

Texas Memory RAM-SAN 520

Test Team

Dan Million
Harvard Holmes
Nancy Johnston
Michael Gleicher

RAM-SAN 520



no internal disk
backup options

- mirror
- dedicated RAID (TMS)

- 28 usec latency
- 3,000 MB/sec transfer rate
- 8-64 Gigabytes
- 750,000 IOPs
- Memory Upgrades: 4GB increments

RAM-SAN 210 (not tested)

20 usec latency 200,000 IOPs
700 MB/sec



8-32 GB, 2 or 4 FC interfaces per chassis
dual disk drives, dual redundant power supplies

Memory Upgrades: 4GB increments

Areas of Interest

- Raw I/O performance
- HPSS performance
- SFS performance

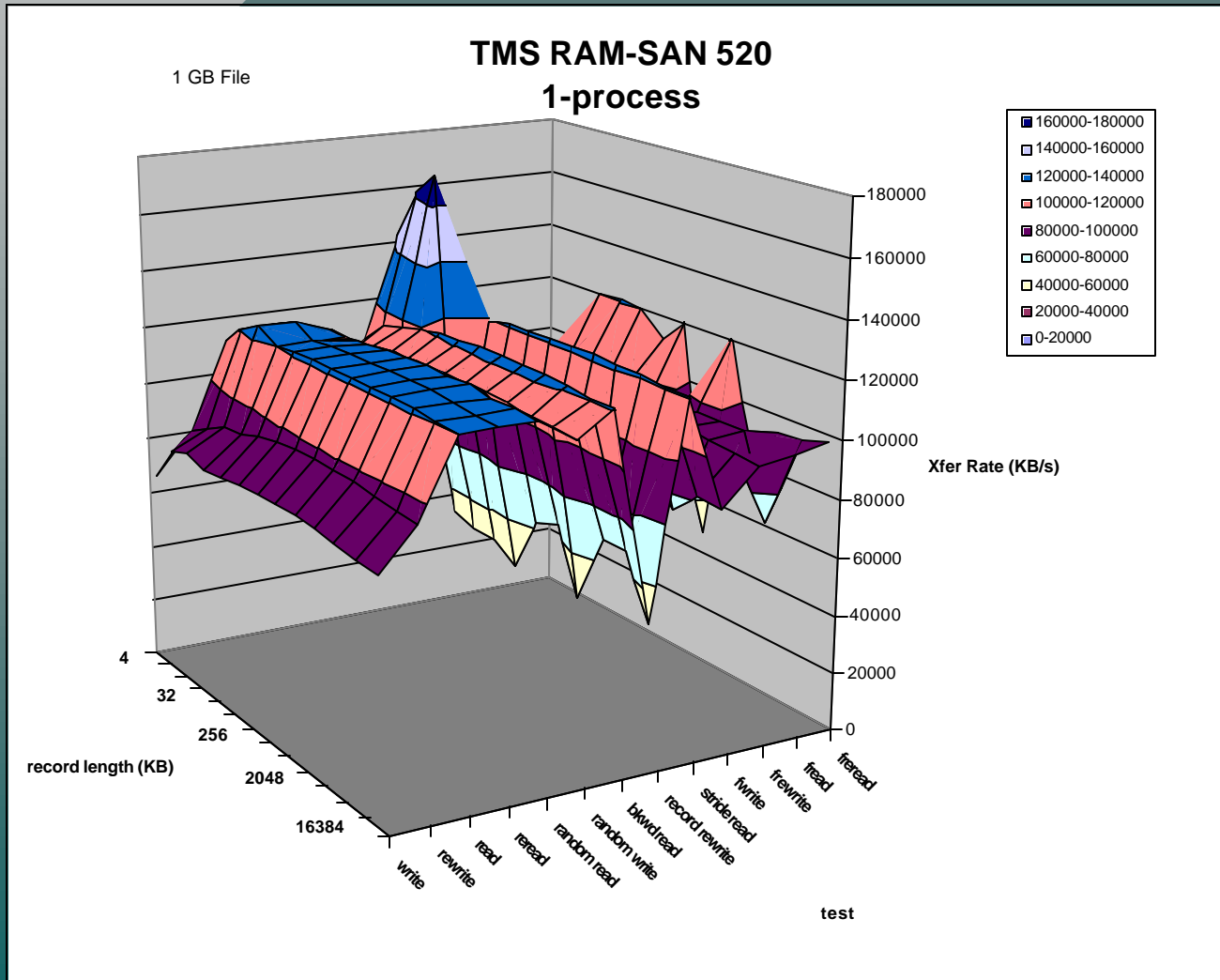
Test Configuration

- RAM-SAN 520, 4 FC interfaces, 16GB
- ORNL:
 - S80 (stingray), H70 Emulex LP 7000, AIX driver
 - F50 - Emulex LP 8000, Emulex driver
 - Sun T3 (1 FC interface)
 - SSA RAID (32MB cache)
- NERSC:
 - H70 (swift) Emulex LP 8000 (3 - 2TMS,1 DDN)
 - F50 (eagle) Emulex LP 8000 (IBM driver)
 - F50 (raven) Emulex LP 8000 (IBM driver)

