



OpenFabrics
Software
User Group
Workshop

SC14 Remote I/O Pipeline Processing Demonstration

#OFSUserGroup

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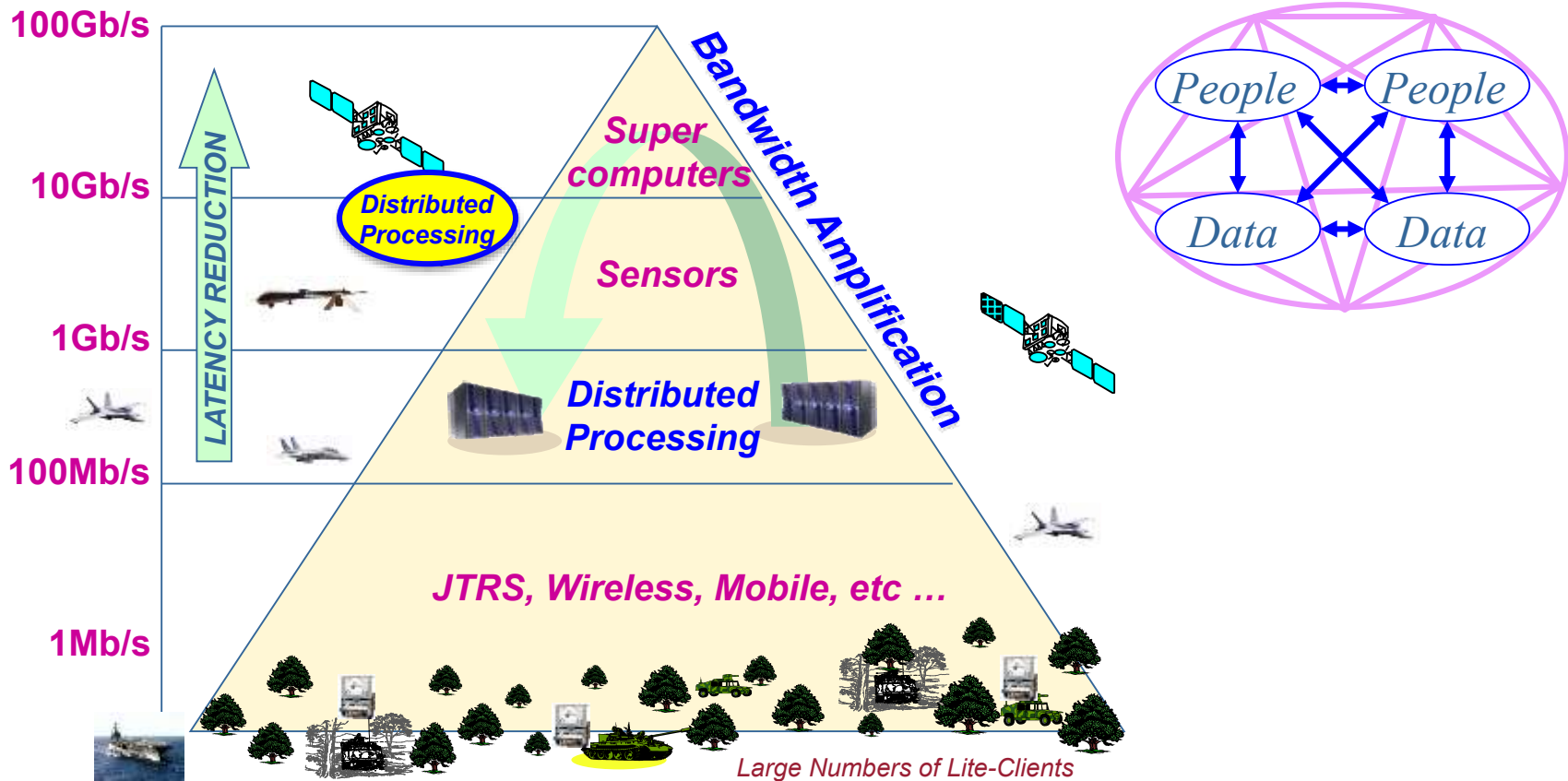
Srinath Jayasundera / Exelis / sjayasundera@exelisinc.com



