HPSS User Forum 2016

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Book of abstracts

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Organizing and Technical Program Committee Moving Forward HUF2017

Corresponding Author: novakov@bnl.gov

Wrap up & End of HUF 2016, moving to HUF 2017

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RHIC Overview Q&A

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Site Presentation: In-house User Interface and Monitoring

Mr. FUJITA, Naoyuki [1]

[1] JAXA

Corresponding Author: fujita@chofu.jaxa.jp

In-house tool which manages archiving and staging files between HPC filesystem and HPSS and monitoring HPSS status by administrator is reported.

Site Presentations / 10

Disk Cache Utilization Graph

Mr. YU, David [1]

[1] Brookhaven National Lab

Corresponding Author: david.yu@bnl.gov

An in-house developed tool to monitor un-migrated data inside HPSS disk cache. With this graph, we are able to see the actual performance of migration vs data injection, and know the true disk utilization.

This tool supports PFTP, HSI/HTAR.

HPSS Presentation / 18

Update from HPSS EC Representative

NOE, John [1]

[1] Sandia National Laboratories

Corresponding Author: jpnoe@sandia.gov

General update from HPSS EC Representative include addressing HSI and HTAR

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Tape drive advanced monitoring & mappings

Mr. CHOU, Tim [1]

[1] Brookhaven National Laboratory

Corresponding Author: tchou@bnl.gov

1. How do we map tape drives between HPSS system and data movers?
2. How do we monitor the usage and health of tape drives?

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HPSS Upgrade with QRep Application

Dr. CHE, Guangwei [1]

[1] BNL

Corresponding Author: gche@bnl.gov

QRep is an abbreviation for “MQ Replication”. It is a high-volume, low-latency replication solution from IBM. QRep uses WebSphere® MQ message queues to transmit transactions between source and target databases or subsystems.

The traditional HPSS upgrade includes DB2 upgrade, restore, conversion, as well as HPSS software upgrade. It requires HPSS fully shutdown. Depending on the data size of the database, DB2 upgrade, conversion and the data integrity validation post procedures can take days to week long, which impacts the production downtime dramatically.

However, with QRep solution, we can accomplish the DB2 upgrade, conversion, data integrity validation and data replication between the source and target DB2 database more efficiently while HPSS is online. The major benefit of using QRep for HPSS upgrade is cutting down the production downtime.

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UKMO MASS System Upgrade

Mr. MAYNARD, Bob [1]; Mr. CONWAY, Brian [1]

[1] The Met Office

Corresponding Author: bob.maynard@metoffice.gov.uk

In late 2015, the UKMO took delivery of the first phase of a new HPC that would provide a step change in the supercomputer capability. The Cray XC40 will be one of the world’s fastest and provided Cray with their largest ever international contract. To achieve maximum benefit from the new HPC the MASS data archive needed a major upgrade to enable us to store up to 600PB by 2020. The UKMO presentation will describe in detail our solution, which involved replacement of virtually every piece of the MASS hardware, and the subsequent migration of over 65PB of data. We will discuss how we translated business requirements into a procurement tender, implemented and tested the new solution and brought it into production with virtually no user impact. We will describe some of the issues that remain unresolved both with the HPSS software and with other vendor products and our method of migrating data using the HPSS repack functionality, its performance and limitations.

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Brookhaven Scientific Computing

About BNL RHIC/ATLAS Computing Facilities

Special Guest Speaker / 28

Storage Outlook

Mr. MOORE, Fred [1]

[1] Horison Information Strategies

Corresponding Author: fmoore@horison.com

Information and entertainment sits at our fingertips. Super-computing power resides in our smartphones. Autonomous vehicles are beginning to appear on our roads and in the sky. These modern high-tech capabilities are powered by the three engines of the digital revolution - semiconductors, software, and storage. In particular, the storage landscape is evolving faster than ever as the roles of SSD (Solid State Disk), HDDs (Hard Disk Drives) and modern tape are changing. Flash SSD's are capturing an increasing portion of the performance intensive high IOPs market, HDDs continue to extend capacity boundaries, while the higher reliability and a 30+ year media life for modern tape has made it best suited for large archival applications. This talk will highlight the latest trends and directions in the data storage industry.

