



# TSM 5.2 Experiences

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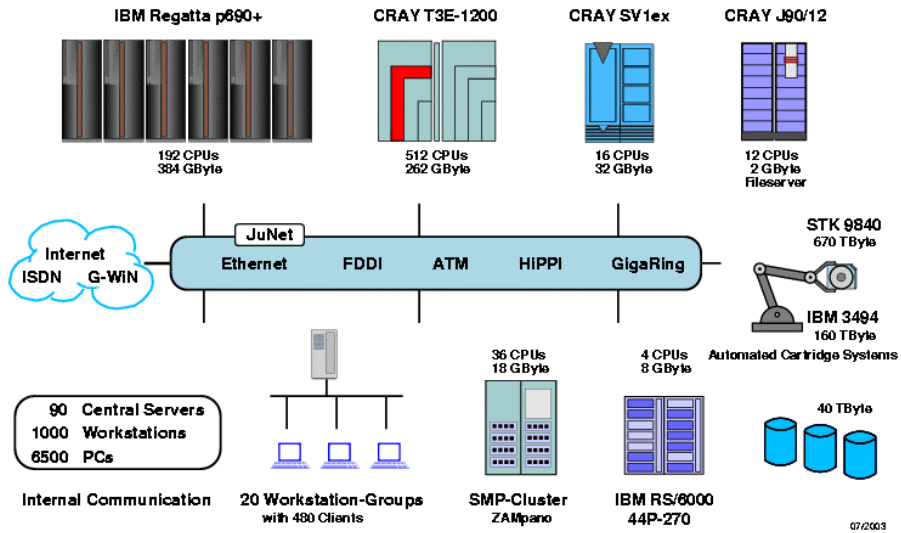
- **TSM Test Configuration**
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- **TSM for the installed IBM Supercomputer**
- **TSM for the planned IBM Supercomputer**
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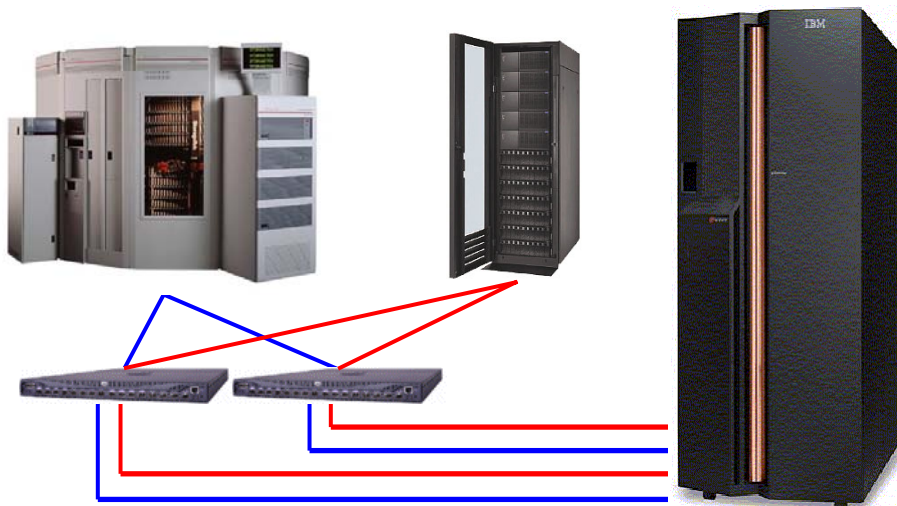
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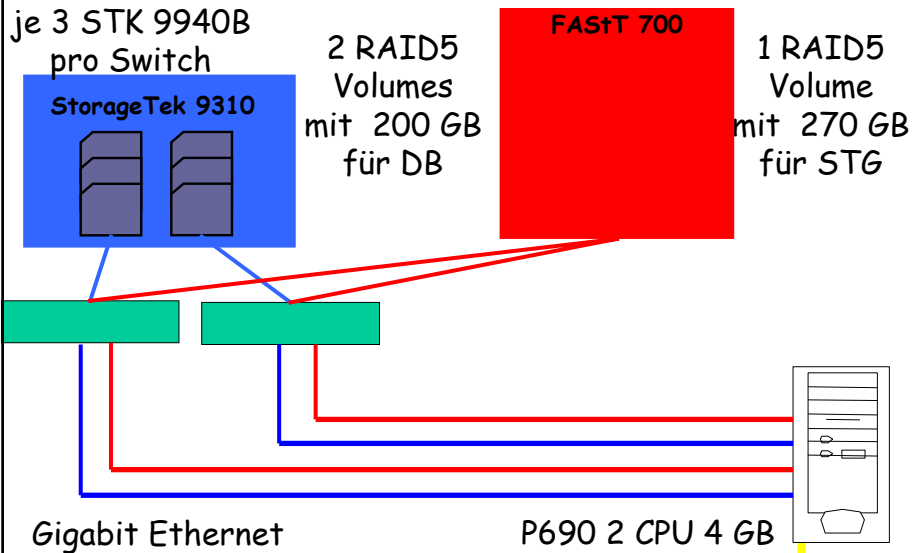


