

***Supporting Advanced Scientific Computing
Research • Basic Energy Sciences • Biological
and Environmental Research • Fusion Energy
Sciences • High Energy Physics • Nuclear Physics***

ESnet Update

Feb 3, 2009

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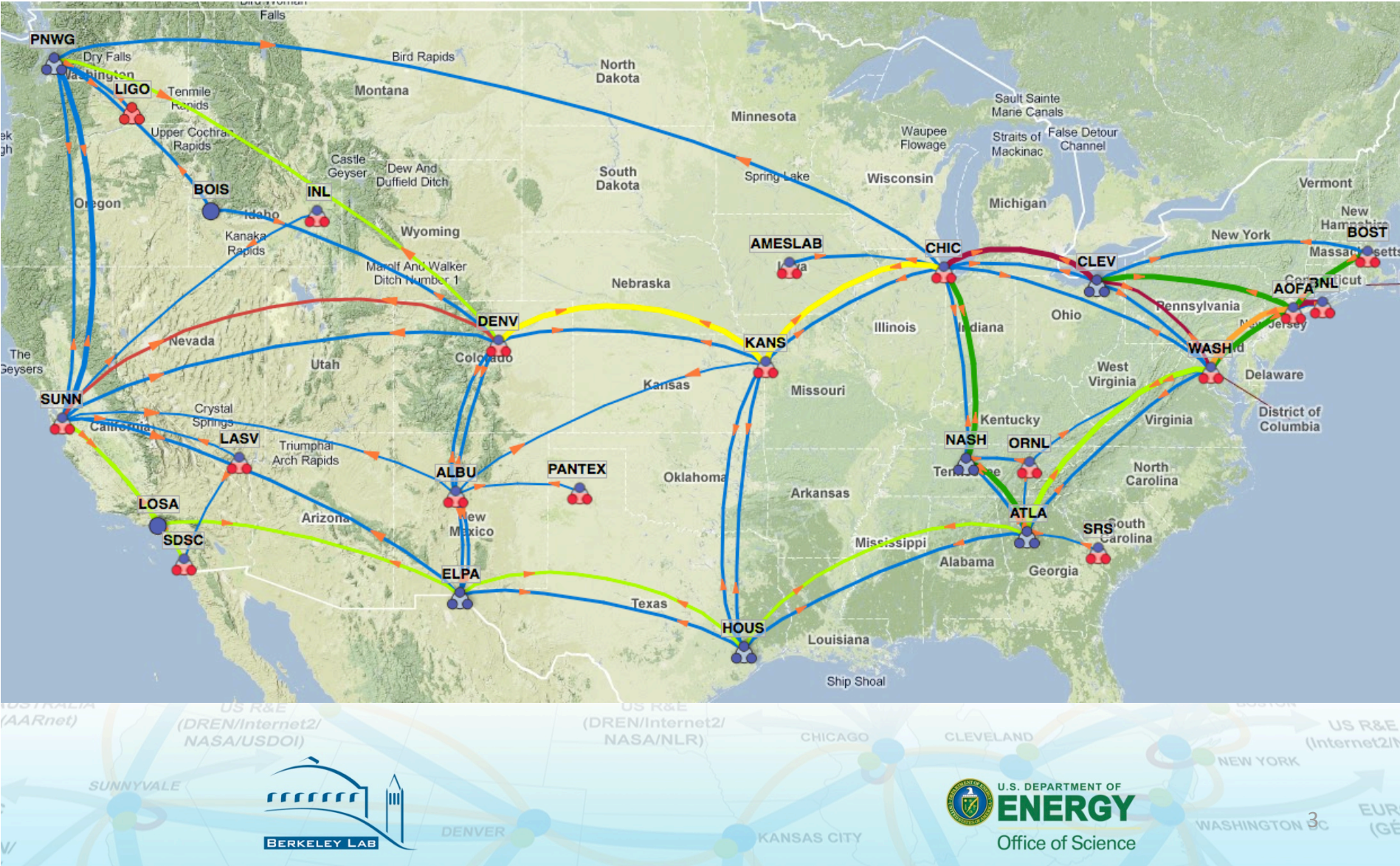


Network Update

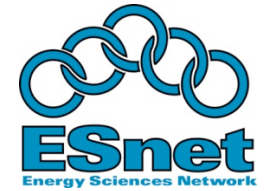
ESnet4, OSCARS, Other Projects



ESnet4 Network



Equipment Upgrades / Installs

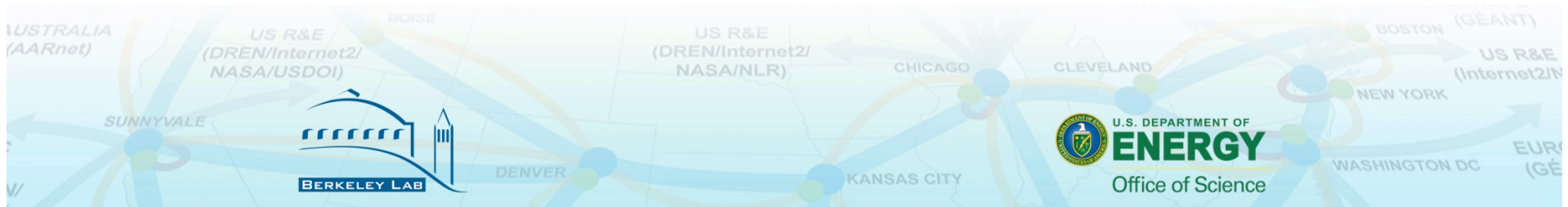


Peering upgrades:

- EQX-SJ: installed MX480 on Oct 15th
- EQX-ASH: installed MX480 on Nov 30th
- EQX-CHI: Pending MX480 install on Feb 18th

