National Energy Research Scientific Computing Center (NERSC)

NERSC Site Report

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BERKELEY LAB

NERSC

NATIONAL ENERGY RESEARCH
SCIENTIFIC COMPUTING CENTER

- **Security**

- **Networking**

- **Storage**

- **GUPFS**

- **Other systems**

Security

- **Increase use of sniffed passwords**
  - **Network**
  - **Local via tty**
- **Email viruses and worms on the rise**
- **Forged email looking more legit**
- **Reading local email especially to root**

- **NFS exploits**
  - **no_root_squash**
  - **NFS v3**
  - **NFS exported on non privilege port**
    - **http://www.deter.com/unix/software/nfsshell.c**
    - **AIX defaulted to insecure**
    - **Linux defaults to secure**

- **What to do? Our view.**
  - **Good sys admin practices check each other**
    - **Keep systems patched**
    - **Latest exploits are old problems**
  - **Fan out logins instead of chaining**
  - **Tripwire, rpm verify and similar setup**
  - **.rhosts .authorized_keys .known_hosts .netrc checking**
  - **Change ssh keys and grid certs on compromised systems**

Security 4

- – **Communicate (A lot of the latest exploits span sites. You may be clean, but the hacker may still have accounts at other sites.)**
- – **Encrypted email about exploits**
- – **Local exploits = remote exploits**
- • **Our contact: security@nersc.gov**

Security Projects

- **NERSC LDAP server**
- **One-time password**
  - **Proactive response (DOE may mandate)**
  - **User and admin usage**
  - **Multi-site specification**
    - **Oak Ridge, PNNL, Argonne, LBL currently**
    - **BNL and SLAC also contacted**
    - **FERMI consulted**
  - **Keep users from having to carry several keys**
- **Contact: sychan@lbl.gov**

Bro

- **IDS which is protocol savvy**
- **Forensic tool (collects connection data)**
- **Started as network analyzer**
- **Grid enabled (gsiftp, gatekeeper, cactus aware)**
  - **Tracks authentication layer**
  - **Records gatekeeper commands**
  - **Gsiftp analyze much like ftp (example, site exec)**

Bro Lite

- **DOE Funded**

- **Simplify Bro**
  - **Configuration (GUI)**
  - **Output filters**

  Available: July/Aug
  - **Beta slots available**
 - **Contact: security@nersc.gov**

- **Oak Ridge**
  - **OC12 to ATM bug cause drop packet thus spoiling single stream performance**

- **BNL**
 - **Cisco PIX: Unsetting tcp_window_scaling fixed via upgrade version ~6.2**

