

Performance Sensitivity Studies for Strategic Applications

Title: [Performance Sensitivity Studies for Strategic Applications](#)

Authors: L. Carrington, X. Gao, N. Wolter, A. Snavely, and R. Campbell

Abstract: This paper applies modeling and simulation to key HPCMP systems and applications to determine the degree to which fundamental system attributes affect application performance. Synthetic probes are used to ascertain target system capabilities, while application tracing is used to uncover the memory and communication usage characteristics of target codes. A predictive model subsequently melds system and application data in order to project a time-to-solution for each application and system pair. System attributes are then systematically modified, and the predictive model is again applied, to determine the sensitivity of application performance to key system attributes. Time-to-solution predictions for five application test cases (AVUS Standard/Large, HYCOM Standard, OVERFLOW2 Standard, and RFCTH2 Standard) from the HPCMP TI-05 Benchmarking Suite were validated against Government-obtained benchmarking data for 10 HPCMP systems (ranging from an SGI Origin 3800 to an IBM Opteron cluster), yielding an average absolute error of 18%. Sensitivity analysis was then applied to AVUS Large and OVERFLOW2 Standard using the DoD baseline system (a 2832 processor IBM tier cache (L3), and therefore greatly benefit from increased L3 and main memory bandwidths.

Reference: @inproceedings{carrington06sensitivity, Author = {L. Carrington, X. Gao, N. Wolter, A. Snavely, and R. Campbell}, Booktitle = {UGC}, Title = {Performance Sensitivity Studies for Strategic Applications}, Year = {2005}}