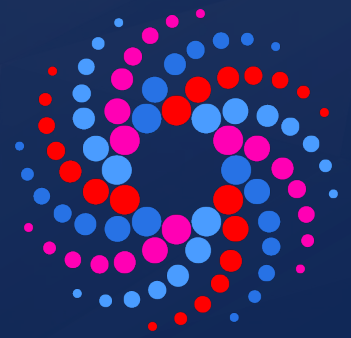
U.S. NAVAL RESEARCH LABORATORY

Resilient Distributed Processing and Reconfigurable Networks



SC22
Dallas, TX | hpc accelerates.

SC22 Demonstration
Naval Research Laboratory
Center for Computational Science

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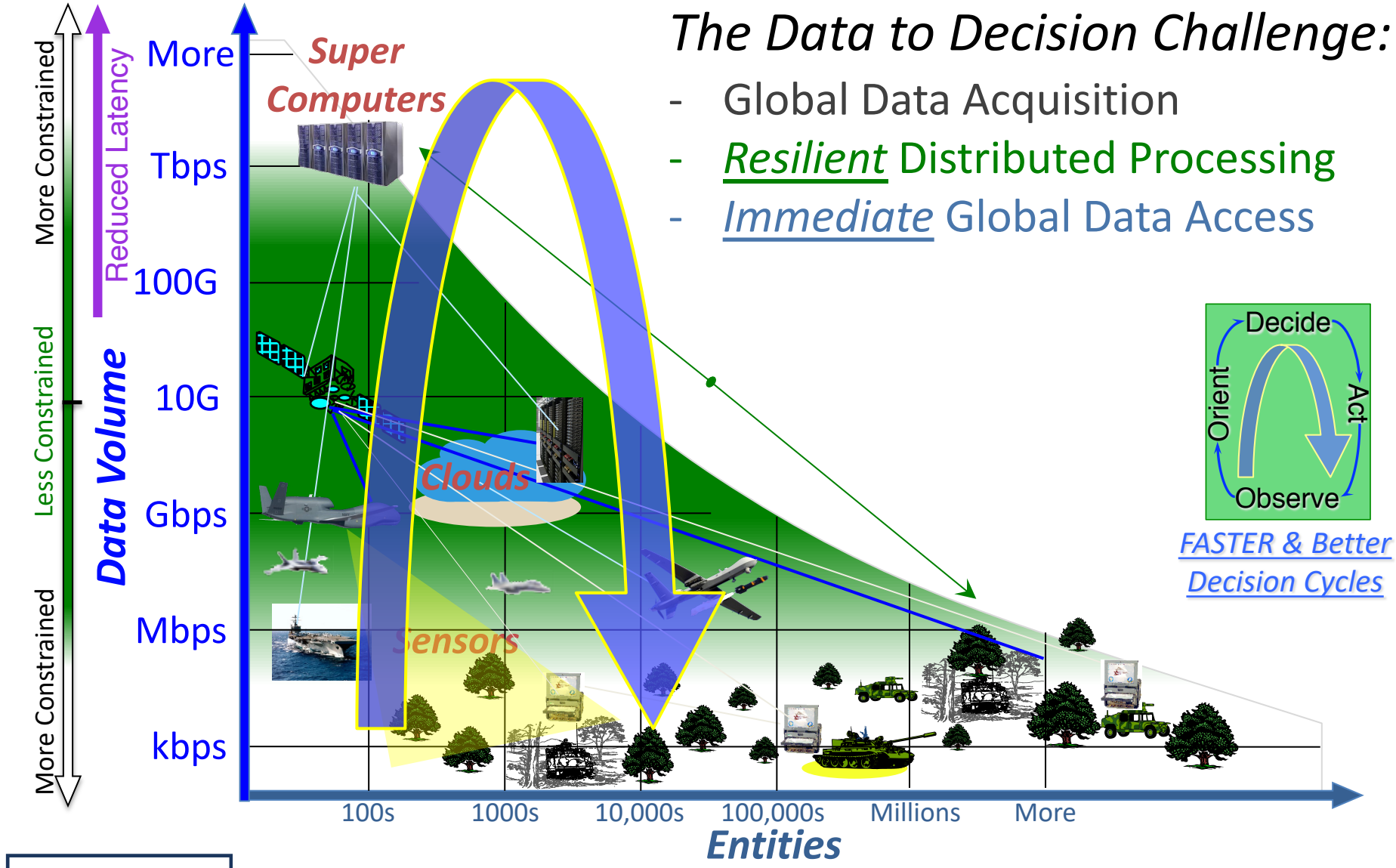
The Data to Decision Challenge:

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



FASTER & Better Decision Cycles

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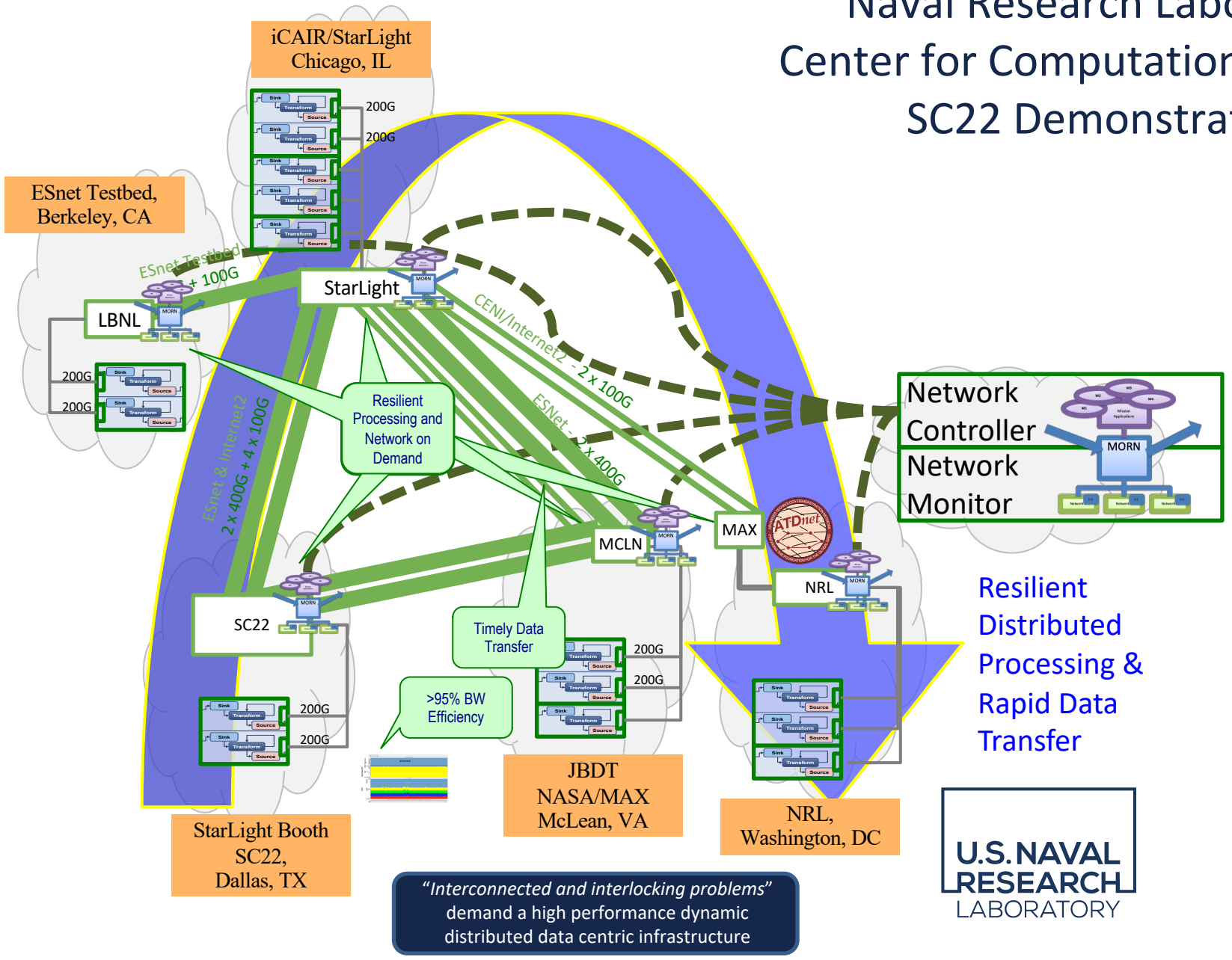
Center for Computational Science
SC22 Demonstration



