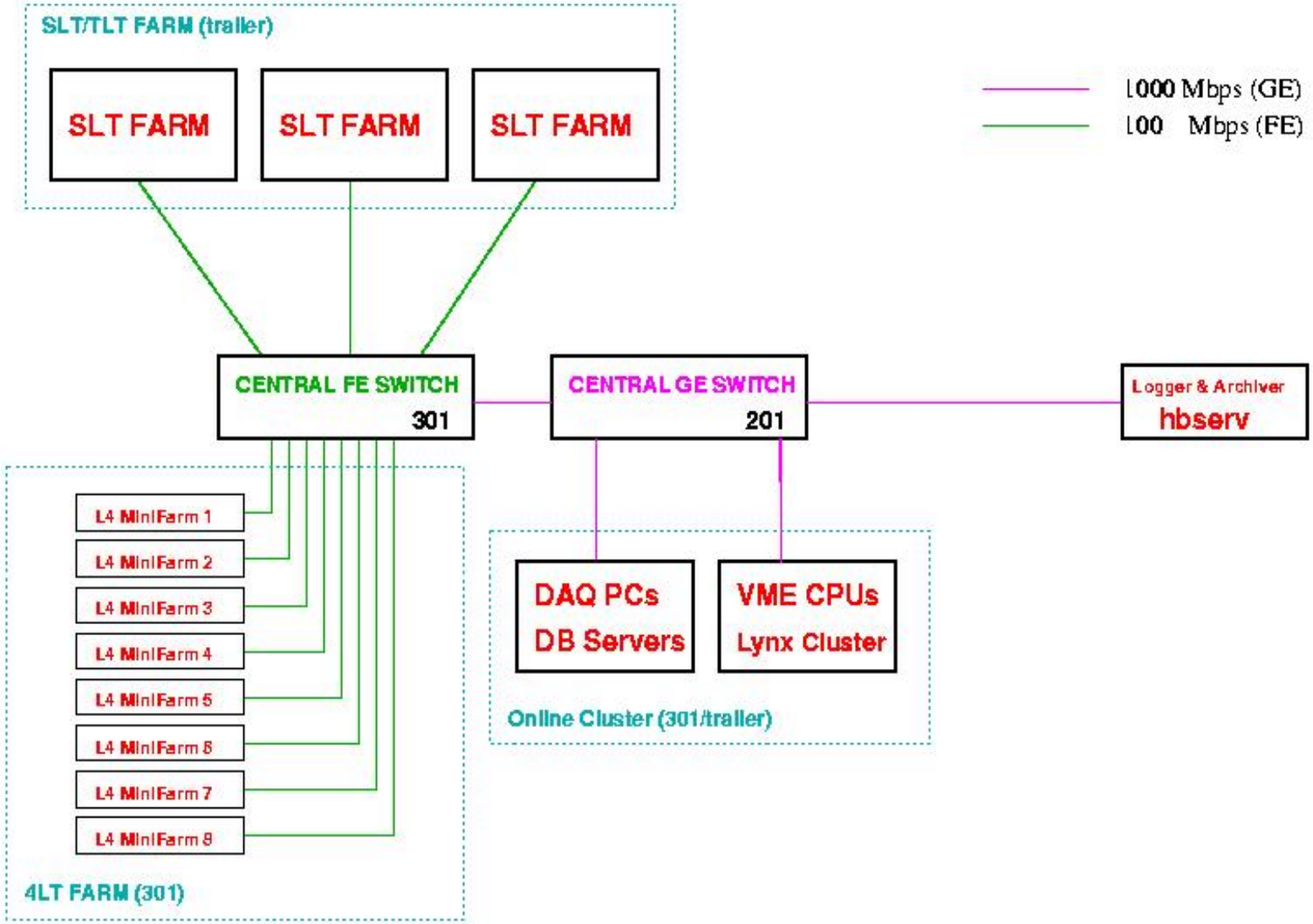
L4 Farm & Online Computing Infrastructure

- Status
  - Manpower
  - Hardware
  - Software
- Upgrade & Prospects

L4 Farm Status

- L4 Farm Manpower
  - F. Sun, U. Schwanke, A. Gellrich have left the group
  - R. Baghshetsyan (YerPhi/DESY). Contract till September 2001
  - S. Essenov (ITEP), Contract till End 2001
  - J. Hernandez (DESY Zeuthen) Contract till July 2002
  - Share manpower with DAQ group
- L4 Farm Tasks
  - L4 Farm coordination: AG $\rightarrow$ JH
  - Farm Hardware and system software FS $\rightarrow$ JH
    - 186+8 CPUs, FE network with GE uplink
    - Standard Linux operating system
    - Status: Some upgrades to be done