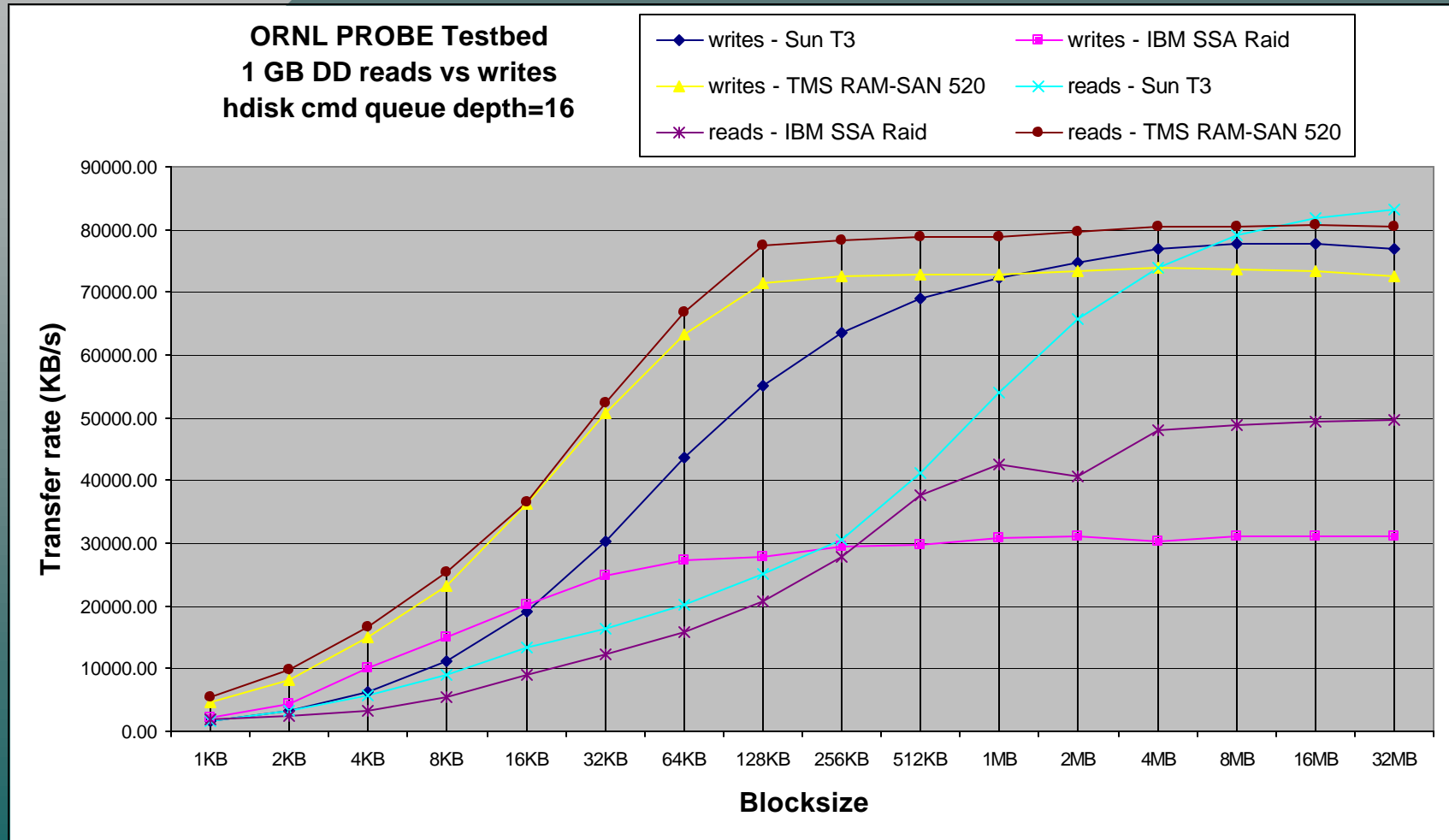
Testing Summary - ORNL

- Raw DD, iozone tests
- Mirroring tests
- HSI read/write tests
- HPSS random access tests

iozone results - TMS



Raw I/O Test - (S80) sample



TMS Tests - Mirroring tests

Notes:

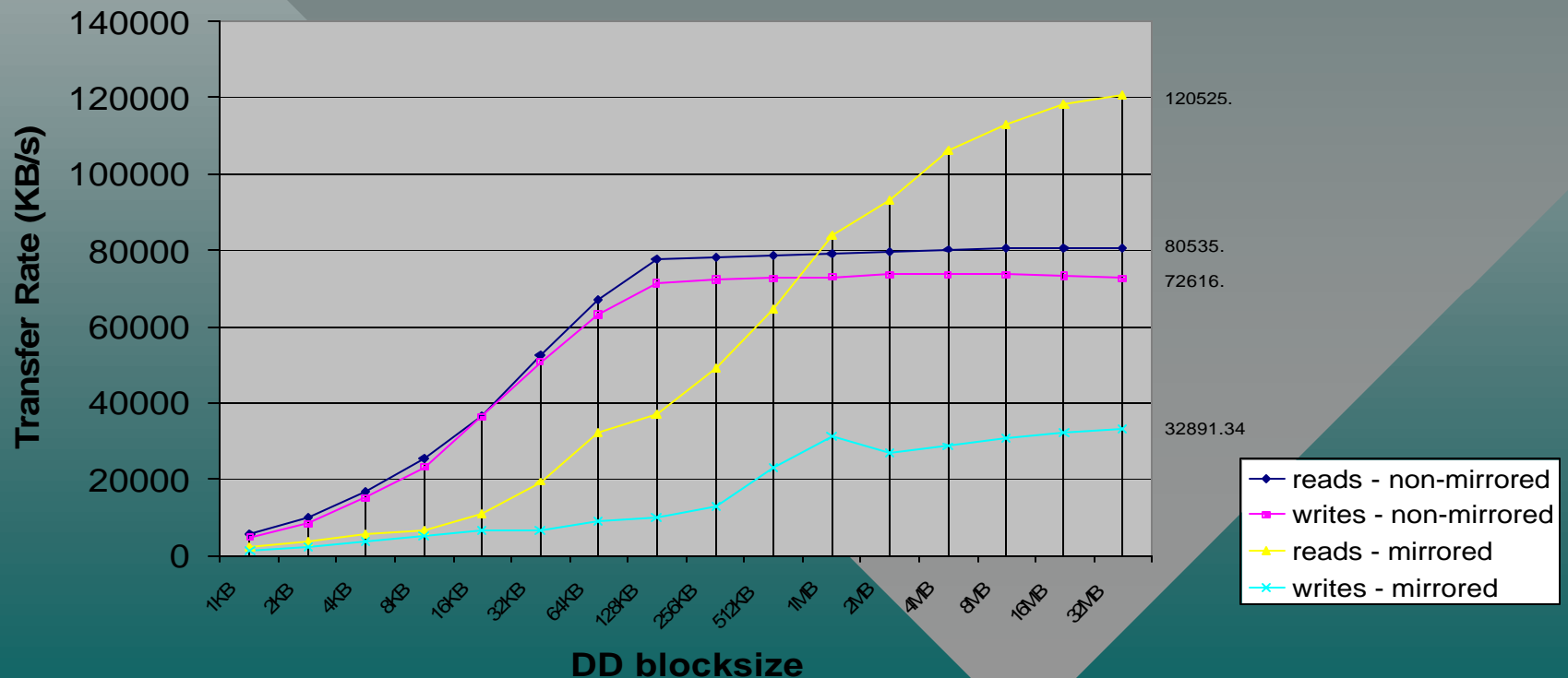
1. queue depth=8 for both TMS and T3
2. "typical" non-mirrored rate used from initial tests
3. "best" rate (for reads) used from all mirror tests; all mirrored write tests had approximately the same results

