CS434:Parallel and Distributed Computing

[Kwaku Ofosu-Agyeman]

[02/11/21]

Lab 1

World Ranking
Rank 1 : Supercomputer Fugaku
Location : Japan
URL: https://www.r-ccs.riken.jp/en/fugaku/project
Manufacturer: Fujitsu
Memory: 5,087,232 gigabytes
Number of cores: 7,630,848
Processor Type: A64FX 48C 2.2GHz
Interconnect: Tofu Interconnect D
Linpack Performance: 442,010 TFlop/s
Theoretical Peak: 537,212 TFlop/s
Power Consumption: 29,899.23 kW (Optimized: 26248.36 kW)
Operating System: Red Hat Enterprise Linux
Interesting Features: Math Library, Compiler and MPI: FUJITSU Software Technical Computing Suite V4.0

Rank 2 : Summit-IBM PowerSystem
Location : United States
URL: http://www.olcf.ornl.gov/olcf-resources/compute-systems/summit/
Manufacturer: IBM
Memory: 2,801,664 GB
Number of cores: 2,414,592
Processor Type: IBM POWER9 22C 3.07GHz
Interconnect: Dual-rail Mellanox EDR Infiniband
Linpack Performance: 148,600 TFlop/s
Theoretical Peak: 200,795 TFlop/s
Power Consumption: 10,096.00 kW (Submitted)
Operating System: RHEL 7.4
Interesting Features: SPECTRUM MPI, XLC, nvcc

Rank 3 : Sierra-IBM Power System
Location : United States
URL: https://hpc.llnl.gov/hardware/platforms/sierra
Manufacturer: IBM / NVIDIA / Mellanox
Memory: 1,382,400 GB
Number of cores: 1,572,480
Processor Type: IBM POWER9 22C 3.1GHz
Interconnect: Dual-rail Mellanox EDR Infiniband
Linpack Performance: 94,640 TFlop/s
Theoretical Peak: 125,712 TFlop/s
Power Consumption: 7,438.28 kW (Submitted)
Operating System: Red Hat Enterprise Linux
Interesting Features: IBM XLC ESSL, CUBLAS 9.2 IBM Spectrum MPI

Rank 4 : Sunway TaihuLight
Location : China
Manufacturer: NRCPC
Memory: 1,310,720 GB
Number of cores: 10,649,600
Processor Type: Sunway SW26010 260C 1.45GHz
Interconnect: Sunway
Linpack Performance: 93,014.6 TFlop/s
Theoretical Peak: 125,436 TFlop/s
Power Consumption: 15,371.00 kW (Submitted)
Operating System: Sunway RaiseOS 2.0.5
Interesting Features: Nmax: 12,288,000, HPCG: 480.848

Rank 5 : Selene
Location : United States
URL: https://www.nvidia.com/DGXSuperPOD
Manufacturer: Nvidia
Memory: 1,120,000 GB
Number of cores: 555,520
Processor Type: AMD EPYC 7742 64C 2.25GHz
Interconnect: Mellanox HDR Infiniband
Linpack Performance: 63,460 TFlop/s
Theoretical Peak: 79,215 TFlop/s
Power Consumption: 2,646.00 kW (Submitted)
Operating System: Ubuntu 20.04.1 LTS
Interesting Features: Compiler: NVIDIA NVCC V11, Intel, Composer 2020.0.166, MPI: OpenMPI 4.0.3

Africa Ranking
Rank 1 : Toubkal
Location : Morocco
URL: hhttps://www.ascc.um6p.ma
Manufacturer: Dell EMC
Memory: 244,224 GB
Number of cores: 71,232
Processor Type: Xeon Platnium 8276L 28C 2.2GHz
Interconnect: Mellanox InfiniBand HDR100
Linpack Performance: 3,158.11 TFlop/s
Theoretical Peak: 5,014.73 TFlop/s
Operating System: CentOS Scientific-OpenStack
Interesting Features: Compiler: Intel, MPI: Intel MPI 2020.2

To incorporate the use of Linux on my Laptop, I decided to dual boot it and install Ubuntu 20.0.4 LTS on my machine. In installing it I faced a few challenges like switching my SATA configuration to AHCI since I could not run Ubuntu with that configuration. Because of this, each time I boot my laptop I have to switch between the AHCI configuration and the default intel SATA configuration depending on whether I want to boot with Windows or Ubuntu. I also had to do some additional installations after installing Visual Studio code to since the terminal could not identify the gcc command. After that I was able to compile and run the code smoothly and successfully.