Networking 2

- **Wisdom**
  - **90% host tuning issues**
  - **8% first hop issues**
  - **Rest is in the WAN**
- **Every problem is magnified with latency**
- **Multiple streams poor substitute to overcome network problems**
- **Passive taps are good at critical points (~$500)**
- **Drop counters lie!**
  Contact: net@nersc.gov
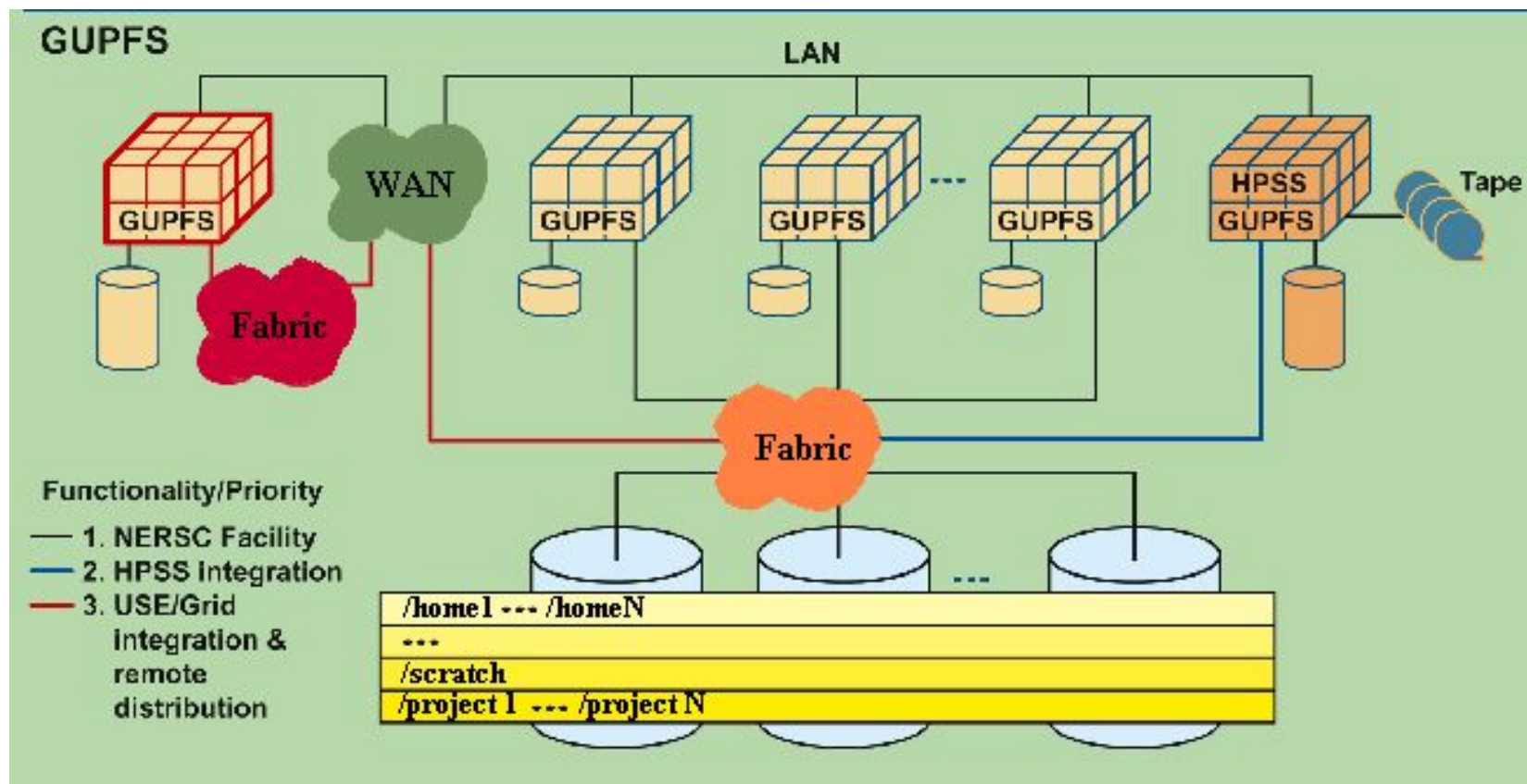
- **Grid myproxy**
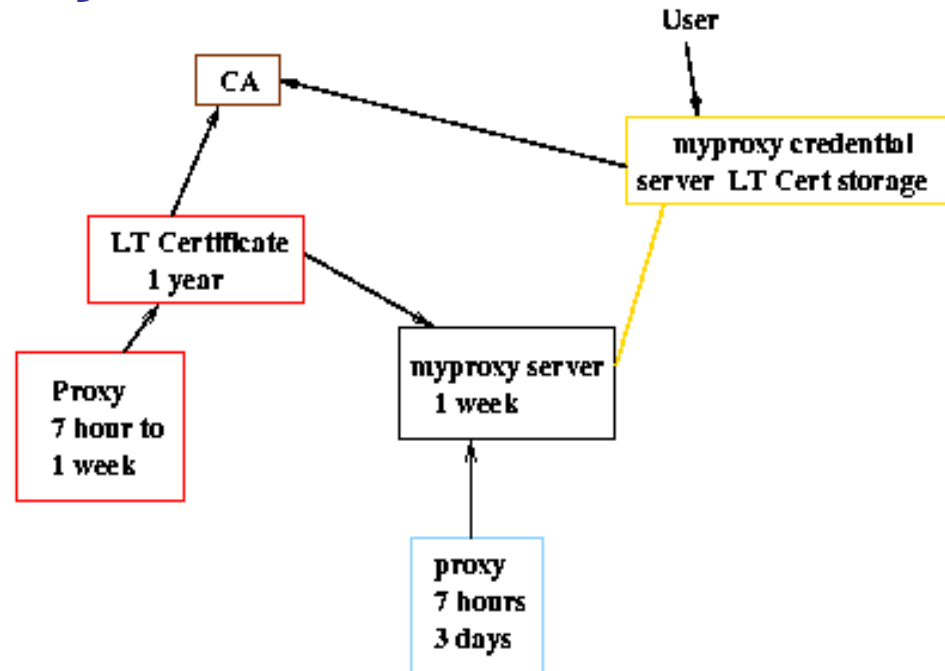
Current non myproxy
With myproxy
Near term myproxy path
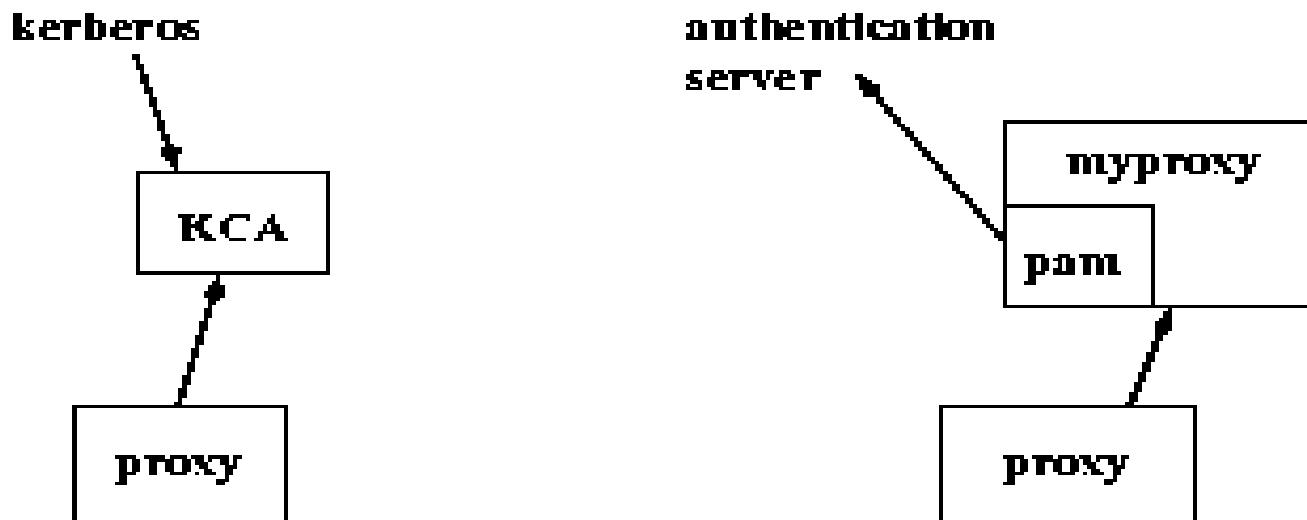
- **Problem**
  - **Still no way to revoke a proxy cert**
  - **OCSP – Online Certificate Status Protocol**
- **Contact: sychan@lbl.gov**

