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#### CENIC News

##### President's Message: CalREN - CENIC's Multitiered Advanced Network-services Fabric

For the past two years, we have been planning the upgrade of CalREN-2. The planning phase for this upgrade was referred to the Optical Network Initiative or ONI.

We set out with the goal of developing the most robust network capability with the dollars we were currently spending. We also desired to have a network that was optics-based and to connect the "last mile" of each Charter Associate campus to the backbone with fiber to reduce the high cost of local loops.

Our planning has achieved these goals.

We are now in the process of implementing our multi-tiered CalREN infrastructure, the implementation of the ONI. However, the journey has been adventurous with many twists, turns, peaks and valleys. That is a story in itself.

The CalREN statewide backbone will be implemented using fiber acquired, via IRUs (Indefeasible Right of Use), from Level3 and augmented by Williams. SBC Pacific Bell is providing one "last mile" connection into several campuses while we acquire and build fiber to the campuses for the second "last mile" connection to these campuses.

Cisco Systems has been selected to provide the optical and router equipment needed for the new CalREN.

In the new multi-tiered CalREN infrastructure the experimental and network researchers will use CalREN-XD; the researchers with large-scale applications will use CalREN-HPR; and all the faculty, students and staff throughout California K-20 community will use CalREN-DC, which will extend into each of the 58 counties.

As CENIC begins its sixth year, truly a new era for research and education networking has arrived in California, one based on fiber and optics that will serve the full range of needs of this community.

Source: Tom West, President, CENIC

##### DCP Project Update

The Digital California Project just begun its third year and has many accomplishments to be proud of. As this is being written, Lassen County has just been connected to the network, becoming the 52nd county to be connected. Only six counties are awaiting connectivity: Humboldt, Del Norte, Modoc, Trinity, Mono and Alpine. Two counties are scheduled to be connected by the end of October and two more are scheduled to be connected by calendar year end. Connectivity for Humboldt and Del Norte counties is dependent upon resolution of issues between CalTrans and the common carriers.

A report on last mile school connectivity, providing connections from the County Offices to districts and schools, is about to be published and work is underway, with collaboration from the California Department of Education, to update during the fall the status of last mile connectivity with current fiscal year data.

As with the growth in connectivity, there is also growing use of the network. Among the increasing uses is video over IP for meetings, conferences and other types of collaborations. Similarly, the use of web cast for various instructional, professional development and administrative purposes is growing in popularity.

Following input received in a May 2002 workshop, work is scheduled to define the role of a portal/web site and guidelines for links and content for the K-12 community. Development of an initial site is scheduled to occur this year. Many other exciting activities to facilitate K-12 teaching, learning and professional development via use of the network are underway and will be reported in future articles.

Source: Jim Dolgonas, COO, CENIC

### **CalREN Optical Network Infrastructure (ONI) Status Report**

The various pieces of CalREN optical network planning and design have come together very quickly in the last three months. The statewide CalREN Optical Network is now in implementation. In that period, CENIC has:

- Completed construction of the first fiber connection from the backbone into San Diego Supercomputer Center and begun second path construction to the San Diego campus
- Purchased backbone fiber from Level 3 that establishes a complete CENIC-managed backbone fiber path from Sacramento to Los Angeles (and San Diego)
- Purchased a second backbone fiber path between Los Angeles and San Diego from Williams Communications
- Completed design of all last mile fiber connections for all UC campuses and gotten UC funding approval for that construction
- Completed the design for fiber connectivity to the California State University Cal Policy San Luis Obispo campus

To view a schematic representation of the CalREN optical backbone that shows the optical equipment nodes and the different logical backbone networks that will operate over the fiber network visit [http://www.cenic.org/DCP\\_Presentation\\_files/optical\\_backbone0902.ppt](http://www.cenic.org/DCP_Presentation_files/optical_backbone0902.ppt).

In parallel with the above fiber acquisitions, CENIC has gone through a vendor qualification and selection process for the optical multiplexers that will 'light' that fiber and the network equipment that runs over these new CENIC operated facilities. An award for both optical and routing equipment has been made to Cisco Systems, pending CENIC's successful negotiation of contract terms and conditions.

These developments represent a major change in CENIC's technical plans. The combination of continued reductions in fiber pricing and very attractive equipment pricing has made it possible for CENIC to implement the end-end dark fiber network envisioned at the start of the Optical Network Infrastructure initiative, but believed to be unaffordable even four months ago. CENIC has developed a financial plan that will allow the migration of both the CalREN-2 and 4CNet network backbones over to this new fiber backbone with no increase in cost to member institutions.

Planned network implementation milestones include the following: (Note that all dates are preliminary, and dependent on final agreement on an equipment contract and equipment delivery schedules.)

- Initial wave service between Los Angeles and San Diego was brought up in September - four 10Gb/s waves for the Distributed Terascale Facility project, and an OC-12 Digital California backbone link.
- CENIC will be the first gigaPOP to connect to the new Abilene 10Gb/s backbone, with that service being active for the October Internet-2 meeting in Los Angeles.
- Southern California CalREN campuses will begin transitioning service over to the new backbone as their last mile fiber construction projects complete, with the first campus service as early as November.
- Northern California CalREN campuses will begin migrating over to the new backbone during the first quarter of 2003.
- The coastal and SF-Sacramento backbone fiber and high speed services will be brought up in the 1st and 2nd quarters of 2003, with UCSB, UCD, and Cal Poly SLO services activated as the backbone comes into production.

We expect to have completed the upgrade to the new backbone before the end of FY 2002/03. Digital California circuits and services now operating over the 4Cnet backbone will be moved to the new backbone during the remainder of calendar 2003.