### Central Computer Systems and Communication Networks



### TSM Test Configuration





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## TSM Software Configuration

- AIX 5.1
- TSM 5.2 Beta Server
- TSM 5.2 Beta GPFS Client
- GPFS 2.1
- Gresham EDT-DistribuTAPe 6.4.3
- STK ACSLS 6.1.1

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## TSM Beta Test

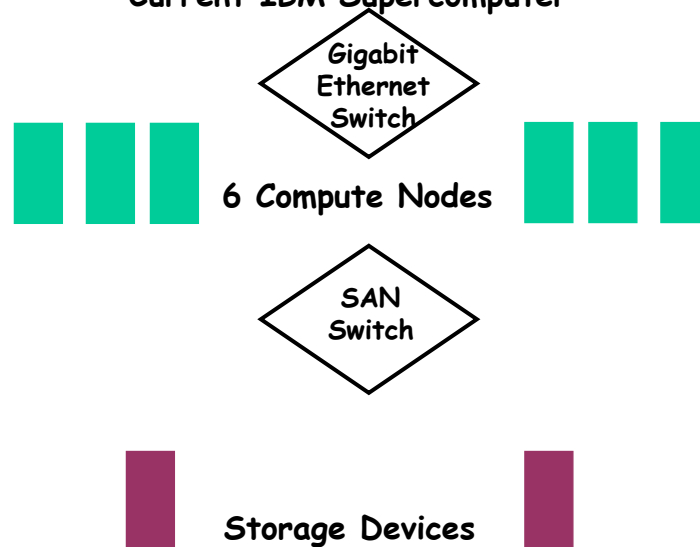
- Archive function without problems
- Backup function without problems
- Tape devices and external tape manager without problems
- Tape performance 30 MB/sec
- HSM function with problems
- HSM function in GA Version without problems

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## Current IBM Supercomputer



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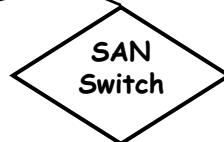


