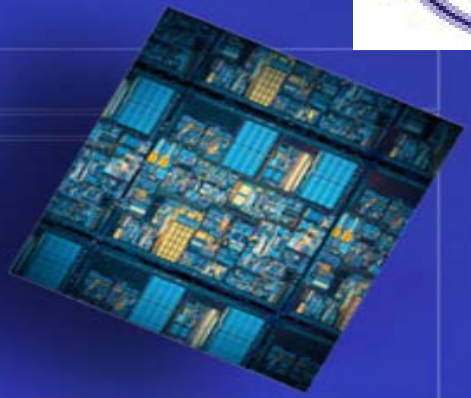
Nevada System of Higher Education

EPSCoR Cyberinfrastructure Assessment



Prepared by
Joseph Lombardo, Director
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for Energy and the Environment

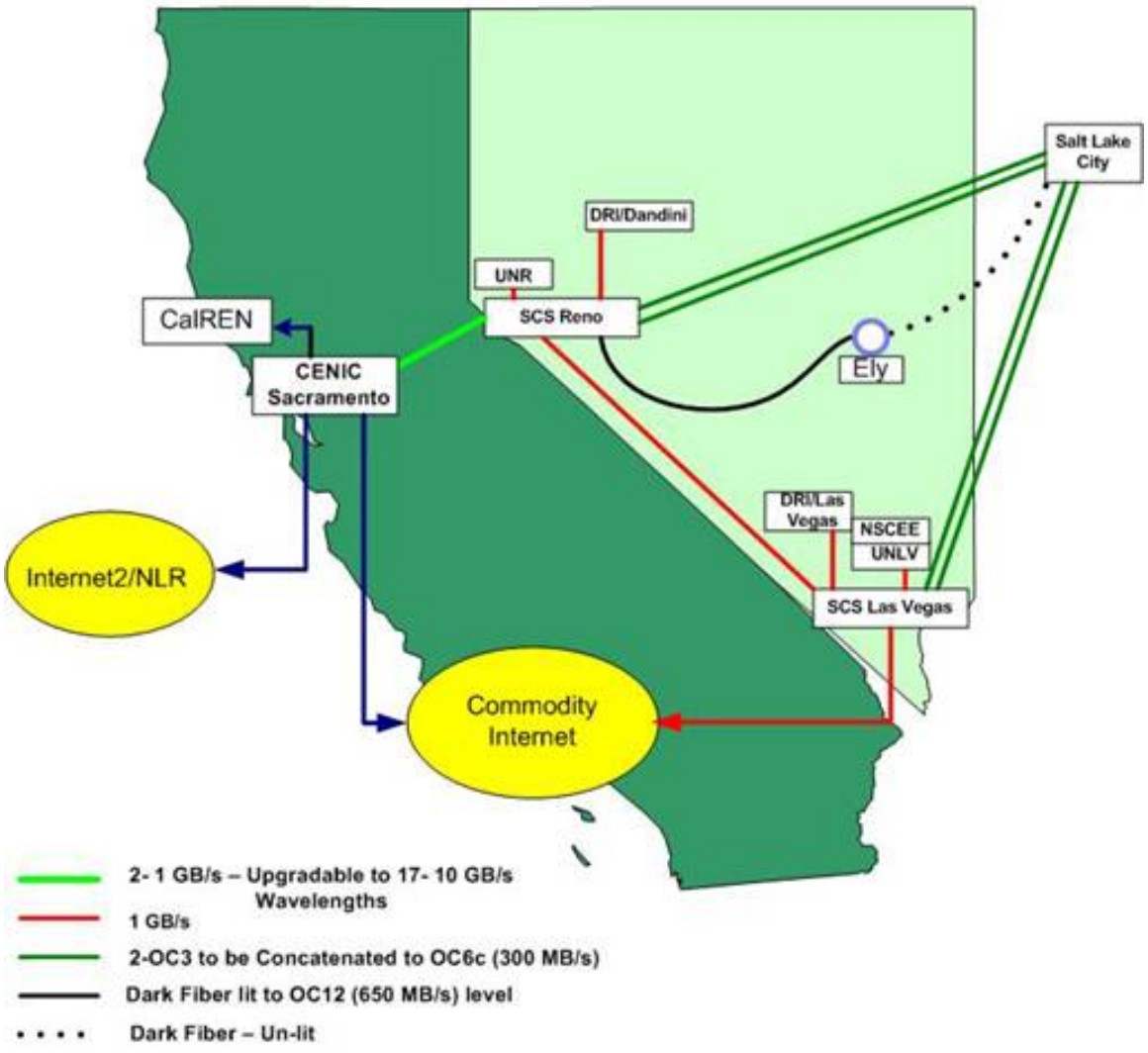
October 15, 2007

Nevada System of Higher Education

