

# PCAP : MPI Cluster

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**MPI Cluster- Library of routines to perform parallelism by using more than one CPU at a time**

**GOAL : To achieve parallelism with network of nodes in LAN.**

**MPICH** is a widely-used implementation of MPI. - Install MPICH on all the machines.

**Steps:**

## 1. Host file configuration:

How to access MPI – Message Passing Interfaces other nodes by giving it some name instead of using IP addresses by mapping IP address to some name for easy access — \$ cat /etc/host [Map the ip with name] —

## 2. Creating new user

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Making new user for easy configurations.

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\$ sudo adduser mpiuser

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## 3. Install and setup ssh

For communications within network/nodes, we have to set up ssh.

\$ sudo apt-get install openssh-server \$su - mpiuser

### Keys Generation

\$ ssh-keygen-t dsa

**Adding the keys to all nodes for easier login in other machines/nodes:**

\$ ssh-copy-id worker This will set up a secure communication between the nodes To enable passwordless ssh ->

\$eval ssh-agent \$ ssh-add-/.ssh/id\_dsa

**For login** \$ssh worker

## 4. Install and set up NFS (Network file sharing/sharing data between machines)

NFS, a protocol that allows you to share directories and files over a network.

- install
- Making a new directory

\$ mkdir cloud \$ sudo apt-get install nfs-kernel-server

- create a directory
- export cloud \$ cat /etc/exports -add  
/home/mpiuser/cloud "(rw, sync, no\_root\_squash,no\_subtree\_check) \$ exportfs-a
- restart nfs server if required

\$ sudo service nfs-kernel-server restart

Nfs-worker install packages

\$ sudo apt-get install nfs-common \$mkdir cloud \$ sudo mount -t nfs manager :/home/mpiuser/cloud-/cloud

- check \$df-h

- To make mount permanent \$ cat /etc/fstab
- add entry

## 5. Run MPI programs

- compile

\$mpicc-o mpi\_sample mpi\_sample.c

- copy the compiled program to shared directory

\$ cd cloud To run it on own machine

\$ mpirun-np 2 ./cpi

- To run it within a cluster, \$mpirun -np 5-hosts worker, localhost ./cpi