



CENIC

COMMUNITY REPORT

JULY 2024–2026



CENIC connects California to the world — advancing education and research statewide by providing a world-class network essential for innovation, collaboration, and economic growth.

Table of Contents

01	CELEBRATING 30 YEARS	Page 4
02	PLANNING FOR THE FUTURE - STRATEGIC DIRECTION	Page 7
03	GOVERNANCE, MEMBERSHIP, AND FINANCIALS	Page 12
04	NETWORK STORIES FROM THE BLOG	Page 20
05	CENIC BIENNIAL CONFERENCE 2026	Page 28
06	TECHNICAL OPERATIONS SERVICES & IMPROVEMENTS	Page 34

01

CELEBRATING 30 YEARS

PRESIDENT'S LETTER

30@30: CELEBRATING CENIC'S 30TH ANNIVERSARY

Celebrating 30 Years

Dear CENIC Community,

As we kick off CENIC's 30th anniversary year, this community report gives us a wonderful chance to look back—and more importantly, look forward. A strong legacy isn't a place to rest; it's the launching pad for our future.

Three decades ago, open-minded leaders from top universities came together to build a network for California. Today, that foundation has scaled into something truly massive, bridging **54,000 miles** of network, **800 Gbps** with over **57 Tbps** of capacity, connecting over **20 million users**—adding community colleges, public libraries, K-12 schools, scientific and cultural organizations, and Tribal Nations to the founders from California's leading universities – UC, CSU, Stanford, USC, and Caltech.

Over the last two years, we've seen incredible momentum. The growth of the **CENIC AI Resource (CENIC AIR)** has been explosive. At the same time, our brilliant engineering teams have partnered with you to build custom security tools that keep CalREN safe and performing at its peak—giving our members a cybersecurity edge you won't find anywhere else.

Serving as your CEO for half of CENIC's history is incredibly humbling. Your energy and innovation keep me inspired every day.

Thank you for being the driving force behind everything we do. This community report is a celebration of your hard work.

Warmly,



Louis Fox

CEO, CENIC



LOUIS FOX
CEO & PRESIDENT



30@30: Celebrating CENIC's 30th Anniversary

We are pleased to announce the launch of a new video series as we mark the 30th anniversary of CENIC. “[CENIC 30@30](#)” will introduce you to some of the significant milestones of the Corporation for Education Network Initiatives in California (CENIC) and its network, the California Research and Education Network, or CalREN—among the most advanced research and education networks in the world with more than 54,000 total miles of CENIC-managed fiber.

The CENIC community’s innovations were a foundation that built upon our common research and education infrastructure, and we have extended the same broadband access and opportunity to many communities across California.



CENIC: California's Research Network Legacy

It all began in the 1990s, when a group of leaders from California’s statewide research and education community realized the new commercial Internet wasn’t designed for their unique, high-performance needs. So they set off to develop their own advanced network that would serve the fast-growing demands of network-enabled research and education.



CalREN Goes Live

Over 1997-1998, CENIC brought the California Research and Education Network fully online. CalREN wasn’t just a faster version of what came before. It was a dedicated infrastructure — purpose-built for the institutions shaping California’s future.

02

PLANNING FOR THE FUTURE - STRATEGIC GOALS

THE VISION FOR CENIC

EVOLUTION OF THE CENIC NETWORK

- THE CALREN BACKBONE
- A CONNECTED CALIFORNIA
- CYBERSECURITY
- COMMUNICATIONS
- ENGAGEMENT

The Vision for CENIC

The organization and staff are driven by a shared vision to build on decades of experience running networks and services for our diverse communities, meeting exponential traffic growth, and enabling future-facing levels of connectivity for sites that lack it. As we have for 20+ years, we continue to support our existing members and sustain network performance, all while pushing the boundaries of what's possible to bring them even more value through advanced services, cost-effectiveness, and network resilience.

Evolution of the CENIC Network

The plan for the future of CalREN follows these four core elements: (1) the network must be cost-effective and keep costs flat over time; (2) it must be reliable and resilient; (3) it must meet the capability and capacity needs of all CENIC segments; and (4) it must be “facilities efficient,” deploying cost-saving innovative technologies that decrease both capital and operating expenses, often in partnership with other networks.

Some of the most recent accomplishments toward the overall vision are described below.

THE CALREN BACKBONE

- Upgraded core backbone capacity to 2x400 Gbps with native 800 Gbps support at major hub sites, and began deploying SuperCore to bring datacenter-grade architecture to the WAN, lowering costs, speeding upgrades, and improving network resilience.
- Expanded peering capacity to over 8 Tbps and added additional capacity to hosted cloud connections, including AWS in Los Angeles and Sunnyvale.
- Modernized network tooling and automation through continued deployment of Falcon and Phoebe, with plans to expand the use of AI for operational efficiency and accuracy.
- Expanded network performance monitoring with perfSONAR and Prometheus Blackbox Exporter, improving visibility into connectivity and reliability across key internal and external services.
- Launched a new member portal with enhanced traffic usage tools, and deployed a cloud-based infrastructure monitoring platform (Zabbix), reflecting CENIC's move toward deploying all infrastructure in a hyper-resilient manner with failover as quick as 5 seconds, now also available to members as IMSaaS.
- Deployed Science DMZ as a Service at San Diego CCD and Los Angeles CCD, enabling rapid setup of CENIC-AIR nodes and contributing to shared AI research resources for the community.

A CONNECTED CALIFORNIA

- Supported the Middle Mile Broadband Initiative during the development, planning, and implementation phases by designing the network backbone and security architectures.
- Completed Years 4 & 5 of the Broadband Infrastructure Grant and secured additional resources for continued program administration through June 30, 2028.
- Supported the transition of Imperial COE as the new aggregator for California's libraries.
- Contributed to the CPUC's Broadband Equity, Access, and Deployment (BEAD) plan.



CYBERSECURITY

- Program Maturity and Governance:** CENIC continued to strengthen its cybersecurity governance by advancing ISO 27001 readiness, formalizing secure development practices, and promoting the consistent use of recognized security standards. These efforts provide a stronger foundation for continuous improvement, accountability, and long-term risk management.
- Threat Prevention and Risk Reduction:** CENIC enhanced its ability to prevent and address cyber threats through stronger DNS and firewall protections, AI-assisted security testing, and increased workflow automation. Together, these improvements help identify vulnerabilities earlier and enable faster, more consistent responses to emerging risks.
- Identity, Email, and Access Protection:** CENIC strengthened protections for users, accounts, and communications by implementing Proofpoint email security and expanding Okta Single Sign-On. These measures reduce the risk of unauthorized access, phishing, and email-based attacks.
- Security Monitoring and Infrastructure:** CENIC upgraded the technology and infrastructure to monitor, analyze, and respond to cybersecurity events. These investments improve visibility across the environment and strengthen the organization's ability to detect and investigate suspicious activity.
- Member Cybersecurity Services:** CENIC expanded the cybersecurity services available to members to include autonomous penetration testing, DMS+, and Protective DNS. These offerings help members identify vulnerabilities, block malicious activity, and improve their overall security posture.
- Cybersecurity Workforce and Capacity:** CENIC increased its cybersecurity staffing and expertise to keep pace with a growing and increasingly complex threat landscape. The additional analyst and engineering capacity strengthen monitoring, incident response, program development, and member support.



COMMUNICATIONS

Over the past two years, Communications has created content for each member segment that CENIC connects. This content welcomes, engages, and informs internal and external colleagues and members about the history, value, and services that CENIC offers. We promote the network and its community members' innovations, impacts, and news across multiple channels.

Highlights include:



CENIC AIR

The Champions site and map serve as the foundation for a comprehensive knowledge base and ecosystem to foster collaborations. It will continue to grow, evolve, and be updated regularly.

[LEARN MORE >](#)



Biennial Conferences

A big success in general, great programming, truly a conference made by and for its members.

[LEARN MORE >](#)



C2TAG Member Community

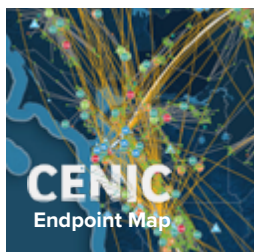
A forum for representatives from all segments to share information and expertise and serve their colleagues as trusted advisors.

[LEARN MORE >](#)



Expanded Salesforce

Our CRM now includes all of our data, and we continue integrating with internal systems to improve data quality and create new audience lists. We continue to dive deeper into our audiences, highlight their successes, and offer them relevant information.



CENIC Endpoint Map

A great tool to visualize the reach, breadth, and impacts of the network and its membership.

