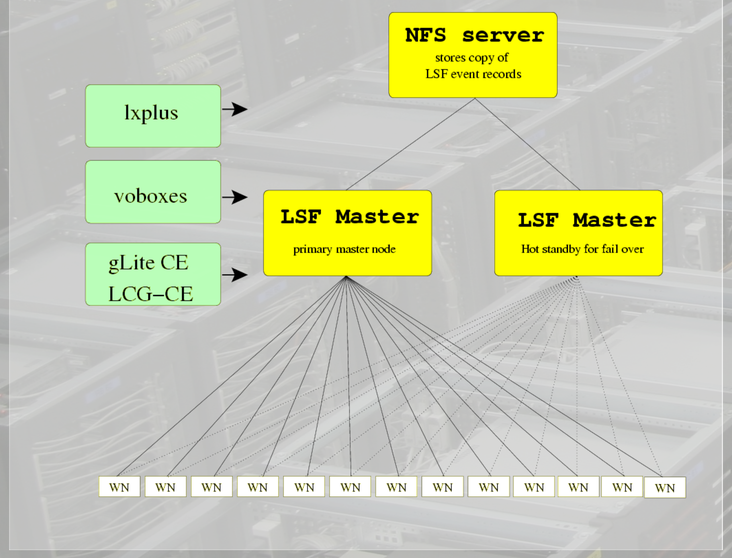
LSF usage for batch at CERN

CERN IT Department

Batch services at CERN status (August 2007)

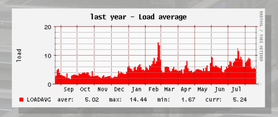
- LSF 6.1 batch system software
- Average job throughput: 20k/day
- 3 Master server nodes:
  - 2.8 GHz Dual Xeon (32bit), 4 GB RAM
  - SLC3 GNU/Linux operating system
  - Event files shared via NFS
- Submission hosts
  - Interactive cluster, VO boxes for local jobs
- GRID CE cluster (18 nodes) for Grid jobs

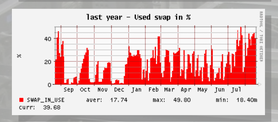


- Worker nodes (~3000)
  - Very dynamic, changing every day
  - Mostly SLC3(32bit) and SLC4(64bit)
  - 2.4-3 GHz CPU, 2-8 GB RAM
  - Newer machines 2 GB RAM / CPU core
  - 35 GB – 160 GB local disk space

Challenges / limitations

- Performance issues above 50k jobs in the system
- Long reconfiguration time
- LSF6.1 limited of 5k hosts
- Number of batch system queries (CE)





Master load average and used swap (one year)

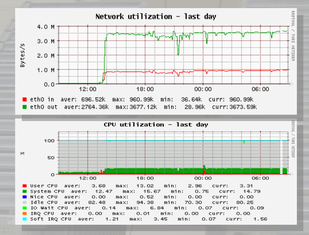
Solutions

- Limit total number of jobs
- Software patches by Platform
- Optimization of tools
- Migrate to more powerful HW
- Migrate to latest Platform LSF
- Grid middleware updates
- Education of users

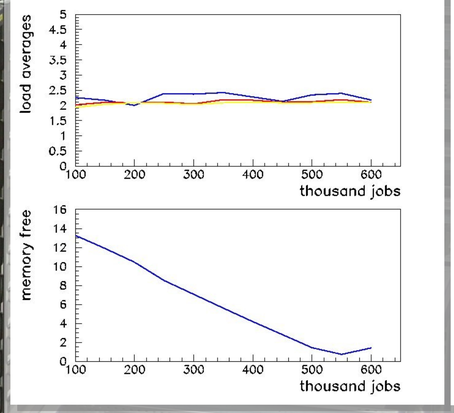
LSF 7.0 first test results (preliminary)

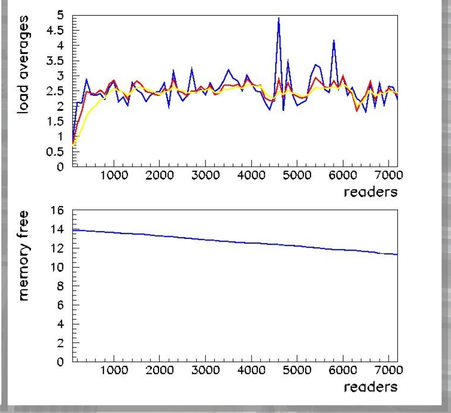
Master test node:

- Intel dual Quadcore
- 2.3 GHz
- 16 GB RAM
- 64bit SLC4 OS



Master node monitoring during query stress test





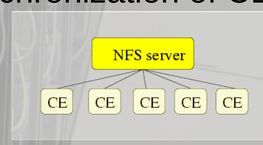
Master load averages and memory utilization as a function of jobs (left) and batch system query processes (bjobs and bacct) for short jobs

500k small jobs OK

number of batch queries limited by network

Caching information providers

- 18 production CEs + CE test nodes + PPS nodes
- share batch query results via cache files on NFS
- side effect: synchronization of CE cluster



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