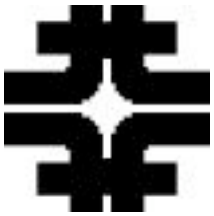


Computing Coordination in the US

D. Petravick, FNAL

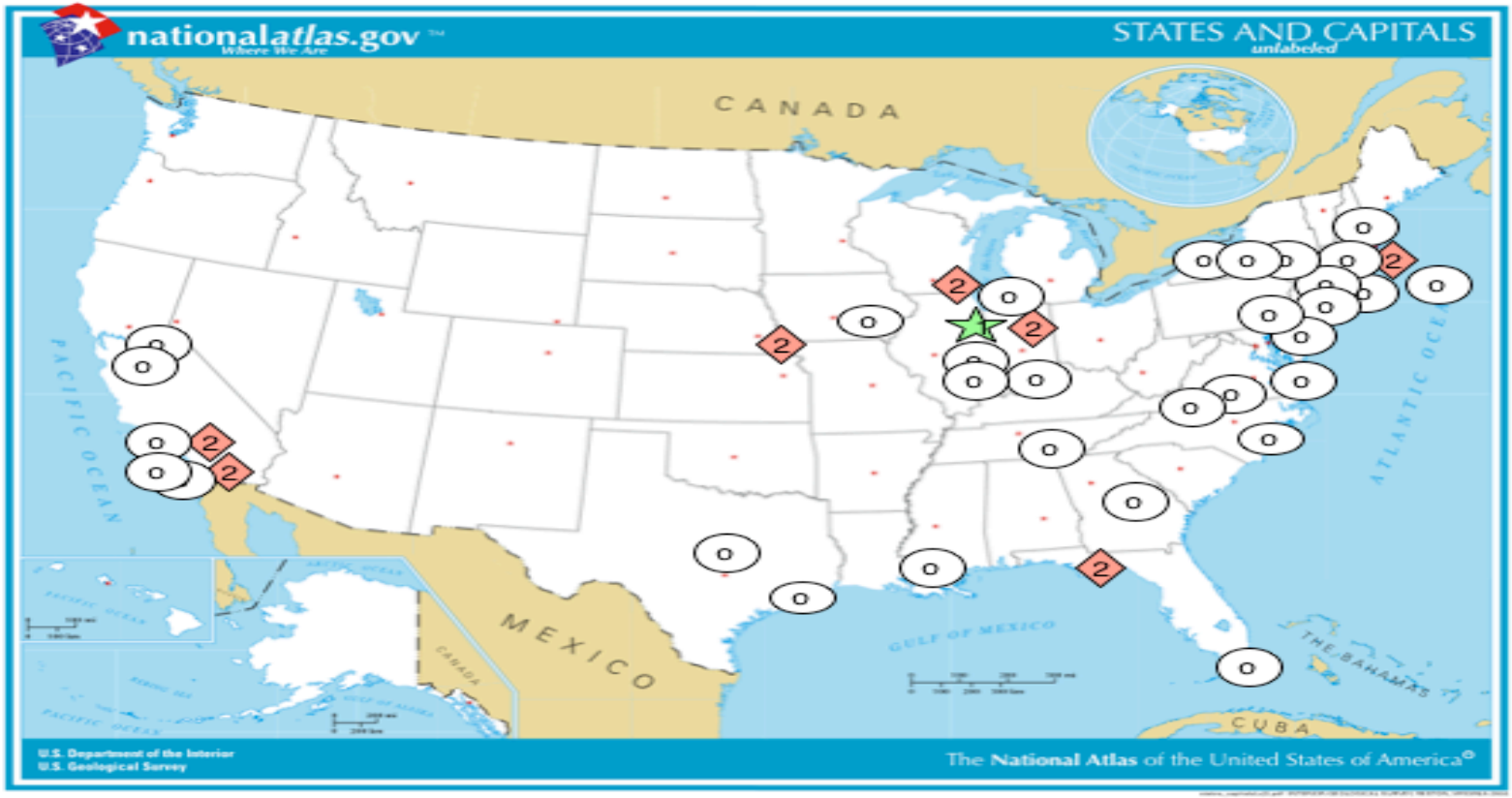
Scope of this talk

- Elements of computing coordination include
  - Running experiments at Brookhaven, Fermilab, RHIC and SLAC.
  - US participation in the LHC.
  - US participation in the ILC.
  - Theory (e.g. QCD)
- Coordinated elements include:
  - Computing facilities, including Storage
  - Networking
  - Grid Infrastructure

