

## **SCS/Telecom Services - 2001-2003 Enhancement Budget Request Overview**

### **SCS/Telecommunications Services Mission Statement**

To provide and maintain a reliable, cost effective, backbone telecommunications network capable of supporting the wide area connectivity needs of the customers of the University and Community College System of Nevada

### **Overview**

The Telecom Services group within System Computing Services consists of 22 FTEs that operate and maintain a statewide communications network known as NevadaNet. NevadaNet provides video and data services to approximately 100 sites throughout the State of Nevada (see attached figure 1). These sites support all levels of academic instruction and research from K-12 and Community Colleges, to the State Universities, and Medical/Dental Schools.

Telecom Services has three main responsibilities related to the network:

1. To provide adequate backbone network capacity to support the needs of the individual educational entities
2. To provide for secure and reliable service over the network
3. Provide network technology development and interconnection standards that allow member institutions to implement new technologies and applications on a cost effective, nonproprietary, system wide basis.

The Telecom Services enhancement budget request for the 2001-2003 biennium focuses on these three main areas in support of its mission.

### **General Network Capacity Upgrades**

Growth continues to be the driving force behind the majority of the SCS/Telecom Services 2001-2003 biennium Enhancement Budget request. Eighty-one percent of the total \$2.86 million request is related to keeping pace with the growing network needs of NevadaNet institutions. System growth is being driven primarily by the following factors:

1. The need for UCCSN institutions to participate in high-level research and collaboration on the High Speed Research Network known as the Internet 2 (ABILENE).
2. The continued growth of traditional compressed video distance learning opportunities.
3. The rapidly growing development of Web based distance learning classes based on Web CT technology. This approach allows for added flexibility by allowing remote students to participate in classes based on their own schedules rather than at fixed class times, but involves greater demand on the network Internet connections. The number of Web CT classes is expected to triple over the next three years.
4. Student Technology fees collected by member institutions are being used to develop additional labs, classrooms, and capacity at institutional sites causing increased demand on the backbone network, which receives none of the technology fee money to bolster its capability.
5. Increased student services like web registration and payment, are also having an impact on backbone network capability, particularly during the peak registration periods.
6. Growth of the UCCSN member institutions i.e. the addition of the Redfield campus in the north and the proposed Henderson State College campus in the south.
7. The U.S. government is making an increasing amount of funding available to rural communities to provide more widespread Internet access to these areas. These rural communities are obtaining federal support to provide tech centers, additional computers, and other equipment to their school systems, but often neglect to provide any funding for backbone infrastructure.
8. High bandwidth telemedicine applications are being proposed that will have a significant impact on the available capacity on the NevadaNet backbone network.

Slow network performance relating to Internet access is the single most prevalent complaint of user institutions. Capacity improvements have been undertaken based on available resources, but there are still significant system bandwidth constraints that are negatively impacting system performance. An item has been included in the 2001-2003 enhancement request to increase commodity Internet access capability in each year of the 2001-2003 biennium. Failure to fund this item will lead to slow network response and ultimately an inability to support Web based administrative and distance learning objectives of UCCSN member institutions.

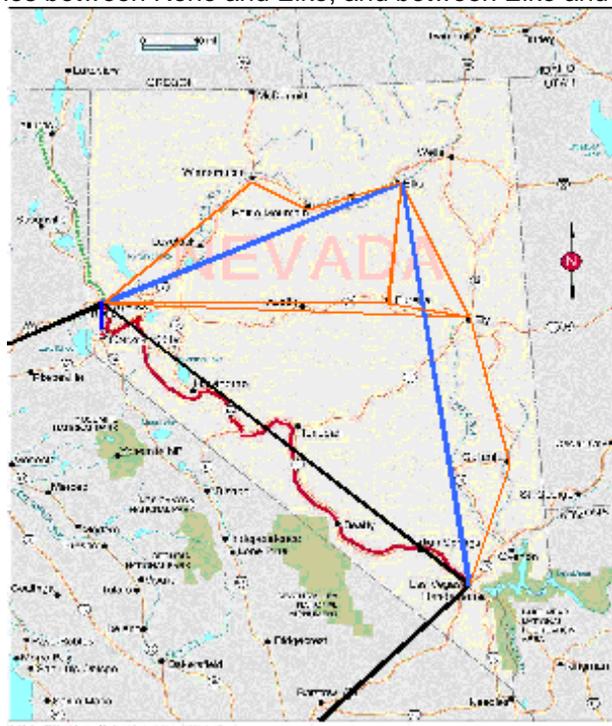
The execution of the agreement with Williams Communications will result in temporary relief of traffic loading problems on the external connections to the Internet, but strengthening of these connections only moves the "weak link" of the bandwidth chain farther into the network. As a result, there is a need to not only be aggressive in keeping up with direct Internet connection capacity, but to bolster the capacity of other tributaries of the network to handle greater traffic levels and provide alternate routing capability as well.