ORNL PROBE Testbed Texas Memory RAM-SAN Mirrored vs Nonmirrored DD reads/writes

Mirror Info

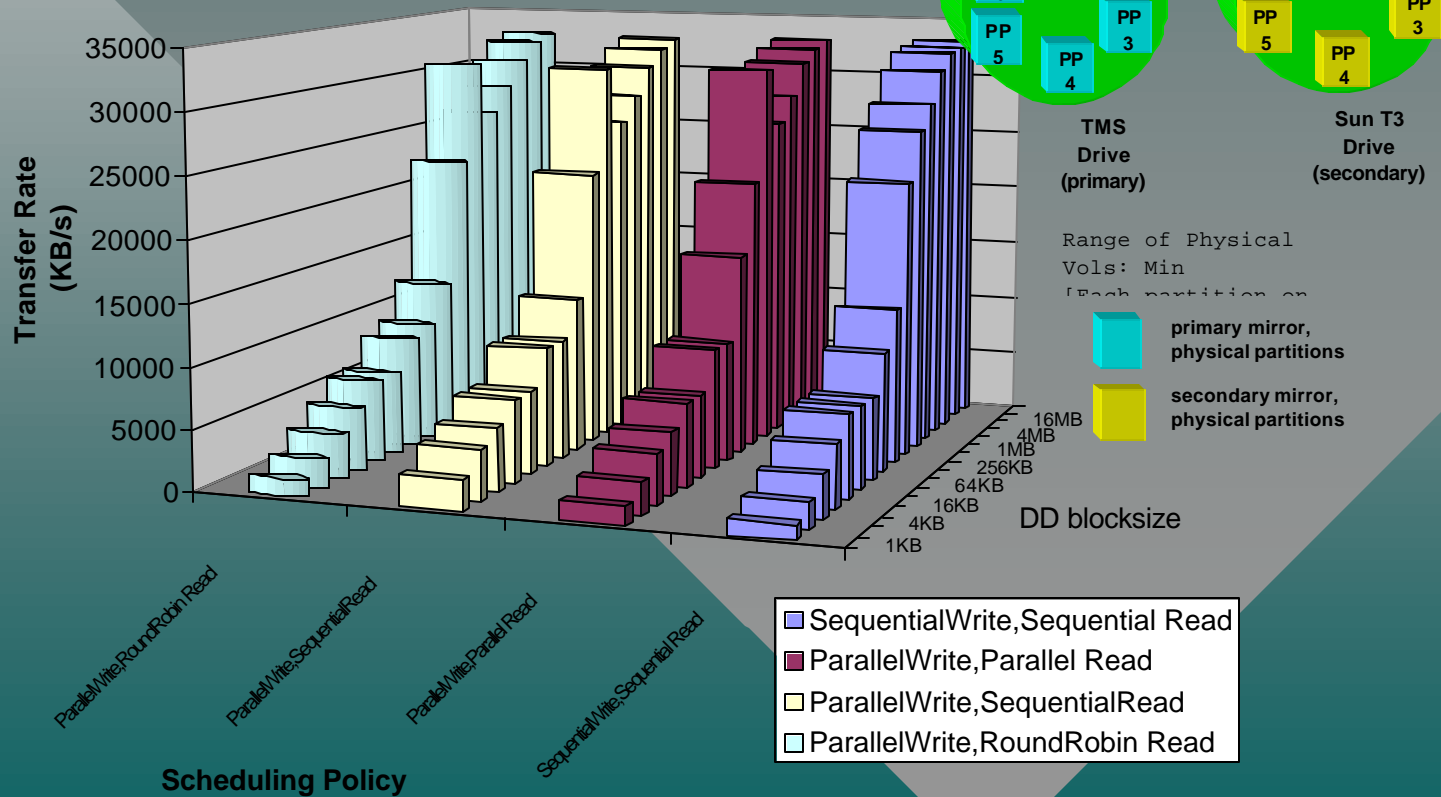
TMS=primary
Sun T3=secondary

LVM Scheduling policy
parallel writes, round-robin
reads



Mirroring Tests - LVM Scheduling Policy

ORNL/PROBE
 Texas Memory Mirrored LV Tests
 DD writes - 1 GB from /dev/zero
 LVM Scheduling Policy Comparison