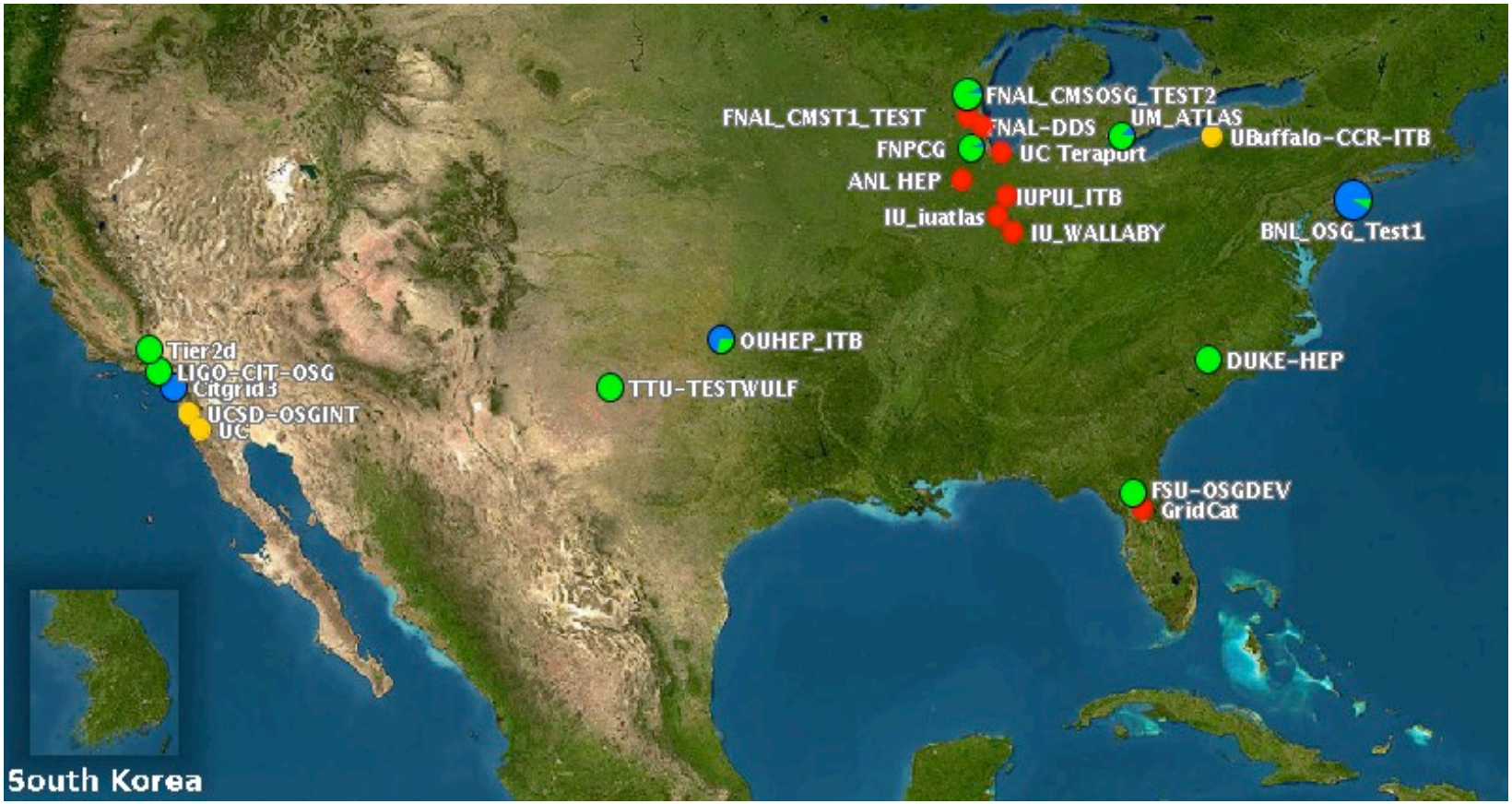
OSG

- OSG is operational.
- Evolution of Grid 3/Trillium
- Blueprint Document
- Deployment Document
- Governance document
- Technical groups.

