

Evolution of High-Performance Computing Environment (HPCE) Clusters at the Computer Center-2

Super Cluster VIRGO(2012–2020): High-Performance Computing in Large-Scale Systems



Total Compute Power:

- Total Compute Power 97 TFlops

System Performance:

- Rmax of 91.126 TFlops
- Rpeak of 97.843 TFlops

System Configuration:

- 292 Compute Nodes
- 2 Master Nodes
- 4 Storage Nodes
- IBM System x iDataPlex dx360 M4 Highly Optimized Servers for HPC
- Populated with 2 X Intel E5-2670 8 C 2.6 GHz Processor
- A total of 64 GB RAM per node with 8 X 8 GB 1600 MHz DIMM connected in a fully balanced mode.
- Low powered Mezzanine Adapter for FDR10 Infiniband based Inter processor communication.

Storage Configuration :

- 2 Storage Subsystem for PFS and 1 for NAS
- Fine Tuned Redundant SAN Switch
- IBM DS3500 Series of Storage System
- Total PFS Capacity 160 TB
- Total NFS Capacity 50 TB



Super Cluster AQUA (2020-Present) : Enhancements in High Performance Computing



Total Compute Power:

- 11680 Cores; 30 GPU Accelerators
- 734 TFlops Rmax (1,106 TFlops Rpeak)

System Performance:

- CPU - 587 TFlops Rmax (896 TFlops Rpeak)
- GPU - 147 TFlops Rmax (210 TFlops Rpeak)

System Configuration:

- 280 CPU Nodes, 40cores and 192GB each
- 15 GPU Nodes each with 2 Nvidia V100 Cards
- Mellonax Interconnect with Non-blocking Fat Free topology
- HPE Apollo XL170rGen10 Servers with Dual Intel Xeon Gold 6248, 2.5 GHz
- HPE Apollo XL190rGen10 Servers with Dual Intel Xeon Gold 6142 20, 2.6 GHz

Storage Configuration :

- 1 PetaByte PFS(HPE Lustre Storage) with minimum 25 GB/s Write Performance
- 200TB NAS Storage

Cooling System:

- Air Colled Liquid chiller units fit with multiples of hermetically sealed SCROLL compressor
- 4 Chiller Units 36TR each, 7 CRV units and 2 PAC units



PARAM Shakti (2025 -present) NSM’S PARAM RUDRA Supercomputing Cluster: Advanced Computing Resource @ IITM



Total Compute Power:

- 28,896 CPU Cores, 60 GPU Accelerators
- Achieving 3.1 PFLOPS

System Performance:

- CPU- Rmax of 1.229PF& Rpeakof 1.887PF
- GPU- Rmax of 793.9 TF & Rpeakof 924 TF

System Configuration:

- 476 CPU only Compute Nodes with 2 Intel Xeon G-6240R, 2.4 GHz, SSD800GB, 192 GB RAM each
- 30 GPU Compute Nodes with 2 Intel Xeon G-6240R, 2.4 GHz, SSD800GB, 192 GB RAM each and 2 NvidiaA100 per node(GPU Cores per node 13824) , GPU Memory of 80 GB HBM2e per NvidiaA100
- 96 High Memory CPU Nodes with 2 Intel Xeon G-6240R, 2.4 GHz, SSD800GB, 768 GB RAM each

Storage Configuration:

- 8 Management Nodes with 2 Intel Xeon G-6240R, 2.4 GHz, SSD 800GB,192 GB,DDR4 2933 MHz each.
- Based on Lustre parallel file system
- 4 PiB of storage with 40 GB/s and 400 TiB with 100 GB/s

Cooling System:

- Two units of 140 TR air-cooled liquid chillers equipped with sealed scroll compressor
- Sixteen RDHx (Rear Door Heat Exchanger) units, each with a capacity of 11 TR offering an efficient and space-saving cooling solution for high-density racks.
- Two 5 TR ductable units, to address and overcome localized heat load

