on your network.

```
MHOST=XX.XX.XX.XX
```

b Change variables in the Control Center defaults file.

The default values in `/etc/default/serviced` configure Control Center for a single-host deployment. To enable a multi-host deployment, uncomment and change the following variables.

HOME

The path `docker` uses to locate the `.dockercfg` authentication file. Docker Hub credentials are stored in the file.

SERVICED_REGISTRY

Determines whether `serviced` uses a local registry to store Docker images. Set the value to 1, true.

SERVICED_AGENT

Determines whether a `serviced` instance acts as a resource pool host. Set the value to 1, true.

SERVICED_MASTER

Determines whether a `serviced` instance acts as the Control Center master host. Set the value to 0, false.

SERVICED_MASTER_IP

The IP address of the `serviced` instance configured as the master. Set the SERVICED_MASTER_IP variable to the IP address of the master host, then uncomment SERVICED_MASTER_IP and all other variables that reference it (SERVICED_ZK, SERVICED_DOCKER_REGISTRY, SERVICED_ENDPOINT, SERVICED_LOG_ADDRESS, SERVICED_LOGSTASH_ES, and SERVICED_STATS_PORT).

The following commands make the required edits to `/etc/default/serviced`.

```
EXT=$(date +"%j-%H%M%S")
test ! -z "${MHOST}" && \
sudo sed -i.${EXT} -e 's|^#[^H]*\(HOME=/root\)|\1|' \
  -e 's|^#[^S]*\(SERVICED_REGISTRY=\).|\11|' \
  -e 's|^#[^S]*\(SERVICED_AGENT=\).|\11|' \
  -e 's|^#[^S]*\(SERVICED_MASTER=\).|\10|' \
  -e 's|^#[^S]*\(SERVICED_MASTER_IP=\).*|\1'${MHOST}'|' \
  -e '/=$SERVICED_MASTER_IP/ s|^#[^S]*||' \
  /etc/default/serviced
```

4 Optional: Specify an alternate private subnet for Control Center, if necessary.

By default, Control Center uses the 10.3/16 private subnet for virtual IP addresses. If your environment already uses 10.3/16 for other purposes, select an unused subnet for Control Center, and add it to the `/etc/default/serviced` file.

Note *RFC 1918* restricts private networks to the 10/8, 172.16/12, and 192.168/16 address spaces. However, Control Center accepts any valid, 16-bit, IPv4 address space for its private network.

For example, to set the private subnet for Control Center to 10.20/16, uncomment the SERVICED_VIRTUAL_ADDRESS_SUBNET variable, and then set its value to 10.20.

The following commands make the required edits to `/etc/default/serviced`.

```
SUBNET=10.20
EXT=$(date +"%j-%H%M%S")
test ! -z "${SUBNET}" && \
sudo sed -i.${EXT} -e \
  's|^#[^S]*\(SERVICED_VIRTUAL_ADDRESS_SUBNET=\).*|\1'${SUBNET}'|' \
  /etc/default/serviced
```

Note All hosts in a Control Center deployment must have the same value for the SERVICED_VIRTUAL_ADDRESS_SUBNET variable.

---

5 Start the Control Center service.

```
sudo start serviced
```

6 Configure additional hosts or start Zenoss Core.

- To configure additional hosts, return to *Preparing a resource pool host* on page 25.
- To start Zenoss Core, proceed to *Starting and tuning Zenoss Core* on page 28.

4 Starting and tuning Zenoss Core

The procedures in this chapter demonstrate how to start Zenoss Core for the first time, and how to install optional packages. Some of the procedures are optional, depending on whether your deployment is single-host or multi-host. For best results, perform the procedures in the order in which they appear in this chapter.

Enabling access to the Control Center web interface

To gain access to the Control Center web interface, users must be members of the Control Center administrative group on the master host. The default administrative group is the system group. (On Ubuntu hosts, the system group is `sudo`; on RHEL/CentOS hosts, it is `wheel`.) You may add users to the system group, or designate a regular group as the administrative group.

1. Log in to the master host as `root` or as a user with `sudo` privileges.
2. Add users to the administrative group.
   - To add users to the default administrative group (the system group) enter one of the following commands for each user to add.
     - Ubuntu hosts: `sudo usermod -aG sudo` *`User`*
     - RHEL/CentOS hosts: `sudo usermod -aG wheel` *`User`*
   - To designate a regular group as the administrative group, perform the remaining steps of this pocedure.
3. Create a variable for the group to designate as the administrative group.

   In this example, the name of group to create is `serviced`. You may choose any name, or use an existing group.

   ```
   GROUP=serviced
   ```
4. Create a new group, if necessary.
   - Ubuntu hosts: `sudo addgroup ${GROUP}`
   - RHEL/CentOS hosts: `sudo groupadd ${GROUP}`
5. Add one or more existing users to the group to designate as the administrative group.

   Repeat the following command for each user to add.

   ```
   sudo usermod -aG ${GROUP} User
   ```
6. Change the value of the *SERVICED_ADMIN_GROUP* variable in `/etc/default/serviced`.

