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Management of Grid Services in Production Grids Workshop

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Status of This Memo

This document provides a workshop summary as information to the Grid user community. It does not define any standards or technical recommendations. Distribution is unlimited.

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Abstract

This is the proceedings of the Management of Grid Services in Production Grids Workshop that was organized and hosted by the Production Grid Management Research Group (PGM-RG). It contains the abstracts of the talks accepted by the program committee and the presentations given at the workshop.

Contents

1 Introduction

The Production Grid Management Research Group (PGM-RG) brings together grid practitioners to discuss issues encountered in managing a grid and the hurdles, both technical and non-technical, to overcome in moving a grid to the persistent or production stage. The group also explores new paradigms in supporting and managing grids.

The goals of this workshop were to capture current activity of grids moving toward production status, the challenges encountered and resolved. This workshop allowed the PGM-RG to capture the state of Grid Management systems and procedures. Presentations were given by invited speakers, followed by an open discussion. Summaries of invited presentations and of the open discussion are included in this document, with web links to the actual presentations for further reading.

2 Summary of Invited Presentations

2.1 The UK Grid: Moving from Research to Production

Presenter: Steven Newhouse, London e-Science Centre, UK

The UK e-Science program has now established two key elements required to deliver a production quality e-research infrastructure within the UK: the OMII (Open Middleware Infrastructure Institute) with a remit to deliver a high-quality software infrastructure to support e-research, and the GOSC (Grid Operational Support Centre) to deploy a software environment that will deliver production quality e-research services to the UK community. The GOSC has direct responsibility for the delivery of the production quality National Grid Service (NGS) and the co-ordination of the Engineering Task Force (ETF).

This talk will describe the processes now being put in place within the UK to establish a production Grid infrastructure focused on the requirements of the applied user communities that will develop and expand as new stable middleware products becomes available.

Full Presentation:
https://forge.gridforum.org/projects/pgm-rg/document/UKGrid/en/1

2.2 TeraGrid Architecture: A Grid for Users

Presenter: Charlie Catlett, University of Chicago and Argonne National Laboratory, USA

The TeraGrid is a national-scale Grid deployment project funded by the US National Science Foundation. Eleven institutions provide computational, storage, information (database/collection), instruments, and visualization services integrated using Grid technologies and extensive shared process and coordination. The participating sites include University of Chicago, Argonne National Laboratory, Caltech, SDSC, NCSA, PSC, University of Texas TACC, Purdue University, Indiana University, ORNL and Georgia Tech.

This talk focuses on two aspects of TeraGrid. The first is the Common TeraGrid Services and Software (CTSS) architecture, which provides the user with a consistent application development and runtime environment on all TeraGrid resources. CTSS includes both core Grid services (provided by the Globus Toolkit, Condor, etc.) and user environment (libraries, compilers, tools), coordinated such that a user can "Learn Once: Run Anywhere." In other words, once a user has developed an application on a TeraGrid platform that application will run on any TeraGrid platform (recompiling to account for different microprocessors).

The second is validation and verification. Given the autonomous and heterogeneous nature of each participating site, it is critical to supplement this with testing, verification, and monitoring at each site to verify installation and compliance to policies, e.g., all necessary packages are installed; updates and patches are deployed on schedule, etc. It is also critical that data be accessible in a format appropriate to various target groups from system operators, who will be monitoring the system, to users, who may want to troubleshoot problems specific to their application. The Inca Test Harness and Reporting Framework (or Inca for short, http://tech.teragrid.org/inca/) provides a flexible framework for automated testing, verification, and monitoring of the TeraGrid Hosting Environment.

Full presentation:
https://forge.gridforum.org/projects/pgm-rg/document/TeraGrid/en/1

2.3 Grids in Asia Pacific: what has been done? And what hasn't?

Presenter: Yoshio Tanaka, Grid Technology Research Center, AIST, Japan

Resource sharing beyond boundaries based on Grid technology is definitely attractive for building a next generation IT infrastructure in Asia Pacific. ApGrid is a partnership for Grid computing in the Asia Pacific region. One of the most important objectives of ApGrid is building an international Grid testbed called the ApGrid Testbed. ApGrid is not a single-source funded project and the ApGrid Testbed is based on contributions, i.e. participating organizations each provide computing resources to the ApGrid Testbed. This talk introduces an overview of the technical aspects, operational policy, and development guidelines for the ApGrid Testbed as well as lessons learned from the testbed development. The ApGrid Testbed is based on standard Grid infrastructure. Security services on the ApGrid Testbed are based on GSI and information services are provided through a hierarchical MDS tree. As of the end of May, 2004, 1674 processors over 27 cluster systems from 10 countries are available on the ApGrid Testbed. We faced some difficulties in constructing the ApGrid Testbed. The difficulties came from sociological problems rather than technical problems.