6 Compute LPARs



RAID Controller  
10 TB

1 TSM Server LPAR



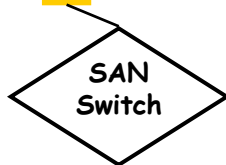
Tape Robot  
16 Tape Units, 1.2 PB

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1 TSM Server LPAR



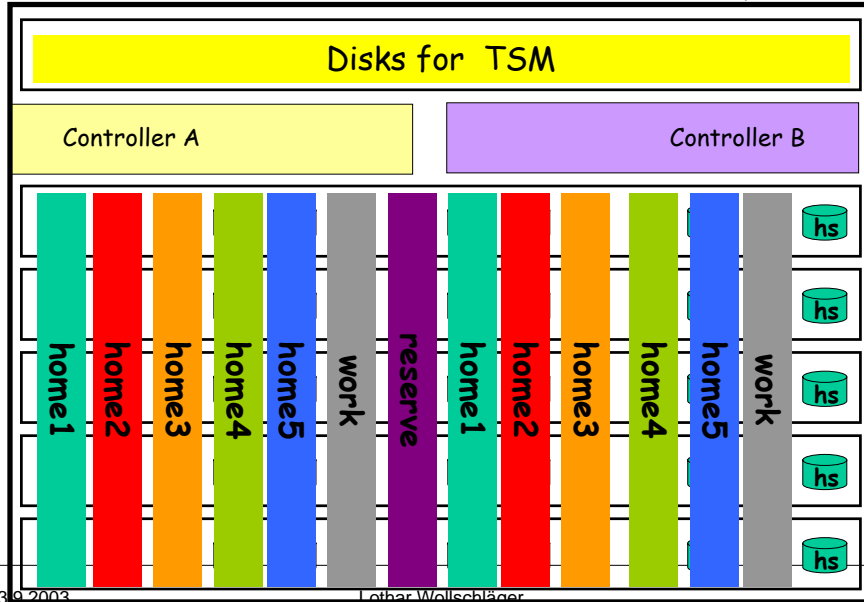
Tape Robot  
16 Tape Units, 1.2 PB

4 CPUS  
8 GB Main Memory  
14 FAST disk (68 GB)

STK Roboter  
5500 Cartridges  
with 200 GB each  
16 Tape units 9940B  
30 MB/sec  
15 seconds mount time

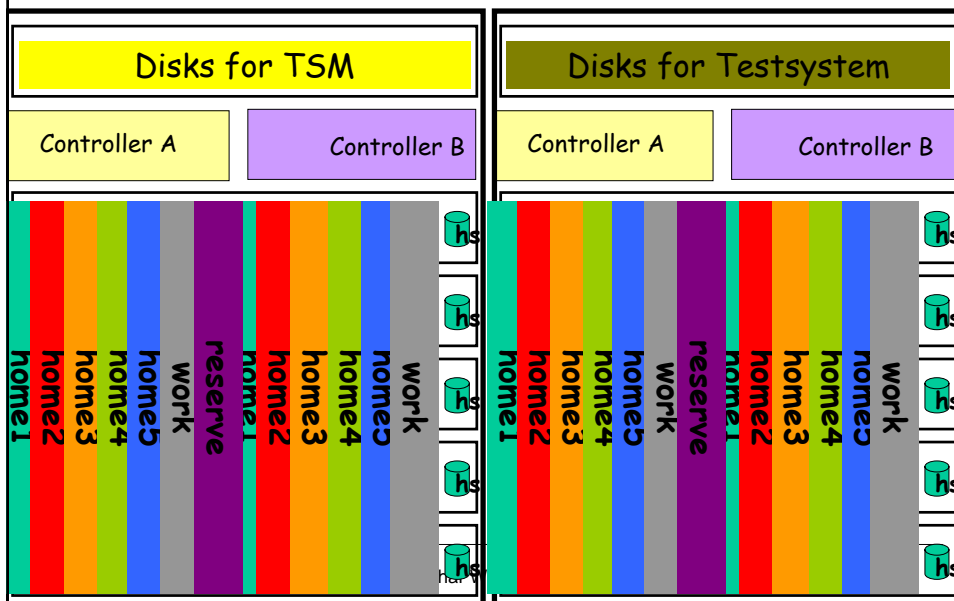
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- RAID5 arrays(0.25TB) building blocks (hdisk)
- 5 home filesystems and 1 work filesystem
- each filesystem has a capacity of 1 TB
- no single point of failure
- 10 hot spares
- 2 arrays (hdisks) (2 x 0.25 TB) in reserve

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## Filesystemlayout

- No local user data on the compute nodes
- All user data in Global Parallel File System (GPFS)
- Each user has his datasets in **one** filesystem
- /work for temporary datasets

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## TSM and the Supercomputer

- incremental backup with TSM
- Hierarchical Storage Management with TSM
- each filesystem has its own TSM Server
- all TSM Servers on one LPAR
- TSM Data (DB,Log,STG) on FASTT
- One TSM Server for backup of „normal“ TSM Server


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## Recovery

### 300 GB Filesystem with 3000 Datasets

1. recreate GPFS filesystem
2. restore all datasets from TSM Backup server  
 3.5 hours (24 MB/sec)
3. Filesystem available

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## Recovery

**Problem: recovery of large filesystems take a long time**  
(1 TB in 12 hours, 10 TB in 5 days)

- more then one user filesystem: if one filesystem is damaged, the other users can work
- one TSM Server per filesystem keeps the TSM database small
- 16 tape units allows parallel restore
- migrate as much datasets as possible and restore only the inodes

