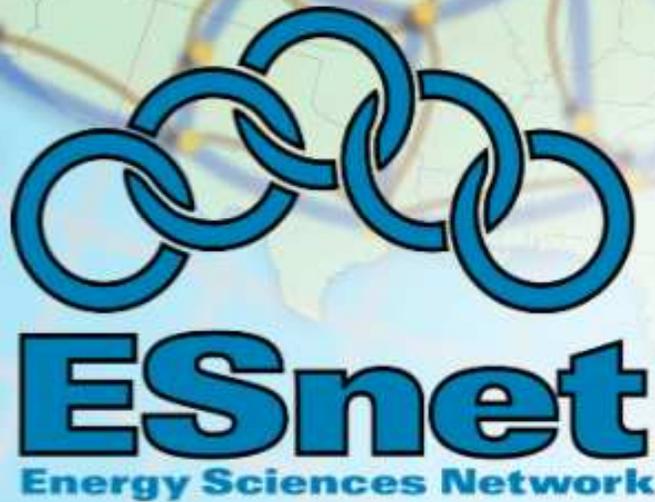


The Science Identity Federation

NUFO – June 2010



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

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*Energy Sciences Network (ESnet)
Lawrence Berkeley National Laboratory*



But First, About ESnet....

The Energy Sciences Network

The Department of Energy's Office of Science is one of the largest supporters of basic research in the physical sciences in the U.S.

- Directly supports the research of some 15,000 scientists, postdocs and graduate students at DOE laboratories, universities, other Federal agencies, and industry worldwide
- Operates major scientific facilities at DOE laboratories that have participation by the US and international research and education (R&E) community

Established in 1985, ESnet is the Department of Energy's science networking program whose responsibility is to **provide the network infrastructure supporting the missions of the Office of Science**

- Enabling a new era in scientific discovery as we tackle global issues like climate change, alternative energy/fuels and understanding the origins of the universe.

ESnet: Driven by Science

Networking needs of researchers are far different than commercial users.

Therefore, ESnet regularly explores the plans and processes of major stakeholders to understand:

- The extreme data characteristics of instruments and facilities
 - How much data will be generated by instruments coming on-line over the next 5-10 years?
- The future process of science
 - How and where will the new data be analyzed and used – that is, how will the process of doing science change over 5-10 years?

• **SC Networking Requirements Workshops**

- 2 workshops a year, rotating thru BES, BER, FES, NP, HEP, ASCR communities
- Workshop reports: <http://www.es.net/hypertext/requirements.html>

Observing current and historical network traffic trends

- What do the trends in network patterns predict for future network needs?

Science: Driven by Data

Scientific data sets are growing exponentially

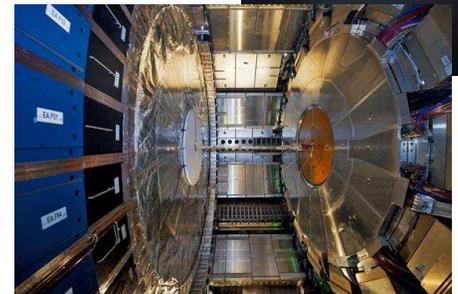
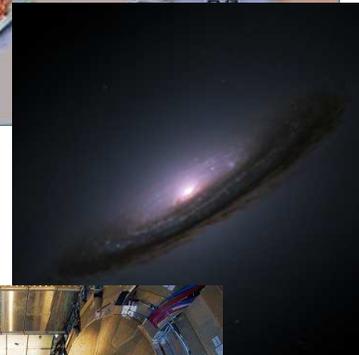
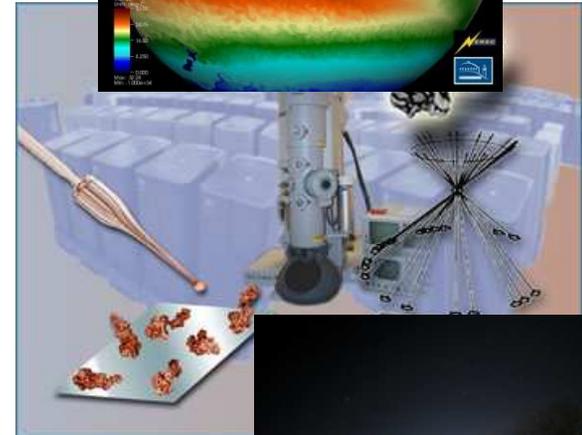
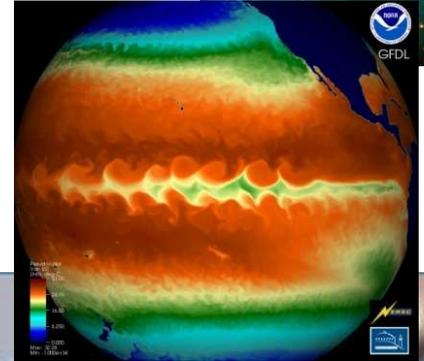
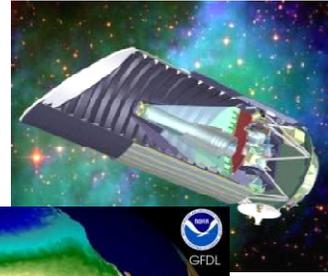
- Ability to generate data is exceeding our ability to store and analyze
- Simulation systems and some observational devices grow in capability with Moore's Law