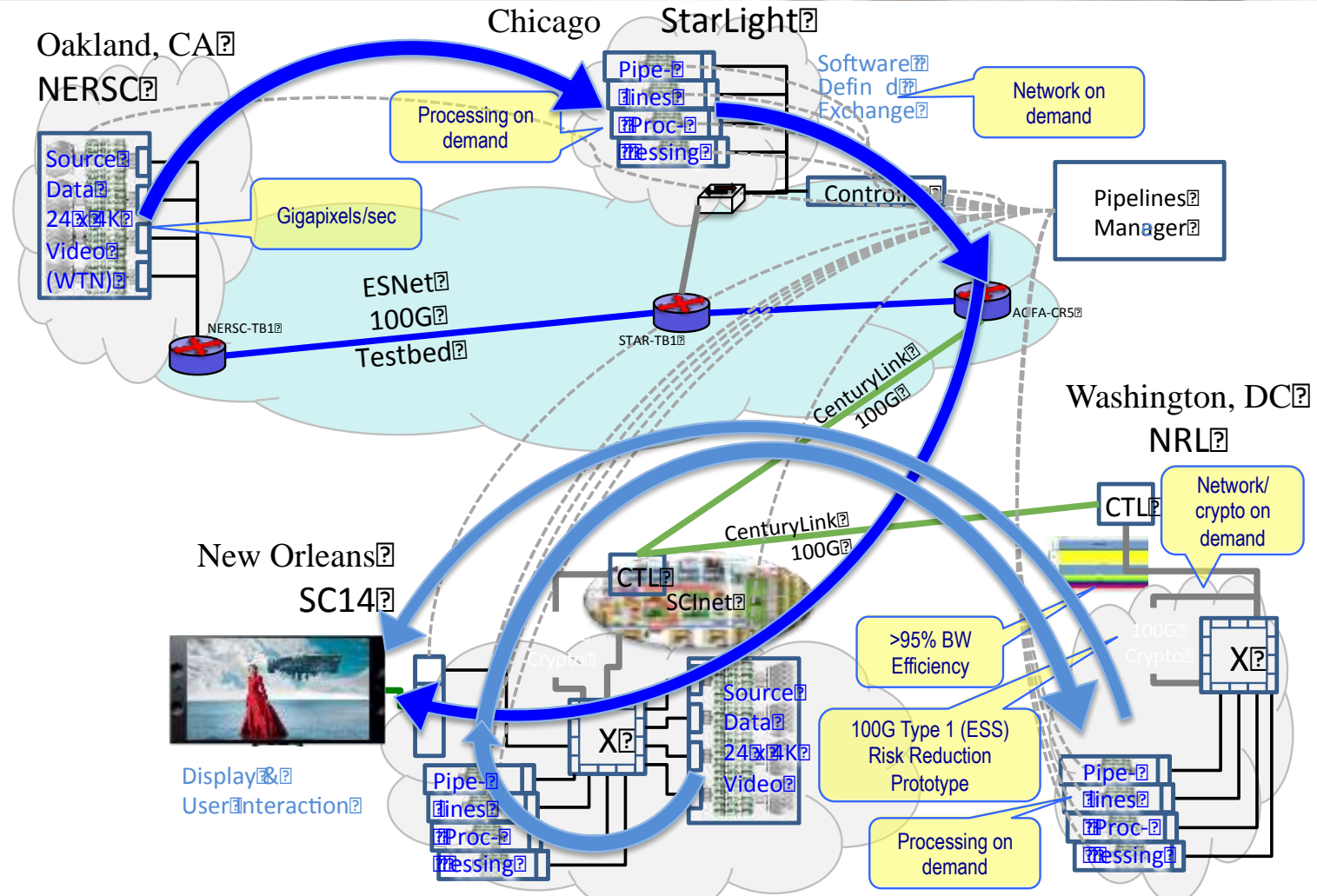
Work done under contract to Naval Research Laboratory

