

ESnet Update

Greg Bell

Acting ESnet Director

ESnet Coordinating Committee (ESCC)

Baton Rouge, LA

January 25, 2012





My Approach for this Update

Not a grand unified update

- a bit shorter, not exhaustive
- more thematic and strategic
- our update information is distributed in a number of presentations

There will be a bit of Q & A

- first question... overlap with Joint Techs?

Outline

1. Attractions of Wellington, New Zealand
2. Timeline Since Summer 2011
3. Updates
4. Looking Forward
5. Other ESnet Talks at ESCC



Attractions of Wellington, New Zealand



Steve Cotter's new adventure

- REANNZ CEO
- marines have landed, are learning to enjoy afternoon tea

Steve's impact on our community has been enormous

- leader and advocate
- unprecedented capabilities for ESnet, its customers, and the R&E community

He'd love to hear from you:

steve.cotter@reannz.co.nz


We are actively recruiting for a replacement

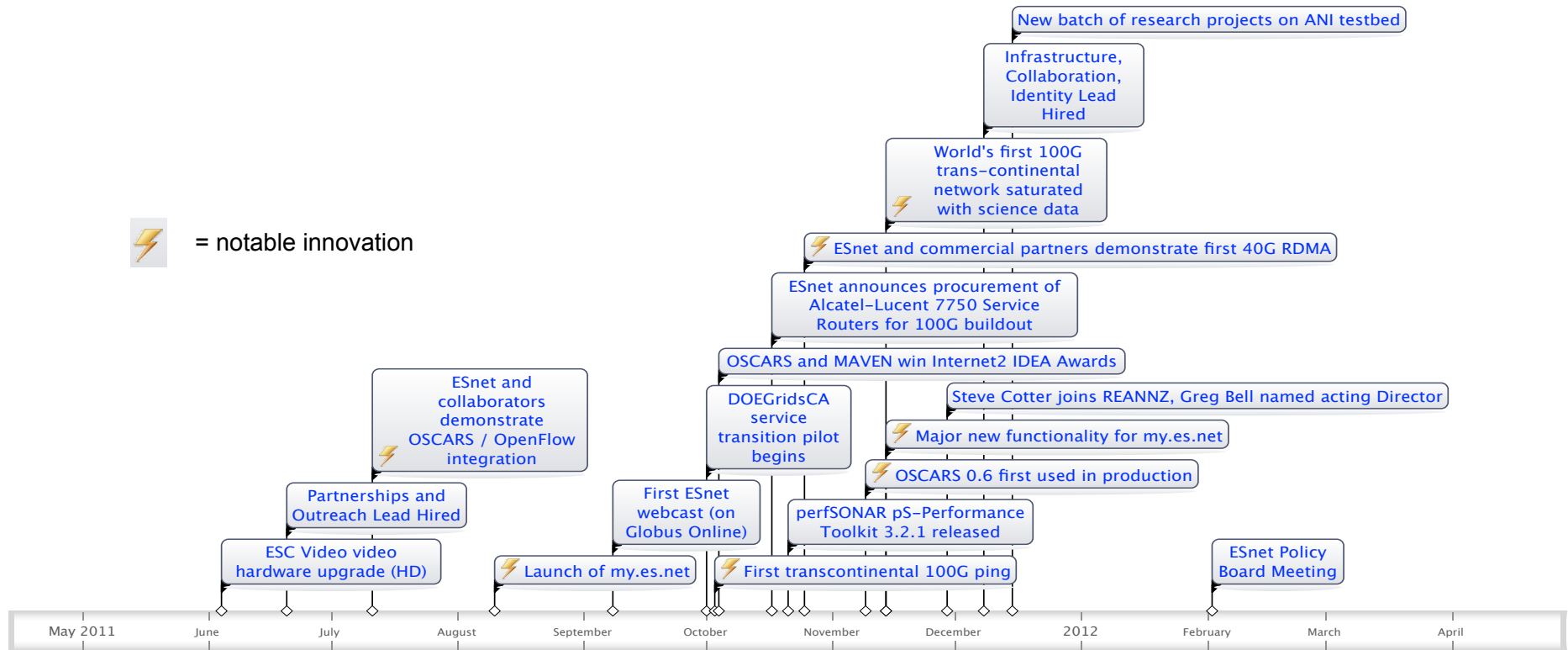
- suggestions, applications welcome
- <http://jobs.lbl.gov> [search for 'ESnet']



Some Highlights of Past 6 Months



 = notable innovation



Updates: 100G Prototype – reminder



1/25/12

6

Updates: 100G Prototype – why?



