Facilities, Equipment, and other Resources

The Department of Mathematics provides each faculty member with a teaching workstation running Windows, Linux, or Mac OS. The faculty also have access to a departmental file server, which hosts home directories, if provided, and any shared files for teaching and departmental business.

The department also provides two virtual servers, running Linux, to host specialized software for faculty use, but which cannot be installed on their individual workstations for various reasons. The virtual servers also provide Windows remote desktop capability. The department currently also provides access to Mathematica.

All academic resources are backed up on a nightly basis.

For academic and research use, the Department of Mathematics maintains a high performance 33-node cluster with separate storage and backup nodes, for funded research. The cluster consists of 68 16-Core Intel Xeon Gold processors (42x 6130 and 26x 6226R), 8.25 TB total system memory, 24.2 TB NVMe SSD usable storage, and utilizes Infiniband EDR for interprocess communication. The cluster provides stakeholders, collaborators and students with a platform to perform small to medium sized computations, when those computations require exclusive access to hardware or have long-running times.

In addition to these department resources, Texas A&M University's central Technology Services provides general academic computing services to faculty, staff, and students at its open access labs running Windows 10/11. Other centrally provided services include email, wired and wireless networking, printing, and software site licenses, including ANSYS, Matlab, and Microsoft 365.

Texas A&M University's High Performance Research Computing Center maintains five high-performing clusters, FASTER, Grace, Terra, ViDal, and Lonestar, along with a Dell cluster, ACES.

- **FASTER** is a 184-node Intel cluster from Dell with an InfiniBand HDR-100 interconnect. A100 GPUs, A10 GPUs, A30 GPUs, A40 GPUs and T4 GPUs are distributed and composable via Liqid PCIe Gen4 fabrics. All nodes are based on the Intel Ice Lake processor.

- **Grace** is a 940-node Intel cluster from Dell with an InfiniBand HDR-100 interconnect, A100 GPUs, RTX 6000 GPUs, T4 GPUs, and A40 GPUs. All nodes are based on the Intel Cascade Lake processor.

- **Terra** is a 320-node hybrid Intel cluster from Lenovo with an Omni-Path Architecture (OPA) interconnect and 48 NVIDIA K80 dual-GPU accelerators. There are 304 nodes based on the Intel Broadwell processor and 16 nodes based on the Intel Knights Landing processor. Four nodes with Skylake processors, 192 GB of memory, and dual V100 GPUs were moved from Ada to Terra in 2020.

- **ViDaL** is a 24-node Dell cluster with Intel Skylake processors and a 40Gb Ethernet interconnect. ViDaL provides secure and compliant computing facilities to conduct research projects involving analysis of sensitive or proprietary data. ViDaL also offers support for both Windows and Linux operating systems.

- **Lonestar6** is the latest in a series of Lonestar clusters hosted at TACC. Jointly funded by the University of Texas System, Texas A&M University, the University of North Texas, and Texas Tech University, it provides additional resources to TAMU researchers.

- **ACES** is a Dell cluster with a rich accelerator testbed consisting of Intel Max GPUs (Graphics Processing Units), Intel FPGAs (Field Programmable Gate Arrays), NVIDIA H100 and A30 GPUs, NEC Vector Engines, NextSilicon co-processors, Graphcore IPUs (Intelligence Processing Units). The ACES cluster consists of compute nodes using a mix of the following processors: Intel Xeon 8468 Sapphire Rapids processors; Intel Xeon Ice Lake 8352Y processors; Intel Xeon Cascade Lake 8268 processors; AMD Epyc Rome 7742 processors. The compute nodes interconnected with NVIDIA NDR200 connections for MPI and access to the Lustre storage. The Intel Optane SSDs and all accelerators (except the Graphcore IPUs and NEC Vector Engines) are accessed using Liqid's composable framework via PCIe (Peripheral Component Interconnect express) Gen4 and Gen5 fabrics.