

High Performance Computing
Homework 1 - Question 3

- a. I logged into the explorer cluster and obtained a CPU-based node. I typed in the command “lscpu” to list information about the CPU. The CPU model is Intel ® Xeon ® CPU E5-2680 v4 @2.40GHz. This CPU has 2 sockets and 14 cores per socket. It also uses an x86_64 architecture. More information, and a screenshot of my command line is shown below.

```
[bahr.j@explorer-02 ~]$ srun -p courses -N 1 --pty --time=03:00:00 /bin/bash
[bahr.j@c0744 ~]$ lscpu
Architecture:          x86_64
CPU op-mode(s):        32-bit, 64-bit
Address sizes:          46 bits physical, 48 bits virtual
Byte Order:             Little Endian
CPU(s):                 28
On-line CPU(s) list:   0-27
Vendor ID:              GenuineIntel
Model name:              Intel(R) Xeon(R) CPU E5-2680 v4 @ 2.40GHz
CPU family:             6
Model:                  79
Thread(s) per core:     1
Core(s) per socket:     14
Socket(s):               2
Stepping:                1
CPU max MHz:            3300.0000
CPU min MHz:            1200.0000
BogoMIPS:                4788.97
```

- b. I typed in the command “getconf -a” to list information about the caches present. This machine has the following memory hierarchy:

L1 Instruction cache - 32768 byte (32 KB), 8-way associative

L1 Data Cache - 32768 byte (32 KB), 8-way associative

L2 Cache - 262144 byte (256 KB), 8-way associative

L3 Cache - 36700160 byte (35840 KB), 20-way associative cache

```
LEVEL1_ICACHE_SIZE      32768
LEVEL1_ICACHE_ASSOC      8
LEVEL1_ICACHE_LINESIZE  64
LEVEL1_DCACHE_SIZE      32768
LEVEL1_DCACHE_ASSOC      8
LEVEL1_DCACHE_LINESIZE  64
LEVEL2_CACHE_SIZE       262144
LEVEL2_CACHE_ASSOC      8
LEVEL2_CACHE_LINESIZE   64
LEVEL3_CACHE_SIZE       36700160
LEVEL3_CACHE_ASSOC      20
LEVEL3_CACHE_LINESIZE   64
LEVEL4_CACHE_SIZE        0
LEVEL4_CACHE_ASSOC      0
LEVEL4_CACHE_LINESIZE   0
```

- c. I typed in the command “grep MemTotal /proc/meminfo” to list the memory size of this node. The total memory of this node is 263358456 KB.

```
[bahr.j@c0745 ~]$ grep MemTotal /proc/meminfo
MemTotal:      263358456 kB
[bahr.j@c0745 ~]$ free
```

	total	used	free	shared	buff/cache	available
Mem:	263358456	3671100	249996820	38768	11409048	259687356
Swap:	20479996	0	20479996			

- d. I typed in the command “uname -r” to list the Linux version installed. This node is using Linux 5.14.0.

```
[bahr.j@c0744 ~]$ uname -r
5.14.0-362.13.1.el9_3.x86_64
```