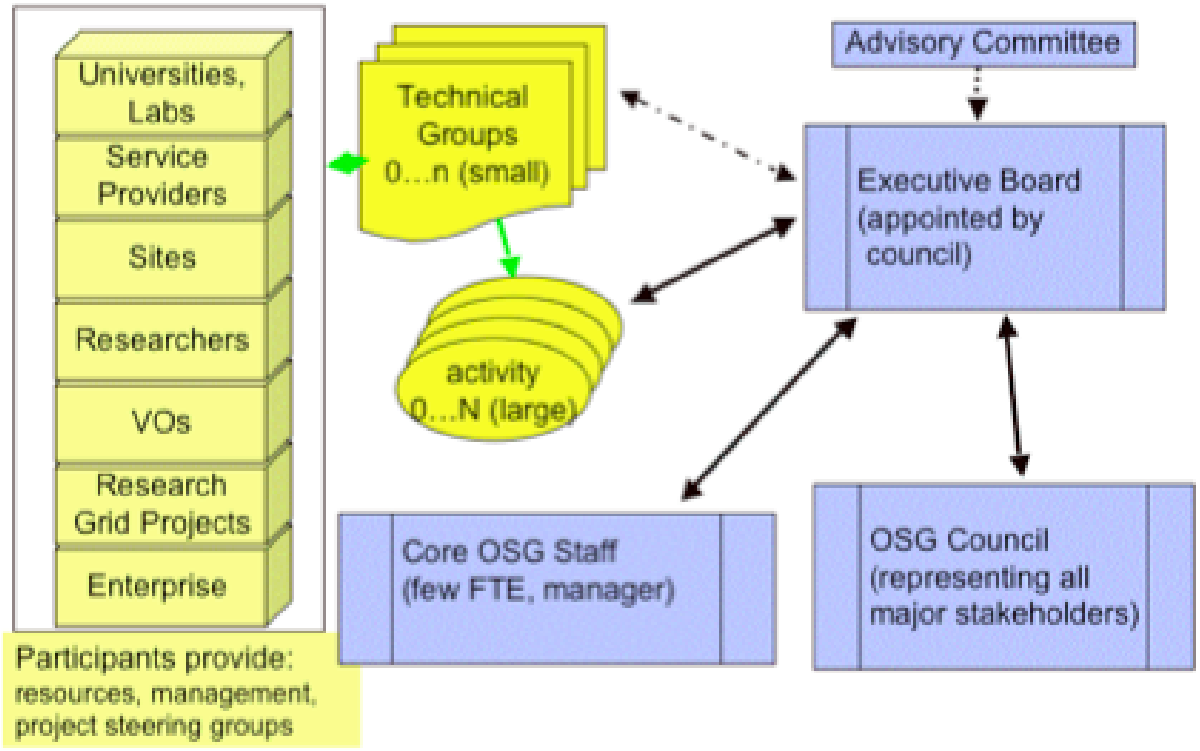
OSG participants (CMS emphasized)



OSG deployment



OSG Organizational Structure

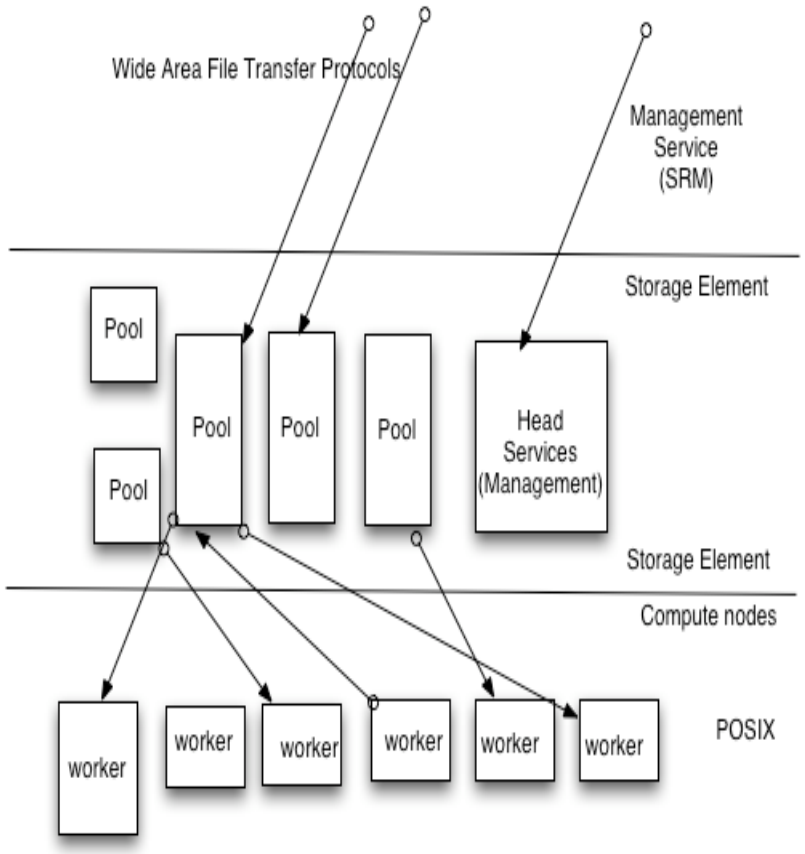


Storage Technical Group

- The Storage Technical group is lead by Paul Sheldon (Vanderbilt) and Robert Kennedy (Fermilab).
- The main activity of the group is to deploy managed storage elements on the OSG.
  - Independently implemented, interoperating, SE are being deployed and or investigated.
    - LBL DRM
    - Fermilab/DESY Dcache.
    - Interest from the IBP people (Tennessee)
    - Possible interest from Xootd people (SLAC)
    - Coordinated with US involvement with Glite.

