

Facilities, Equipment and Other Resources University of Texas at San Antonio (UTSA)

UTSA Research Data Center (RDC): UTSA has a dedicated, 3,558 square foot Research Data Center (RDC), custom built and designed for research technology equipment. The RDC is a raised floor data center and was opened in the summer of 2012. The main purpose of the RDC is to provide data center space for servers and data storage equipment utilized by researchers at UTSA. The primary section of the RDC consists of one outer staging area used for delivering and unpacking of equipment, one room to house a 180kW backup UPS, and an open area for colocation of research equipment. A second section is secured in a caged off area, only accessible through use of biometric readers. A final area is separated with a solid wall and is also only accessible through use of a biometric reader. All power, data cabling, etc. is installed overhead and cooling is delivered via the raised floor plenum. The cooling system provides 31 tons of cooling capacity and is configured in a redundant fashion.

The RDC is connected directly to the UTSA backbone network, in a similar fashion as each physical building. A 40Gb/s Ethernet connection serves the RDC with a 1Gb/s Ethernet delivered out to each individual host system. 10Gb/s connectivity is delivered to five (5) separate physical areas in the room. The current network gear serving the RDC has the capability to provide 10Gb/s connectivity to other areas of the room with the simple addition of optical transceivers, additional fiber, and a top of rack Ethernet switch.

UTSA John Peace Library (JPL) Data Center: The Main UTSA Data Center provides a secure and environmentally controlled environment for many of the systems critical to the university's operations and will soon be home to the new HPC cluster (GRACE). The data center also provides space for departmental servers. This data center is directly connected to the UTSA backbone network, via a pair of two combined 40Gb/s Ethernet connections for a total of 80Gb/s into the data center. By default, 1Gb/s Ethernet connectivity is delivered to each individual host system, however 10Gb/s is available as requested. All power, data cabling, etc. is ran overhead and the raised floor space is used for air flow to cool the room.

The data center is equipped with four 20 ton Computer Room Air Conditioning units (CRACs), a main UPS unit which supplies 160 kW of conditioned power to the data center, and an emergency power generator. Additional UPS units, and in row cooling units have been purchased and have been scheduled for installation in order to accommodate the new HPC cluster that will be installed in February 2021.

Data Center for the National Security Collaboration Center (NSCC), Downtown, San Antonio: UTSA is one of the few universities in the nation to hold four National Center of Excellence designations from the National Security Agency and Department of Homeland Security, further solidifying its dominance as a leader in cybersecurity. Planning is underway to build a new data center at NSCC in Downtown San Antonio.

Arc HPC Cluster: A new cluster was launched on August 16, 2021. This new cluster is transformational to UTSA's research mission and includes the following features:

- 156 total compute/GPU nodes and 2 login nodes, majority of these are Intel Cascade Lake CPUs
- TFlops: 387
- 15,024 Total CPU cores
- 70TB of shared memory
- 100Gb/s Infiniband storage network connectivity

- DDN highly fault tolerant storage array with 1PB of shared storage utilizing the Lustre file system
- A cumulative total of 250TB of local scratch space spread evenly among each physical compute node
- 30 GPU nodes - each containing two processors with 20 cores each for a total of 40 cores, 384GB RAM, and each including one V100 Nvidia GPU accelerator
- 5 GPU nodes - each containing two processors with 20 cores each for a total of 40 cores, 384GB RAM, and each including two V100 Nvidia GPU accelerators
- 2 GPU nodes - each containing two processors with 20 cores each for a total of 40 cores, 384GB RAM, and each including two V100 Nvidia GPU accelerators
- Two large-memory nodes, each containing four processors with 20 cores each for a total of 80 cores, and each including 1.5TB of RAM

Dell Isilon Storage System: In addition to the data center and HPC improvements, UTSA has acquired, and will soon be implementing, a resilient Isilon storage array. This storage array will have a total of 2PB of raw storage that will be divided between the research, academic, and administrative, areas at UTSA. This system will be utilized for active data storage, as well as long-term data archival.

Dell IDPA: UTSA has also recently purchased a robust backup system (a Dell Integrated Protection Appliance) that includes a total of 336TB usable space dedicated to backups of research specific data. The Dell IDPA solution provides a 36:1 to 40:1 deduplication rate, which will be more than adequate for current needs, and can be expanded as necessary.

Dell VxRail System: UTSA has invested in a new Hyper Converged Infrastructure (HCI) product that will enable multiple areas (**including researchers**) on campus to have quick access to reliable virtual machines to meet their various needs. Higher tier applications or use cases will be replicated to a remote location approximately 275 miles from UTSA for an increased resiliency of higher tier applications.

UTSA Advanced Visualization Laboratory (VizLab): UTS also manages the VizLab that allows researchers from all disciplines of art, science, and engineering to conduct simulation and visualization research to better understand complex phenomena and translate data into images on large-scale and high-resolution visualization walls or other display devices. The Lab is open to all faculty, students and the San Antonio community. VizLab Features:

- Visualization Wall
- 24 high-definition 32" monitors
- 115 million pixels versus 2 million on a 1080P TV
- Powered by:
 - Three tile nodes: Dell Precision workstations with dual 10 core Intel Xeon processors, 32 GB of RAM, and dual NVidia Quadro M2000 graphics cards
 - Head node: Dell Precision workstation with dual 10 core Intel Xeon processors and 32 GB of RAM
 - Storage node: PowerEdge R530 server with dual 8 core Intel Xeon processors, 64GB of RAM, and 8TB of fault tolerant storage
- HTC Vive virtual and Oculus Rift reality headsets, HoloLens AR, Oculus Rift Go, and Lenovo Daydream
- 3D Systems Touch Haptic Device
- 85" 4K television monitor
- Two high performance workstations each configured with:
 - Dual Intel Xeon 8 core processors
 - 64GB RAM

- Nvidia Quadro M4000 CAD video cards
- 500GB Solid State Disk (SSD) drives
- 10Gb/s connectivity to the UTSA network and the Texas Advanced Computing Center (TACC)
- iMac Pro Workstation
- Visual Mobile Cart with MS Surface Studio, Oculus Rift, and more

Internet2 (I2) Connectivity and Usage: UTSA is currently a full standing member of Internet2 and maintains a shared 10Gb/s link to other research institutions and universities connected to I2.

University of Texas System Research Cyberinfrastructure (UTRC): Through the University of Texas Research Cyberinfrastructure (UTRC) initiative, which was implemented in collaboration with the Texas Advanced Computing Center (TACC), researchers from across The University of Texas System are able to leverage a combination of advanced computational systems, large data storage resources, and high bandwidth data access between institutions in the UT system. High-bandwidth network connectivity (10Gb/s) has been established between all UT System institutions which enables the sharing of data for collaborative purposes, as well as the movement of data to/from computing and data systems. UT System has deployed this high-bandwidth network capability (10Gb/s connection) and continues to work with institutions to best utilize the resource.