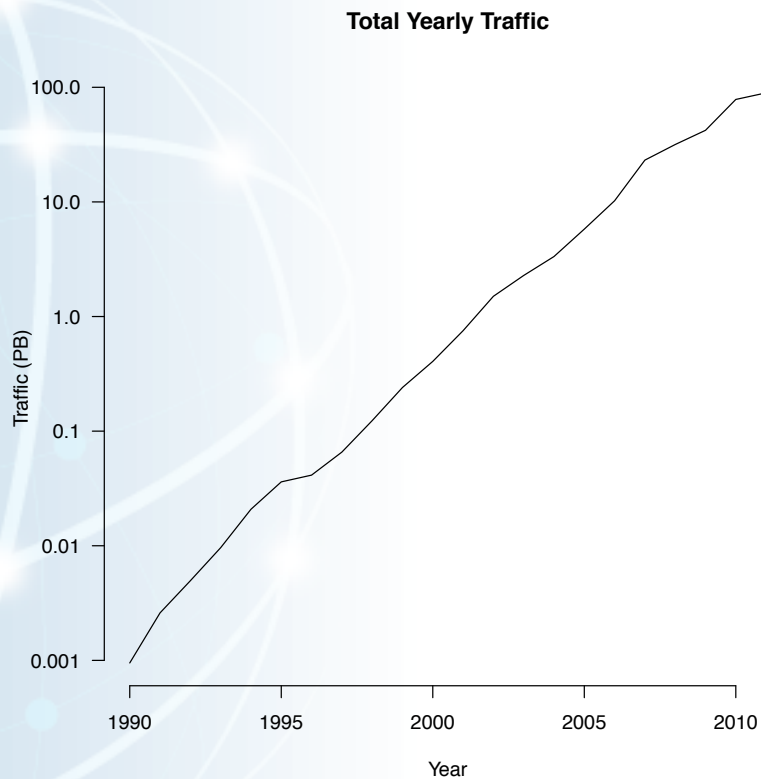
To accelerate commercial timeline for 100G deployment.

To deliver a national-scale 100G Prototype Network, connecting major DOE computing facilities and international peering points.

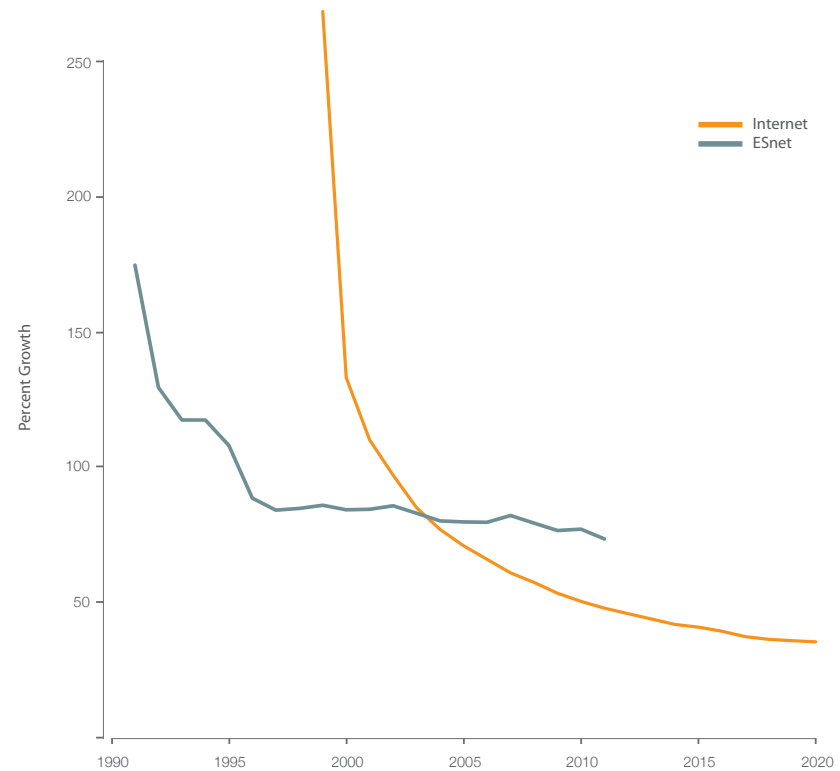
Broader ANI Goal: to create a national-scale testbed for disruptive research.

