HPC Cluster Description

App State HPC

AppState HPC is an educational and research cluster with 2 compute nodes for a total of 128 cores and 2TB RAM. The storage controller provides 20TB of active storage for students and researchers. A high-throughput, low-latency Infiniband network is available for optimal performance in file storage and message-passing between processes on multiple nodes. The cluster uses Slurm Workload Manager for job scheduling.

Per-compute-node specifications, compute partition:

- 64 Cores / 128 Threads: 2x AMD EPYC 7543 2.8GHz (turbo 3.7GHz) 32-core Processors
- 1TB RAM: 16x DDR4 3200MHz 64GB Samsung DIMM
- 16GB per core
- 10Gbit/s Ethernet: BCM57412 NetXTreme-E
- Infiniband: Mellanox MT28908 ConnextX-6

Controller node specifications:

- 12TB Long-term Storage (12x 2TB SSD in RAID 10)
- 3.2TB Active Storage (1x NVME SSD over Infiniband)

Debug nodes we have two older, lesser nodes for use in classroom and testing.

hpcd1:

- 16 Cores / 32 Threads: Intel(R) Xeon(R) CPU E5-2650 v2 @ 2.60GHz
- 256GB DDR3
- 1Gbps Ethernet connection

hcpd2:

- 16 Cores / 32 Threads: Intel(R) Xeon(R) CPU E5-2650 v2 @ 2.60GHz
- 256GB DDR3
- 1Gbps Ethernet connection

`lscpu` capabilities statement for AMD EPYC 7543: `lm fpu fpu_exception wp vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov pat pse36 clflush mmx fxsr sse sse2 ht syscall nx mmxext fxsr_opt pdpe1gb rdtscp x86-64 constant_tsc rep_good nopl nonstop_tsc cpuid extd_apicid aperfmperf rapl pni pclmulqdq monitor ssse3 fma cx16 pcid sse4_1 sse4_2 movbe popcnt aes xsave avx f16c`

```
rdrand lahf_lm cmp_legacy svm extapic cr8_legacy abm sse4a misalignsse 3dnowprefetch osvw ibs skinit wdt tce topoext perfctr_core perfctr_nb bpext perfctr_llc mwaitx cpb cat_l3 cdp_l3 invpcid_single hw_pstate ssbd mba ibrs ibpb stibp vmmcall fsgsbase bmi1 avx2 smep bmi2 erms invpcid cqm rdt_a rdseed adx smap clflushopt clwb sha_ni xsaveopt xsavec xgetbv1 xsaves cqm_llc cqm_occup_llc cqm_mbm_total cqm_mbm_local clzero irperf xsaveerptr rdpru wbnoinvd amd_ppin brs arat npt lbrv svm_lock nrip_save tsc_scale vmcb_clean flushbyasid decodeassists pausefilter pfthreshold v_vmsave_vmload vgif v_spec_ctrl umip pku ospke vaes vpclmulqdq rdpid overflow_recov succor smca fsrm cpufreq
```

A Note on Storage

The storage available on the HPC is for active research data only and space is limited. We enforce quotas per account that can be grown, but rely on you to remove data from the HPC after you are done with it. Systems and Research Computing staff will reach out periodically about removing data that is no longer involved in active research. If your dataset is too large to allow others to also utilize the HPC system, we may have to discuss alternative compute opportunities.

Long-term data storage is available for $7/TB/mo through ITS and is the only approved mechanism for long-term storage of App State research data. Please contact us to set up your long-term storage account.

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