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# HPSS User Forum - Site Report

Neal Adams

Stanford Linear Accelerator Center

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## BaBar & The B-Factory

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- 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

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- 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

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<u>Date</u>	<u>Machine</u>	<u>OS</u>	<u>DCE</u>	<u>Encina</u>	<u>HPSS</u>
<b>AIX core server</b>					
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

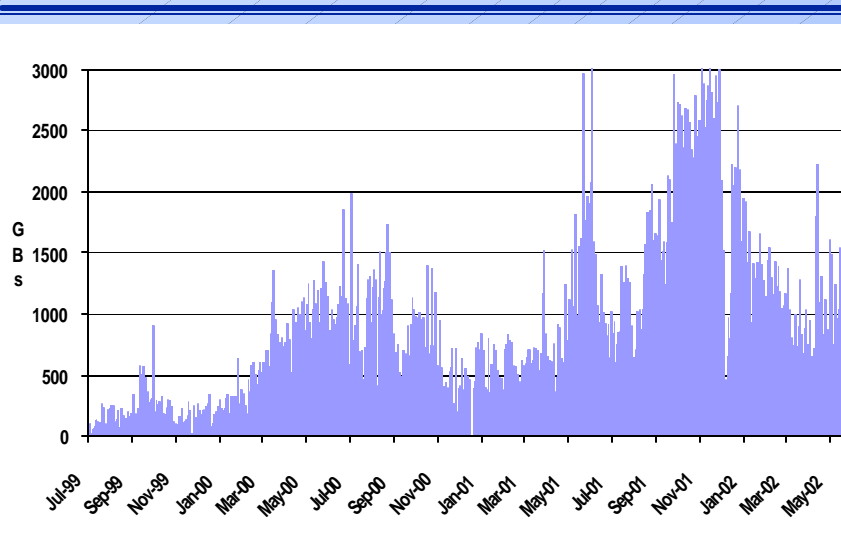


## Public HPSS Software Levels

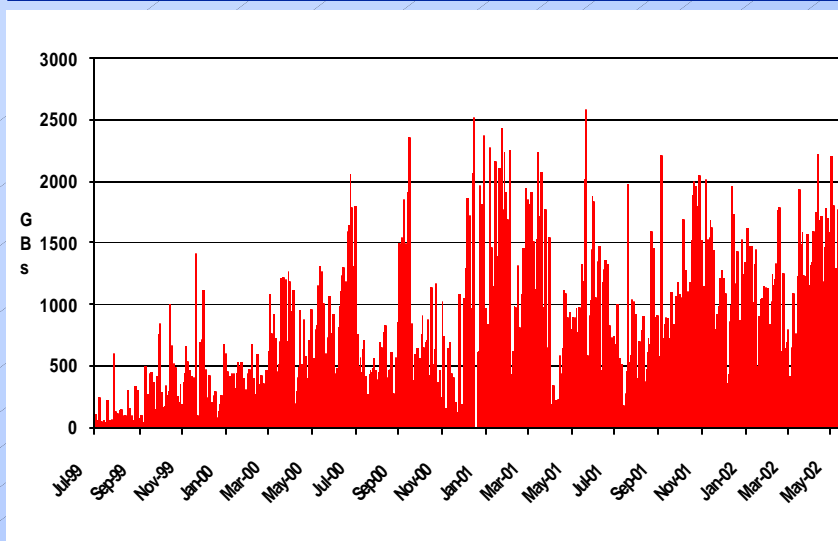
<u>Date</u>	<u>Machine</u>	<u>OS</u>	<u>DCE</u>	<u>Encina</u>	<u>HPSS</u>
<b>Solaris core server and movers</b>					
May 01	420R	7	3.1	4.3.0.3	4.2
Dec 01	420R	8	3.1	4.3.0.4	4.3



