Parallel and Distributed Computing Lab 1

Supercomputers

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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 Power System**
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
URL	
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

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

Name	**Lengau**
Location	South Africa
Number of Cores	40,000
Peak Performance	64.44 TFlops/s
Manufacturer	Dell
Memory	5 Petabytes
Servers	1039 Dell PowerEdge servers
Linpack performance	1000 Tflops/s
Interconnect	Mellanox EDT InfinBand

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 smoothly and successfully compile and run the code.