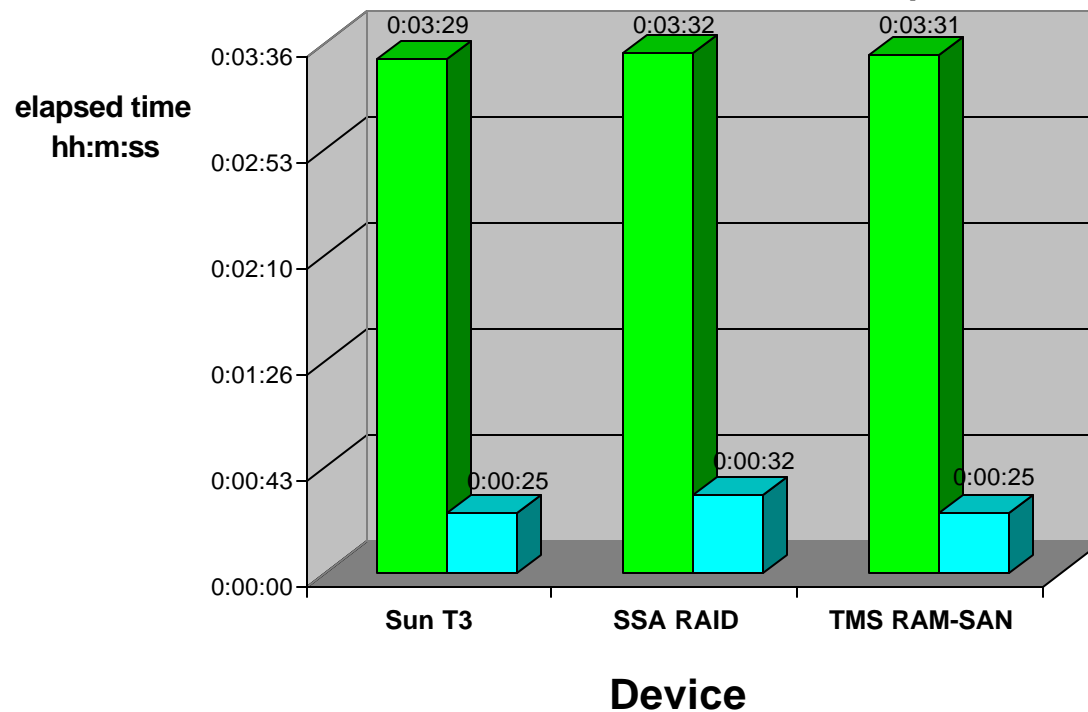


HPSS Random I/O Tests

- 1000 Random Reads
- Write 512 MB file

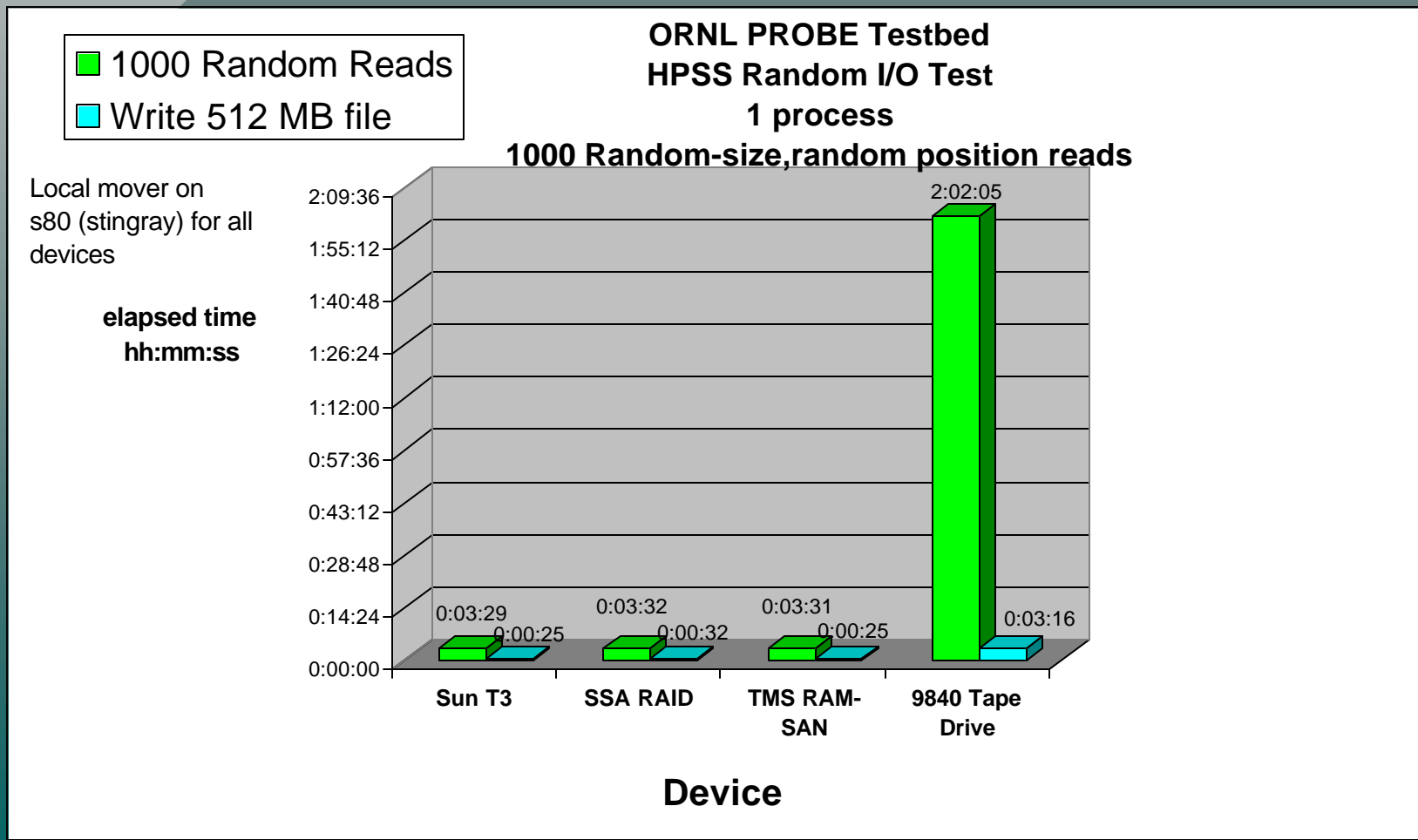
ORNL PROBE Testbed
HPSS Random I/O Test
1 process

