FIU Facilities

Instructional and Research Computing Center (IRCC)

The Division of IT at Florida International University (FIU) established the IRCC [1] in 2012 to consolidate and grow computational computing resources in a centrally managed facility. The primary goal of the center is to provide the technologies, training and support needed by faculty to help them be successful in their research and academic endeavors. There are 3.5 FTEs dedicated to the management of IRCC resources with additional support coming from Division of IT's Operations team (Datacenter team), Network Management Services and Enterprise Systems team.

For further information on FIU's Instructional and Research Computing Center, please see: http://ircc.fiu.edu

Equipment

IRCC's initial cluster, Panther Cluster, is a CentOS Linux environment that consists of approximately 3000 cores, a 12 node GPU cluster for CUDA jobs, and a 3 node visualization environment. All nodes use a low latency Ethernet interconnect and a portion of the cluster also connects to a 56Gbps Infiniband fabric. A GPFS filesystem provides over 240 Terabytes of tiered storage (SSD, 15K SAS, Near Line SAS) using DDN's 12K Embedded GridScaler platform. The Panther Cluster compute nodes consist of 27 IBM H-Series Blades, 12 Dell PowerEdge C6220 Servers, 70 M420 Dell Blades with IB interconnect, 1 Dell R730 server, 4 Dell R720 GPU nodes, 1 Dell R730 GPU node, 1 Silicon Mechanics R353 GPU node, 2 Penguin 1903GT GPU Node. Login nodes are provided by 2 vCenter VM's and 1 Dell R420. Visualization nodes are provided by 3 Dell R720 node. Slurm scheduler nodes are provided on 2 Dell PowerEdge R740 Servers.

Virtual Computing Lab (VCL) [2] is an offering of the center that provides the ability for faculty or their students to spin up virtual workstations or servers to be used for development, research or instructional purposes. This environment consists of 4 IBM iDataplex (2 nodes each) and 1 Dell C6100 (4 nodes).

Datacenter

The IRCC has two datacenters at its disposal. FIU's primary datacenter has 2000 SF of raised floor space, located on FIU's Modesto Maidique Campus. It is managed and monitored 24/7 by the Division of IT's Operations department. Its power infrastructure includes enterprise grade power distribution systems, which are fed with conditioned power from a redundant Uninterruptible Power Supply (UPS) infrastructure that will provide a smooth transition to an on-site generator in the case of commercial power outages. The heating, ventilation and air conditioning (HVAC) system is redundant to ensure continuous operation should one module be out of operation as a result of equipment failure or scheduled maintenance. An advanced clean agent fire-suppression system is in place as a protective

measure. To ensure security, the datacenter has a variety of access controls, including, but not limited to, two-factor entry systems, 24/7 monitored alarm and video surveillance systems.

Network Infrastructure

The FIU Datacenter, including IRCC resources are connected to the campus 10 gigabit backbone. This backbone connects FIU and its computational computing resources to the Florida Lambda Rail, which connectivity to the National Lambda Rail and Internet2 can then be achieved. Furthermore, FIU has strands of dark fiber to Verizon's NAP of the Americas connecting it to Division of IT resources at that location, including AMPATH International Exchange Point (IXP) [3], a project of FIU.

"AMPATH serves as the premiere interconnection point for network-enabled U.S. - Latin America and Caribbean science research and education. Through its exchange point facilities in Miami, Florida, high-bandwidth network services are available for U.S. and international research and education networks to extend participation to underrepresented groups in Latin America and the Caribbean. AMPATH works as a major research facility recognized by the U.S. National Science Foundation, supporting international e-science. "

For further information about AMPATH, please see https://www.ampath.net/

A Science DMZ research network is implemented at FIU thanks in part to an NSF CC-NIE award that was received in 2012. IRCC's resources are connected to this new Science DMZ to provide enhanced end-to-end connectivity to other scientific instruments that were previously awarded to FIU faculty, such as ExoGENI [4] racks, Center for Imaging Sciences' MRI facility and the Wall of Wind facility. Other scientific instruments will be connected to the Science DMZ, such as GIS, mass spectrometer, genome sequencer, etc.

Staffing

Three full-time staff are dedicated to design and manage the IRCC resources. Additionally, five full-time staff members are shared between the Instructional and Research Computing Center, Network Operations Center and Enterprise Systems - all of which are departments within FIU's Division of IT. These positions also provide training documentation and workshops for FIU faculty and students to help take full advantage of the center's resources. In addition, Network Operations Center and Network Management Services support IRCC efforts by providing professional enterprise level datacenter hosting and network infrastructure services 24 hour a day, 365 days a year.

Florida Cyber-infrastructure

Florida International University is a member of the Sunshine State Education & Research Computing Alliance (SSERCA)[5], which "brings together geographically distributed organizations and resources in

such a way that their collective impact is far greater than the sum of their individual parts. The mission of SSERCA is to further the development of a state-wide computational science infrastructure of advanced scientific computing, communication and education resources by promoting cooperation between Florida's universities." Currently SSERCA consists of six members (FIU, FSU, UCF, UM, USF, UFL) and five affiliate members (FAMU, ERAU, FIT, UNF & FAU).

References

1. Instructional and Research Computing Center (IRCC), http://ircc.fiu.edu
2. Virtual Computing Lab (VCL), http://ircc.fiu.edu/resources/vcl/
3. AMPATH, The International Exchange Point for Research, https://www.ampath.net/
4. ExoGeni, http://www.exogeni.net
5. Sunshine State Educational & Research Computing Alliance, http://www.SSERCA.org