



EPOC

Engagement and Performance
Operations Center



Award #1826994

Newsletter I August 7, 2020

A Note from the PIs: EPOC the Data Movement Pipeline



This is our second newsletter for the Engagement and Performance Operations Center (EPOC), a production platform for operations, applied training, monitoring, and research and education support, jointly led by Indiana University (IU) and the Energy Sciences Network (ESnet). By considering the full end-to-end data movement pipeline, EPOC is uniquely able to support collaborative science, allowing researchers to make the most effective use of shared data, computing, and storage resources to accelerate the discovery process.

Upcoming Talks and Events (EPOC and others)

- 7 August 2020, 2pm EDT: Michael Lambert, PSC, "Peering DB & IRR", [CI Engineering Brownbag talk](#)
- 14 August 2020, 2pm EDT: Ken Miller, ESnet, "Data Movement Exhibition Update", [CI Engineering Brownbag talk](#)
- 18 and 20 August 2020, 11am-5pm EDT: Sponsored by ResearchSOC and CI CoE Pilot, [Cyberinfrastructure/Cybersecurity Workshop](#)
- 21 August 2020, 2pm EDT: Alan Whinery, University of Hawaii, "The IPv6 Only Network: How To Simplify Your Life By Turning Off IPv4", [CI Engineering Brownbag talk](#)
- 28 August 2020, 2pm EDT: George

We will be sharing these newsletters once or twice a month to give updates on our activities, share examples of the work we're doing at a national scale, and to let you know about upcoming talks or events we're participating with. Please feel free to give us feedback about what you'd like to see in these newsletters here: [feedback form](#).

Thanks!

-Jennifer Schopf, Jason Zurawski, and Dave Jent

Regional Network Partner Highlight:

Great Plains Network

 EPOC has three types of partners: Regional Networking Partners, who are deploying the infrastructure EPOC supports and use their members for outreach for EPOC, Infrastructure Partners, who are themselves collaborations that support a variety of cyberinfrastructure (CI) services, and Science Community Partners.

One of our Regional Networking Partners is the Great Plains Network (GPN), <https://www.greatplains.net/>, which is the regional network that serves Arkansas, Kansas, Missouri, Nebraska, Oklahoma and South Dakota. Over the last 2 years, EPOC and GPN have jointly supported multiple training sessions for GPN members, and have worked together on 10 consultations and roadside assistance cases. They were the first partner to have a NetSage monitoring dashboard set up - which was recently expanded, as you can see at <http://gpn.netsage.global>.

In May 2019, EPOC and GPN supported a Deep Dive Training Session at the GPN annual meeting. This focused on work with researchers at Kansas State University (KSU) to help characterize the requirements for an agronomy application, to enable cyberinfrastructure support staff to better understand the needs of the researchers they support, and to offer training to GPN members to be able to conduct these on their own. Before the event, we worked together to document the agronomy application at KSU and detail the infrastructure setup at KSU, which were then discussed in person in detail as part of the structured Deep Dive process. The outcomes included identifying several upcoming CI needs, from additional storage to the need to wirelessly connect agricultural research fields, and were written up as tech report, available online at: <https://epoc.global/wp-content/uploads/2020/02/20191111-EPOC-Report-GPN-Final.pdf>.



Robb & Charles Shiflett, ESnet,
"DTN Design Patterns", [CI
Engineering Brownbag talk](#)

Roadside Assistance and Consultations: Iowa State and UCAR



A key aspect of EPOC is the process pipeline for immediate help, referred to as Roadside Assistance. Based on our previous experience with international performance issues, the Roadside Assistance approach helps collaborators when data sharing failures occur, since these almost always involve multiple domains and organizations.

A great example of how this works in practice took place when a climate researcher at Iowa State University (ISU) got in touch with us after experiencing poor performance streaming National Oceanic and Atmospheric Administration (NOAA) real time earth observation data from the University Corporation for Atmospheric Research (UCAR) in Boulder, Colorado, in June, 2019, after attending an EPOC presentation at the Great Plains Networks (GPN) annual meeting.

The researcher's data needed a sustained transfer rate of 80Mb/s to keep up with the real time stream of data, but the researcher was seeing intermittent transfer rates that fell as low as 32Mb/s. Performance had degraded slowly over time, with a significant drop in performance over the past few months.

In consultation with EPOC engineers, ISU network staff, staff from GPN, and help from UCAR, several perfSONAR test nodes were added at key points in the end-to-end path, which showed reasonable performance from ISU to UCAR, however, the performance from UCAR to ISU was much less and showed many packet retransmits. Trace routes between the hosts showed data took an asymmetric path. There was also evidence of packet fragmentation along the path with some jumbo frame packets being dropped or possibly fragmented. Additional tests seemed to indicate that at least some of the network issues were within the local ISU network.

ISU engineers also upgraded several key system configurations on hardware along the path, upgraded much of the switching hardware in the building of the receiver site (which had been part of the campus plan for the year in any case), and verified the settings on the rest of the campus switches they had access to. Through this multilateral collaboration, it was discovered that there had been some recent changes to the routing policy for the ISU wide area network, and this traffic appeared to be preferring a more congested path as opposed to the original one. The primary WAN connection was shifted from an older 10 Gb/s link to a newly setup 100Gb/s, and also normalized the routing path to remove the routing asymmetry.

These improvements have resulted in a more consistent transfer rate averaging 624Mb/s to and from the UCAR perfSONAR node. This

improvement allowed the researcher to process earth observation data in real time again and the perfSONAR infrastructure that was set up as part of this process will continue to be used in the ISU campus infrastructure to continue to monitor the network performance and support this important science project.

More information about the Roadside Assistance and Consulting process is available at: [EPOC Roadside Assistance](#).

You are receiving this email because you registered for one of our events or we believe you requested information about our project.

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