

Resilient, Performant Networks and Distributed Processing

SC24 Demonstration
Naval Research Laboratory
Center for Computational Science
November 17–22, 2024

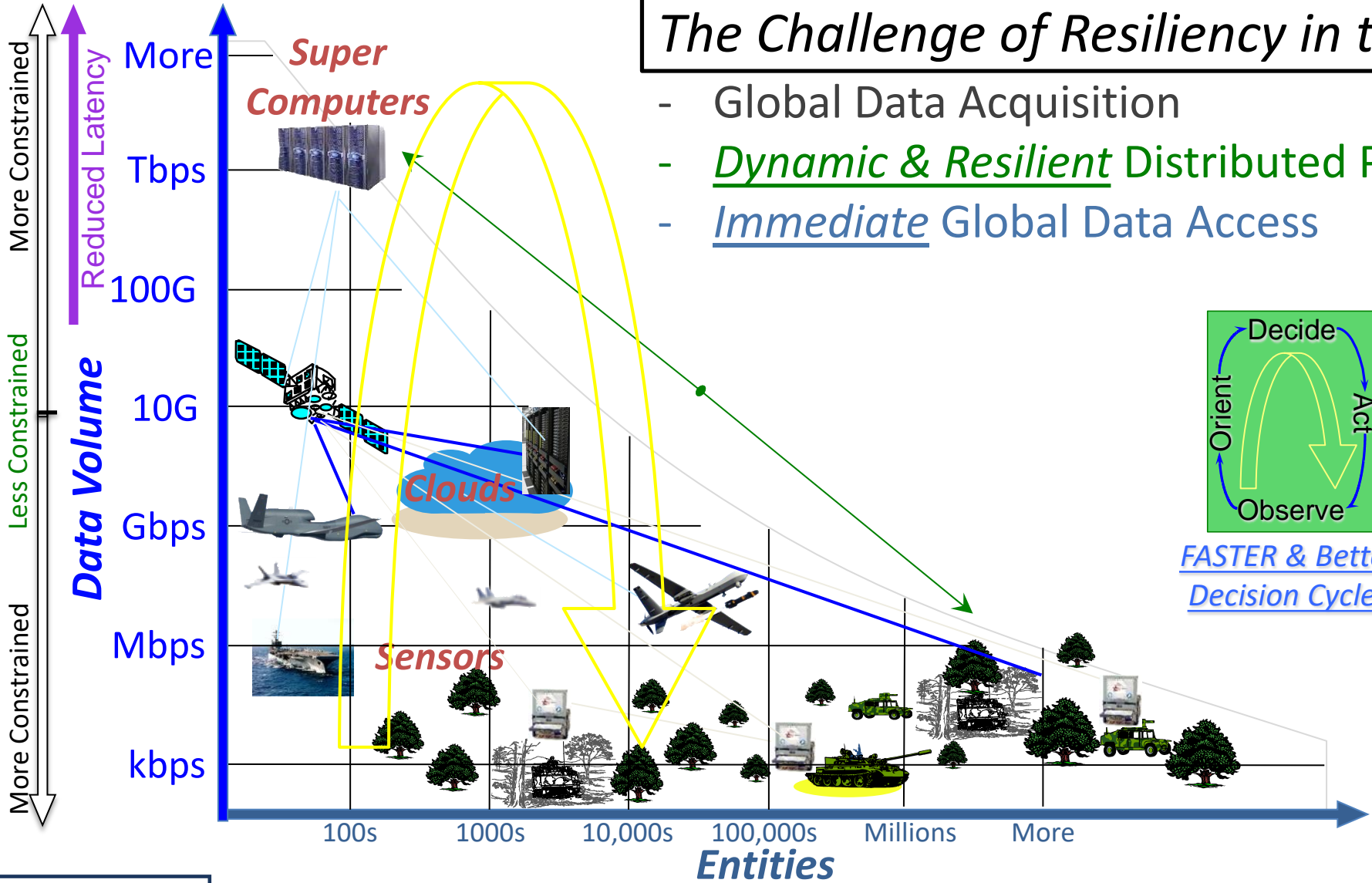


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This material is based upon work supported by the
Department of Defense, US Naval Research Laboratory.

The Challenge of Resiliency in the DoD:

- Global Data Acquisition
- Dynamic & Resilient Distributed Processing
- Immediate Global Data Access



