

# UC San Diego launches Triton Resource Supercomputer

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The San Diego Supercomputer Center (SDSC) at the University of California, San Diego, today officially launched the Triton Resource, an integrated, data-intensive computing system primarily designed to support UC San Diego and UC researchers.

The Triton Resource - which features some of the most extensive data analysis power available commercially or at any research institution in the country because of its unique large-memory nodes - also will be available to researchers throughout the larger academic community, as well as private industry and government-funded organizations. Plans for the new system were first announced last fall, as SDSC formally opened a new building and data center that doubled the size of the existing [supercomputer](#) center to 160,000 square feet.

"The Triton Resource will play a large role in keeping UC San Diego at the forefront of scientific research and discovery, while doing so in an energy-efficient and sustainable manner," said Arthur B. Ellis, vice chancellor for research for UC San Diego. "Its unique configuration is specifically intended to promote collaborative research across the entire campus and the UC system, serving as a catalyst for new ideas, innovation and interdisciplinary research."

SDSC Interim Director Michael Norman called the launch of the Triton Resource, which was designed from the outset by UC researchers and computing specialists at SDSC, a significant milestone for the center, which is an Organized Research Unit (ORU) of UC San Diego.

"This one-of-a-kind system gives us a cost-effective alternative for researchers who require the highest levels of speed, storage and user support for their data-intensive computing needs," said Norman. "The entire Triton Resource was collaboratively configured from the ground up by a team of scientists and data specialists from across the UC system, with the goal of accelerating research and discovery across a wide range of scientific domains to help transform science and society."

Named after the mythical sea god and his three-pronged trident - the image was adopted by UC San Diego - the Triton Resource consists of three key components:

- **Triton Compute Cluster (TCC):** Designed as a centralized resource and a highly affordable alternative to less energy-efficient 'closet computers,' Triton's scalable cluster is configured to operate either in a standard batch mode, or be set up so users can run customized software stacks at scale, with full connectivity to large-scale storage. Using Appro International's GreenBlade™ server series, and Nehalem processors from Intel Corporation, Triton's TCC has an aggregate of 6 terabytes (TB) of RAM memory across 256 nodes, while offering a peak performance of 24 teraflops (TF). One terabyte equals one trillion bytes of storage capacity, while one teraflop equals one trillion calculations per second.
- **Petascale Data Analysis Facility (PDAF):** Specifically configured to meet researchers' needs to efficiently process extremely large data sets, Triton's PDAF consists of large-memory (20 256GB and eight 512GB) 32-core nodes, providing some of the most extensive data analysis power available commercially or at any research institution in the country. The Petascale Data Analysis Facility's unique architecture permits a single node to be filled in

about 60 seconds, so that large-scale data sets can quickly and easily be brought into memory, manipulated and written out to disk. Coupled to a Lustre™ parallel file system, this part of the Triton Resource uses Sun Microsystems' Sun Fire™ X4600 M2 server and Shanghai processors from Advanced Micro Devices, and has an aggregate of 9TB memory across the 28 nodes with a peak speed of 9 TF.

- Data Oasis: Scheduled to be built in two phases starting this fall to accommodate large-scale disk storage, Data Oasis will assist in the practical manipulation of data across high-bandwidth paths to researchers throughout UC San Diego and the statewide UC system. The system will be configured to provide up to 4 petabytes (PB) of extensible storage when fully deployed - the largest capacity of any academic data center - providing between 60 and 120 gigabytes per second of data movement capacity and managing 3,000 to 6,000 individual disks.

The Triton Resource is designed to deliver excellent scaling for parallel message passing codes and a high level of integration with campus, national and international networks. In addition to the 480 Fabric Ports, the core switch includes 32 10 GB/s Ethernet ports, enabling Triton's nodes to direct high-speed network access to other resources outside SDSC. Connectivity for the Triton Resource to UC San Diego campus laboratories is achieved via both production and research (NSF-funded OptIPuter and Quartzite) multi-10 Gigabit networks. Connectivity for UC researchers elsewhere is achieved using a 10 Gigabit Ethernet campus connection to the statewide education network designed and managed by the Corporation for Education Network Initiatives in California (CENIC).

"The Triton Resource was specifically designed to integrate with the analysis workflows of UC researchers," said Philip Papadopoulos,

director of UC Systems at SDSC and head of the definition and acquisition team for the new computer system, noting the 9TF/9TB ratio of the PDAF - among the highest in the field. "The development team paid particular attention to the movement of data within Triton, while ensuring a very high level of scalable network connectivity to other resources."

More information: [tritonresource.sdsc.edu](http://tritonresource.sdsc.edu)

Source: University of California - San Diego ([news](#) : [web](#))

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