

Once again it is time to address issues regarding the TACC data archive infrastructure. When we planned for the purchase of the existing STK silo, five 9840 tape drives, and 1000 tapes we based our projections on an annual growth rate of 1.5. This projection was not a guess but based on historical usage data, Figure 1.

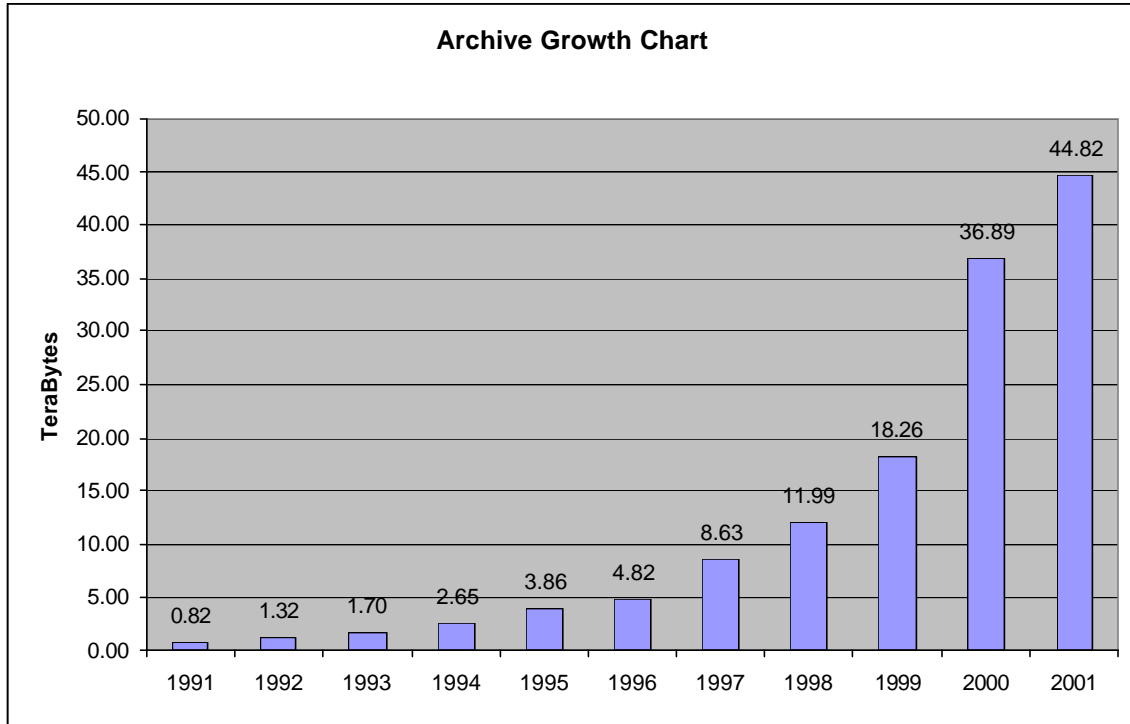


Figure 1

The growth rate in UT FY 2000-2001 was 2.0, with the unexpected growth probably from a combination of 1) the relocation of the T3E/272, 2) the relocation of the IBM SP, 3) TACC assuming responsibility for management of the visualization center in the ACES building, 4) archive becoming a repository for system backups from BEG and CSM, and 5) increased CSR and NPACI utilization. We expected the 1000 tapes purchased with the silo and drives to take us through FY 2000-2001 but the unexpected growth necessitated the purchase of an additional 1000 pieces of media at a cost of approximately \$58,000.

In the first quarter of FY 2001-2002 the archive grew by 17TB. Continued growth at this rate will result in a growth rate of 3.0 for the year. With the installation of the four IBM Power4 systems (peak theoretical performance of .3Tflops), the 64 processor IA32 cluster, and the 40 processor IA64 cluster, and if our plans to increase the user base of the center come to fruition, we will likely exceed a growth rate of 4.0. The decommissioning of the T3E/88 will not have a positive affect on the archive as all users have been migrated to the T3E/272. The users we will attract with the new, more powerful architectures mentioned above will offset any reduced stress on the archive resulting from the relocation of the IBM SP to Michigan.

With the current STK 9840 tape technology, required media type, and average achievable capacity of 22.4GB per tape, to store the projected 72TB for FY 2001-2002 will incur a media cost of approximately \$209,044 (3216 tapes @ \$65 per tape). At the end of FY 2002-2003 the media costs dramatically increase (\$627,133) and the number of tapes will exceed the capacity of three of the current STK 9310 silos. See Figure 2 for details.

Current Technology^{1,2,3}

Fiscal Year	Total TB in Archive	Growth (TB)	# of Tapes	Cost
2001-2002	108.06	72.04	3216	\$209,044.64
2002-2003	324.18	216.12	9648	\$627,133.93
2003-2004	972.54	648.36	28944	\$1,881,401.79
Total:				\$2,717,580.36

¹Projected growth rate of 3.0.

²36.02 TB at the end of FY 2000-2001.

³9840 drives and media.

Figure 2

It is proposed to immediately begin transitioning to the new STK 9940 tape technology. The currently available 9940A drive/cartridge combination provides a native capacity of 60GB per tape, three times that of the 9840 technology we currently deploy. Scheduled for release in the fourth quarter of calendar year 2002 is the 9940B drive, which will provide a native capacity of 200GB per cartridge, ten times the 9840. To leverage past investment, the 9840 drives/media will continue to be used to manage small files. Two 9940A drives and 600 tapes will be purchased (\$110,00) and will be used to manage large files. When available, 9940B drives will be acquired to handle large files, replacing the two 9940A drives. The 9940 cartridges can be read by both model A and model B drives. A comparison between Figure 2 and Figure 3 demonstrates the advantage to moving forward with 9940 technology.

9940 Technology^{1,2,3}

Fiscal Year	Total TB in Archive	Growth (TB)	# of Tapes	Cost
2001-2002	108.06	72.04	1072	\$91,122.02
2002-2003	324.18	216.12	964	\$82,009.82
2003-2004	972.54	648.36	2894	\$246,929.46

Total: \$420,061.30

¹Projected growth rate of 3.0.

²36.02 TB at the end of FY 2000-2001.

³9940 (A/B) drives and media.

Figure 3

The 9940B purchase is actually part of a proposed major upgrade that will provide the infrastructure for an additional 1.2PB capacity at a cost of approximately \$800,000. This will allow TACC to meet the projected storage needs through FY 2003-2004, using a projected growth rate of 3.0. The upgrade includes the following components.

- Six (6) 9940B tape drives
- 5000 9940 tape cartridges
- STK 9310 silo
- Support infrastructure (cables,etc.)
- Shipping and installation

To summarize, TACC has incurred \$58,000 in unexpected costs in FY 2000-2001, plans to spend \$110,000 as soon as possible to upgrade to the newer 9940A tape drives and media, and is tentatively planning to spend \$800,000 on a major upgrade in the next UT fiscal year. As of 1/11/2002 the total amount of storage in the archive was 49.51TB.