[LEARN MORE >](#)

We complete between **40 and 75 projects monthly**, depending on complexity, working across CENIC departments and its initiatives like C2TAG, CENIC AIR, BIG, and Pacific Wave.

ENGAGEMENT

Engagement at CENIC is an organization-wide effort focused on strengthening partnerships and deepening relations to demonstrate the value of our network community. Through deeper understanding and alignment with member needs, revitalizing key relationships with members and partners, and refining internal strategies, we enhance service delivery while demonstrating the tangible benefits of our collaborative efforts.

Goals include:

- Educate members about CENIC services.
- Inform members about the community, including its composition and ways they can collaborate and enrich one another.
- Strengthen relationships with members and partners.
- Inform and educate all CENIC staff, and ensure they can contribute to achieving engagement goals.
- Create advocates for CENIC from each member segment.

Highlights include:

- The CENIC Community Technology Affinity Group (C2TAG) convenes member institutions:
 - Hosted nine C2TAG events.
 - Created a C2TAG Slack group for real-time communication.
 - Grew representation to 540 members representing all CENIC segments.
- Participated in 64 Member Engagement Meetings.
- Attended and participated in 11 conferences hosted by member institutions.
- Attended and participated in 15 technical conferences.
- Attended and participated in 19 Research and Education conferences.
- Improved relationships with strategic telecommunications partners through Annual Business Reviews.



03

GOVERNANCE, MEMBERSHIP, AND FINANCIALS

[ABOUT CENIC](#)

[BOARD OF DIRECTORS](#)

[C2TAG](#)

[MEMBERSHIP](#)

[FINANCIAL STATEMENT\(S\)](#)

About CENIC

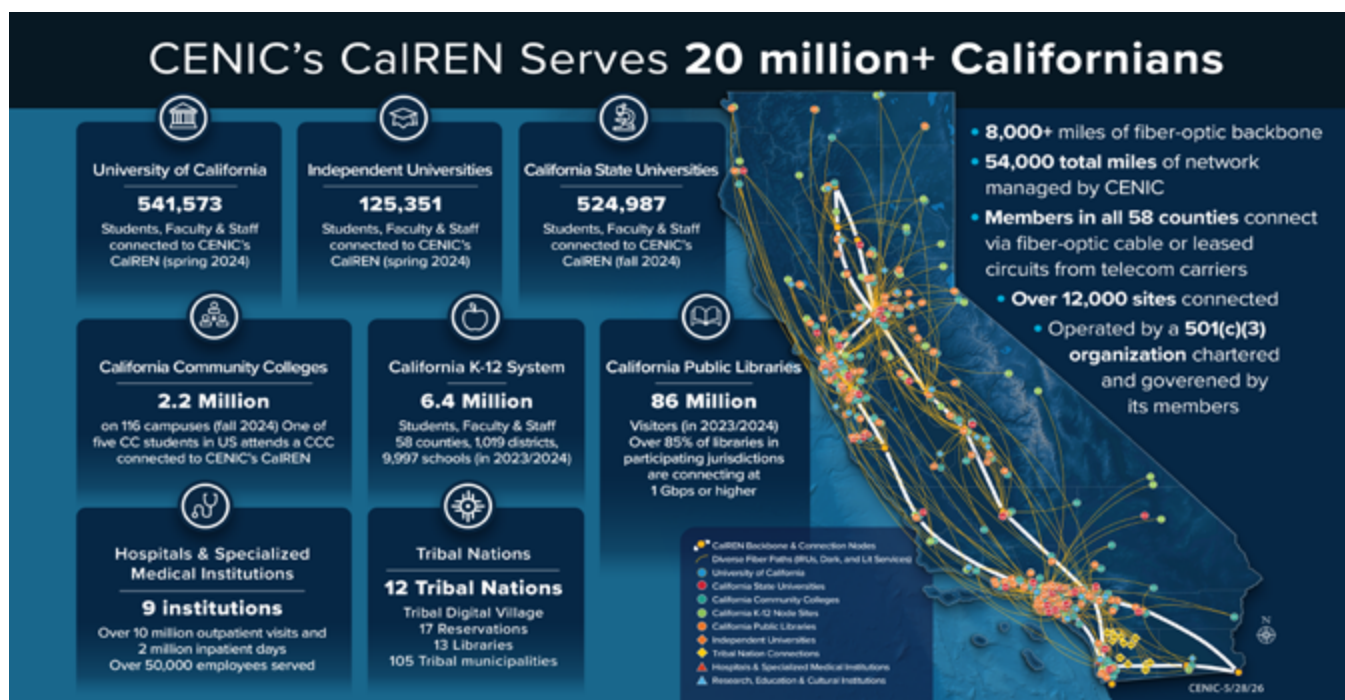
CENIC connects California to the world — advancing education and research statewide by providing the world-class computing network essential for innovation, collaboration, and economic growth.

Established in 1997, the Corporation for Education Network Initiatives in California (CENIC) is the nonprofit organization operating the California Research and Education Network (CalREN), a high-capacity Internet-based network backbone consisting of more than 8,000 miles of optical fiber and thousands of network connections reaching out from the backbone to member institutions throughout the state, for a total of 54,000 CENIC-managed network miles. The network serves over 20 million users across California, including the vast majority of K–20 students, together with educators, researchers, and individuals at other vital public-serving institutions.

CENIC is governed by representatives of the Charter Associate institutions that it serves: California's Community Colleges, the California K–12 system, the California Public Libraries, the California State University, the University of California, and independent universities (the California Institute of Technology, the Naval Postgraduate School, Stanford University, and the University of Southern California).

CENIC's resources provide cost-effective, high-bandwidth networking and services to support our members — responding to the needs of their faculties, staff, students, and associated research groups — and to facilitate excellence in scientific, educational, government, and private sector collaboration and innovation.

Additionally, CENIC is closely involved with important efforts to develop and expand networking capacity across the region, the nation, and the world. [Pacific Wave](#), a joint project of CENIC and the [Pacific Northwest Gigapop](#) (PNWGP), is a wide-area distributed exchange platform that provides research and education networks throughout the Pacific Rim and the world with access to state-of-the-art peering and exchange services, Science DMZs, and software-defined exchange (SDX) and software-defined networking (SDN) capabilities. The [CENIC AI Resource](#) (CENIC AIR) functions as the California portion of the [National Research Platform](#) (NRP), which integrates its 50+ member institutions' Science DMZs into a high-capacity national system that enables secure processing and transfers of large scientific datasets for research and instruction.



Board of Directors

CENIC is governed by its member institutions through the board of directors. Director seats are held by representatives of the CENIC Charter Associates — the segments of the California research and education community for and by which CENIC was created, as well as significant segments that joined later. Directors typically serve three-year terms. Board members in office as of June 30, 2026, include:

BOARD CHAIR & VICE CHAIR



Samuel Sudhakar, (Chair)

CFO & Vice President of Finance,
Technology and Operations,
CSU San Bernardino



Marla Meehl, (Vice Chair)

Integrated Network Services Manager
& Assistant Director of Enterprise IT;
Senior Program Director, Front Range
GigaPoP; Workforce in IT Networking
at SC team, University Corporation for
Atmospheric Research

BOARD MEMBERS



Keith Agosta

Sr. Director of Network Engineering, Enterprise
Technology, Stanford University



Josh Chisom

Manager, Broadband Opportunities Program,
California State Library



Danny J. Allen

Investor and Consultant, djallen LLC



Ed Clark

CIO, Information Technology,
CSU Chancellor's Office



Kendra Ard

Chief Infrastructure Officer,
CSU Chancellor's Office



Jennifer Coleman

Executive Director, CCC Technology Center



Joe Bengfort

CIO, Senior Vice President, and Associate Vice
Chancellor, UC San Francisco



Crystal Duran

Library Director, Belvedere Tiburon Library



Jin Chang

CIO, California Institute of Technology



Louis Fox

President & CEO, CENIC

BOARD MEMBERS

**Jory Hadsell**

Executive in Residence, Information Technology,
CCC Chancellor's Office

**Ramesh Rao**

Director of Qualcomm Institute &
Professor, UC San Diego

**Craig Hayward**

Vice Chancellor, AI Strategy and Digital
Transformation, CCC Chancellor's Office

**Kari Robertson**

Deputy CIO & CTO, UC Office of the President

**Ron Johnson**

Vice President, CIO Emeritus, and Professor,
University of Washington

**Nick Scheib**

Associate CIO for Infrastructure,
University of Southern California

**Terry Loftus**

Assistant Superintendent & CIO,
UC San Diego County Office of Education

**Nancy Schram**

Library Director, Ventura County Library

**Mary Nicely**

Deputy Superintendent of Information &
Technology, California Department of Education

**Andrew Schwab**

Superintendent, Dos Palos-Oro Loma Joint
Unified School District

**Bill Paik, (Ex Officio Director)**

Treasurer & CFO, CENIC

**Larry Smarr, (Science Advisor)**

Distinguished Professor Emeritus,
UC San Diego

**Matthew Rantanen**

Advisory Director of Technology, Southern
California Tribal Chairmen's Association

**Van Williams**

CIO & Vice President for Information Technology
Services, UC Office of the President

CENIC Community Technology Affinity Group



The Community Technology Affinity Group (C2TAG) is a forum for representatives from all CENIC member segments to share information and expertise on network technologies, fostering a community of like-minded professionals who serve as trusted advisors to their colleagues. It also allows members to engage CENIC staff and explore recently deployed network services and their applications among CENIC segments.

