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South American – African Astronomy Coordination Committee (SA3CC)

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R&E Network Infrastructure

Going beyond the “fastest link” - making the platform extensible in hardware and software

Onramp to Cloud Connectivity

Cloud Connect, virtual
networks, and peering

Onramp to Compute & Storage

GPU, CPU, and
storage pools
hosted by NRP &
institutions

Timing & Identity

PTP timing, InCommon
identity federation, and
security

MDLP & New Locations

Extending the Cloud,
Extending RENS,
Delivering
Services

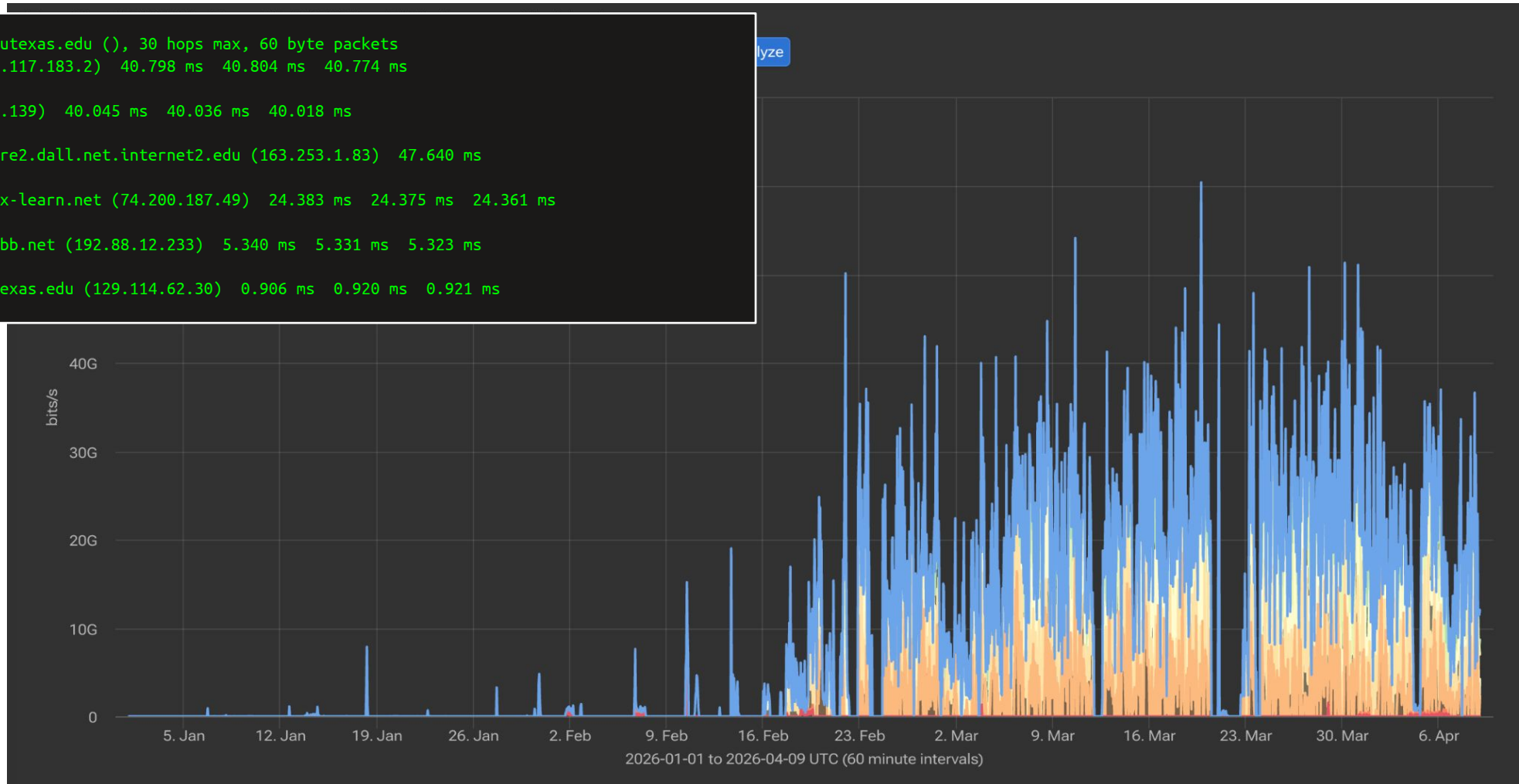
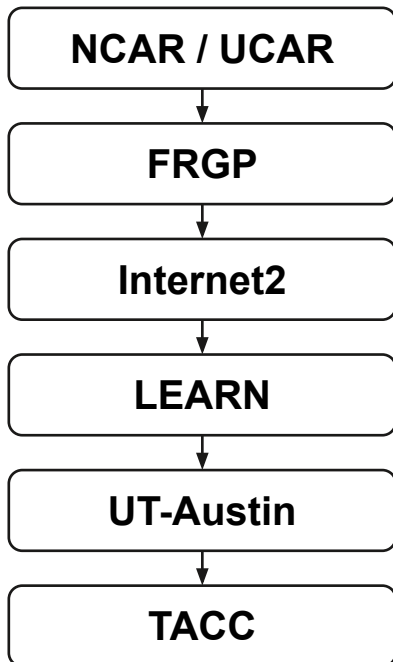
12,000 miles of community-owned fiber · 400G backbone · Next Gen: 800G+