Broader ANI Goal: to build a platform for scalable, cost-effective delivery of high-performance network services to National Lab scientists and their collaborators around the world.

Updates: 100G Prototype – why, cont.



ESnet PB accepted per year



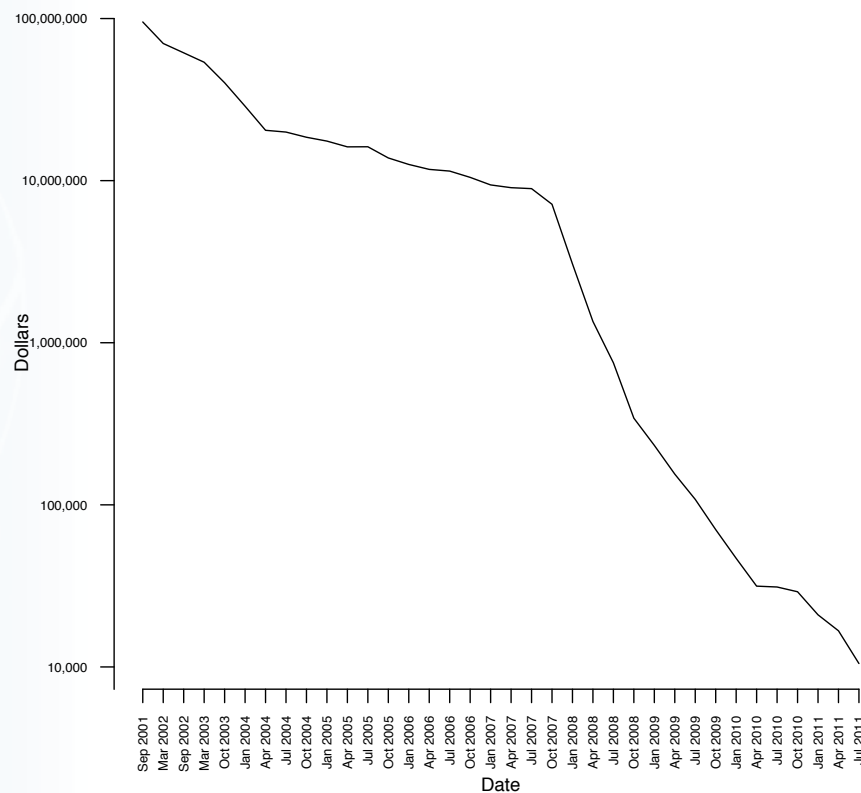
Compound Annual Growth Rates for ESnet [measured] and Internet core [estimated and predicted, from "Power Trends in Communication Networks", IEEE Journal of Selected Topics in Quantum Electronics, VOL. 17, NO. 2].

1/25/12

Updates: 100G Prototype – why, cont.

