Transitioning NCAR MSS to HPSS

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NCAR

Overview

- Transitioning to HPSS
  - Explain rationale behind the move
  - Introduce current HPSS system in-house
  - Present transition plans with timelines

Evolution of NCAR MSS

- Began in 1987
  - Served Cray supers running COS through a homegrown MASnet network
  - Everything local, “total trust” model
- Archival storage gone through several stages since then
  - Began to service directly connected UNIX hosts, TCP/IP networks introduced, along with HiPPI for data
  - Expanded connectivity to “store and forward” for clients within the UCAR security perimeter, as well as direct connected hosts
  - UCAS password auth’ed FTP access to external clients
  - Special tunnel from outside UCAR security perimeter to MSS (frost)

Why HPSS?

- Essential answer – it's the next logical step to our Mass Storage evolution
- Need to address new use cases
  - Wide area data sharing, access, copying
  - Our scientists computing elsewhere, bringing data back

What is HPSS?

- HPSS – High Performance Storage System
- HPSS developed in 1990's collaboration between IBM and DOE national labs
  - LLNL, LANL, ORNL, Sandia, NERSC
- Running at
  - most DOE labs
  - many Teragrid sites

HPSS Enables New Features

- HSI - a Unix-style interface with many convenient data management features
- larger maximum file sizes (1 TB)
- integration with IBM's General Parallel Filesystem (GPFS) via its Hierarchical Storage Management (HSM) feature
- high performance WAN file transfer capability via GridFTP

Integration with National Computing and Data Resources

- HPSS positions NCAR for enhanced interoperability with other scientific SC sites
  - Enabled via Grid based technologies
  - Includes the NSF Teragrid and its XD follow-on
  - Facilitates scientific collaboration through higher-performance data sharing between NCAR and the nation's Supercomputing centers

Scaling for the Future

- HPSS is a highly scalable system
- Expected to meet coming requirements for
  - petascale computing
  - and beyond into the exascale arena

Current Deployment

- Running HPSS 7.1
- Small initial configuration
  - One core server, two movers
  - 1.4 PB capacity in library
- Users ask: “Is equipment the same?”

HPSS Hardware

- Servers and internal RAID cache
  - Different from NCAR MSS
  - Need to be built out soon

HPSS Hardware

- Storage (Libraries & Tape)
  - Same as NCAR MSS
  - AMSTAR equipment

Current Deployment

- Clients
  - HSI
    - **H**ierarchical **S**torage **I**nterface
  - GridFTP for HPSS
    - globus-url-copy and uberftp
- Local trust models no longer adequate due to expanded accessibility
  - HSI auth uses *Kerberos*
  - GridFTP auth uses *GSI (Grid Security Infrastructure)*

HPSS Team

- Currently 4 members
- Representing ~ 3 FTE's
- Contacts
  - Marc Genty mgenty@ucar.edu
  - John Merrill jhm@ucar.edu
  - Bill Anderson andersnb@ucar.edu
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Timelines

- Jul 2008
  - HPSS brought in, limited testing as part of TG
- Mar 2009
  - available to the NCAR TG community
- Jun 2009
  - Announcement to replace NCAR MSS
- Jul-Sep 2009
  - GridFTP development

Timelines

- Sep 2009
  - Move inside UCAR security perimeter
  - Visibility to NCAR MSS hosts
- Oct 2009 – Dec 2009
  - Early client builds and installs
- Oct-Dec 2009
  - GridFTP shakeout

Timelines - Tentative

- Jan 2010
  - Prepare early users for move to HPSS
- Jan-Feb 2010
  - Client proliferation
- Mar 2010
  - Open doors to NCAR selected early users

Timelines - Tentative

- Jan-Sep 2010
  - Conversion software development
- Oct-Dec 2010
  - Load balancing upgrades to HPSS
- Jan 2011
  - Cutover from NCAR MSS to HPSS

User Concerns

- Will I lose access to any data I am used to using?
- Will I have to copy my own data to the new system?
- Answer to both questions is “no”

User Concerns

- Data will *not* be copied at the final cutover, and all data will be available afterward
  - NCAR data tapes will be readable by HPSS
  - Metadata conversion and ingest step prior to cutover, with some downtime (2 days)
  - Thus no read-only phase required, although this is still a possibility
  - Target date Jan 2011 (tentative)
- Users will have early access to HPSS prior to the final cutover
  - Target date Mar 2010 (tentative)

Outreach

- Outreach through transition period
  - Transition website for users
  - Client website for sysadmins to download/install clients
  - Offering one-on-one in-depth support/consultation

URL's

- News Release:
  - http://www.cisl.ucar.edu/news/09/0909.hpss.jsp
- User Transition Website
  - http://www.mss.ucar.edu/transition
  - We strongly encourage visiting this transition site periodically and to …
  - contact us so that we may assist you in developing your own personalized transition

Questions

Basic Transition Elements

- Change in interfaces (coding)
  - DCS -> HSI/GridFTP
- Change in file security model (server side)
  - COS/UNIX mix -> POSIX compliant grps/perms
- Change in user auth
  - Kerberos for HSI
  - GSI (Grid Security Infrastructure) for GridFTP

Change in Security Model

- Current MSS model based on COS
  - Read/write passwords per file
  - Transient directories with no security
  - No groups, just users
- HPSS model
  - POSIX based
  - Regular UNIX style permissions
  - Implies persistent directories, groups

Outreach

- More socialized, broader model for the future
  - Leverage web technology
    - Wiki
    - Forums
    - Comments
    - News items
  - Share practice and experience
    - Users
    - Sysadmins
    - HPSS admins across the nation/globe

Outreach

- Retool MSSAC (MSS Advisory Committee)
  - To date has been
    - Forum for changes coming down the road from MSSG
    - Wishlist items from users
  - Change to more of an in-depth seminar series
    - Look at role of HPSS embedded in broader/deeper use cases and data flows
    - DMWG style stuff continued

Integration with National Computing and Data Resources

- HPSS positions NCAR for enhanced interoperability with other scientific supercomputing sites
  - via Grid based technologies
  - includes the NSF Teragrid and its XD follow-on
- This facilitates scientific collaboration:
  - contribute to higher-performance data sharing between NCAR and the nation's Supercomputing centers
  - enhance access to NCAR's scientific data services