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## Recovery

### Filesystem defect

1. recreate GPFS Filesystem
2. restore directory structure from TSM Backup server
3. recreate inodes of migrated datasets from TSM HSM server
4. Restore all other datasets from TSM Backup server
5. Filesystem available

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## Recovery

### 300 GB Filesystem with 3000 Datasets

1. recreate GPFS filesystem
2. restore directory structure from TSM Backup server  
=> 1 minute
3. recreate inodes of migrated datasets from TSM HSM server  
=> 1 minute
4. Restore all other datasets from TSM Backup server  
=> 3 minutes
5. Filesystem available  
=> 5 minutes versus 210 minutes

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## Hierarchical Storage Management

- All userfilesystems are controlled by TSM/HSM.
- Only large datasets which are not used for a long time are removed from disks (migrated)
  - Copy alle datasets as fast as possible to tape (premigration)
  - Free disk space is more disk space is needed
  - Large datasets first
- one TSM server per filesystem
- Integrated with backup solution

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## Hierarchical Storage Management open Problems

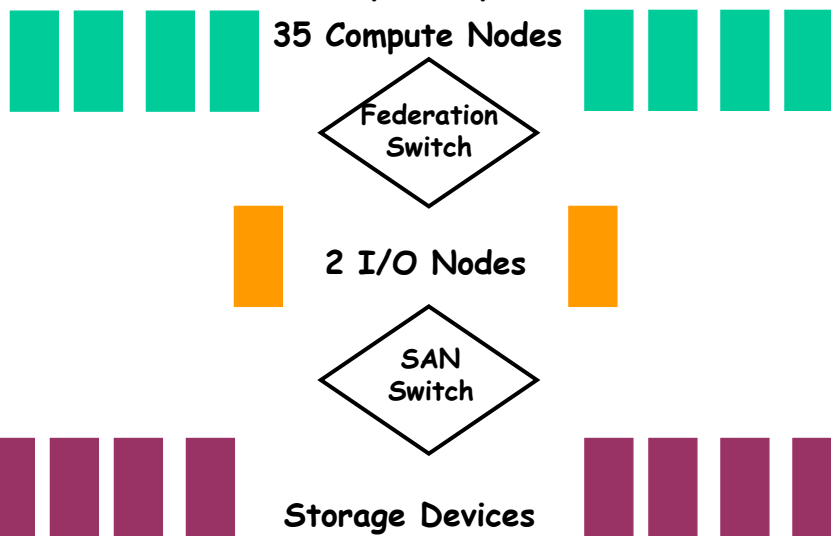
- dsmmigrate from all nodes in a GPFS cluster
- dsmrecall from all nodes in a GPFS cluster

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## Planned IBM Supercomputer (12/03)