   ```
   EXT=$(date +"%j-%H%M%S")
   ```

```
test ! -z "${GROUP}" && sudo sed -i.${EXT} -e \
  's|^#[^S]*\(SERVICED_ADMIN_GROUP=\).*$|\1'${GROUP}'|' \
  /etc/default/serviced || \
  echo "** GROUP undefined; no edit performed"
```

7 Optional: Prevent `root` users and members of the `sudo` or `wheel` groups from gaining access to the Control Center web interface.

```
EXT=$(date +"%j-%H%M%S")
sudo sed -i.${EXT} \
  -e 's|^#[^S]*\(SERVICED_ALLOW_ROOT_LOGIN=\).*$|\10|' \
  /etc/default/serviced
```

8 Restart Control Center.

- Ubuntu hosts: `sudo stop serviced && sudo start serviced`
- RHEL/CentOS hosts: `systemctl stop serviced && systemctl start serviced`

Deploying the Zenoss Core application

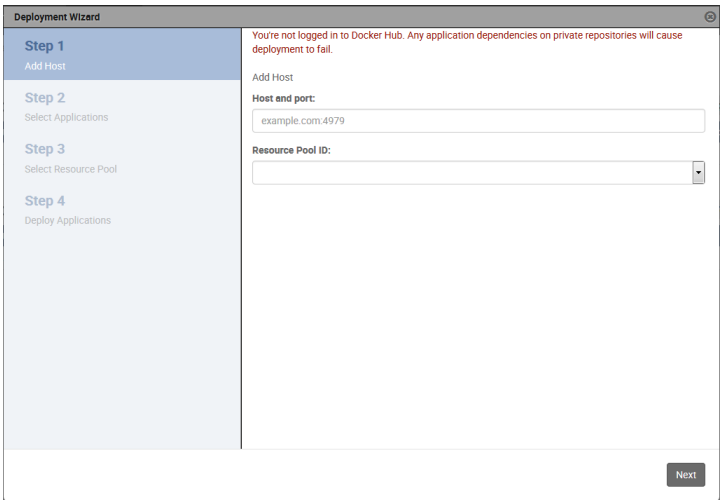
Perform this procedure after enabling client access.

1 Log in to the Control Center web interface.

For example, if the master host is `mypc`, then the address of the Control Center web interface is `https://mypc`.

Note Access to this interface is restricted to users with accounts on the Control Center master host.

The **Deployment Wizard** displays on initial login.



2 Add a host to the `default` resource pool.

For this step, the host to add is the Control Center master host. Add resource pool hosts after completing the Deployment Wizard, if desired.

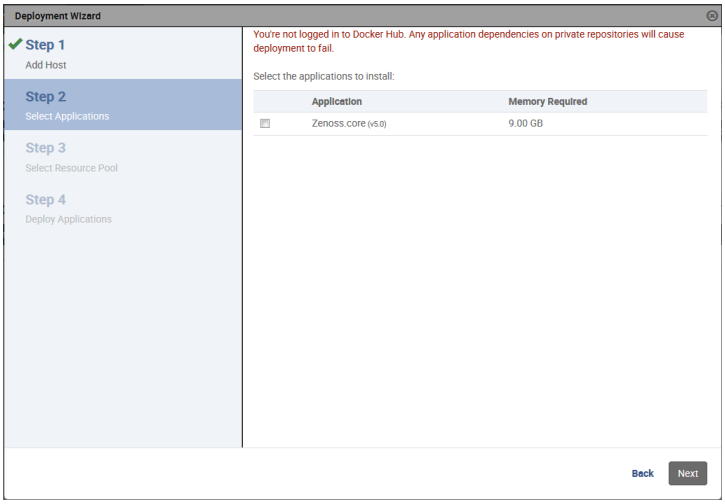
a In the **Host and Port** field, enter the hostname or IP address of the Control Center master host, followed by a colon character (`:`), and then `4979`.

- If you enter a hostname, all hosts in your Control Center deployment must be able to resolve the name, either through an entry in `/etc/hosts` or through a nameserver on your network.
- Port 4979 is the default port Control Center uses to communicate among hosts in resource pools.

b In the **Resource Pool ID** field, select `default` from the list, and then click **Next**.

3 Select an application to deploy.

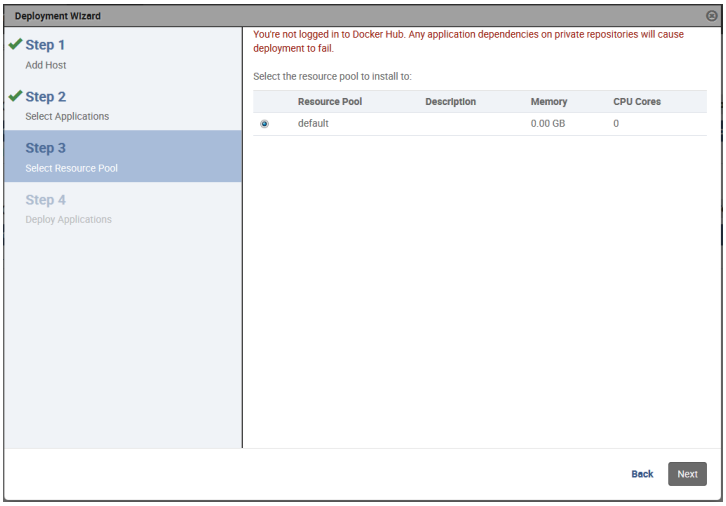
a Mark the `Zenoss.core (v5.0)` checkbox.



b Click **Next**.

