MURPA Seminar: Friday 31 August 2012, 9am

Gordon: A novel high performance computing system for data and memory intensive applications

Speaker: Dr Robert Sinkovits
Venue: Seminar Room 135, Building 26, Clayton Campus and Seminar Room H7.84, Caulfield Campus, Monash University

Abstract:
The Gordon system at the San Diego Supercomputer Center was designed from the ground up to solve data and memory intensive problems. For example, in contrast to the current trend in supercomputing of building increasingly larger machines with less memory per core, Gordon's 1024 compute nodes each contain two Intel Sandy Bridge octo-core processors and 64 GB of memory. The nodes are connected via a dual-rail 3D torus network based on Mellanox QDR Infiniband hardware and can access a 4 PB Lustre-based parallel file system capable of delivering up to 100 GB/s of sequential bandwidth. Two novel features of Gordon though make it particularly well suited for data intensive problems. To bridge the large latency gap between remote memory and spinning disk, Gordon contains 300 TB of high performance Intel 710 series solid-state storage. Gordon also deploys a number of "supernodes", based on ScaleMP's vSMP foundation software, which can provide users with up to 2 TB of virtual shared memory. This talk will cover the Gordon architecture and our motivation for building the system. We will then present the results of both micro andapplication level benchmarks. The talk concludes with recent Gordon success stories spanning domains, such as computational chemistry and structural mechanics, that have traditionally made use of HPC resources and fields that are relatively new to supercomputing.

Biography:
Robert Sinkovits has been working in high performance computing for 20 years and has been with the San Diego Supercomputer Center for almost 15 years. He has collaborated with researchers in a number of fields including astronomy, graph theory, chemistry, bioinformatics, computational fluid dynamics, and structural biology. He was the lead developer of the AUTO3DEM and IHRSR++ software packages that are used to solve the structures of icosahedral and helical viruses, respectively. He is the author or co-author of more than 40 peer reviewed journal articles, book chapters, and conference proceedings. In March 2011, he took the role of Applications Lead for the Gordon project and oversees activities including benchmarking, development of advanced training materials, software parallelization, and performance optimization.