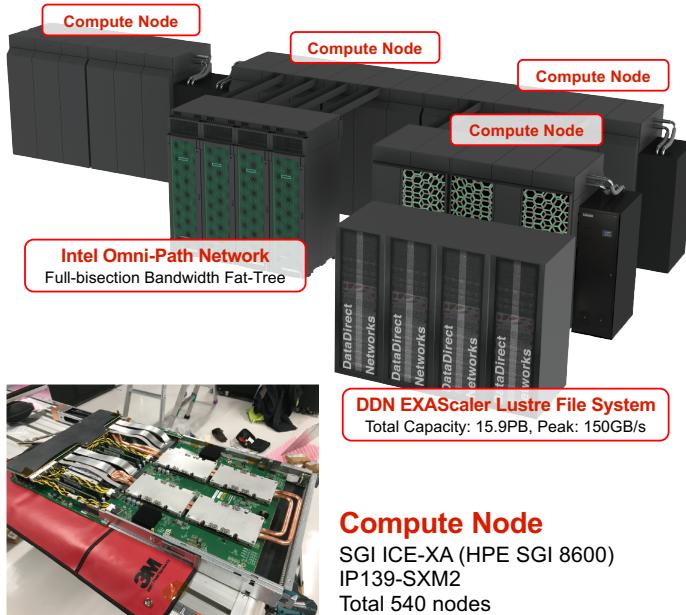


TSUBAME3.0 : Cloud/Big-Data/Green Supercomputer @ Tokyo Tech

Overview



Compute Node

SGI ICE-XA (HPE SGI 8600)
IP139-SXM2
Total 540 nodes

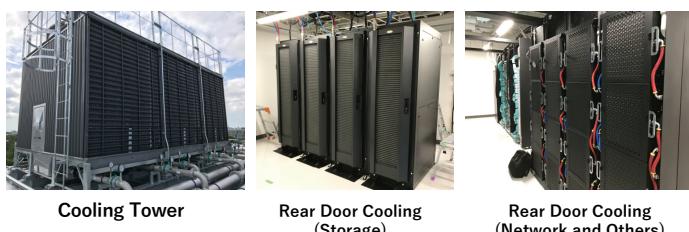
System Total

Peak Flops: 12.15PF(FP64), 47.2PF(FP16)
Memory: 168.7TiB, 1.66PB/s
Local SSD: 1.08PB, Read 1.45TB/s, Write 0.97TB/s
Power: 1MW (Peak)

Data Center Facilities

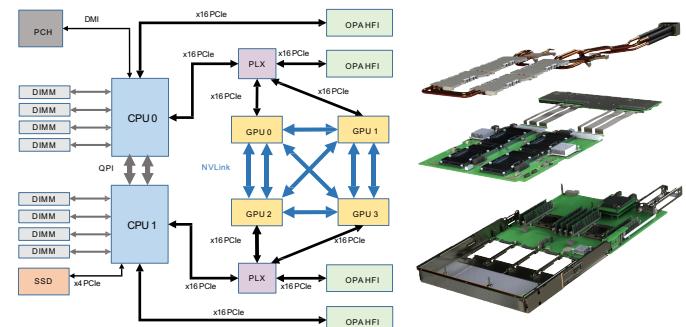
Cooling System

- Cooling of the supercomputers is very important in term of power consumption. TSUBAME3.0 employs a free cooling using warm water cooling technology to minimize power consumption
- An evaporative, closed type cooling tower is installed on the roof of the building. This tower provides 32°C or lower water to the system even in the summer in Tokyo
- For storage, network, and other management servers, rear doors are attached to the racks, which cool the hot air from the servers to reduce the load on air conditioners



Compute Node

- A compact compute node includes: two CPUs, four GPUs, four OPA HFIs, and one NVMe SSD
- CPUs and GPUs are directly water cooled. The other components are air-cooled indirectly using water

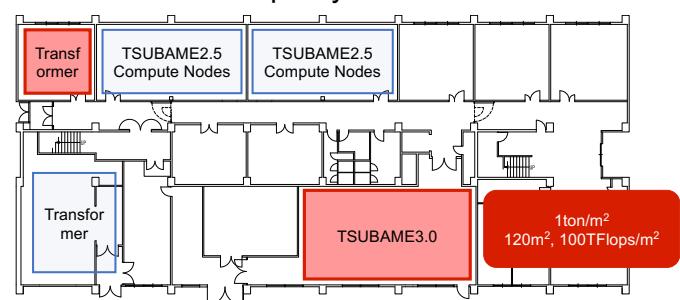


Compute Node Specification

CPU: Intel Xeon E5-2680 v4 × 2
14 cores per socket, total 28 cores per node
GPU: NVIDIA TESLA P100 for NVLink-Optimized servers × 4
5.3TFlops, 16GB HBM2 @ 732GB/s
Mem: 256GB (DDR4-2400 32GB module × 8)
SSD: Intel DC P3500 2TB (NVMe, PCI-E 3.0 x4)
sequential read 2700MB/s, sequential write 1800MB/s
Network: Intel Omni-Path Architecture HFI (100Gbps) × 4

Floor Space

- The water cooling increases the weight of the compute nodes. For a high density installation in the server room, we reconstructed the floor base to have 1ton/m² capacity



Power Supply

- We introduced 420V high voltage power supply to reduce power loss

