Tape Storage Performance

2011 Computer System, Cluster, and Networking Summer Institute

Jonathan Maye-Hobbs
William Buehler
Importance

- Limits
  - Buffer
  - I/O

- Advantages
  - Speed
  - Density
  - Longevity

- Challenges
  - Sequential I/O

- Disk
  - Pros
  - Cons
Hardware & Procedure

**Tape Drives**
- LT0-5 (140 MB/s uncompressed)
- T10K-B (120 MB/s uncompressed)

**Fiber Channel Cards**
- 4Gbit HP StorageWorks FC1242SR
- 8Gbit HP Storage 82Q
Software

• Tapecmd for AIX and Linux
  – Parameter Controlled program
  – Read/Write to UNIX tape devices
  – Reports the amount of data read/written as well as performance

• “tapecmd –f /dev/st0 –o write –b 262144 –N 1 –m 800 –p lz1p5”
Results

LT0–5: Block size 64 KB
Results

Min/Max Write Speeds for the T10k-B with 4 Gb and 8 Gb fiber

Block Size (bytes)

Write Speed (MB/s)

4 Gb fiber

8 Gb fiber
Results

Min/Max Write Speeds for the LT0-5 and T10k-B on 8 Gb and 4 Gb fiber

LT0-5 on 8 Gb fiber

T10k-B on 4 Gb fiber
Results

T10k-B and LT0-5 on 8 Gb fiber, Block size = 256 KB, Compression = 1.5

Write Speed (MB/s)

File Size (MB)
Conclusion

What file sizes give the best performance? What block sizes?

Large files (~16 GB) gave the best performance in each scenario we tested.

Files that large may not always be used.

600 MB to 1 GB file sizes performed on par with much larger files.

Throughput of the LT0-5 was greater than that of the T10k-B

Block sizes from 64kb to 2MB gave the best performance.
Acknowledgements

We thank Andree Jacobson for lecture hours, Cody Scott, Milton Turley, Aaron Torres for mentorship as well as project assistance, and Gary Grider for troubleshooting assistance. Test hardware was kindly donated by our mentors through LANL. Funding for this project was provided by the NNSA, NSF, and SULI.

For further info contact Cody Scott: Cscott@lanl.gov
Questions