HERA–B NETWORK INFRASTRUCTURE



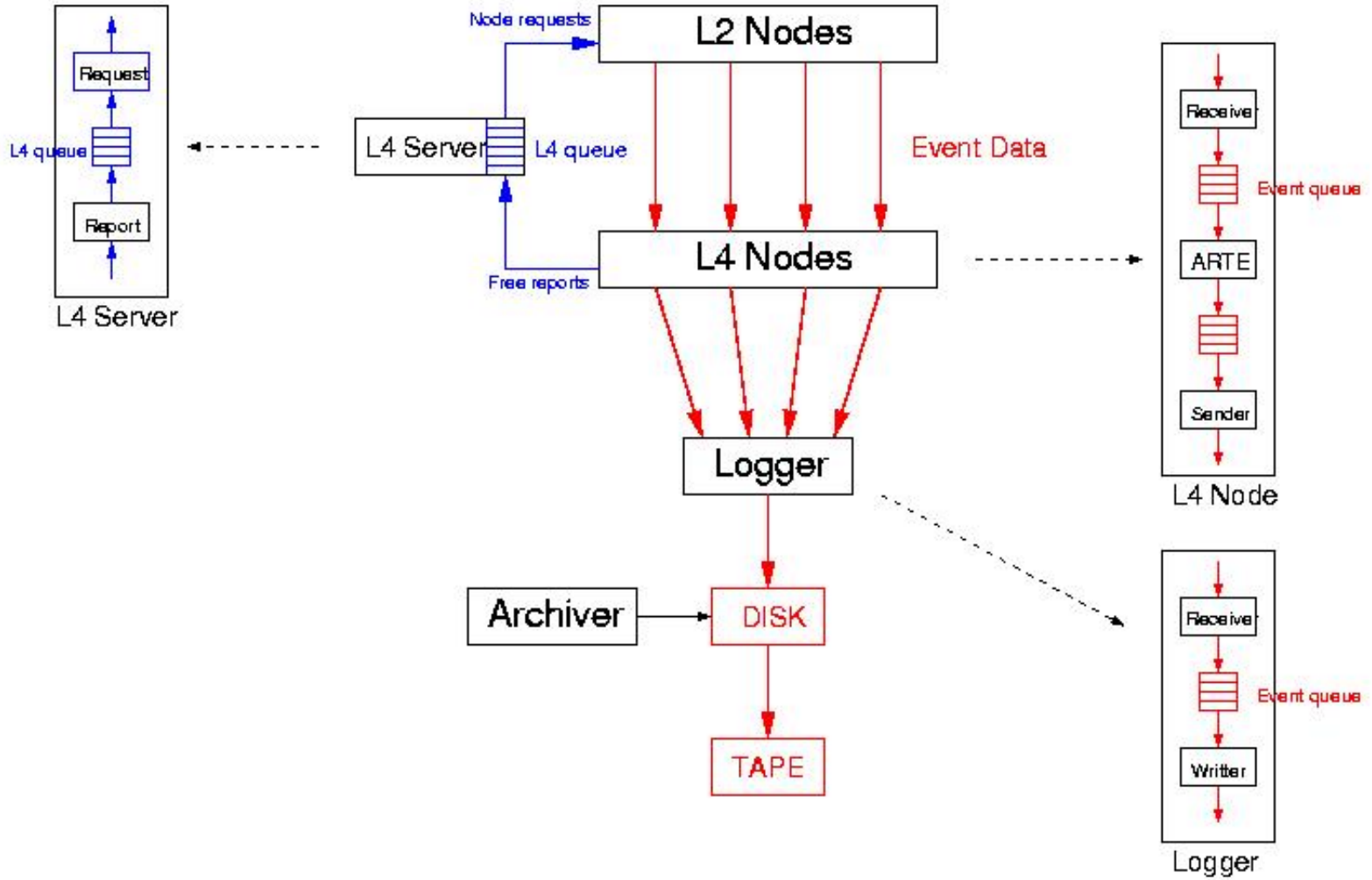
L4 Farm Status

- Event Distribution L2 $\rightarrow$ L4 software — FS $\rightarrow$ JH
  - L2 sender, L4 Receiver, L2 $\rightarrow$ L4 controller, tcp-based event transmission. Status: Maintenance
- Event Distribution for Reprocessing — JH
  - Max. Performance $\approx$ 25 Hz limited by CPU power in logging machine, ARTE event processing time, event distribution protocol. Status: being improved (see Reprocessing report in Physics Plenary)
- Event Logging software — SE
  - L4 Sender, Logger Receiver, Logger Writer, event dirs, gpack, tcp-based event transmission. Status: maintenance
  - Performance up to 100 Hz, 12 MB/sec
- Archiving & staging software and Data management — RB
  - Archiver process, staging software. Status: maintenance
  - 8 Tbytes 2000 run on tape. Sustained 5 MB/sec