1000 Random-size,random position reads

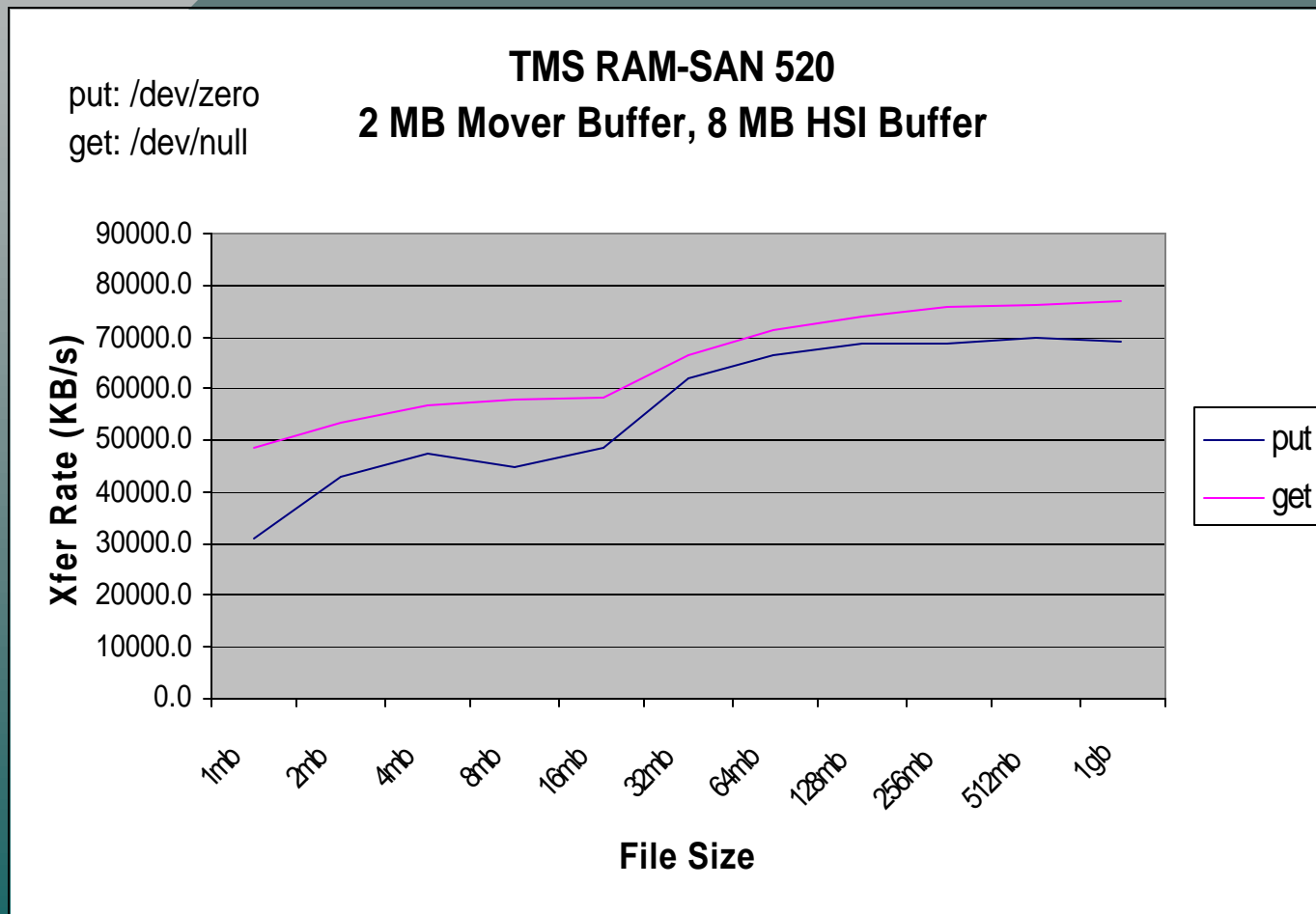


Conclusion: bottleneck on issuing I/Os (?)

HPSS Random I/O (9840)



HPSS Sequential I/O - 1-way stripe



Testing Summary - NERSC

- Raw I/O - dd
- HPSS Speed tests - PDSF (linux) cluster
 - 300+ MB/s HPSS aggregate rate achieved
- SFS Database tests