Full presentation:
https://forge.gridforum.org/projects/pgm-rg/document/PGM-WS-ApGrid/en/1

2.4 Grid3 Experiences and thoughts on Federation

Presenter: Robert Gardner, University of Chicago

We discuss experiences and lessons learnt from the Grid2003 project from the point of view of application metrics and lessons learned. We also discuss general issues of federating grid resources for application frameworks.

Full presentation:
https://forge.gridforum.org/projects/pgm-rg/document/Grid3/en/1

2.5 Challenges of Moving IPG into Production

Presenter: Cathy Schulbach, NASA Ames Research Center

Over the past 5-6 years, NASA has been developing the Information Power Grid and has a persistent testbed currently based on GT2.4.2. This presentation will begin with an overview of IPG status and services, discuss key milestones in IPG development, and present early as well as expected applications. The presentation will discuss some of the issues encountered in developing a grid including the tension between providing centralized and distributed computing. These issues also affect how the grid is moved into production. Finally, the presentation will provide current plans for moving IPG into full production, including gaining broad user input, developing acceptance criteria from the production operations group, planning upgrades, and training users.

Full presentation:
https://forge.gridforum.org/projects/pgm-rg/document/NASA_IPG/en/1

3 Discussion Comments from the Open Mic Session

(Successful) production Grid has problems and/or deals with presenting some level of "monolithic" or "single system image" view to the end users. This is not to say that the users do not see distributed/distinct resources, but the base software installation/versions, tool interface and operations, etc. will be largely identical across sites.

On related terms, attempting to maintain this single image takes a lot of tools and subject to automated administration with tools support. TeraGrid does this to some extent but as was evident in the presentation, having all the tools working across (only) 9 sites still seems difficult, not to mention the difficulties that ApGrid has despite extensive work by participants.

It is interesting to note the philosophy in providing users with either multiplicity of tools for a single function, or related to above provide a relatively narrow but well maintained set of tools. For example, TeraGrid, ApGrid standardizes on basic tools, while Grid3 seems to have multiplicity of tools in areas such as monitoring. Each approach has its reasons and associated pros and cons.

Much of the discussion part of the meeting centered on how easy/difficult it is to use production grids, and whether difficulties present in today's grids will in some fashion diminish the overall viability of grids or their adoption by the scientific community. The point was made that much work is being done in
the physics community to create systems for distributed analysis, which typically involve many more users than the current applications being run, and which have more complex usage patterns.

We did not spend much time on robustness, hardening, and debugging of applications which use distributed services, but much work is clearly needed in this area. One approach, such as TeraGrid is taking, it to establish standards for uniform user environments, and to relieve the users from debugging the grid. Leading up to this ideal, if it is possible, would be that grid user environments come with additional (user) toolkits that allow better debugging of applications. Along these lines, there needs to be more work on grid user programming environments such as grid shells and more powerful distributed application frameworks.

General discussion. These are listed as offered:
Some believed the time has come for production grids, others disagreed.
What will it take?

- Useable for the masses before funding will be available
  - Easy to use (transparent as possible)
  - Many users want to add a few parameters and click ‘do’
- Good user support is critical
  - Documentation
  - Problem resolution
- Grids should first concentrate on current users
- Keep it as simple as possible (for both users and staff)
- Operation cost more than the research
  - So why are more people not here to discuss these issues!
- Are Grid Services really needed?
  - Yes, they will offer much more than we have today
  - But applications will require a lot of modifications
- Grids are here to stay; do not want to go back to the old perl scripts

4 Security Considerations

This informational document does not cover security issues, nor did the presentations or discussions cover security in any detail.

5 Author Information

The workshop was organized by the Program Committee of the PGM-RG:

- Judith Utley, NASA Ames Research Center, USA
- Laura McGinnis, Pittsburg Supercomputer Center

- Steven Newhouse, London e-Science Centre, UK
- Doug Olson, Lawrence Berkeley Laboratory, USA
- David Wallom, Bristol e-Science Centre, UK

The authors of the individual presentations can be reached according to the information provided in the respective presentations.

6 Program Committee

The following individuals organized this workshop:

- Judith Utley, NASA Ames Research Center, USA, (PGM-RG co-chair, utley@nas.nasa.gov
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