By joining the C2TAG, technology professionals connect with peers in an informal setting. Through e-mails, Slack, and various in-person and virtual meetings, we share best practices, discuss problems and solutions, and gain valuable insights into industry trends.

Steering Committee Members include:

- **Aaron Lusk**, San Joaquin Valley Library System
- **Alan Worthy**, Sacramento Public Library
- **Amanda Armitage**, Ventura County Library
- **Anjali Jauregui**, Irvine Valley College
- **Dustin Koelzer**, Sacramento County Office of Education
- **Erik Latrope**, UC Berkeley
- **George Peek**, UC Santa Cruz
- **Jose Sanchez**, Cypress Community College
- **Joseph Goodwin**, UC Los Angeles
- **Keoni Kamura**, South Orange County Community College District
- **Luis Wong**, Imperial County Office of Education
- **Matt Duhon**, Black Gold Cooperative Library System
- **Matt Hughes**, CSU Chancellor's Office
- **Shane Greene**, Getty Institute
- **Tamara Broman**, Sacramento Public Library
- **Willie Peng**, CSU Fullerton



Membership

Charter Associates

These founding and governing research and education members have full access to CENIC's portfolio of networks and services. Charter Associates' representatives comprise the CENIC Board of Directors, setting policy and guiding the organization. [Learn more about CENIC membership levels.](#)

- University of California
- California State University
- California Community Colleges
- California K–12 Schools
- California Public Libraries
- California Institute of Technology
- Stanford University
- University of Southern California
- Naval Postgraduate School



Associates

These independent research, educational, medical, and technology institutions and organizations engage with and connect directly to the broader CENIC community. Associates have direct access to CENIC's portfolio of networks and services.

- Chan Zuckerberg Biohub
- NASA Ames Research Center
- Montage Health

Sponsored Associates

These are cultural, scientific, or artistic institutions or organizations with a close tie to a Charter Associate that serves as a sponsor. Sponsored associates have direct access to an abbreviated portfolio of CENIC's networks and services.

- California Academy of Sciences
- Exploratorium
- Lockheed Martin Advanced Technology Center
- National Oceanic and Atmospheric Administration (NOAA)
- The Jackson Laboratory

Auxiliary Associates

Auxiliary Associates are smaller institutions and organizations that engage with the CENIC community and have direct access to an abbreviated portfolio of networks and services.

- Carnegie Mellon Silicon Valley
- Chapman University
- Getty Center
- H.N. and Frances C. Berger Foundation
- Internet Archive
- Salinas Valley Memorial Healthcare System
- Santa Clara University
- University of San Diego

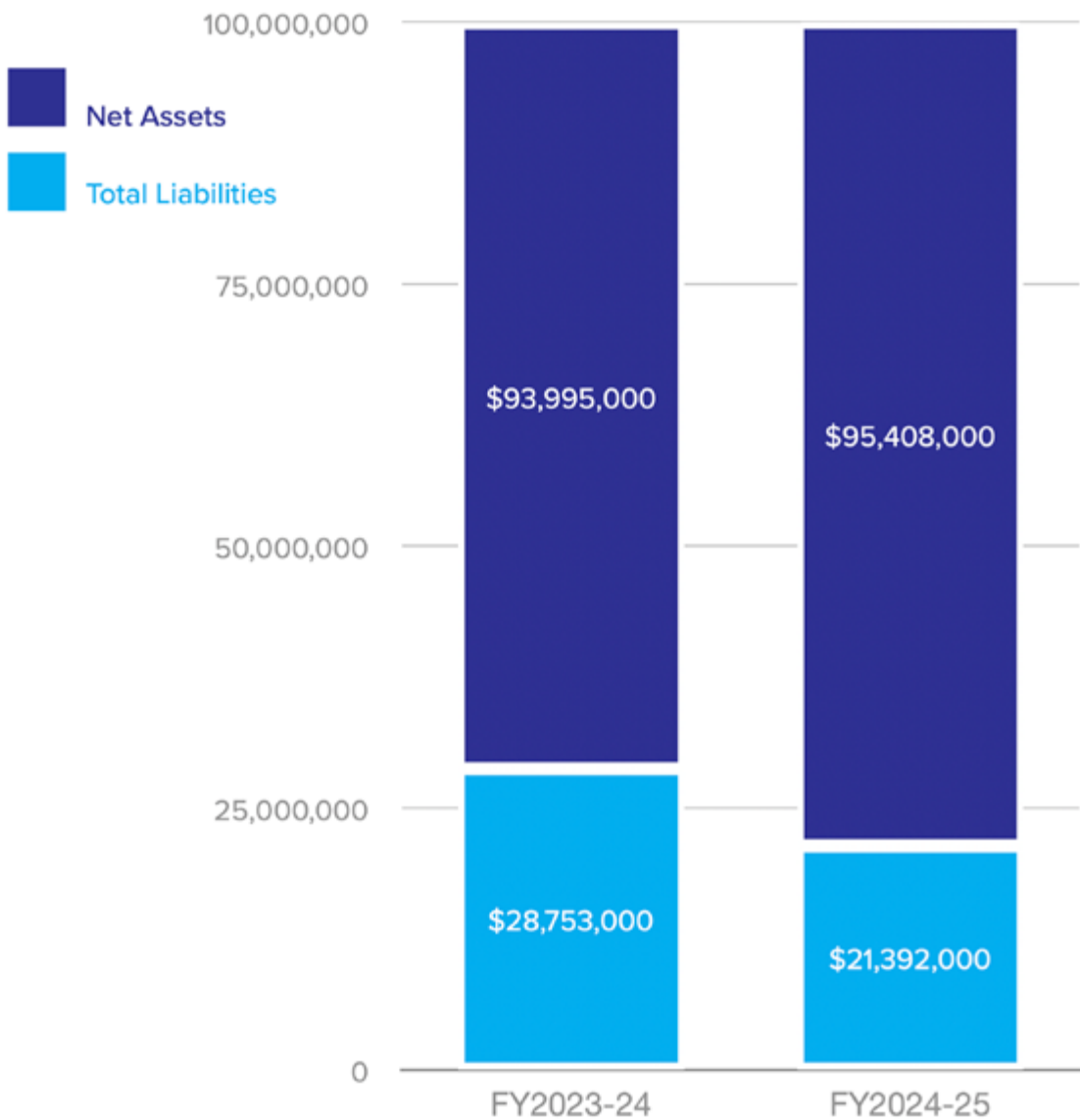
Affiliates

These educational and research institutions and organizations make use of CalREN indirectly through a Charter Associate that serves as an Affiliate's connection to the network.

- ArtCenter College of Design
- Charles Drew University
- Colburn School
- East Bay Community Law Centers
- Hopkins Marine Station
- International Computer Science Institute
- J. Craig Venter Institute
- Lick Observatory
- Loyola Marymount University
- Mount Saint Mary's University
- National Marine Fisheries Service
- Occidental College
- Salk Institute for Biological Studies
- Scripps Institute of Oceanography
- SLAC National Accelerator Laboratory
- The Broad Art Foundation
- The Claremont Colleges

CENIC Financial Statement 2023–2025

	FY2023-24	FY2024-25
Total Assets	\$122,748,000	\$116,800,000
Total Liabilities	28,753,000	21,392,000
Net Assets	\$93,995,000	\$95,408,000





04

NETWORK STORIES FROM OUR BLOG

CENIC AIR

ADVANCED NETWORKING AND SERVICES FOR ALL

NETWORK-ENABLED AGRICULTURE

DISASTER RESEARCH, RESPONSE, AND RECOVERY

CENIC NETWORKING AND SERVICES UPGRADES

EXPANDING GLOBAL COLLABORATION

PROMOTING EQUITABLE ACCESS

CENIC AIR



California at the Vanguard of AI-Enabled Education for All with CENIC AIR

See how CENIC's AI Resources initiative (CENIC AIR) offers California's educational institutions a revolutionary leg up in an era where AI-enabled education is a critical differentiator for sustainability. Keynote delivered by UCSD's Supercomputer Center director Frank Wuerthwein.