4 Select a resource pool for the application.

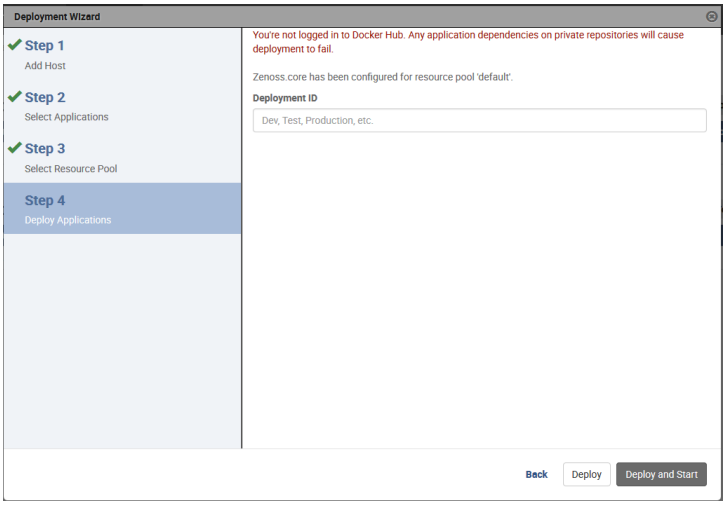
a Select the radio button of the `default` pool.



b Click **Next**.

5 Deploy the application to the resource pool.

a In the **Deployment ID** field, enter an identifier for this deployment of the application.



b Click **Deploy**.

Control Center pulls the application's images from the Zenoss repository at Docker Hub, which takes 20-30 minutes.

c When the **Deployment Wizard** completes, refresh the browser window to update the **Applications** table.

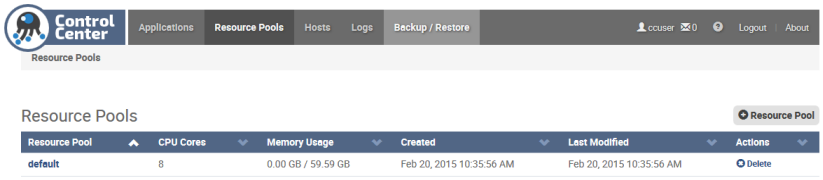
6 Optional: Add hosts to the default resource pool or other resource pools, if desired.

- To add hosts to the default resource pool, see *Adding a host to a resource pool* on page 32.
- To add hosts to other resource pools, see *Creating a resource pool* on page 31.

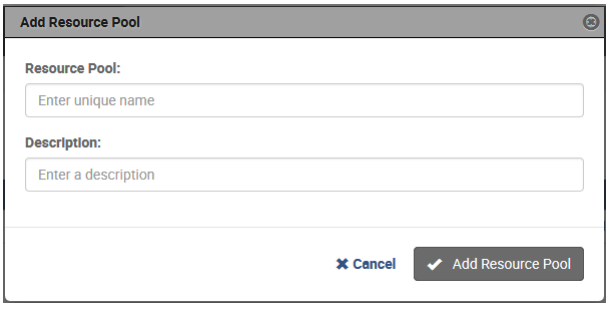
Creating a resource pool

1 Log in to the Control Center web interface.

2 In the Control Center menu bar, click **Resource Pools**.



3 On the **Resource Pools** page, click the **+Resource Pool** button, located at the right side of the page.



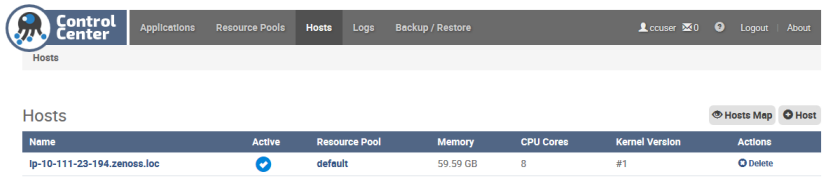
4 In the **Resource Pool** field of the **Add Resource Pool** dialog, enter a name for the new resource pool.

5 Optional: In the **Description** field, enter a brief description of the purpose of the new resource pool, and then click **Add Resource Pool**.

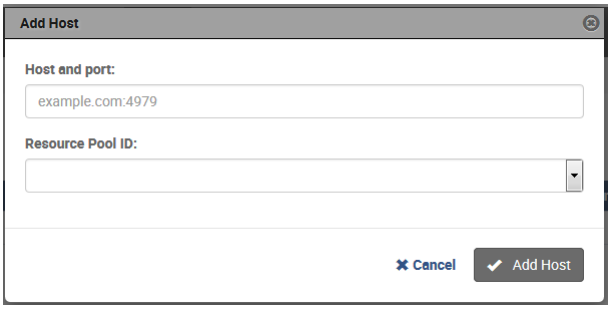
To add hosts to the new resource pool, see *Adding a host to a resource pool* on page 32.

Adding a host to a resource pool

1 Log in to the Control Center web interface.
2 In the Control Center menu bar, click **Hosts**.



3 On the **Hosts** page, click the **+Host** button, located at the right side of the page.



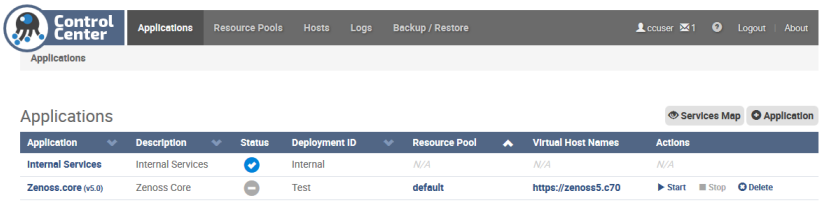
4 In the **Host and Port** field of the **Add Host** dialog, enter the hostname or IP address of a Control Center resource pool host, followed by a colon character (`:`), and then `4979`.
5 In the **Resource Pool ID** field, select a resource pool from the list, and then click **Add Host**.