Petabyte (PB) data sets will soon be common:

- Climate modeling: estimates of the next IPCC data is in 10s of petabytes
- Genome: JGI alone will have 0.5 petabyte of data this year and double each year
- Particle physics: LHC is projected to produce 16 petabytes of data per year
- Astrophysics: LSST and others will produce 5 petabytes/year

6/7/2010

SIF - NUFO



Solution: ESnet4

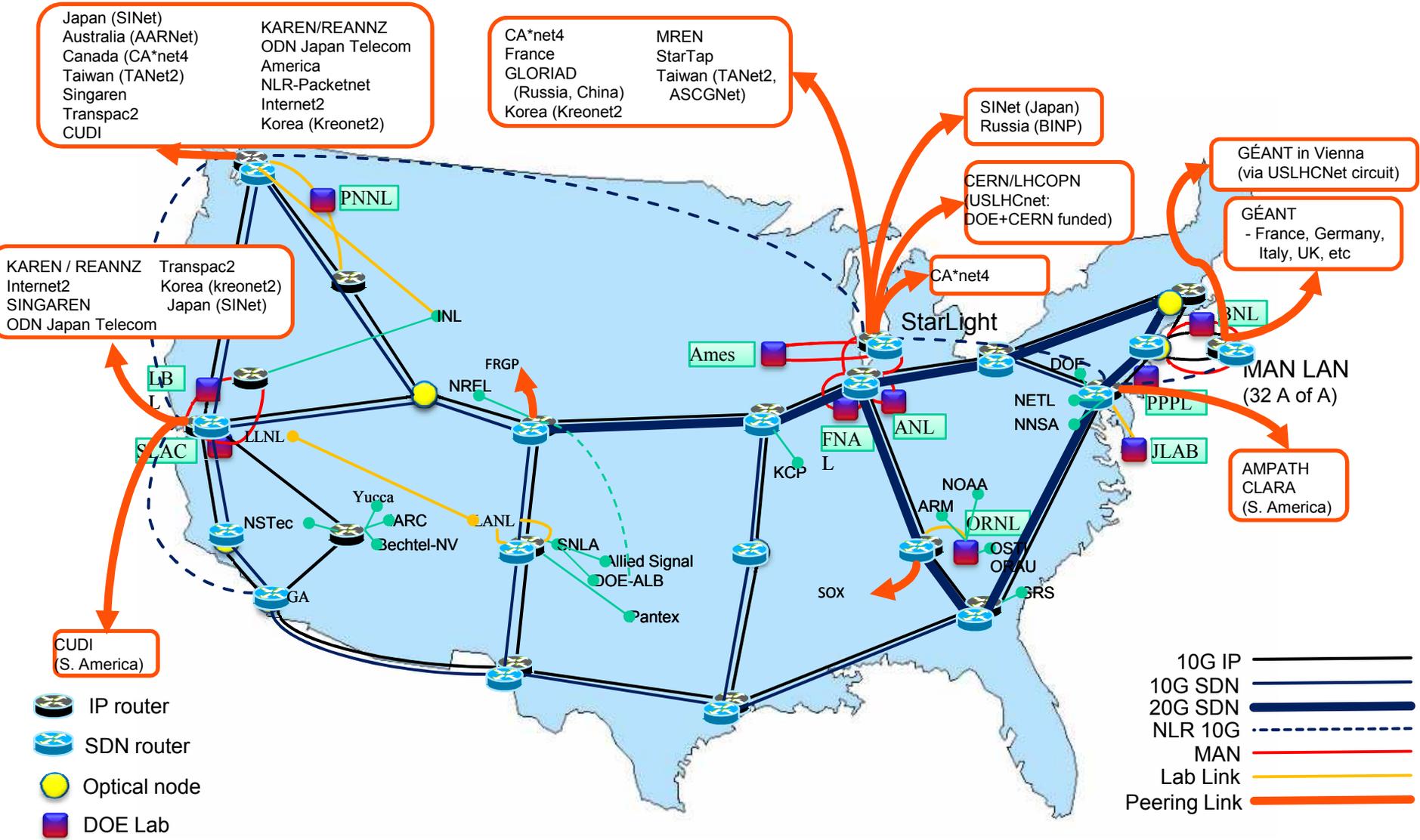
ESnet4: a unique hybrid packet- & circuit-switched network infrastructure specifically designed to handle massive amounts of data

