updated 27 December 2018

A. INTRODUCTION & EXECUTIVE SUMMARY

Vision: Cyberinfrastructure as the key to research acceleration

The University of Nevada, Reno (UNR), the land-grant institution in the State of Nevada, attracts over $100M annually in sponsored research projects and is rapidly transforming into a Carnegie Highest Activity Research University where significant student participation in research drives next-generation workforce development. Essential to this process is coordinated implementation of a cutting-edge cyberinfrastructure that enables institutional success and accelerates the research process.

"Cyberinfrastructure" is defined as a fabric of highly connected systems for information and data acquisition, visualization, computing, storage, and associated human expertise serving end-to-end scientific and engineering workflows to improve scholarly productivity and enable breakthroughs not otherwise possible.

Advances in technology have shifted the global research paradigm from reliance on individual experience to the need to generate and access large datasets, perform advanced analytics, and produce unique outputs across interdisciplinary teams within and outside institutions. Success in research going forward depends entirely on the efficiencies of data movement, processing, and management – which all require coordinated cyberinfrastructure and institutional investment. www enperoor

C. CURRENT INFRASTRUCTURE OVERVIEW

Networking

The campus network core is a diverse series of five routers (Brocade VDX) fully meshed in a VCS fabric with 40GbE links, allowing for data to move through the core at 160 Gbps. These are dispersed around campus to fiber aggregation nodes with UPS and generator back-up. The campus is segregated into 17 regions each having two 10GbE links using single mode fiber to the diverse core allowing for redundancy. Each building has connectivity via fiber with a mix of 1GbE and 10GbE links. Wireless connectivity is integrated as a core part of the total campus network, with wireless access in all research and instructional spaces. Network status and performance is monitored by **SolarWinds**, **Intermapper**, and **perfSONAR**.

UNR is connected to **Internet2**

management plans, metadata issues, long term data storage, and uploading research data into the ScholarWorks repository.

Cyber security

UNR's strategic approach to cyber security is a policy-driven data classification methodology, combined with strong technical safeguards and proactive user engagement. This allows deployment of clear and concise data policies, along with an agile data governance environment, to provide a secure and adaptable framework for increasing the ability to do research on both regulated and non-regulated data.

A robust border network control and monitoring system is in place (since 2016) using a combination of layer 7 application firewalls and network inspection using fiber taps and an SDN switch to distribute flows to a CERT NetSA SiLK capture system. Big data analytic environments built to grow to 40Gbps were installed in 2016 to handle both the campus administrative network and anticipated demands of **a future Science DMZ**. UNR subscribes to the **InCommon** certificate service to increase utilization of encryption for all online services. UNR maintains an inclusive Identity Management System that allows auto-provisioning for students, faculty and staff and accommodating guests, affiliates, and visiting scholars. Shibboleth is the primary authentication gateway for all federated services. A campus wide Active Directory (AD) environment provides a multi-platform authentication and authorization system to all constituents. **Eduroam** authentication was enabled on the campus in 2016.

D. CURRENT CI PROJECTS & EFFORT (2018-19)

CI Program Development