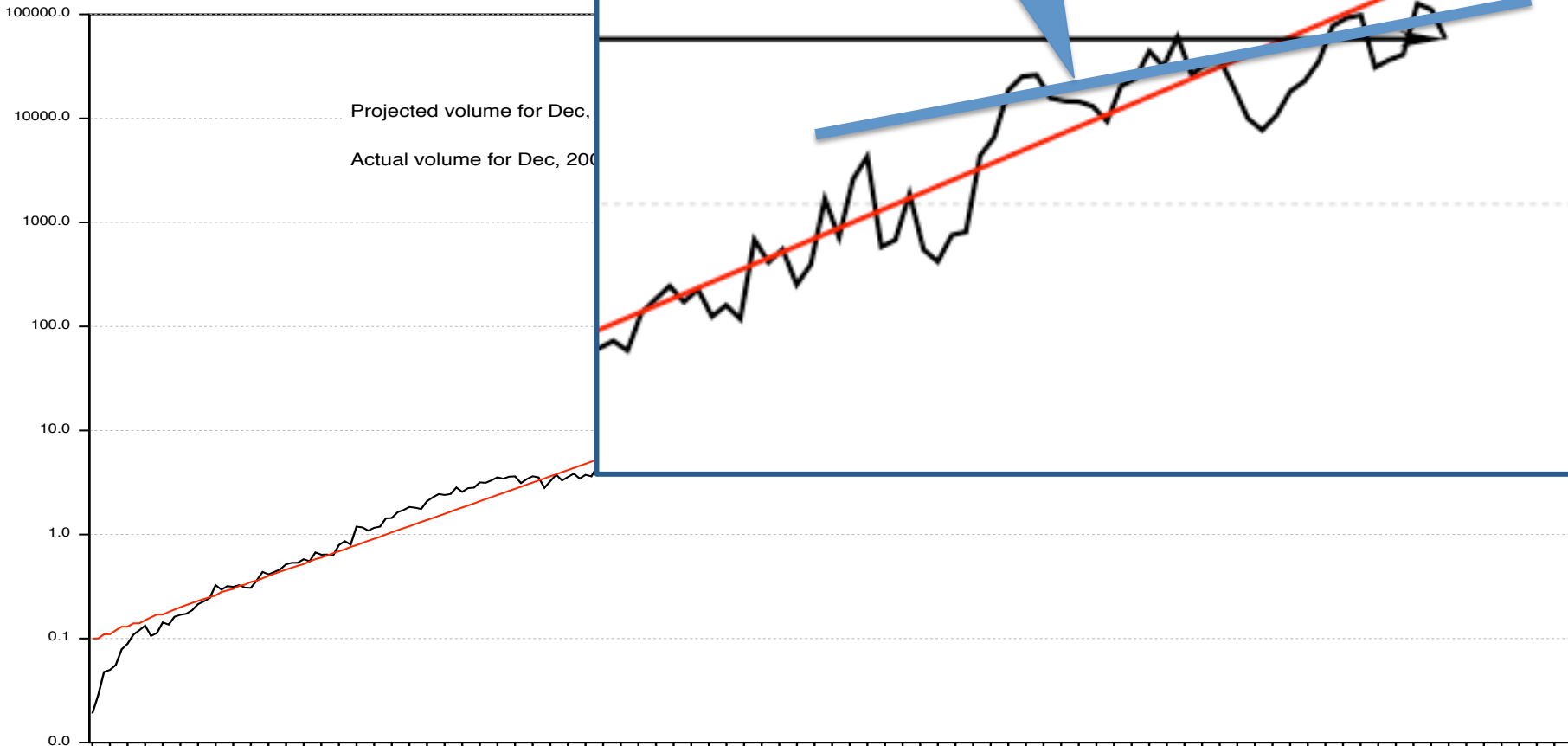
Site / hub upgrades:

- 10G connection at BOIS with PNNL for backup peering Nov 10th
- 10G peering at PNWG-HUB with Korea (KSTAR & KISTI) Nov 11th
- Combine of LOSA-SUNN & ELPA-LOSA into new ELPA-SUNN SDN (prior to the decommission of LOSA-HUB) Dec. 3rd
- OC12 between DENV-HUB and Pantex Jan 28th



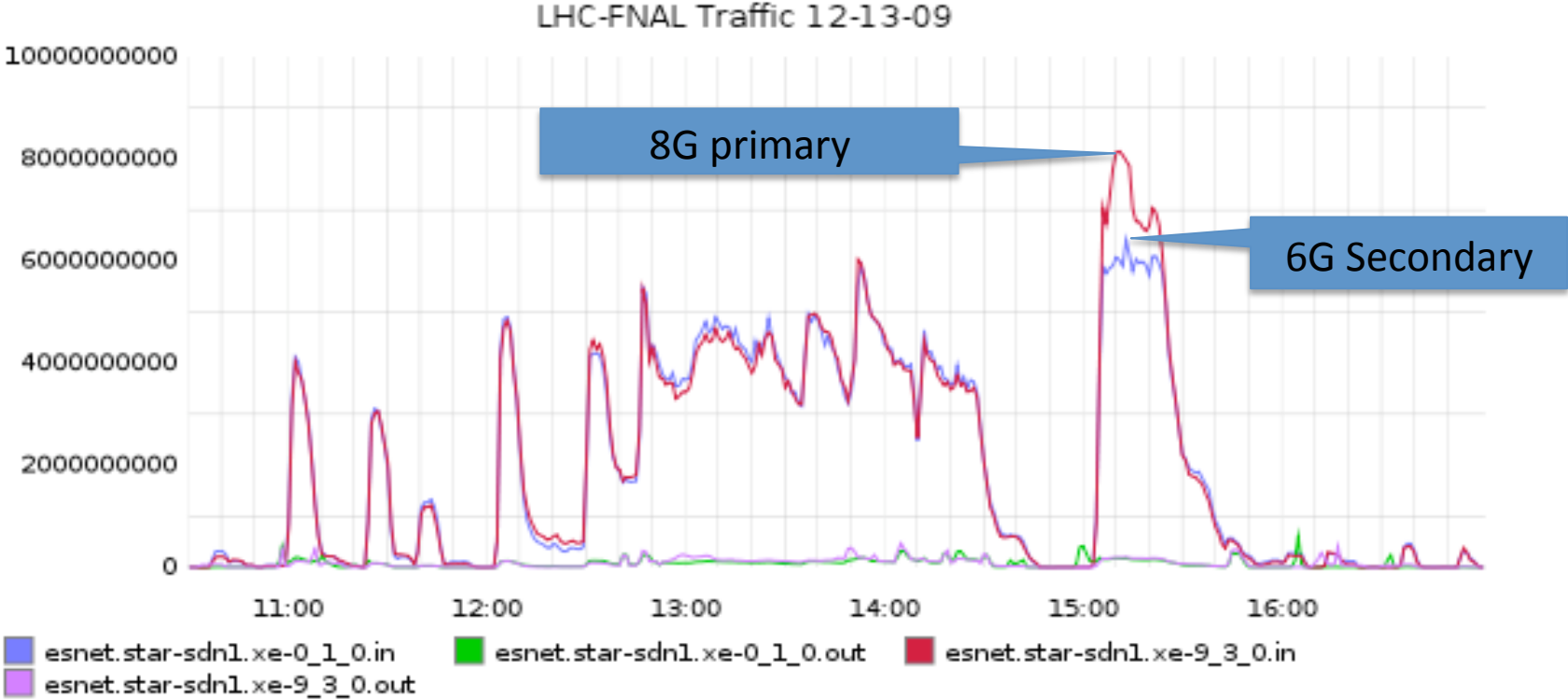
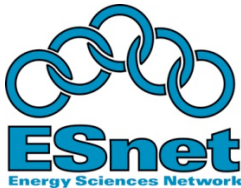
ESnet Traffic

