SC23 Network Research Exhibition

FABRIC

Preliminary Abstract
FABRIC SC23 Team

Abstract
This demonstration will show the FABRIC Research Cyberinfrastructure in operation:

- FABRIC
  https://fabric-testbed.net

FABRIC (FABRIC is Adaptive ProgrammaBle Research Infrastructure for Computer Science and Science Applications) is an International infrastructure that enables cutting-edge experimentation and research at-scale in the areas of networking, cybersecurity, distributed computing, storage, virtual reality, 5G, machine learning, and science applications.

The FABRIC infrastructure includes a distributed set of equipment at commercial collocation spaces, national labs and campuses. Each of the FABRIC sites has large amounts of compute and storage, interconnected by high speed, dedicated optical links. It also connects to specialized testbeds (5G/IoT PAWR, NSF Clouds), the Internet and high-performance computing facilities to create a rich environment for a wide variety of experimental activities.

The FABRIC Network includes 33 sites distributed across the United States, CERN (Switzerland), University of Amsterdam (Netherlands), University of Bristol (England), and University of Tokyo (Japan).

Figure 1 shows a map of the FABRIC infrastructure. This SC23 infrastructure and demonstration will also include deployment of a FABRIC Node within the SC SCinet infrastructure.

- SC SCinet
  https://sc23.supercomputing.org/scinet

The SCinet network infrastructure is built every year during the SC conference, and is an extremely powerful and advanced network. Industry, academia, and government experts volunteer to design, build, and administer this cutting-edge SCinet infrastructure.

The FABRIC Node embedded within the SCinet infrastructure will be used to connect resources inside SC23 Exhibit Booths as part of demonstrations and research activities. This deployment will leverage the extensive wide area connectivity engineered into SCinet to connect back to the external globally distributed FABRIC infrastructure. Figure 2 shows a topology diagram of this SC23 SCinet FABRIC Node deployment along with the connections back to the external FABRIC sites.

Additional detail regarding FABRIC is available in the following paper:

- FABRIC: A National-Scale Programmable Experimental Network Infrastructure
  Ilya Baldin, Anita Nikolich, James Griffioen, Indermohan Inder S. Monga, Kuang-Ching Wang, Tom Lehman, Paul Ruth
  DOI: 10.1109/MIC.2019.2958545
  https://ieeexplore.ieee.org/document/8972790

Exhibit Floor Connections and Demonstrations
The FABRIC infrastructure includes an architectural concept known as "Facility Ports". These are attachment points to resources which are external to the FABRIC core infrastructure. These Facility Ports provide a mechanism for

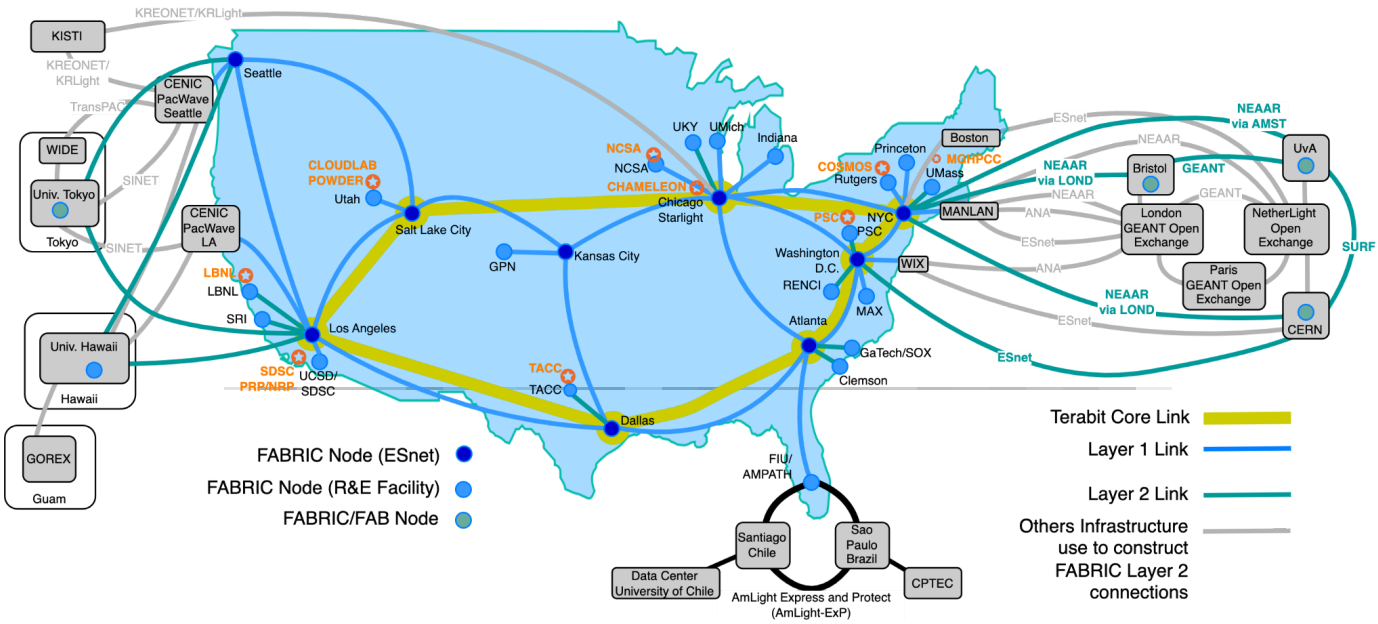


Figure 1 FABRIC Research Infrastructure

these external resources to be included in FABRIC Slices and Experiments. External research infrastructure which is integrated with FABRIC in this manner includes Chameleon, CloudLab, POWDER, Rutgers CryoEM & Nanoimaging Facility, Internet2 AL2S and Cloud Connect Services, ESnet OSCARS Layer2 services, and others.

