HPSS User Forum - Site Report

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BaBar & The B-Factory

- Use big-bang energies to create B meson particles
  - Look at collision decay products
  - Answer the question “where did all the anti-matter go?”
- 800 physicists collaborating from >80 sites in 10 countries
  - USA, Canada, China, France, Germany, Italy, Norway, Russia, UK, Taiwan
- The experiment produces large quantities of data
  - 200 - 400 TBs/year for 10 years
  - **Data stored as objects using Objectivity**
- Heavy computational load
  - ~15,000+ SpecInt95’s needed

HPSS Milestones

- BaBar HPSS has over 800TB stored
  - 518 TB data written in last year
  - 384 TB data read in last year
- Public HPSS 4.3 Solaris system
  - Non-BaBar experimental data
  - Upgraded to HPSS 4.3
  - Running in production mode
  - Over 2TB data stored

BaBar HPSS Software Levels

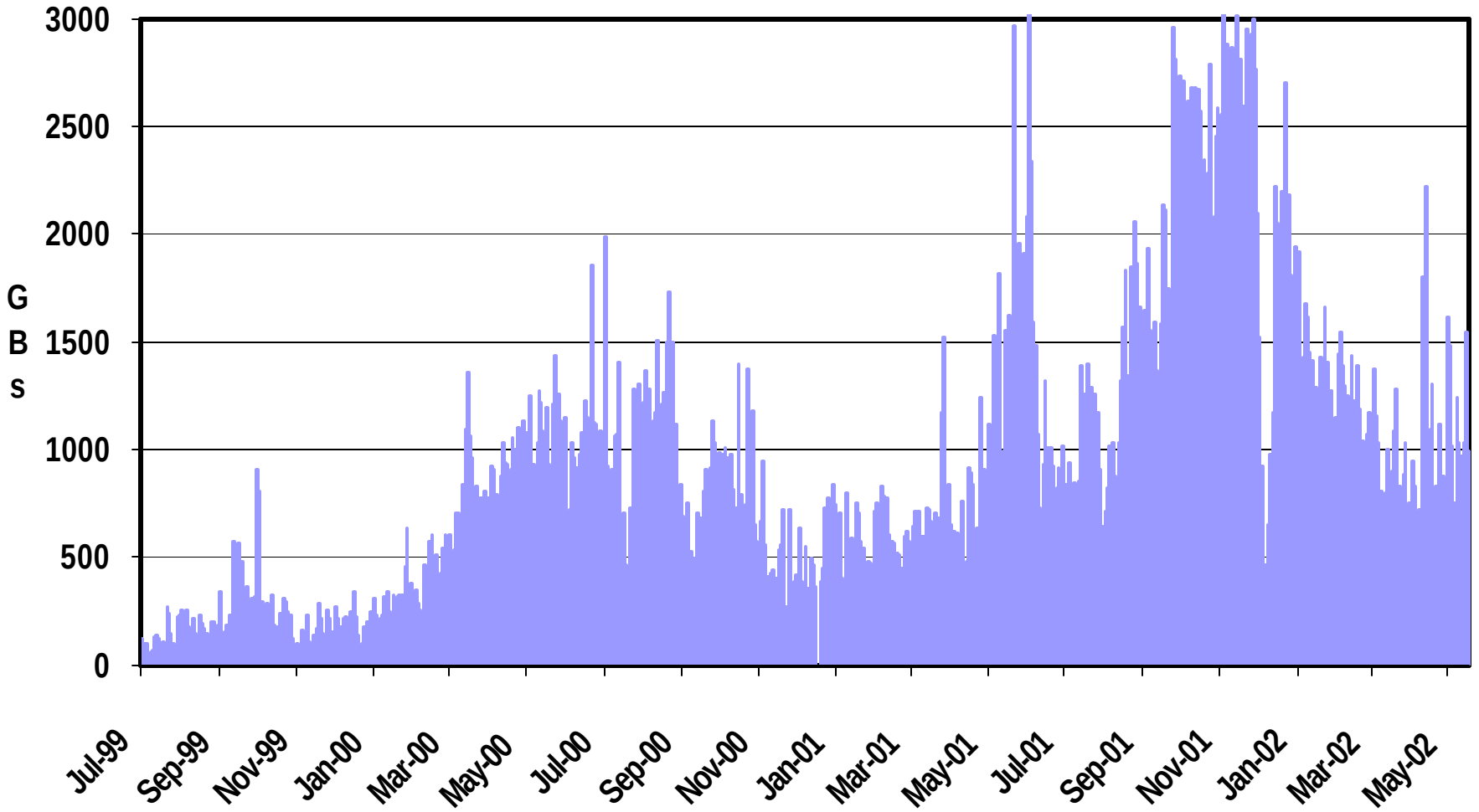
Date	Machine	OS	DCE	Encina	HPSS
AIX core server					
Jul 98	F40	4.1.5	2.1	2.1	3.2
Sep 99	F50	4.2.1	2.1	2.5	4.1
Jan 01	F50	4.3.3	2.2.0.8	4.2.0.14	4.1.1.4