ESnet Accepted Traffic (TB/mo) - L

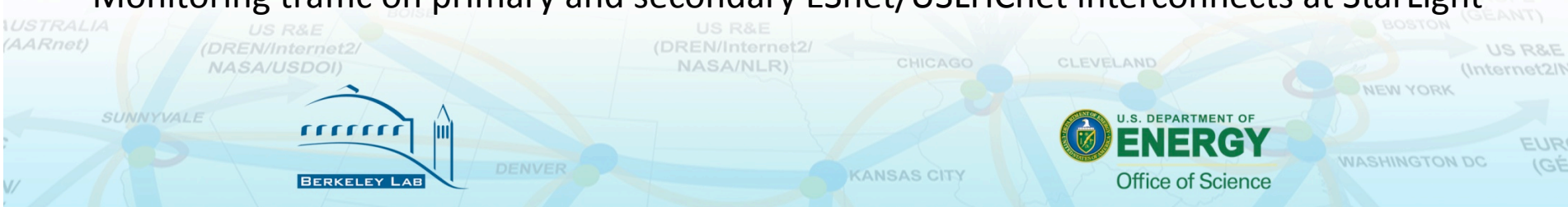


New trend?

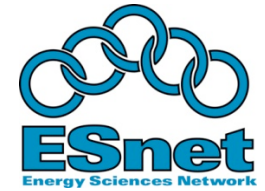
Dec 13 - 2.36 TeV LHC Run



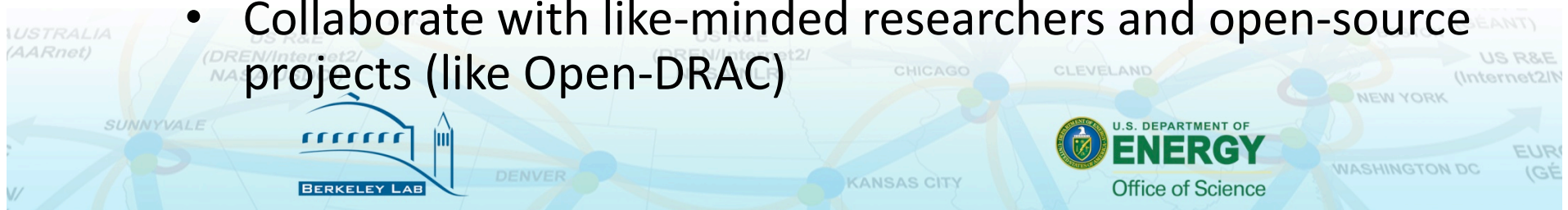
Monitoring traffic on primary and secondary ESnet/USLHCnet interconnects at StarLight



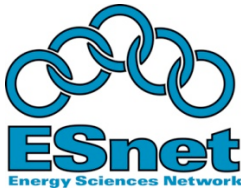
OSCARS: “Multi-Domain, Virtual Circuits” as a Service



- Successfully deployed within ESnet SDN
- OSCARS Software is Open-source (oscars-idc.googlecode.com)
 - A resource for the community
 - Example: Internet2 ION leverages OSCARS
- Ongoing challenge: Build dual-purpose software
 - Enable researchers to innovate using this framework
 - Provide robust product-grade software
 - Take advantage of new innovations and research in this field
- Direction forward: Build larger critical mass around the open-source effort
 - Collaborate with like-minded researchers and open-source projects (like Open-DRAC)