Demonstration/Test Motivation

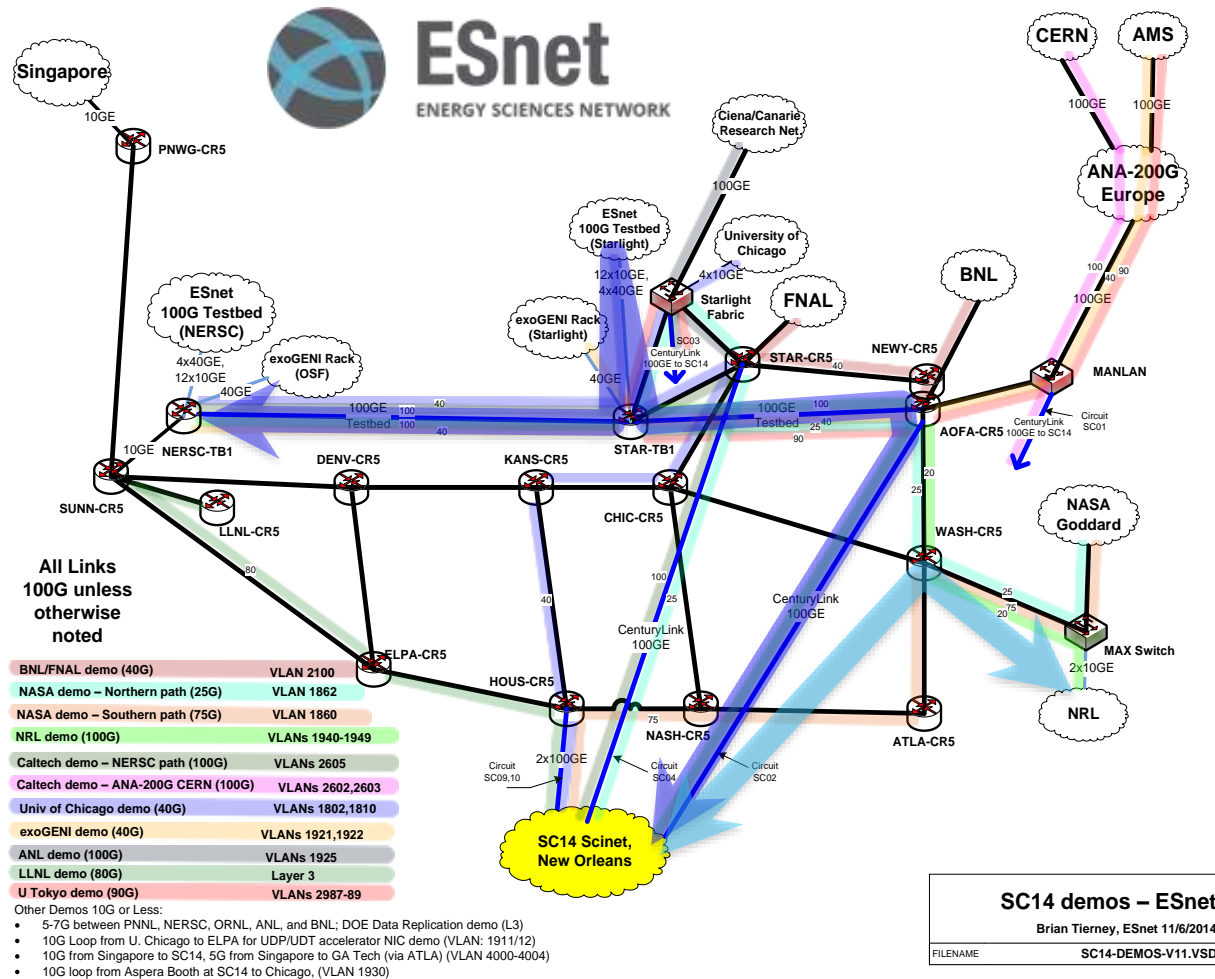
Simple Queries Trigger Extensive Bandwidth Utilization