The SC23 SCinet FABRIC node deployment will include multiple "Facility Ports" facing specific research and demonstration resources in the Exhibit Floor. In this manner these SC23 Exhibitors can leverage the connectivity back to the entire FABRIC globally distributed infrastructure for their demonstrations.

FABRIC Supported SC23 Demonstrations

Additional information will be added here in future revisions to describe the specific Facility Port connections and the associated demonstration activities on the Exhibit Floor.

Goals

The SC23 goal of this experiment is to showcase the FABRIC Research Cyberinfrastructure and the ease with which other resources and sites can be integrated.

Resources

This NRE demonstration will be conducted using resources of the FABRIC infrastructure, SC23 SCinet for the SC23 FABRIC Site Deployment, and paths across the wide area network links into the SC23 conference. As shown in Figure 2, multiple wide area VLAN paths will be utilized to connect to the core FABRIC infrastructure as follows: SCinet FABRIC Node to StarLight, Washington, and Los Angeles.

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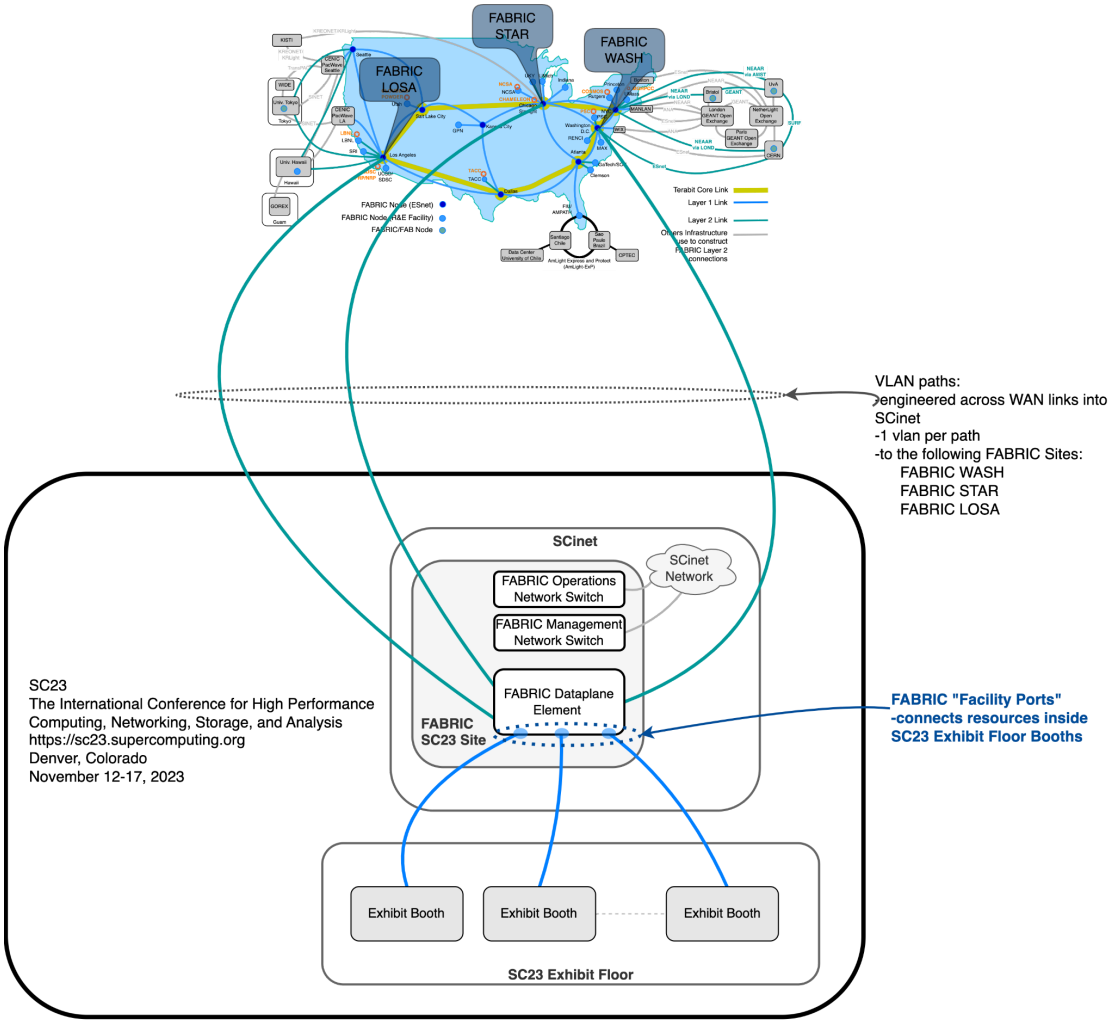


Figure 2 FABRIC SC23 SCinet Node Deployment and WAN Connections