Workshop on Grid Applications and Programming Tools
Held in conjunction with GGF8, June 25 2003, Seattle, USA
Proceedings

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1. Abstract

This is the proceedings of the Workshop on Grid Applications and Programming Tools that has been organized jointly by the Applications and Testbeds Research Group (APPS-RG) and the User Program Development Tools Research Group (UPDT-RG) of the GGF. It contains the papers that have been presented based on the acceptance decisions made by the programme committee.

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2. Foreword

The Applications and Testbeds Research Group (APPS-RG) seeks to facilitate the use of Grid technology by application developers, and to attract new application domains to the Grid. The User Program Development Tools for the Grid Research Group (UPDT-RG) seeks to simplify the process of programming on the Grid by facilitating the development and deployment of Grid-enabled tools such as debuggers and performance tuning tools. Recent experience shows that Grid users run their applications using various kinds of additional (and frequently tailor-made) tools, ranging from simple wrappers around Globus commands up to web-based application portals.

The goals of this workshop were

- to provide a forum for (prospective) applications utilizing Grids and to disseminate "lessons learned" from Grid-enabling application codes
- to spread information about tools, toolkits and other instruments for users and application programmers
- to encourage users and application programmers to make use of existing Grid infrastructure

We were looking for presentations on the workshop's subject. Suggested topics for talks were the following:

1. Experience in converting an existing application to run on the Grid
2. Experience in designing a new application to run on the Grid
3. Experience in using a Grid-enabled application
4. Experience in using or creating tools that support the development or use of Grid applications
5. Thoughts on what the Grid should provide to effectively support applications
6. Thoughts and/or experience on the characteristics of applications or particular application software that make them well suited for the Grid, or make them ill-suited to run on the Grid.

Despite the short time frame that was available to announce the workshop, the response on submitted papers was very positive. From the submissions, the programme committee selected the 11 papers included in this report. The organizers were very pleased by the interesting presentations and the discussions they spawned off. Extended versions of the strongest papers have appeared in a special issue of the *Journal of Grid Computing* on *Grid Applications and Programming Tools*, published as Volume 1, Issue 2, 2003*.*

In general, the submissions fell in two categories. A smaller group describes experiences with Grid-enabling applications and with extending the accessibility of data repositories using Grid technologies. However, the larger group describes experiences with creating and using tools for Grid application development. All papers describe some software development by the author groups. This is likely the reason why the evaluation of the presented approaches was quite positive. Things that did not work might be extracted from the papers only indirectly, by trying to identify holes in the presented functionality. Unfortunately, none of the author teams dared to present their thoughts on what kind of features the Grid should provide to applications.

However, the submitted papers seem to reflect the status quo in Grid application development and deployment. It appears to be common that developer teams consist of many Grid experts, who know what to expect from Grids -- and thus do not spell out unbiased expectations. Furthermore, these experts develop their own suites of tools and environments, basically circumventing the weaknesses of existing Grid middleware. Seemingly, we are still far away from domain experts developing or at least Grid-enabling their applications.

3. Workshop Organizers

The workshop has been organized by the chair persons of the two GGF research groups which were involved (APPS-RG and UPDT-RG):

- Thomas Hinke, NASA Ames, USA, *Thomas.H.Hinke@nasa.gov*
- Thilo Kielmann, Vrije Universiteit, The Netherlands, *kielmann@cs.vu.nl*
- Ed Seidel, AEI – MPG, Germany, and LSU, USA, *eseidel@cct.lsu.edu*
- Susanne Balle, HP, USA, *susanne.balle@hp.com*
- Robert T. Hood, NASA Ames, USA, *rhood@nas.nasa.gov*

4. Programme Committee

The workshop organizers would like to thank the GGF staff for doing a great job in organizing the logistics for GGF meetings. Besides, a successful meeting can only be organized by carefully selecting a strong and interesting programme. The following people kindly agreed to review the submitted papers:

Gabrielle Allen   (AEI - MPG)
Susanne Balle   (HP)
Simon J. Cox   (University of Southampton)
Thomas Hinke   (NASA Ames)
Robert T. Hood (NASA Ames)
Shantenu Jha   (University College London)
Thilo Kielmann (Vrije Universiteit)
Andre Merzky   (Zuse Institute Berlin)
Matthias Müller (HLRS Stuttgart)
Ed Seidel   (AEI - MPG)
Yoshio Tanaka (AIST)

5. List of Workshop Papers

- *Development of Grid Applications on Standard Grid Middleware.* H.Takemiya, K. Shudo, Y. Tanaka, S. Sekiguchi (AIST, Japan), pages 7-17.

- *Multivariate Minimization Using Grid Computing.* K. Kulish, J. Perez, P. Smith (Texas Tech University), pages 18-27.

- *GridSuperscalar: a programming paradigm for Grid applications.* R.M. Badia, J. Labarta, R. Sirvent, J.M. Cela, R. Grima (CEPBA, Spain), pages 28-39.

- *MPI Development Tools and Applications for the Grid.* R. Keller, B. Krammer, M.S. Müller, M.M. Resch, E. Gabriel (HLRS, Stuttgart and UT, Knoxville), pages 40-51.

- *Dimemas: Predicting MPI applications behavior in Grid environments.* R.M. Badia, J. Labarta, J. Gimémez, F. Escalé (CEPBA, Spain), pages 52-62.

- *The Integration of Grid Technology with OGC Web Services.* L. Di, A. Chen, W. Yang, P. Zhao (George Mason University), pages 63-72.

- *Enhanced Product Generation at NASA Data Centers Through Grid Technology.* B.R. Barkstrom, T.H. Hinke, S. Gavali, W.J. Seufzer (NASA Ames and NASA Langley Research Centers), pages 73-82.

- *NASA-XDB-IPG: Extensible Database - Information Grid.* D.A. Maluf, D.G. Bell, C. Knight, P. Tran, T. La, J. Lin, B. McDermott, B. Pell (NASA Ames Research Center), pages 83-94.

- *Metacomputing support by P-Grade.* P. Kacsuk, G. Dózsa, J. Kovács, R. Lovas, N. Podhorszki (MTA SZTAKI, Hungary), pages 95-110.

- *Design and Implementation of the Web-based Grid-computing Framework GridGate.* K. Kyung-woo, K. Yun-hee, K. Do-hyun, C. Kwang-moon, K. Sang-whan (Cheonan University, Korea), pages 111-118.

- *Grid Enabling Applications Using Triana.* I. Taylor, M. Shields, I. Wang, R. Philp (Cardiff University), pages 119-129.

6.   Author Information

The bulk of this document consists of the individual, contributed papers. Their authors can be reached according to the information given in the respective papers. The overall volume has been edited by:

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7.   Security Considerations

There may be security issues related to the individual solutions presented at the workshop. These need to be considered on a per-paper basis.

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10. Appendix: Papers contributed to the Workshop

The remainder of this document consists of the papers that had been accepted for presentation at the workshop.