

# Integration of Interactive MATLAB® and Linux Clusters

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## Introduction

Star-P is an interactive supercomputing software platform that enables use of high performance computers (HPCs) by eliminating the re-programming often associated with porting desktop application code. It is intended for scientists, engineers and analysts who want to solve large and complex MATLAB® problems that can no longer be done productively on the desktop computer.

Star-P couples the interactive and familiar use of desktop applications with the computing power of HPCs. The large parallel objects are distributed across the parallel system, greatly reducing communication costs and delays when performing operations.

The interactive performance results in a faster response time that enables the user to work with large data sets from the beginning and interactively refine the model. Star-P allows the user to use MATLAB® on a parallel system to greatly speed up desktop computations and the resulting solution time, allowing larger problem sets to be handled. Standard MATLAB® commands and functions are available and perform in a parallel manner transparently to the user.

## Working Interactively with Large Datasets

Through several example calculations, we demonstrated how standard MATLAB® commands are used to create, store, and manipulate large data objects on a Linux cluster. Several benchmark tests were carried out to explore the “cross-over” point where Star-P-enabled clusters become faster than MATLAB® on a desktop.

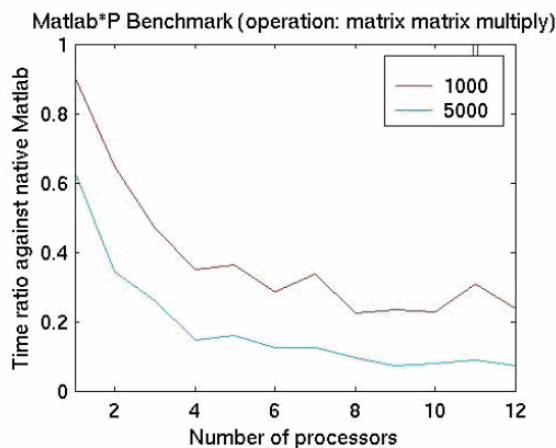


Figure 1: Benchmark #1 – Matrix Multiplication

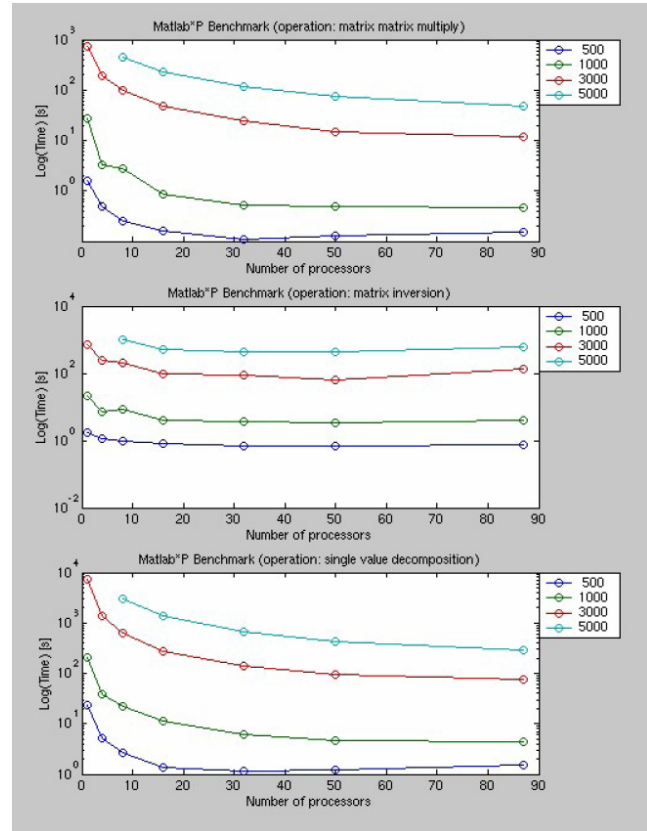


Figure 2: Benchmark #2 on Larger Cluster

Our preliminary results are shown in Figures 1 and 2. In our poster session, we will present comprehensive Star-P parallel MATLAB® performance enhancement as compared to a typical desktop computer running MATLAB® commands, the HPL test and selected signal processing applications. Star-P performance results will be obtained on SGI Altix and a Linux Beowulf cluster.

## References

- [1] Husbands, Parry. *Interactive Supercomputing*. PhD Dissertation supervised by A. Edelman, Massachusetts Institute of Technology, 1999.
- [2] Choy, Ron and Edelman, Alan, “*Parallel MATLAB: doing it right*,” Proceedings of the IEEE, Volume 93, Issue 2, Feb 2005, pp. 331–341.