OSG Storage element

- Storage Resource Manager interface.
  - storage space management
  - data movement resource management
- File transfer protocols (GridFTP as "lingua franca")
- POSIX-like IO on the worker nodes.



Storage Element Strategy

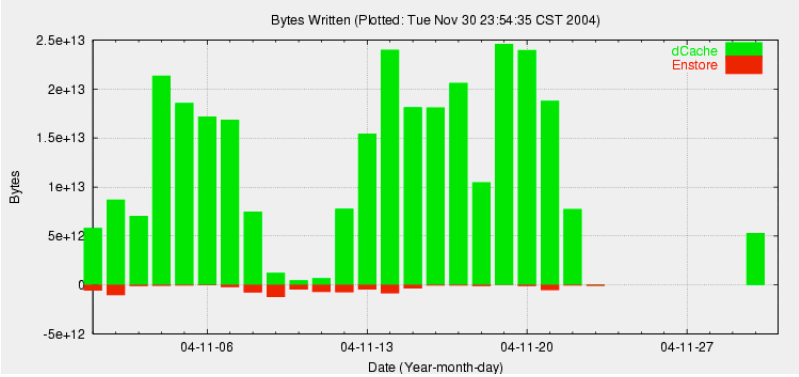
Strategy is to allow for diverse implementations

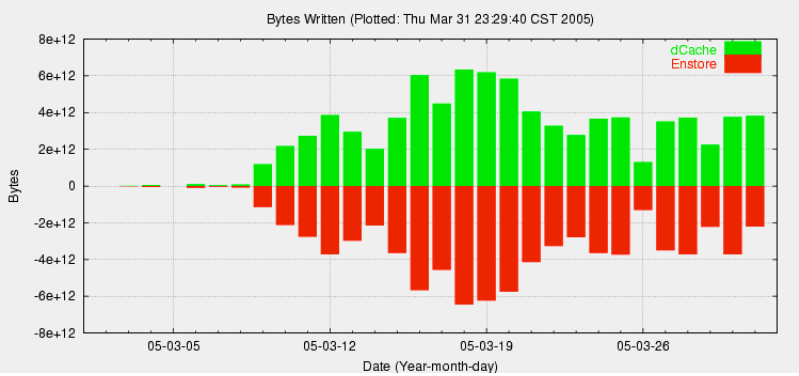
- Distinguishing features:
  - File system or own virtualizer”
  - Play a role in shaping traffic, and metering data movement resources, protocol selection.
  - Play a role dealing with network features like firewalls and NATs.
  - Assemble spare storage into a usable whole.
  - Integrate w/tape or not

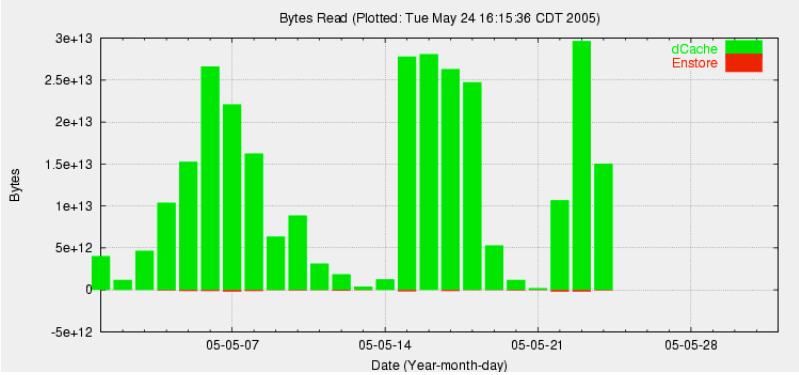
Storage Element Deployment

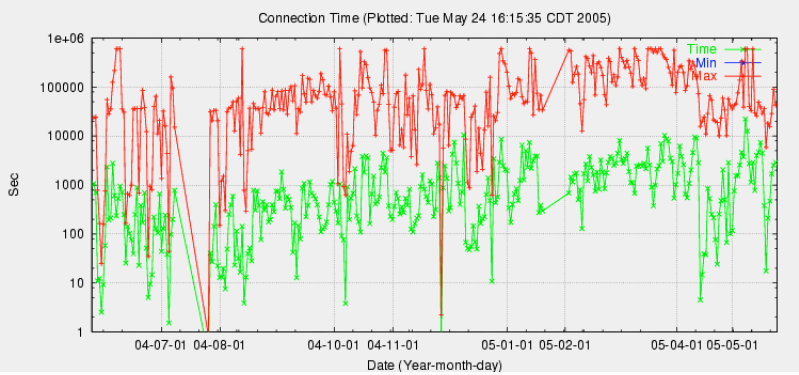
- 57 TB at CMS T1 center at Fermilab
  More by the end of the summer.
- ~20TB at each CMS T2 center
- SE at BNL T1
- 130 TB SE for CDF
- 22 TB for General Facility at FNAL.
- SE being investigated by ATLAS