[READ MORE >](#)



Advancing AI for California's Community Colleges through Collaboration Across the CENIC Membership

See how a relationship forged at a CENIC biennial conference led to California's community colleges' engagement with CENIC AIR, exponentially expanding access to its tools.

[READ MORE >](#)



NRP's Vision: Open National Infrastructure for Research & Education Beyond R1s

The promise and potential of a federation of cyberinfrastructure available to the nation's higher ed, non-profit research, and library institutions is doable via the National Research Platform born out of the success of the Pacific Research Platform. Learn more from Frank Wuerthwein, director of the San Diego Supercomputer Center.

[READ MORE >](#)



Science DMZs: Enabling Secure AI and Machine Learning Innovation with CENIC AIR

Understand the options and policies that enable CENIC members to participate in CENIC AIR and the National Research Platform efficiently, effectively, and securely.

[READ MORE >](#)



CENIC AIR and Your Campus: From Concept to Connection

Does your institution want Equitable Access to the AI resources offered via CENIC AIR? Learn from your colleagues in the CSU system in a presentation from the 2024 Biennial Conference.

[READ MORE >](#)

Advanced Networking and Services for All



Opening the Digital Future for the Next Generation

Spurring the innovation needed for solutions to tomorrow's problems requires creativity to build the technology skills and tools broadly for the next generation. That was the core message of a panel of thought leaders at the 2026 Biennial conference.

[READ MORE >](#)



Ventura County Library to Provide eduroam Connectivity to Student and Faculty Patrons with CENIC Membership

See how CENIC membership boosted network services and lowered costs for the San Joaquin Valley Library System's 105 libraries.

[READ MORE >](#)



Digital Navigators at California's Public Libraries Help Bridge Broadband Divide

Learn about new strategies and opportunities from a panel of experienced library and policy experts gathered by CENIC for its Biennial Conference.

[READ MORE >](#)



CENIC Members Bolster the Economy by Expanding Digital Literacy in California

CENIC members play an important role in bolstering digital literacy for an economy where 90% of jobs require online proficiency. See how libraries, schools, and Tribal communities are meeting the challenge.

[READ MORE >](#)



CENIC Membership Enables San Joaquin Valley Library System's Wi-Fi Revolution

See how CENIC membership boosted network services and lowered costs for the San Joaquin Valley Library System's 105 libraries.

[READ MORE >](#)

Network-Enabled Agriculture



CENIC and San Diego Supercomputer Center Create Sustainable Agriculture for California's Future

Technology and AI have a significant role to play in the future of agriculture, a critical industry in California - and one that CENIC AIR supports both through statewide data sharing and educational opportunities for future farm employees.

[READ MORE >](#)



CENIC Members Enable Data-Driven Agriculture: Optimizing Harvests in a Changing Environment

Learn how a vineyard-based learning lab at Iron Horse Vineyards is working with CENIC and its higher ed members to collect and share its data as both a learning tool for future vintners and for future sustainability.

[READ MORE >](#)

Disaster Research, Response, and Recovery



Network Strategies to Predict, Plan, and Prepare for Disasters

Recovering from disaster requires a resilient network of connections. CENIC's 30 year experience with disaster recovery is built on innovative solutions, partnerships with private and public entities, and the wisdom of expert colleagues nationwide as noted in this 2026 Biennial conference panel.

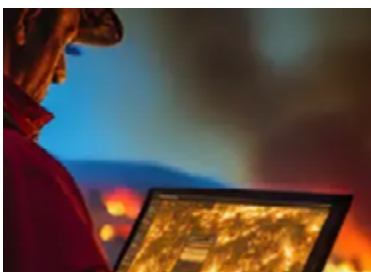
[READ MORE >](#)



AI-Enabled Fiber-Optic Geodesy: CENIC Networking and Services Enable Cutting-Edge Seismology

Caltech's Zhan Group of Observational Seismology recognized that microscopic imperfections in fiber-optic cables act as seismometers, providing scientists with an ongoing detailed real-time view of ground, ocean floor, and magma movement. See how access to this surge in data is leading to development of AI-enabled tools for seismologists globally.

[READ MORE >](#)



CENIC and its Members Help Prepare for, Recover from, and Respond to Disasters

CENIC's members - particularly schools and libraries - play critical roles in disaster recovery as "second responders", including the Altadena Library following the devastating 2025 Eaton Fire. See other recent examples here.

[READ MORE >](#)

CENIC Networking and Services Upgrades



CENIC Completes 800 Gbps Upgrade to California Research and Education Network

Learn how this upgrade provides agility and efficiency for members.

[READ MORE >](#)



The Easy Button for DDoS Attacks: Fast, Convenient, Cost-Effective Mitigation for CENIC Member Institutions

Learn about the protective layer of cybersecurity available to CENIC member institutions with DDoS Mitigation Service and its highly responsive Network Operations Center.

[READ MORE >](#)



CENIC Network Automation Update: New Network Source-of-Truth Tool Implemented

Learn more about CENIC's new Network Source of Truth tool.

[READ MORE >](#)

Expanding Global Collaboration



Pacific Wave Signs MoU with New Japan-Based Research and Education Exchange Facility FUJIXP

Read about the exciting expansion in connectivity offered via the recently created Coalition of Interoperable Networks for Japan and International (CINJI) that furthers the promise of Pacific Wave - a joint project of CENIC and the Pacific Northwest Gigapop.

[READ MORE >](#)



The National Data Platform: Enabling Researchers to Cruise Vast Oceans of Data

Learn how CENIC and its R&E network colleagues have evolved over the years to now provide a suite of member driven services and resources, adding significant value to those using the network.

[READ MORE >](#)



Pacific Wave, Cal Poly Humboldt, and Internet2 Collaborate on Connectivity to Singapore, Guam, and Jakarta

CENIC takes its mission to connect California to the world seriously, as demonstrated with this new collaborative upgrade to the Pacific Wave Exchange.

[READ MORE >](#)

Promoting Equitable Access

Promoting Equitable Access means defending government programs and policies that expand broadband access. In Fiscal Year 2025–2026, federal and state Universal Services programs came under scrutiny with rulemaking processes at the FCC for E-Rate and at the California Public Utilities Commission (CPUC) for the California Teleconnect Fund (CTF). The proposed changes would narrow these programs and eliminate eligibility for many CENIC member sites that have historically relied on these subsidies, and that would be catastrophic for schools, libraries, and community colleges.



CENIC coordinates efforts with the California Department of Education (CDE), the California State Library (CSL), and the CCC Chancellor's Office regarding CTF eligibility. CENIC is also contributing to nationwide advocacy efforts led by the Schools, Health & Libraries Broadband Coalition, the Consortium for School Networking, the American Library Association, the Benton Institute, and others to preserve these funds.

New technologies and emerging fields of study are fueling rapid expansion and evolution across the research and education ecosystem, with CENIC offering expanded services and resources to members. Also, CENIC engages with potential new members to join our community, adding two new members: Santa Clara University and H. N. and Frances C. Berger Foundation in the past two years. In the new fiscal year, additional discussions will take place with prospective new members to further expand the reach of network infrastructure and services.

The joint-build approach has been successfully demonstrated as a way to deliver essential broadband services to the hardest-to-connect areas of the state. By identifying multiple local sites that can share a common fiber path, joint builds can be developed to the mutual benefit of the sites involved. As with carpooling, sharing the majority of the commute lowers the cost compared to each individual traveling alone.

As CENIC continues to identify last-mile solutions for schools and libraries in un- and underserved areas, we plan to expand this model by coordinating with awardees of other broadband funds, such as the various CPUC Last-mile grants, and Internet Service Providers building local solutions.

Broadband Infrastructure Grant Program: A BIG Idea to Connect California's Most Underserved Schools

The Broadband Infrastructure Grant (BIG) program was established in 2019 to identify and fund fiber-based broadband solutions for California's most poorly connected schools, supporting digital learning opportunities for students statewide. Funds are allocated through the CDE, which contracts with CENIC to serve as the program's third-party administrator.

Unlike many state grant programs, which require awardees to identify their own solutions and manage implementation independently, BIG places that responsibility on CENIC. Drawing on three decades of securing connectivity in some of the state's most challenging environments, CENIC identifies potential awardees, partners with commercial providers to develop solutions, and manages each project through completion.

