U.S. NAVAL RESEARCH LABORATORY

Resilient, Performant Networks and Distributed Processing

SC24 Demonstration
Naval Research Laboratory
Center for Computational Science

SC24 Atlanta, GA | hpc creates.

November 17–22, 2024

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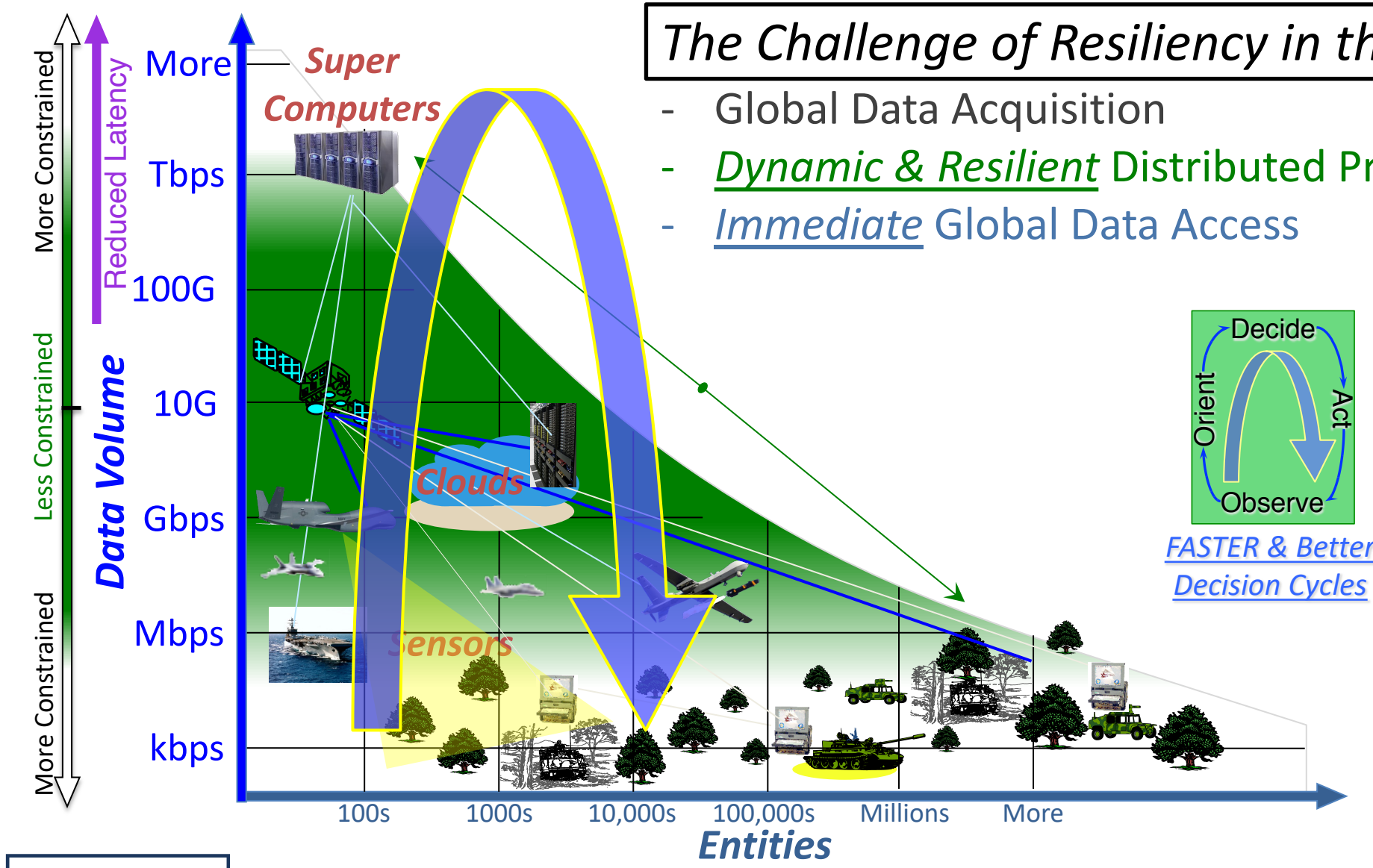
v3b

The Challenge of Resiliency in the DoD:

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



FASTER & Better Decision Cycles

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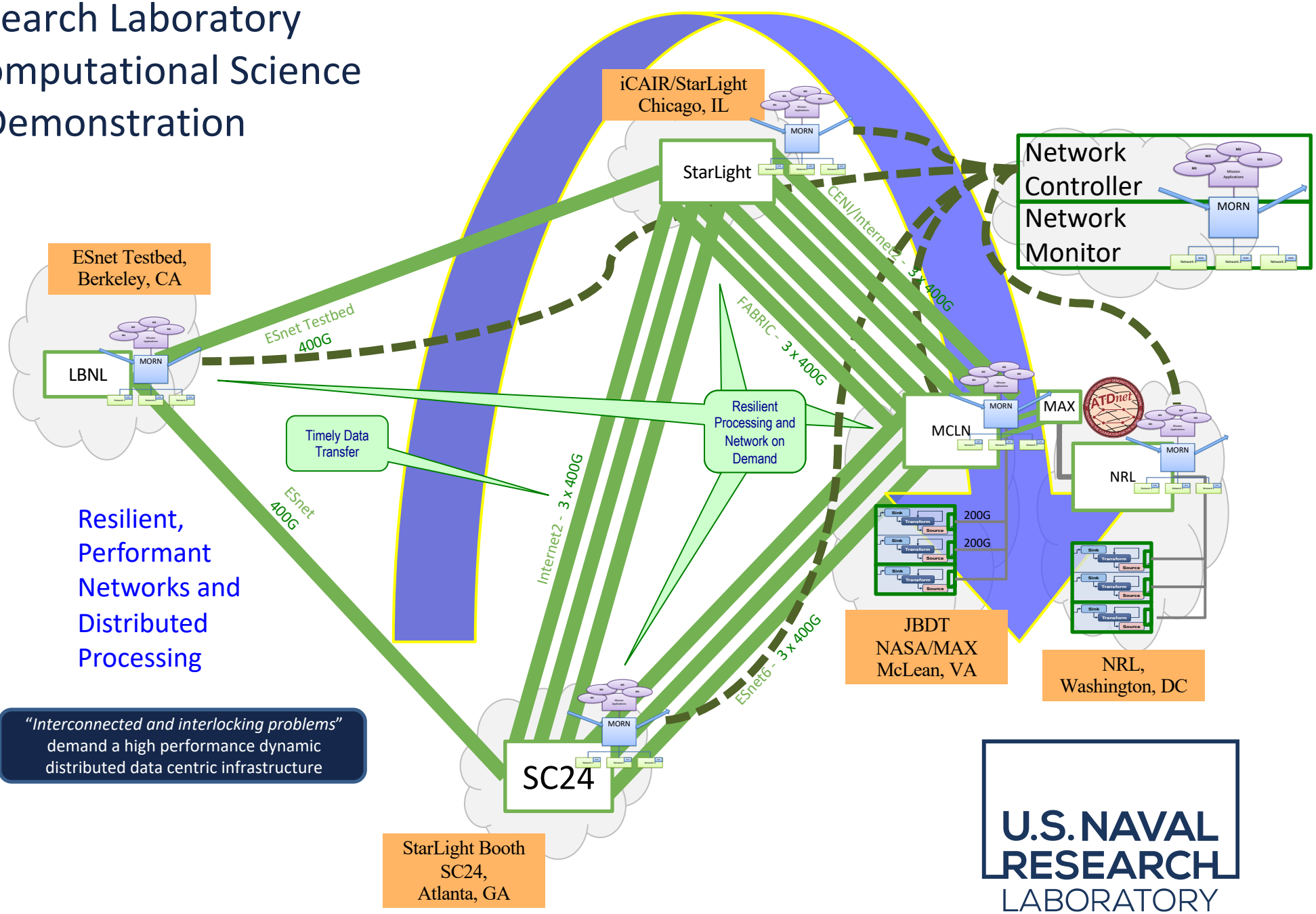
Naval Research Laboratory
Center for Computational Science
SC24 Demonstration

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).



