Towards Next Generation Grids

Proceedings of the CoreGRID Symposium 2007

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Foreword

The symposium was organised by the Network of Excellence CoreGRID funded by the European Commission under the sixth Framework Programme IST-2003-2.3.2.8 starting September 1st, 2004 for a duration of four years. CoreGRID aims at strengthening and advancing scientific and technological excellence in the area of Grid and Peer-to-Peer technologies. To achieve this objective, the network brings together a critical mass of well-established researchers (155 permanent researchers and 168 PhD students) from forty one institutions who have constructed an ambitious joint programme of activities.

The final programme has been organized into eight sessions (parallel sessions are denoted by letters A and B):

1.A. Service Level Agreement and Quality of Service
1.B. Trust, Security and Virtual Organization
2.A. Programming with Software Components
2.B. Communication and Networking
3.A. Job, Information and Resource Management
3.B. Programming Methodology
4.A. Workflow Management
4.B. Data Management

The *Service Level Agreement and Quality of Service* session presents the NextGRID architectural principles and components to support a SLA framework and service construction and composition (Snelling, Anjomshoaa); the NextGRID approach is further developed in (Tserpes, Kyriazis, Menychtas, Varvarigou, Silvestri, Laforenza) through a design pattern for SLA monitoring and evaluating in business applications. Moreover, this session contains a solution to the virtual domain sharing based on usage SLA (Dumitrescu, Iosup, Sonmez, Mohamed, Epema), and an optimal algorithm for the replica-management optimization problem taking into account of QoS and bandwidth constraints (Rehn).

In the *Trust, Security and Virtual Organization* session, two papers are derived from the XtreemOS project: in (Yang) the XtreemOS vision of native VO support and management, as well as a preliminary security architecture, is

presented; in (Lakhani) the security support is analyzed and evaluated using the attacker tree methodology. Moreover, (Arenas, Silaghi, Silva) present a reputation model tailored to service-oriented architectures through the exploitation of monitoring supports. The approach based on dedicated hardware virtual machines for service deployment is investigated in (Kuba, Kouril, Prochazka).

Programming issues are discussed in three distinct sections on Components, Methodology, and Workflow, respectively.

- In the *Programming with Software Components* session, the paper by (Malawski, Bubak, Buade, Caromel, Henrio, Morel) deals with the problem of interoperability of component models through a case study centered on CCA and the Fractal-based GCM model. (Schmidt, Benker, Lucka) propose a framework based upon CCA layered in top of Web services and the Vienna Grid Environment. The problem of dynamic adaptability of component-based applications is studied in (André, Bouziane, Buisson, Pazat, Perez) with reference to the master-worker model of computation.

- In the *Programming Methodology* session, three issues are investigated: an approach to the evaluation and refinement of Grid applications through a formal specification in Orc exploting domain knowledge information (Danelutto, Kilpatrick, Aldinucci); a generic framework for the analysis and performance evaluation of legacy application migration (Enaganti, Damodaran, Chakrabarti); and the study of trade-offs between different code tranfer techniques, namely WS-GRAM and a higher order component approach, in a bioinformatics case (Dumitrescu, Duennweber, Luedeking, Gorlatch, Raicu, Foster).

- In the *Workflow Management session*, (Qin, Wieczorek, Fahringer) present a light-weight workflow engine based on just-in-time scheduling, automatically generated performance predictions and task prioritization. The support of specific computation models at the workflow level is studied in (Kacsuk, Farkas, Sipos, Hermann, Kiss) with reference to master-worker applications in the context of the P-GRADE portal, and in (Villazon, Junaid, Siddiqui, Fahringer) with reference to a set of patterns for porting applications on the grid.

In the session *Job, Information and Resource Management*, the paper by (Xing, Corcho, Goble, Dikaiakos) discusses an evaluation framework for information services in the context of EGEE infrastructures. An approach to a Grid architecture based on a set of independent and composable tools for middleware, brokering and submission is presented in (Elmroth, Gardfjäll, Norberg, Tordsson, Ostgerg). Monitoring job status and resource usage, according to a user-oriented and interactive approach, is described in (Mueller, Nuemann,

William). Finally, in (Ziegler, Eickermann, Kirtchakova, Wäldrick, Barz, Pilz) an integrated network and resource management system is presented based on the unifying concept of Bandwidth on Demand.

The session *Data Management* contains two contributions: (Dickens) studies the integration of a real-time classification mechanism into an high-performance data-transfer system, exploiting packet patterns and statistics; (Alonso Lopez, Torres, L. Silva, P.F: Silva) present a software rejuvenation scheme to improve the availability of Grid services and apply it to OGSA-DAI server crashes.

The session *Communication and Networking* contains contributions on the application and specialization of communication techniques to grid architectures. (Steffenel, Jeannot) study a two-phase implementation and performance model of the all-to-all mechanism in a context characterized by high congestion of network resources. (Agapi, Kielmann, Bal) address the scalability problem of routing packets on multiple, router-disjoint paths in the Internet using large-scale overlay networks, proposing and evaluating a synthetic coordinates-based approach. (Moser, Haridi) investigate atomic commitment in a transactional database on top of a DHT, aiming to reduce the number of communication rounds and metadata amount and to achieve dynamic adaptability.

The Programme Committee who made the selection of papers included:

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Rennes, France, August 2007

Dr. Thierry Priol and Prof. Marco Vanneschi (Symposium Chairs)

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