Resilient
Distributed
Processing &
Rapid Data
Transfer

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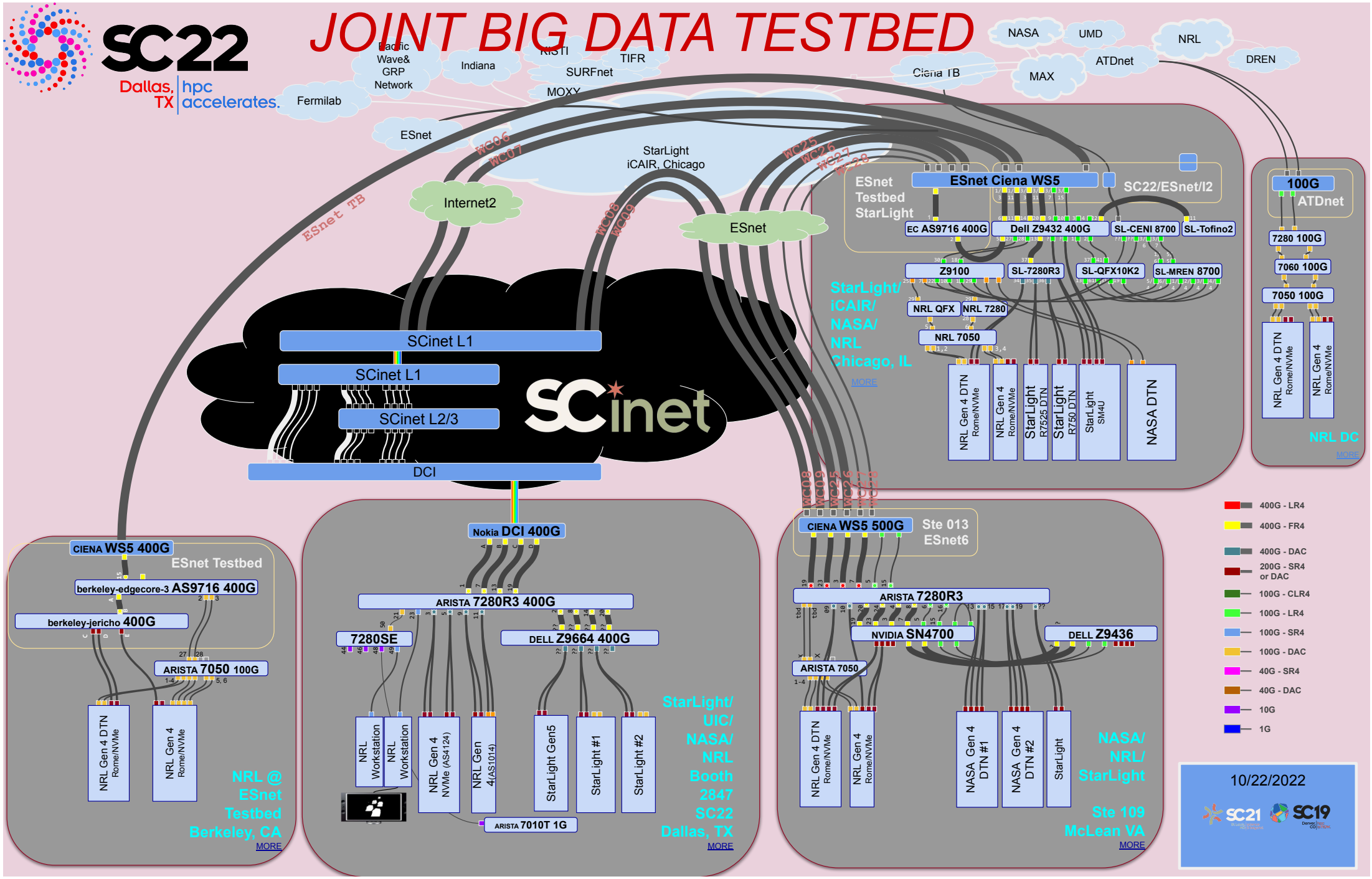