Resilient, Performant Networks and Distributed Processing

"Interconnected and interlocking problems" demand a high performance dynamic distributed data centric infrastructure

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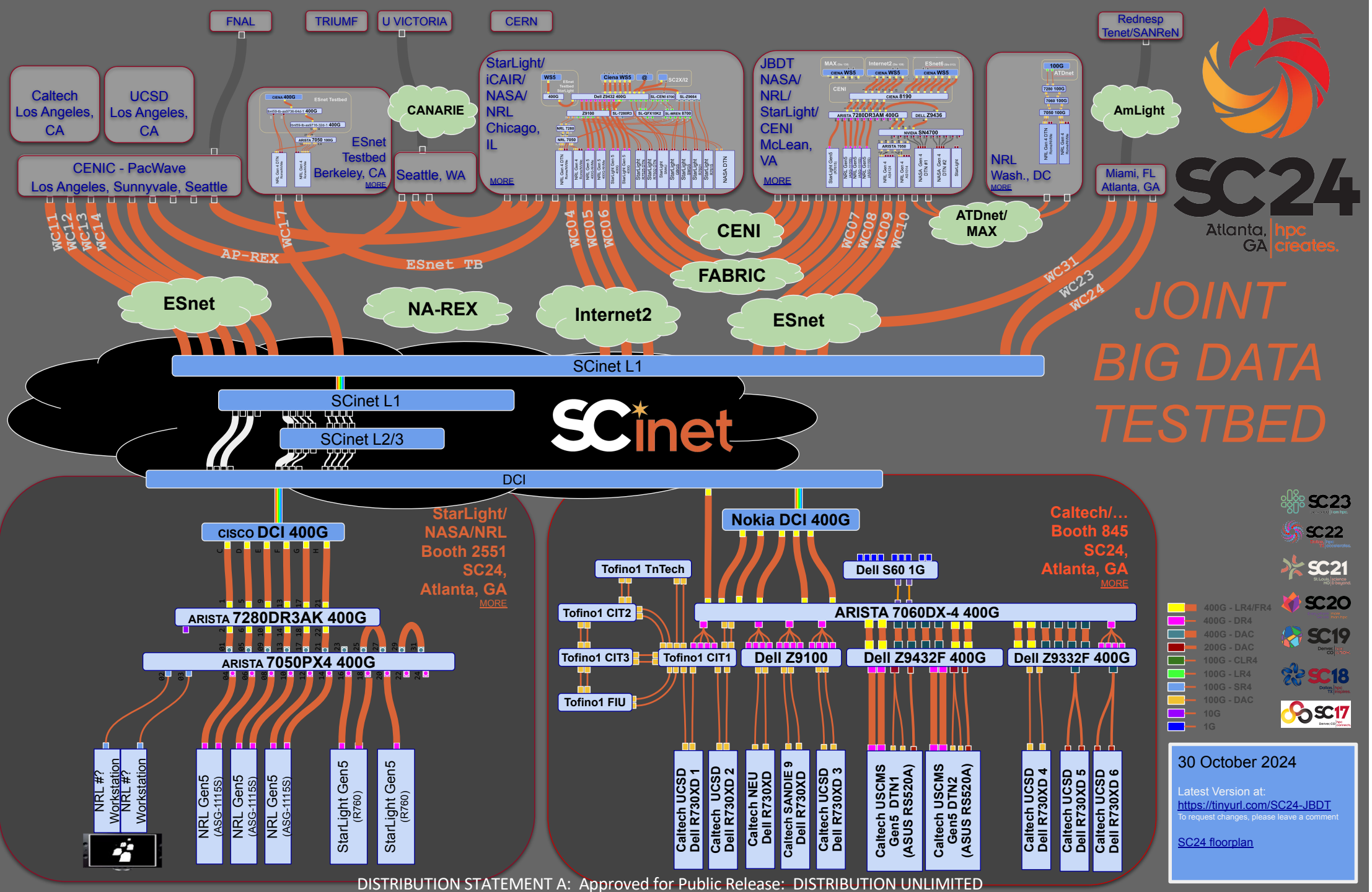
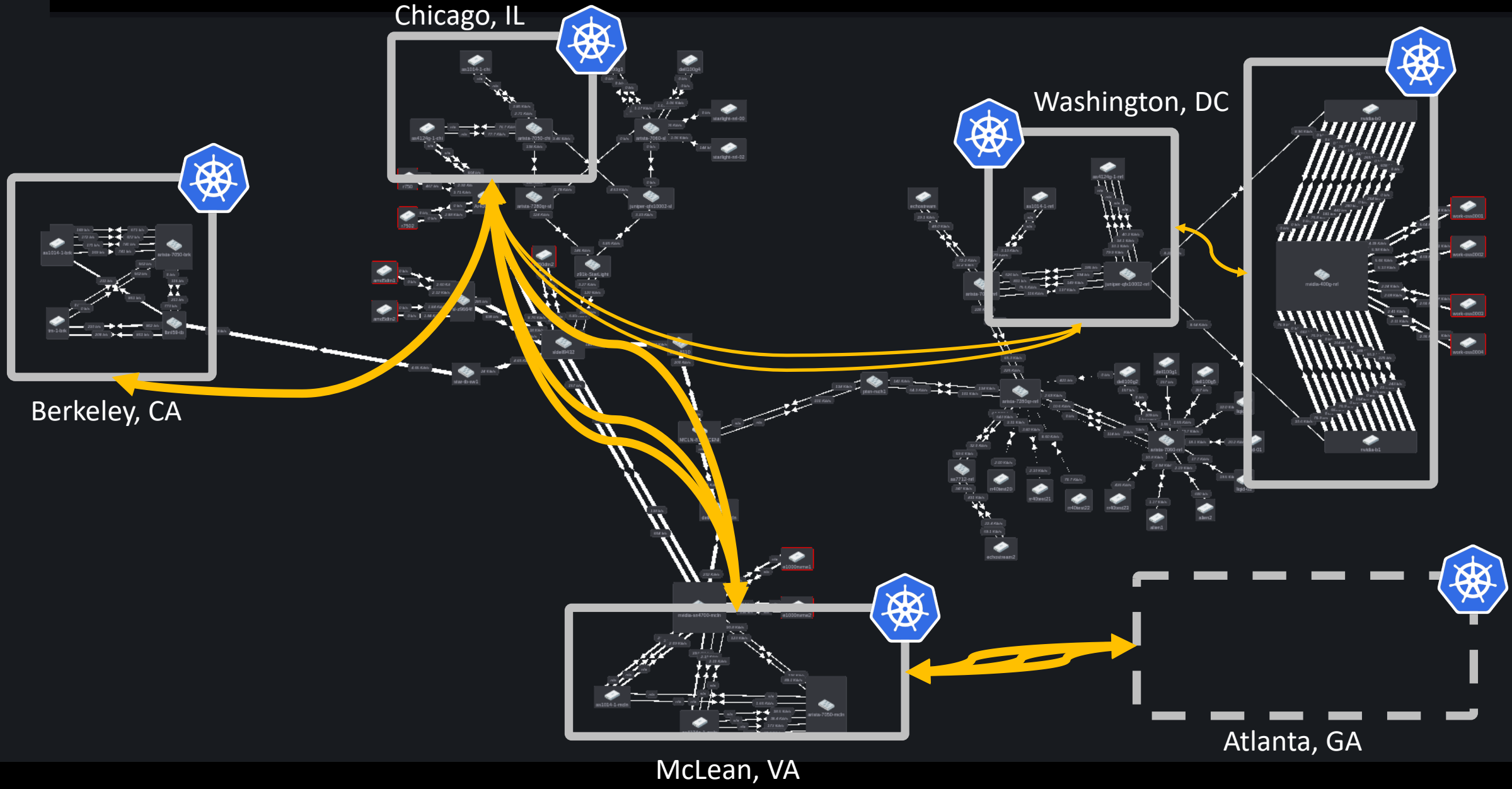


