

Performance Tuning of the NCCS Storage System: Throughput Measurements

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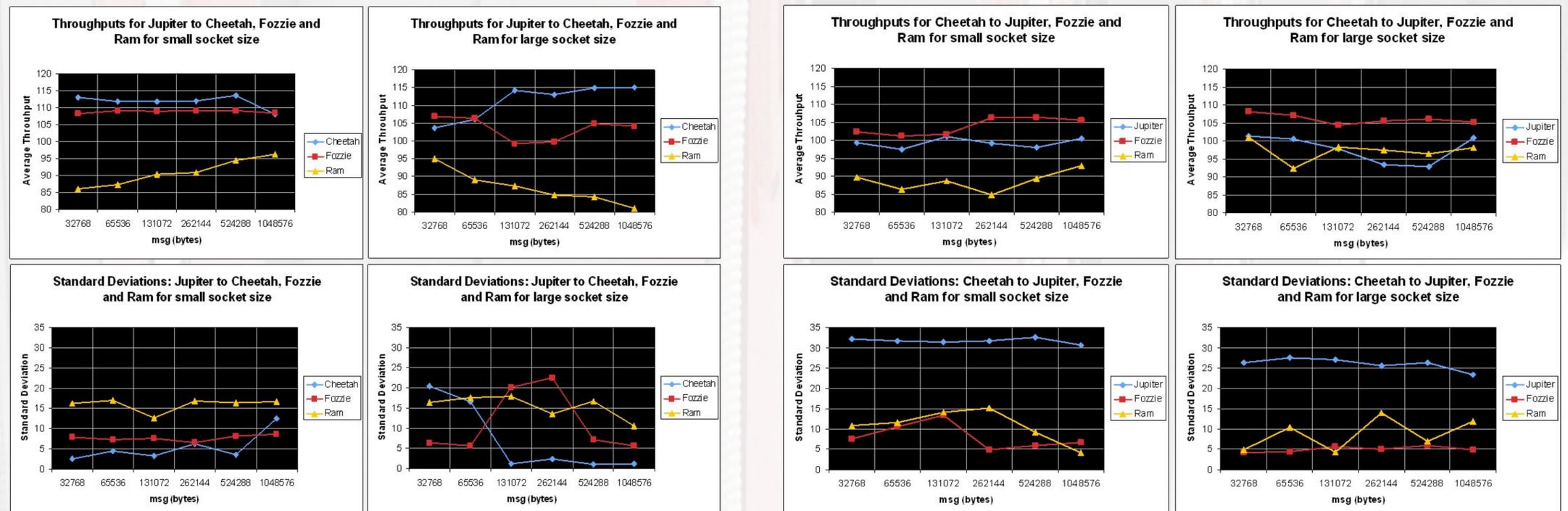
Research Alliance in Math and Science
National Center for Computational Sciences
http://www.csm.ornl.gov/Internships/Websites05/j_jones/abstract.html

This project is an evaluation of the performance of the storage system for the National Center for Computational Sciences (NCCS). It is a "High Performance Storage System" (HPSS) operated in collaboration between DOE labs and IBM. Applications such as Netperf, HSI, and other assorted system utilities will be used to test throughput to the various computational platforms used in the NCCS. Performance will be benchmarked between storage servers and the super computers. The performance data obtained in this project will be useful in determining where bottlenecks are most likely to restrict data transfer or storage. The systems could then be tuned according to the parameters that are given by each test, and re-evaluated in order to determine the best overall performance.

Project Tasks/ Goals

Obtaining maximum speed and storage through HPSS is the main goal of this research. Initial tasks were:

- Install the operating system on an AIX 5.2 server
- Benchmark performance between servers and super computers
- Analyze throughput measurements
- Future work will use results to determine where bottleneck are that restrict data throughput



Benefits

- Maximize data storage and increase data retrieval rates for users of the NCCS
- Increased data storage and faster data retrieval will enhance research in application areas, such as biomedical engineering, environmental science, and medicine
- Will help in distinguishing between systems with the best performances and those with the worst performance

Resources/methodology

- Configure the operating system for an AIX 5.2 system
- Platforms used for testing are: Unicos, Linux, and AIX
- Netperf was used for test runs on Jupiter and Cheetah
- Graph data in excel and analyze throughputs
- Standard deviation for small number of n measurements is

$$\sigma = \sqrt{\frac{1}{(n-1)} \sum_{i=1}^n d_i^2}$$

where $d = x_i - \bar{x}$

Results

- These preliminary results show that Jupiter to Cheetah has the best performance and stability (based on standard deviation) for the systems tested, but this is not the same for the reverse case (Cheetah to Jupiter)
- More measurements, and more runs (n) per measurement, are needed for a more reliable conclusion
- Measurements are in progress for HSI