- No changes to software levels in past year
- BaBar operation makes major software upgrades difficult
- Want to convert from AIX to Solaris core servers

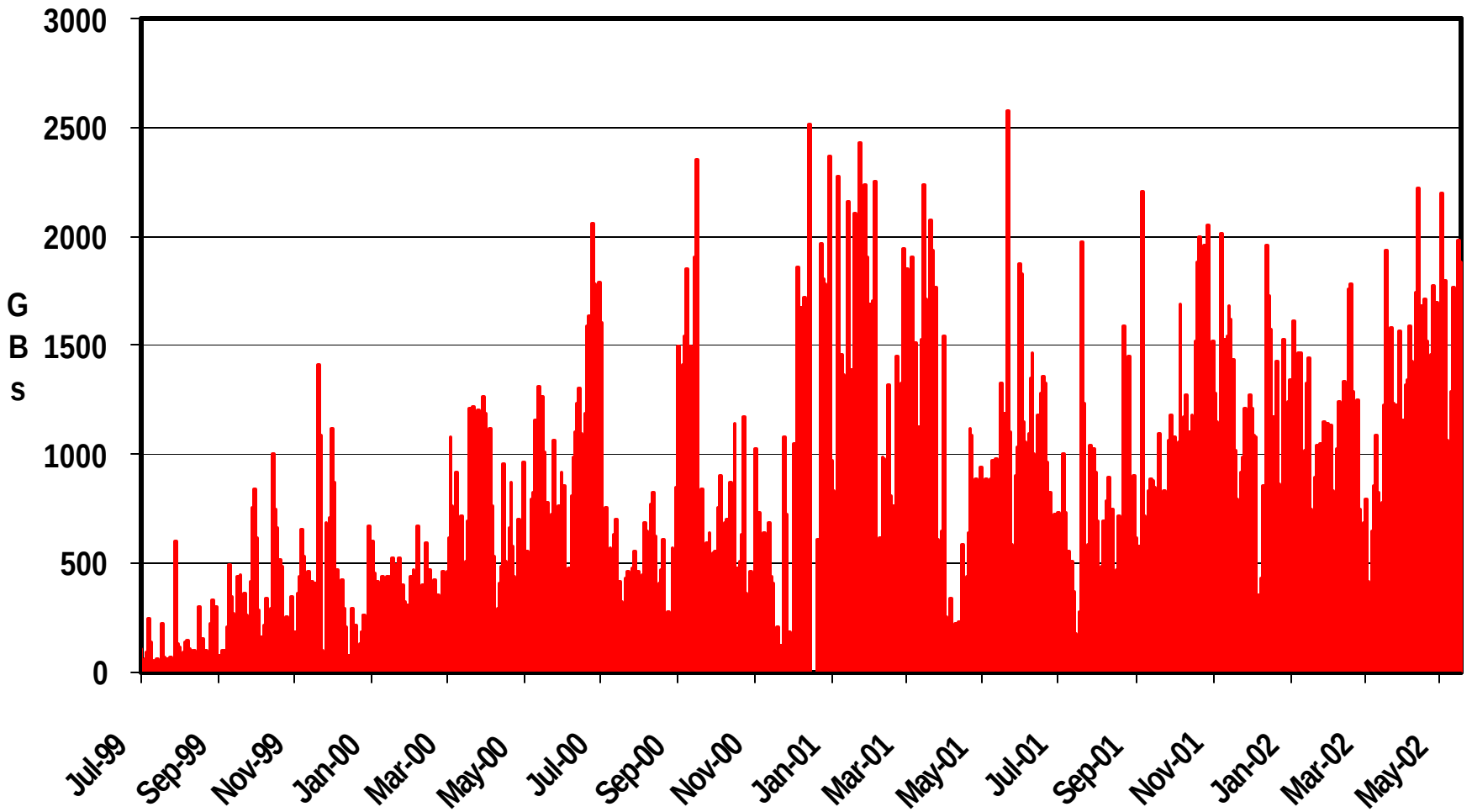
Public HPSS Software Levels

Date	Machine	OS	DCE	Encina	HPSS
Solaris core server and movers					
May 01	420R	7	3.1	4.3.0.3	4.2
Dec 01	420R	8	3.1	4.3.0.4	4.3