MORN SC24 Testbed



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

Each server has 2 x 400G CX-7

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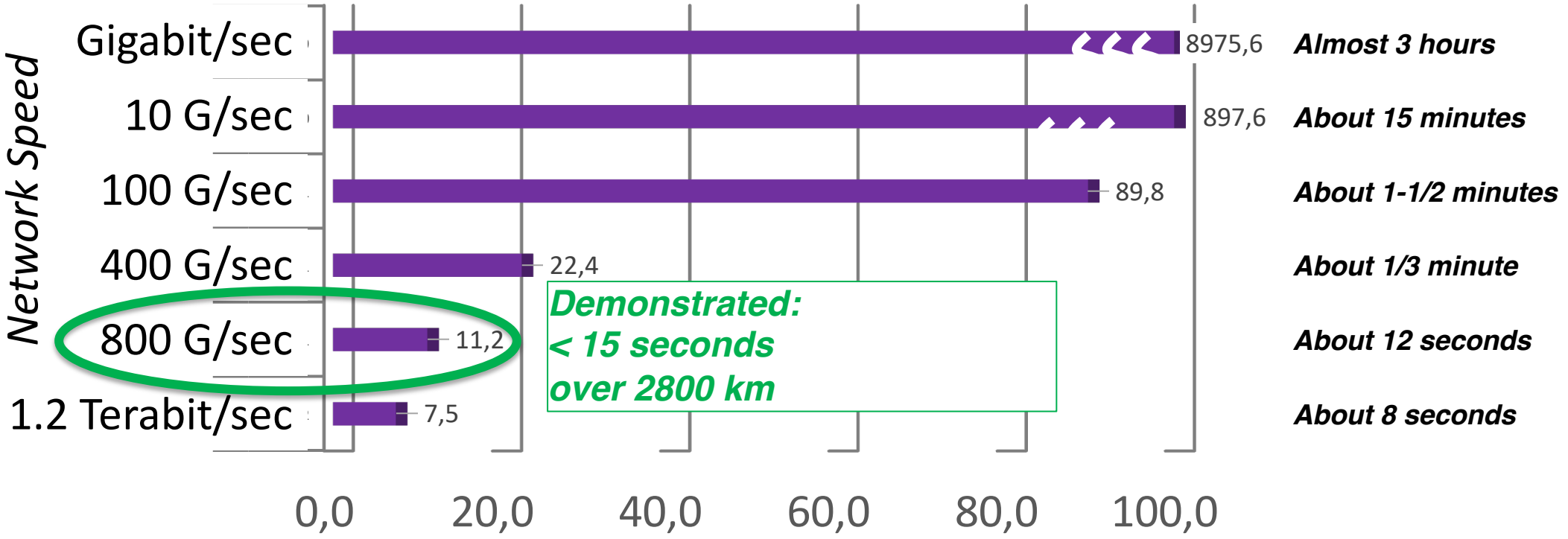
Terabyte Data Movement

