Javier Delgado

CONTACT INFORMATION

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RESEARCH INTERESTS

Job Scheduling, Performance Analysis and Modeling, Cloud Computing, Scientific Computing, Medical Image Processing

EDUCATION

Florida International University, Miami, FL, USA

- B.S., Computer Engineering (graduation date: Dec. 2004)
- M.S., Computer Engineering (graduation date: Apr. 2007)
  - Thesis: A Grid Computing Network Platform for Enhanced Data Management and Visualization
  - Adviser: Dr. Malek Adjouadi
- Ph.D., Electrical Engineering (graduation date: May 2012)
  - Dissertation: Scheduling Medical Application Workloads On Virtualized Computing Systems
  - Advisers:
    - Dr. Malek Adjouadi, major professor
    - Dr. S. Masoud Sadjadi, co-major professor
  - GPA: 3.98 / 4.00

DISSERATION SUMMARY

My goal was to show that the fine-grained CPU allocation afforded by virtualization technology can be used to improve throughput of jobs in deadline-driven batch processing environments (e.g. in the cloud). As a case study, we used computationally-intensive medical image processing workloads. Using real executions with synthetic deadlines, we saw an improvement of around 30% in terms of system utilization compared to using first-come, first-served scheduling with reservations.

AWARDS

Partnerships for International Research Experience (PIRE)
- 2010. Best international research student poster award

Global Cyberbridges Award
- 2007. Curriculum completion
- 2008. Enhancement of collaboration through cyberinfrastructure
- 2009. GPU performance analysis for weather forecasting software

2004 IEEE SECON Website Competition
- Second Place

AIC (Association of Cuban Engineers) Scholarship recipient
- 2002
- 2003

Academic Experience

Florida International University
Center for Advanced Technology and Education (CATE)

- Adviser: Dr. Malek Adjouadi
- Co-adviser: Dr. S. Masoud Sadjadi

Research Assistant **Jan. 2005 to present**

- Developed a deadline-driven job scheduling system for provisioning virtual machines for medical imaging applications
- Performed in-depth analysis of the effects of virtualization on different scientific applications
- Investigated methods for predicting the performance of applications on HPC resources
- Deployed and maintain a 16-node compute cluster and 15-tile mural display
- Implemented a system for sharing data among researchers and medical professionals using the Globus Toolkit
- Studied methods of enhancing collaboration between researchers and local hospitals

International Academic Experience

Polytechnic University of Catalunya (Spain)
Barcelona Supercomputing Center

- Adviser: Dr. Rosa Badia

Activities **May 2008 - July 2008**

- Deploying two performance analysis tools on the Marenostrum supercomputer
- Using the performance tuning tools developed at BSC to study the execution behavior of a weather forecasting application

Federal Fluminense University (Brazil)

- Adviser: Dr. Esteban Clua

Activities **August 2009 - September 2009**

- Porting a module of a weather forecasting application to the compute unified device architecture (CUDA)
- Analysis of execution behavior of CUDA-enabled code on different graphical processing units

Journal Publications

Javier Delgado, João Gazolla, Esteban Clua and S. Masoud Sadjadi, *A case study on porting scientific applications to GPU/CUDA*. Journal of Computational Interdisciplinary Sciences, v. 2, p. 3-11, 2011, pdn: jcis.2011.02.01.0027.

David Villegas, Norman Bobroff, Ivan Rodero, Javier Delgado, Yanbin Liu, Aditya Devarakonda, Liana Fong, S. Masoud Sadjadi, Manish Parashar, *Cloud federation in a layered service model*, Journal of Computer and System Sciences, Available online 5 January 2012, ISSN 0022-0000, 10.1016/j.jcss.2011.12.017.

Conference Publications

J. Delgado, M. R. Guillen, M. Lahlou, M. Adjouadi, *MIND: A Tiled Display Visualization System at CATE/FIU*, IASTED International Conference on Graphics and Visualization in Engineering (GVE 2007), Clearwater, Florida, USA. January 3-5, 2007. *(presented at conference)*

J. Delgado and M. Adjouadi. *Towards an Efficient and Extensible Grid-Based Data Storage Solution.* The IEEE 22nd International Conference on Advanced Information Networking and Applications. pp. 659-666, Okinawa, Japan, Mar. 25-28, 2008.