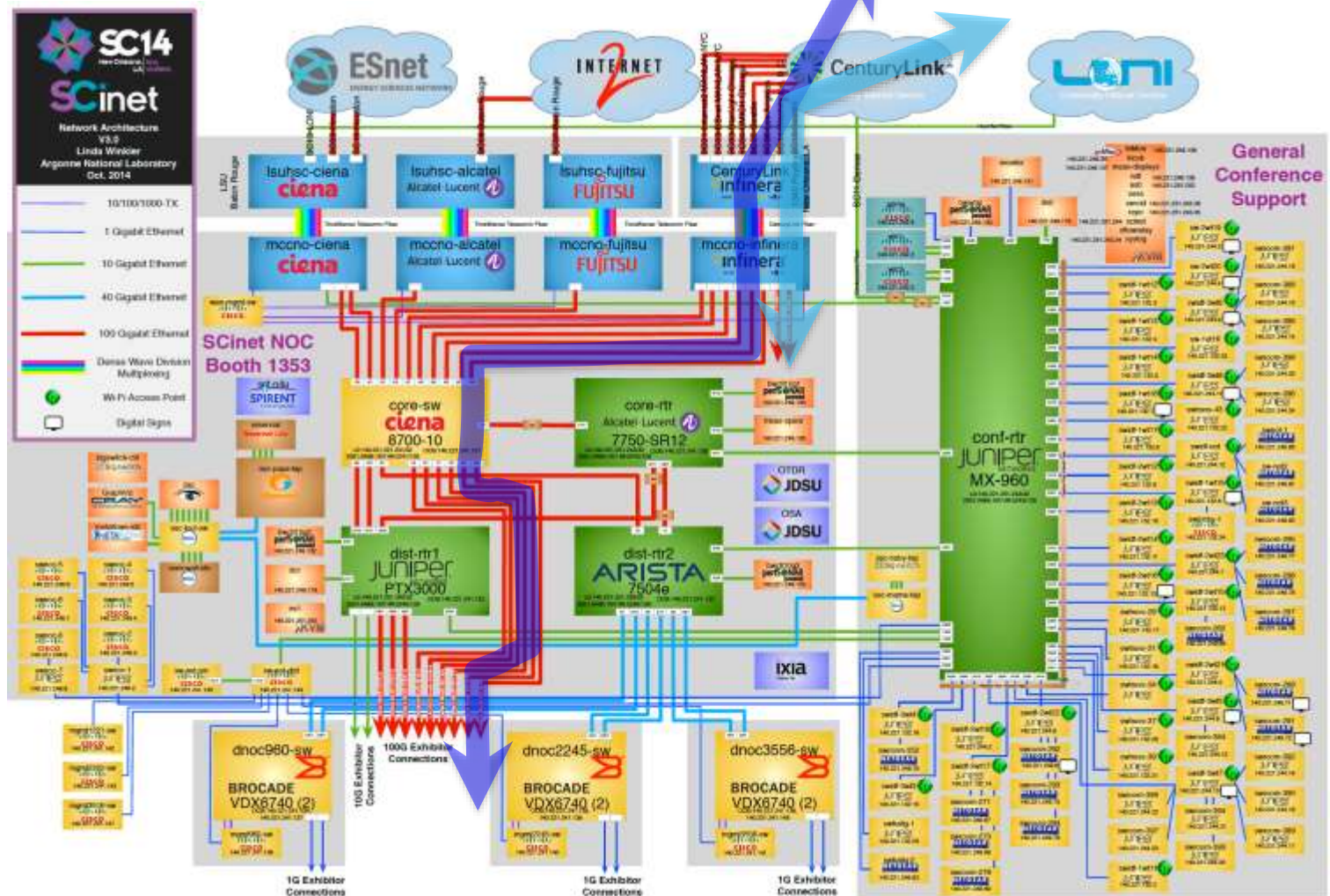
Remote I/O Pipeline Processing Network



100G Network Paths



Scinet 100G Paths

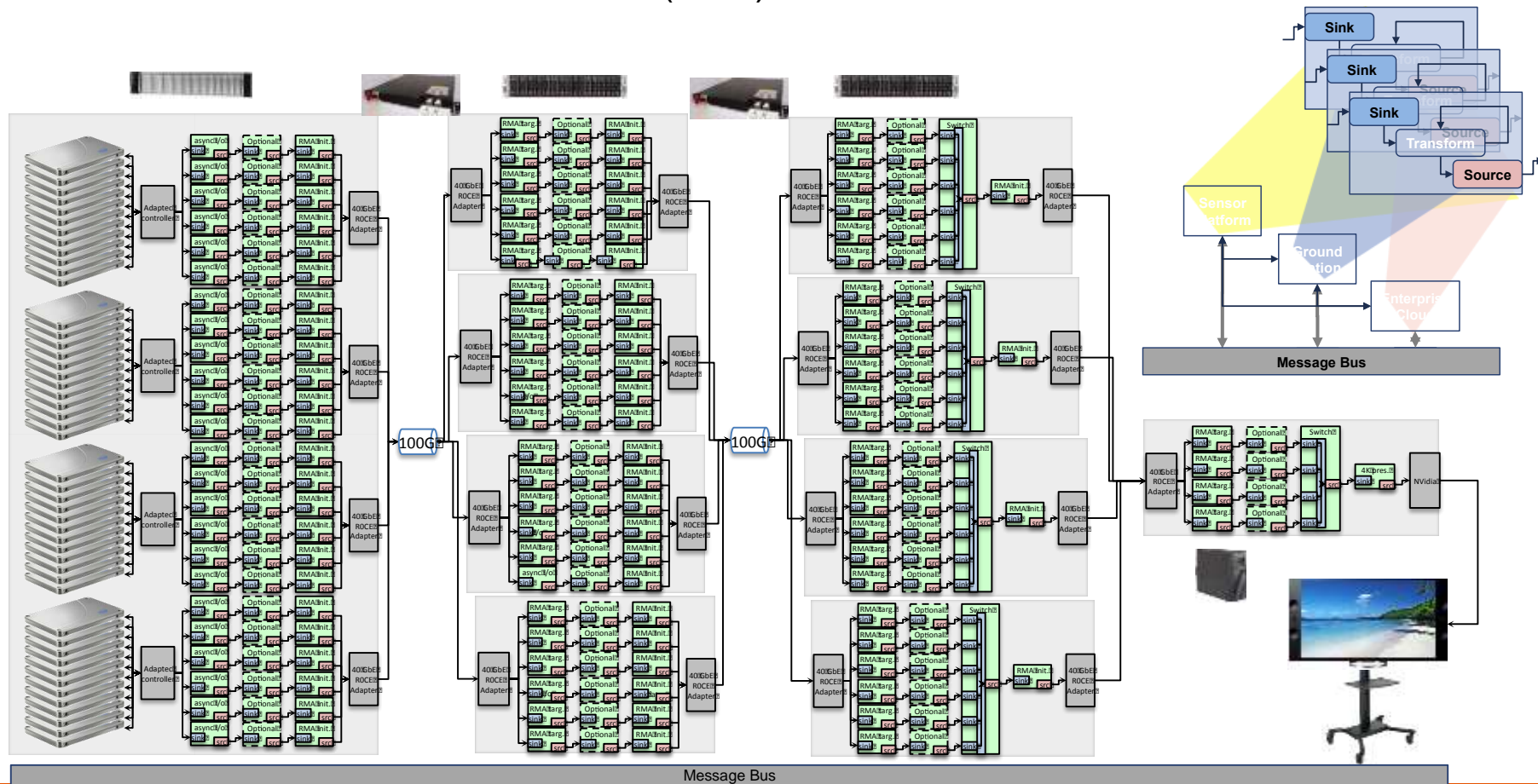