Schools with the greatest connectivity gaps are typically located in economically disadvantaged areas, where limited return on investment discourages commercial providers from building infrastructure. CENIC's long-standing relationships with providers — extending to senior management — allow us to negotiate solutions in areas that would otherwise attract little commercial interest. This has delivered fiber-based broadband to historically underserved communities at a reasonable cost, including schools along the west side of the Salton Sea in Riverside County, in Round Valley in Mendocino County, and across the Sacramento Delta in Clarksburg. CENIC also employs joint-build construction, coordinating shared builds across multiple nearby E-Rate-eligible sites. This reduces individual site costs and overall construction costs, while giving commercial providers greater confidence that the resulting revenue will justify their investment.

BIG builds on the infrastructure established by the state-funded K12HSN project, which connects County Offices of Education (COE) in all 58 counties to CalREN as aggregation points for districts statewide. BIG-funded schools typically connect through their local district or COE, gaining access to the same advanced network services, expertise, and vendor relationships.

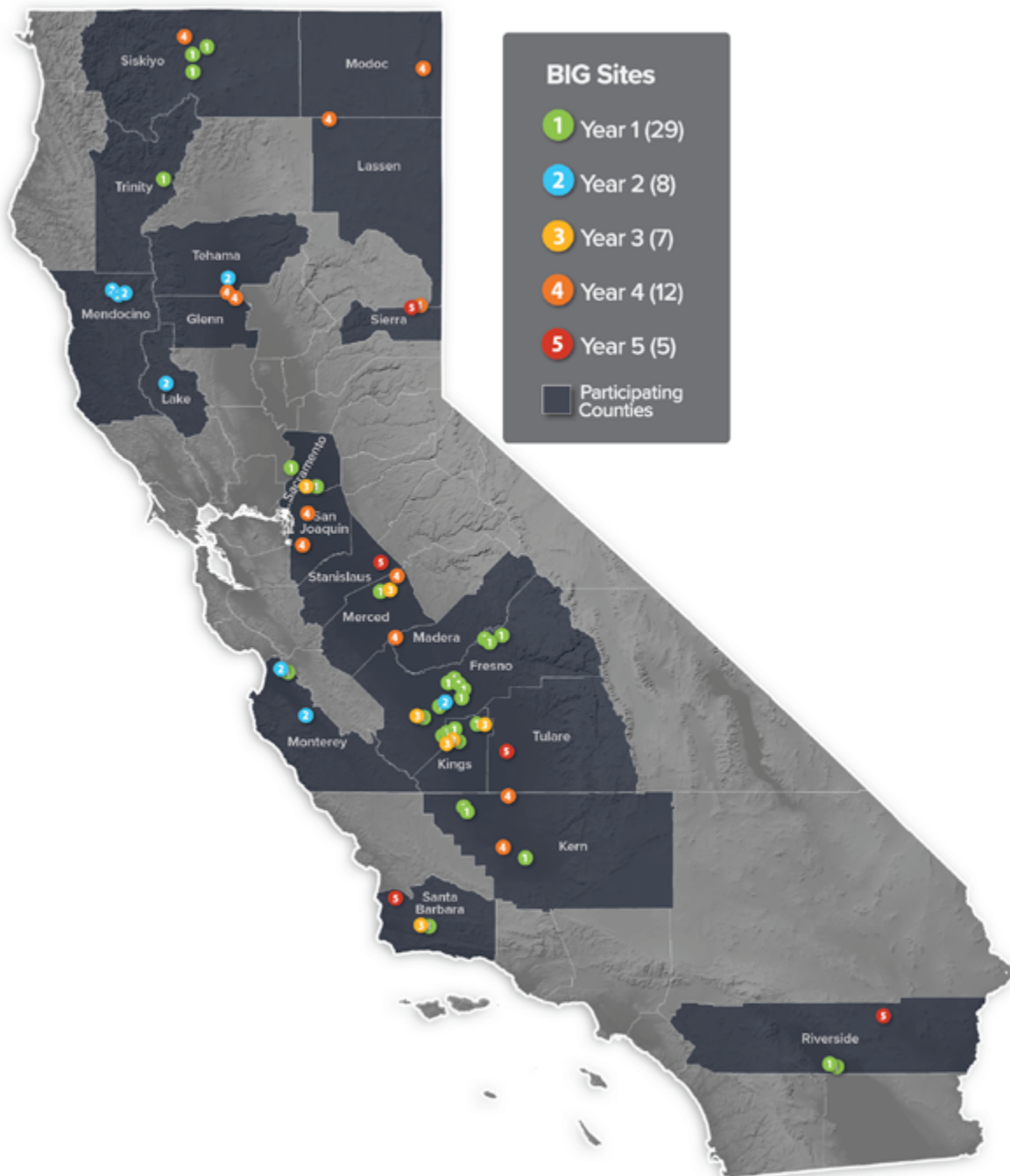
In 2025, CENIC surveyed 127 education stakeholders, including superintendents, principals, and technology directors, across 47 schools in 12 counties with active BIG-funded circuits. Eighty percent of respondents stated their schools were in hard-to-reach areas where fiber infrastructure had previously been limited or nonexistent. The impact of reliable connectivity extended beyond the classroom: 80% of respondents reported increased after-school programming, 92% reported improved parent communication, and 90% reported smoother integration of digital records into administrative systems. Respondents also noted that reliable connectivity enabled new services like speech-language teletherapy, virtual field trips, and accelerated credit recovery through online programs.

Maximizing Funds

To maximize program funding and minimize administrative burden, CENIC serves as consortium lead in securing federal E-Rate funding for one-time construction costs, as well as E-Rate and state-based CTF discounts on recurring costs. To date, the program has funded roughly \$7,075,000 in construction costs, with CENIC securing \$6,525,000 in federal E-Rate funds, reducing the net cost to \$550,000, or 8% of the total construction cost. The program has connected 50 schools across 19 counties, serving approximately 15,000 students, teachers, and staff.

In 2025, CENIC surveyed 127 education stakeholders, including superintendents, principals, and technology directors, across 47 schools in 12 counties with active BIG-funded circuits. Eighty percent of respondents stated their schools were in hard-to-reach areas where fiber infrastructure had previously been limited or nonexistent. The impact of reliable connectivity extended beyond the classroom: 80% of respondents reported increased after-school programming, 92% reported improved parent communication, and 90% reported smoother integration of digital records into administrative systems. Respondents also noted that reliable connectivity enabled new services like speech-language teletherapy, virtual field trips, and accelerated credit recovery through online programs.

These results reflect CENIC's ongoing commitment, built over three decades, to ensuring equitable broadband access across California's education community.



05

CENIC BIENNIAL CONFERENCE 2026

GENERAL PROGRAM INFORMATION

2026 INNOVATIONS IN NETWORKING AWARDS





THE RIGHT CONNECTION CENIC 2026

Since 2002, CENIC's Biennial Conference "The Right Connection" has been the premier research and educational networking event on the West Coast and one of the top events worldwide. The Conference brings together CENIC's rich and diverse community, with participants from all education segments: public and private research universities; public libraries; scientific, cultural, and performing arts institutions; private sector technology businesses; public policy and government agencies; as well as R&E partners from across the country and around the world. More details can be found on the events page.

CENIC's 2026 Biennial Conference

CENIC is always delighted to welcome attendees, sponsors, and presenters to the Biennial Conference in Monterey. If you were unable to attend this year, presentations are still available on the CENIC News YouTube channel. Highlights include:



Disaster Backup, Resiliency, and Emergency Response

As California faces increasing threats from wildfires, earthquakes, floods, and other climate-driven disasters, equitable access to reliable broadband has become a matter of public safety and resilience. This panel examines strategies to ensure that every community—whether urban, rural, low-income, affluent, Tribal, or coastal—can remain connected before, during, and after emergencies.

- **Roger Blake**, President & CEO, Merit Network, Inc.
- **Louis Fox**, President & CEO, CENIC
- **Marla Meehl**, Integrated Network Services Manager & Assistant Director of Enterprise IT; Senior Program Director, Front Range GigaPoP; Workforce in IT Networking at SC team, University Corporation for Atmospheric Research
- **Garret Yoshimi**, Vice President, Information Technology and Chief Information Officer, University of Hawai'i

Shaping the Conference Program

Crafting a useful and engaging conference program for such an accomplished audience is the responsibility of the CENIC Biennial Conference Program Committee, composed of representatives from all CENIC member segments and all disciplines and levels of technology expertise. Together, they suggest, recruit, and select presenters, topics, panels, and demonstrations that make the program future-facing, useful, and grounded in experience, while ensuring that their communities' needs are well represented.



