ESnet Update

Feb 3, 2009
Joint Techs, Salt Lake City

Steve Cotter, Dept Head
steve@es.net
Lawrence Berkeley National Lab
Network Update

ESnet4, OSCARS, Other Projects
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-LOS A 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) - Log Scale

Projected volume for Dec, 2010:
10442 TB

Actual volume for Dec, 2009:
3562 TB

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)
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/ipperf 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 22\textsuperscript{nd}
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
Site Outreach Program

• 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