GUPFS Layout

- ## File Systems
  - Sistina GFS 4.2, 5.0, 5.1, and 5.2 Beta
  - ADIC StorNext File System 2.0 and 2.2
  - Lustre 0.6 (1.0 Beta 1), 0.9.2, 1.0, 1.0.{1,2,3,4}, 1.2.1
  - IBM GPFS for Linux, 1.3 and 2.2
  - Panasas

- ## Fabric
  - FC (1Gb/s and 2Gb/s): Brocade SilkWorm, Qlogic SANbox2, Cisco MDS 9509, SANDial Shadow 14000
  - Ethernet (iSCSI): Cisco SN 5428, Intel & Adaptec iSCSI HBA, Adaptec TOE, Cisco MDS 9509
  - Infiniband (1x and 4x): InfiniCon and Topspin IB to GE/FC bridges (SRP over IB, iSCSI over IB),
  - Inter-connect: Myrinnet 2000 (Rev D)

- ## Storage
  - Traditional Storage: Dot Hill, Silicon Gear, Chaparral
  - New Storage: Yotta Yotta GSX 2400, EMC CX 600, 3PAR, DDN S2A 8500

General

- **Many vendors are involved and have various products available. But are more focused on commercial market.**

- **Need standardized, centralized monitoring and management for fabric and storage.**

Filesystem

- **Progress but still need more work, remains the component with the highest risk**
  - **Stability**
  - **Parallel I/O performance and functionality**
  - **Scalability**

- **Not enough filesystems can or plan to support many platforms/OS's.**
  - **ADIC SNFS greatest variety now**
  - **IBM Storage Tank has many now and more planned**
  - **Lustre plans to support OS-X**
  - **IBM GPFS supports AIX and Linux**

- **Planned deployment late 2005**
- **Unified filesystem spanning all NERSC systems (NCS, Seaborg, PDSF)**
- **Possible candidates**
  - **GPFS, ADIC, Lustre, Panasas, Storage Tank**
- **Results: http://www.nersc.gov/projects/GUPFS**
- **Contact: gupfs@nersc.gov**

Storage

- **htar**
  - **HSI tar utility – creates/retrieves tar archive on hpss.**
- **Portal/web access to HPSS**
- **GPFS DMAPI**
  - **Linux**
  - **AIX**