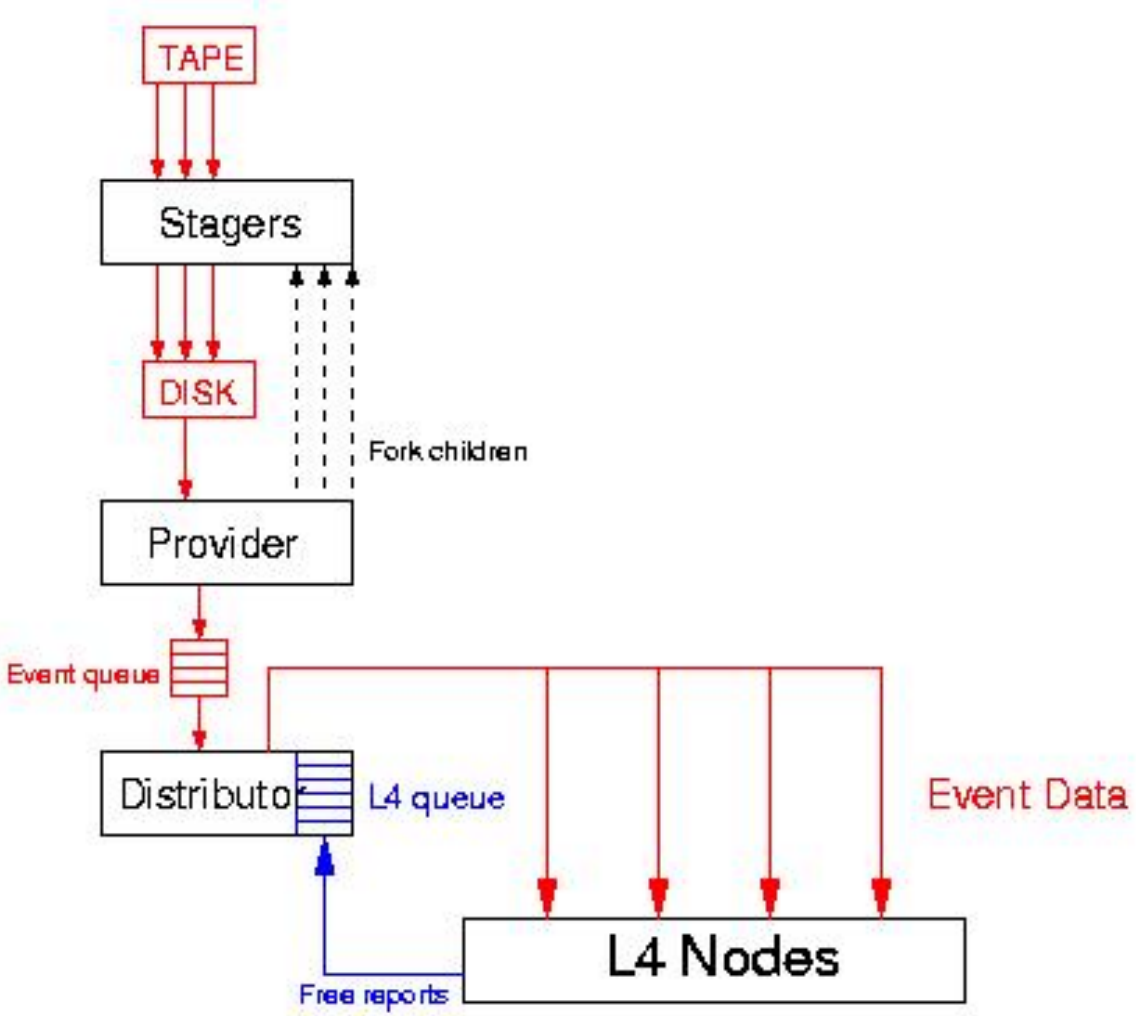
L4 Farm Status

- Farm Slow Control, Monitoring and RHP software — US → ?
  - rpm multithreading implemented in RHP
- FARM module in ARTE — AG → JH
  - Online extensions, CnA, DQ, Event Classification and Selection Frameworks.
  - Continue integration of subgroups
- Monte Carlo Production in the FARM(s) — All
  - Use reprocessing machinery to boot, control, monitor, produce and collect MC events
  - Some details to be fixed but in principle no major effort