SE performance







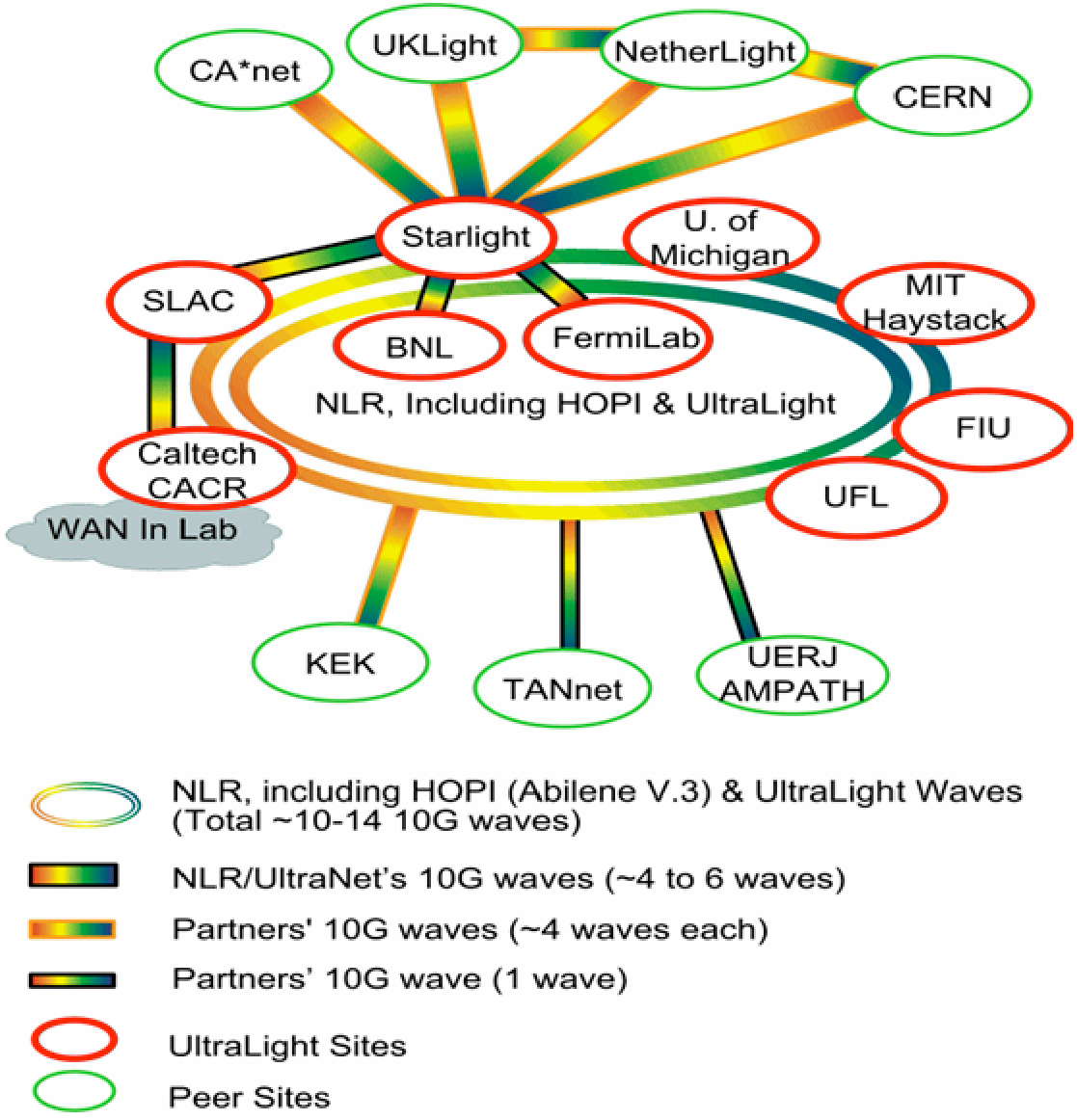


Network Technical Group

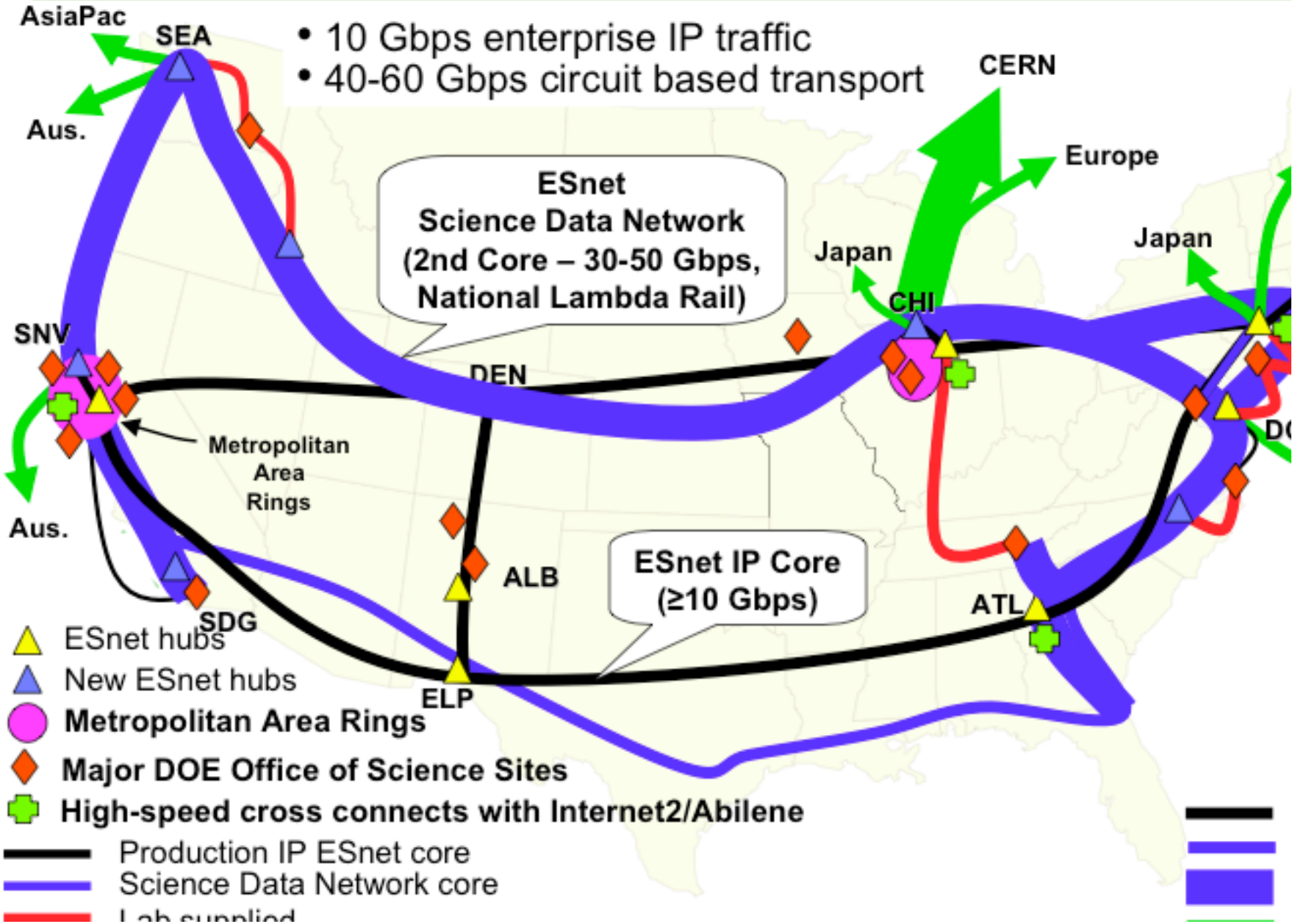
- The Network Technical group is lead by Shawn McKee(Michigan) and Donald Petravick (Fermilab).
- We are beginning to organize.
  - Have seeded a monitoring activity.
  - Want to consider the needs of the HEP experiments exploiting OSG.
  - Diverse network resources within the US.

UltraLight Network: PHASE 2

- Move into production (2007)
- Optical switching fully enabled amongst primary sites
- Integrated international infrastructure