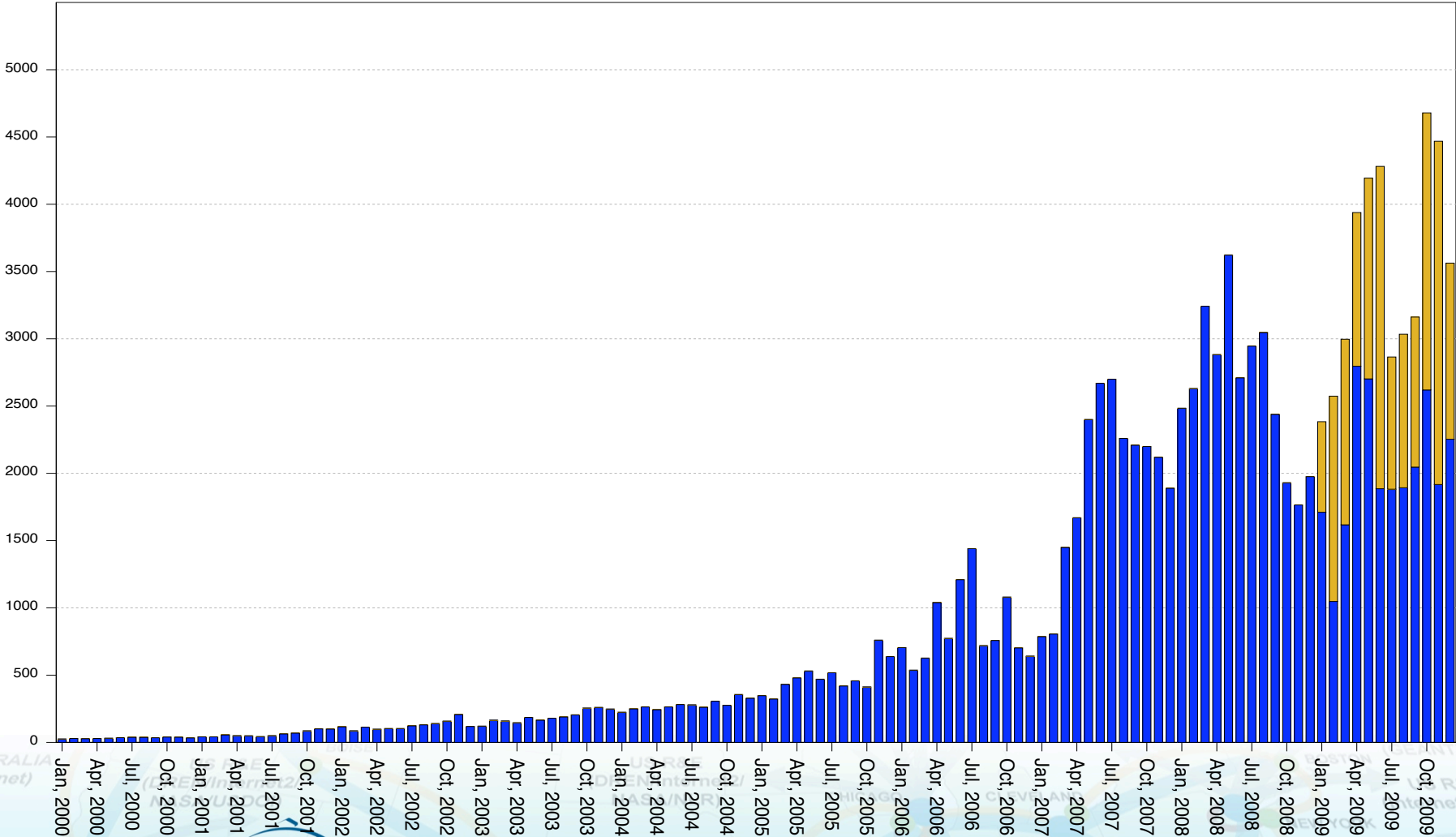


ESnet IP & OSCARS Traffic



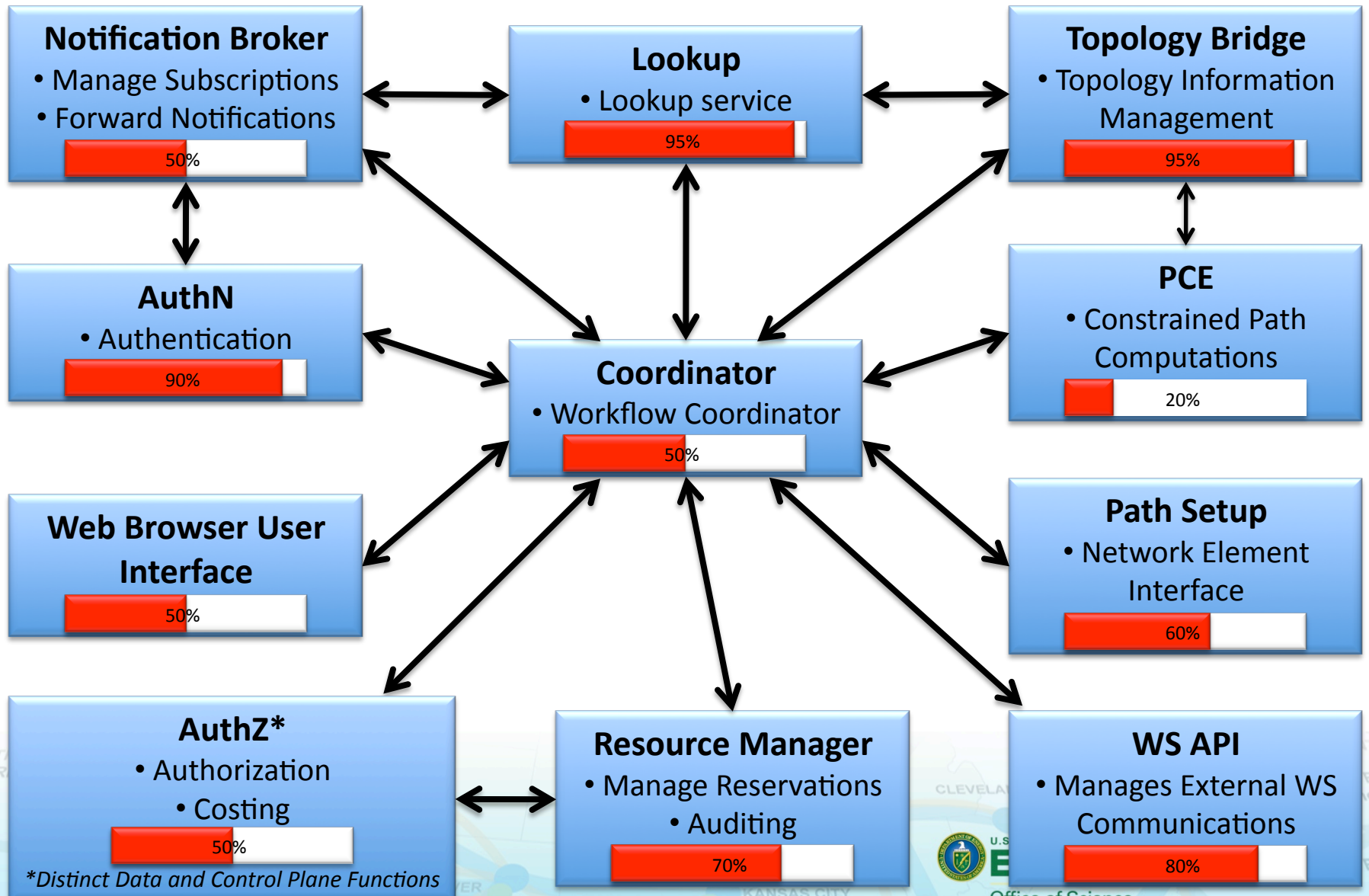
ESnet Accepted Traffic (TB/mo)