SC14 Pipelines Processing Detail

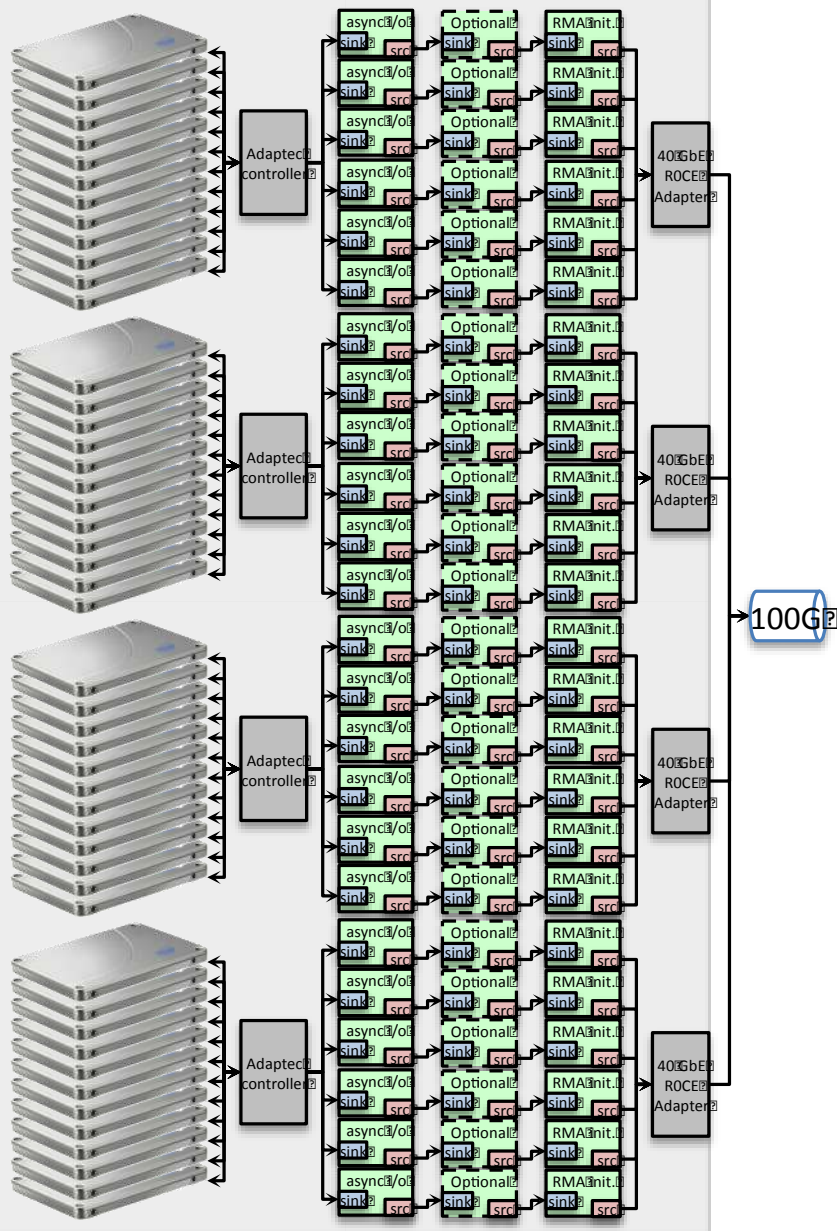
Oakland-NERSC or
SC14-NOLA

Chicago or
Wash., DC (NRL)