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Global Problem Space

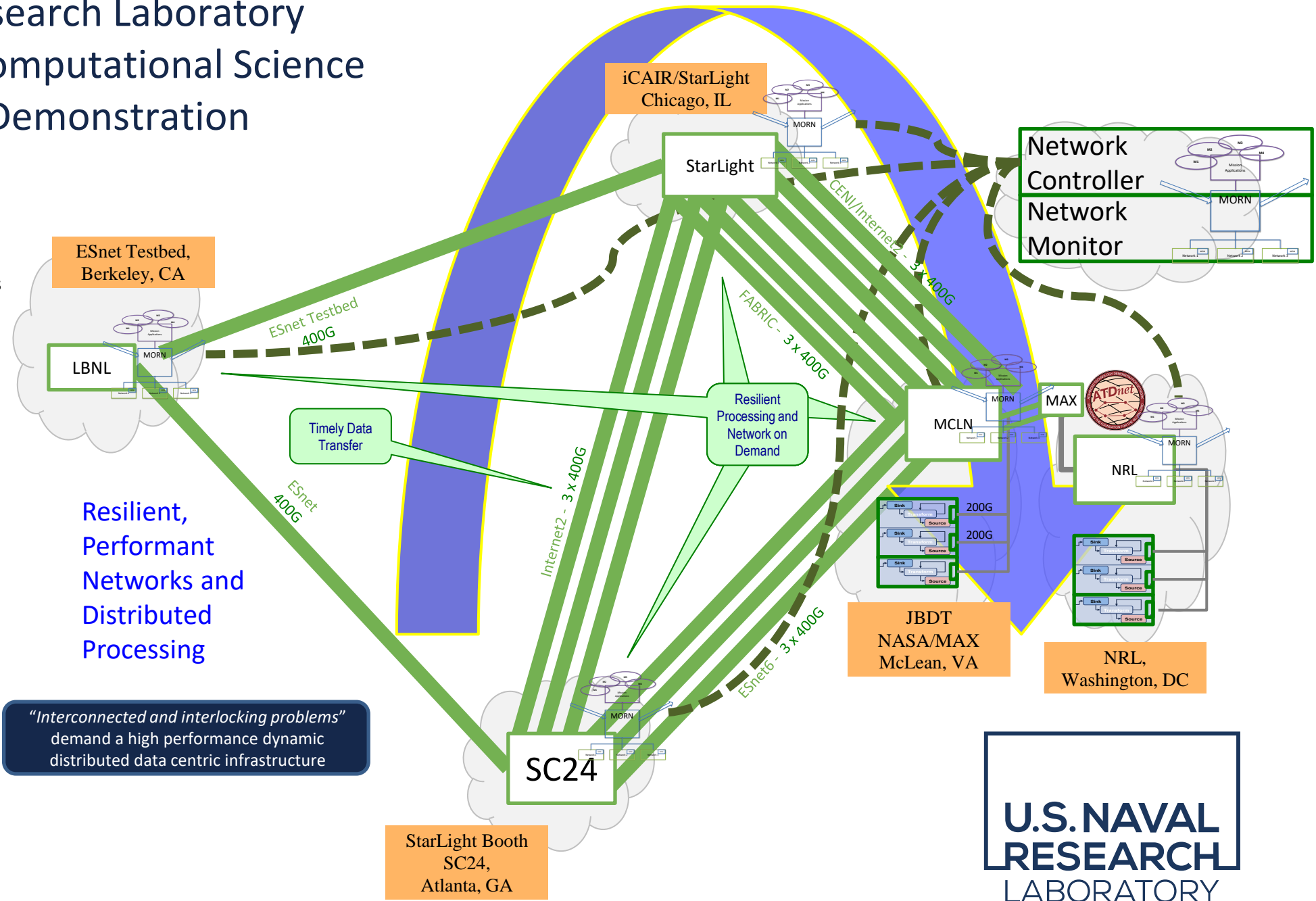
