

Practical Experiences Summary

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Today's Running HENP Experiments

are continuing to successfully using commodity Clusters

are steadily expanding both Computer Center and Remote Clusters

are moving to replicated Clusters connected through the WAN

and starting to prototype using GRID technologies

BaBar Computing - Stephen Gowdy (SLAC)

CDF for Run II - Frank Wuerthwein (FNAL)

D0 and SAM for Run II - Lee Lueking (FNAL)

Computing Centers are Running Clusters for Shared Usage by Multiple Applications Groups

Building a Computer Centre - Tony Cass (CERN)

Tier 1A Storage Procurement - John Gordon (RAL)

Managing a mature white box cluster at CERN - Tim Smith (CERN)

**University Multidisciplinary Scientific Computing: Experience and Plans
- Alan Tackett (Vanderbilt University)**

**The GridKa Installation for HEP Computing - Dr. Holger Marten (Forschungszentrum
Karlsruhe)**

RHIC Computing Facility - Shigeki Misawa (BNL)

FNAL Computer Centre - Don Petravick (FNAL)

Data Challenges and Fabric Architecture - Bernd Panzer Steindel (CERN)

Distributed/Grid Deployment Status and Experiences are coming in

European DataGrid Testbed Experience - Markus Schulz (CERN)

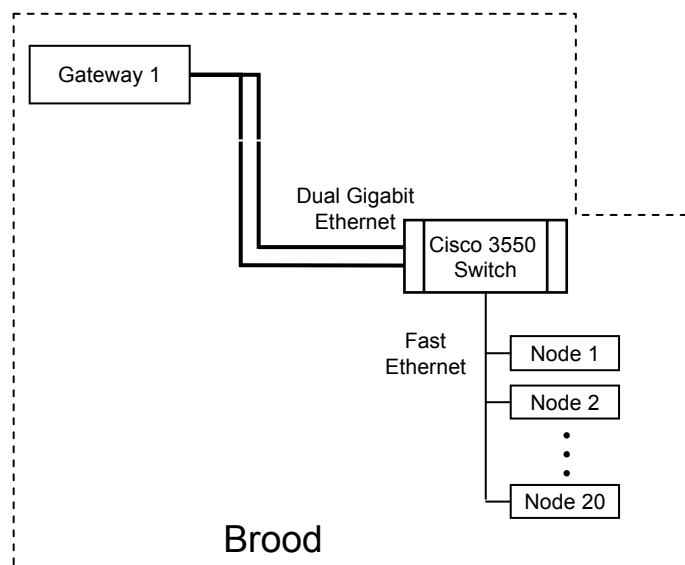
A Pre-Production Update on the NSF TeraGrid - Remy Evard (ANL)

European DataGrid Fabric Management - Olof Barring (CERN)

Basic Model and Use of Clusters has not changed significantly since last meeting

- **Head or Gateway node providing connectivity and cluster wide services**

Brood Vanderbuilt Vampire Fundamental Building Block



•Brood Configuration

- Gateway
- Switch
- 20 or more compute nodes

•Gateway responsible for

- Health monitoring
- Updates and Installs
- Compute Nodes DHCP service
- Exporting of /usr/local to nodes

•Brood Flexibility

- Complete Mini-Cluster
- Can be segregated from the main cluster for users specialized needs.
 - Testing special hardware, kernels, different OS's, apps
- Easily reintegrated with larger cluster using SystemImager

Summary of Experiences

Steady Scaling rather than “Factors of 10s” are occurring in terms of

- **Number of CPUS**
- **Amount of disk space**
- **Loosely coupled (sub)-clusters operating as an application cluster over the WAN.**

Much attention to by requirements of increasing numbers of systems and clusters:

- **Management, configuration etc**
- **Automation projects underway to reduce manpower**
- **Worth putting in effort put into performance and tuning.**
- **Production qualities are important and affecting choice of technology**

Applications expecting Grid infrastructure software that can be relied on and not “R&D depending on R&D”

- **Define Aggregate architecture of loosely coupled clusters (Grid)**
- **Encourage service definitions and protocols to spur multiple implementations.**

Include the Desktop in the Cluster (Grid)

- **Is a goal of several experiments but not too much application experience in practice reported yet - or was this because the name of the workshop?**
- **Wait to hear about success of “seti@home” approach at Cern..**

Practical Experience cont

Increase of dynamic sharing of clusters by multiple application groups brings challenges and continued work in

- **Dynamic Installation and Configuration of all layers of software**
- **Resource Management**
- **Monitoring**
- **The current trend to make multi-disciplinary (of various flavors) collaborations takes a long time to mature and make a productive development project.**

Need a coherent environment for applications across multiple sites:

- **Sites desire different configurations.**
- **Distributed administration.**

Commercial s/w still in a small minority.

No new “silver bullet” practices seem to be emerging - progress is made through hard work.

Computer Centre practical experiences range from the Physical Infrastructure to Disk Server load.

Power and Cooling - large clusters run hot

Serving through NFS does not scale but XFS has come to the rescue for large files and is being used in production.

Space for all the boxes.

Goal to increase automation to offset increasing load on system administrators.

Burn in of new hardware necessary.

Data Serving from Disk is a big issue and causing work

- **Need aggregate rates of Terabytes a day: ~100-300 Mbytes/sec reads and ~100Mbytes/sec writes.**
- **Disk caching used in front of the MSS for rate adapting and fault tolerance**

Ethernet needs tuning and congestion control.

..in Summary

This meeting has continued the tradition of concentrating on the technical - the real and the actual

All talks have been interesting and had insight to impart

Organization has been great - almost enough power outlets for all laptops

Thank you to Mark and Alan for organizing the Workshop