How To Run MPI Programs Using The Linux Lab Machines

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1. Log onto a Linux lab machine and set up passwordless login by first keying in:

   ```
   ssh-keygen -t rsa -b 4096
   ```

   You will be asked for a passphrase, which can be anything you choose. Make sure you remember it. Then key in:

   ```
   cat ~/.ssh/id_rsa.pub >> ~/.ssh/authorized_keys
   ```

   followed by:

   ```
   chmod 600 ~/.ssh/authorized_keys
   ```

   You need to do the above steps only once, but you should do the following steps every time you log in. Key in:

   ```
   echo $SSH_AGENT_PID
   ```

   If you do NOT get a number back then key in:

   ```
   eval $(ssh-agent -s)
   ```

   Finally key in:

   ```
   ssh-add
   ```

   You will be asked for your passphrase. For more information on what is actually going on when you follow the above instructions see http://docs.cs.cf.ac.uk/notes/configuring-passwordless-login/

2. You need to do this step only once. Key in:

   ```
   echo "MPD_SECRETWORD=hshsjscj0008" > ~/.mpd.conf
   ```

   where “hshsjscj0008” can be any string. Then do:

   ```
   chmod 600 ~/.mpd.conf
   ```

3. Create a file named machines.txt, if you don’t already have one. This file should contain the names of the machines in your parallel system, one on each line, e.g., hydrogen.cs.cf.ac.uk (you must use the full machine name). Then key in:

   ```
   for i in $(cat machines.txt); do ssh $i true; done
   ```

   For each machine you will be prompted to save the fingerprint. Respond “yes” in each case.

4. Then do:

   ```
   for i in $(cat machines.txt); do ssh $(basename $i .cs.cf.ac.uk) true; done
   ```

5. Now you should be able to compile parallel MPI programs using mpicc, and run them with the command mpirun or mpiexec. Make sure you have /usr/bin in your PATH.

   a. Compile:

   ```
   mpicc -o mycode mycode.c
   ```

   b. Run on 16 processors:

   ```
   mpiexec -n 16 -hostfile machines.txt mycode
   ```