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Main Menu

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In this issue...

DoD Takes Advantage of NAS Metacenter Expertise

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Within This Article...

The Department of Defense has already consolidated much of its high-performance computing capability into Major Shared Resource Centers (MSRCs) at four sites east of the Mississippi. For several years, however, the department's High Performance Computing Modernization Program has been considering going a step further to implement a "metaqueuing environment" that will allow users to submit and run jobs at whichever MSRC is ideal, regardless of distance. The DoD now plans to get such a project underway, with help from the NAS scientists who built the metacenter linking computing resources at NASA's Ames and Langley Research Centers.

DoD representatives met with NAS personnel at Ames in April to begin drawing up plans for the project. Sharad Gavali, the NAS representative on the joint DoD-NASA executive committee overseeing the project, says the DoD approached NAS because of a compatibility of resources and expertise. DoD supercomputing managers realized that "they did not have to reinvent the wheel," Gavali says. "They could take what [NASA] had done and build upon that."

The goal of a metaqueuing environment is to provide a seamless front-end user interface, joined to an infrastructure which can accept, track, and run users' job submissions. The Langley-Ames Metacenter project began in 1995 and became fully operational in October 1996 (NAS News, *July-August 1997*).

Similar Environments

The NASA metacenter was created on IBM SP2 systems running the Portable Batch System (*see article, this issue*). Of the four DoD MSRCs, just two -- the U.S. Army Corps of Engineers Waterways Experiment Station (CEWES) in Vicksburg, Mississippi, and the Aeronautical Systems Center (ASC) at Wright-Patterson Air Force Base in Ohio -- operated the same environment. These sites were chosen to initiate DoD

cross-center computing partly for their similarity to the Ames-Langley architecture, according to Gavali.

Implementation will probably "begin by duplicating what we had done with the SPs at NASA," according to Mary Hultquist, a member of the technical committee working on the project and NAS's group lead for the Ames-Langley Metacenter project. "It's the same setup," she says, with "a few issues specific to the DoD," such as cycle allocations, security authentication, and special projects handling. Incremental technical steps are "progressing well," Hultquist reports, and the project proposal calls for an operational metaqueuing environment by October 1.

Two joint DoD-NASA committees oversee the project. A technical committee consisting of two representatives each from ASC, CEWES, and NAS is studying the feasibility and implementation of different metaqueuing approaches. An executive committee with two representatives each from ASC and CEWES and one from NAS will reconcile the technical committee's recommendations with the specific needs of the DoD sites.

Software Work Continues

While the MSRC integration project gets underway, several NAS groups -- including high speed processing, parallel systems, and scientific consulting -- continue to work on improved job management software that can easily encompass heterogeneous systems. A "heterogeneous peer scheduler," expected to become operational next year, will integrate many different computing resources at each site into the metaqueuing environment. The main challenge in creating such a scheduler, says Hultquist, is the nature of heterogeneous computing itself, since the scheduler must automatically choose the ideal system on which to run a submitted program.

The DoD's current plans encompass only the two MSRCs in Mississippi and Ohio. However, Gavali says, "once the environment is operational, we will work on having other MSRCs join."

The DoD plans to demonstrate the metacomputing concept at November's SC98 conference in Orlando, Florida, using two IBM SP2s at ASC and CEWES.