The map below is a diagram of the roughly triangular NevadaNet backbone network. There are four major hub points Las Vegas, Reno, Elko, and Carson City as well as minor hub points in Ely, Panaca/Caliente, Eureka, Battle Mountain, and Winnemucca. From these hub points emanate a myriad of radial connections to the approximately 100 individual Community College, K-12, and other institutional sites.

The lines between Las Vegas and Reno, and the connections to California the connections that will benefit from the capacity provided by the Williams Agreement. Initiatives are proposed in the 2001-2003 budget request to provide additional capacity to the lines between Reno and Elko, and between Elko and Las in an attempt to increase rural access to the Internet and provide alternate routing capability. Existing connections from the major hub sites to the primary UCCSN member institutions are also becoming bandwidth constrained. Consequently, it is planned to over the next biennium to upgrade these connections as well.

Migrating to higher bandwidth connections will necessitate upgrading existing equipment to handle higher capacity interfaces i.e. DS3, OC3, etc. Several items have been included to support these equipment upgrades.

Telecom has been preparing to migrate to a data transport technology called ATM. ATM makes more efficient use of bandwidth by allowing all types of traffic i.e. voice, data, and video to use a common network rather than having separate networks for each. The completion of the connections to the Williams fiber project and migration to ATM will add a whole new class of equipment requiring maintenance and support. Two additional FTEs have been included to handle this additional workload.



## Video

While Internet access has grown rapidly, so has the use of traditional video conferencing for both educational and administrative purposes. Currently SCS/Telecom schedules approximately 125 classes and 30 administrative conferences (a total of approximately 320 hours each week). These sessions are set up and taken down by SCS/Telecom technicians and schedulers on an hourly basis between the hours of 7:15 am and 9:00 pm. The number of sites involved in each session averages between 4-5.

Projected growth of conventional video conferencing remains strong. As the number of video sites increases, the average number of sites per conference increases due to the ready availability of facilities. More sites per conference put an added burden on video switching equipment capacity. An item has been included to increase video switching capacity to support the increasing number of sites per session.

The video scheduling aspect of the Telecom mission has a very high profile and is very customer service intensive. Two additional FTEs have been included to maintain the current level of scheduling and troubleshooting support in the face of the expansion of the video network usage.

UCCSN institutions have requested additional troubleshooting support and an extension of the scheduling day from the current 7:00 AM - 9:00 PM to 6:45 AM - 10:00 PM. One additional FTE would be required to provide this extended level of service and has been included as a separate line item.

Approximately 81% (\$2.32 million) of the SCS/Telecom Enhancement Budget request is in support of system growth being driven by member institutions. Failure to fund these initiatives will result in slow to unacceptable network performance that could seriously jeopardize the ability of member institutions to meet their internal and distance learning objectives.

### **Network Reliability / Security**

The NevadaNet network has grown from a small network of radial T-1 lines to a large-scale network with a looped backbone. The Internet and video conferencing, once novelties and used by a relative few are now mainstream and an integral part of the educational curriculum. The network, and more importantly the customer base, can no longer tolerate long outage times and unreliable operation.

The network needs alternate routing capability as well as more stable hardware and software in order to provide operate at a more commercial level of network performance. Items have been included to improve the reliability of eemailand Web servers, provide backup circuit routing capability, and the integrity of the video scheduling and switching equipment.

Approximately 14% (\$407K) of the SCS/Telecom 2001-2003 enhancement request is in support of additional reliability and security. Failure to fund these reliability/security items will result in less reliable network performance to member institutions and could potentially jeopardize the ability of UCCSN member institutions to meet educational and administrative objectives.

### **New Technology Development**

SCS/Telecom has traditionally been a leader in implementing technology to meet the needs of the member institutions and insuring that new technology can be implemented in a standardized and scalable fashion to meet the wide area connectivity needs of all member institutions.

To that end SCS/Telecom is requesting funding to investigate one technology, desktop video, which is being aggressively pursued by member institutions and could result in enhanced network performance and reduced operating costs.

Approximately 5% (\$143K) of the SCS/Telecom 2110-2003 enhancement request is in support of this new technology research/development. Failure to fund this initiative could result in member institutions developing non-scalable and proprietary applications that may not interface with the wide area network. In addition, the opportunity to improve network efficiency and reduce operating costs via implementation of more cost-effective technology would be lost.