**Making every service, every partnership, every shared resource pool
available to researchers, educators, and students.**

R&E Infrastructure as a Service - An Example

R&E Infrastructure should be fast, reliable, transparent, agile - however, not unknown.
Instant collaboration. Force multiplier.

```
traceroute to gridftp1.ranch.tacc.utexas.edu (129.114.62.30), 30 hops max, 60 byte packets
 1  bifrost-1183.hpc.ucar.edu (128.117.183.2)  40.798 ms  40.804 ms  40.774 ms
    ...
 3  core-1850.frgp.net (192.43.217.139)  40.045 ms  40.036 ms  40.018 ms
    ...
 5  fourhundredge-0-0-0-19.4079.core2.dall.net.internet2.edu (163.253.1.83)  47.640 ms
    ...
 7  rt1-akard-dlls-xe-1-1-0-3030.tx-learn.net (74.200.187.49)  24.383 ms  24.375 ms  24.361 ms
    ...
10  hstn-lvl3-core-et-1-1-0-25.tx-bb.net (192.88.12.233)  5.340 ms  5.331 ms  5.323 ms
    ...
13  qfx10008-vl1621-gw.net.tacc.utexas.edu (129.114.62.30)  0.906 ms  0.920 ms  0.921 ms
```



Network Services: Recent Key Accomplishments

101

Projects Delivered

Across 5 teams, delivering infrastructure capabilities to members

138+

Tbps for AI Research

Bespoke AI network capacity, scalable to 300+ Tbps

3,400 km

AI Research Span

Spanning 5 U.S. data center locations for distributed AI workloads

10

Regional Services Augmented

LONI, NJEdge, GPN, OneNet, Link Oregon + FABRIC & Flex Ports

9

DDoS Tenants Added

Distributed DDoS protection extended across the research community

4+

New Federal Partnerships

DOC, Air Force, and GSA expanding federal research infrastructure

Network Services: Key Accomplishments and Ongoing Initiatives

138+ Tbps Bespoke Network

Hyperscale AI Research

- 138+ Tbps dedicated AI research network
- 3,400 km
- 5 U.S. data centers

Virtual Networks Platform

Network Automation & Transparency

- Looking Glass (Live Network Inspector)
- NetFlow analytics
- Cloud Router policy
- High-bandwidth support

Kentik Monitoring Platform

Network Intelligence

- My Kentik Portal
- Long-term flow analytics

Cloud Connect Exchange

Cloud Access Phase 1 Launched

- Community focus group
- Equinix Fabric

Regional Network Growth

Expanded Connectivity for Members

- LONI
- NJEdge
- Link Oregon
- GPN
- OneNet
- NEREN

Routing Security Innovation

Global R&E Security Leadership

- NSF ROOTBEER grant (CAIDA)
- Local Pref Probe
- DDoS protection (7 member tenants)

Network Services: Key Accomplishments and Ongoing Initiatives

NY Metro Consolidation

Strategic Infrastructure Migration

- Moved NYC (111 8th St) to Newark (Halsey St)