Changing default passwords

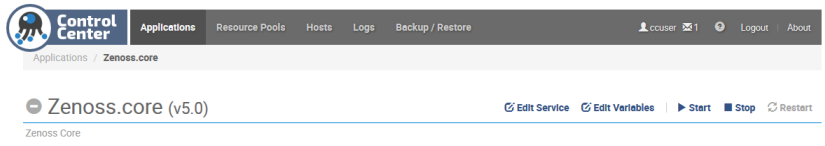
Zenoss Core includes several services with independent authentication systems, each of which have default passwords defined by Zenoss. This procedure describes how to gain access to passwords and other global application variables.

Note You may change any default password. However, Zenoss recommends not changing account names.

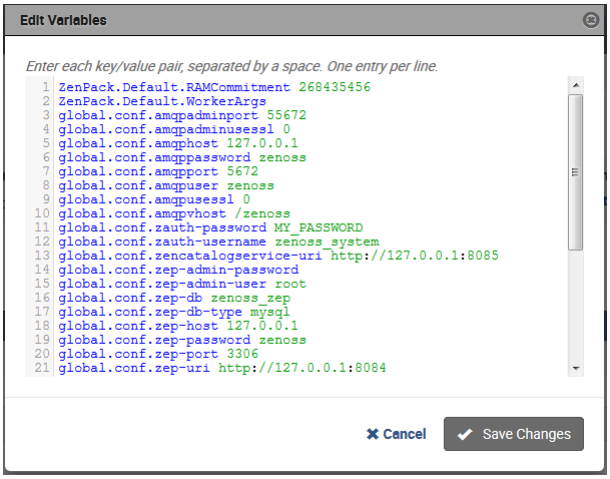
1 Log in to the Control Center web interface.



2 In the **Application** column of the **Applications** table, click the application name (**Zenoss.core**).



3 In the application title line, click **Edit Variables**.



4 Change the default password of the RabbitMQ service.
   a In the **Edit Variables** dialog, locate the `global.conf.amqppassword` variable.
   b Replace the default value, `zenoss`, with a new password.
5 Change the default password of the Zenoss authentication proxy.
   a In the **Edit Variables** dialog, locate the `global.conf.zauth-password` variable.
   b Replace the default value, `MY_PASSWORD`, with a new password.
6 Edit other passwords as desired, and then click **Save Changes**.

Enabling access to application-level services

Control Center proxies the IP addresses of the services it manages, and the addresses can change during normal operations. To facilitate access, Control Center provides virtual host aliases for Zenoss Core, HBase, OpenTSDB, and RabbitMQ.

Note For each virtual host alias in the following table, substitute the hostname of your Control Center master host for *Master*.

Virtual host alias	Application	Description
`https://zenoss5.`*`Master`*	Zenoss Core	The browser interface of Zenoss Core.
`https://hbase.`*`Master`*	Apache HBase	The browser interface of the Apache HBase instance in which OpenTSDB stores device monitoring data.
`https://opentsdb.`*`Master`*	OpenTSDB	The browser interface of the OpenTSDB database which Zenoss Core uses to manage and manipulate device monitoring data.
`https://rabbitmq.`*`Master`*	RabbitMQ	The administrative interface of the *RabbitMQ* service.

To enable access to application-level services, configure network-wide access, or configure client systems individually.

- To configure network-wide access, ask your network administrator to add the virtual host aliases to a DNS server.

- To configure client systems individually, add the virtual host aliases to the `C:\Windows\System32\drivers\etc\hosts` file (Windows systems) or the `/etc/hosts` file (Linux and OS/X systems).

Note You may create additional virtual host aliases for each of the services identified in the preceding table. For more information, see *Creating virtual host aliases* on page 34.

Virtual host alias name resolution

The following line shows the syntax of the entry to add to a DNS server or to a client system's name resolution file.

```
IP-Address Host.Domain Host zenoss5.Host hbase.Host opentsdb.Host
 rabbitmq.Host
```

The following entry is for a master host at IP address `192.0.2.12`, named `cc`, in the `big.io` domain.

```
192.0.2.12 cc.big.io cc zenoss5.cc hbase.cc opentsdb.cc rabbitmq.cc
```

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. From the **Start** menu, highlight **All Programs > Accessories > Notepad**.
3. Right click, and then select **Run as administrator**.
4. From the Notepad **File** menu, select **Open**.
5. In the **File name** field of the **Open** window, enter `C:\Windows\System32\drivers\etc\hosts`.
6. Add the name resolution entry for your Control Center master host to the end of the file.
   For example, the following entry is for a master host at IP address `192.0.2.12`, named `cc`, in the `big.io` domain.

   ```
   192.0.2.12 cc.big.io cc zenoss5.cc hbase.cc opentsdb.cc rabbitmq.cc
   ```
7. Save the file, and then exit Notepad.

Configuring name resolution on a Linux or OS/X system

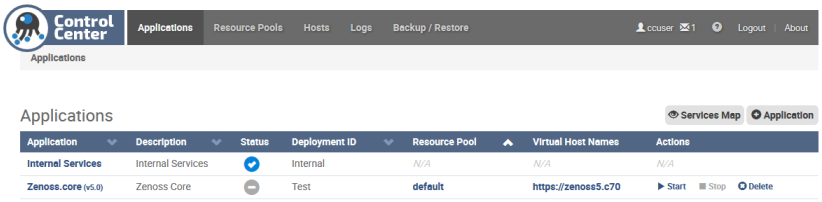
To perform this procedure, you need superuser privileges on the client system.