- Combines the flexibility and resiliency of IP routed networks with the deterministic, high-speed capability of a circuit-switched infrastructure

Used commercially available technologies to create two logically separate networks over which traffic seamlessly switches

- IP Network: One network for IP traffic using a single 10 Gbps circuit over which ESnet provides audio/videoconferencing and data collaboration tools
- Science Data Network: Circuit-switched core network consisting of **multiple 10 Gbps** circuits connecting directly with other high-speed R&E networks and utilizing Layer 2/3 switches

ESnet4 June 2009

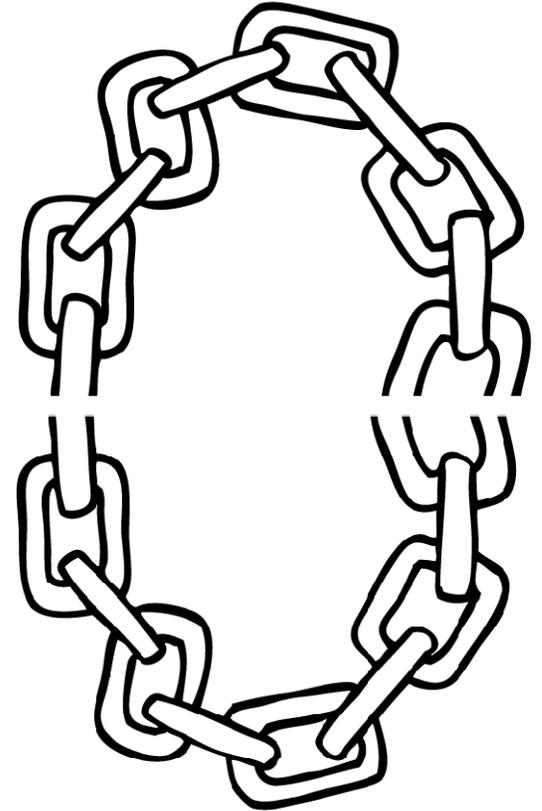


6/7/2010

But ... is 10 GBps enough for you?

ESnet Service Links

- <http://www.es.net>
- <http://www.es.net/OSCARS>
- <http://fasterdata.es.net>
- <http://www.perfsonar.net>
- <http://www.doe grids.org>
- <http://www.ecs.es.net>
- And SIF – Science Identity Federation



Science Identity Federation

- Collaborations need scalable "security" infrastructure
 - Authentication ... Authorization ... Identity
- Environment is diverse
 - DOE sites ... Projects ... Academia ... Industry
- Different security and identity objectives
- Internet is changing
 - Social network
- Internet identity and security environment is changing
 - Software, protocols, APIs, principles and practices
- Efficiency and process
 - We have a lot of identity "process" locked up in sites
 - Why build new identity silos for each new service?