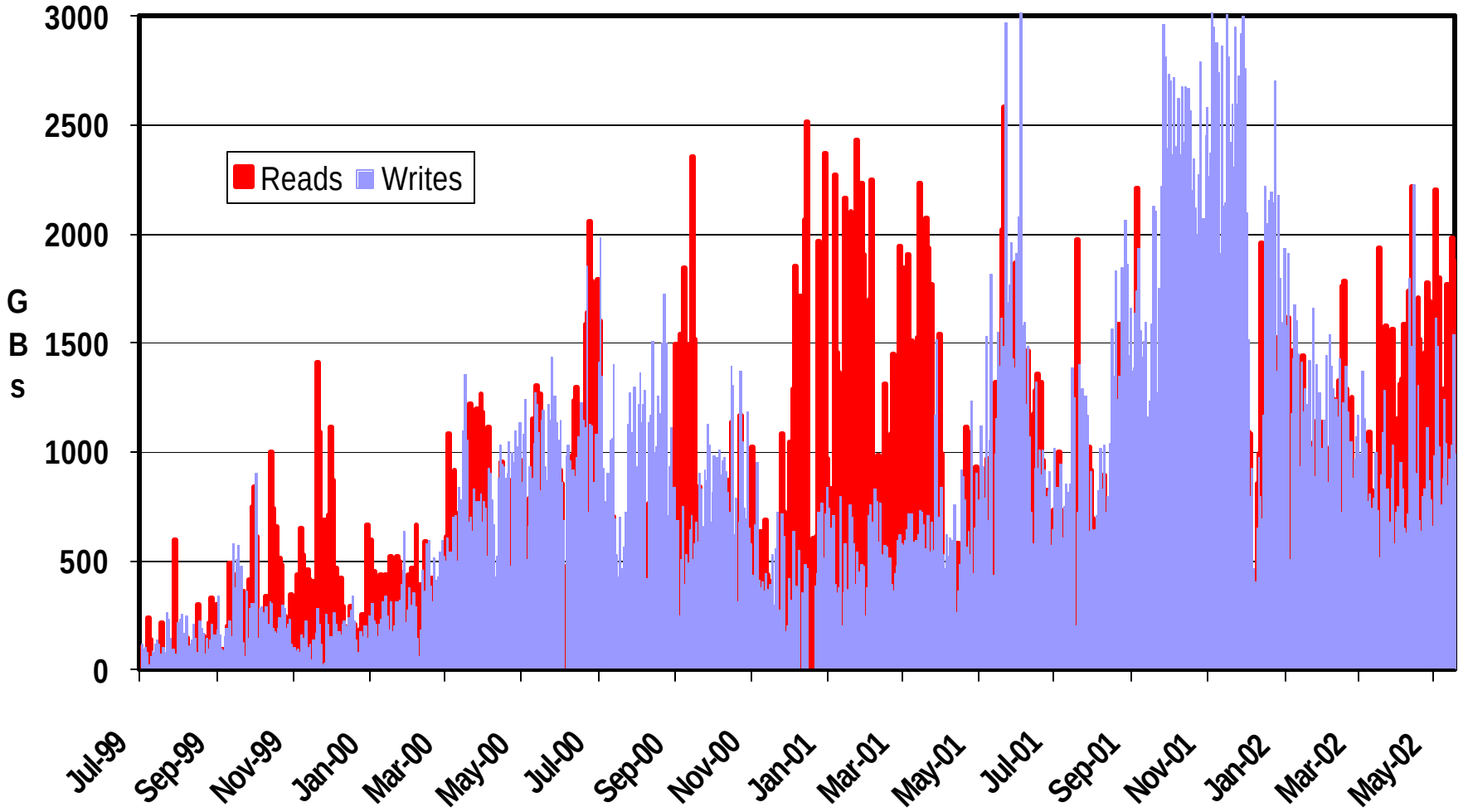
HPSS Bytes Written per Day



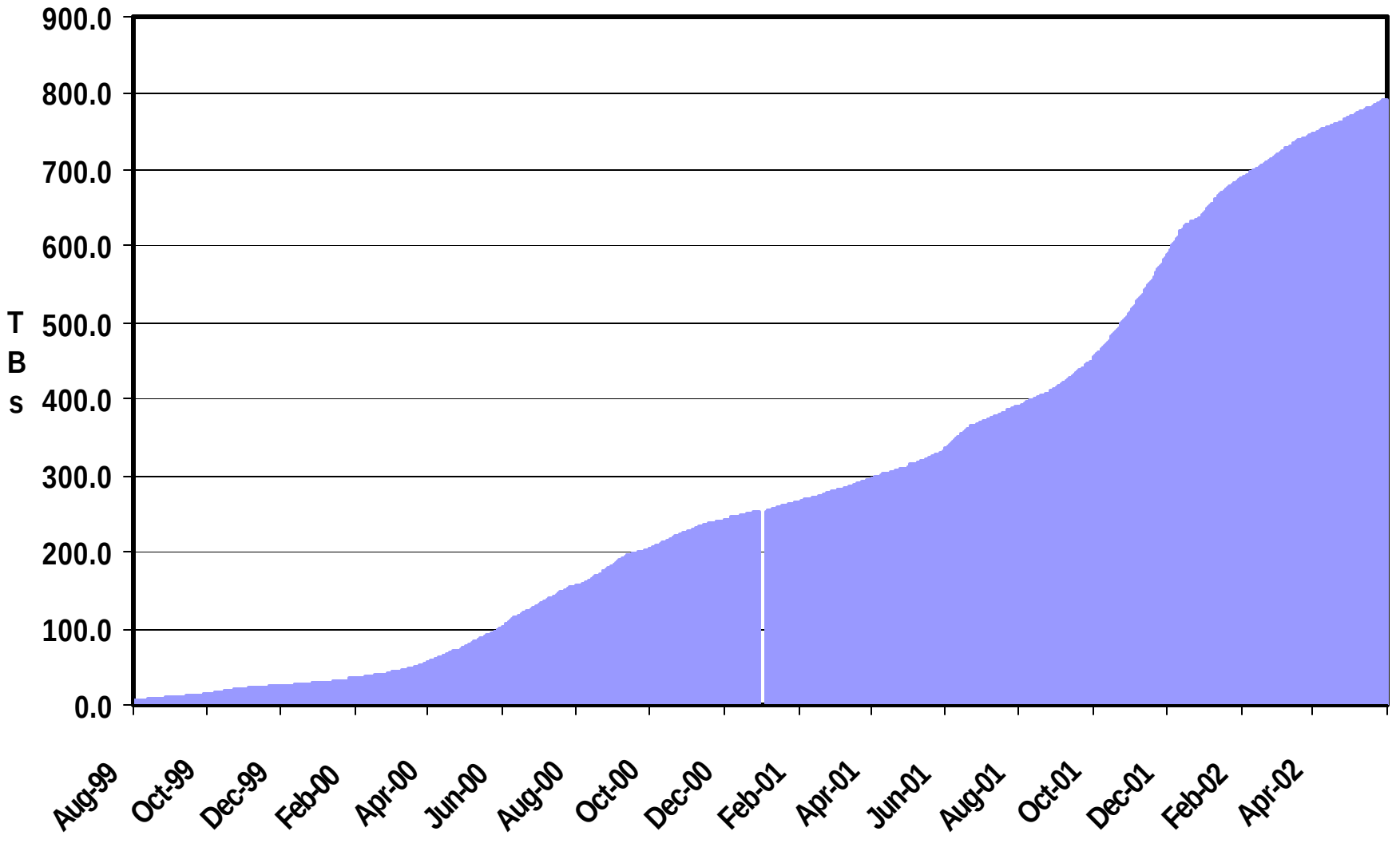
HPSS Bytes Read per Day



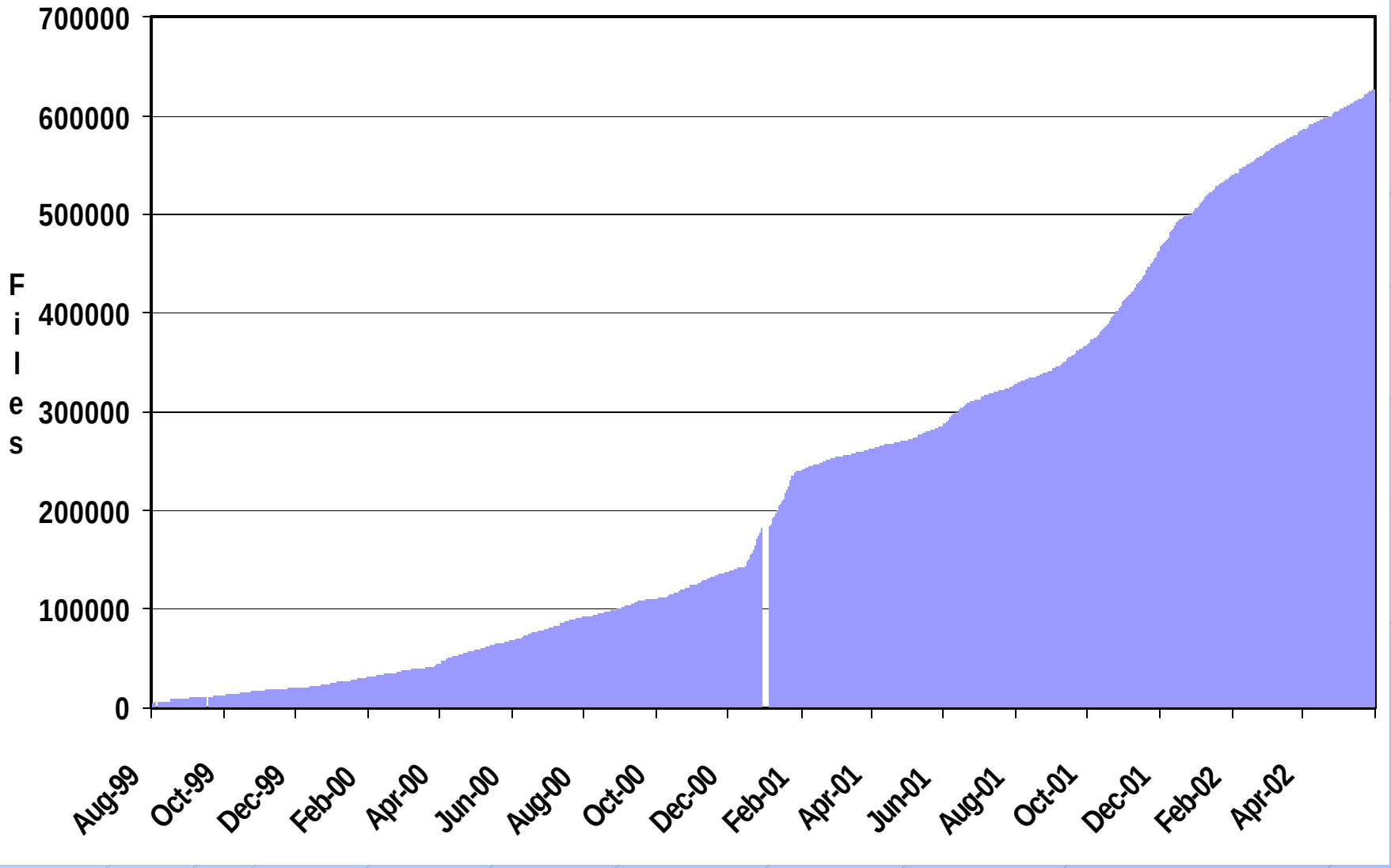
HPSS Bytes Processed per Day



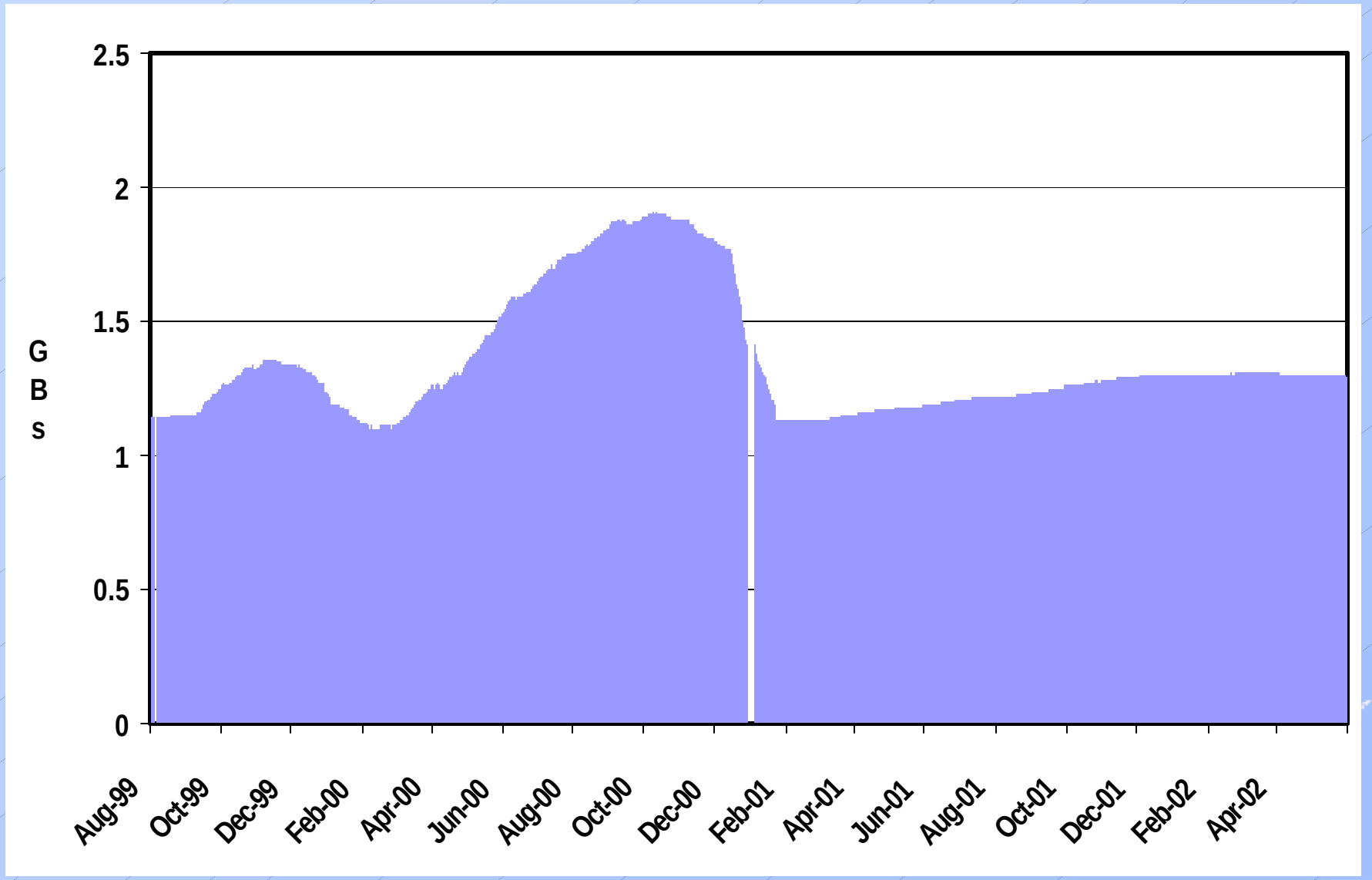
HPSS Total Space Used



HPSS Total Files



HPSS Average File Size



HPSS Reliability

- Service outages since June 2001
  - 6 Separate outages, total down time 62 hours
  - 4 Unscheduled outages