1. Log in to the client system as `root` or as a user with `sudo` privileges.
2. Add the name resolution entry for your Control Center master host to the end of the file.
   For example, the following entry is for a master host at IP address `192.0.2.12`, named `cc`, in the `big.io` domain.

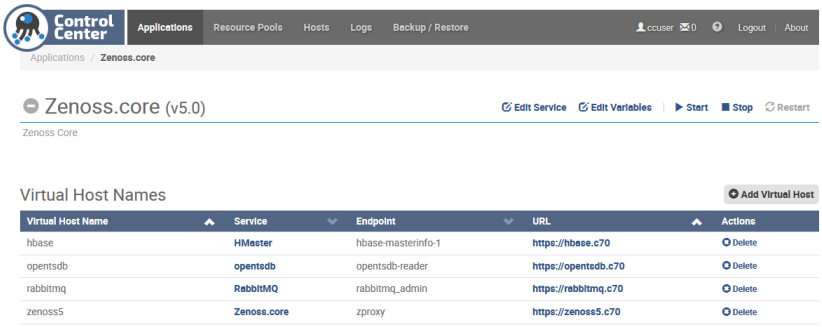
   ```
   192.0.2.12 cc.big.io cc zenoss5.cc hbase.cc opentsdb.cc rabbitmq.cc
   ```
3. Save the file, and then close the editor.

Creating virtual host aliases

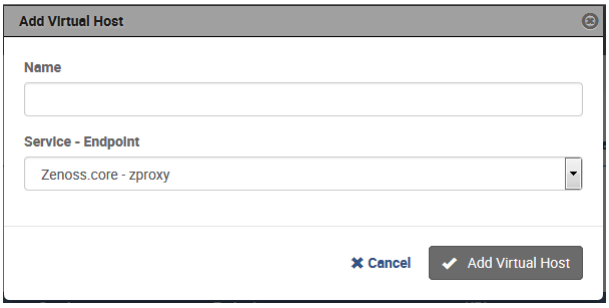
1. Log in to the Control Center web interface.



2 In the **Application** column of the **Applications** table, click the application name (**Zenoss.core**).



3 Click the **+ Add Virtual Host** button, located above the **Virtual Hosts** table, on the right side.



4 Define the new virtual host alias.

a In the **Name** field, enter a fully-qualified domain name for the new alias.

b From the **Service - Endpoint** list, select a service to associate with the new alias.

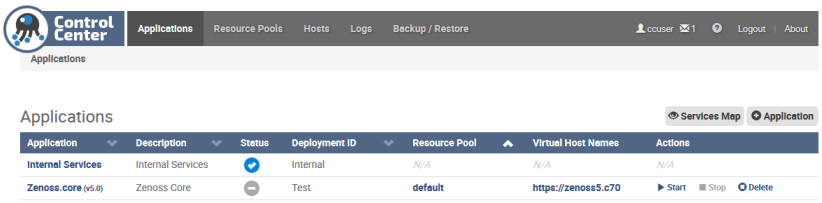
c Click **Add Virtual Host**.

Configuring OpenTSDB compaction

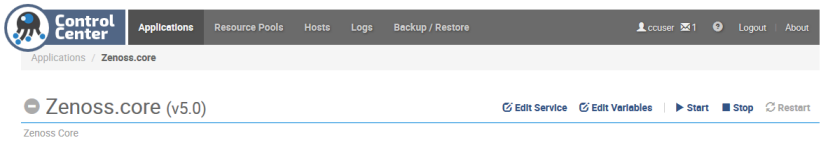
Zenoss Core uses an OpenTSDB database to store the monitoring data it collects. When OpenTSDB compaction is enabled, multiple columns in an HBase row are merged into a single column, to reduce disk space. In testing, Zenoss has observed that the merges result in duplicate data points, so by default, compaction is disabled. Duplicate data points do not affect the integrity of the data.

Perform this procedure to enable OpenTSDB compaction.

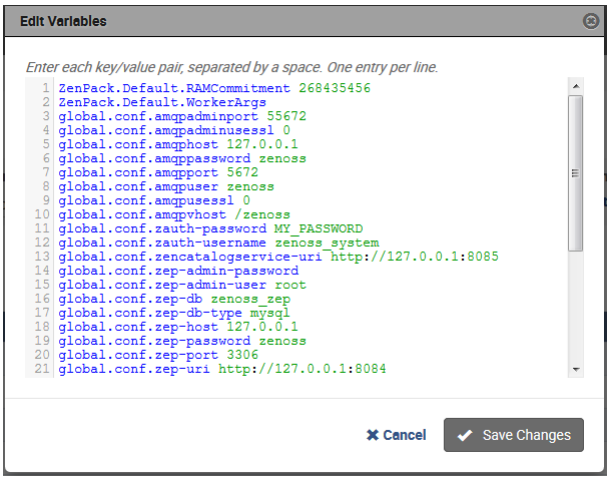
1 Log in to the Control Center web interface.



2 In the **Application** column of the **Applications** table, click the application name (**Zenoss.core**).



3 In the application title line, click **Edit Variables**.



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**.

Installing the Quilt package

Perform this procedure to install the Quilt patch management system into a Zenoss Core image.