S. M. Sadjadi, S. Shimizu, J. Figueroa, R. Rangaswami, J. Delgado, H. Duran and X. Collazo, *A Modeling Approach for Estimating Execution Time of Long-Running Sci-*

entific Applications. Fifth High-Performance Grid Computing Workshop at the 2008 IEEE International Parallel and Distributed Processing Symposium (IPDPS), pp. 1-8, Miami, FL, Apr. 14, 2008.

S. Masoud Sadjadi, et. al. *Transparent Grid Enablement of Weather Research and Forecasting*. The 15th Mardi Gras Conference. Jan. 30 - Feb. 2, 2008. Baton Rouge, Louisiana, USA.

J. Delgado and M. Adjouadi. *On the Efficacy of Present Grid Computing Software for Deploying a Medical Grid*, 2009 Richard Tapia Celebration of Diversity in Computing, pp. 81-86, Portland, Oregon, Apr. 1-4, 2009. *(presented at conference)*

J. Delgado, M. Joselli, S. Stanzani, S. M. Sadjadi, E. Clua, and H. Alvarez. *A learning and collaboration platform based on SAGE*. In Proceedings of the 14th Western Canadian Conference on Computing Education (WCCCE 2010), Simon Fraser University, Vancouver, Canada, May 2009.

J. Gazolla, J. Delgado, E. Clua, and S. M. Sadjadi. *An incremental approach to porting complex scientific applications to GPU/CUDA*. In Proceedings of the IV Brazilian e-Science Workshop, Minas Gerais, Brazil, July 2010.

J. Delgado, S. M. Sadjadi, H. Duran, M. Bright, and M. Adjouadi. *Performance prediction of weather forecasting software on multicore systems*. In Proceedings of the 24th IEEE International Parallel & Distributed Processing Symposium (IPDPS-2010), 11th Parallel and Distributed Scientific and Engineering Computing (PDSEC) workshop, Atlanta, Georgia, April 2010. *(presented at conference)*

N. Bobroff, Y. Liu, L. Fong, S. Seelam, J. Delgado. *New Metrics for Scheduling Jobs on a Cluster of Virtual Machines*. In Proceedings of the 25th IEEE International Parallel & Distributed Processing Symposium (IPDPS-2011), The Seventh International Workshop on System Management Techniques, Processes, and Services (SMTPS), Anchorage, Alaska, May 2011. *(presented at conference)*

J. Delgado, A.S. Eddin, M. Adjouadi, and S. M. Sadjadi. *Paravirtualization for Scientific Computing: Performance Analysis and Prediction*. In Proceedings of the 2011 IEEE International Conference on High Performance Computing and Communications (HPCC '11), pp. 536-543, Banff, AB, Canada, 2011. *(presented at conference)*

J. Delgado, L. Fong, Y. Liu, N. Bobroff, S. Seelam, S. M. Sadjadi, *Efficiency Assessment of Parallel Workloads on Virtualized Resources*, In proc. 2011 Fourth IEEE International Conference on Utility and Cloud Computing, pp. 89-96, Melbourne, Australia, Dec. 2011. *(presented at conference)*

Poster Sessions

J. Delgado and M. Adjouadi. *A Novel Grid-based Data Storage Paradigm*. Poster and Extended Abstract. Presented at the 2nd CAHSI Workshop. December 15-18, 2007. Miami, Florida, USA.

J. Delgado, M. Bright, M. Sadjadi, R. Badia. *Application Profiling and Prediction in the Grid Environment*. Poster presented at the 2008 Latin American Grid Summit. Oct. 30, 2008. Boca Raton, FL.

J. Delgado, G. Gazolla, M. Sadjadi, M. Adjouadi, L. Fong, E. Clua. *Performance Prediction of Scientific Applications*. Poster presented at the 2009 Latin American Grid Summit. Oct. 20, 2009. Miami, FL.

J. Delgado and M. Adjouadi. *An Incremental Approach to Performance Prediction*. Poster presented at the 4th annual Computing Alliance for Hispanic Serving Institutions meeting. April 5, 2010. Redmond, WA.