Naval Research Laboratory Center for Computational Science SC24 Demonstration

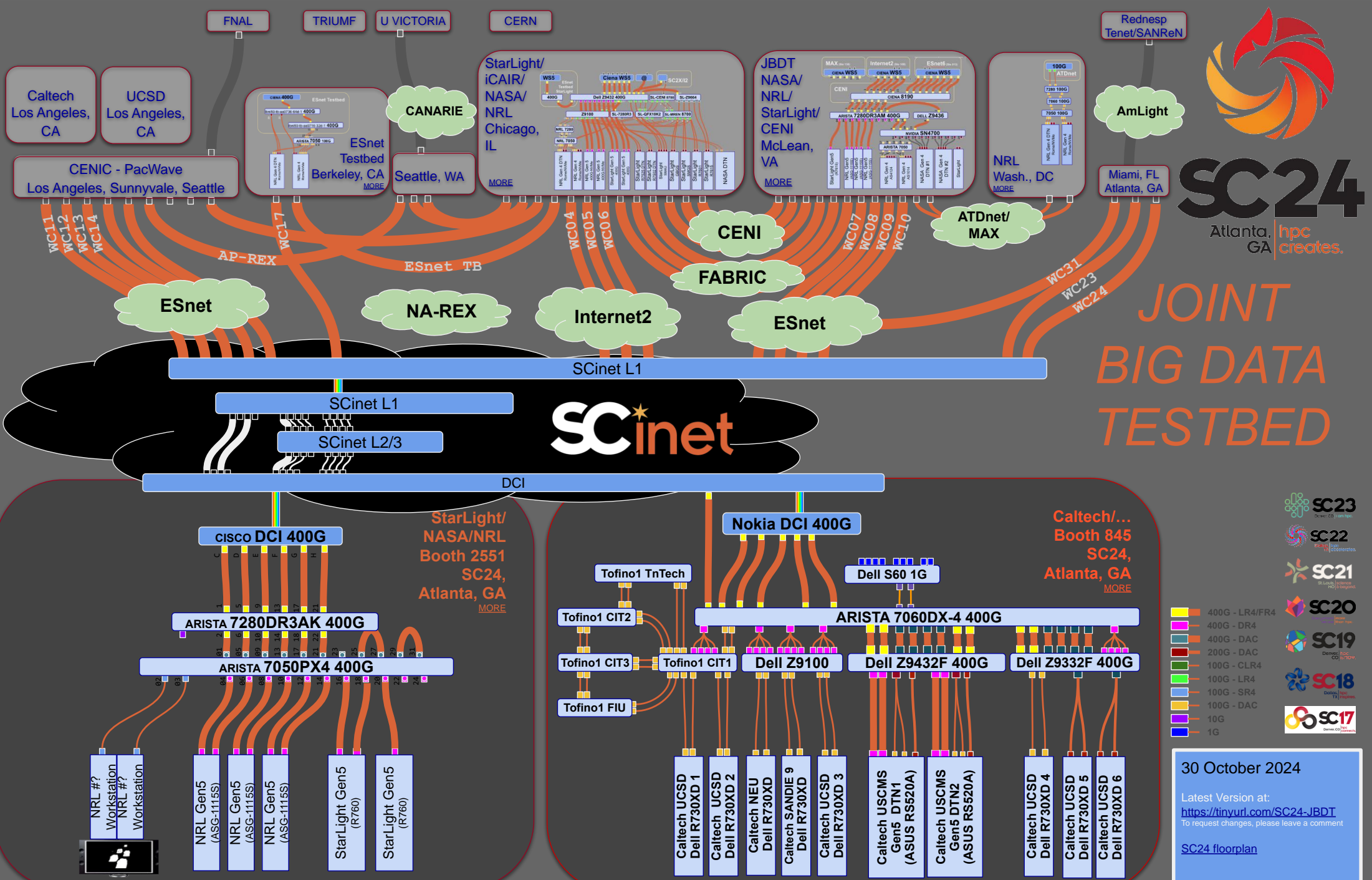
NRL aims to demonstrate:

- Dynamic arrangement and re-arrangement of widely distributed processing of large volumes of data across compute and network resources organized in response to resource availability and changing application demands
- SC24 booth to compute and storage assets in McLean, VA; Chicago, IL; and Berkeley, CA

Specific goals:

1. Rapid network deployment, monitoring, reporting, and redeployment.
2. Tbps RDMA data movement over global distance for timely Terabyte transfers (goal << 1 min Tbyte transfer on N by 400G network).
3. Dynamic shifting of processing and network resources from one location/path/system to another (in response to demand and availability).





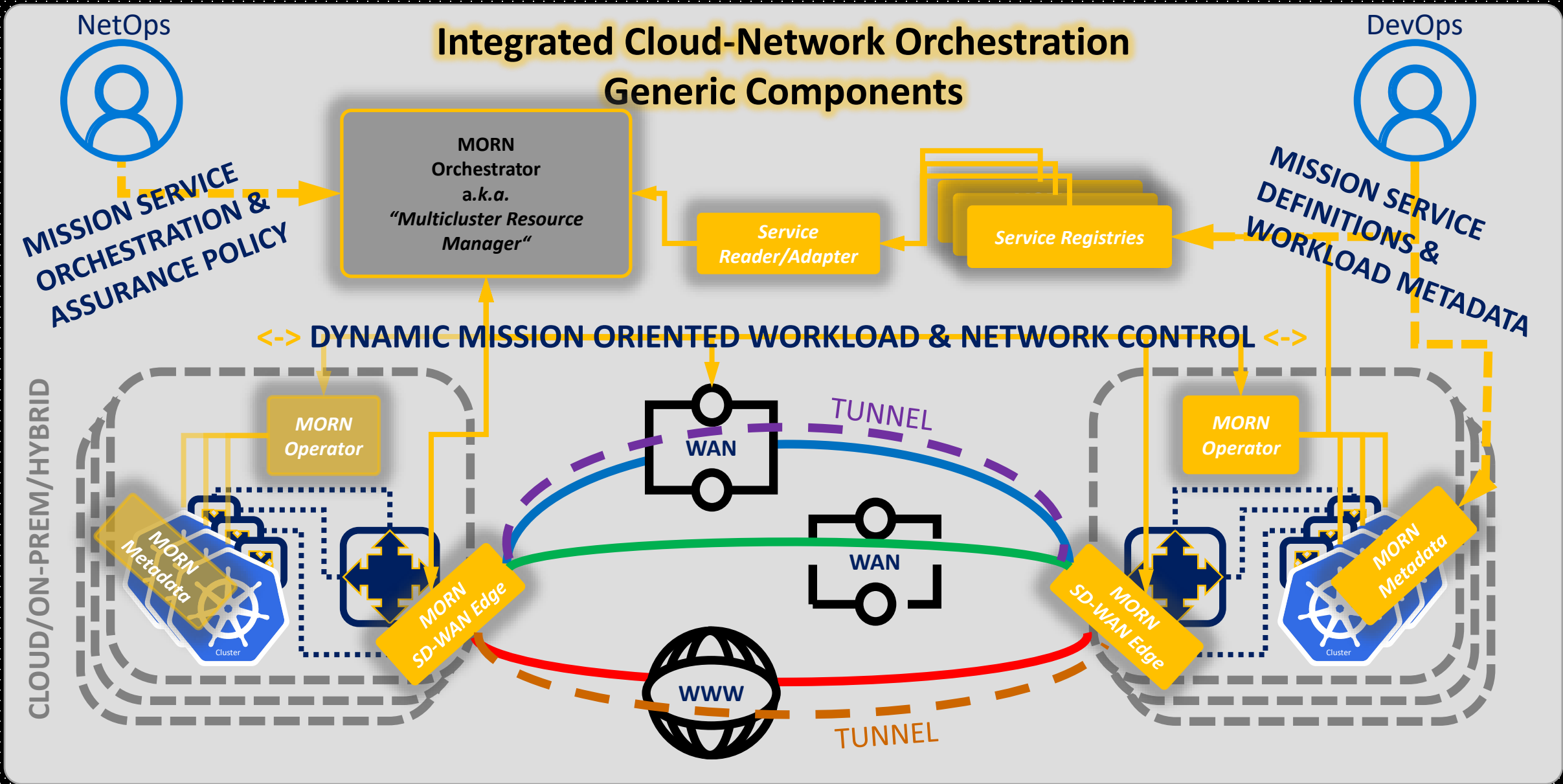
JOINT BIG DATA TESTBED

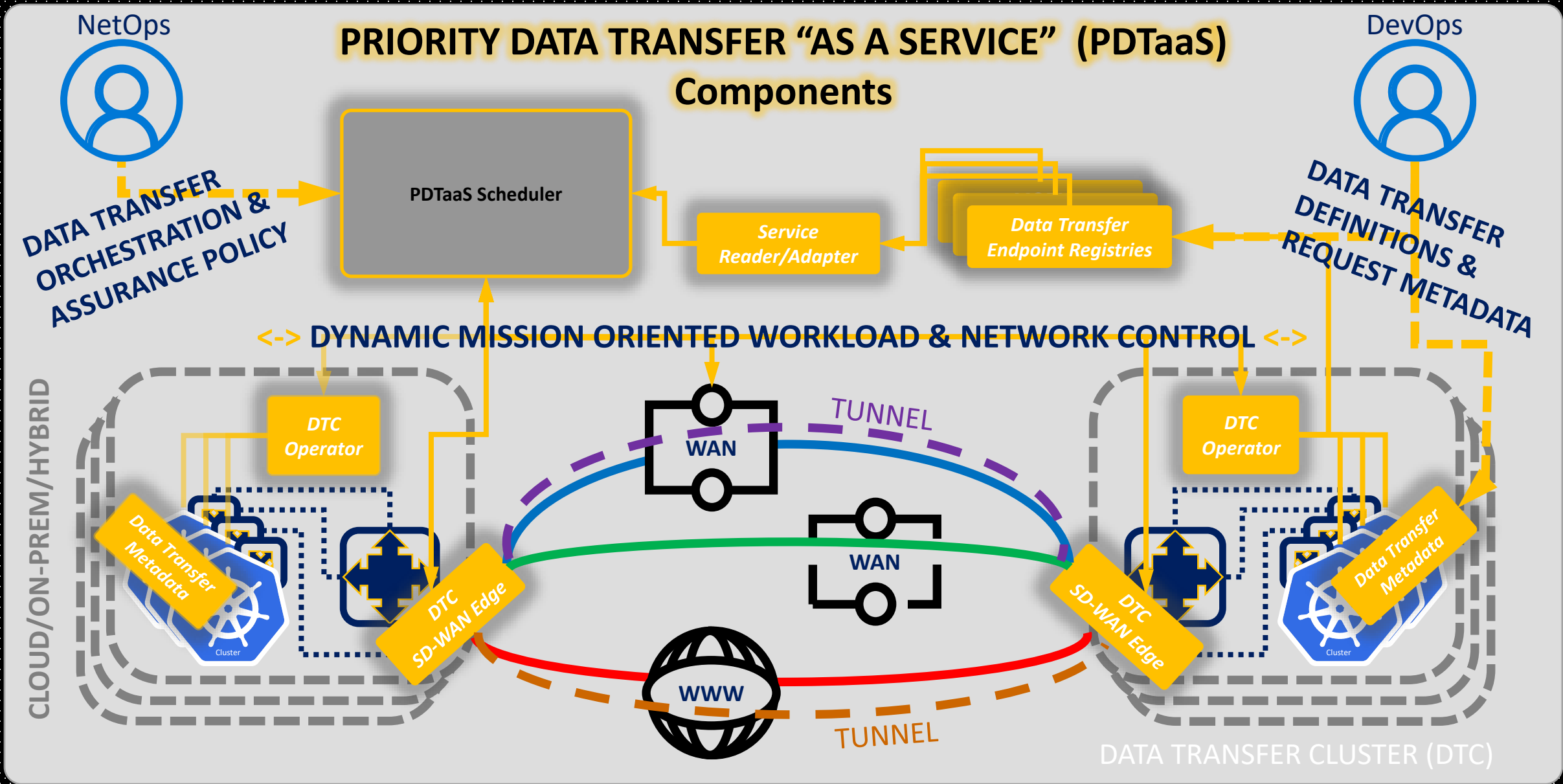


30 October 2024

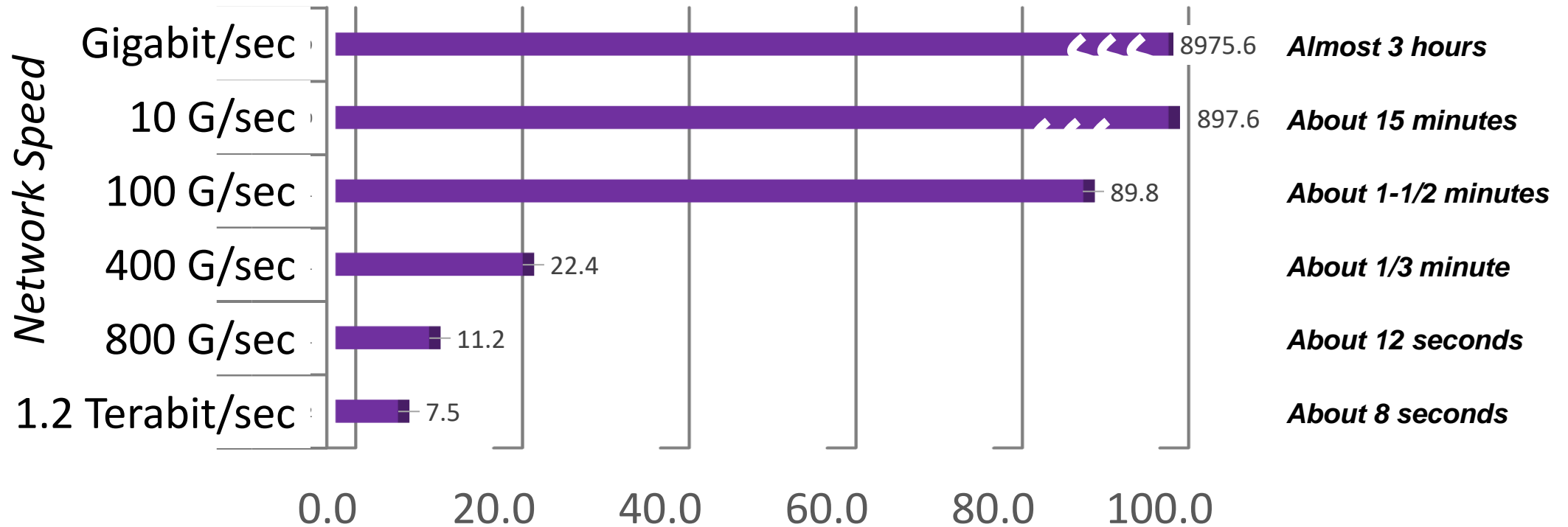
Latest Version at:
<https://tinyurl.com/SC24-JBDT>
 To request changes, please leave a comment

[SC24 floorplan](#)





Terabyte Data Movement



The ideal number of seconds to transfer One Terabyte

Example TByte Datasets:

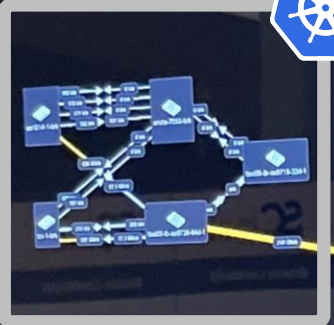
- Largest imagery
- 3D additive manufacturing
- Medical imaging

* a Terabyte is 8.8 Terabits (2^{43} bits) - storage to bandwidth conversion

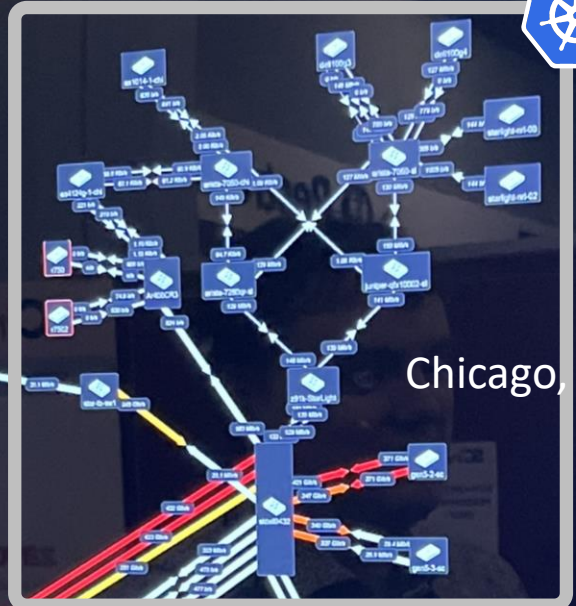
* ~3 hours of high-quality compressed 4K UHD video (H.265) is about 100 Gigabytes