1 Log in to the Control Center master host as a user with `serviced` CLI privileges.
2 Copy the following script and paste it into a file (in this example, `quilt.txt`) on the master host.

```
DESCRIPTION quilt.txt -- add Quilt to a Zenoss image
VERSION zenoss-quilt-1.0
REQUIRE_SVC
SNAPSHOT

# Download the EPEL RPM
SVC_EXEC COMMIT Zenoss.resmgr yum install -y epel-release
# Download repository metadata
SVC_EXEC COMMIT Zenoss.resmgr yum makecache -y
# Install quilt
SVC_EXEC COMMIT Zenoss.resmgr yum install -y quilt
# Remove EPEL
```

```
SVC_EXEC COMMIT Zenoss.resmgr yum erase -y epel-release
# Clean up yum caches
SVC_EXEC COMMIT Zenoss.resmgr yum clean all
```

3 Verify the syntax of the script file.

```
serviced script parse quilt.txt
```

- If the preceding command returns no result, proceed to the next step.
- If the preceding command returns an error, correct the error and parse the file again.

4 Install the Quilt package.

```
serviced script run quilt.txt --service Zenoss.core
```

Installing the Percona Toolkit

The *Percona Toolkit* is a collection of helpful utilities for MySQL and MariaDB databases. It uses the GNU GPL v2 license, so Zenoss can not distribute it. All installations of Zenoss Core should install this package.

1 Log in to the Control Center master host as a user with `serviced` CLI privileges.
2 Install the package.

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

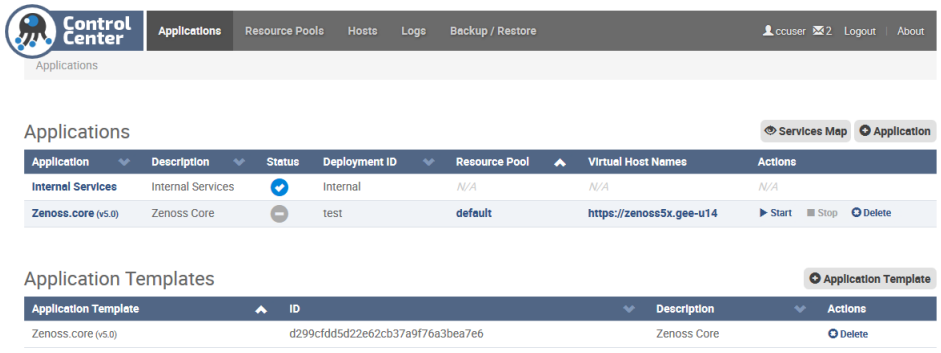
At the end of the installation process, the message `Container not commited` is displayed. This is normal. The tools are installed in the distributed file system, not in an image.

Starting the Zenoss Core application

To perform this procedure, you need a user account that is a member of the Control Center administrative group on the master host.

1 Log in to the Control Center browser interface.

CLI equivalent: Log in to the Control Center master host as a user with `serviced` CLI privileges.



2 In the **Actions** column of the **Applications** table, click the **Start** control.

CLI equivalent:

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

3 Optional: To monitor the startup process, click the application's name in the **Application** column, and then scroll down the page.

CLI equivalent:

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

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
```

Configuring periodic maintenance

Zenoss recommends performing weekly maintenance of Btrfs file systems. The following example script, `/etc/cron.weekly/zenoss-master-btrfs`, is for the Control Center master host.

```
DOCKER_PARTITION=/var/lib/docker
btrfs balance start ${DOCKER_PARTITION} \
  && btrfs scrub start ${DOCKER_PARTITION}

DATA_PARTITION=/opt/serviced/var/volumes
btrfs balance start ${DATA_PARTITION} \
  && btrfs scrub start ${DATA_PARTITION}
```

The Btrfs file systems on resource pool hosts also need weekly maintenance. The following example script, `/etc/cron.weekly/zenoss-pool-btrfs`, is for Control Center resource pool hosts.

