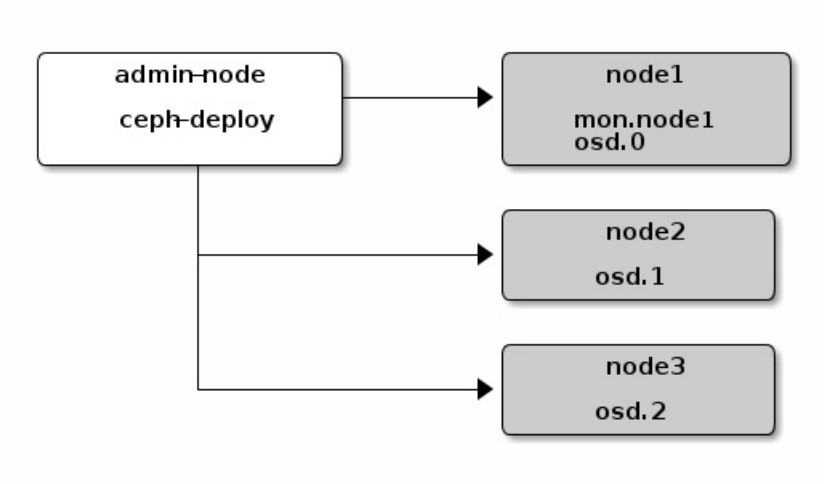
PREFLIGHT CHECKLIST

The ceph-deploy tool operates out of a directory on an admin node. Any host with network connectivity and a modern python environment and ssh (such as Linux) should work.

In the descriptions below, Node refers to a single machine.



CEPH-DEPLOY SETUP

Add Ceph repositories to the ceph-deploy admin node. Then, install ceph-deploy.

DEBIAN/UBUNTU

For Debian and Ubuntu distributions, perform the following steps:

1. Add the release key:

```
wget -q -O- 'https://download.ceph.com/keys/release.asc' | sudo apt-key add -
```

2. Add the Ceph packages to your repository:

```
echo deb https://download.ceph.com/debian/ $(lsb_release -sc) main | sudo tee /etc/apt/sc
```

   The above URL contains the latest stable release of Ceph. If you would like to select a specific release, use the command below and replace {ceph-stable-release} with a stable Ceph release (e.g., luminous.) For example:

```
echo deb https://download.ceph.com/debian-{ceph-stable-release}/ $(lsb_release -sc) main
```

3. Update your repository and install ceph-deploy:

```
sudo apt update
sudo apt install ceph-deploy
```

Note: You can also use the EU mirror eu.ceph.com for downloading your packages by replacing https://ceph.com/ by http://eu.ceph.com/

RHEL/CENTOS

For CentOS 7, perform the following steps:

1. On Red Hat Enterprise Linux 7, register the target machine with `subscription-manager`, verify your subscriptions, and enable the “Extras” repository for package dependencies. For example:

```
sudo subscription-manager repos --enable=rhel-7-server-extras-rpms
```

2. Install and enable the Extra Packages for Enterprise Linux (EPEL) repository:

```
sudo yum install -y https://dl.fedoraproject.org/pub/epel/epel-release-latest-7.noarch.rp
```

   Please see the EPEL wiki page for more information.

3. Add the Ceph repository to your yum configuration file at `/etc/yum.repos.d/ceph.repo` with the following command:

```
cat >/etc/yum.repos.d/ceph.repo
[ceph-noarch]
name=Ceph noarch packages
baseurl=https://download.ceph.com/rpm/el7/noarch
enabled=1
gpgcheck=1
type=rpm-md
gpgkey=https://download.ceph.com/keys/release.asc
```

   and then this *Control-D*. This will use the latest stable Ceph release. If you would like to install a different release, replace `https://download.ceph.com/rpm/el7/noarch` with `https://download.ceph.com/rpm-{ceph-release}/el7/noarch` where `{ceph-release}` is a release name like `luminous`.