Science Identity Federation (SIF)

- **Interoperable Identity for DOE labs**

... based on the well-known

- **Shibboleth authentication & authorization software from Internet2**

... so that labs can also

- **Federate with InCommon**

US Higher Education Shibboleth Federation:

see InCommonfederation.org

.... and other federations as needed

Let's Explain...



- **"Federation"** - coalition of resources; resources retain most of their autonomy, but agree to respect a few common rules
 - Science Identity Federation is an AUTHENTICATION federation ... for Logical Access to Computers
- **"Identity"** - attributes about a person - name, affiliation, contact information
- **"Shibboleth"** - A particular implementation of authentication federation, based on certain profiles of SAML
- **SAML** - Security Assertion Markup Language

Safe, Secure Identity

- I login with my home site identity
- Your service gets valid, useful attributes about me

SIF Today



We have

- Discussion Group
 - <http://groups.google.com/group/science-federation>
- Basic discovery service
- Interesting service – confluence.scifed.org
 - See Demo
- Several test IDPs
- Blanket contract for InCommon membership
 - Coming soon!
- Training Event (Shib Install Fest)

What Is InCommon?

The screenshot shows the Mozilla Firefox browser displaying the InCommon Participants website. The address bar shows the URL <http://www.incommonfederation.org/participants/>. The page features a navigation menu on the left and a main content area with three columns of participant categories and links.

	Higher Education Participants (160)	Government and Nonprofit Laboratories, Research Centers, and Agencies (7)	Sponsored Partners (56)
CAMP	Arizona State University	Argonne National Laboratory	Absolute Software, Inc.
Affiliates	Augsburg College	Energy Sciences Network (ESNet)	Apple - iTunes U
Certificate Service	Baylor University	Lawrence Berkeley National Laboratory	Atlas Systems, Inc.
Policies and Practices	Brown University	Moss Landing Marine Laboratories	BioOne, Inc.
Technical Information	California Institute of Technology		Blatant Media Corporation
Software Guide	California Maritime Academy		Burton Group
Metadata and WAYF	California Polytechnic State University, San Luis Obispo		Cengage Learning, Inc.
Site Administrator Info	California State Polytechnic University		Colorado Alliance of Research Libraries
Frequently Asked Questions			CSO Research, Inc.
Benefits			Davis County Schools
Site Administrator Login			
Collaboration Wiki			
Glossary			
Contact Us			

Why Science Identity Federation?

DOE User Facilities

- DOE operates a unique complex of research programs, sites, and over 60 user facilities for scientific research.
- Identity federation *should*
 - Reduce long-run costs of running existing facilities
 - Remove an administrative barrier for new facilities
- These facilities are very valuable asset to a federation
 - Your identity can enable you do something useful!



What Can We Do Together?

- Use Cases
- Attributes
- Look at your user community
 - Where are they from?
 - Are there users of multiple user facilities
 - YES – if you include the computational resources
- DOE Facilities –
 - Talk to your site CIO about SIF
 - Talk to your DOE program managers





What Was That SIF Site Again?

<http://groups.google.com/group/science-federation>

Or

Go to **groups.google.com** and
Search for **science federation**

Or

Contact me:

Michael Helm

helm@es.net

+1-510-621-7353

Links



- Science Identity Federation google group
- <http://groups.google.com/group/science-federation>
 - Shibboleth project at Internet2
- <http://shibboleth.internet2.edu/>
 - InCommon - US Shibboleth Federation
- <http://incommonfederation.org>
- Many interesting things to see here; consider IAM
- <http://www.incommonfederation.org/iamonline.html>
- InCommon metadata:
- <http://wayf.incommonfederation.org/InCommon/InCommon-metadata.xml>
 - SWITCH AAI demo
 - <http://www.switch.ch/aai/demo/expert.html>
 - How the Internet works video
- <http://www.youtube.com/watch?v=a5837LcDHfE>

Acknowledgements

- Bill Johnston, Mike O'Connor – ESnet slides
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- Dhiva Muruganantham, Greg Haverkamp – hard work
- Mine Altunay, Nate Klingenstein - Installfest
- ... and many more