Predicting the likelihood of armed conflict

A former British army officer once said, "History is littered with the Wars which everybody knew would never happen."

To better understand the likelihood of conflict, Ohio State University political science Professor Bear Braumoeller, Ph.D., and doctoral student Austin Carson recently used Ohio Supercomputer Center (OSC) resources to employ several statistical techniques relatively new to the quantitative study of international politics. Specifically, the project analyzed a handful of very large-sized datasets regarding the statistical correlates of war (350,000+ observations, 10-20 variables per observation) using a series of estimation models in the statistical program R.

"The OSC computing resources were instrumental in helping us compute the level of statistical certainty of our inferences," said Braumoeller. "The supercomputing protocol allowed us to make these inferences with a high level of accuracy; such calculations were crucial for inference."

Braumoeller and Carson found that statistical literature on conflict studies has generated strong and consistent findings on the relationship of political irrelevance (large distance between two countries) and democratic regime type on conflict. However, they found that scant attention was paid to whether these factors directly influence the likelihood of disputes or indirectly by modifying the influence of other variables.

Braumoeller's project determined that the literature to date had misunderstood the important theoretical question of how these variables influence peace and war. Greater distance between states and greater political liberalism make other war-related variables less influential and dramatically reduce the probability of conflict. ■

Project lead: Bear F. Braumoeller, The Ohio State University
Research title: Political irrelevance, democracy, and the limits of militarized conflict
Funding source: The Ohio State University

Advancing network features of petascale computers

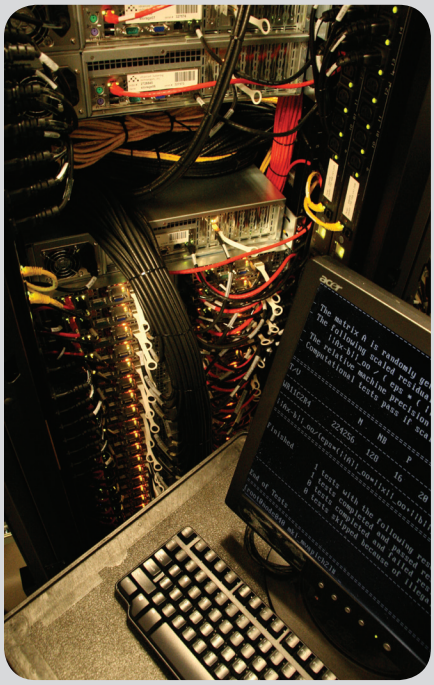
Message Passing Interface (MPI) is the dominant parallel computing model on supercomputers today, including petascale systems that are capable of executing one quadrillion operations per second. MPI allows the thousands of nodes in these large clusters to "talk" with one another over high-speed, internal networks, such as InfiniBand and high-speed Ethernet.

Dhabaleswar K. Panda, professor of computer science and engineering at The Ohio State University (OSU), is investigating how these next-generation systems can provide topology, routing and status information, network features that can improve performance and scalability for many applications.

"This project will have significant impact in deriving guidelines for designing, deploying and using next generation petascale systems," said Panda. "This study involves National Science Foundation researchers from OSU, Texas Advanced Computing Center (TACC), University of California – San Diego and San Diego Supercomputer Center operating large-scale simulations on TACC's Ranger system and other supercomputers."

In another related project, the team is studying MPI-2 one-sided communication operations, to improve scaling and performance on petascale systems. The researchers are investigating methods to couple one-sided communication with hardware support from InfiniBand and leverage them in scientific applications. As a part of this project, the team is utilizing and enhancing MVAPICH2 software, a very popular MPI-2 implementation on InfiniBand, 10 GE iWARP and RoCE.

Karen Tomko, an Ohio Supercomuter Center senior systems developer/engineer, is supporting Panda's team on both projects, providing expertise with the MPI library and scientific applications and helping facilitate production-level testing. ■



Project lead: Dhabaleswar Panda, The Ohio State University
Research title: Topology-aware MPI communication and scheduling for petascale systems; and Extending one-sided communication in MPI programming model for next-generation ultra-scale HEC
Funding source: National Science Foundation