- Accepted
- OSCARS Accepted

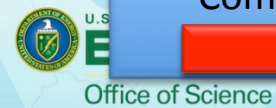


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OSCARS 0.6 – Target Release 3/10



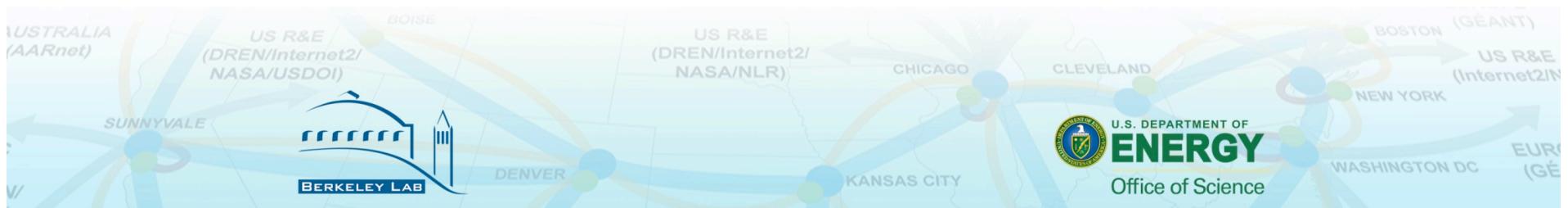
*Distinct Data and Control Plane Functions

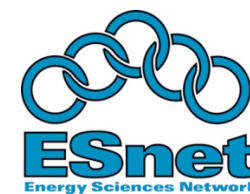


perfSONAR



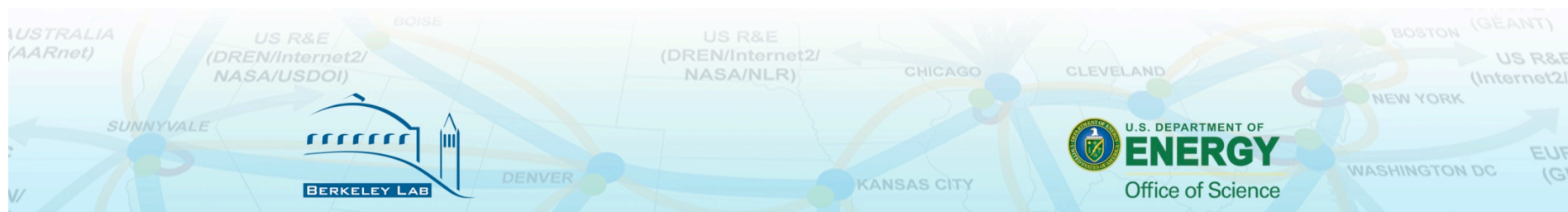
- ESnet is a key member of the perfSONAR collaboration – <http://www.perfsonar.net>
- Numerous test hosts deployed, automated tests are run regularly (<http://stats1.es.net>)
- Test hosts are available to ESnet sites and R&E collaborators for bwctl/iperf tests
- Test and measurement is very helpful in locating the cause of network performance problems



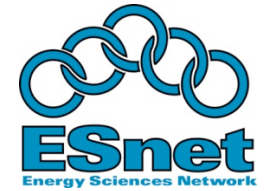


Advanced Networking Initiative

Prototype Network and Testbed



ANI Project Goals

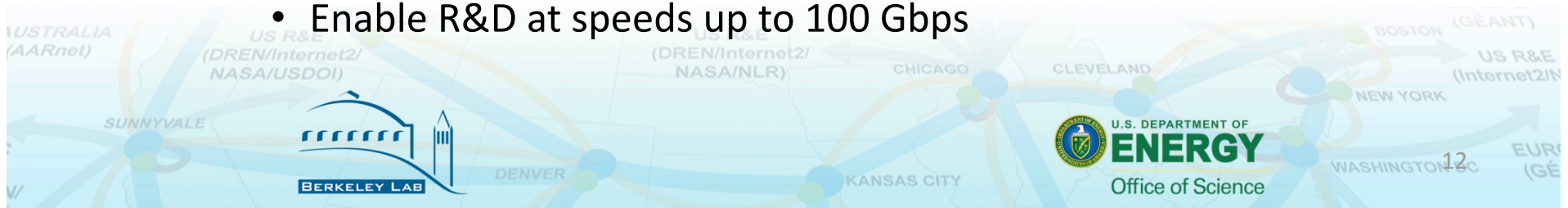


- Prototype network:

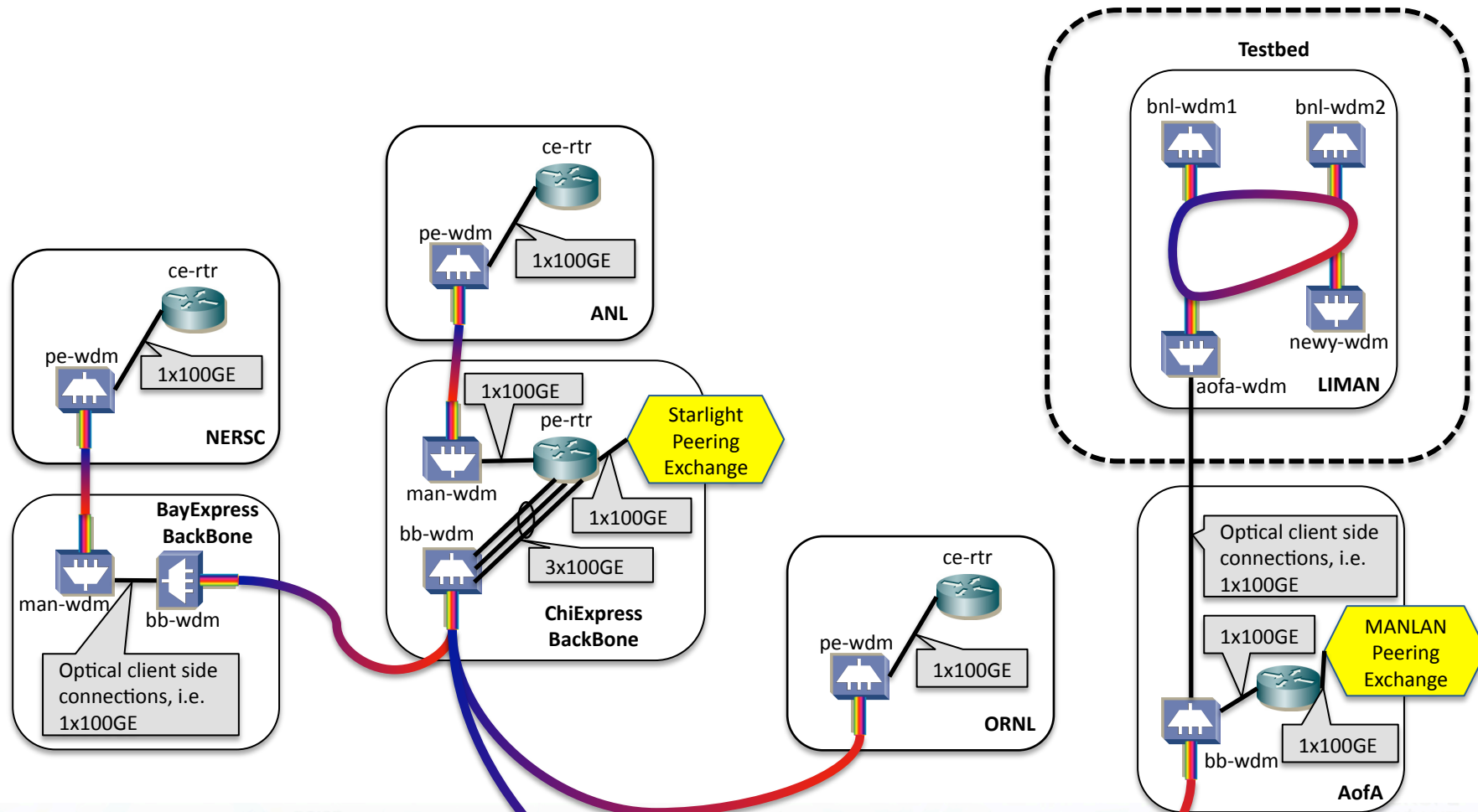
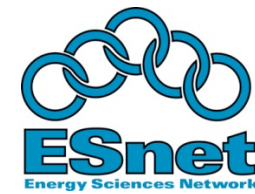
- Accelerate the deployment of 100 Gbps technologies
- Build a persistent infrastructure that will transition to the production network ~2012
 - Key step toward DOE's vision of a 1-Terabit network linking DOE supercomputing centers and experimental facilities

- Testbed:

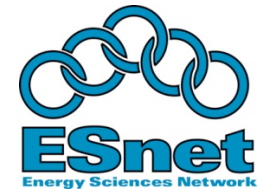
- Build an experimental network research environment at sufficient scale to usefully test experimental approaches to next generation networks
 - Funded for 3 years, then roll into the ESnet program
 - Breakable, reserveable, configurable, resettable
 - Enable R&D at speeds up to 100 Gbps