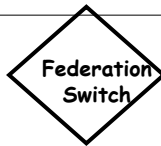


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4 VSD Server LPARs



2 TSM Server LPARs



RAID Controller  
50 TB Benutzerdaten



Tape Robot  
16 Tape Units, 1.2 PB

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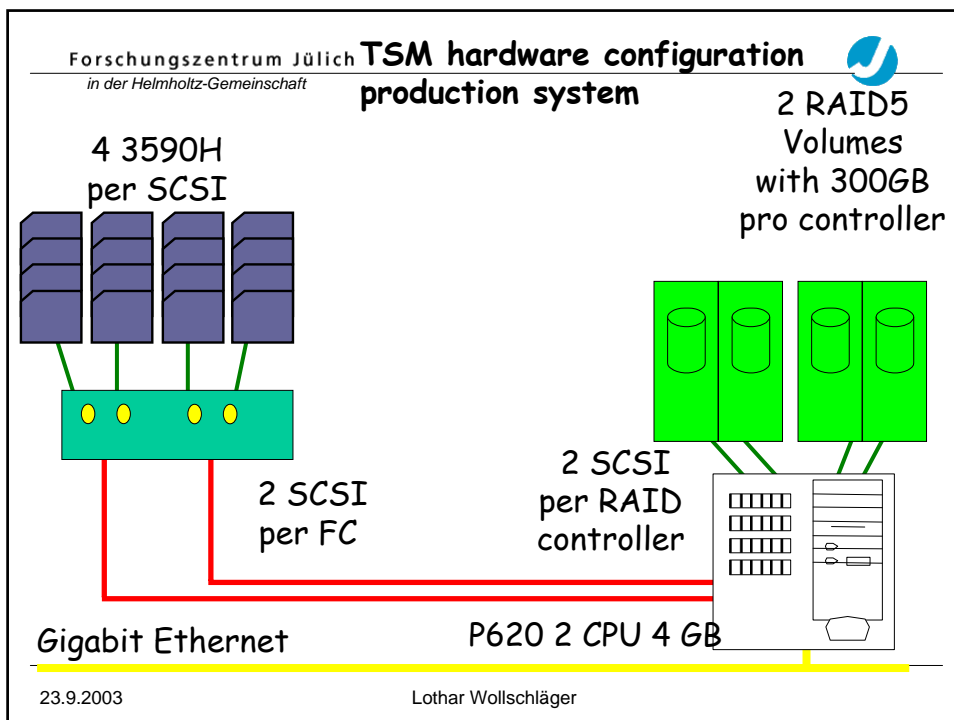
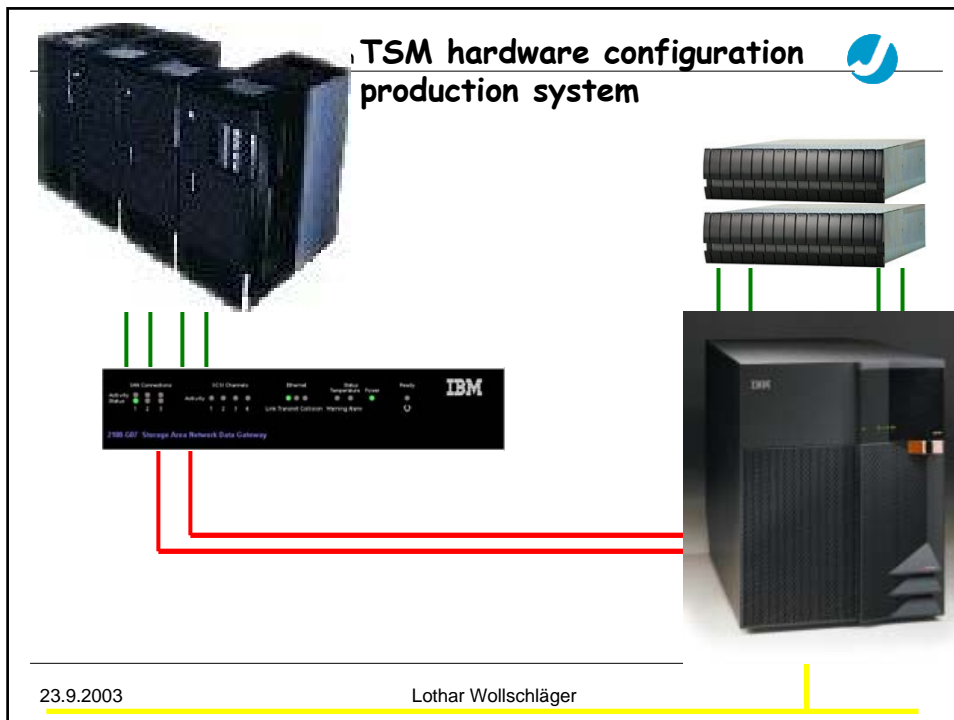
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- Disk access over SAN
- no single point of failure
- GPFS over VSD
- All data on RAID5 (4+1) arrays
- 144 RAID5 arrays with 250 GB each
- 9 filesystems of 16 arrays each (4 TB)
- enough Hot Spare disk
- TSM Daten (Datenbank, Log) in RAID5 Systemen

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## TSM Software Configuration

- 7 backup server and 1 archive server
- ✓ 70 GB Database each
- ✓ shared IBM 3490 Tape Library
  