Source: Greg Scott, CENIC, Director, Infrastructure Initiatives

### **Teragrid Update**

Ciena, formerly ONI Systems, has completed installation of the wave division multiplexing (WDM) equipment between Los Angeles and the San Diego Supercomputing Center. As of September 12, Ciena's installation team was in the final stages of completing their testing and turn-up procedures, leading to California's segment of the TeraGrid completion by the end of the month.

TeraGrid is a multi-year effort to build and deploy the world's largest, fastest, most comprehensive, distributed infrastructure for open scientific research. When completed, the TeraGrid will include 13.6 teraflops of Linux Cluster computing power distributed at the four TeraGrid sites, facilities capable of managing and storing more than 450 terabytes of data, high-resolution visualization environments, and toolkits for grid computing. The four participating partner institutions are the National Center for Supercomputing Applications (NCSA) at the University of Illinois, Urbana-Champaign, the San Diego Supercomputer Center (SDSC) at the University of California, San Diego, Argonne National Laboratory in Argonne, IL, and Center for Advanced Computing Research (CACR) at the California Institute of Technology in Pasadena.

Source: Edwin Smith, Network Implementation Project Manager

#### **CalVIP -- Bringing Video over Internet Protocol to CalREN and 4CNet Users**

The California State University and CENIC have worked together to address the issues of implementing Video over IP on the CSU and CENIC networks.

The California Voice over IP project team (CALVIP) has hired a consultant that will begin to put together an RFP that will specify the requirements of the video network. This RFP will be offered to the vendor community for a response and is expected to be completed in a very short time period (30-45 days). Please watch this newsletter and the website for further details.

Source: Susan Bowers, CALVIP Project Manager

#### **NGI Roundtable -Innovative First Mile Strategies Workshop**

CENIC's Innovative First Mile Strategies Workshop is scheduled for October 9 at the Fairmont Hotel in San Jose, CA. This NGI Roundtable event will identify the opportunities and obstacles to achieving one gigabit per second connectivity throughout California by 2010. CENIC has gathered more than 20 luminaries from the industry, government and academia to discuss the best means to bring one gigabit into every business and each home over the next eight years. For more information or to register, visit <http://www.cenic.org/Workshops/NGI/09October02/index.html>.

Source: Molly Petrick, NGI Roundtable Director

#### **CENIC Technical Advisory Committee (TAC) Update**

A meeting of the TAC was held September 5th, at Stanford University. The meeting focused on the Optical Network Infrastructure Initiative (ONI) and included a presentation from Cisco on their proposal to support this effort. Other notable topics included reports on the Digital California Project, CalVIP, and the recent IPv6 workshop at UC Berkeley.

In addition to regular face-to-face meetings, the TAC sponsors working groups to pursue more in-depth investigations of technologies of interest to the CENIC community. Active working groups of the TAC include an IPv6 Working Group headed by Michael Sinatra ([michael@rancid.berkeley.edu](mailto:michael@rancid.berkeley.edu)) of UC Berkeley and a Network Instrumentation Working Group headed by David Wasley ([david.wasley@ucop.edu](mailto:david.wasley@ucop.edu)) of the UC Office of the President. Contact Michael or David for information on joining these working groups.

The schedule for future TAC meeting is October 21 at UC Santa Barbara; November 14 at California Polytechnic State University, San Luis Obispo; December 12 at UC Riverside; and January 16, 2003 at UC Santa Cruz. Contact the TAC chair, Michael Van Norman ([mvn@ucla.edu](mailto:mvn@ucla.edu)) for more information regarding these meetings and other TAC events.

Source: Michael Van Norman, TAC Chair

#### **National Networking News**

##### **FY 2003 Supplement to the President's Budget (Blue Book)**

The Supplement to the President's Budget, also known as the Blue Book, reports on the coordinated research priorities and activities of the NITRD agencies for FY 2003. In the post-September 11 world, highest-quality IT capabilities and technical advances with broad applications are needed more than ever. In that context, the Blue Book's first two sections - "From Research to Reality" and "U.S. Priorities" - highlight ways in which technologies developed through Federal NITRD investments aided in disaster response efforts after 9/11 and are playing critical roles in Federal initiatives to strengthen national, homeland, and economic security. The next section - "The NITRD Program" - outlines the Program's goals, management, and research structure. Subsequent sections are devoted to each of the NITRD enterprise's major research areas: high-end computing, large-scale and broadband networking, human-computer interaction and information management, high-confidence software and systems, software design and productivity, and socioeconomic and workforce implications of IT and IT workforce development. Each section describes current issues and major research challenges and lists the proposed FY 2003 research activities of the participating agencies.

For more information visit <http://www.itrd.gov/pubs/blue03/index.html>.

Source: National Coordination Office of Information Technology Research and Development

#### **New NSF CISE Division Director for Information and Intelligent Systems**

Dr. Michael Pazzani of the University of California, Irvine (UCI), will be joining NSF as the Division Director of the Information and Intelligent Systems Division (IIS) within the Computer and Information Science and Engineering (CISE) Directorate on October 1, 2002. Dr. Pazzani is a professor of information and computer science at UCI and will be on loan to NSF from his position there.

Dr. Pazzani is a noted researcher in machine learning, personalization, information retrieval, and cognitive science. In addition, he was department chair of Information and Computer Science at UCI for five years.

Source: NSF CISE Announcements

### **About CENIC**

CENIC is a not-for-profit corporation formed by the California Institute of Technology, the California State University, Stanford University, the University of California, and the University of Southern California to facilitate and coordinate the deployment, development, and operation of a set of seamless and robust advanced network services. The CENIC Associates program offers qualified companies the opportunity to collaborate with CENIC in pursuit of the goal of providing the most advanced network services for research and education. Cisco Systems, SBC, and the University and Community College System of Nevada are CENIC's Partner Associates.

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