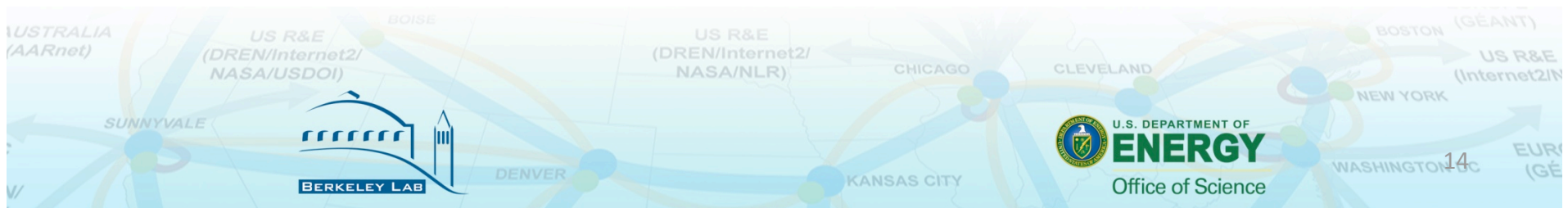
ANI Baseline Design

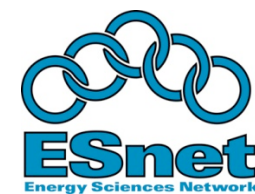


ANI Progress to Date



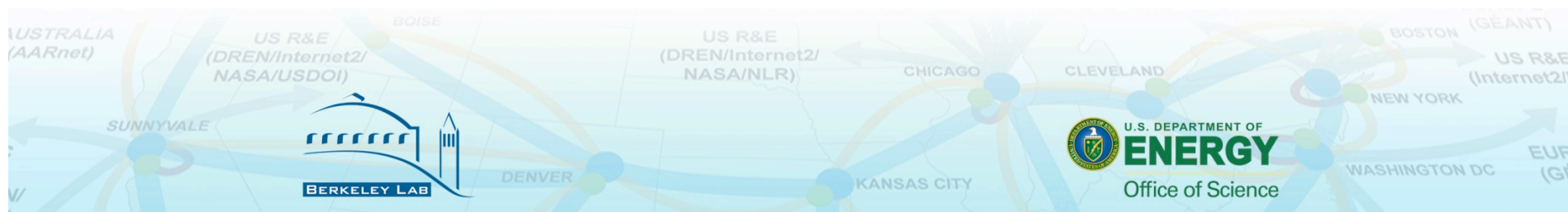
- Tabletop testbed equipment – ordered, racked at LBL
- 100 Gbps technology research & evaluation phase - ongoing
 - Meetings / briefings with vendors
 - Equipment in ESnet lab
- Transport RFP written – going through reviews
 - Acquire 100 Gbps wave service from a carrier
 - Don't need to own / control optical gear
 - Plan to run OSCARS layer 2 / 3 services across network
 - Dark fiber is part of DOE's long-term research agenda
- Routing / Switch RFP – Summer 2010
 - ESnet will purchase this equipment
 - Will conduct testing / evaluation as part of selection process





ESnet Projects

Fenius, Site Outreach, Other Projects

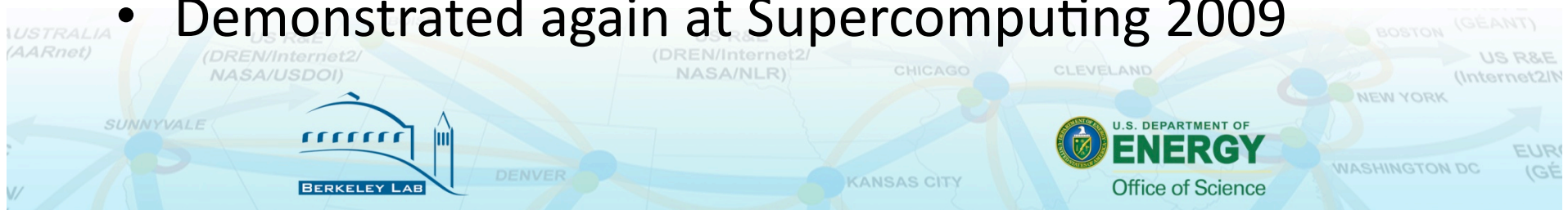


Fenius



- At the 9th Annual Global LambdaGrid Workshop in Daejeon, Korea.
 - ESnet, KISTI, AIST and the EU-funded Phosphorus project successfully demonstrated interoperability between their network resource scheduling systems
- Coordinated within the activities of the GLIF consortium GNI API Task Force
 - Developed specialized software to enable the different network scheduling services to be used and monitored through one common interface.

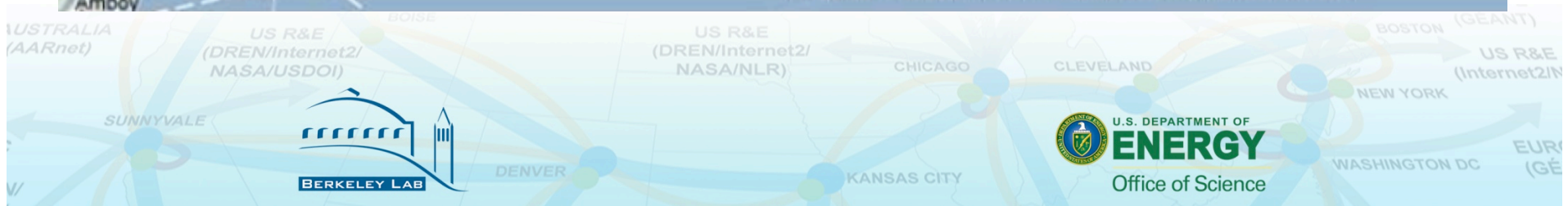
- Demonstrated again at Supercomputing 2009



Long Island MAN



RFP responses due: Feb 22nd



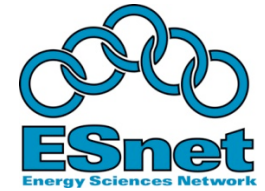
Internal Projects



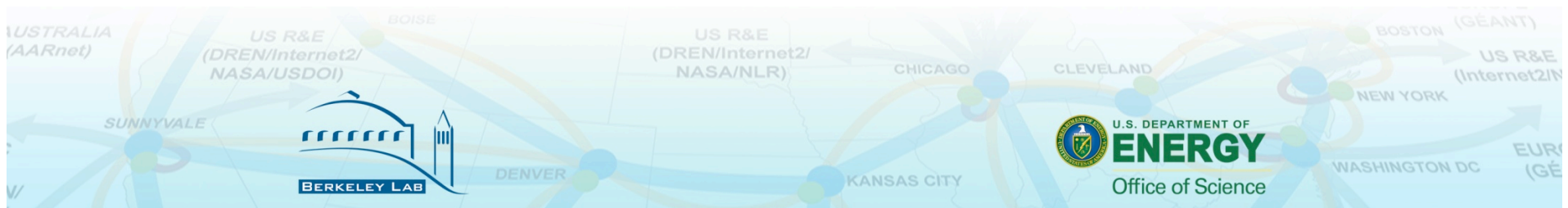
- **Spectrum**
 - All Juniper routers are being polled with and send traps using IPv6
 - The Spectrum MPLS transport manager auto-discovers the OSCARS circuit topology.
 - OSCARS LSP alarms have now been integrated into the daily outages on the Planned Maintenance Calendar (PMC)
- **DNSSEC** – completed ahead of OMB mandate
- **Cfengine** – provide automated configuration and maintenance of servers, from a policy specification
- **Nagios & OpsView** – for automated monitoring servers and other equipment
- **Blade servers** – reduce space and power consumption , labor