SC14 – New Orleans, LA



SC14 Pipelines Processing Detail Cont'd

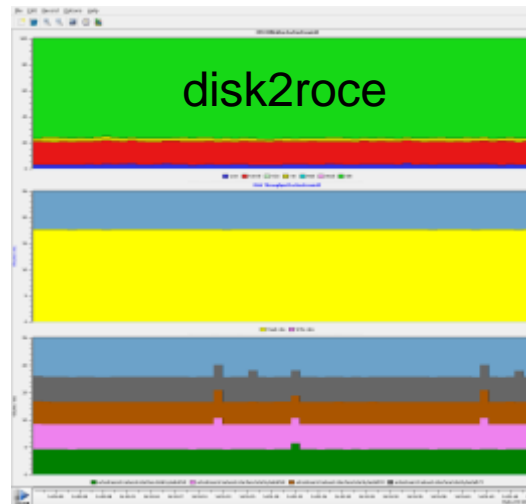
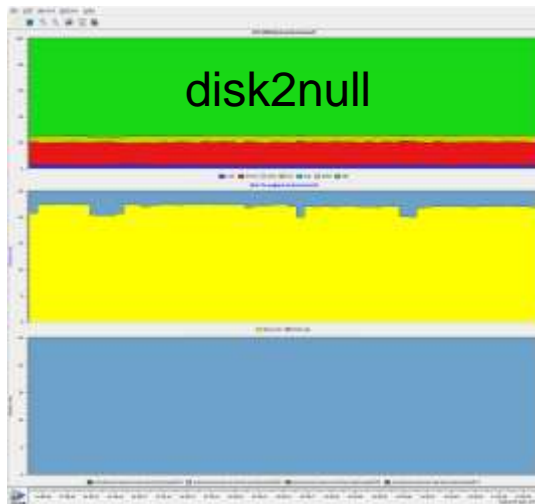
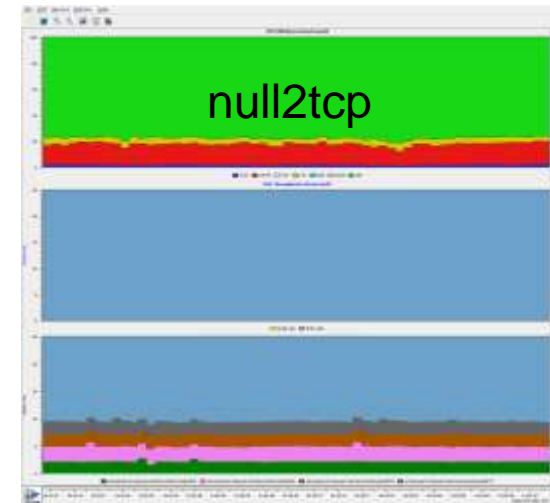
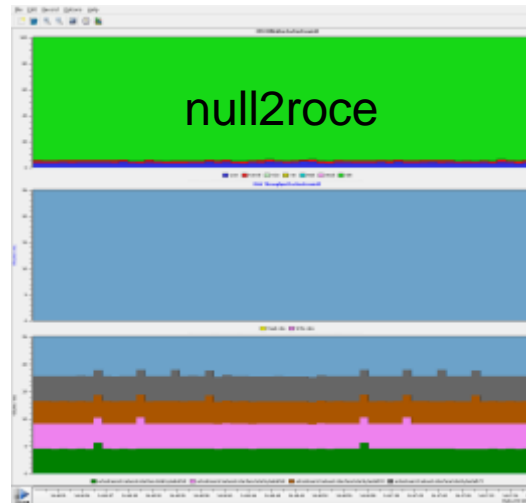


Oakland-NERSC and SC14-NOLA

- EchoStreams FlacheSAN system
 - 48 SSD
 - 4 x 40 Gbps
- Sourcing 24 coordinated uncompressed UHD video streams
 - 4096x1714x24 fps each
 - > 4 gigapixels/second (RGB)
 - >97 gigabits/second
- >150 Gbps raw storage to network performance
- RDMA networking provides low demand on CPU – more processing available for the mission

SC14 Demo Quicklook Results

From 7/30/2014



SC14 Demo Quicklook Results

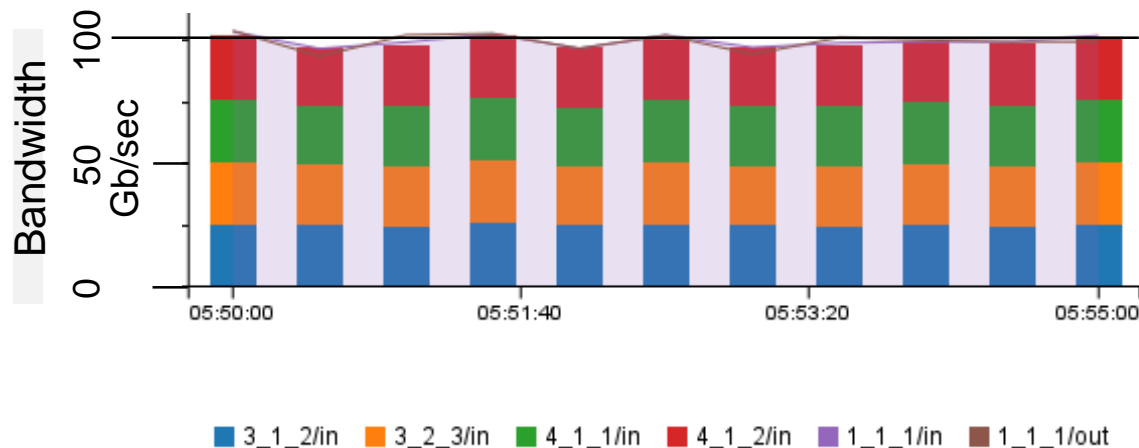


From 10//2014

SC14 Demo Quicklook Results



- Early test between NERSC (Oakland, CA) and StarLight (Chicago)
- Single FlacheSAN2 data source
 - >23 Gbyte/second raw storage performance
 - Network data output of >150Gbps over four 56Gbps InfiniBand or 40Gbps Ethernet (RDMA).
 - 2RU density
 - Minimal power consumption of 450W.
- Data streams are “caught” by 4 compact Pipeline processing systems, each with 40G Ethernet interfaces