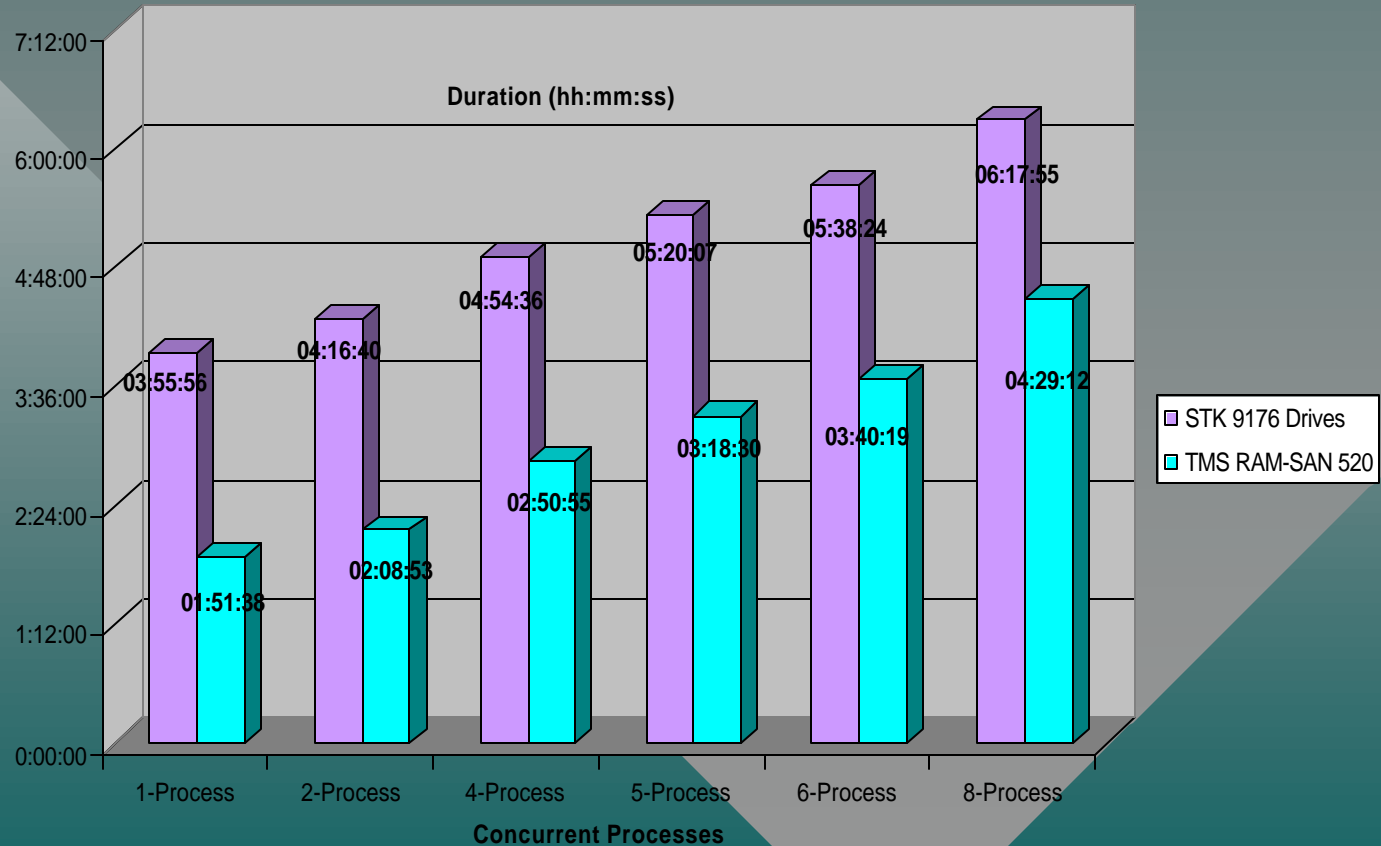
NERSC Tests - Database

- Application: Accounting Program
- Sequentially read CNSOBJECTS
- Randomly read associated BITFILE data
- Test File: "Archive" metadata
 - restored into probe DCE cell
 - tests run on TMS, STK 9176 RAID

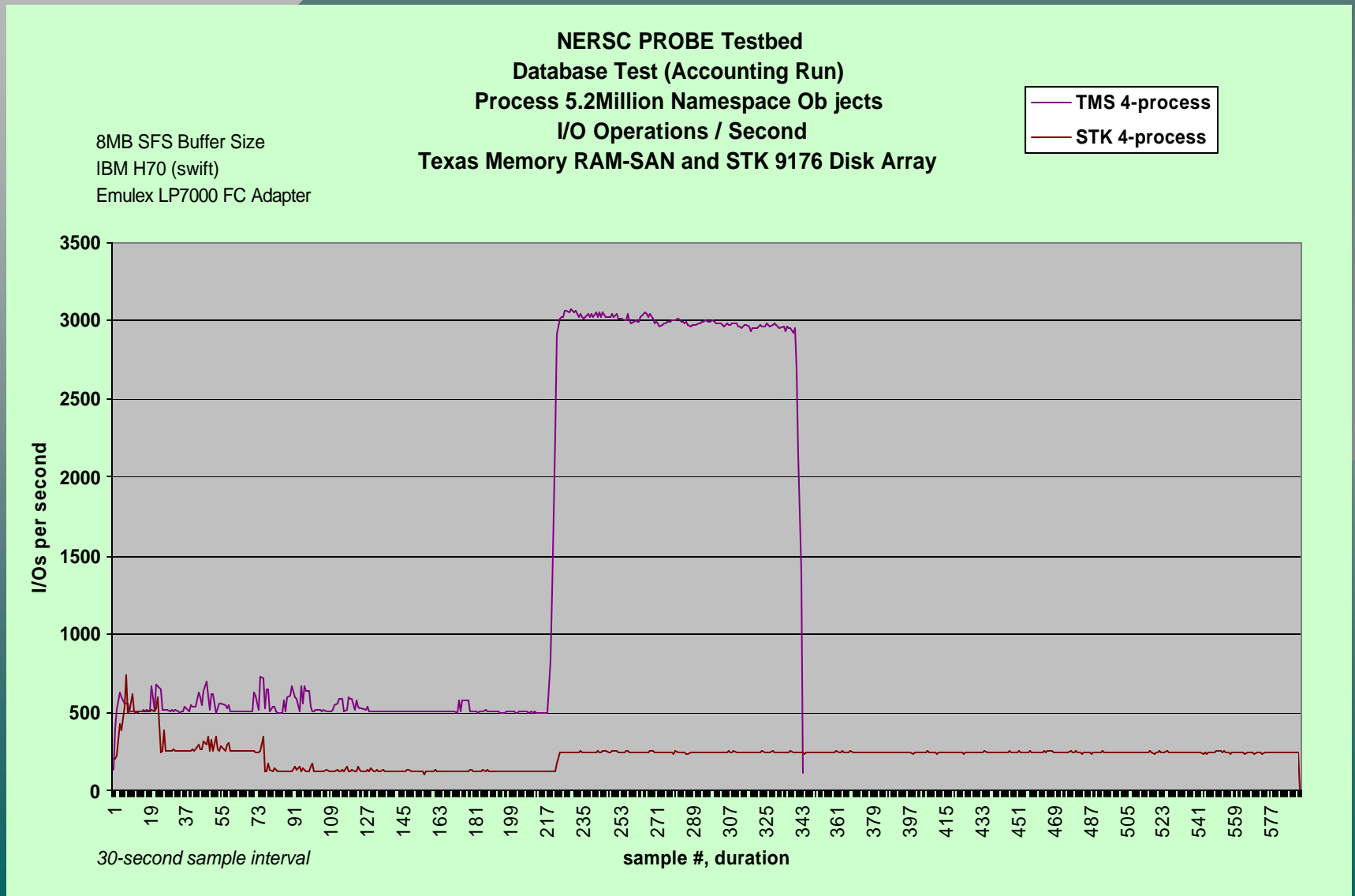
Accounting Database test results Duration

IBM 4-CPU H70
Fiberchannel-Attached
Drives (STK & RAM-SAN)