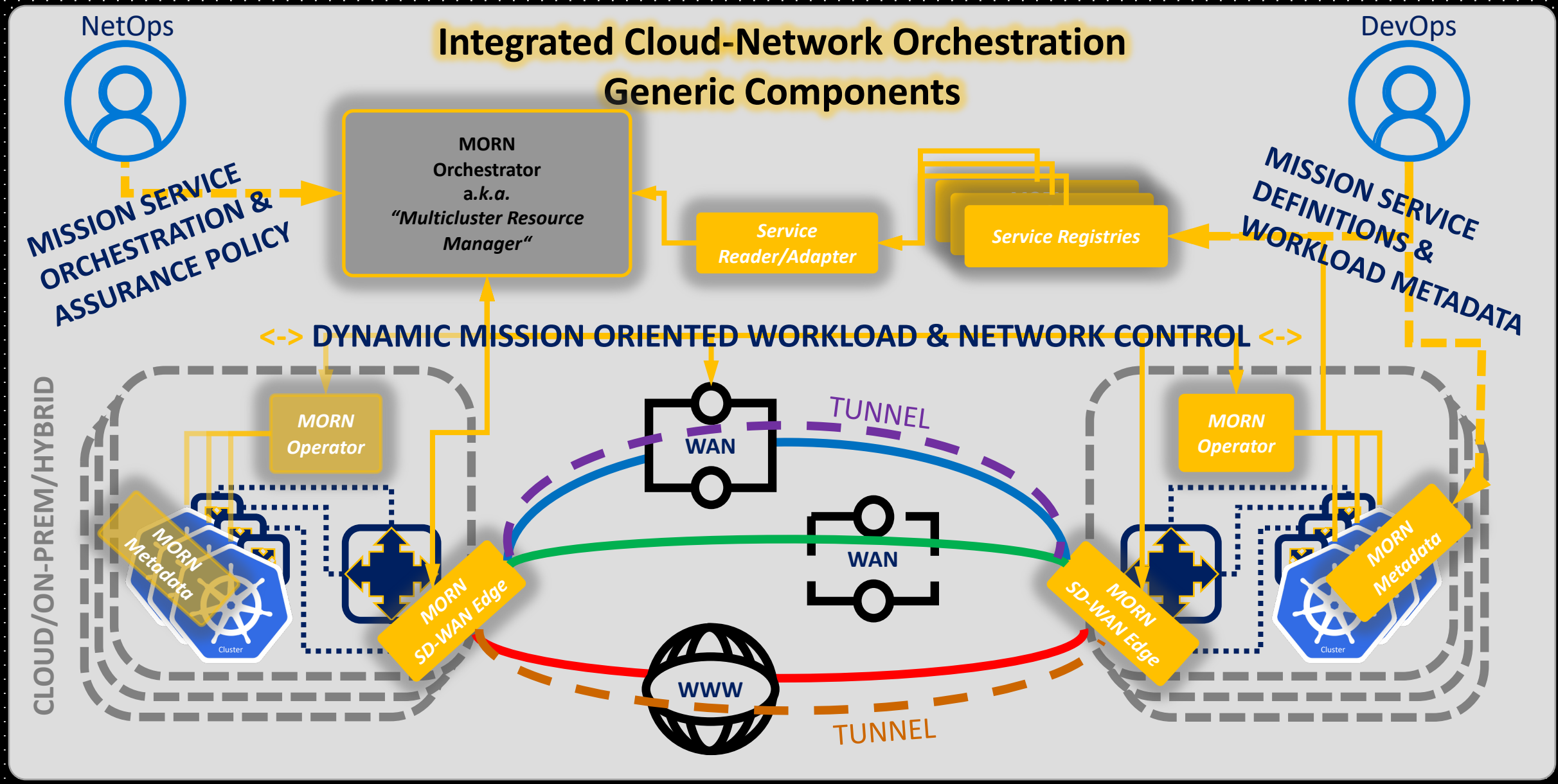


Number of seconds to transfer One Terabyte

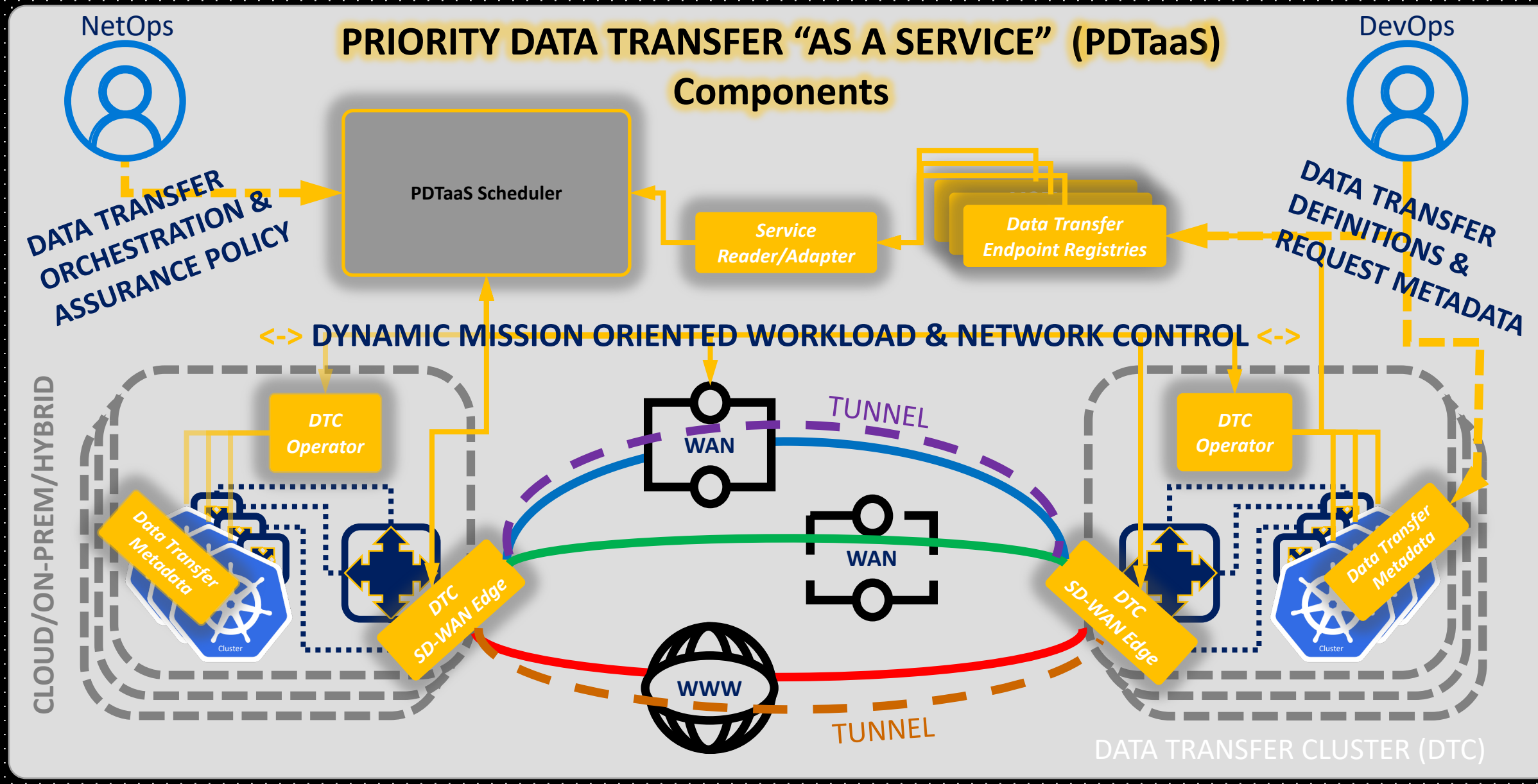
Example TByte Datasets:

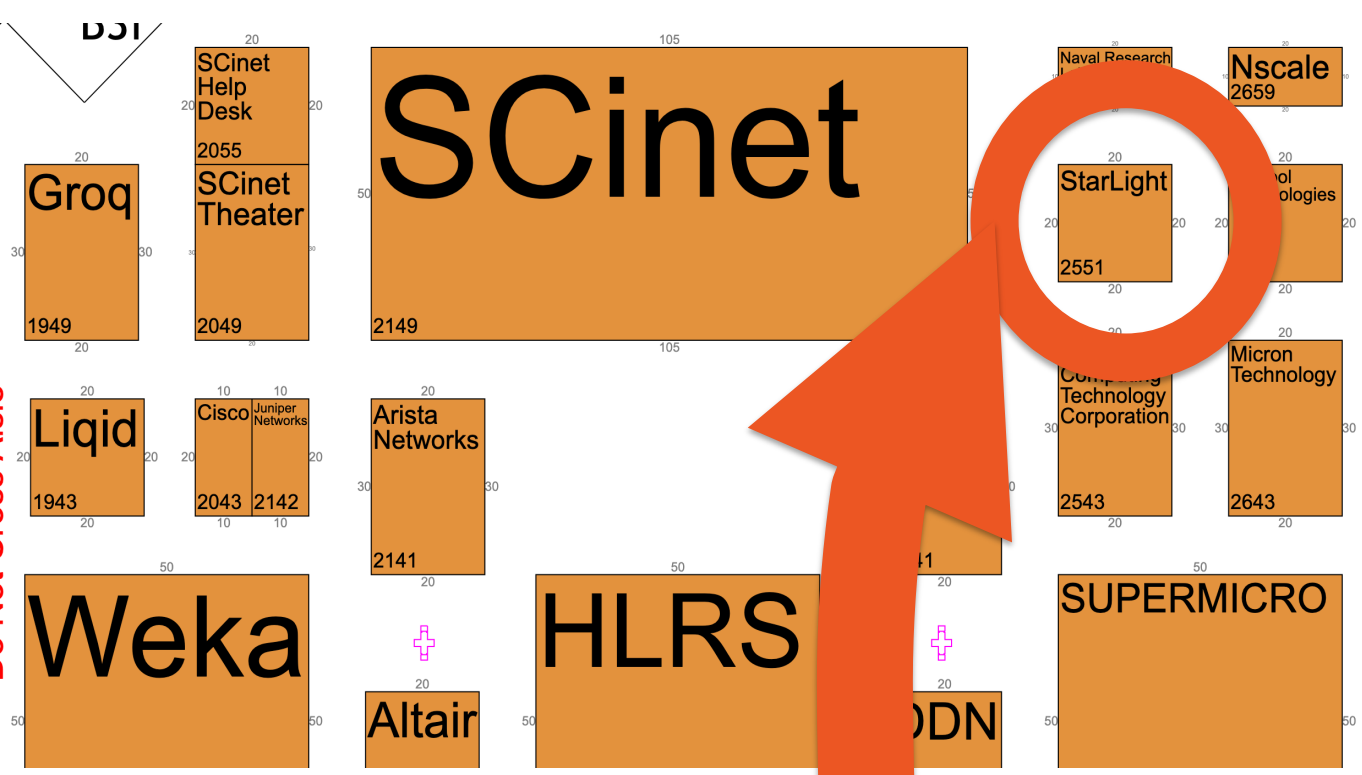
- **Largest imagery**
- **3D additive manufacturing**
- **Medical imaging**

* 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



PRIORITY DATA TRANSFER "AS A SERVICE" (PDTaaS)
Components





STARLIGHT™

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Come and See !