MORN SC24 Testbed

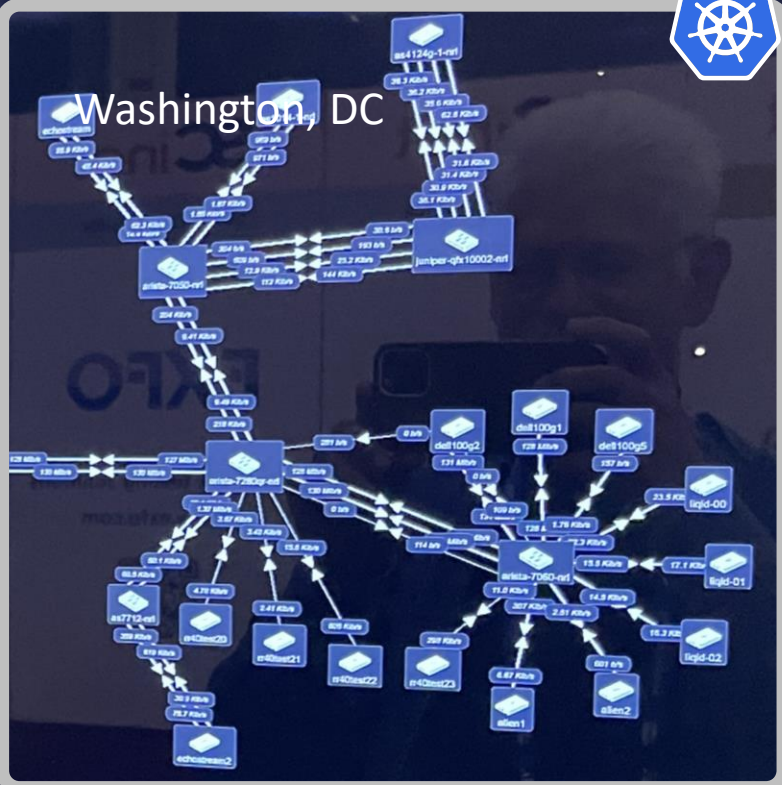
CUI



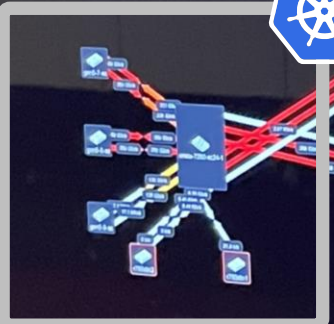
Berkeley, CA



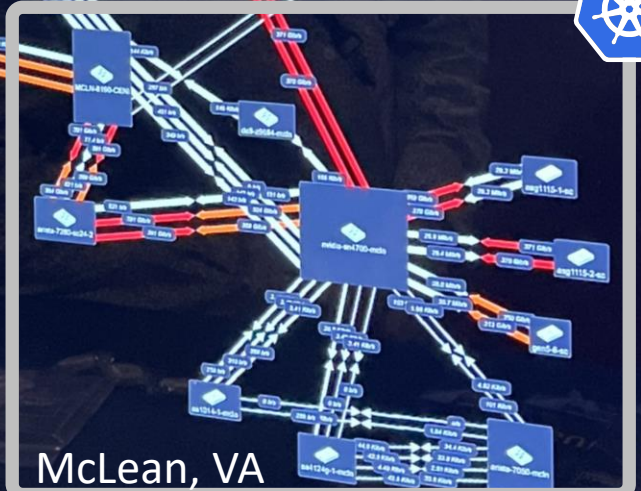
Chicago, IL



Washington, DC



Atlanta, GA



McLean, VA

3 NRL servers

SuperMicro ASG-1115

with

Single processor

- Genoa 9354P 32C/64T 3.25GHz

Memory

- 384GB DDR5-4800

Storage

