

FABRIC Testbed





FABRIC

NSF-funded Research Infrastructure

Securely prototype and **validate designs** in distributed systems and networks.

Facilitates experiments that **closely emulate real-world production** environments.

Test applications, protocols and services that run at any node in the network,
not just the edge or cloud.



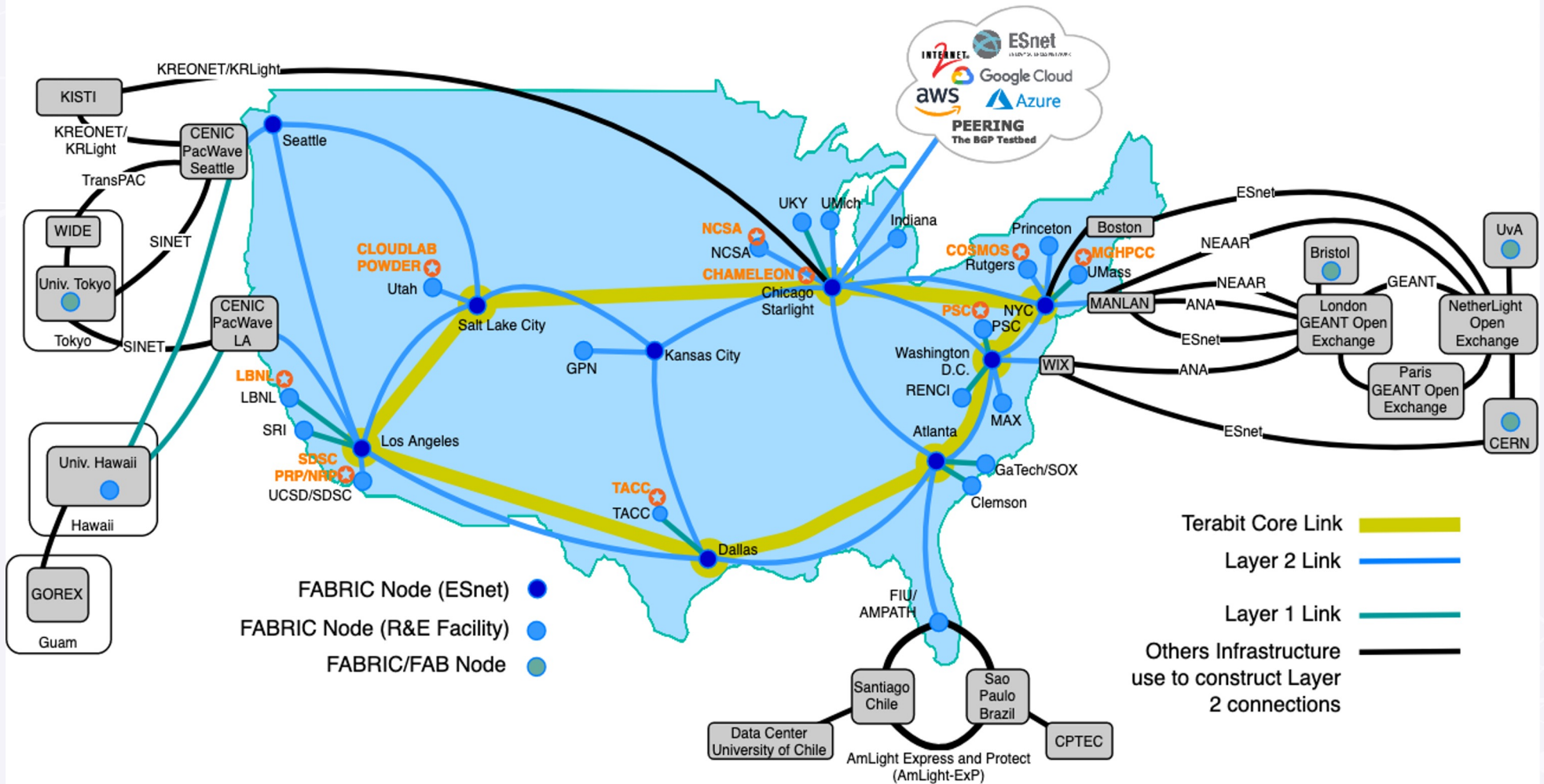
- **Testbed** for networking, distributed systems, security, ML, etc
- **30 US & 4 Int'l sites**
- **100G DWDM at 9 core sites**
- **Public Clouds**
- **IP4 & 6 peering**
- **Free!**