HPSS Presentation / 30

HPSS Deployment and Support

HAMALA, Annette [1]

[1] IBM

Corresponding Author: ahamala@us.ibm.com

This is the standard HPSS Deployment and Support update that is given at every HPSS User Forum (HUF). The presentation will include information on any new HPSS deployments as well as HPSS system upgrades since the last HUF.

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Dternity Data Protection Solution - Fujifilm

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Spectra Logic

Mr. THOMPSON, Nathan [1]

[1] Spectra Logic

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Hewlett Packard Enterprise

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Oracle

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Hewlett Packard Enterprise

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Using Basic Machine Learning to Help Manage Tape Technology Migrations

Mr. ANDERSON, Bill [1]; Mr. GENTY, Marc [1]; Mr. THANHARDT, Erich [1]

[1] NCAR

Corresponding Author: andersnb@ucar.edu

In the past, NCAR has usually used a fixed number of repack streams to migrate data from an old tape technology to a new one.
Lately, though, due to variability in our workload (for example, users often put a heavier load on our HPSS system during the middle of the week) and due to overall increases in our workload, we've found that we can't just set a fixed value and leave it for months. If we set it too high, user transfers sometimes have to wait too long; if we set it too low, our technology migration doesn't finish soon enough. To manage the migration better, we implemented a simple machine learning algorithm that learns from the historical and current workload and dynamically adjusts the number of repack streams. In this talk, we'll share details about our approach and how it could be potentially used to manage other aspects of HPSS.

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IBM HPC Services and Big Data Challenges

SCHWERDTFEGER, Isabel [1]

[1] IBM Deutschland GmbH

Corresponding Author: schwerdtfeger@de.ibm.com

IBM Global Technology (GTS) runs today the IT-backbone of many businesses and organizations worldwide.
From our originating mission many years ago, GTS was the on site integrator for various hardware and software systems.
Due to the digitization and disruptive changing business models of our clients, GTS is facing a change to address these needs and embrace new ways of service concepts for their clients. Cloud, Mobile, Security, Social and Supercomputing are the new services plays, where GTS is creating value for our clients worldwide as a services integrator. This presentation highlights these new approaches and presents current client references to demonstrate this new approach.

Special Guest Speaker / 39

Avoiding The Zettabyte Apocalypse: Hyper-Growth In Data Requires A New York-Sized Storage Solution

TOIGO, Jon [1]

[1] Toigo Partners International

Corresponding Author: jtoigo@toigopartners.com

Between the rise of social media, mobile commerce and cognitive computing, the widespread proliferation of gigapixel cameras and 4K video recorders on smart phones, and the Internet of Things, data growth is accelerating wildly. Combined flash, disk and optical storage media manufacturing will not be able to keep pace with capacity demand – and contrary to all of the low-information commentary, cloud is not another storage media. Many new point technologies are appearing in the market, some derived from supercomputing and hypercluster computing, to platform the data. But, what is really needed is a "New York" scale solution combining solid fundamentals with bold vision and reach – and a certain kind of business savvy in technology valuation and implementation. Jon Toigo, a 30-plus year IT veteran, vendor watchdog and technology consumer ombudsman, focuses attention on the emerging challenges of data storage in an increasingly data hungry world.

HPSS Presentation / 40

GHI Update [Restricted]

ADAMS, Fabiola [1]

[1] IBM

Corresponding Author: fabiola.adams@us.ibm.com

An update of new features in GHI.

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Slicing a COS Pie

MITCHELL, Quinn [1]

[1] ORNL

Corresponding Author: mitchellqd@ornl.gov

How many COSs do you really need? Do you have too many or too few? Walk through a design and implementation with ORNL to slice the COS pie. Reduce the metadata foot print and maximize metadata performance, at the same time simplify COS administration. A COS design for the HPSS of today leveraging tape aggregation and RAIT. Considering limits and capabilities of T10KD, NetApp and DDN 12K storage.

HPSS Presentation / 42

HPSS Development - 7.5.1 Features and Roadmap [Restricted]

Mr. MESEKE, Michael [1]

[1] IBM

Corresponding Author: michael.meseke@us.ibm.com

Overview of features and issues within the upcoming major HPSS 7.5.1 release, plus information about upcoming releases.

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HUF Burning Issues

PROCKNOW, Jonathan [1]

[1] IBM

Corresponding Author: procknow@us.ibm.com

Provide information about the HUF Burning Issues process. Update the community on the status of new and existing Burning Issues.