```
DOCKER_PARTITION=/var/lib/docker
btrfs balance start ${DOCKER_PARTITION} \
  && btrfs scrub start ${DOCKER_PARTITION}
```

Note

- The paths of the Docker and data partitions in the preceding scripts may not match your envionment.
- When you install a script in `/etc/cron.weekly`, remember to make the file executable (`chmod +x` *`Script-File`*).

Stopping Control Center and applications

To perform this procedure, you need a user account on the Control Center master host with `serviced` CLI privileges.

Control Center is a distributed system that relies on the system clock (and NTP) to coordinate application services. Consequently, pausing or stopping the Control Center master host operating system can leave Control Center in an unknown state, which requires manual intervention to undo. If your Control Center master host is managed by another application, Zenoss strongly recommends following the procedure in this section to stop Control Center, before pausing or stopping the master host.

1. Log in to the Control Center master host as a user with `serviced` CLI privileges.
2. Stop applications.
   For example, to stop Zenoss Core, enter the following command:

   ```
   sudo serviced service stop Zenoss.core
   ```

   To monitor the stop, enter the following command:

   ```
   sudo serviced service status Zenoss.core
   ```
3. Stop Control Center.
   - RHEL/CentOS hosts: `systemctl stop serviced`
   - Ubuntu hosts: `sudo stop serviced`

The Control Center master host operating system may be paused, stopped, or restarted.

Upgrading your system A

This appendix describes how to upgrade Control Center and Zenoss Core.

Zenoss periodically updates applications to provide product fixes and enhancements. Based on the product release schedule of each application, you may need to upgrade the Control Center alone, or the Control Center and one or more applications.

Note Before you upgrade your system, always refer to the release notes for the latest version and upgrade information.

Upgrade script

Zenoss provides an upgrade script for Zenoss Core named *version*`-upgrade-core.txt`, where *version* is the version that you are upgrading to. For example, if you are upgrading to version 5.0.*x*, the file name would be `5.0.x-upgrade-core.txt`.

The upgrade script performs the underlying tasks required to upgrade the application binary and is provided as part of the new application images. When you pull the new Zenoss Core image from Docker hub, the script is automatically extracted and placed in the `root` directory of the master host.

The upgrade script performs the following actions:

- Pulls the latest application images from Docker hub.

  Note If maintenance downtime is an issue for your environment, you can perform this step manually to reduce the downtime window. For more information, see *Optional: Reducing the downtime maintenance window* on page 42.

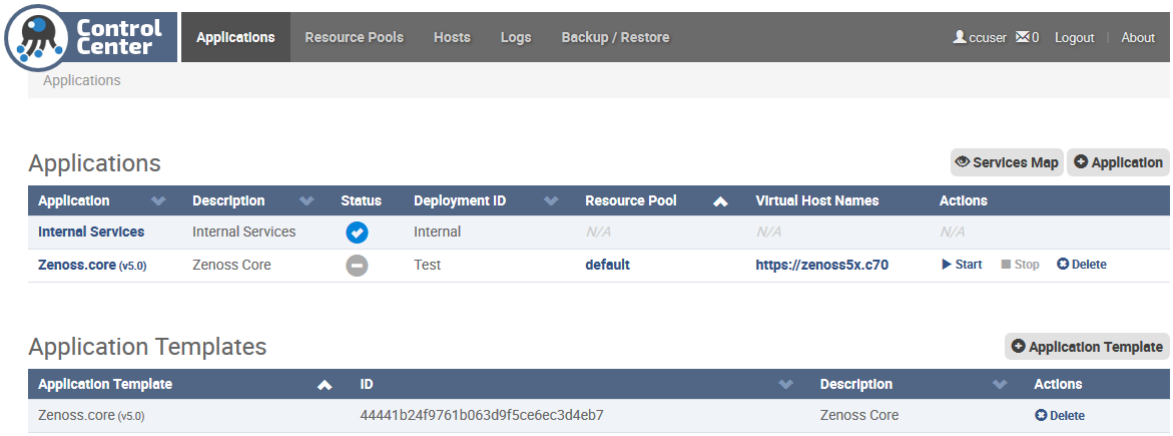
- Preserves your custom data on the DFS.
- Re-installs all currently installed Zenpacks.
- Checks your deployment for any removed files, and if necessary, removes the corresponding file in the upgraded application.
- Checks for any locally installed patches and re-installs them.

Upgrading Control Center

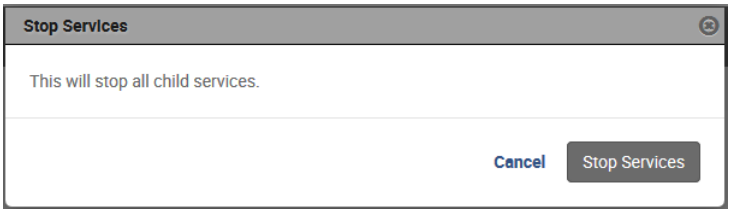
This procedure describes how to upgrade Control Center (`serviced`).

To upgrade Control Center (`serviced`), you will use the web interface to stop all applications that are currently running. Then depending on your operating system environment, you will either use `yum` or `apt-get` to install the latest package from the Zenoss `apt` or `yum` repository to the master host. Once the package is installed, you will open Control Center and restart the stopped applications.

1 Log in to the Control Center web interface.
2 In the **Applications** table, identify the name of the Zenoss Core instance.
3 Stop the instance, and wait until all subservices are stopped.
   a In the **Actions** column of the **Applications** table, click **Stop**.



   b In the **Stop Services** dialog, click **Stop Services**.



   c Display the child services of Zenoss Core.

   In the **Application** column of the **Applications** table, click Zenoss Core, and then scroll down to the **Services** table. Stopped services have a grey circle icon in the **Status** column. Do not proceed until all services are stopped.

4 Log in to the Control Center master host as a user with `sudo` privileges and install the latest Control Center (`serviced`) package.

   - RHEL:

```
sudo yum --enablerepo=zenoss-stable install -y serviced-1.0.*
```

   - Ubuntu:

```
sudo apt-get update && sudo apt-get install -y serviced=1.0.*
```

   The Control Center web interface and `serviced` binary are updated.

5 If you are upgrading another application, refer to the upgrade steps for that product. Otherwise, open the Control Center web interface, click **Start** in the **Actions** column of the **Applications** table to restart Zenoss Core.

Upgrading Zenoss Core

This section contains the steps to upgrade the Zenoss Core application.

Optional: Reducing the downtime maintenance window

To minimize downtown and verify that you have adequate disk space, you can `pull` the required images manually, prior to your planned maintenance window. If you choose not to pull the images manually, the upgrade script performs these actions for you.

Note The examples in this procedure use the variable *[x]* to represent the micro version number of this release. When entering a command, replace the variable with the latest micro version number. If you do not know the the micro version number, refer to the release notes.

1. Log in to the master host as a user with `serviced` privileges.
2. Pull the most recent Zenoss Core image to the local master and copy the the upgrade script to the root directory.

```
sudo docker run -it --rm -v /root:/mnt/root /
  zenoss/core_5.0:5.0.[x] \
  rsync -a /root/5.0.x /mnt/root
```

   The Zenoss Core pull takes approximately 10 - 20 minutes.
3. Search the Zenoss Core image for the name and version of the Hbase image.

```
image=$(sudo awk '/SVC_USE.*hbase/{print $NF}' \
  /root/5.0.x/5.0.[x]-upgrade-core.txt; echo $image
```

   The returned value is `zenoss/hbase:v6`.
4. Pull the Hbase image.