- 1 dedicated server for the tape library
  
- 1 backup server for the supercomputer TSM Servers

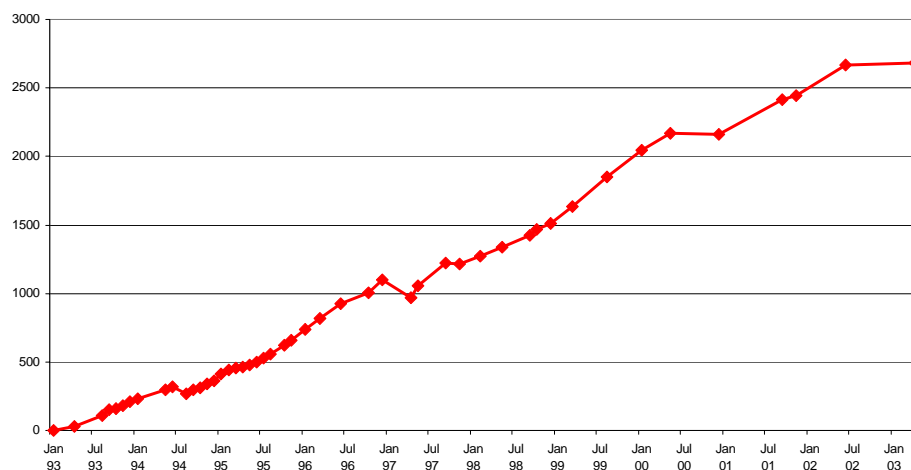
**10 TSM Server on this System**

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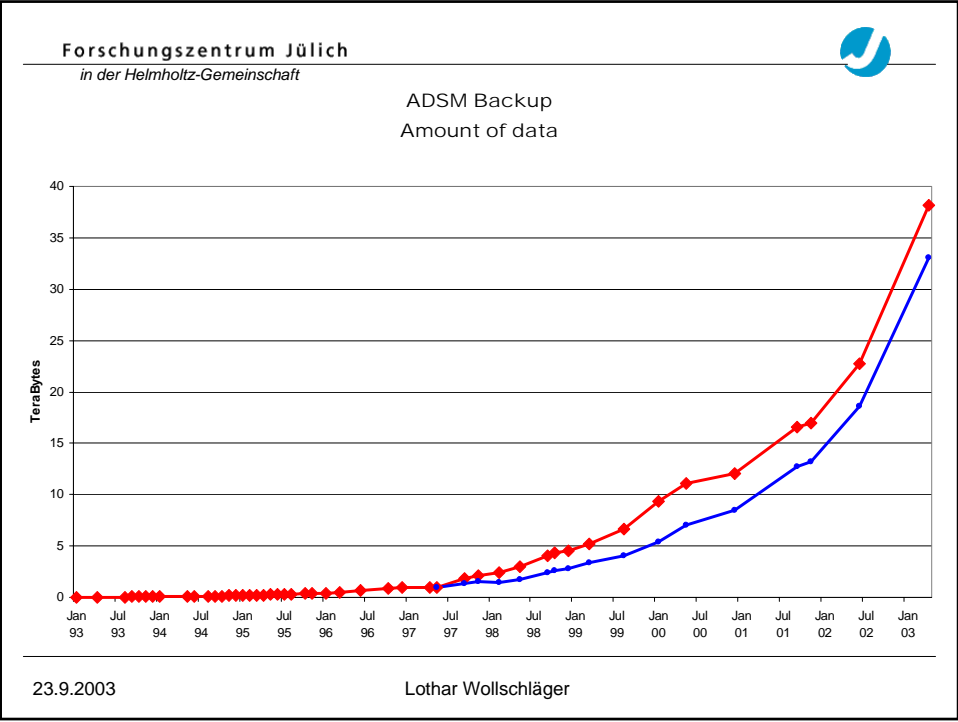
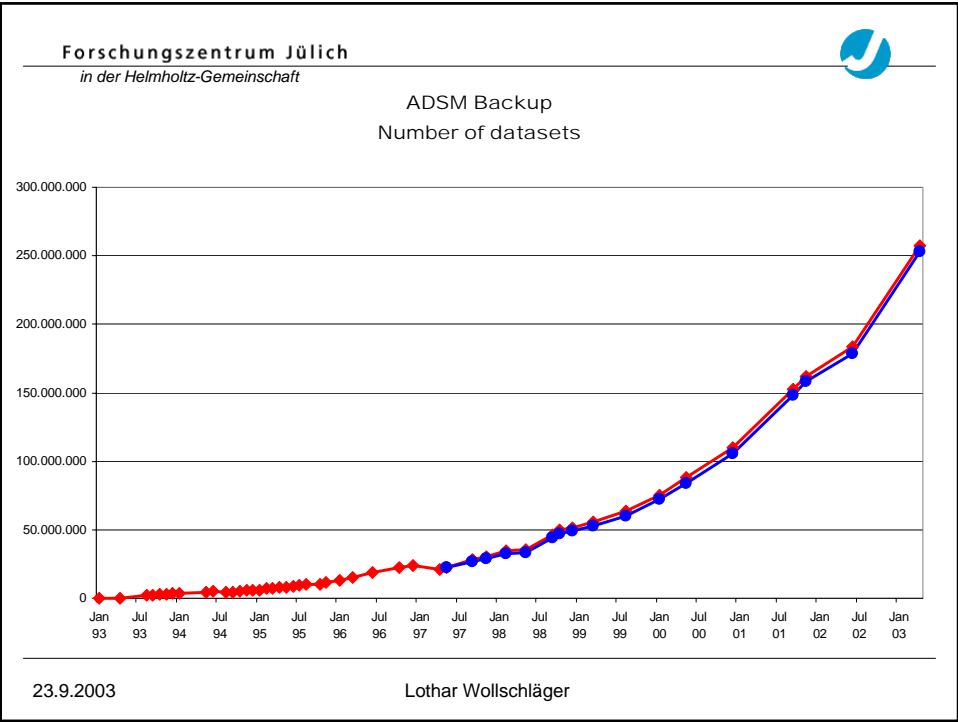