Event distribution, Logging & Archiving



Event Distribution in Reprocessing



L4 Farm Upgrade

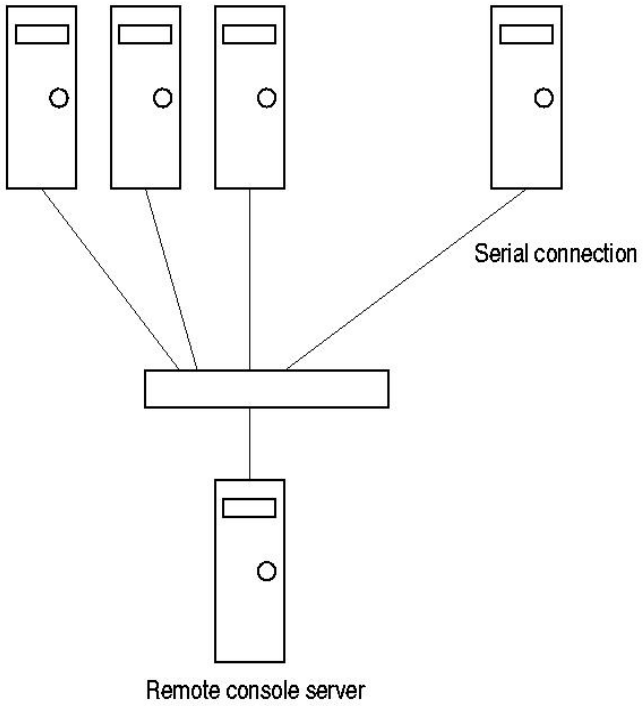
- Goal
  - Smooth FARM operation and running
  - Improve remote access for troubleshooting

- Problems during run 2000
  1. No remote access for reset, power off/on of nodes
  2. No remote access to console of nodes
  3. Outdated Linux installation
  4. Instability in loading of CnA constants by ARTE
  5. Poor performance of DQ gatherer
  6. Interference with offline usage of logging machine

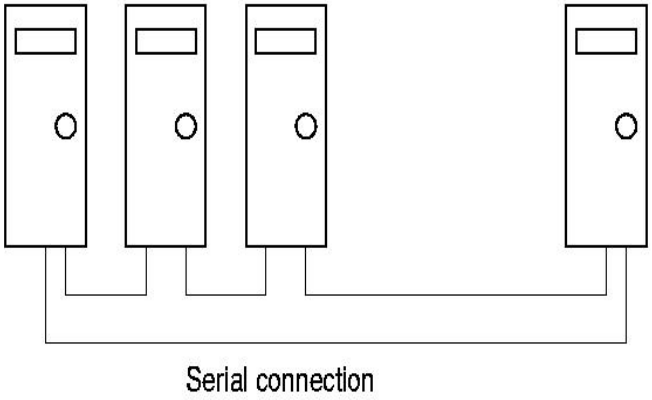
L4 Farm Upgrade

- Solutions
  1. Installation of CAN bus cards
     - Cards ready. To be installed in March/April
     - Connect to existing L2 CAN control
  2. Installation of serial console access
  3. Automatic Linux installation from central DESY installation server customized for HERA-B online being prepared.
     3. Upgrade to SuSE 6.3, kernel 2.2.17, glibc 2.1 in March/April
  4. Improve response of DB servers: rpm multithreading
  5. Improve histogram gathering protocol: rpm multithreading in DQ gatherers
  6. Installation of dedicated logging machine in WH