ESnet Goal – 2007/2008

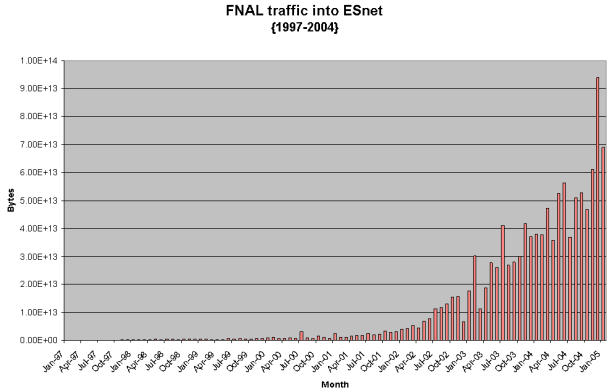


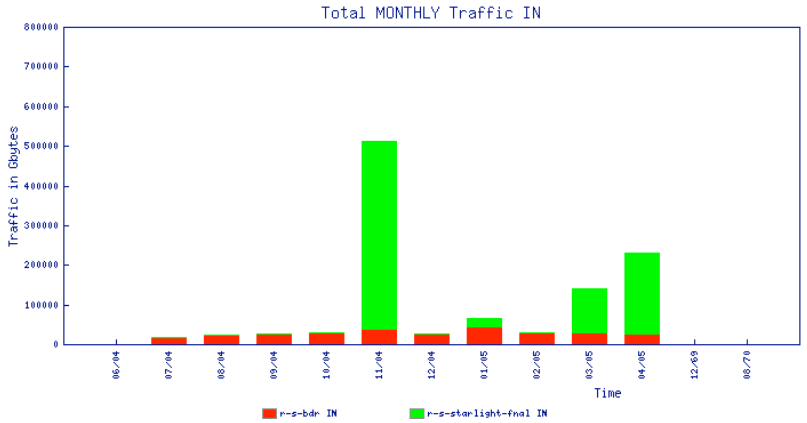
Practical Integration Goals

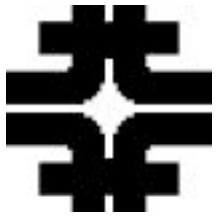
- Effective use of bandwidth on WANS
- Light paths, because they are there.
- Transactions.
- Have working advanced integrations by 2007
  - DISON
  - Baseline S&C project.
  - more
- Buy in and acceptance of the availability and usability of WAN.
- Routinely do across the (nation/world) what we used to do at a lab.
- Prepare for advanced systems of autonomous agents.
- Exploit open exchanges

Example: Practical Work at FNAL

- Dark fiber to Starlight
- Burgeoning direct peerings, direct lightpaths
- Lightpath bandwidth more available that packet switched bandwidth.