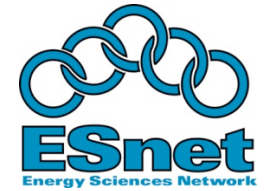
Site Outreach Program



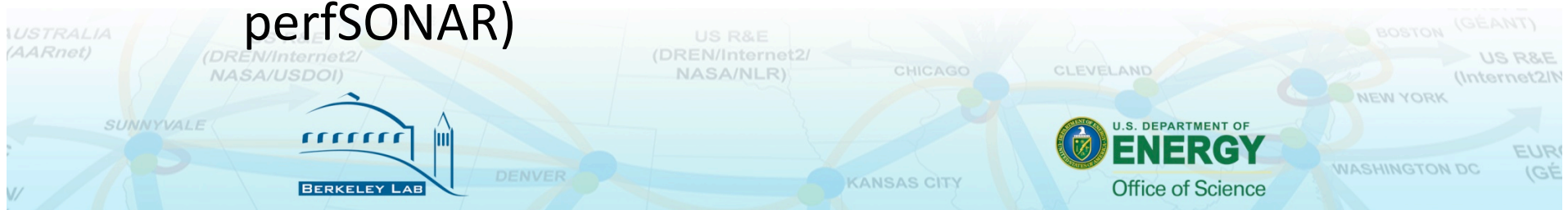
- Started Jan 1, led by Eli Dart
- Goal is to increase effective use of networks for science
 - Leverage ESnet's experience in helping sites solve problems and increase performance
 - Understand site network infrastructure, drivers, and long-term plans
 - Help sites and disciplines build networks well-matched to their needs



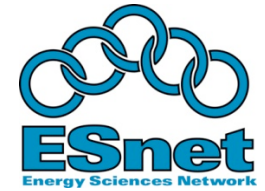
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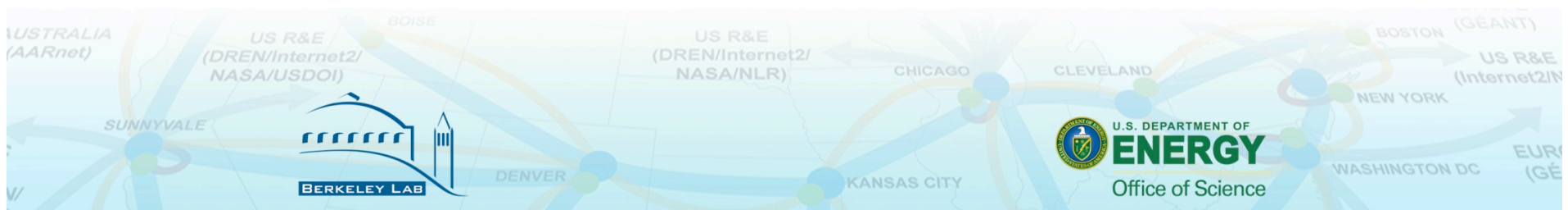
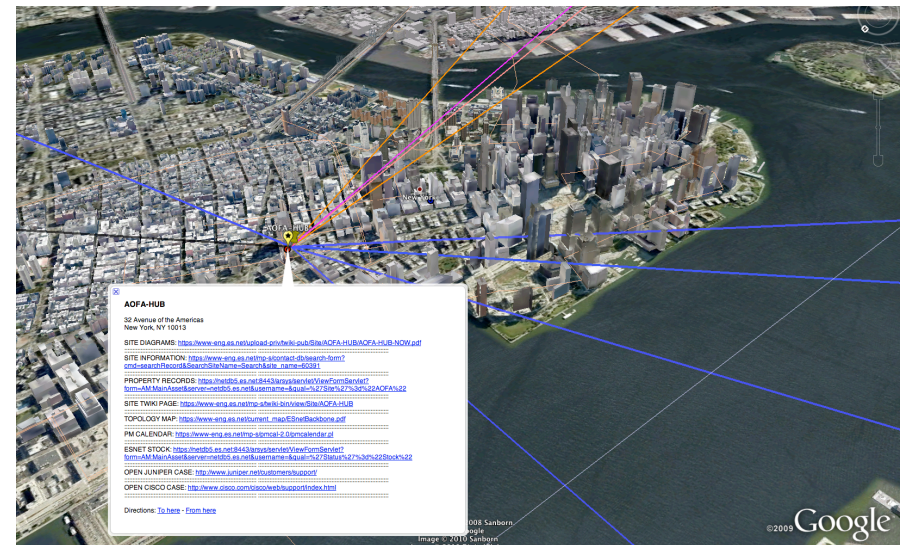
- Pilot underway: SLAC
- Looking at:
 - Network architecture
 - Impact of “converged networks” on high bandwidth data transfers – and possible need for separation of Science and Enterprise networks
 - Adequate buffering on switches and routers
 - Host and system configuration
 - Dedicated hosts for wide area data transfer
 - Proper TCP tuning
 - Test and measurement infrastructure (e.g. perfSONAR)

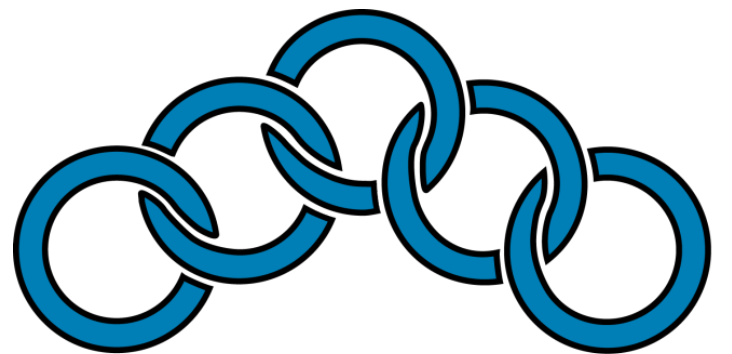


Other ESnet Projects



- Planned Maintenance Calendar
- Network measurement
- Web site update
- weathermap.es.net
- ESnet View
- Twitter feeds





ESnet

Energy Sciences Network



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