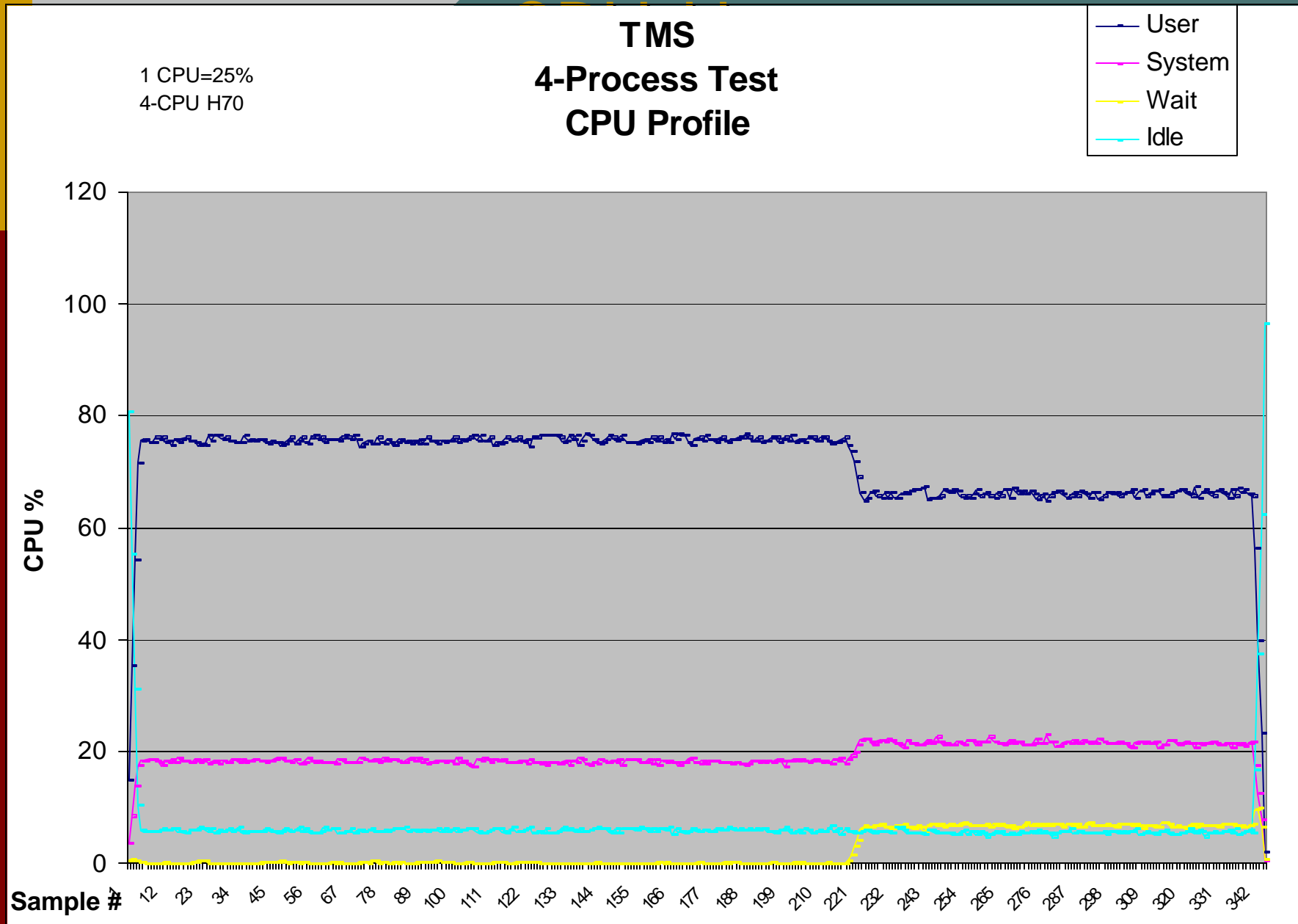
NERSC PROBE Testbed
Database Test (Accounting Run)
Time to Process 5.2Million Namespace Ob jects



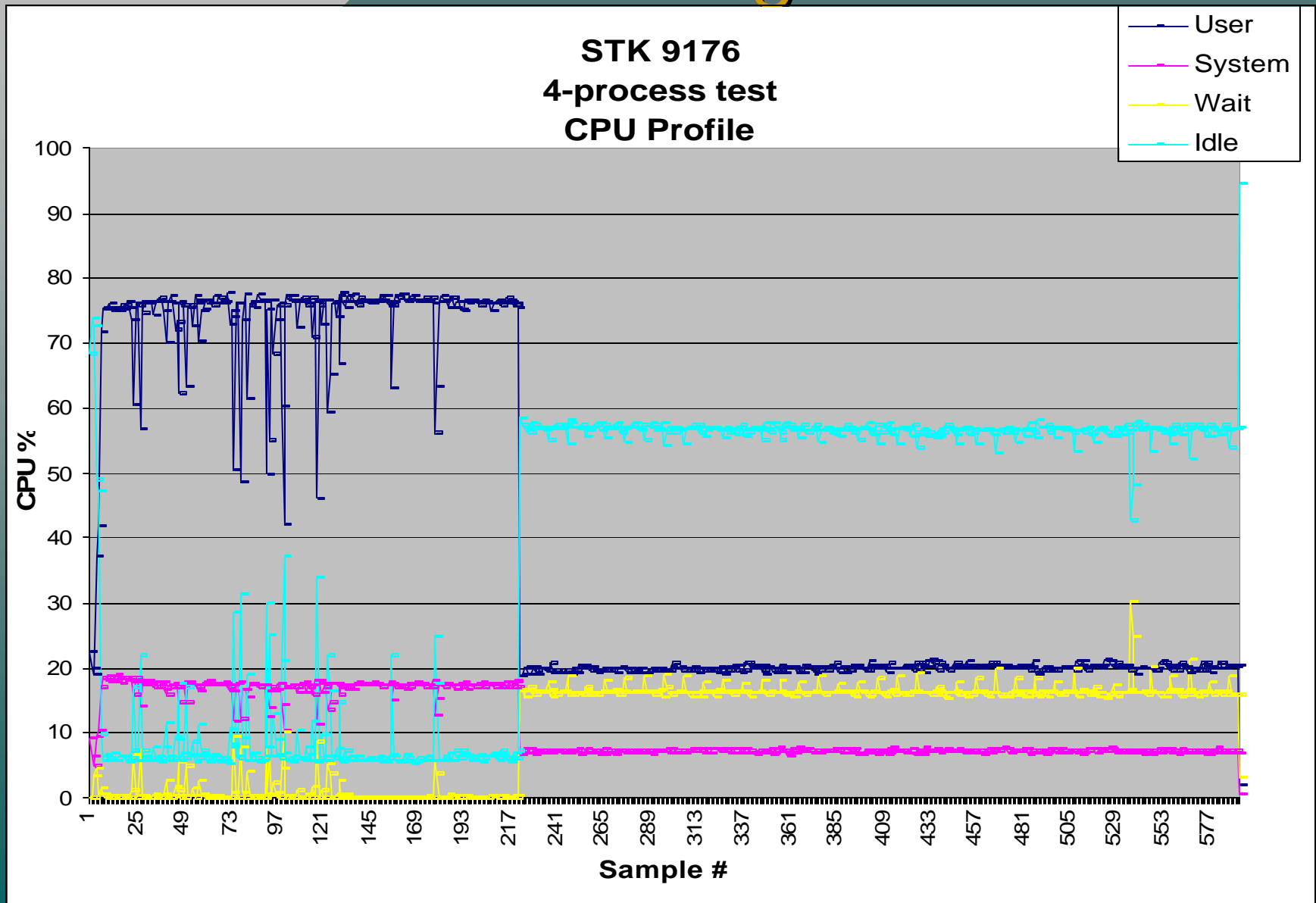
Accounting database tests I/Os per second