Remote Console Access



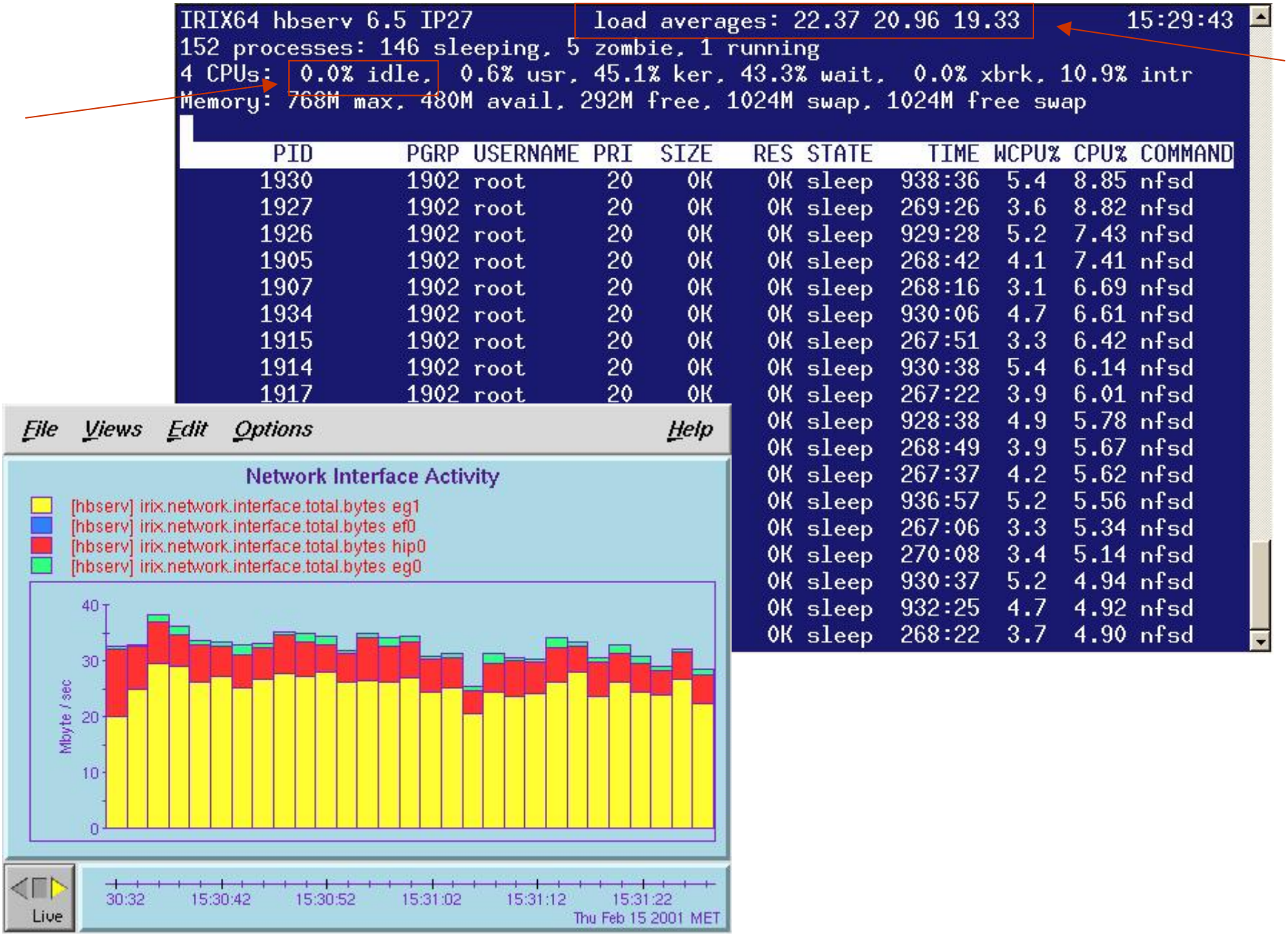
- Console can be redirected to serial port
- Remote serial console server:
  - Flexible, scalable but expensive



- Serial console access via the neighbour
  - Redirect console to 1st serial port
  - Use 2nd serial port to access console of the neighbour
  - Very cheap
  - Not so flexible but allows remote access to the console