NevadaNet High Speed Research Network 10/1/2007

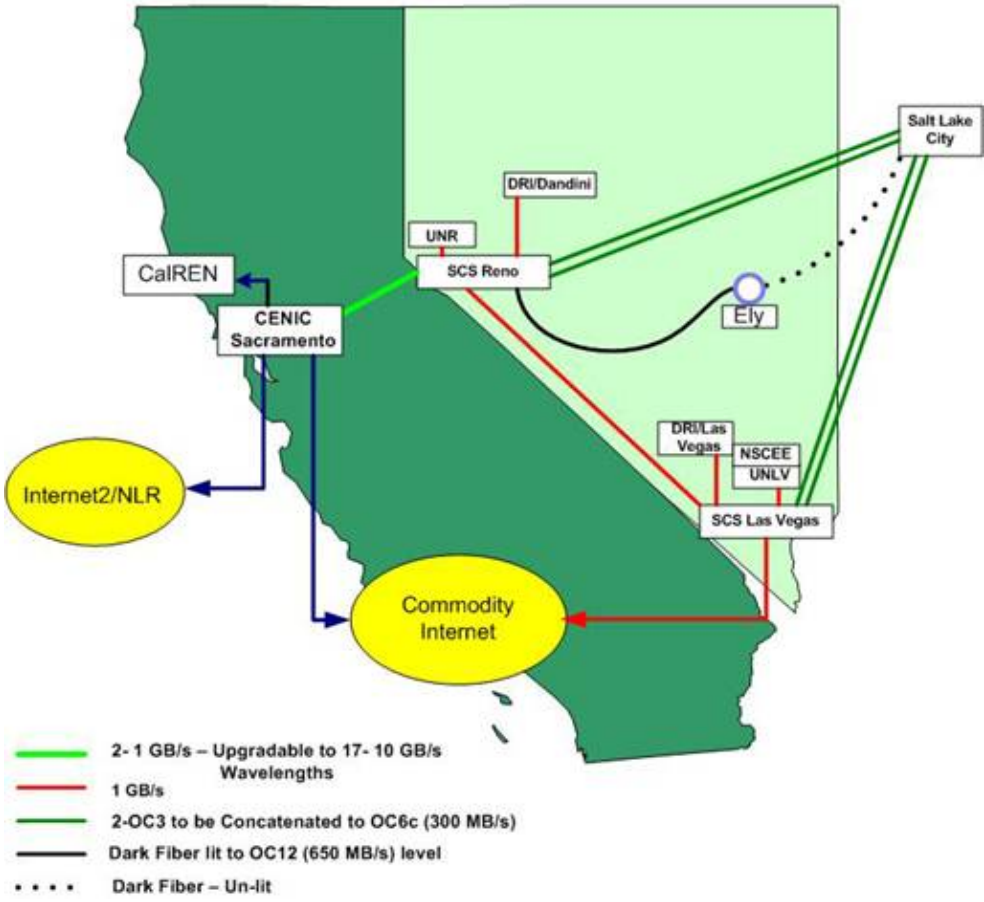
Mission:

- **Provide statewide data/video connectivity and capacity to adequately meet the needs of NSHE member institutions and other entities connected to NevadaNet.**
- **Maintain a high level of wide area network service reliability.**