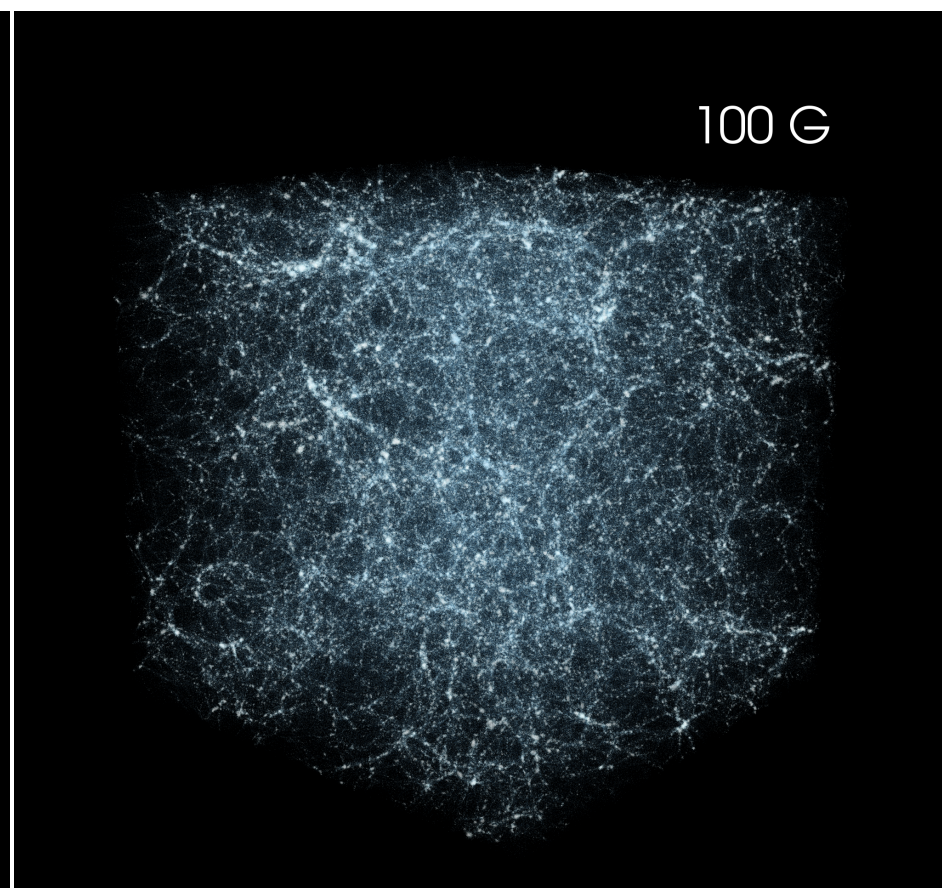
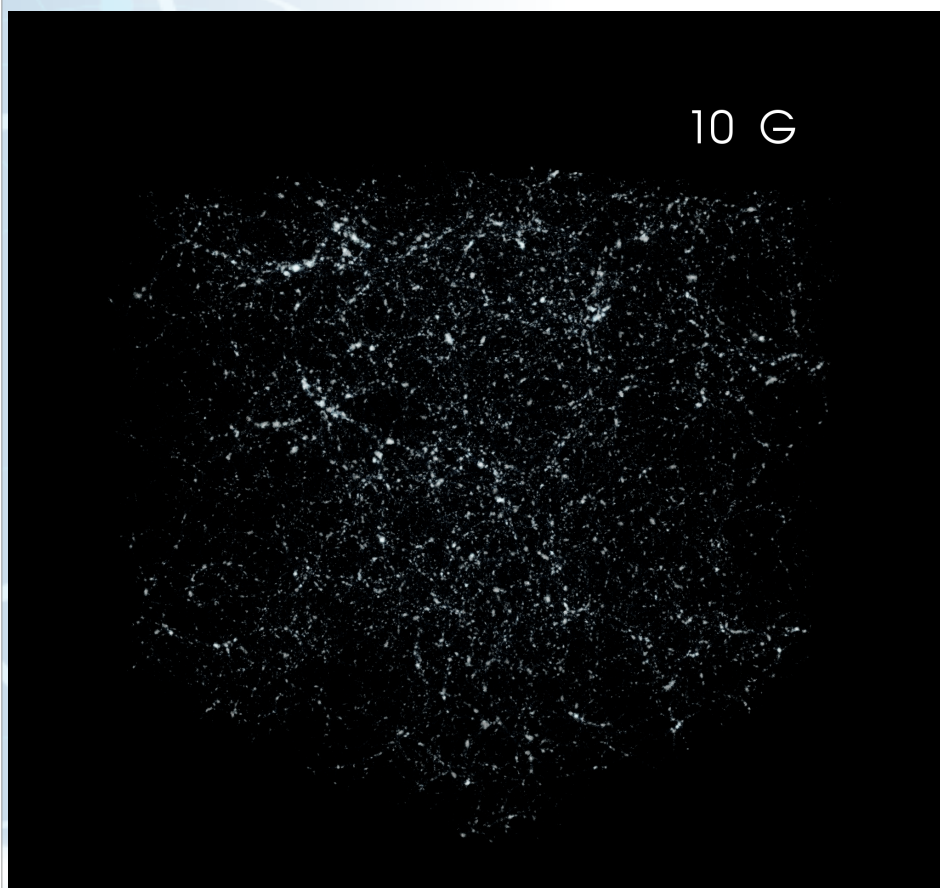