Bridging the Digital Divide: Empowering Youth for a Digital Future

As technology reshapes every aspect of modern life, the digital divide continues to widen, leaving many young people without equitable access to the skills, tools, and resources they need to thrive. Ensuring that the current generation is prepared for the realities of a digital world with the advent of AI has never been more urgent. This session explores strategies to bridge the widening digital divide by focusing on access, skills, and community-driven support systems.

- **Danny Allen**, CEO, djallen LLC
- **Terry Loftus**, CIO & Assistant Superintendent, San Diego County Office of Education
- **Matt Rantanen**, Senior Advisor, Tribal Broadband, GoldenStateNet
- **Raul Rincon**, Senior Vice President of Strategic Initiatives, CENIC



Federal Regulatory Update: E-Rate, School Bus WiFi/ Hotspots, Universal Service Reform

As technology reshapes every aspect of modern life, the digital divide continues to widen, leaving many young people without equitable access to the skills, tools, and resources they need to thrive. Ensuring that the current generation is prepared for the realities of a digital world with the advent of AI has never been more urgent. This session explores strategies to bridge the widening digital divide by focusing on access, skills, and community-driven support systems.

- **Rachelle Chong**, Attorney, Law Office of Rachelle Chong
- **Kristen Corra**, Policy Counsel, SHLB Coalition
- **Philip Neufeld**, Executive Officer: Strategic Research & Policy Analysis, Fresno Unified School District
- **Beverly Sutherland**, President, EdTechnologyFunds, Inc.
- **Luis Wong**, CEO, K-12 High Speed Network

AI Research & Educational Infrastructure Takes Center Stage at CENIC's 2026 Biennial Conference

Artificial intelligence and its uses and impact for research, education, and networking itself were a focus of the 2026 conference. In addition, there was a strong focus on the cyberinfrastructure needed to make it effective and equitable. Select presentations can be found on the [CENIC News YouTube channel](#). Highlights include:



AI Infrastructure for All

CENIC AIR is now close to 2 years old. CENIC helped add an “AI Education” identity to what started as a “research platform” and, within the last year, expanded us into a driver of economic impact through engagement among community colleges, CSUs, and their local industries. In this presentation, we will start with the premise and rationale for “Why CENIC AIR?”, followed by an update on where we are now and a brief outlook for what’s next. We will convince you that, in the end, it’s all about social mobility and spreading AI education and experiential learning that prepares students for good jobs in their communities across all of California. We will describe how CENIC AIR and, on a national scale, the National Research Platform advance the scientific, societal, and economic impact of higher education on the nation, and how institutions can be part of this exciting endeavor.

- **Frank Würthwein**, Director, San Diego Supercomputer Center



Beyond Connectivity and Access: Operationalizing Networks and Platforms as AI Innovation Infrastructure

As artificial intelligence becomes integral to scientific discovery, education, and societal decision-making, connectivity and access alone are no longer sufficient. Research and education networks must evolve from transport layers into active layers of innovation and AI infrastructure, integrating deeply with data platforms, computing resources, and operational workflows. Framed through the lens of societal computing and innovation, the talk will discuss how networks and platforms together enable AI systems that are usable, trustworthy, and impactful at scale. Operational examples from the WIFIRE Program will illustrate how AI-enabled workflows and digital twins support time-critical wildfire response, prescribed fire planning, smoke management, and science-informed decision-making.

- **İlkay Altıntaş**, Chief Data Science Officer. San Diego Supercomputer Center



Case Studies of Research Areas that Have Been Advanced Using AI/ML Enabled by CENIC AIR

CENIC AIR storage and computing resources are being used to investigate how AI/ML algorithms can be applied to a wide range of disciplines. Examples are drawn from the research projects of several CENIC AIR users across disciplines as diverse as astrophysics, climate change, healthcare, finance, precision agriculture, and conservation genomics. This session will highlight research use cases from CSU Dominguez Hills, CSU Fullerton, CSU Northridge, Cal Poly Humboldt, and Cal Poly San Luis Obispo, as well as from Caltech, UC San Diego, and UC Riverside.

- **Larry Smarr**, Professor Emeritus, UC San Diego



Building The Future of California's Responsible AI Workforce: Digital Literacy Beyond Technical Skills

As AI systems become embedded in educational institutions, healthcare, and public services across California, digital literacy can no longer mean simply knowing how to use technology. This session presents findings from NSF-funded research that tracks the responsible technology workforce from 2021 to 2025, revealing how the skills needed to work ethically with AI have dramatically shifted—and what this means for California's research and education communities.

- **Deb Donig**, Lecturer, UC Berkeley



2026 Innovations in Networking Award Winners

The way we work, teach, and learn continues to change dramatically. The Christine Haska Award for Distinguished Service, CENIC AIR Awards, and Innovations in Networking Awards highlight exemplary innovations that leverage ultra-high-bandwidth networking, particularly those with the potential to transform how instruction and research are conducted or to further the deployment of broadband in underserved areas

During our 2026 conference, six awards were given in the following areas:



CHRISTINE HASKA AWARD
FOR DISTINGUISHED SERVICE

Larry Smarr
UC San Diego

[LEARN MORE >](#)



INNOVATIONS IN NETWORKING AWARD
FOR NETWORK PARTNER

David Lassner and Team
University of Hawai'i

[LEARN MORE >](#)



INNOVATIONS IN NETWORK AWARD
FOR EXPERIMENTAL APPLICATIONS

Harvey Newman and Team
Caltech

[LEARN MORE >](#)



CENIC AIR PIONEERING CONTRIBUTIONS
ADVANCING NETWORKING AND AI AWARD

Joy Sterling
Iron Horse Vineyards

[LEARN MORE >](#)



CENIC AIR AWARD FOR INNOVATIVE TECHNICAL
DESIGN & INSTRUCTIONAL SUPPORT

Frank Wuerthwein and Team
UC San Diego

[LEARN MORE >](#)

