

TDT4200 - MPI Assignment

Install MPI and run your first parallel program

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1 Introduction

This tutorial is intended as a guidance to how to install MPI and execute your parallel MPI programs.

There are two main implementations of the Message Passing interface (MPI). In this course we are going to use the version called openMPI. To install OpenMPI on Ubuntu and many other Linux distributions, you start off by searching for "install mpi ubuntu" in your browser, or copy the link below;

```
https://researchweb.iiit.ac.in/~abu/\_saad/files/  
Installing\\_MPI.pdf
```

You can either install MPI by following the quick commands section in the installation guide, or install it manually as shown in the section below. Experience have shown that the quick commands often need some extra and tedious work to get hold of all the packages, so we recommend installing it manually as this is the most stable procedure.

2 Manual installation of OpenMPI

We will here show the steps for a manual installation of OpenMPI in the same way as in the installation guide in the link above.

You start by downloading the last version of OpenMPI from the official webpage:

```
http://www.open-mpi.org/software/ompi
```

Here you will find and download the version on *tar.gz*. You can then either extract the files with the command line or manually. If you choose the latter, you can navigate or open the terminal in the extracted directory.

1. Decompress the download file. The * indicate the version number of the installation. The version number is on the form openmpi-x.x.x.tar.gz

```
$ tar -xvf openmpi-*
```

2. Go into the new decompressed directory

```
$ cd openmpi-*
```

3. We then configure the installation file. Note that this process usually takes between 5 and 10 minutes. You also have to add on the prefix the installation directory we want to use for OpenMPI. usually you would want to select the directory `"/home/username/.openmpi"`. On Linux you find the username of your computer in the command line in the terminal on the form: `username@computername:~` \$

```
./configure --prefix="/home/username/.openmpi"
```

4. Now we can finally install OpenMPI. Note that this process takes between 10 and 15 minutes

```
$ make
$ sudo make install
```

5. All that is left is to do include the path to our installation to the path environment and the library to the library environment of our system.

```
$ export PATH="$PATH:/home/username/.openmpi/bin"
$ export LD_LIBRARY_PATH="$LD_LIBRARY_PATH:/home/
username/.openmpi/lib/"
```

To let the exportation be effective for future sessions and terminals, we write the exports in the environments variable's files. By default this should be in `"/home/username/.bashrc"`.

```
$ echo export PATH="$PATH:/home/username/.openmpi
/bin" >> /home/username/.bashrc
$ echo export LD_LIBRARY_PATH="$LD_LIBRARY_PATH:/
home/username/.openmpi/lib/" >> /home/username/
.bashrc
```

6. We finalize the installation process by updating our system

```
$ sudo apt-get update
```

When you have completed the installation guide, you can check if mpi is properly installed by typing

```
$ mpirun --version
```

"mpirun" is the command that we later will use to run our code.

3 Running a MPI program

By navigating into the build directory as we did in the previous assignment tutorial, we can build and compile our code.

```
$ cmake ..  
$ make
```

If everything went fine we can run our code with the command *mpirun*. When executing an mpi program, we also need to specify the number of processors we want to use:

```
$ mpirun -np 4 mpiIntro/mpiIntro
```

Here we told mpi to be initialized with four processors.