Cost of Sequencing per Genome



source: <http://www.genome.gov/sequencingcosts/>

Updates: 100G Prototype – why, cont.



Core and Community Services



ESnet Core Services

- comprehensive IP services optimized for science
- dynamic circuits
- access to commercial Internet
- distributed performance monitoring platform

ESnet Community Services

- expertise, advocacy, and concerted outreach
- requirements gathering through science case studies
- research, development, and global innovation
- multi-domain problem resolution ('bucks stops here')
- fasterdata.es.net, ScienceDMZ, DTN
- my.es.net portal (making the network visible)
- audio, video, and desktop collaboration



Without these,
100G capacity
would not be
**scientifically
productive.**

Updates: ESnet as Newest LBNL Division



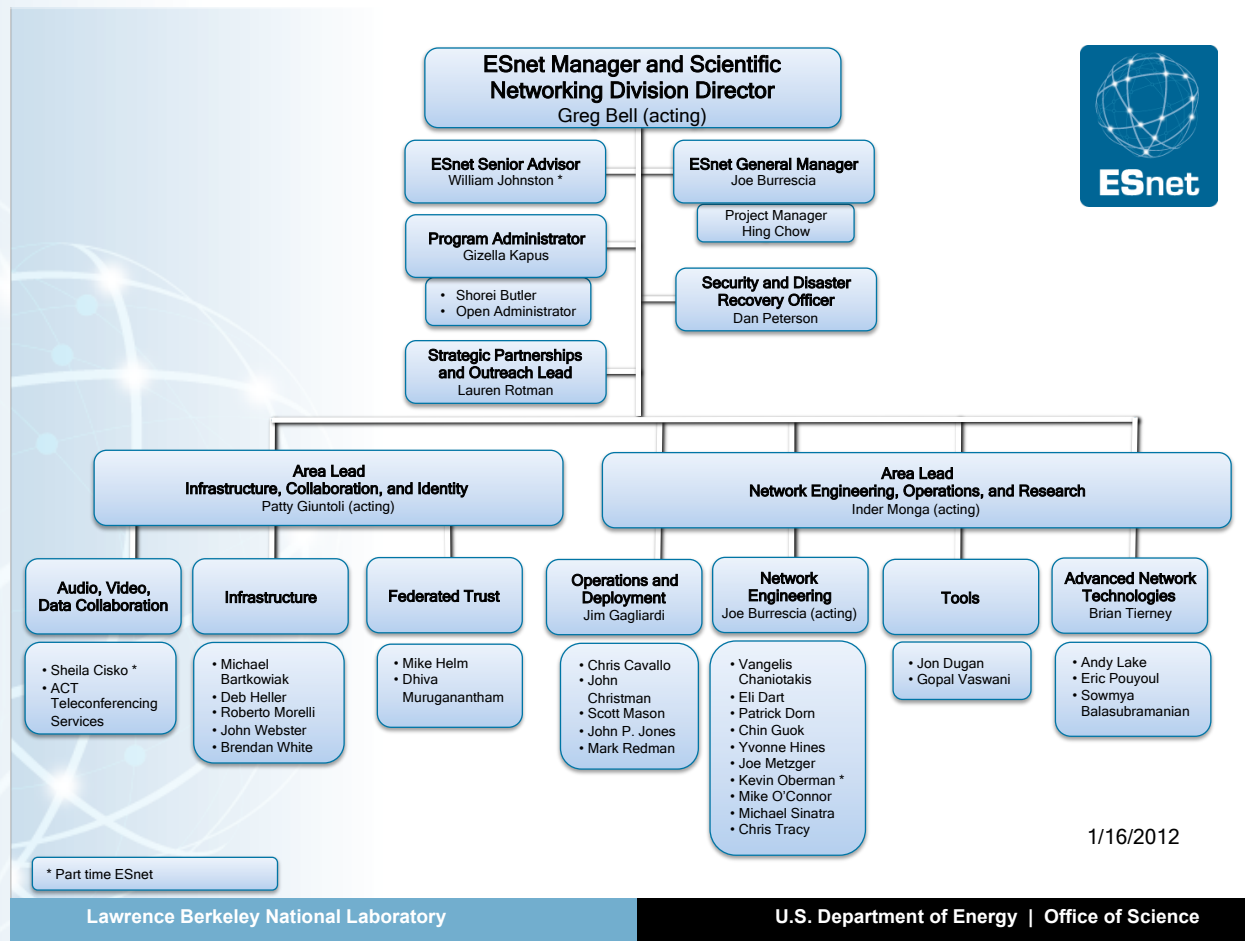
Scientific Networking Division

- now one of 15 Scientific Divisions [w/ Genomics, Physics, Materials Sciences, Nuclear Physics, Accelerator and Fusion Research, etc]
- part of Computing Sciences Area, which also includes NERSC and Computational Research Divisions
 - all told, >200 computer scientists & engineers in the CS Area
- our current recruitment is for a **Division Director of Scientific Networking**

Why the Promotion?

- recognition of critical importance of networking in distributed science
- ability to participate in strategic planning for Lab
- ability to promote better integration of networking into science workflows & architectures
- ability to offer greater range of services (eventually)

Updates: Interim Org Chart



1/16/2012



Updates: New & Future Staff

Lauren Rotman

- responsibilities: partnerships and outreach
- recent background: Director of Communications for Internet2