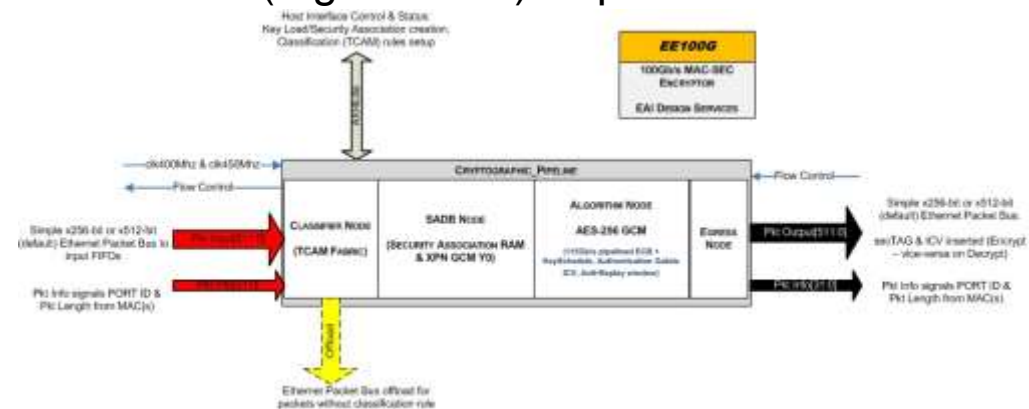


From 11/7/2014

100 Gbit Ethernet Type 1 Prototype

EAI Design Type 1 Prototype

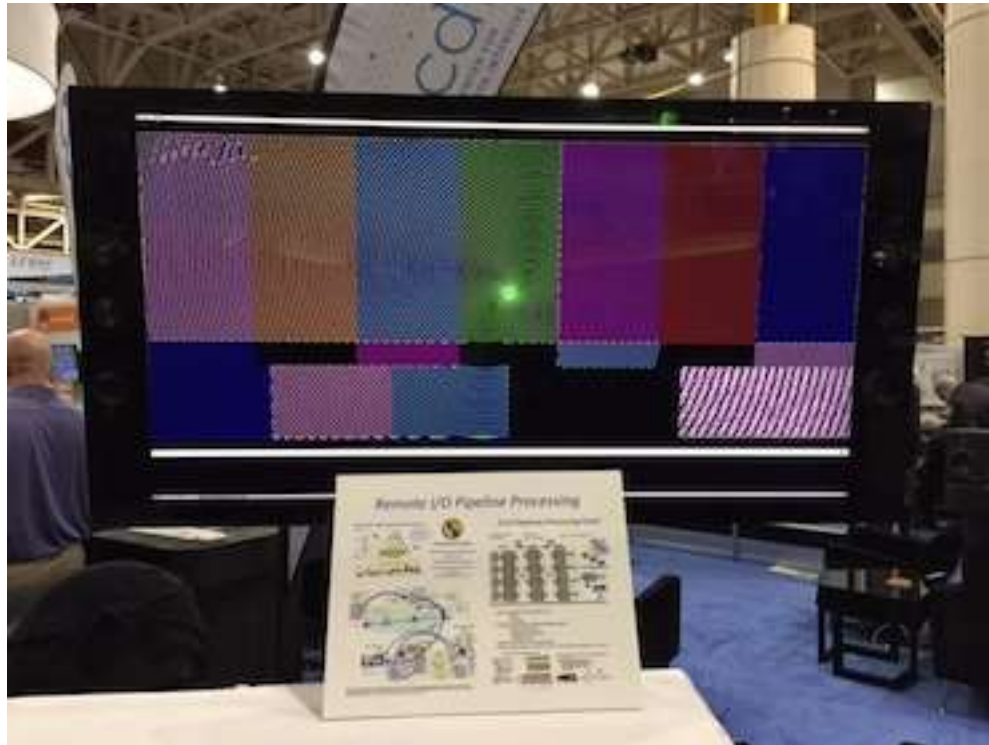
- Conforms to NSA Ethernet Security Specification (ESS)
- Available as EE100G Commercial Off the Shelf (COTS) Encryptor
 - 100Gb/s AES-256 XPN-MAC-SEC GCM Encryption Core [IEEE 802.1AEbw]
 - Verified in Silicon at 400Mhz in Xilinx Virtex-6 HX565T, Virtex-7 2000t
 - 512 Security Associations by default (32-64K configurable)
 - 128 Internal TCAM Classifier Rules by default (32-16K configurable)
 - Highly Configurable Soft/Technology Independent VHDL to support 100GbE applications in FPGAs or ASICs.
 - No external NPU, Classifier, or Memories (e.g. TCAMs) required.



Results

- 4K Video Processing

[NRL and Collaborators Conduct 100 Gigabit/Second Remote I/O Demonstration](#)



[YouTube Video](#)