Potential Projects

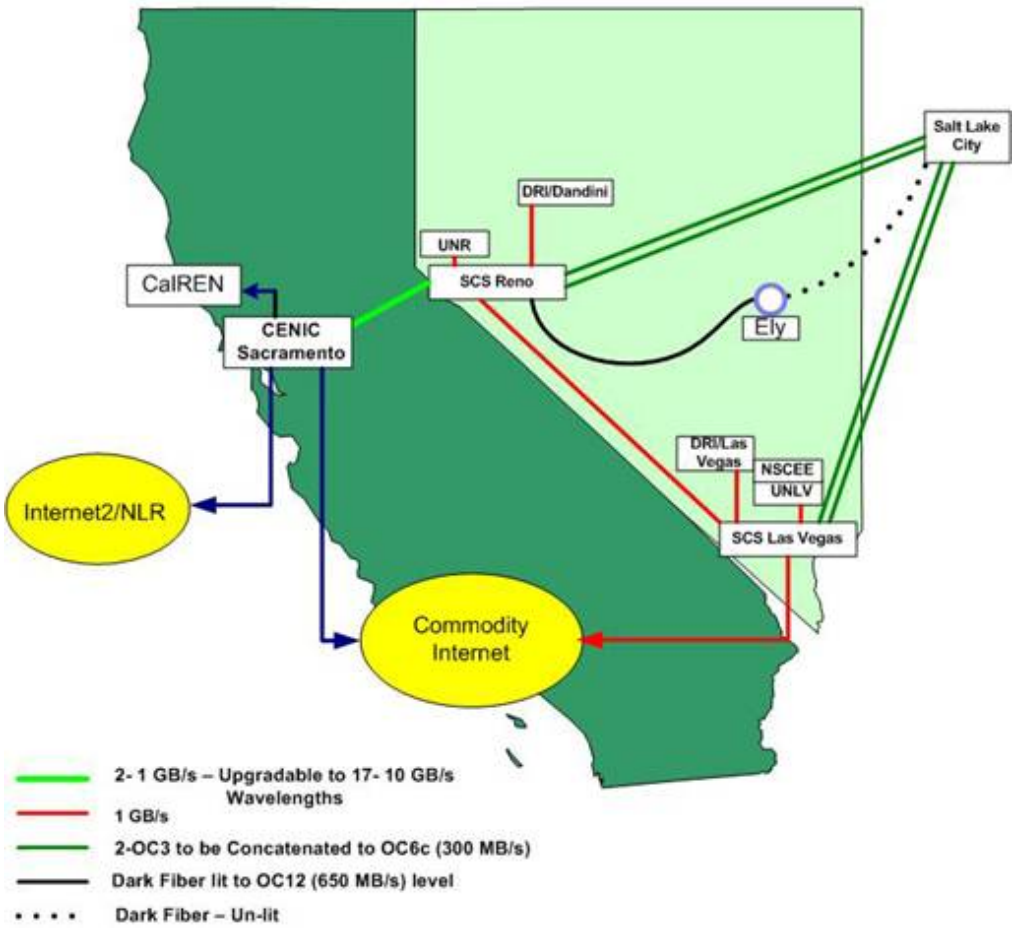
- Upgrade the path between Reno and Salt Lake City. This could be a joint initiative with Utah to provide Utah with access to California -- and for Nevada potential access to Denver and the Pacific Northwest.
- Upgrade research network capacity in Las Vegas. This could be done by providing a high capacity link from Las Vegas to southern California and/or increasing Reno/Las Vegas link capacity to allow Las Vegas to take advantage to the existing high capacity Reno/Sacramento link.



Nevada System of Higher Education

Potential Projects

- **The existing link from Reno to Sacramento connecting NSHE and CENIC is currently provisioned for 2- 1Gb/s links but is capable of expanding to multiple 10 Gb/s wavelengths.**
- **NSHE is paying annual fees for a connection to CENIC that has a flat rate for capacities from 1-10 Gb/s. For little incremental cost, the existing 2- 1Gb/s connections could be upgraded to a single 10 Gb/s link providing 5 times the bandwidth to support research applications.**
- **Develop more local fiber distribution points along fiber routes depicted in order to provide local access to fiber services such as rural health clinics and distance education instruction/support.**



Other NevadaNet Initiatives/Needs

- ✓ High Definition video services for medical/surgical teaching and education.
- ✓ Development/storage of universal/Statewide Electronic Health Records.
- ✓ Expanded environmental research by DRI/CAVE simulation technology.
- ✓ Expanded earthquake analysis and simulation by UNR
- ✓ State of Nevada Health Sciences initiative and the role of NSHE cyberinfrastructure in that development as well.
- ✓ Increased bandwidth from UNLV to NevadaNet.
- ✓ National Lambda Rail connectivity.
- ✓ Connectivity to the UNLV Research Park.
- ✓ Connectivity to the planned UNLV North Campus – 2009.
- ✓ Dense wave division multiplexing and the anticipated 40G standard.
- ✓ Higher bandwidth to on-campus research centers.