- talks at ESCC: update on DOEGridsCA sourcing pilot

Patty Giuntoli

- responsibilities: infrastructure, collaboration, identity
- recent background: manager at LBNL, Kaiser, Oracle
- talks at ESCC: update on ECS video services

Network Engineering Group Lead

- selection process is underway and going well

ESnet Director

- recruitment is actively underway – your help appreciated

Updates: ESnet Policy Board



ESnet's first 'Policy Board' meeting occurs next Thursday, Feb 2

- Policy Board will provide strategic advice regarding ESnet to Berkeley Lab's Director, chemist and pioneering nano-scientist Paul Alivisatos
- Board members: Vint Cerf (Google), David Clark (MIT), Larry Smarr (UCSD), Kristin Rauschenbach (BBN), Jagdeep Singh (Infinera founder), Cees de Laat (University of Amsterdam), David Foster (CERN)

Major themes for our first meeting

- support for data-intensive science
- are there opportunities for new services?
- strategy for research, development and innovation



Updates: Hub and Site

- ANI 100G Alcatel Lucent (ALU) Router Installs:
 - 10ea ALU 7750 chassis, 100G & 10G boards received, tested & configured @ LBNL (Aug-Oct 2011)
 - SUNN-ANI ALU install (Sept 2011)
 - NERSC-ANI, ANL-ANI, STAR-ANI, AOFA-ANI, SALT-ANI install (Oct 2011)
 - SC11 LBNL booth and Scinet ALU's installed (Nov 2011)
 - ESnet/Internet2/Level3 Ciena 6500 site installs:
 - ANL, NERSC & ORNL (Oct-Nov 2011)
 - NERSC ANI Test bed servers & equipment installed (Oct 2011)
 - ANL ANI Test bed servers & equipment installed (Dec 2011)
 - ESnet Ciena Testbed 6500 chassis installed at LBNL (Dec 2011)
 - PPPL MX480 replaced the M120 in the new High Performance Computing Research Center (HPCRC) (in production Jan 2012)