Participants and Contributors



Naval Research Laboratory



Orange Silicon Valley





Thank You



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User Group Workshop

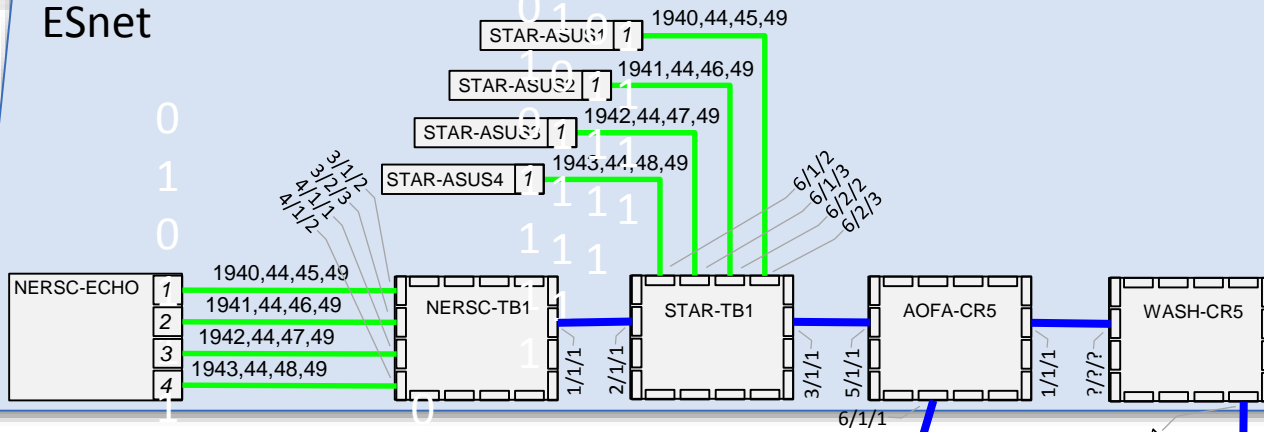
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NRL SC14 Demo

(all VLANs are "tagged" unless noted)

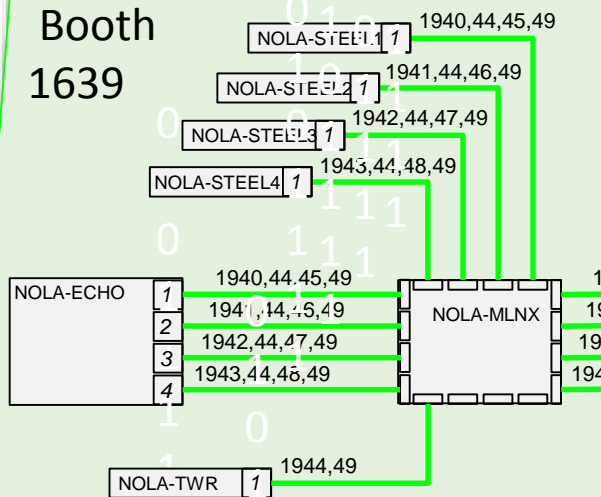
ESnet



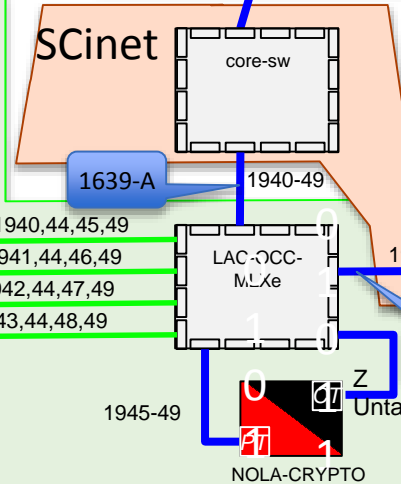
- A - 1940
- B - 1941
- C - 1942
- D - 1943
- E - 1944
- U - 1945
- V - 1946
- W - 1947
- X - 1948
- Y - 1949



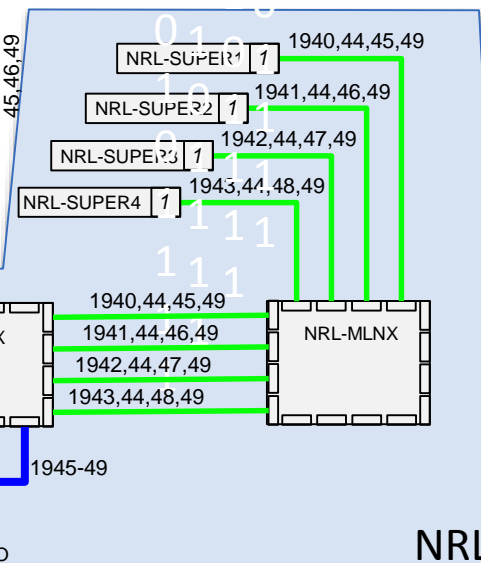
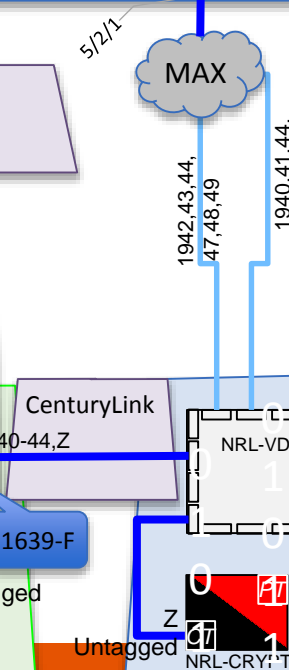
Booth 1639



SCinet



Century-Link



NRL