

Integration of the ECP Proxy Apps Suite into the Pavilion Test Harness

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Researching solutions for critical challenges such as clean energy and nuclear studies, the Exascale Computing Project (ECP) was developed by the U.S. Department of Energy (DOE) to increase the capabilities of High Performance Computing (HPC) systems to execute the DOE mission of supporting science, engineering and nuclear stockpile stewardship. Exascale computing is the next goalpost for the DOE HPC centers to remain globally competitive. The ECP Proxy Applications Project models the performance-critical computations of large applications and employs modern parallel programming methods targeting Exascale systems. We integrated several ECP proxy applications using Los Alamos National Laboratory's Pavilion HPC Test Harness by developing portable test configurations to generalize build commands, runtime inputs, and capture performance results. Programmable inputs in the test definitions facilitate the adaptability of proxy applications through test permutations and results comparison. This ability to parameter sweep on input data and build configurations simplifies determining the optimal runtime configuration. Combined into a Pavilion test suite, these applications run a wide variety of multi-dimensional mathematical operations that benchmark machine performance, thereby demonstrating Pavilion's capability to build, run, and provide analyzable results of the ECP proxy applications. By integrating these applications, we demonstrate Pavilion's strengths in supporting HPC benchmarking for Exascale computing.