## HPSS Bytes Written per Day



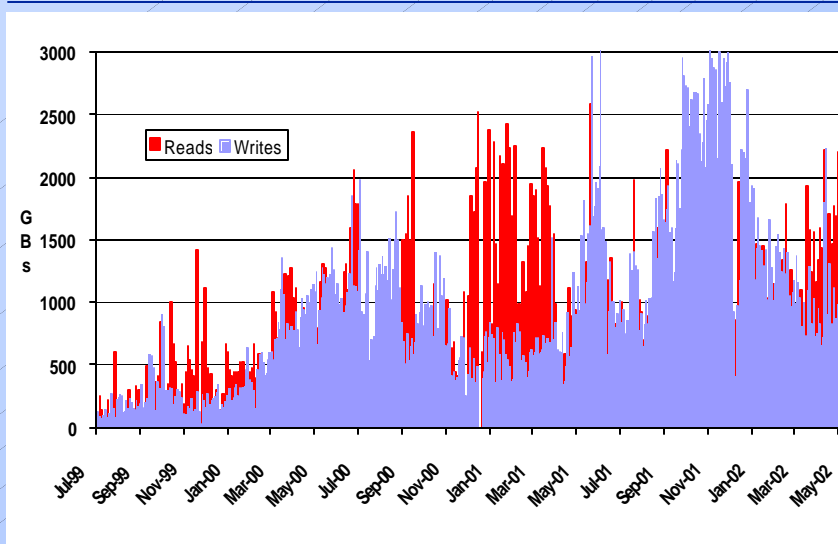
## HPSS Bytes Read per Day



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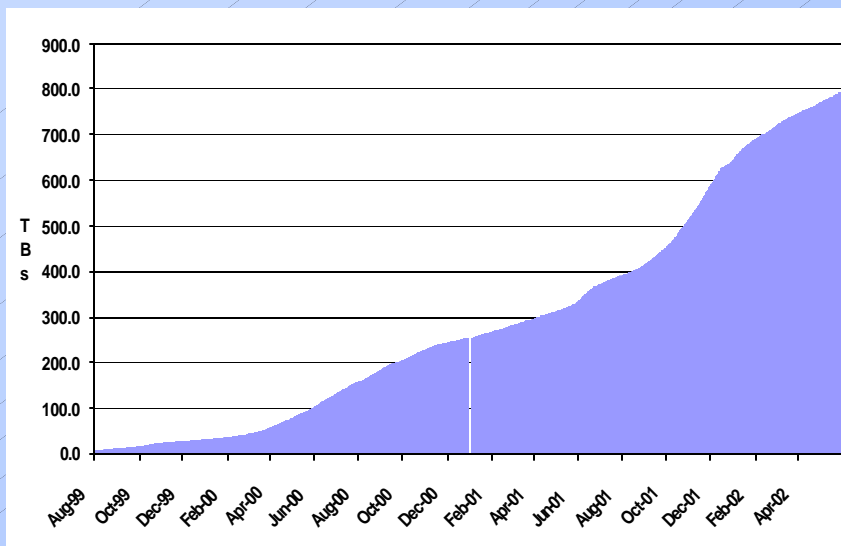
## HPSS Bytes Processed per Day



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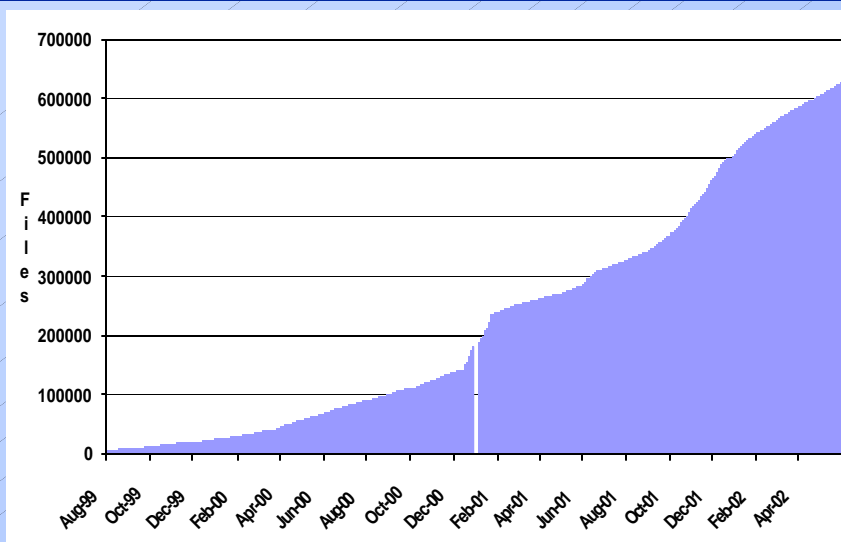
## HPSS Total Space Used



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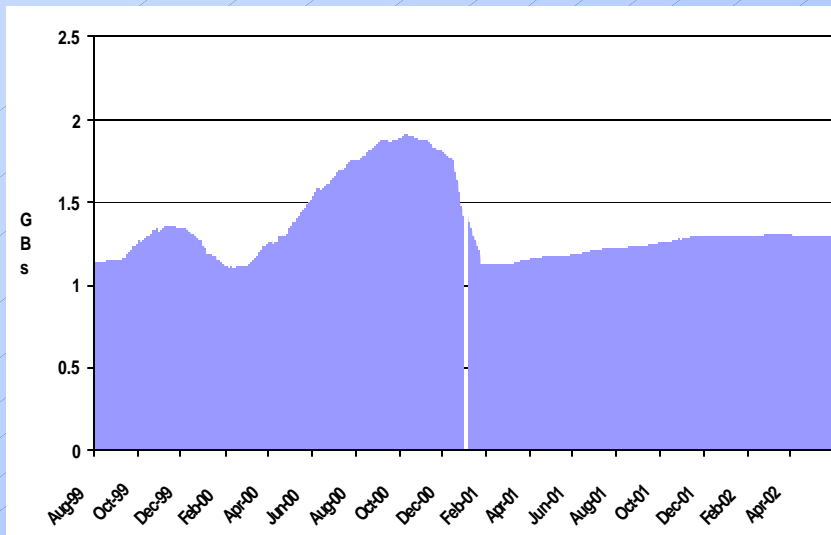
## HPSS Total Files



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## HPSS Average File Size



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## 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



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## 9940 Statistics

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- 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

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- 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)

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- 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

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- 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

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