Nevada System of Higher Education

University of Nevada Reno

41 Research Centers, Institutes, and Facilities

Central cluster/grid supercomputer housed in tier 1 server room

- **64 node, 256 processor cores, 256GB physical memory, 24TB local storage. Currently used, for production, by Computer Science & Bioinformatics.**

Additional, independent clusters in Physics , Nevada Seismological Laboratory, Mathematics, and the Nevada Terawatt Facility.

Dedicated grid administrator who reports to IT.

Issues

- **Independent clusters lack the higher quality infrastructure and dedicated support personnel. Growing interest among these groups to move to the central grid on campus so that they can share resources and, more importantly, share support.**
- **One likely need arising out of the success of the centrally administered campus grid and to achieve integration of these independent, geographically diverse clusters is the design and deployment of a dedicated campus research network to keep this high bandwidth grid traffic off the commodity UNR campus network.**
- **Discussion is also taking place of opening up the UNR grid to accommodate research clusters at the Desert Research Institute.**

Nevada System of Higher Education

University of Nevada Las Vegas

62 Research Centers, Institutes, and Facilities

One 200 processor Linux cluster (Engineering)

One 32 node Linux cluster (Science)

Two Access Grid Nodes

National Supercomputing Center for Energy and the Environment (not inclusive)

- **SGI® Onyx® 3800 with InfiniteReality3 Graphics**
- **2 Sun Fire[tm] E6900 Servers**
- **Sun Enterprise[tm] 5500 Server**
- **Sun Enterprise[tm] 450 Server**
- **RackSaver® RS-1100 Cluster**
- **Internet2 Graphics Visualization Lab and Access Node Grid**
- **Itanium-2 Cluster – (64 node system)**
- **StorageTek PowderHorn® 9310 Automated Cartridge System (360 TeraBytes)**
- **2 Sun StorEdge[tm] L180 Tape Libraries (70 TeraBytes)**
- **SGI® Total Performance 9400 (TP9400) Storage Subsystem (4 Terabytes)**
- **Sun StorEdge[tm] T4 Disk Array (17.4 TeraBytes)**

Desert Research Institute

Research Labs:

- 10 distinct research areas: Archaeology, Biology, Chemistry, Computing, Ecology, Engineering & Instrumentation, Geology, Hydrology, Physics, Weather & Climate AND 51 distinct labs : Located in Las Vegas (8), Reno (41), NV Test Site (1), Steamboat Springs, CO (1)

Centers

- Center for Advanced Visualization, Computation and Modelling (CAVCaM)
- Center for Arid Lands Environmental Management (CALEM)
- Center for Watersheds and Environmental Sustainability (CWES)
- Frank H. Rogers Center for Environmental Remediation and Monitoring (CERM)

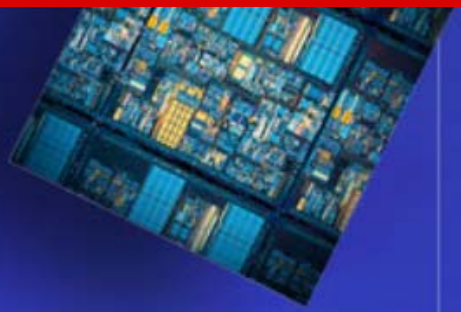
Compute Resources (not inclusive)

- SGI Altix 350 Itanium-2 8-processor
- Altix 3000 Itanium-2 32-processor system
- SGI Origin 200 server with dual Risc 10000 processors
- Sun Fire V480 with a dual UltraSPARC III processor
- Apple Macintosh Power Mac
- Apple iMac
- Apple PowerBook G4's and G5's
- Linux high-end graphics workstations
- SGI Altix 3700 44-processor system
- 31.8 terabytes of disk storage
- Access Grid Node

National Supercomputing Center for Energy and the Environment

High-Performance Computing and Communications in Nevada

Questions



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