The LSU Campus Cyber Infrastructure Plan

Executive Summary:

The Louisiana State University (LSU) campus cyberinfrastructure plan is based on the broader LSU Flagship IT Strategy (FITS). The FITS is a community-authored IT strategic plan written by LSU researchers, faculty, staff, and students, and is part of the coherent campus-wide strategy and approach to campus cyberinfrastructure. The FITS addresses a variety of issues including network, wiring, high performance computing (HPC), and other infrastructure and applications that meet the needs of researchers, faculty, staff, and students. The FITS is used as a directive to guide the University in making strategic decisions that will benefit both research and academic infrastructure components. The FITS document can be accessed via http://itsweb.lsu.edu/CIO/FITS/item1982.html

Horizontal Integration with intra-campus resources:

1. LSU continues to maintain a “best-in-class” network as part of the FITS plan. A network upgrade began in 2007 as part of the Network 2010 project (part of the original FITS document). Research buildings were upgraded to 10 Gbps links along with many other infrastructure improvements to the network and fiber plant. LSU is currently underway with Network 2015 which continues to upgrade areas throughout the campus. In collaboration with LSU researchers, the network continues to evolve as part of the overall cyberinfrastructure plan.

2. LSU currently maintains two High Performance Computing (HPC) environments on the LSU campus – SuperMike II and SuperMIC (an additional state resource – QB2, is also maintained by LSU). Additionally, 1.5 PB of high performance storage are available as
well. These clusters provide abundant compute resources for researchers throughout the campus.

3. The campus backbone consists of four core routers fully meshed providing 30 Gbps connectivity across the backbone. The routers are capable of higher speed upgrades as needed.

4. LSU maintains a 14,000 square foot data center with two UPS systems and two generators. The data center is staffed 24x7x365 with personnel which support the campus as well as the LONI (Louisiana Optical Network Initiative) networks.

**Vertically integrated with regional and national CI investments and best practices:**

LSU is a founding member of LONI (Louisiana Optical Network Initiative) and Internet2 and continues to play an active role in both organizations. LSU is also an active member of REN-ISAC along with various organizations include EDUCAUSE and ACUTA. ITS staff are active members in each of these organizations, participating as committee members or chairs.

**IPv6 Deployment:**

The entire LSU network is fully IPv6 compatible. In 2008, LSU was issued a /48 IPv6 address space by ARIN. On July 6, 2011, the size of this space was increased to a /40. ITS staff subsequently fully deployed IPv6 campus-wide. All VLANs on the LSU campus have IPv6 routing enabled, including user VLANs and DMZ VLANs deployed for research and administrative purposes. LSU utilizes EUI 64 for IPv6 address distribution.

**InCommon Federation:**

LSU has committed to the adoption of federated approaches to identity authentication and authorization. That commitment is spelled out in the FITS document as follows:

*Action Item 2.04: Students, faculty, and staff work outside of standard office hours. The community expects to be able to access University resources from abroad and outside of regular office hours. Efforts like the Virtual Lab should continue. The University should continue to explore involvement in global resources like Eduroam and InCommon. In addition, LSU should provide robust and secure remote access like remote desktop and VPN resources.*

As a result of this early focus on federated approaches, LSU became a member of InCommon in 2009 and has had federated identity and authorization services deployed since 2010. Today, LSU uses federated identity and authorization in conjunction with Yale CAS for a number of outsourced services and for LSU WordPress sites. Plans to leverage federated services for other applications such as the LSU’s Moodle learning management system are presently in formation as part of a process of general evolution towards federated approaches to authentication and authorization. In addition, LSU leverages the eduroam-US federated authentication framework
for authentication to campus wireless, the InCommon Certificate Service, and looks aggressively for opportunities to leverage other Internet2/InCommon offerings as they are introduced.

**Summary:**

In summary, the LSU cyberinfrastructure plan incorporates network infrastructure with security in order to provide faculty, staff, and students the necessary resources to conduct research and business. The network infrastructure utilizes a modular design that is flexible enough to serve a variety of users, but more importantly, can be supported by the Network Operations Center. At the very nature of research is collaboration. In today’s world, scientists from all over the world work with each other on research issues, and this information is exchanged over an organization’s network infrastructure. Critical to information exchange is security. LSU has a security team devoted to utilizing best practices to maintain a safe environment while still accommodating researcher’s needs to exchange data.

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