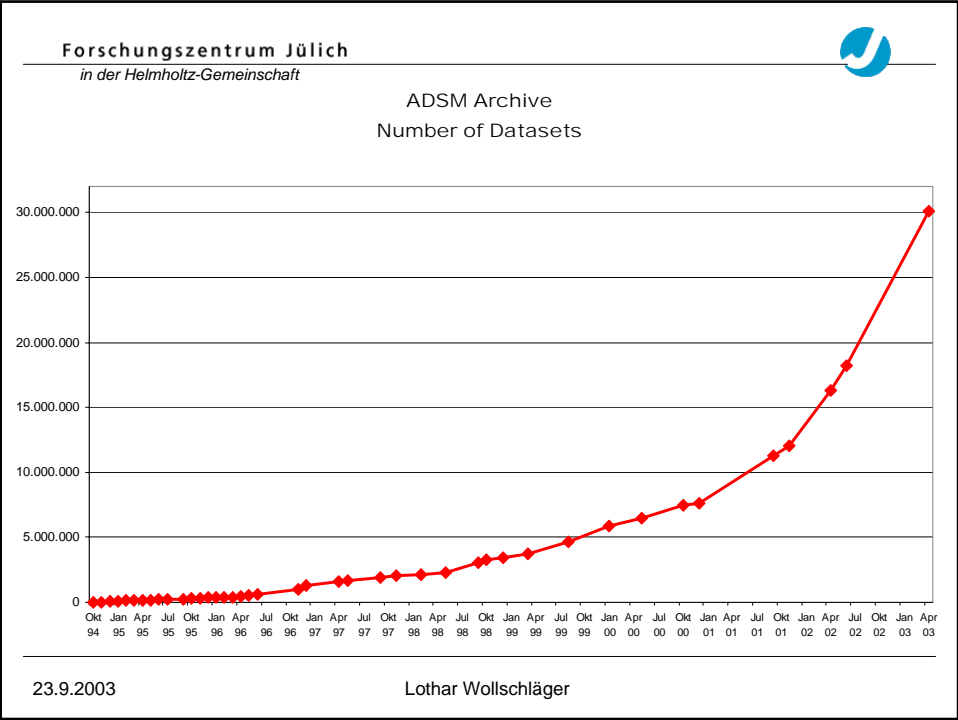
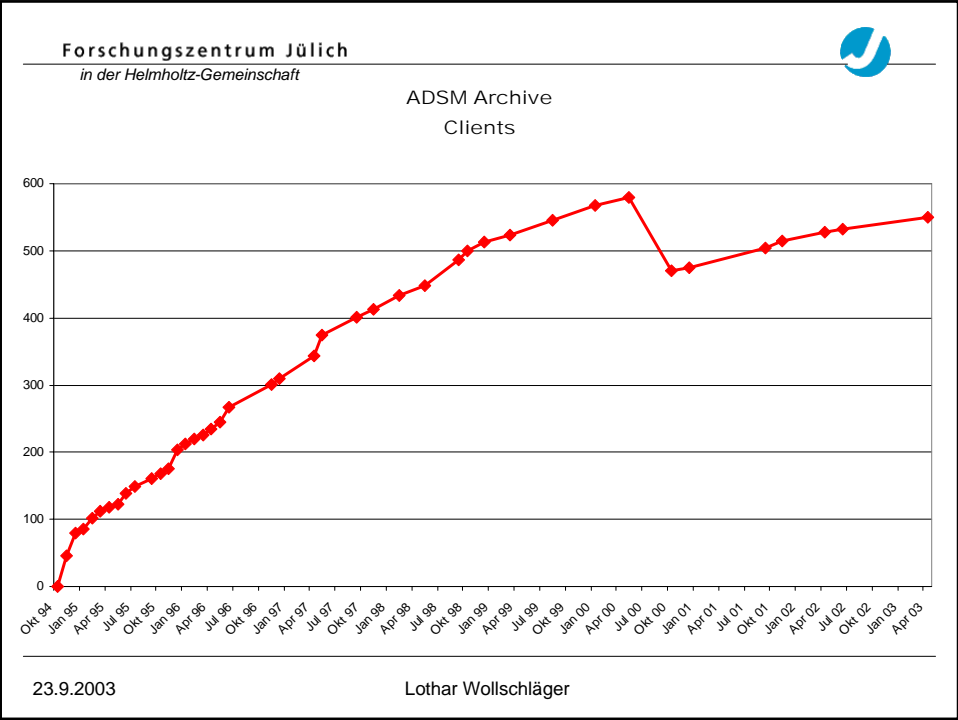
## ADSM Backup Clients