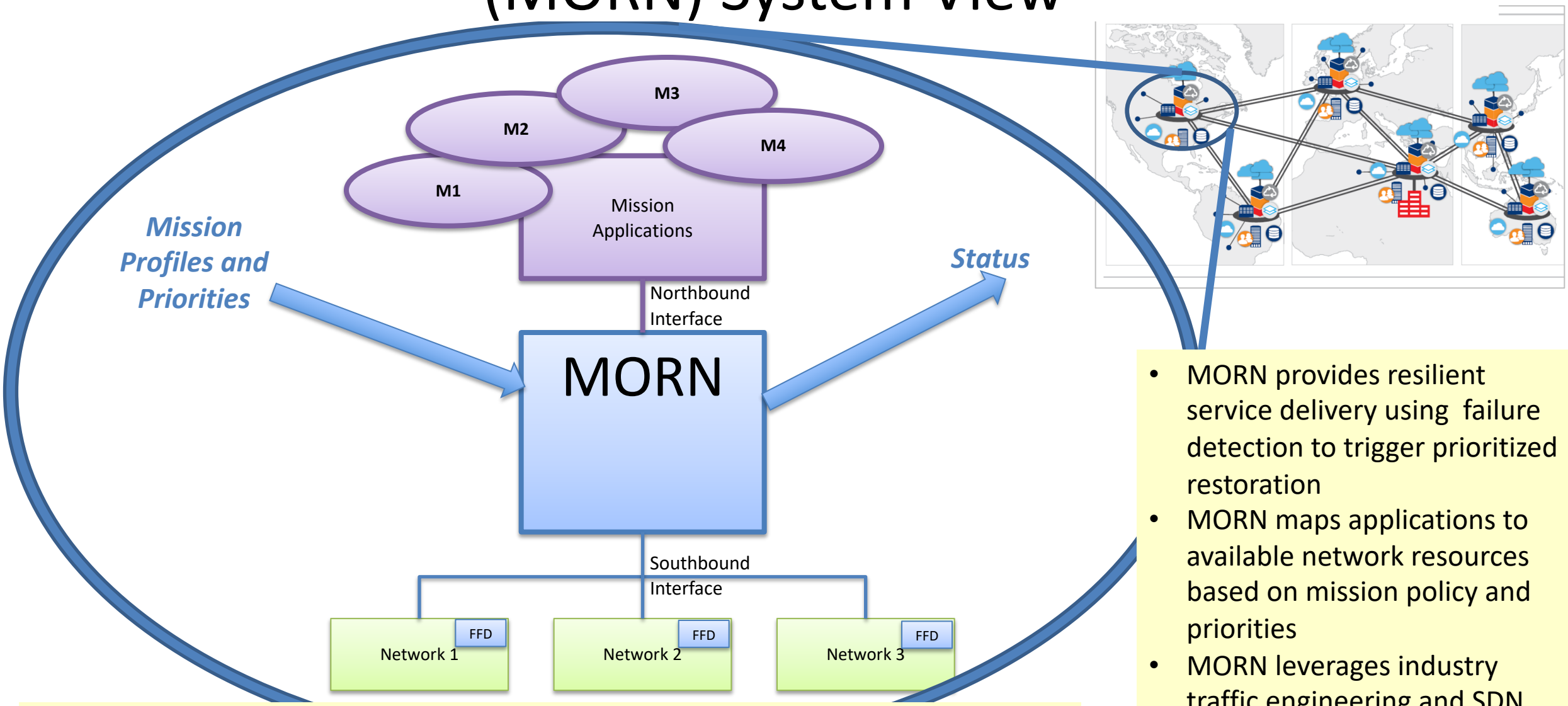
"Interconnected and interlocking problems" demand a high performance dynamic distributed data centric infrastructure