    - STK PVR sequence number wrap (36 hours)
  - 2 Scheduled outages
    - 9940 installation (3 hours)
    - Building power outage (23 hours)
- System available 99.2% of real time

9940 Statistics

- 512TB stored on 4565 tapes
- Write errors on 83 tapes, 1.8% of tapes written
- Read errors on 33 tapes
  - 2 sent to STK data recovery lab
- Broken leader block on 3 tapes
- Drives replaced 12 times

HPSS Problems

- SSM System Manager crashes
  - Happens 4-7 times per month
  - Often Metadata Monitor also crashes
  - No resolution in sight
- Mount/Dismount performance with STK PVR
  - On busy system, can take 5-10 minutes to mount a tape
- Pftp login fails with “could not load thread state”
  - Transient problem, load dependent?
  - Upgrade from 4.1.1.4 to 4.3 may fix problem?

HPSS Problems (continued)

- Tape Handling problems
  - Unlabeled tape mounted over and over
    - Lock tape or mark it EOM
  - Not ready tape reused
    - Tape dropped ready
    - HPSS should dismount tape
    - PTR 2647

HPSS Wish List

- Dynamic device reconfiguration
  - PVL, PVR outages too disruptive
- Automatic system startup
  - Proper sequencing of DCE, Encina, hpssd, SSM, etc
- Conversion from AIX to Solaris core server

Summary

- HPSS is reliable
- HPSS performance is adequate for current usage pattern
- Software upgrades will always be a problem