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Investing in the Future of Tape Technology

Mr. FAULHABER, Peter [1]

[1] FUJIFILM Recording Media U.S.A., Inc.

Corresponding Author: rgadomski@fujifilm.com

This presentation will be presented by Peter Faulhaber, president of FUJIFILM Recording Media U.S.A., Inc. The presentation will focus on the dynamic state of the tape industry and why tape remains competitive today. Mr. Faulhaber will also take a deeper look at the investments being made at the nano-particle and coating level that are enabling impressive areal density gains now and well into the future. As a result, tape technology will continue to be the most reliable and cost effective solution for long term data preservation.

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ALCF Storage Upgrade for Hands-off Data Management

LIU, Anping [1]; O'CONNELL, Jack [1]

[1] Argonne National Laboratory

Corresponding Author: aliu@alcf.anl.gov

The Argonne Leadership Computing Facility (ALCF), a DOE Office of Science user facility, has currently two system upgrade projects in proceeding aimed at reducing the amount of time users have to spend managing the massive amounts of data produced by its supercomputers.

One plan is to insert an extremely large and extremely fast cache between the compute system and storage system. The files in cache are synchronized automatically to the storage system by the active file management software.

The other plan is to add the GPFS and HPSS Interface (GHI) to our storage system. GHI enables data to be moved easily between the tape and disk storage systems. Both AFM and GHI utilize the GPFS ILM features, namely, policy driven.

The goal of our storage upgrade is hands-off data management, Ideally, once the new systems are complete, our users won’t have to manage their disk space quotas, they won’t have to worry about copying data, and they won’t have to worry about putting data into tape storage.

This will allow our users to focus more of their time on science.

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Lessons Learned from Running an HPSS Globus Endpoint

GERHARDT, Lisa [1]; PORTER, Jeff [1]; BALTHASER, Nicholas [1]

[1] LBNL/NERSC

Corresponding Author: nabalthaser@lbl.gov

The NERSC division of LBNL has been running HPSS in production since 1998. The archive is quite popular with roughly 100TB IO every day from the ~6000 scientists that use the NERSC facility. We maintain a Globus-HPSS endpoint that transfers over 1PB / month of data into and out of HPSS. Getting Globus and HPSS to mesh well can be challenging. This talk gives an overview of some of the lessons learned.

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SwiftOnHPSS Evaluation

Mr. BARTZ, Christopher [1]

[1] Deutsches Klimarechenzentrum GmbH

Corresponding Author: bartz@dkrz.de

SwiftOnHPSS allows migration and retrieval of objects in OpenStack Swift to and from HPSS. First glance experiences from tests with a development version of SwiftOnHPSS will be presented. We evaluate use-cases and show the benefits of this solution.

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HLRS Data Management Evolution

Mr. SCHEMBERA, Björn [1]

[1] HLRS

Corresponding Author: schembera@hlrs.de

The High Performance Computing Center Stuttgart (HLRS) is one of the three national German computing centers and has a focus on engineering applications as well as on Global System Science. At HLRS, for each project running on the main CRAY XC40 "Hazel Hen" system, typically some 10^6 files are created, resulting in multiple terabyte of data produced per project. Since data growth on HPC system strongly depends on the amount of main memory of a supercomputer, we see a trend of exponential data growth in the HPSS.
To cope with this trend, the HPSS at HLRS has undergone an infrastructural upgrade in late 2014. Technologies such as LustreHSM are evaluated for production use.
Moreover, with bwDataArchiv a project with KIT/Karlsruhe was set up to form a federal long-term archiving infrastructure. Soon expiring projects will be required to transfer their research data to this archive. Workflows have been developed and first data has been already written from HLRS resources (Lustre, HPSS) to KIT (HPSS).

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When a Computer Hall Starts to Crack at the Seams

Mr. DEQUENNE, Francis [1]

[1] ECMWF

Corresponding Author: francis.dequenne@ecmwf.int

For over 40 years, ECMWF has been running super computers and large data handling on the same site.
Today, the limitations of that site have been reached, and a relocation of the systems is expected to take place by the end of the decade.
This present some interesting challenges when it comes to move over 1/2 exabyte of data.
This paper will present a few of the options considered, and point out some issues that may have to be addressed.