SC22
Dallas, TX | hpc accelerates.
JOINT BIG DATA TESTBED
Pacific Wave& GRP Network
Indiana
KISTI
TIFR
SURFnet
MOXY
Fermilab
ESnet
Internet2
StarLight iCAIR, Chicago
ESnet
Ciena TB
NASA
UMD
NRL
ATDnet
MAX
DREN
ESnet TB
WC06
WC07
WC08
WC09
WC25
WC26
WC27
WC28
SCinet L1
SCinet L1
SCinet L2/3
DCI
SCinet
ESnet Testbed StarLight
ESnet Ciena WS5
SC22/ESnet/I2
EC AS9716 400G
Dell Z9432 400G
SL-CENI 8700
SL-Tofino2
Z9100
SL-7280R3
SL-QFX10K2
SL-MREN 8700
NRL QFX
NRL 7280
NRL 7050
StarLight/ iCAIR/ NASA/ NRL Chicago, IL
MORE
NRL Gen 4 DTN Rome/NVMe
NRL Gen 4 Rome/NVMe
StarLight R7525 DTN
StarLight R750 DTN
StarLight SM4U
NASA DTN
100G ATDnet
7280 100G
7060 100G
7050 100G
NRL Gen 4 DTN Rome/NVMe
NRL Gen 4 Rome/NVMe
NRL DC
MORE
CIENA WS5 400G
ESnet Testbed
berkeley-edgecore-3 AS9716 400G
berkeley-jericho 400G
ARISTA 7050 100G
NRL Gen 4 DTN Rome/NVMe
NRL Gen 4 Rome/NVMe
NRL @ ESnet Testbed Berkeley, CA
MORE
Nokia DCI 400G
ARISTA 7280R3 400G
7280SE
DELL Z9664 400G
NRL Workstation
NRL Workstation
NRL Gen 4 NVMe (AS4124)
NRL Gen 4 (AS1014)
StarLight Gen5
StarLight #1
StarLight #2
ARISTA 7010T 1G
StarLight/ UIC/ NASA/ NRL Booth 2847 SC22 Dallas, TX
MORE
CIENA WS5 500G
Ste 013 ESnet6
ARISTA 7280R3
NVIDIA SN4700
DELL Z9436
ARISTA 7050
NRL Gen 4 DTN Rome/NVMe
NRL Gen 4 Rome/NVMe
NASA Gen 4 DTN #1
NASA Gen 4 DTN #2
StarLight
NASA/ NRL/ StarLight
Ste 109 McLean VA
MORE
400G - LR4
400G - FR4
400G - DAC
200G - SR4 or DAC
100G - CLR4
100G - LR4
100G - SR4
100G - DAC
40G - SR4
40G - DAC
10G
1G
10/22/2022
SC21
SC19