J. Delgado, N. Bobroff, Y. Liu, L. Fong, S. M. Sadjadi, M. Adjouadi. *Implementation of a Simulator for Scheduling on Virtual Machines*. Poster presented at the 2010 Latin American Grid Summit. Oct. 20, 2010. Miami, FL.

J. Delgado and M. Adjouadi. *Assessing the Performance of Medical Image Segmentation on Virtualized Resources*. Poster presented at the 5th annual Computing Alliance for Hispanic Serving Institutions meeting. March 27-29, 2011. San Juan, Puerto Rico.

J. Delgado, L. Fong, Y. Liu, N. Bobroff, S. Seelam, S.M. Sadjadi, M. Adjouadi. *Efficiency assessment of Parallel workloads on Virtualized Resources*. Poster presented at the 2011 Latin American Grid Summit. Nov. 4, 2011. Boca Raton, FL.

Other Presentations

J. Delgado and Z. Juan. *How cyberinfrastructure is helping hurricane mitigation*. Presented at the 2008 Chinese American Networking Symposium (CANS 2008). Oct. 20 - 22. Indiana, USA.

J. Delgado. *A collaborative platform based on SAGE* and *GPU performance prediction*. 2009 GCB - Calit2 Summer Workshop. July 1, 2009. La Jolla, CA, USA.

J. Delgado and G. Gazolla. *How GPUs are improving numerical weather prediction*. Seminar held at the Federal Fluminense University. Rio de Janeiro, Brazil. Sep. 2, 2009.

J. Delgado. *Partnerships for International Research Experience*. Presentation given during the ACM/FIU High School Programming Contest Awards Ceremony. Miami, FL. March 19. 2011.

Related Work Experience

International Business Machines, T. J. Watson Research Center, Hawthorne, NY, USA
Research Intern **May 09 - Jun. 09, Apr. 10 - Jun. 10, May 11 - Aug. 11**

- Implemented a simulator for testing and comparing scheduling algorithms for HPC workloads on virtual machines
- Helped design and test additional algorithms for scheduling tightly coupled parallel jobs in virtualized environments.
- Performed performance analysis of weather forecasting software on POWER architecture.

International Business Machines, India Research Lab, New Delhi, India
Research Intern **Jul. 2010 - August 2010**

- Analyzed performance of a software routing platform on commodity workstations with the goal of determining bottlenecks, such that accelerators can be used for the corresponding sections of code
- Continued development of the simulator for job scheduling on virtual machines

FIU Center for Diversity in Engineering, Miami, Florida USA
Web Developer **Aug. 2003 to Aug. 2004**

- Increased public awareness of youth summer programs by implementing modern websites for each of five such programs.

Instructor **Jul. 2004 to Aug. 2004**

- Taught web design to high school and middle school students.
- Taught basic computer skills to elementary-level English-as-second-language (ESL) students

Undergraduate Advisees

- Marlon Bright January 2008 - December 2009
  Recently completed MS Degree at the University of Texas
- Javier Figueroa January 2008 - April 2008
  Currently with IBM

Paper Reviewing

- 2007: TPDS
- 2008: GPC, SEAMS
- 2009: GPC, CCGrid, ICAC, IEEE Cloud, HPCC, ICSOC-ServiceWave
- 2010: SEKE, ICAC, HPCC, ATC, ICSOC
- 2011: CCGrid, SEAMS, ICAC, IEEE Cloud, ICSOC, SEKE, HASE, SOSE, CGC
- 2012: CCGrid, SEKE, ICAC

Service

Webmaster, Association of Cuban-American Engineers (FIU Chapter)

- Designed entire website using Xhtml, CSS, and basic ASP
- Office held May 2003 to Jan. 2005

Treasurer, Society of Automotive Engineers (FIU Chapter)

- Office held May 2003 to June 2004

Technical Skills

Programming Languages: Java, Python, MATLAB, C, Unix Shell, CUDA
Web development: HTML, CSS, Java Servlets and JSP
Application Environments and Middleware: OpenNebula, Globus, Visual Studio, Unix Shell, Eclipse, netBeans, XCode
Operating Systems: Linux (including Xen), MS Windows, Apple OS X

Languages

English, Spanish, and some Portuguese