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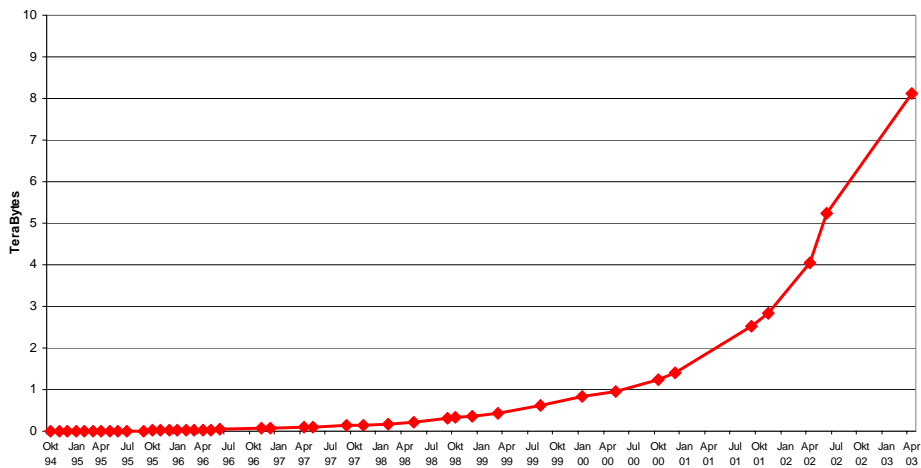








ADSM Archive  
Amount of data



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## Test of TSM 5.2 (Backup)

- Install TSM 5.2 server on a test system
- Install TSM 5.2 clients on dedicated Systems (Win,LINUX,AIX,Solaris)
- Test of 5.2 clients with 5.1 Server
- Test of 5.2 clients with 5.2 Server
- Test of old clients with 5.2 Server
- Define the test Server on the 5.1 TAPE Server to share the IBM Tape Library

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## Migration to TSM 5.2

- **Each server has its own bin directory (copy of /usr/tivoli/tsm/server/bin)**
- **Installation of TSM 5.2.0.0**
- **Halt of a server**
- **Copy /usr/tivoli/tsm/server/bin to /server/bin**
- **Start of a server with /server/bin/dsmserv upgradedb**
- **After migration of first server wait a week to see problems**
- **Migrate the other servers**