TL;DR

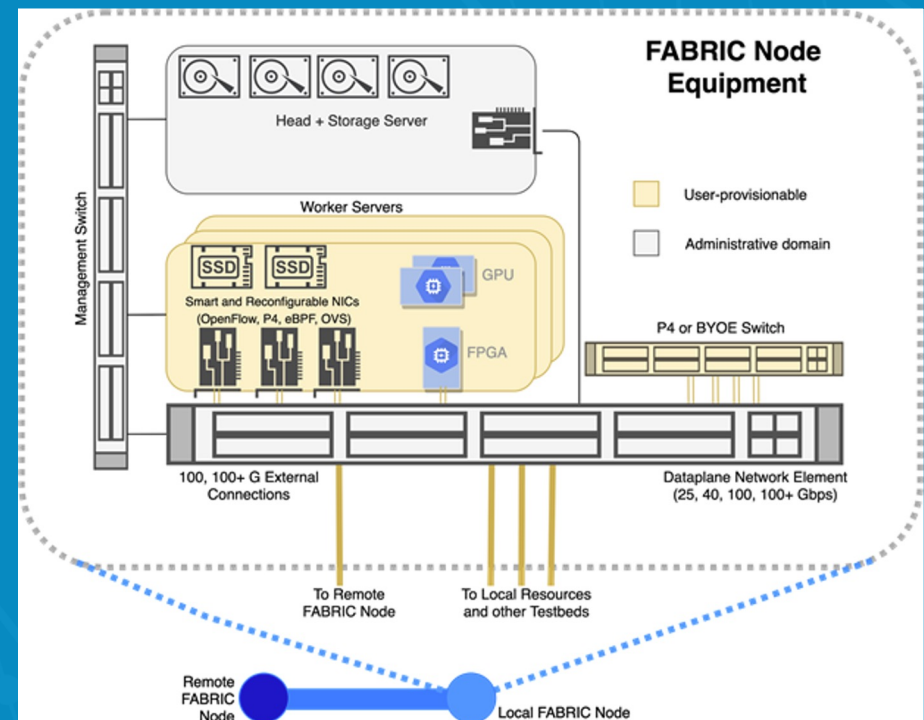
What is FABRIC?

Networking Experiments at Scale



- Compute (GPU, CPU, FPGA, programmable NICs)
- Storage
- Networking (inc. Tofino-based P4 switches) from 25G - 100G (200G+ future)
- PTP timing using GPS

What is FABRIC?



Network as part of computing continuum

- 'Everywhere-programmable' using different abstractions (P4, OpenFlow, others)
- Diverse compute & storage where routers reside today

Network as a scientific instrument

- Pervasive measurement capabilities
- Precision timing (using GPS) at every site



Key Features



Sandbox for New Ideas

- Test production uses *in parallel with* production
- Connect to real facilities

Suite of Tools & Protocols

- L2/L3 networks
- In-network compute, storage, and accelerators
- Robust measurement: bandwidth, latency, jitter, timing
- Programmable port mirroring
- Smart PDUs to measure power

Prototype Validation



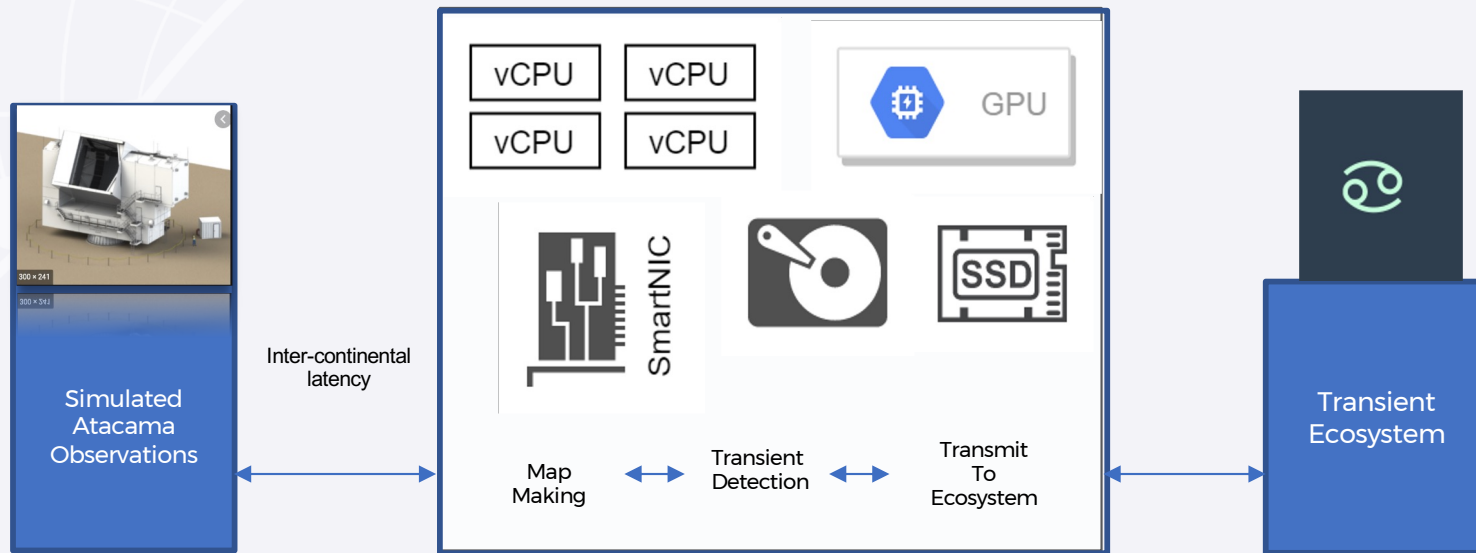
Full Scale Prototypes

- Production scale
- Connect to real facilities
- Secure Sandbox

Measured Validation

- Justification for expensive/risky systems
- Path for transition to production deployments

Cosmology



Simulated observatory source and path (Chile to US) to ensure code can be generalized to work for Chile-based data.



NeRF (2D to 3D) and VR/Art Collaboration

Neural Radiance Field (NeRF) Photorealistic environments from different points of view.
Render realistic 3D scenes based on 2D images.

Immersive 3D VR deployment between US & U Bristol for artists to co-create





FABRIC

FABRIC Across Borders

Take Our Data

The Community



Users

- 800+

Projects

- 100+ Total

Organizations

- 108

Workshops

- 2 annually

Questions?

anitan@illinois.edu

<https://whatisfabric.net>



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