- 16 Samsung PM1743 3.84T

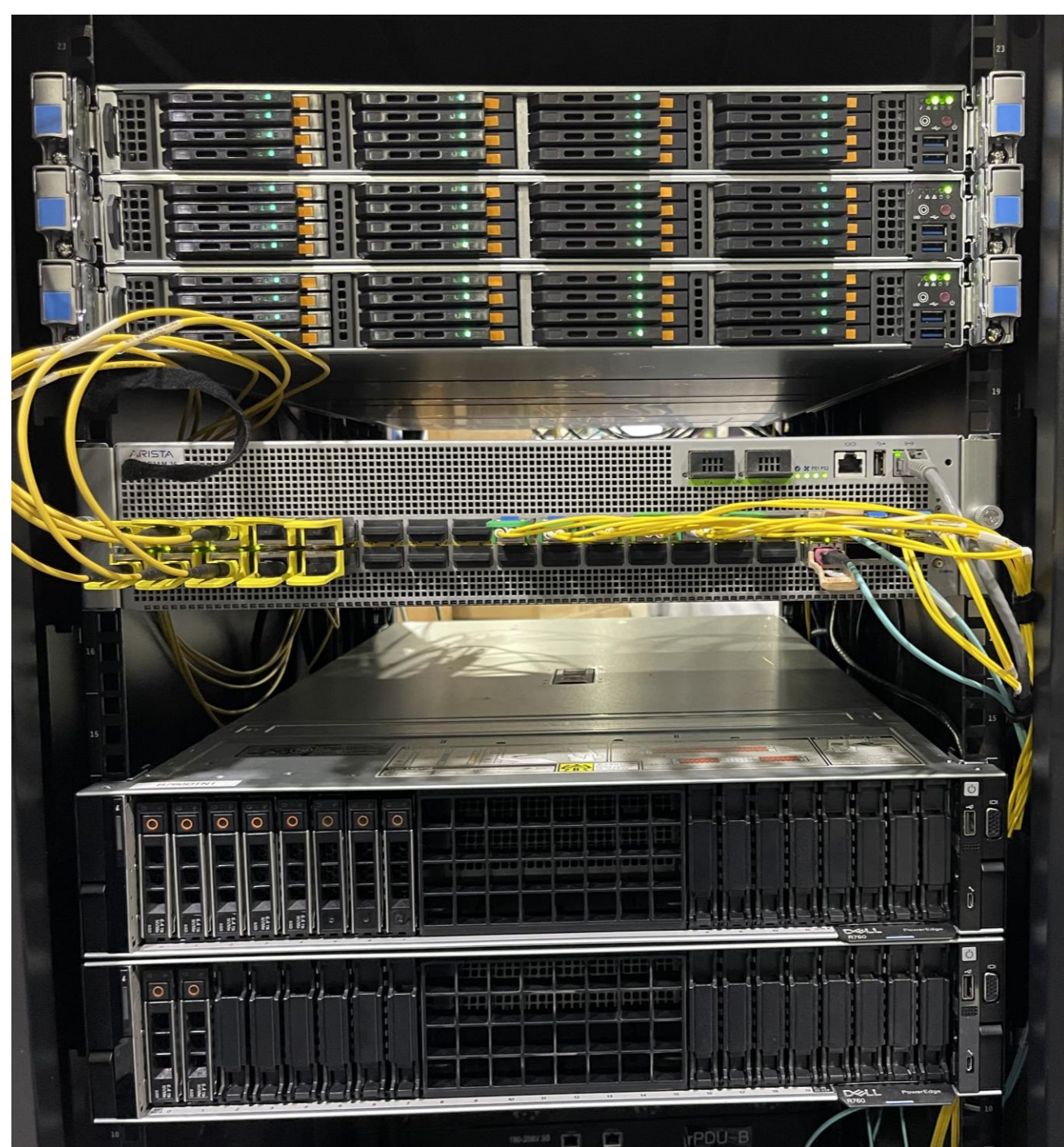
NVMePCIeGen5 E3.S

400G Ethernet switch

Arista 7280R3

- Jericho 2C+

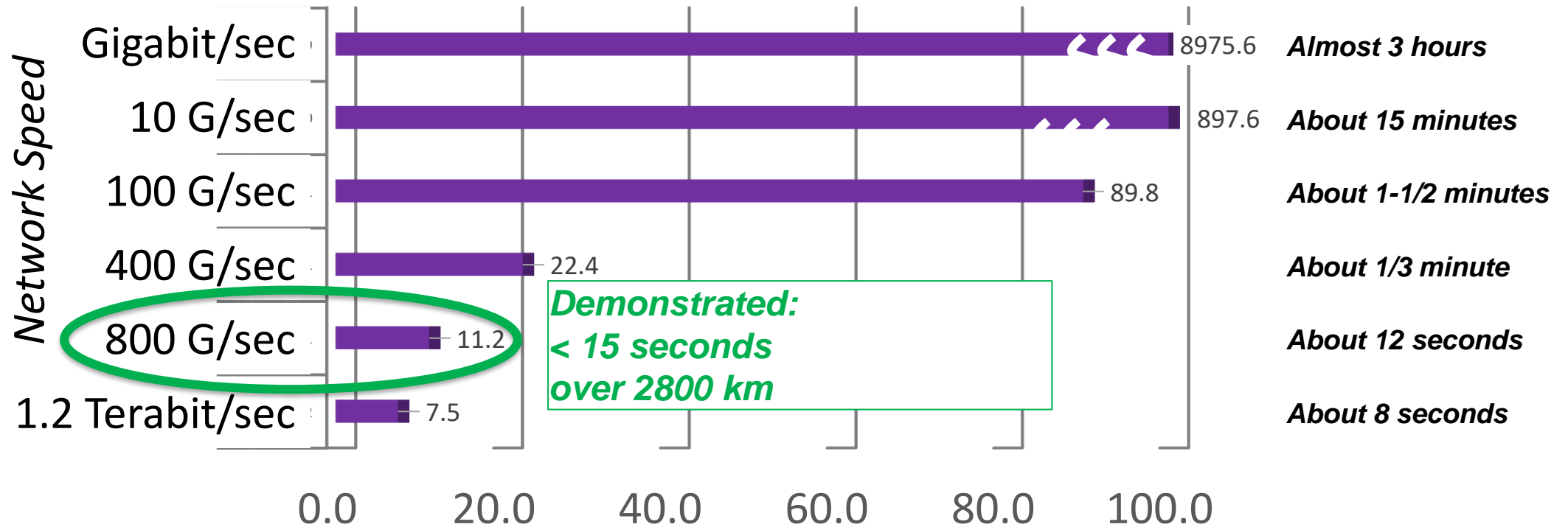
- Deep buffers



Each server has 2 x 400G CX-7



Terabyte Data Movement



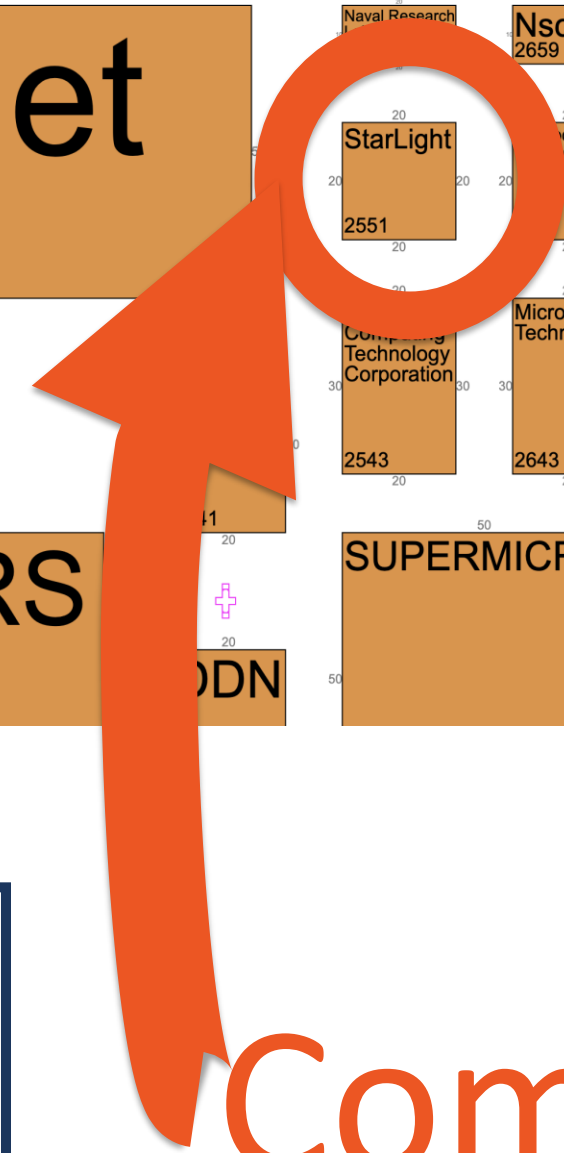
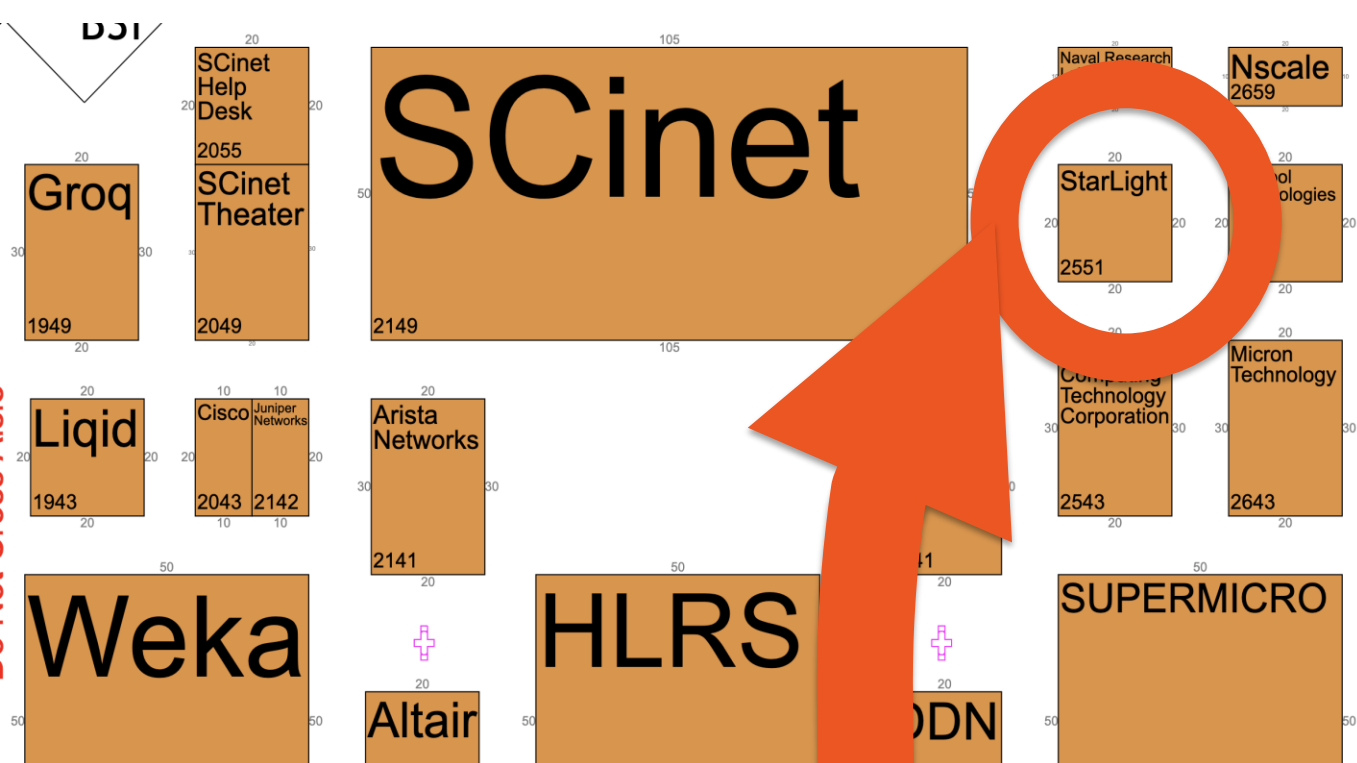
Number of seconds to transfer One Terabyte

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Come and See !

"Any opinions, findings, conclusions or recommendations expressed in this material are those of the author(s) and do not necessarily reflect the views of the Networking and Information Technology Research and Development Program."

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