4. Update your repository and install `ceph-deploy`:

```
sudo yum update
sudo yum install ceph-deploy
```

Note: You can also use the EU mirror eu.ceph.com for downloading your packages by replacing `https://ceph.com/` by `http://eu.ceph.com/`

OPENSUSE

The Ceph project does not currently publish release RPMs for openSUSE, but a stable version of Ceph is included in the default update repository, so installing it is just a matter of:

```
sudo zypper install ceph
sudo zypper install ceph-deploy
```

If the distro version is out-of-date, open a bug at https://bugzilla.opensuse.org/index.cgi and possibly try your luck with one of the following repositories:

1. Hammer:

```
https://software.opensuse.org/download.html?project=filesystems%3Aceph%3Ahammer&package=c
```

2. Jewel:

```
https://software.opensuse.org/download.html?project=filesystems%3Aceph%3Ajewel&package=ce
```

CEPH NODE SETUP

The admin node must have password-less SSH access to Ceph nodes. When ceph-deploy logs in to a Ceph node as a user, that particular user must have passwordless sudo privileges.

INSTALL NTP

We recommend installing NTP on Ceph nodes (especially on Ceph Monitor nodes) to prevent issues arising from clock drift. See Clock for details.

On CentOS / RHEL, execute:

```
sudo yum install ntp ntpdate ntp-doc
```

On Debian / Ubuntu, execute:

```
sudo apt install ntp
```

Ensure that you enable the NTP service. Ensure that each Ceph Node uses the same NTP time server. See NTP for details.

INSTALL SSH SERVER

For **ALL** Ceph Nodes perform the following steps:

1. Install an SSH server (if necessary) on each Ceph Node:

   ```
   sudo apt install openssh-server
   ```

   or:

   ```
   sudo yum install openssh-server
   ```

2. Ensure the SSH server is running on **ALL** Ceph Nodes.

CREATE A CEPH DEPLOY USER

The `ceph-deploy` utility must login to a Ceph node as a user that has passwordless sudo privileges, because it needs to install software and configuration files without prompting for passwords.

Recent versions of `ceph-deploy` support a `--username` option so you can specify any user that has password-less sudo (including `root`, although this is **NOT** recommended). To use `ceph-deploy --username {username}`, the user you specify must have password-less SSH access to the Ceph node, as `ceph-deploy` will not prompt you for a password.

We recommend creating a specific user for `ceph-deploy` on **ALL** Ceph nodes in the cluster. Please do **NOT** use “ceph” as the user name. A uniform user name across the cluster may improve ease of use (not required), but you should avoid obvious user names, because hackers typically use them with brute force hacks (e.g., `root`, `admin`, `{productname}`). The following procedure, substituting `{username}` for the user name you define, describes how to create a user with passwordless sudo.

Note: Starting with the Infernalis release the “ceph” user name is reserved for the Ceph daemons. If the “ceph” user already exists on the Ceph nodes, removing the user must be done before attempting an upgrade.

1. Create a new user on each Ceph Node.

   ```
   ssh user@ceph-server
   sudo useradd -d /home/{username} -m {username}
   sudo passwd {username}
   ```

2. For the new user you added to each Ceph node, ensure that the user has sudo privileges.

   ```
   echo "{username} ALL = (root) NOPASSWD:ALL" | sudo tee /etc/sudoers.d/{username}
   ```

```
sudo chmod 0440 /etc/sudoers.d/{username}
```

ENABLE PASSWORD-LESS SSH

Since `ceph-deploy` will not prompt for a password, you must generate SSH keys on the admin node and distribute the public key to each Ceph node. `ceph-deploy` will attempt to generate the SSH keys for initial monitors.

1. Generate the SSH keys, but do not use `sudo` or the `root` user. Leave the passphrase empty:

```
ssh-keygen

Generating public/private key pair.
Enter file in which to save the key (/ceph-admin/.ssh/id_rsa):
Enter passphrase (empty for no passphrase):
Enter same passphrase again:
Your identification has been saved in /ceph-admin/.ssh/id_rsa.
Your public key has been saved in /ceph-admin/.ssh/id_rsa.pub.
```

2. Copy the key to each Ceph Node, replacing `{username}` with the user name you created with Create a Ceph Deploy User.

```
ssh-copy-id {username}@node1
ssh-copy-id {username}@node2
ssh-copy-id {username}@node3
```

3. (Recommended) Modify the `~/.ssh/config` file of your `ceph-deploy` admin node so that `ceph-deploy` can log in to Ceph nodes as the user you created without requiring you to specify `--username {username}` each time you execute `ceph-deploy`. This has the added benefit of streamlining `ssh` and `scp` usage. Replace `{username}` with the user name you created:

```
Host node1
   Hostname node1
   User {username}
Host node2
   Hostname node2
   User {username}
Host node3
   Hostname node3
   User {username}
```

ENABLE NETWORKING ON BOOTUP

Ceph OSDs peer with each other and report to Ceph Monitors over the network. If networking is `off` by default, the Ceph cluster cannot come online during bootup until you enable networking.

