Backing up AFS Using TSM

March 24th, 2004

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Overview

- AFS at Stanford
- Old Backup Systems
- Top Requirements
- Implementation using TSM
- Summary
- Questions and Comments

AFS at Stanford

RW Volumes	2,506,130	11,350,278	54,686	45.83
RO Volumes	150,964	1,744,689	6,108	24.72
BK Volumes	-	-	54,684	-
Total Volumes	2,657,094	13,094,967	115,478	23.01

Category	Used (MB)	Quota (MB)	Volumes	Avrg. (MB)

	Total (MB)	Used (MB)	Free (MB)	% Used
Total Disk Space	3,910,413	2,644,824	1,265,590	67.64%

Accounts: 40,000 Class: 4000 Group & Research: 15,00 Dept: 258

Servers: 17 Sun Netra20 Uptime: 99.973%

Old Backup Systems – Before 1999

Old system was built around Legato software and traditional Exabyte tape library

Manual tape changes were required everyday for both backup and restore purposes; hardware failed often

Restore took days and many hours of staff time

Tape capacity was limited and non-automated procedures did not scale as AFS grows

Top Requirements

Automation

Capacity

AFS file level backup and restore; ACLs awareness

Use of centralized storage management infrastructure, if possible

Implementation Using TSM

Hardware

- Two AIX RS 6000 H50 servers
- IBM 3494 tape library – 60 TB capacity
- 200 GB EMC CLARiilon disk

Software and internal developed tools

- Tivoli's TSM server software
- Tivoli's TSM Unix backup-archive client
- Set of tools to optimize the process and schedule concurrent backup jobs
- OpenAFS client on TSM server

Backup Procedures

1. **AFS file servers generate <volume>.backup**
2. **A script generates 2 lists – one for each TSM server - containing volume name, .backup creation time, and modification time.**
3. **Volumes with .nb suffix are not in the lists**
4. **TSM server reads the list, only processes a volume when its modification time is newer than the last TSM backup time**
5. **Concurrent jobs are scheduled to backup the volumes to TSM system**

Issues to be Aware of

- Backup retention policy
- Special backup principal to read AFS files
- Excluding data you don’t want to backup
- No crossing of mount point
- Reporting

Summary

- Optimization and concurrency reduce unneeded processing and speed up the backup process
- Only 10% of the 55,000 volumes are processed
- Daily backup data average – 50 GG
- Restore can be done from command line
- The system has been in production for 5 years, very stable and scalable

Questions and Comments