Cmpe 300: How to setup Open MPI 4.0.2

Utkan Gezer

Here is a guide on getting Open MPI up-and-running on a Windows, macOS, and a Linux distribution. In either case, you will need to download the following at some point: https://download.open-mpi.org/release/open-mpi/v4.0/openmpi-4.0.2.tar.gz

1 Windows

Unfortunately, I was unable to find a way to install the latest Open MPI directly onto Windows. Here are the two ways to proceed. Choose one, and continue:

1. Get the Windows Subsystem for Linux by following the official Microsoft guide:
   https://docs.microsoft.com/en-us/windows/wsl/install-win10
   (a) To open a Linux terminal session, open a command prompt and run the command `bash`.
2. Obtain a Linux virtual machine. One way to do this is as follows:
   (a) You can get the VirtualBox from here: https://www.virtualbox.org/
   (b) You may use the Lubuntu image I had created for Cmpe 250 from here:
   https://drive.google.com/file/d/1NPtm9Vadbj3n0AJVR9078ux8AohIZ3oZ/
   The password for the login is: **cmpe250**

Once you get your Linux on Windows or Linux VM on VirtualBox running, continue from the Linux's section (section 3).

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2 macOS

Open MPI requires a C/C++ compiler. To install those:

1. Launch a terminal session and run the following: `xcode-select --install`
2. Hit the install button (or get Xcode if you like).

After the installation is complete, download Open MPI 4.0.2 from the link at the beginning of this document. Then, continue from section 4.

3 A Linux distribution

Open MPI requires a C/C++ compiler. To install those and more:

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1. Launch a terminal session and run: `sudo apt install gcc g++ wget make`
   Try `apt-get`, if `apt` does not work.
2. Run: `wget <the-url-to-Open-MPI>`
3. Run: `gunzip -c openmpi-4.0.2.tar.gz | tar xf -`
   This extracts the archive.

Then, continue from section 4.

4 The common part

To complete your installation;

1. Open up a terminal session and navigate inside the extracted Open MPI installation folder, called `openmpi-4.0.2` by default.
2. Run: `sudo ./configure --prefix=/usr/local`
3. Once it's done, run: `sudo make all install`

This should complete your installation. Test it by running `mpicc` and `mpirun` without arguments.

4.1 Error while loading `libopen-rte.so`

This is an error I had got while working on Windows and Linux. The solution was to run:

```
sudo ldconfig
```

Source of this solution: https://github.com/horovod/horovod/issues/400

4.2 The common issue

A common issue I've encountered in each system was an error message and consequent failures, when the system is oversubscribed[1].

To resolve those issues, run the following command (as mentioned in the link above) each time you start a new terminal session:

```
export OMPI_MCA_btl=self,tcp
```

You have to do it only once for each terminal session. If you want to do it once and for all, you can put that line into the `.bashrc` file (which runs at the start of all terminal sessions), located in `~/.bashrc`.

Source of this solution: https://github.com/open-mpi/ompi/issues/6518

[1] A word for assigning more processes than the logical processors available on the system.