```
sudo docker pull $image
```

   The HBase `pull` takes approximately 5 - 10 minutes.
5. Search the Zenoss Core image for the name and version of the OpenTSDB image.

```
image=$(sudo awk '/SVC_USE.*opentsdb/{print $NF}' \
  /root/5.0.x/5.0.[x]-upgrade-core.txt; echo $image
```

   The returned value is `zenoss/opentsdb:v14`.
6. Pull the OpenTSDB image:

```
sudo docker pull $image
```

   The OpenTSDB `pull` takes approximately 5 - 10 minutes.
7. Synchronize the image with the local `serviced` registry:

```
serviced docker sync
```

   The sync for Zenoss Core takes approximately 5 minutes, Hbase takes approximately 5 minutes and OpenTSDB takes approximately 8 minutes.

Upgrading the Zenoss Core application

This procedure describes how to upgrade Zenoss Core to 5.0.x.

Note The examples in this procedure use the variable *[x]* to represent the micro version number of this release. When entering a command, replace the variable with the latest micro version number. If you do not know the the micro version number, refer to the release notes.

1. If Zenoss Core is currently running, log in to the Control Center web interface and click **Stop** in the **Actions** column of the **Applications** table.
2. Display the child services of Zenoss Core.

   In the **Application** column of the **Applications** table, click Zenoss Core, and then scroll down to the **Services** table. Stopped services have a grey circle icon in the **Status** column. Do not to proceed until all services are stopped.
3. Log in to the Control Center master host as a user with `serviced` privileges.
4. Pull the most recent Zenoss Core images to the local master and copy the upgrade script to the `root` directory.

   ```
   sudo docker run -it  --rm -v \
     /root:/mnt/root zenoss/core_5.0:5.0.[x] \
     rsync -a /root/5.0.x /mnt/root
   ```

   The Zenoss Core `pull` takes approximately 10 - 20 minutes.
5. Run the upgrade script.

   ```
   serviced script run /root/5.0.x/5.0.[x]-upgrade-core.txt \
     --service  Zenoss.core
   ```

   The Zenoss Core application is upgraded and your custom data is preserved.
6. Log in to the Control Center web interface and click **Start** in the **Actions** column of the **Applications** table to start Zenoss Core.

Mirroring repositories

B

The procedure in this section enable installing Control Center and Zenoss Core on hosts that do not have an internet connection.

Mirroring the Zenoss Docker Hub repository

You may use a transfer host with synchronous access to both the internet and the Control Center master host to mirror the Zenoss Docker Hub repository.

To perform this procedure:

- A Control Center master host must be installed and running in your environment.
- A separate, transfer host must have simultaneous network access to the internet and to the Control Center master host.
- The transfer host must implement the 64-bit version of the x86 instruction set.
- The transfer host and the master host must be able to resolve each other's fully-qualified domain names (FQDN).

Preparing a transfer host

This procedure is written for the `bash` shell on Ubuntu 14.04 LTS Linux hosts.

1. Log in to the transfer host as `root` or as a user with `sudo` privileges.
2. Verify that the host implements the 64-bit version of the x86 instruction set.

```
uname -m
```

   - If the output is `x86_64`, the architecture is 64-bit. Proceed to the next step
   - If the output is `i386/i486/i586/i686`, the architecture is 32-bit. Stop this procedure and select a different host.
3. Install *Docker*.

```
sudo sh -c 'echo "deb http://get.docker.com/ubuntu docker main" \
  > /etc/apt/sources.list.d/docker.list'
sudo apt-key adv --keyserver hkp://keyserver.ubuntu.com:80 \
  --recv-keys 36A1D7869245C8950F966E92D8576A8BA88D21E9
sudo apt-get update
sudo apt-get install -y lxc-docker-1.5.0
```

4 Add the current user account to the `docker` group.

```
sudo usermod -aG docker $USER
```

5 Determine the installed version of Python.

```
python --version
```

The required minimum version for this procedure is 2.7, which is included in Ubuntu 14.04 by default.

6 Download the mirror script from the Control Center master host.

```
curl -k -O https://Master-Host-FQDN/static/scripts/template-mirror.py
```

7 Add execute permission to the mirror script.

```
chmod +x template-mirror.py
```

8 Reboot the host.

```
sudo reboot
```

Mirroring with synchronous internet and master host access

1 Log in to the transfer host as a user with `sudo` and `docker` privileges.
2 Copy the service definition template file from the Control Center master host to the transfer host.

```
scp Master-Host-FQDN:/opt/serviced/templates/Template.json .
```

3 Invoke the mirror script.

```
./template-mirror.py ./Template.json Master-Host-FQDN:5000 \
  ./Template_Master-Host-FQDN.json
```

The mirror script

1 pulls the Docker images listed in the original template into a Docker index on the transfer host
2 pushes the images in the local index to the Docker registry on the Control Center master host
3 tags the images on the master host with the FQDN of the master host
4 creates a new template, referencing the new image tags

4 Copy the new template to the master host.

```
scp ./Template_Master-Host-FQDN.json \
  Master-Host-FQDN:/opt/serviced/templates
```

5 Log in to the Control Center master host as a user with `sudo` and `docker` privileges.
6 Remove the template added when `serviced` was installed.

```
ID=$(serviced template list | tail -1 | awk '{ print $1 }'); echo $ID
serviced template remove $ID
```

7 Add the new template to Control Center.

```
serviced template add \
  /opt/serviced/templates/Template_Master-Host-FQDN.json
```

This step makes the new template available for deployment in the Control Center web interface.