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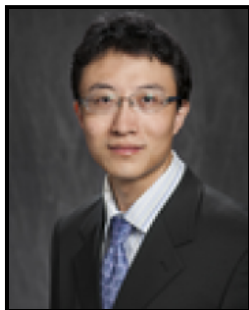
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Coast to Cosmos Lecture Series

Running Coastal Models on Cloud Platforms

Jian Tao, LSU

Digital Media Center 1034
May 06, 2016 - 12:00 pm

Abstract:

Compared to the quick adoption of cloud computing technology in industry, the academic community, and especially the computational science community as a whole, has been slow to make the move. For years, many researchers and engineers who didn't run large-scale applications regularly were inhibited by the effort needed to gain the specialized knowledge necessary to effectively use HPC resources for their research. The Coastal Model Repository (CMR) is targeting cloud and cloud-like architectures to enable quick deployment of coastal models and their working environments. CMR will serve as a community repository for precompiled open source models that are widely used by coastal researchers. CMR will also distribute containerized coastal models, which can run on any cloud-like architecture with negligible system overhead. The containerization of cloud-ready applications has become a viable solution given the rapid development of kernel-level virtualization technologies. With the help of CMR, a coastal researcher can start running state-of-the-art models on the latest cloud-ready computing systems in minutes. Workflow management tools, such as SIMULOCEAN, can take advantage of CMR to quickly deploy coastal models on academic and commercial cloud platforms while continuing their support on traditional HPC systems. This work is supported by NSF Award EPS-1010640, CCF-1539567 and in part by HPC computing resources at LSU and Extreme Science and Engineering Discovery Environment (XSEDE). We acknowledge the assistance and support of the Community Surface Dynamics Modeling System (CSDMS) Integration Facility and XSEDE Extended Collaborative Support Service (ECSS) program.

Speaker's Bio:

Jian Tao is an IT consultant at the Center for Computation & Technology at Louisiana State University. He received his Ph.D in computational astrophysics from Washington University in St. Louis. Before joining CCT as an IT consultant, he worked at CCT as a postdoc on the NSF XiRel project to build the next generation infrastructure for numerical relativity, and the NSF CyberTools project to develop the infrastructures needed for interdisciplinary research. He helped to manage the cyberinfrastructure development of the NSF Northern Gulf Coastal Hazards Collaboratory (NG-CHC) project at LSU where he led the development of SIMULOCEAN, a Service-Oriented Architecture (SOA) for deploying coastal models on High Performance Computing (HPC) systems. Jian Tao co-led the Technology for Extreme Scale Computing (TESC) team supported by the NSF Louisiana Alliance for Simulation-Guided Materials Applications (LA-SiGMA) project. He is also the PI of an ongoing NSF BIGDATA (SMALL) project to improve both performance and usability of the HDF5 library that is widely used in the scientific computing community.