The default configuration on some distributions (e.g., CentOS) has the networking interface(s) off by default. Ensure that, during boot up, your network interface(s) turn(s) on so that your Ceph daemons can communicate over the network. For example, on Red Hat and CentOS, navigate to `/etc/sysconfig/network-scripts` and ensure that the `ifcfg-{iface}` file has `ONBOOT` set to `yes`.

ENSURE CONNECTIVITY

Ensure connectivity using `ping` with short hostnames (`hostname -s`). Address hostname resolution issues as necessary.

> **Note:** Hostnames should resolve to a network IP address, not to the loopback IP address (e.g., hostnames should resolve to an IP address other than `127.0.0.1`). If you use your admin node as a Ceph node, you should also ensure that it resolves to its hostname and IP address (i.e., not its loopback IP address).

OPEN REQUIRED PORTS

Ceph Monitors communicate using port `6789` by default. Ceph OSDs communicate in a port range of `6800:7300` by default. See the Network Configuration Reference for details. Ceph OSDs can use multiple network connections to communicate with

clients, monitors, other OSDs for replication, and other OSDs for heartbeats.

On some distributions (e.g., RHEL), the default firewall configuration is fairly strict. You may need to adjust your firewall settings allow inbound requests so that clients in your network can communicate with daemons on your Ceph nodes.

For `firewalld` on RHEL 7, add the `ceph-mon` service for Ceph Monitor nodes and the `ceph` service for Ceph OSDs and MDSs to the public zone and ensure that you make the settings permanent so that they are enabled on reboot.

For example, on monitors:

```
sudo firewall-cmd --zone=public --add-service=ceph-mon --permanent
```

and on OSDs and MDSs:

```
sudo firewall-cmd --zone=public --add-service=ceph --permanent
```

Once you have finished configuring firewalld with the `--permanent` flag, you can make the changes live immediately without rebooting:

```
sudo firewall-cmd --reload
```

For `iptables`, add port `6789` for Ceph Monitors and ports `6800:7300` for Ceph OSDs. For example:

```
sudo iptables -A INPUT -i {iface} -p tcp -s {ip-address}/{netmask} --dport 6789 -j ACCEPT
```

Once you have finished configuring `iptables`, ensure that you make the changes persistent on each node so that they will be in effect when your nodes reboot. For example:

```
/sbin/service iptables save
```

TTY

On CentOS and RHEL, you may receive an error while trying to execute `ceph-deploy` commands. If `requiretty` is set by default on your Ceph nodes, disable it by executing `sudo visudo` and locate the `Defaults requiretty` setting. Change it to `Defaults:ceph !requiretty` or comment it out to ensure that `ceph-deploy` can connect using the user you created with Create a Ceph Deploy User.

Note: If editing, `/etc/sudoers`, ensure that you use `sudo visudo` rather than a text editor.

SELINUX

On CentOS and RHEL, SELinux is set to `Enforcing` by default. To streamline your installation, we recommend setting SELinux to `Permissive` or disabling it entirely and ensuring that your installation and cluster are working properly before hardening your configuration. To set SELinux to `Permissive`, execute the following:

```
sudo setenforce 0
```

To configure SELinux persistently (recommended if SELinux is an issue), modify the configuration file at `/etc/selinux/config`.

PRIORITIES/PREFERENCES

Ensure that your package manager has priority/preferences packages installed and enabled. On CentOS, you may need to install EPEL. On RHEL, you may need to enable optional repositories.

```
sudo yum install yum-plugin-priorities
```

For example, on RHEL 7 server, execute the following to install `yum-plugin-priorities` and enable the `rhel-7-server-optional-rpms` repository:

```
sudo yum install yum-plugin-priorities --enablerepo=rhel-7-server-optional-rpms
```

SUMMARY

This completes the Quick Start Preflight. Proceed to the Storage Cluster Quick Start.