Next-Gen Packet Hardware

Interoperability Testing Completed

- Arista, Nokia, Juniper, Cisco
- Community committee for vendor evaluation

Global Exchange Point Upgrades

Global Connectivity Strengthened

- Upgrades at WIX, BIX, and MAN LAN GXPs
- NA-REX 400G deployment

perfSONAR & MetrANOVA

Network Measurement Leadership

- Sustained leadership in network measurement
- Additional Tool development and flow analysis

Quantum Security Research

Next-Generation Readiness

- New Quantum networking partnerships (QKD+)
- Post-quantum cryptography (PQC)

Operational Excellence

High-Volume Service Delivery

- 762 provisioning tickets
- 56 R&D tasks
- 23 senior engineering initiatives

Network Services Retrospective: Global Collaboration & Community

Coherent Optics Proof-Of-Concept

Internet2 & Cisco Collaboration

- 400 Gbps
- 3,000+ km
- Albany and Indianapolis
- No transponders, no regeneration

International Peering Policy

Global Routing Integrity, July 2025

- New technical policy
- Reduce risk of commercial route leakage
- Preserve zero-touch backup transit
- Optimizing global path selection

GNA-G Leadership

Global R&E Infrastructure Leadership

- Brenna Meade & Chris Wilkinson
Appointed to the GNA-G Leadership Team

MANRS Leadership

Global Routing Security Leadership

- Steven Wallace
3-year term, MANRS Steering Committee
- ROA Planner

SC25 SCinet Leadership

Diamond Contributor, St. Louis Nov. 2025

- 15 Internet2 staff participated
- 13.72 Tbps
- Co- and Vice-Chair roles
- Intercontinental: CERN, KAUST, Brazil, S Africa

OFC 2025 / OFCnet

Optical Innovation Showcase, April 2025

- Community: CENIC and ESnet
- Industry: Ciena, Adtran, and Juniper
- OFCnet

Community Success: Driven by SIGs and Working Groups

Automation SIG

Monthly · 3rd Thursday 4 pm ET

~32 members per session

- Network automation tooling
- NSO/WFO workflows
- Orchestration best practices

NTAC Main

Monthly · 1st Tuesday 4 pm ET

~25 members per session

- Core network operations
- Troubleshooting
- Cross-community coordination

IPv6 Working Group

Monthly · 3rd Thursday 4 pm ET

~12 members session

- IPv6 deployment strategy
- Transition planning
- R&E network readiness.

Optical SIG

Monthly (intermittent)

~10 members per session

- Optical networking
- DWDM system design
- Vendor evaluation
- Emerging optical technology for R&E

Performance SIG

Monthly · Relunched Oct 2025

~13 members per session

- Inter-domain performance measurement
- Community performance targets
- Troubleshooting guides

Time & Frequency Working Group

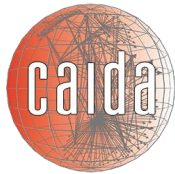
Monthly · TBD

Launching in April 2026!!

- Synchronization
- Distribution
- Traceability

May 19-20, 2026

Community Success: Driven by SIGs and Working Groups



Network Services: New Initiatives

AI Operations (HAWAT)

AI-Powered Network Operations

Intelligent operations platform built to reduce escalation overhead and surface network issues before members notice them.

Member Self-Service

Guided troubleshooting for Cloud Connect, user & access management, and onboarding — targeting 60-70% of tickets resolved without escalation.

Proactive Intelligence

AI agents continuously monitor telemetry and BGP data, surfacing anomalies before symptoms appear. 24/7 proactive monitoring.

Cross-Domain A2A Interop

Launching with SURF and ESnet. Multi-network collaborative troubleshooting across the R&E ecosystem

PERISCOPE

The Next Internet2 Console

A unified, open, federated console for the entire R&E community — replacing and extending the Insight Console across the full Internet2 network service catalog.

Full Service Catalog & Real-Time Ops

Every Internet2 network service in one place. Live-streamed updates and provisioning status — no more hitting refresh.

Open-Source & Plugin Architecture

Regional networks write their own plugins; Internet2 distributes Looking Glass and Virtual Networks plugins to the community.

Federated by Design

Periscope instances across domains can discover and communicate with each other — enabling cross-domain troubleshooting and end-to-end visibility.