Using TSM to create a high-performance tape connection

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Introduction

• Forschungszentrum Karlsruhe and GridKa
• dCache setup
• the easiest tape connection
• improvements
• a high-performance tape connection
• conclusion
GridKa

- Forschungszentrum Karlsruhe
  - Research centre with 3800 employees
  - Program: Energy, health, nano-microsystems, earth and environment, structure of matter
  - GridKa is part of "structure of matter"

- Grid Computing Centre Karlsruhe (GridKa)
  - Tier1 centre for LHC experiments
  - Production for further experiments
Service Challenge Throughput Phase

Daily Averaged Throughput From 17/01 to 23/01
From CERNCI to ALL SITES

Throughput (MB/s)

Dates

GRIDVIEW, Powered by R-GMA
Our GridFTP doors

8 gridFTP doors but only 4 pool nodes
Planning numbers

- 10% of total LHC
- Includes non-LHC
- CPU (2006) = 1300 kSI2K
A Simple Tape Connection

A solution for Tier2 sites ~100MB/s
Storage Agent

• TSM Server has database about tape information
  – location
  – utilisation

• Storage Agent is a minimised TSM-Server without its own database
  – connected via Storage Area Network (SAN) to the tape library (can directly use tapes)
  – the control connection to the TSM-Server is via LAN
Proxy Node

• dCache does its own load balancing
  – files are stored from one pool and retrieved from another pool

• all nodes have the same node name within TSM
  – creates lots of info messages
  – it works only if the TSM-server does the tape connection

• same node name does not work with LAN-free storage agents
  – proxy node is common name for all nodes
An Idea

TSM-Server

Client

dCache pool storage agent

dCache pool storage agent

dCache pool storage agent

dCache pool storage agent

Tape library
Archive Functionality

• a “normal” tsm archive
  – information lost if interruption occurs
  – no version control

• dCache creates a new session for every file
  – actual status of written files
  – TSM-server -> tape connection
    • same tape is used without dismounting
  – storage agents -> tape connection
    • frequent tape dismount
TSM With Storage Agents

Pool A  Pool B  Pool C  TSM Server  drive f  drive g  drive h

tape k mounted  tape m mounted
write file  write file
request mount  choose tape
wait for tape
umount tape k
mount tape k
write file
choose tape
take tape k
take tape o

13 February 2006, Chep06, T.I.F.R. Mumbai India
A Solution

tape handler keeps connection open
– dismounting is minimized
Conclusion

- TSM Server max throughput is 100MB/s
  - 3 drives (LTO2) a 35MB/s = 105 MB/s
- Storage Agent max throughput is 100MB/s
  - without tape handler
    - >> # storage agents >> tape mount actions
    - >> # storage agents << throughput
  - tape handler
    - max 1 or 2 drives connected
    - max used is 70 MB/s
    - >> # storage agents >> throughput
Poster Session

• Dr. Andreas Heiss: Connecting WLCG Tier-2 Centers to GridKa (today)
• Dr. Sven Hermann: Operating a Tier1 centre as part of a grid environment (today)
• Bruno Hoeft: LHC-OPN Network at GridKa (Wednesday)