Abstract:

High-performance computing is changing rapidly. Systems such as Intrepid, Argonne National Laboratory's IBM Blue Gene/P and Jaguar, the Cray XT at Oak Ridge National Laboratory have shown that tightly coupled systems once again are dominating high-end architecture. Research groups are now working to use codesign - bringing together computational scientists and their applications, system architects, and computer scientists developing system software to develop exascale systems that will be 1000 times faster than the world's largest supercomputers by the year 2018. Some profound changes to the system software will be required to reach exascale. Key design issues will include a massive intranode parallelism, power management, advanced run-time systems, and fault management. This presentation will focus on the key computer science issues and impacts on exascale software.