Ethan Nuessle
nuesse@rpi.edu
Main Repo: https://github.com/ceph/ceph

Setting up a Development Environment

In order to compile and run the code, you need to get set up with an environment that Ceph can run on. You can either do this through your local machine, or through a vpn.

VPN

Depending on whether you are working through a Mac or Linux (or WSL) system, you will need to either use Tunnelblick (Mac) or OpenVPN (Linux). The basic guide to work with VPN on Ceph is here:

https://wiki.sepia.ceph.com/doku.php?id=vpnaccess#mac_os_x

For all systems, the basic flow is,
1. Create an account on the Ceph tracker site.
2. Generate a public SSH Key
3. Set up VPN and copy the VPN credentials (these are only generated once, so make sure to copy and save them somewhere)
4. Do a post on the Ceph tracker site (if this is for RCOS, you should have been linked to a special RCOS thread). Include your desired username, email, public SSH Key, and VPN Credentials.

Local Machine

In order to run the code locally, you need a Linux system, or a Linux virtual machine of some kind. Docker and WSL are common choices if you don't have Linux. Ceph supports many different Linux distros, but the main one I would recommend, and that I know works well, is Ubuntu 22.04 (Jammy Jellyfish). If you are running Ubuntu and it is running into compilation errors, check to make sure it is some version of Jammy Jellyfish. (This may become outdated as Ceph is currently adding support for newer Ubuntu versions).

Commands to Build

In order to build the project, you will need to clone the repository, and run a few commands to build it. The following commands are in the terminal. Building the repository will likely take a bit more than 16gb, so keep that in mind.

Main Repository (Ceph Stable Branch):

```
git clone https://github.com/ceph.git
cd ceph
./install-deps.sh
./do_cmake,sh -DCMAKE_BUILD_TYPE=RelWithDebInfo
ninja vstart-base cephfs cython_cephfs cython_rbd
```

Forked Repository:

```
git clone https://github.com/ceph.git
cd ceph
git remote add <name of fork> <url to fork>
git fetch <name of fork>
git checkout -track <name of fork>/<name of branch>
git pull <name of fork> <name of branch> --rebase
./install-deps.sh
./do_cmake,sh -DCMAKE_BUILD_TYPE=RelWithDebInfo
ninja vstart-base cephfs cython_cephfs cython_rbd
```

Notes:

If you want it to compile a bit quicker and likely take up (a bit) less space, you can replace the clone command with

```
git clone https://github.com/ceph.git --depth 1
```

, this makes it clone a bit less, but has some potential to run into issues in niche cases.
It is recommended to try this first, and if issues come up, you can try again without the depth modifier.

For cloning a forked repository, you with `<name of fork>` and `<url to fork>`, you can follow this format, using this repository fork as an example: https://github.com/enuessle/ceph

```
git clone https://github.com/ceph.git
cd ceph
git remote add enuessle git@github.com:enuessle/ceph.git
git fetch enuessle
git checkout -track enuessle/main
git pull enuessle main --rebase
./install-deps.sh
./do_cmake,sh -DCMAKE_BUILD_TYPE=RelWithDebInfo
ninja vstart-base cephfs cython_cephfs cython_rbd
```

Errors in Building

Building Ceph takes quite a while, around 2 hours to finish on my local machine. There are also many errors that may come up. This is a (non-comprehensive) list of different errors that have come up and ways to fix it and get it to compile and build.

Failed to Recurse into submodule

```
Aborting
fatal: Unable to checkout '59cca28a61ae3154ba1731ca2ee7daa402ec5e2e' in
submodule path 'src/nvmeof/gateway/spdk/xnvme'
fatal: Failed to recurse into submodule path 'src/nvmeof/gateway/spdk'
fatal: Unable to checkout '84714379121c19f89a8145fee179d6388bf74c1e' in
submodule path 'ceph-object-corpus'
fatal: Failed to recurse into submodule path 'src/nvmeof/gateway'
```

This issue occurs with the `./do_cmake,sh -DCMAKE_BUILD_TYPE=RelWithDebInfo` command. It was caused by an issue with installing dependencies.
Possible causes include
- Not running `./install-deps.sh`
- Not letting `./install-deps.sh` complete
- Not running `./install-deps.sh` in the same location you are building the repository

In my case, the root issue was trying to run
`./do_cmake,sh -DCMAKE_BUILD_TYPE=RelWithDebInfo`
on an external drive where `./install-deps.sh` was not able to be completed properly.

Solutions:
- If possible, build Ceph in the original location that you cloned it from.
- If storage is a concern, rerun `./install-deps.sh` in the new location
- If `./install-deps.sh` fails, likely due to a permissions error, then you might be trying to install dependencies on a drive without a supported format. Check your drive format using the `fsck` command. If it is not ext4 (or some other file system that supports Unix File Permissions), then try to either use a different drive that is ext4, or reformat (if possible) to ext4.

In my case this error was solved by using a new flashdrive, formatting it to ext4, and then cloning from the beginning.

Errors during ninja

While running `ninja vstart-base cephfs cython_cephfs cython_rbd` it might run into errors. In my case, it was failing at compiling because of the missing package Boost. Solving this issue just requires reinstalling dependencies, and redoing cmake. If any other issue comes up, solve those first, as those will likely be causing the missing packages. Delete the build directory, and run these commands

```
./install-deps.sh
./do_cmake,sh -DCMAKE_BUILD_TYPE=RelWithDebInfo
ninja vstart-base cephfs cython_cephfs cython_rbd
```

OpenVPN not staying active

This issue is when OpenVpn shuts down (deactivates) a few seconds after starting. If you are running into OpenVPN issues, namely shh hanging, you can check to see if this is the issue by running these commands

```
sudo systemctl restart openvpn@sepia
sudo systemctl enable openvpn@sepia
sudo systemctl status openvpn@sepia
```

If, within a few seconds after running `sudo systemctl enable openvpn@sepia`, `sudo systemctl status openvpn@sepia` shows `Active: inactive (dead)`, then this might be your issue.

Solution:
Uninstall OpenVPN (likely `apt-get remove openvpn`)
Reinstall it
Follow the guide to set up the vpn again, creating new credentials
Repost the credentials on the Ceph Tracker