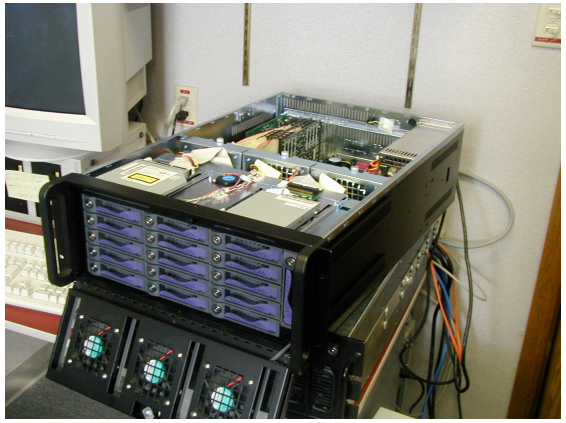


Production, Studies

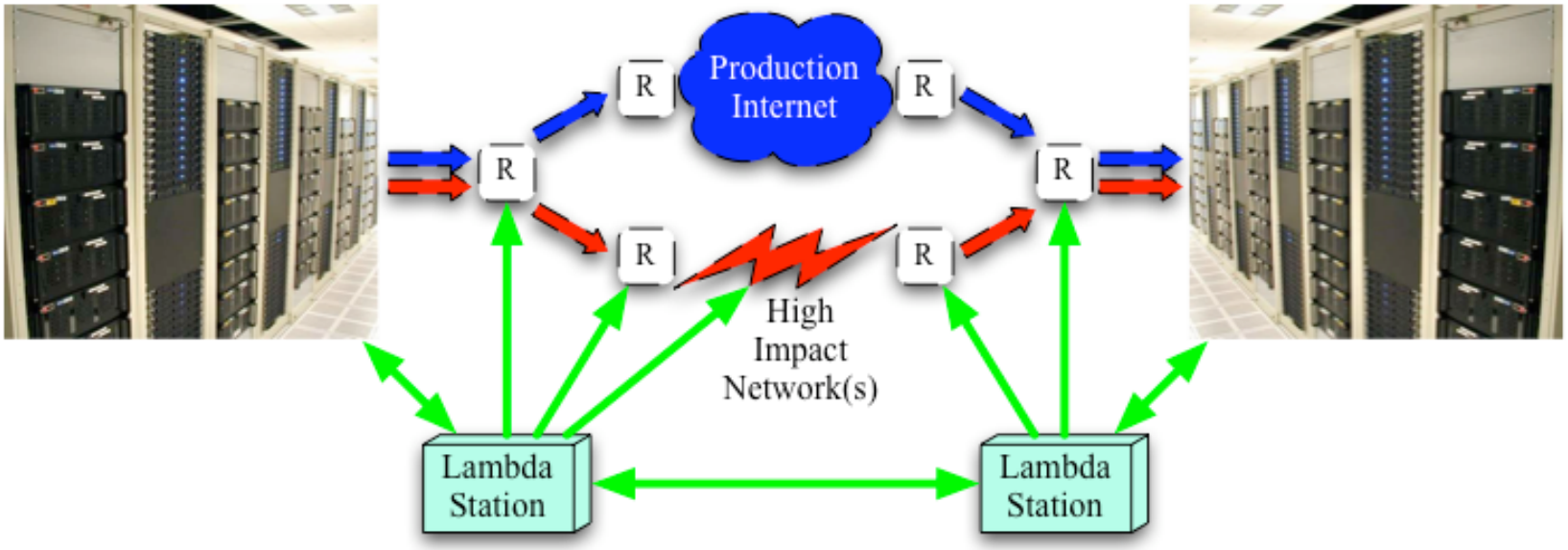
Project	Collaboration	Remote Site	Status	Max B .W.	Type
UKlight - CDF	CDF	UCL	Active	1 Gb/s	periodic
CMS/CERN	CMS	CERN	Active	1-10 Gb/s	sustained
LambdaStation	CMS	CalTech	Active	1-10 Gb/s	sustained
WestGrid (Ca)	D0	Simon Fraser	Active	1 Gb/s	sustained
LHC Tier 1	CMS	BNL	Active	< 622 Mb/s	periodic
UltraLight	CMS	Cal Tech, UFL	Pending	1-10 Gb/s	sustained
UKlight – D0	D0	Lancaster	Pending	1 Gb/s	sustained
ASnet	CDF	Sinica, Taiwan	Pending	2-4 Gb/s	periodic
CMS Tier 2	CMS	UFL, UCSD, Wisconsin	Active	< 622 Mb/s	sustained
McGill	CDF & D0	McGill, Ca	Active	1 Gb/s	sustained
Twaren	SDSS	NCHC, Taiwan	Active	1 Gb/s	periodic
Prague, Cz	D0	IoP	Active	1 Gb/s	sustained
Toronto HEP	CDF	U. Toronto	Pending	1-10 Gb/s	periodic

Current state of HEP computing

- Dual CPU box is very common.
- Middleware with long time constants
- Awareness of WAN, but not full acceptance of its potential.
- Goal: vertical integration of many layers.
  - Hope: large social and technical impact

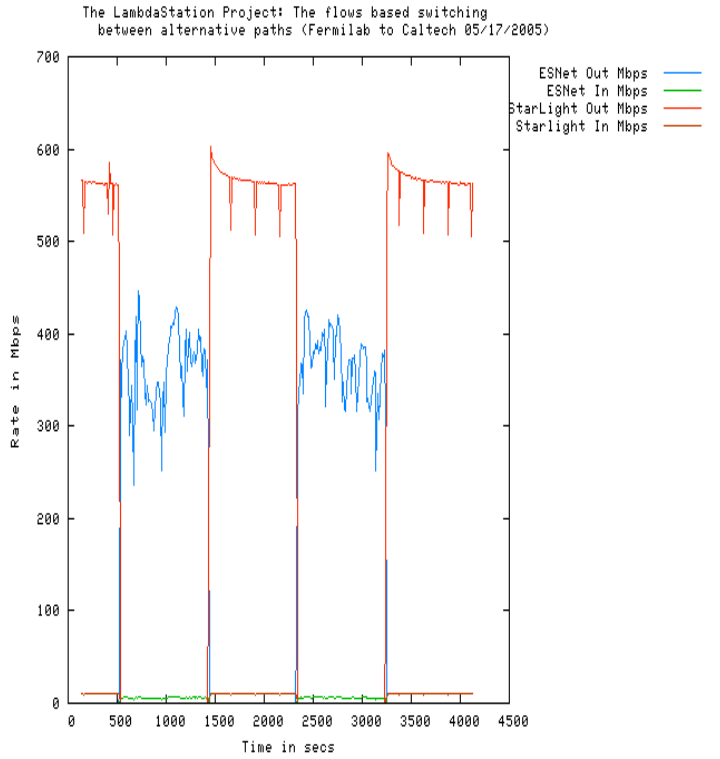


Practical Integration



Results

- Plot shows functionality
- Alternate use of lightpaths and conventional routed networks.
- Grid FTP
- Exampel integration with SRM
- Will have working advanced integrations
  - DISON
  - Baseline S&C project.
  - more



Summary

Coordination via OSG, DISON, Trilluim.

- All of experimental HEP + QCD
- Consistent with solid results for 2007.

- Storage:
  - Standards exist for competing/complimentary SE work.
- Network:
  - Active exploitation of diverse networks, including those enabled by open optical exchanges.
- Active program of work for acceptance.