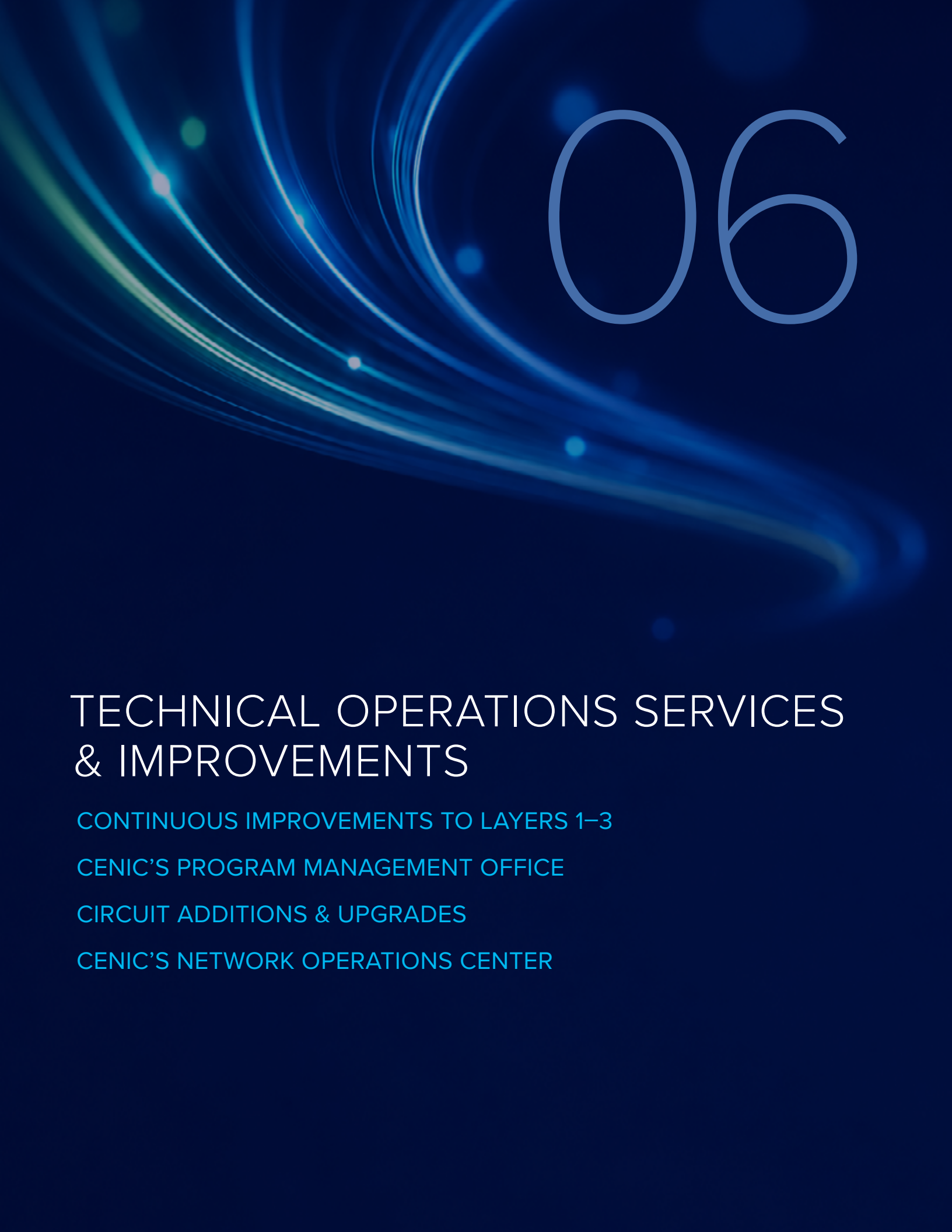


CENIC AIR AWARD FOR ENGAGEMENT

Kendra Ard and Ed Clark
California State University
Office of the Chancellor

[LEARN MORE >](#)





06

TECHNICAL OPERATIONS SERVICES & IMPROVEMENTS

CONTINUOUS IMPROVEMENTS TO LAYERS 1–3

CENIC'S PROGRAM MANAGEMENT OFFICE

CIRCUIT ADDITIONS & UPGRADES

CENIC'S NETWORK OPERATIONS CENTER

Continuous Improvements to Layers 1–3

CENIC's California Research and Education Network (CalREN) is a multi-tiered, advanced network-services fabric serving the majority of research and education institutions in the state. The CalREN backbone serves over 12,000 sites and more than 20 million Californians, spans more than 8,000 miles of CENIC-owned and managed fiber and last-mile fiber with hundreds of optical components, and manages more than 54,000 total miles of network.

CENIC engineers perform regular upgrades at the three network layers outlined below. As of June 30, 2026, recent network upgrades include the following:



LAYER 1: OPTICAL BACKBONE

- Continued deployment of next-generation optical infrastructure, Cisco NCS1010, a highly flexible platform that supports flex-grid technology and native coherent optics, enabling higher-bandwidth links while reducing complexity and improving reliability, space, and power efficiency.
- Deployed the Cisco Optical Network Controller, a next-generation optical management and orchestration tool that provides a unified platform for monitoring and provisioning, enhances troubleshooting capabilities, and allows CENIC to decommission legacy tools.
- Deployed 800G ZR optics and continued testing next-generation coherent optics, supporting faster deployment, lower complexity, and lower costs.

CENIC California Research and Education Network (CalREN)



LAYER 2: DC/HRP CUSTOMER ACCESS, COMMODITY PEERING TRANSPORT, AND PACIFIC WAVE EXCHANGE

- Upgraded Pacific Wave routers at Los Angeles, Sunnyvale, and Seattle to support 400G, lowering costs and reducing space and power requirements.
- Deployed an Internet Routing Registry (IRR) tool and route-server. The route-server enables easier, quicker setup for Pacific Wave members to exchange traffic, while the IRR tool validates and secures connections, preventing participants from hijacking IP addresses.
- Completed the upgrade of the ESnet connection to 2x400G in Los Angeles and 1x400G in Sunnyvale.
- Completed the order of ECHO fiber capacity to expand connectivity to Guam, Singapore, and Indonesia, offering additional capacity and resiliency for research and education engagement in the Pacific.
- Expanded peering capacity to over 8 Tbps and added 20 Gbps of hosted connections to AWS in Los Angeles and Sunnyvale, with Microsoft ExpressRoute hosted connections currently in progress.



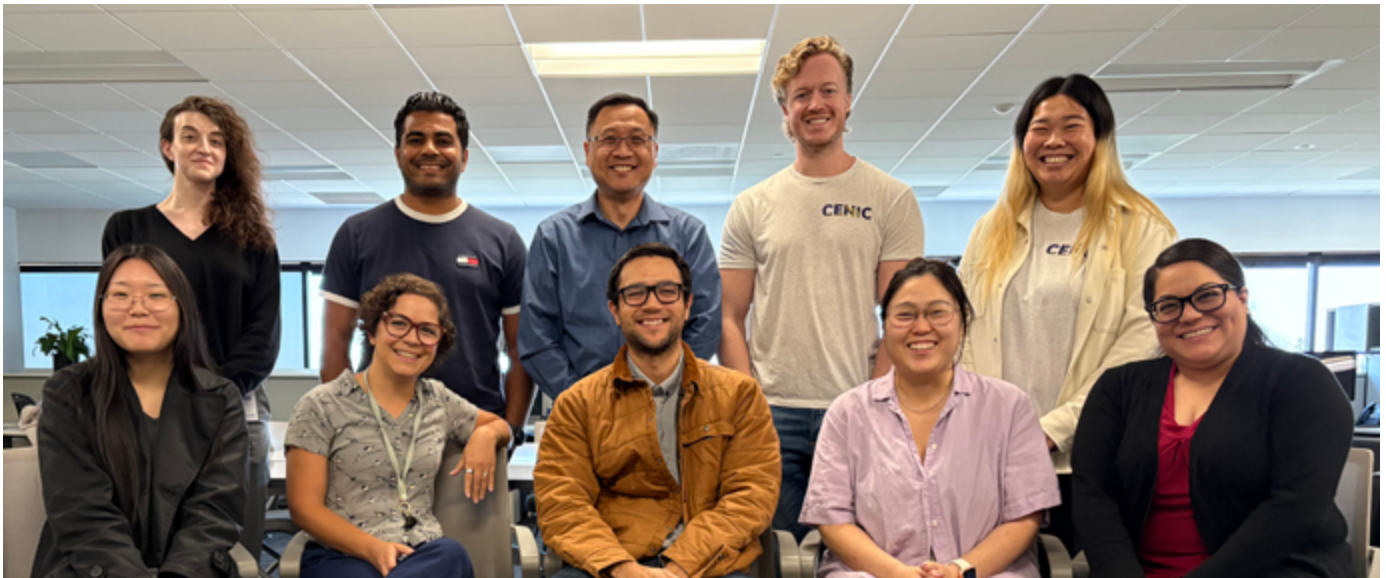
LAYER 3: ROUTED NETWORKS (DC/HPR BACKBONES)

- Upgraded routers at peering locations to enable Layer 3 capabilities, adding efficient bandwidth usage and greater resiliency for our critical peers.
- Upgraded and deployed 2x400G with native 800G support at major hub sites, including Los Angeles, Sunnyvale, Triangle Court, and San Diego, supporting larger research and campus demands at a lower cost per bit. This is part of the broader deployment of SuperCore, bringing datacenter architecture to the WAN for lower costs, faster upgrades, and a more resilient network.
- Successfully deployed Science DMZ as a Service at SDCCD and LACCD, enabling both institutions to quickly install CENIC AIR nodes and contribute to shared AI resources used by the community. This service also relieves member institutions of the burden of designing, deploying, and managing their own Science DMZ, reducing the technical expertise and staff time required while ensuring a secure, high-performance environment for data-intensive research.
- Deployed Falcon and added the majority of CENIC devices into Phoebe, CENIC's configuration automation tool, reflecting continued investment in modernizing CENIC's tools. In future phases, we will modernize additional tools and expand our use of AI for operational efficiency and accuracy.
- Deployed Perfsonar nodes at all Layer 3 hub sites to continuously monitor network performance. We're expanding this by deploying the Prometheus Blackbox Exporter to replace Smokeping and testing performance for key services internally and externally, including AT&T, Spectrum, K-12 testing, and DNS services, among many other uses.
- Deployed the CENIC network portal, providing members with an enhanced traffic usage tool. Future releases will include additional visibility, such as alarms and outages, and self-service capabilities so members can access services on their own time and as needed.
- Deployed new Infrastructure Management System, or IMS, enabling CENIC to achieve hyper-resilient infrastructure monitoring with failover as quick as 5 seconds. This has also enabled CENIC to create a new service, IMSaaS, which allows members to use the same monitoring tools and the same hyper-resilient monitoring.

CENIC's Program Management Office

CENIC's Program Management Office (PMO) serves as the primary point of contact for our members and provides end-to-end project management services for all service deployment activities. Starting with a call or email from a member institution, the assigned CENIC project manager facilitates meetings with CENIC engineers to develop tailored solutions, requests quotes from service providers, authorizes and manages service delivery, and hands the completed service to CENIC's Network Operations Center for active monitoring.

