First Results of Using IDE File Servers for PC Farms for LHC Experiments.

- Introduction
- Experimental Setup
- RAID0 local tests
- Network tests
- Some conclusions

LHC Experiments Requirements

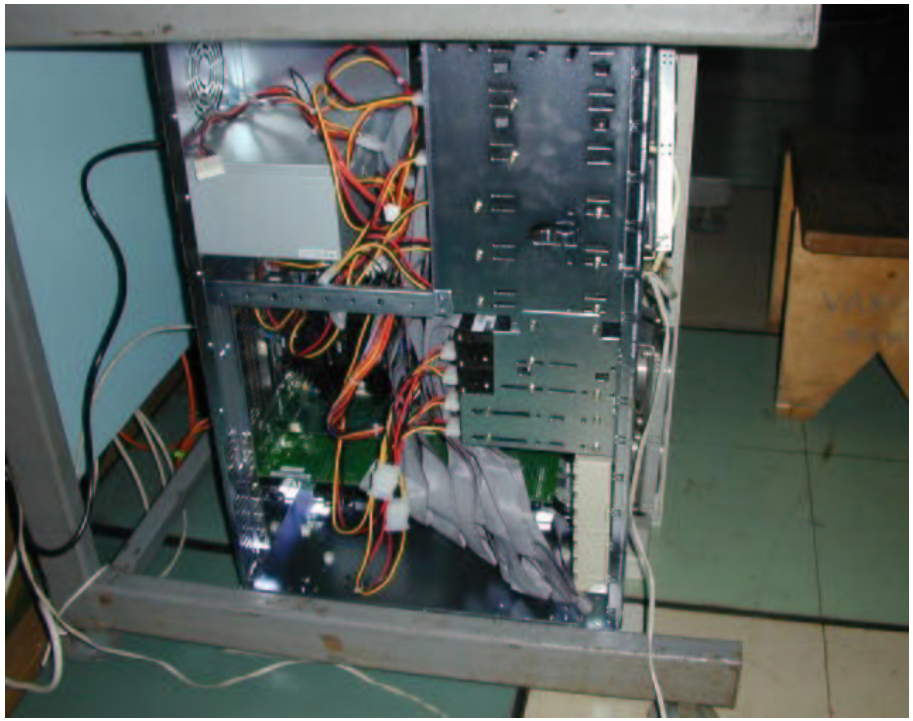
Tier1:

CPU:	~100K SI95
Network:	~2.6Gbit/s
Disk Storage:	**~300TB**
Tape:	~1000TB

Setup

-Dual PIII-650MHz on Intel L440GX+motherboard
-512MB of RAM
-Intel(R) PRO/1000 Ethernet card on 66MHz PCI
-3ware 6800 IDE RAID controller on 33MHz PCI
-8 IBM-DTLA-307075 in hardware RAID0
-Linux-2.2.18
-Ext2 file system

Setup



RAID0 tests

Bonnie -s 2000

Output:	
Per char:	10230 K/sec
Per block:	64040 K/sec
Rewrite:	22107 K/sec
Input:	
Per char:	11001 K/sec
Per block:	79553 K/sec
Random seeks:	400.2/sec

RAID0 tests

```
dd bs=1024 count=2000000 if=/dev/zero of=file#
dd bs=1024 count=2000000 if=file# of=/dev/null
```

For 6 processes:

output: ~65-66MB/sec

input: ~78-79MB/sec

NETWORK tests

NFS v2 async mode:

mount -orsize=8192,wsize=8192

```
dd bs=1024 count=2000000 if=/dev/zero of=file#
dd bs=1024 count=2000000 if=file# of=/dev/null
```

Output: 220-230Mbit/s
Input: 260Mbit/s

NETWORK tests

TCP/IP pipelines:

```
rsh hostname dd bs=1024 count=2000000 if=/dev/zero | \
   dd bs=1024 of=file#
dd bs=1024 count=2000000 if=file# | \
   rsh hostname dd bs=1024 of=/dev/null
```

Output: 220-230Mbit/s
Input: 260Mbit/s

Pure NETWORK tests

TCP/IP pipelines (no file system):

```
rsh hostname dd bs=1024 count=2000000 if=/dev/zero | \
   dd bs=1024 of=/dev/null
dd bs=1024 count=2000000 if=/dev/zero | \
   rsh hostname dd bs=1024 of=/dev/null
```

Output: ~450Mbit/s
Input: ~450Mbit/s
Bidirect IO: ~300-350Mbit/s

Conclusions

- Due to some archetecture limitations we have real disk access speed at 200-250Mbit/sec
- The limitations are common for IDE and SCSI options
- EtherChannels can be used instead of GigaEthernet, though GigaEtheret is more scalable solution
- We need to study of some other options (2.4.xx kernel, >100MHz system bus, faster processors etc)