Mission Oriented Reconfigurable Networking (MORN) System View



- MORN provides resilient service delivery using failure detection to trigger prioritized restoration
- MORN maps applications to available network resources based on mission policy and priorities
- MORN leverages industry traffic engineering and SDN

MORN is our approach to optimizing the allocation of resources to meet mission requirements

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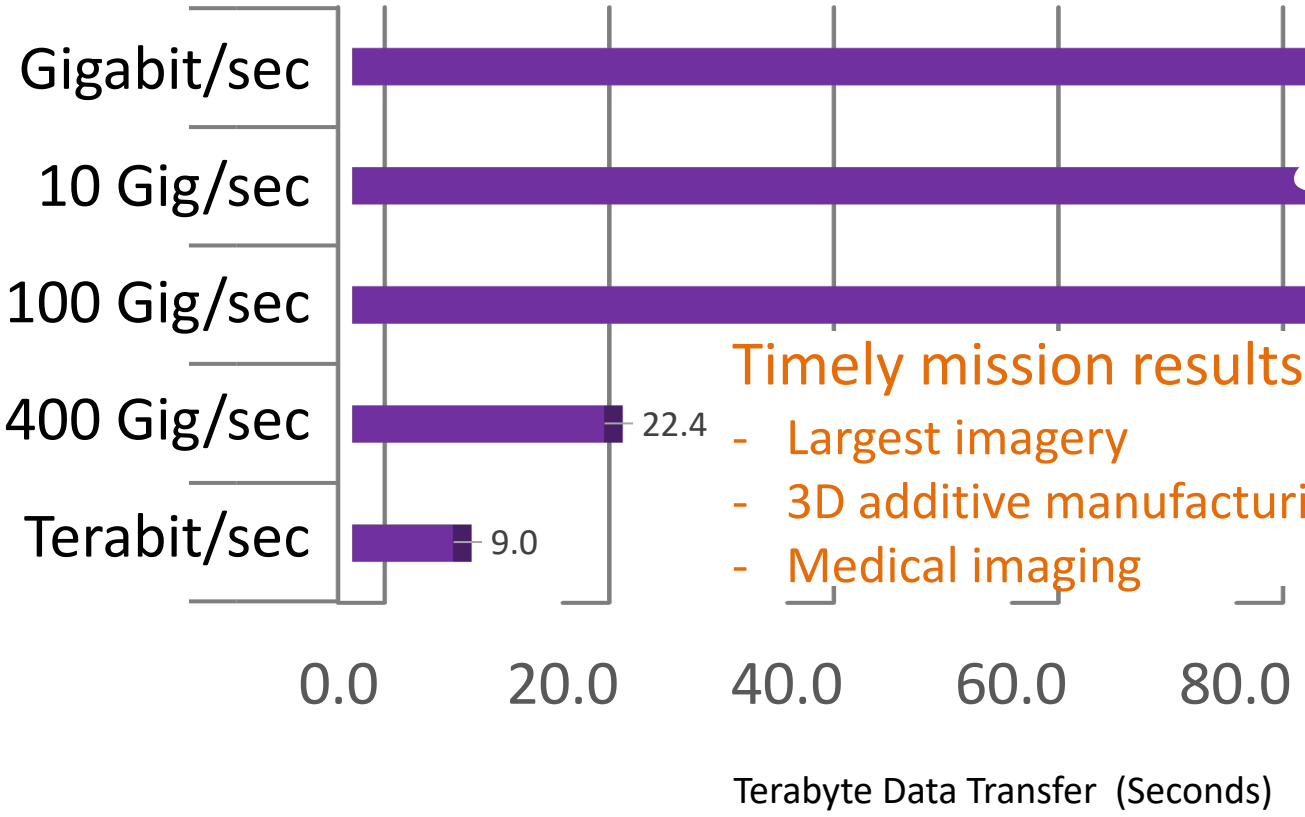
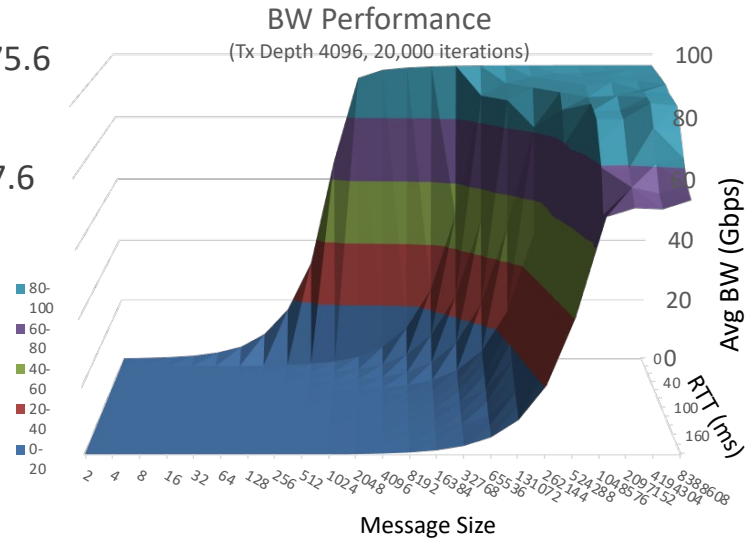
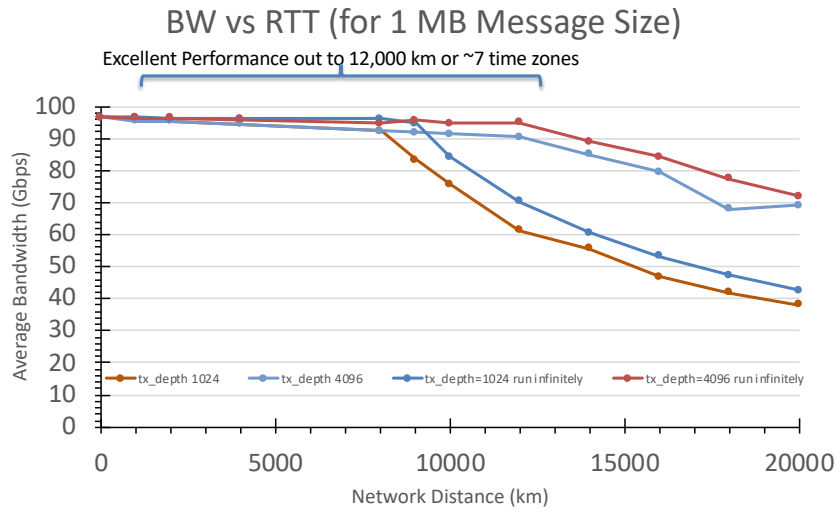
Terabyte Data Movement



Timely mission results:

- Largest imagery
- 3D additive manufacturing
- Medical imaging





100 Gigabyte = ~3 hours of high quality 4K video (H.265),
the best Blu-ray disc, 9 hours of Netflix 4K video