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Distinguished Speaker Series

Franck Cappello

*INRIA, University of Illinois at
Urbana-Champaign*

Redesigning Fault Tolerance for High Performance Computing

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4 - 5 PM CST

3405 Siebel Center

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Abstract

Fault tolerance is already a major concern for users of large-scale message passing HPC applications. Future HPC systems with their projected shorter MTBF will make this problem even more difficult to address. The current fault tolerance approach in HPC essentially relies on concepts defined 30 years ago for generic distributed systems. Several recent studies question its applicability to next generation HPC systems and applications and advocate for the exploration of novel, potentially disruptive fault tolerance techniques.

In this talk, we will analyze two important components of the fault tolerance design: the HPC applications and the HPC systems. We will show how we can conceive more efficient fault tolerance based on the fundamental characteristics of the HPC applications and the dynamic behaviors of the HPC systems. In particular we will present the notions of send-determinism, partial restart, hybrid fault tolerance protocols and processes clustering in HPC applications. We will also show how we can improve fault tolerance by exploring the mine of information generated dynamically by HPC systems about the state of their components.

Bio

Franck Cappello holds a Senior Researcher position at INRIA and a visiting research professor position at University of Illinois at Urbana Champaign. He is the co-director with Marc Snir of the INRIA-Illinois Joint-Laboratory on PetaScale Computing (<http://jointlab.ncsa.illinois.edu/>). He is member of the executive committee of IESP (International Exascale Software Project : <http://www.exascale.org>) and chair of the "system software ecosystem" for EESI (European Exascale Software Initiative). He has been involved in many Exascale preparation workshops. Before 2009, he led the Grid5000 project, a nationwide computer science platform for research in large scale distributed systems used by hundreds of researchers. He is editorial board member of the international Journal on Grid Computing, Journal of Grid and Utility Computing and Journal of Cluster Computing. He is a steering committee member of IEEE HPDC and IEEE/ACM CCGRID. He is the Program chair of HiPC 2010, Technical paper co-chair of SC2010, Program co-Chair of IEEE CCGRID'2009 and was the General Chair of IEEE HPDC'2006.



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