

Cloud and Big Data Educational and Research Resources: The Department of Intelligent Systems Engineering operates several systems termed FutureSystems aimed at supporting leading edge research and education. Most systems have large disk per CPU and large memory needed for big data applications

a. 3456-core Haswell cluster (Juliet)

The Haswell cluster (Juliet) is a SuperMicro distributed shared memory cluster with 3,456 CPU cores and 16TB total memory capacity. The compute nodes consist of SuperMicro X10DRT-HIBF servers, 32 nodes with 2 18-core Intel(R) Xeon(R) CPU E5-2699 v3 2.30GHz processors; 96 nodes with 2 12-core Intel(R) Xeon(R) CPU E5-2670 v3 2.30GHz processors, all compute nodes with 128GB of memory, 8TB of local disk storage, 400GB of NVMe storage, and a Mellanox ConnectX-3 InfiniBand FDR 56GT/s onboard adapter for high bandwidth, low-latency MPI applications. Operating System: RedHat Linux 7.4

b. 126-core NVIDIA K80/Volta GPU cluster (Romeo) aimed at Deep Learning

The K80/Volta GPU cluster (Romeo) is a SuperMicro distributed shared memory cluster with 136 CPU cores, 161,792 CUDA cores, and 768GB total memory capacity. The compute nodes consist of 4 SuperMicro X10DGQ servers with 2 12-core Intel(R) Xeon(R) CPU E5-2670 v3 2.30GHz processors, 4 NVIDIA GK210GL [Tesla K80] GPU Accelerator cards with 4,992 CUDA cores, and 2 SuperMicro X10DGO servers with 2 10-core Intel Xeon E5-2600 v4 2.2GHz processors and 8 NVIDIA V100 (Tesla Volta) accelerators with 5,120 CUDA cores. All nodes with 128GB of memory, 8TB of local disk storage, 400GB of NVMe storage, and a Mellanox ConnectX-3 InfiniBand FDR 56GT/s onboard adapter for high bandwidth, low-latency MPI applications. Operating System: RedHat Linux 7.4

c. 3264-core Knight's Landing cluster (Tango)

The Knight's Landing cluster (Tango) is a Penguin Computing distributed shared memory cluster with 4,416 Xeon Phi cores and 12.8TB total memory capacity. The compute nodes consist of 16 nodes with 1 72-core Intel(R) Xeon Phi(TM) CPU 7290F 1.50GHz processor and 48 nodes with 1 68-core Intel(R) Xeon Phi(TM) CPU 7250F 1.50GHz processor. All nodes with 200GB of memory, 3.2TB of local disk storage, 800GB of NVMe storage, and an Intel OmniPath adapter for high bandwidth, low-latency MPI applications. Operating System: CentOS release 7.2.1511

d. 480-core Platinum cluster (Tempest)

The Platinum cluster (Tempest) is a SuperMicro distributed shared memory cluster with 480 CPU cores and 2.5TB total memory capacity. The 10 compute nodes consist of SuperMicro X11DPT-PS servers with 2 24-core Intel(R) Xeon(R) Platinum 8160 2.10GHz processors, 256GB of memory, 8TB of local disk storage, 400GB of NVMe storage, and an Intel OmniPath adapter for high bandwidth, low-latency MPI applications. Operating System: RedHat Linux 7.4

e. 768-core Platinum cluster (Victor)

The Platinum cluster (Victor) is a SuperMicro distributed shared memory cluster with 768 CPU cores and 2.5TB total memory capacity. The 16 compute nodes consist of SuperMicro X11DPT-PS servers with 2 24-core Intel(R) Xeon(R) Platinum 8160 2.10GHz processors, 256GB of memory, 8TB of local disk storage, 400GB of NVMe storage, and a Mellanox

ConnectX-3 InfiniBand FDR 56GT/s adapter for high bandwidth, low-latency MPI applications. Operating System: RedHat Linux 7.4

f. 192-core cloud cluster (Echo)

The cloud cluster (Echo) is a SuperMicro distributed shared memory cluster with 192 CPU cores and 6TB total memory capacity. The compute nodes consist of 16 SuperMicro X9DRW servers, each node with 2 6-core Intel(R) Xeon(R) CPU E5-2640 2.50GHz processors; 384GB of memory, 10TB of local disk storage, a 10GbE Ethernet and a Mellanox ConnectX-3 InfiniBand FDR 56GT/s onboard adapter for high bandwidth, low-latency MPI applications. Operating System: Ubuntu Linux 16.04

g. 128-core HP cluster (Bravo)

The large-memory HP cluster is a 1.7 Tflop HP Proliant distributed shared memory cluster with 128 processor cores and 3 TB total memory capacity. The compute nodes consist of 16 HP DL180 servers, each with two quad-core Intel Xeon E5620 2.4 GHz processors, 192 GB of memory, 12 TB of local attached storage, and a PCIe 4x QDR InfiniBand adapter for high bandwidth, low-latency MPI applications. Bravo is currently used as a shared storage cluster and is not being utilized for compute jobs. Operating System: RedHat Linux 6.9

h. 192-core Tesla GPU cluster (Delta)

The GPU cluster (Delta) is a SuperMicro distributed shared memory cluster with 192 CPU cores and 14,336 GPU cores and 3TB total memory capacity. The compute nodes consist of 16 SuperMicro X8DTG-QF servers, each with 2 6-core Intel Xeon 5660 2.80 GHz processors, 2 NVIDIA Tesla Fermi C2075 GPUs with 448 cores per GPU, 192GB of memory, 9TB of local attached storage, and a Mellanox ConnectX-2 VPI dual-port InfiniBand QDR/10GigE PCIe adapter card. Operating System: RedHat Linux 7.4