Accounting Database test

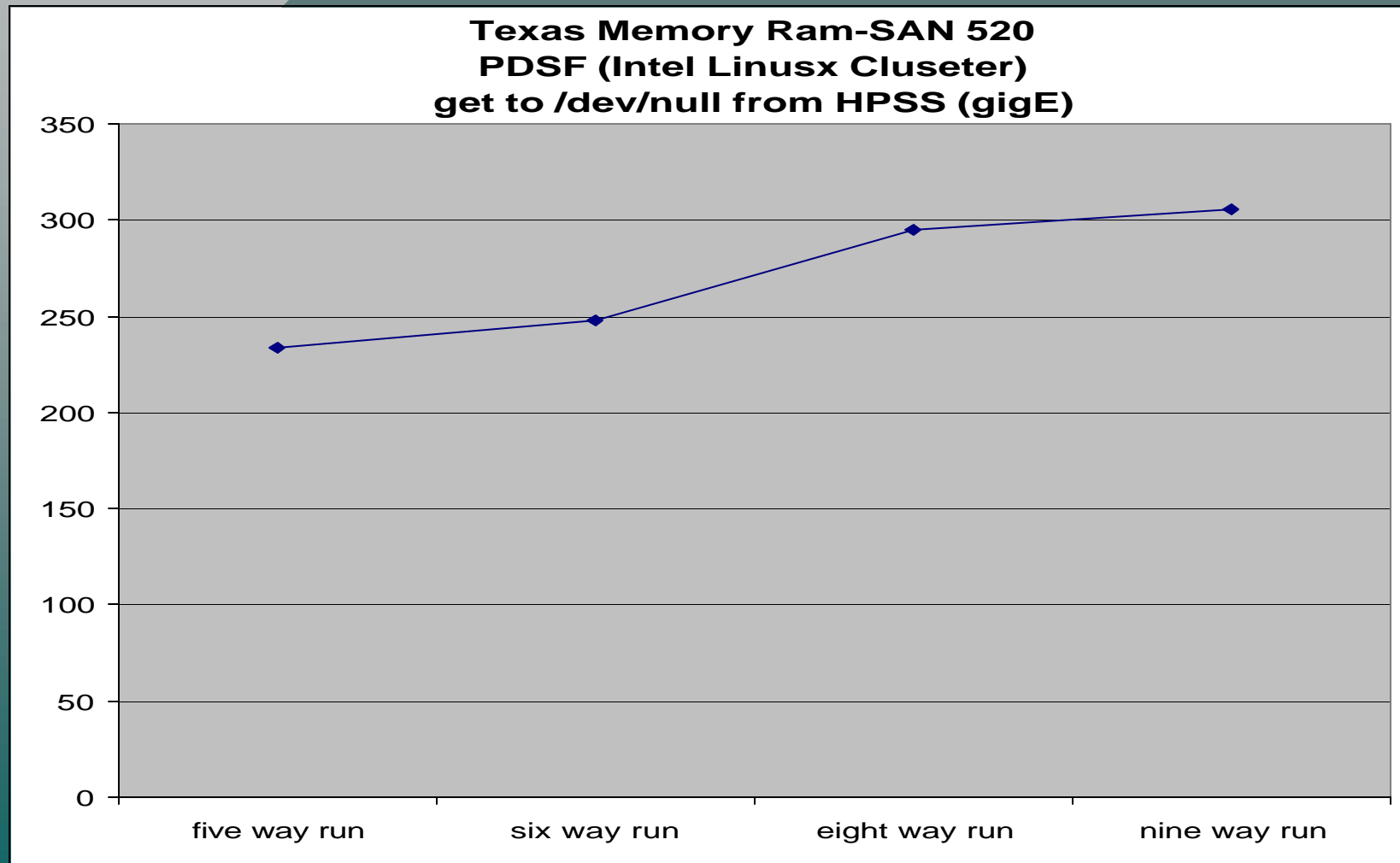


Accounting Database Test CPU Usage



NERSC HPSS Tests

PDSF sample



Conclusions

- Stability was excellent - 0 problems with disk emulation software
- It easily handled everything we tried with it. Bottlenecks were always in AIX, HPSS (DCE) and SFS
- Would be an excellent device to use for metadata consistency checking, or other database-type applications

Texas Memory Contact Information

www.texmemsys.com

Doug Keller

For More Testing Info

- <http://www.csm.ornl.gov/PROBE/>
- <http://hpcf.nerisc.gov/storage/hpss/probe/>