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Météo-France TS4500 and Jag5 with HPSS Feedback

REPESSE, Sylvain [1]

[1] Météo-France

Corresponding Author: sylvain.repesse@meteo.fr

Météo-France activities
HPSS-Storage Growth
Key features
Architecture evolution
HPSS Issues - Solutions
HPSS performances - library performances

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LANL Site Presentation: Present and Future HPSS Plans

Mr. WESTERMAN, Julius [1]

[1] Los Alamos National Lab

Corresponding Author: jdwesterman@lanl.gov

Will address LANL HPSS storage requirements and path forward to meet the storage needs for HPC Trinity system. Will discuss Sony Optical archival system, ZFS for HPSS, the design and implementation of the new data movement tool project.

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Automatic Configuration Management of Indiana University's HPSS Tape Storage

ANTOLOVIC, Danko [1]

[1] Indiana University

Corresponding Author: dantolov@iu.edu

Indiana University maintains a HPSS-based tape storage, with ca. 15 PB of usable capacity, replicated on the University's two main campuses. The installation on each campus consists of a robotic tape library and several classes of servers, implementing the HPSS system. It is a considerable administrative challenge to maintain coherent configurations across the classes of servers, as well as across the two geographically distant sites. This presentation describes the current effort to build an automatic configuration management system for IU's HPSS installation.

Configuration management software has been decided upon through an extensive process of evaluation and acceptance by the administrative personnel, and a two-tiered software architecture has been designed. First tier is based on the Cobbler package, which builds fully functional, customized servers from bare-metal hardware. Second tier is based on the Salt software, which maintains and modifies the configuration details. The challenge ahead lies in a robust, fail-safe implementation of configuration management across both sites of IU's HPSS installation.

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HPSS Software Testing

Mr. CARABALLO, Exel [1]

[1] IBM

Corresponding Author: ecarabal@us.ibm.com

Overview of the benefits of leveraging achieved test automation to increase test coverage and test cycle improvements. Insights into the application design concepts for the realization of test automation in HPSS are being presented.

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HPSS Statistics

Mr. SCHMIDT, Andreas [1]

[1] MPCDF - Max Planck Computing and Data Facility

Corresponding Author: andreas.schmidt@mpcdf.mpg.de

We present a toolbox to gather, analyse and display all sorts of HPSS statistical data, including:
- Total amount and progression of data within HPSS
- Development of data per COS / FileFamily
- Tapemounts (total, progression)
- Data written to tapes per day
- etc.

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Experience with HPSSFS-FUSE at KIT

VAN WEZEL, Jos [1]

[1] Karlsruhe Institute of Technology

Corresponding Author: jos.vanwezel@kit.edu

The Filesystem in Userspace (FUSE) and the HPSSFS-FUSE implementation presents the HPSS name space directly on the filesystem of the Linux node and subsequently allows all users and processes transparent, POSIX-like, access to data stored in HPSS.
Archives at KIT exclusively read and write through the FUSE interface and this model is seen as strategic solution for future archive data storage. In the presentation we show the current setup and future directions. We highlight several use cases, present some throughput tests and tweaks.

HPSS Presentation / 57

Partitioning (DB2) [Restricted]

Mr. BOOMER, David [1]

[1] IBM - HPSS

Corresponding Author: david.i.boomer@gmail.com

Review the latest updates regarding partitioned database use in HPSS 7.5.1 and discuss the "next steps" being considered.

HPSS Presentation / 58

QRep [Restricted]

Mr. BOOMER, David [1]

[1] IBM - HPSS

Corresponding Author: david.i.boomer@gmail.com

Discuss the new enhancements and the status of the conversion to HPSS 7.5.1.
The new enhancements are things that were added as a result of lessons learned at ECMWF as well as other conversion done over the last year.

HPSS Presentation / 59

IBM Advanced Technology Team HUF 2016 Update [Restricted]

GERRY, Jim [1]

[1] IBM

Corresponding Author: david.yu@bnl.gov

Discussing details and status of the HPSS object storage interface using OpenStack Swift

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Report on HPSS/GHI Site Migration to New KEKCC

Dr. MURAKAMI, Koichi [1]

[1] KEK

Corresponding Author: koichi.murakami@kek.jp

The KEK central computer system (KEKCC) supports various activities in KEK, such as the Belle / Belle II, J-PARC experiments, etc. The system is now under replacement and will be put into production in September 2016. The computing resources, CPU and storage in the next system are much enhanced as recent increase of computing resource demand. We will have 10,000 CPU cores, 13 PB disk storage, and 70 PB maximum capacity of tape system for the next 4 years. The HPSS / GHI system is the key component to realize high scalability of data management and high I/O throughput. We make continuous efforts on improving the HSM system in terms of system stability, scalability, usability, data integrity, monitoring etc. In this talk, we will report site status especially on the system migration to the new system and technical review for the new system.