As the largest E-Rate consortium in the United States, the PMO also manages E-Rate and California Teleconnect Fund (CTF) submissions on behalf of eligible members. The management of these processes returns over \$25 million in annual subsidies to our members, saves them hours of staff time, and ensures compliance with program requirements. In addition, our PMO manages two state grant programs: the Broadband Infrastructure Grant (BIG), which provides fiber-based broadband connections to schools in unserved and underserved communities, and the Library Equipment Grant, which provides equipment to libraries so they can offer their patrons the robust, reliable, high-speed broadband they need.



The CENIC PMO also applies its expertise to internal initiatives that improve the deployment, reliability, and quality of the services CENIC provides to its members. Over the past two fiscal years, this has included:

- Modernization of Network Management Service via Zabbix, which also serves as the foundation for CENIC's Infrastructure Management System as a Service (IMSaaS)
- Implementation of Salesforce CRM for the Communications team, enabling CENIC to better target and measure the effectiveness of our communications to our members
- Migration of both Contracts and Telecom expense management to cloud-based platforms
- Migration to Zoom Phone for all employees and to Zoom Contact Center for the NOC, supporting faster, more reliable member support
- Optimization of alarm management via Falcon, a new internal application that shifts monitoring from an alarm-centric to a service-centric model, and which provides faster identification and resolution of impacted services

Circuit Additions & Upgrades



As a member-driven organization, CENIC and its member institutions continually evaluate networking needs and plan connectivity upgrades to ensure constituents receive the highest level of service. This assessment and planning include network management and continuous monitoring by CENIC’s NOC.

California’s K-20 research and education communities benefit significantly from having all their networking needs represented by CENIC. These include substantial cost savings in circuits

and equipment thanks to CENIC’s bulk purchasing power, and process efficiencies enabled by CENIC’s project management of quotes, contracts, installations, upgrades, and more.

All of this results in a network with greater capacity and responsiveness to the unique needs of research and education than a commercial network can provide. Examples of this growth in capacity for each member segment are shown in the following tables of circuits initiated or authorized from July 1, 2024, through June 30, 2026.

University of California (32 total)

- 21 new circuits
- 10 circuit upgrades
- 1 circuit move

California State Universities (42 total)

- 17 new circuits
- 9 new dark fiber circuits
- 14 circuit upgrades
- 2 circuit moves

California Community Colleges (219 total)

- 207 new circuits
- 1 new dark fiber circuit
- 10 circuit renewals
- 1 circuit move

K–12 System (144 total)

- 68 new circuits
- 45 circuit renewals
- 28 circuit upgrades
- 3 circuit moves

Libraries (368 total)

- 73 new circuits
- 272 circuit renewals
- 6 circuit upgrades
- 17 circuit moves

Other Universities and Colleges, Scientific and Cultural Institutions (23 total)

- 12 new circuits
- 2 new dark fiber circuits
- 9 circuit upgrades

CENIC's Network Operations Center

Once an institution is connected to CalREN, CENIC's Network Operations Center (NOC) is the first point of contact for any issues or questions regarding all services provided over the Network. It is monitored 24 hours a day, 7 days a week, 365 days a year.

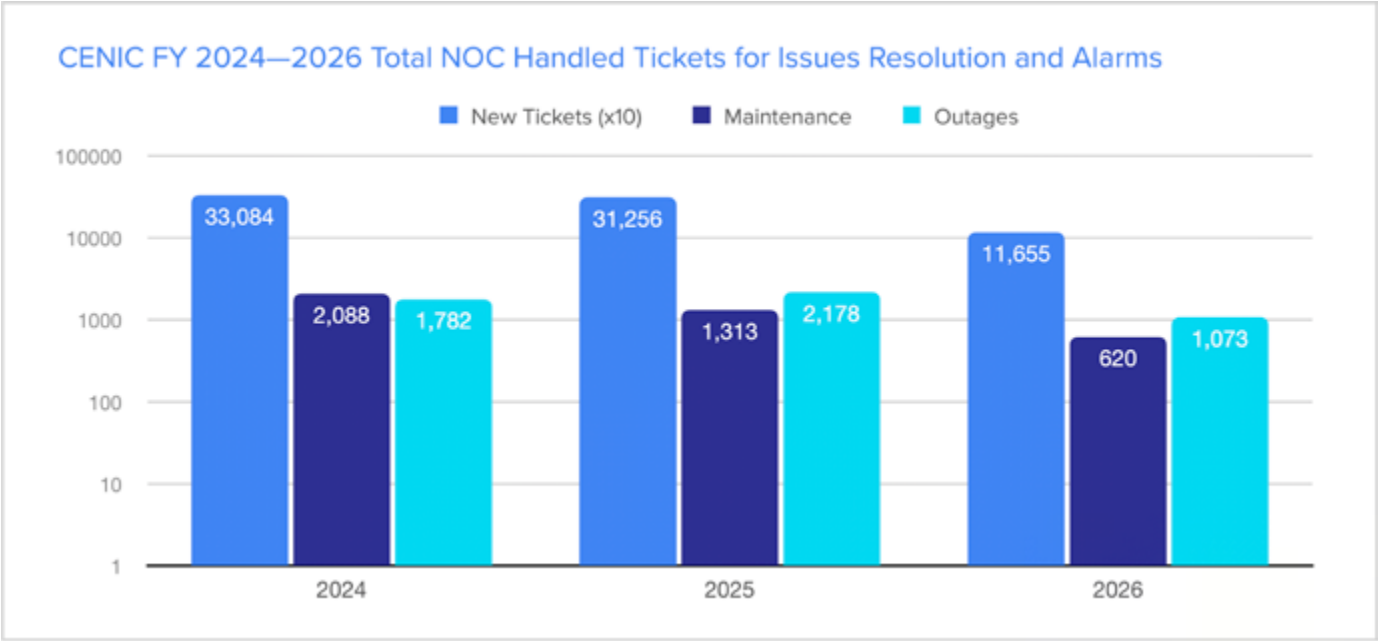
NOC engineers perform the technical functions required to maintain and manage the network's optical (Layer 1), Ethernet (Layer 2), and routing (Layer 3) components. They diagnose and resolve network problems; upgrade, refresh, and decommission equipment; perform circuit installations, service upgrades, and backbone upgrades; respond to abuse complaints; and coordinate third-party maintenance and repair activities.

CENIC members who experience a problem notify the NOC and are immediately connected to an experienced, highly trained network engineer who begins troubleshooting with them. NOC engineers can resolve most issues; fewer than 1% of incoming tickets are escalated to a more senior engineer.

Additionally, the engineers diagnose and resolve problems identified by network monitoring tools, which generate alarms when issues are detected. This alarm system allows engineers to detect problems before they affect users and quickly resolve them.



NOC staff from left: (back row) Ivan Mikhaylov, Aaron Hu (Intern), David Dolidze (Intern), Eric Steffan (Intern), Carlos Barron, Ethan Cope, Robert Baldo, Mina Elhazer, Victor Deras, Gilbert Marin (front row) Viet Do, Ron Esteban, Mark Swank, Bryan Barnett, Ozzie Reyes, James Ding, Alaa Hamadeh, Michael Gong, Larissa Esteban, Ozzie Reyes, Phat Tran, and Andre Noblejas.



The NOC uses a ticketing system to track issues that need resolution. While many issues can be resolved on the same day, some are more complex and take longer. During the time covered by this Community Report, the NOC assessed and resolved the following tickets and alarms:

	2024	2025	2026 (TO 6/30)
RESOLVED TICKET	22,623	20,067	6,196
LAYER 1 ALARMS	90,184	130,243	13,775

NOC engineers also coordinate and communicate third-party maintenance and repair activities, perform equipment updates, replacements, and upgrades, decommission retired equipment, and handle tasks supporting circuit installations, service upgrades, and backbone upgrades. During the time covered by this Community Report, the NOC completed the following maintenance procedures:

	2024	2025	2026 (TO 6/30)
MAINTENANCE PROCEDURES	1,519	1,762	2,426
OPERATIONAL READINESS TICKETS	426	574	154



SOUTHERN CALIFORNIA:

16700 Valley View, Ste 400
La Mirada, CA 90638

NORTHERN CALIFORNIA:

300 Brannan St, Suite 510
San Francisco, CA 94107

PHONE: 714.220.3400

WEB: www.cenic.org

FOLLOW US:

www.linkedin.com/company/cenicnews

www.youtube.com/cenicnews