Updates: Hub and Site

- Future ALU router installs:
 - HOUS-HUB (Future install Feb 2012)
 - ELPA-HUB (Future install Mar 2012)
 - Other 100G ALU Hub routers to follow (Mar – Aug 2012)
- Future ESnet/Internet2/Level3 Ciena 6500 site installs:
 - FNAL, SLAC, LBL, JGI, SNL (2nd Qtr 2012)
- Future SRS M7i upgrade (Feb 2012)
- Adding perfSONAR servers to ESnet small sites:
 - LASV-HUB (Aug 2011)
 - NSO (waiting on site to install)

Updates: Circuits



- LIMAN Metro OCG waves:
 - 5x 10G waves between BNL, NEWY/AofA accepted (July 2011)
 - Future OCG LIMAN Southern Route Dark Fiber (In the works)
- 100G waves:
 - AofA-STAR, ANL-STAR, ORNL-STAR, STAR-SUNN, NERSC-SUNN, & AofA-MANLAN (Oct-Nov 2011)
 - (Temp 100G for SC11 (SALT-STAR, SALT-SEAT & SALT- SUNN) & 3x10G waves between PNWG-SC11) (Nov 2011)
- Two 1GE private connection to support FNAL link to Canarie (July 2011)
- 1GE FNAL – UMN NOvA psuedo-wire (Nov 2011)
- 2x10G peering with WIX at WASH-HUB (Dec 2011 in test)
- 10G MANLAN – BNL for LHCONE via LIMAN Wave (Jan 2012)

Updates: Circuits, Peerings



- 3 transit peerings with Hurricane Electric at all Equinix (EQX-ASH, EQX-SJ and EQX-CHI) (Aug 2011)
- 1 DS3 upgrade between LVK – SNLL (Oct 2011)
- 1GE for OSTI-Y12 disaster recovery (Nov 2011)
- 2 transit peerings with Level3 (AofA-HUB & SUNN-HUB (Dec 2011)
- PNNL-OSTI 10M → 100M upgrade pending contract mod. (TBD)
- SRS-EM 10M → 100M upgrade pending contract mod. (TBD)
- Proposed INL OC3 circuit upgrades and back-up to SUNN / BOIS (TBD)
- Proposed 100M peering for IN in Denver (DOE-IN RMR) pending contract mod (TBD)

Updates: Disconnects



- 2 10G Lighttower wave between BNL – AofA Replaced by new OCG waves (Aug 2011)
- NGA connections at FORR move to IN switch (Sept 2011)
- SALT-HUB ALU router and equipment disco after SC11 (Dec 2011)
- 2 AT&T OC12 private peering disconnected in (Dec 2011)
- 2 Verizon 100M private peering disconnected in (Jan 2012)
- 2 Sprint 100M private peering to be disconnected in (Feb 2012)

Looking Forward: ESnet5



Three Separate Networks:

1. Fiber (just under 14,000 miles) – nationwide backbone and LIMAN completion target Feb 1; Chicago and SF rings by April 2012.
2. Optical (Ciena 6500 platform) – phase I (ANI prototype) completed Nov 2011; Express and backbone by April 2012.
3. Routed (ALU 7750 platform) – phase I (ANI prototype) completed Nov 2011; 100G core routers deployed by July; new backbone links rolled into production July / August 2012.

Joe Metzger to provide more detail in his presentation.



Other ESnet Talks

ECS Update (Patty and Sheila)

ESnet5 Deployment Plans (Joe Metzger)

DOEGridsCA Service Update (Greg and Lauren)

Site IPv6 Deployment (Michael Sinatra)

ESnet as an ISP (Michael Sinatra)



Looking forward: NLCIO

I'll be attending NLCIO in DC (February). Planning to discuss:

- DOEGridsCA service transition
- Lab interest in InCommon certificates (either SSL only, or SSL + client)
- Lab interest in Net+ services

Do any of you have opinions on these questions? Any other topics it would be useful for me to introduce in this setting?



Questions?

Thanks!

Greg Bell, greg@es.net

<http://www.es.net/>

<http://fasterdata.es.net/>



Service Update: DOEGridsCA Transition



After delivering certificate services for roughly 10 years, ESnet is now partnering with the Open Science Grid to explore a commercial alternative that offers several advantages to user communities.

A service transition will occur during FY12, and we believe most customers have been informed of the details. We've also informed NLCIO.