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HPSS in Embedded Storage Systems at CEA

Mr. DELBARY, Gael [1]

[1] CEA

Corresponding Author: gael.delbary@cea.fr

CEA deployed a new high performance storage architecture based on embedded storage systems, for running Lustre filesystems and HPSS. The goal of this architecture is to increase the performance of these systems, but also to minimize system downtimes, and make administration and hardware maintenance easier.
This topic will describe CEA storage system architecture, then it will focus on the HPSS system, and provide performance charts. It will conclude with a feedback about embedded storage, summarizing its pros and cons.

HPSS Presentation / 63

Beyond 7.5.1: Upcoming Planned Features [Restricted]

Mr. MESEKE, Michael [1]

[1] IBM

Corresponding Author: michael.meseke@us.ibm.com

A discussion and overview of upcoming HPSS features.

HPSS Presentation / 64

Feature Deep Dive [Restricted]

Mr. MESEKE, Michael [1]

[1] IBM

Corresponding Author: david.yu@bnl.gov

Detailed use case / operation impact discussion of each of the major 7.5.1 features: E2EDI / TOR / etc with examples.

HPSS Presentation / 65

HPSS LBP Verify Tool [Restricted]

THEALL, Michael [1]

[1] IBM

Corresponding Author: david.yu@bnl.gov

Discussing continous verification of LBP-enabled media and its integration with HPSS.

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TBD

Sponsor Presentation / 68

Oracle StorageTek Presentation

Dr. ALSTRIN, April [1]

[1] Oracle

Corresponding Author: kevin.horn@oracle.com

In this session, we will share real-world experiences using two recent innovations from Oracle: StorageTek Direct Copy for efficient tape data migration and Oracle Archive Cloud for use as a long term, low cost HPC archive storage tier. Looking towards the future, we will conclude the session with an interactive discussion on the topic of ethernet-based tape drive connectivity and the potential implications for HPSS infrastructures.

Sponsor Presentation / 69

Managing Extreme Data Growth

STARR, Matt [1]

[1] Spectra Logic

Corresponding Author: megans@spectralogic.com

During this session Matt Starr, CTO, Spectra Logic will review recent company and product updates – including the newly released Exascale Edition TFinity; current disk and tape market trends; as well as Spectra customer support updates from the field.

HPSS Presentation / 70

Distinguished Engineer

Mr. KARP, Jim [1]

[1] IBM

Corresponding Author: karp@us.ibm.com

Tape technology trends, roadmaps, implications for users

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Latest Innovations from HPE Object Storage and Tape offerings for Medium to Cold Tiers of Storages

Mr. VICK, Will [1]

[1] Hewlett Packard Enterprise

Corresponding Author: walshak@hpe.com

Join this session to learn the latest Hewlett Packard Enterprise innovations around medium to cold tier storage using Object storage solutions and the latest LTO7 tape products to deliver the best $/GB in any scenario.

Sponsor Presentation / 72

Cognitive Platforms And HPSS: Meet The Next Generation Data Center

Mr. CERF, David [1]

[1] FUJIFILM Recording Media U.S.A., Inc.

Corresponding Author: dcerf@strongboxdata.com

GPFS and HPSS have been the workhorses of traditional data center hierarchical storage management. But is it still what we need? With new file systems and object storage systems coming into greater use within data centers, does this strategy enable – or block – innovation? Can you be sure that it will work in a hybrid cloud data center that combines systems of interaction, systems of engagement, systems of insight AND systems of record, as well as cloud services? The long term retention of archival data requires a careful consideration of technology tenure and/or propensity for obsolescence. Needed is a unified and cognitive data management solution that can scale and expand to provide a variety of data management services leveraging any hardware and any service delivery model. This session will discuss options to support new workloads, new data types, new protection and preservation requirements, and how to support new technology as they appear on your horizon.

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HSI/HTAR Discussion

Corresponding Author: jpnoe@sandia.gov