Dedicated Logging Machine

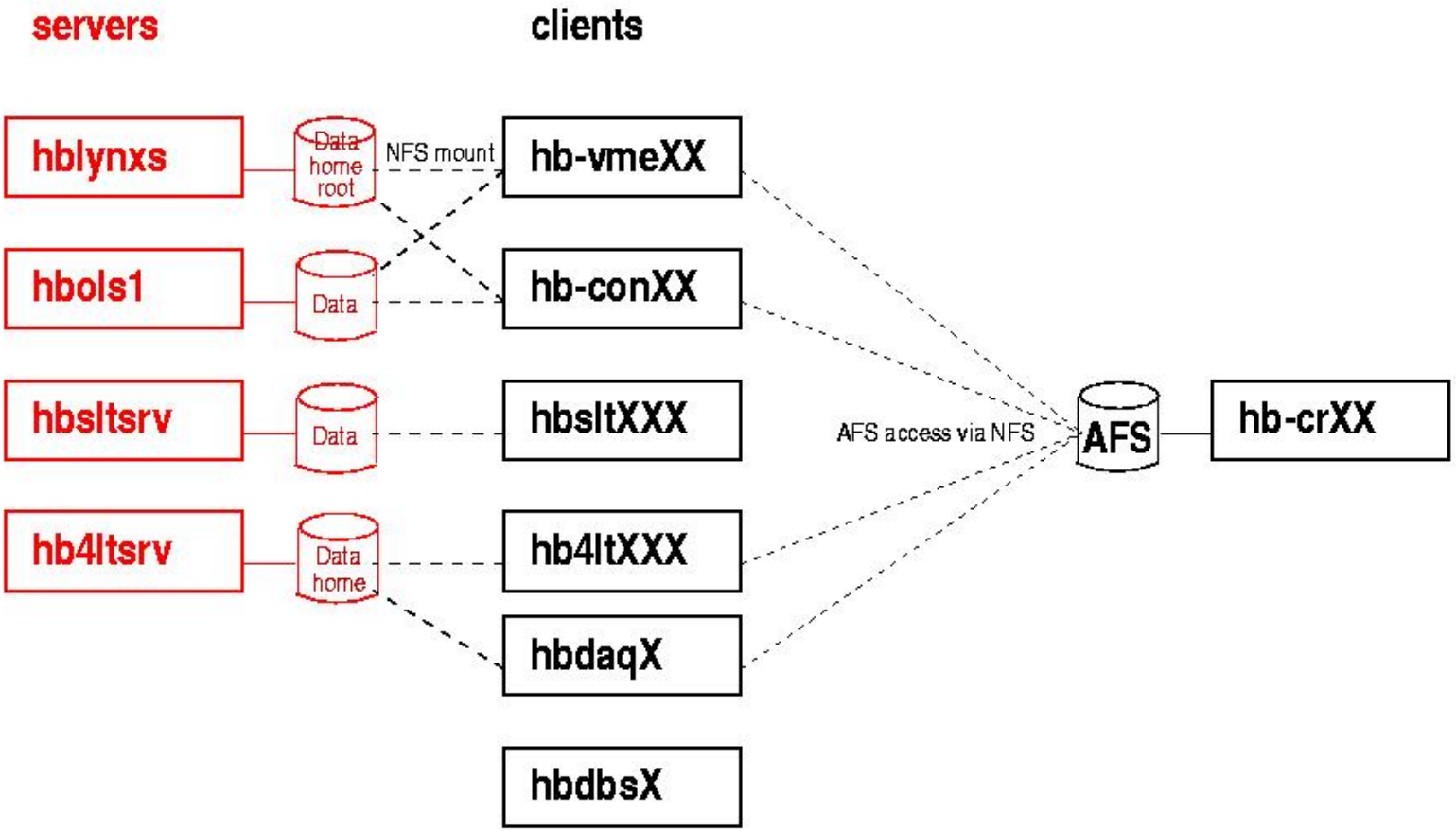
- Logging and event distribution for reprocessing currently done in offline machine (hbserv) which is used as event data file server
- Dedicated logging machine to avoid any interference
- Powerful machine needed for logging and reprocessing
  - High network bandwidth, CPU power and disk performance
- Evaluation of new DESY Linux File server (delfi)
  - 2 x PIII 800 MHz
  - Gigabit Ethernet interface (1000 Mbps)
  - Hardware RAID controller
- Very promising logging and reprocessing tests


IRIX64 hbserv 6.5 IP27
load averages: 22.37 20.96 19.33
15:29:43
152 processes: 146 sleeping, 5 zombie, 1 running
4 CPUs: 0.0% idle, 0.6% usr, 45.1% ker, 43.3% wait, 0.0% xbrk, 10.9% intr
Memory: 768M max, 480M avail, 292M free, 1024M swap, 1024M free swap
PID PGRP USERNAME PRI SIZE RES STATE TIME WCPU% CPU% COMMAND
1930 1902 root 20 0K 0K sleep 938:36 5.4 8.85 nfsd
1927 1902 root 20 0K 0K sleep 269:26 3.6 8.82 nfsd
1926 1902 root 20 0K 0K sleep 929:28 5.2 7.43 nfsd
1905 1902 root 20 0K 0K sleep 268:42 4.1 7.41 nfsd
1907 1902 root 20 0K 0K sleep 268:16 3.1 6.69 nfsd
1934 1902 root 20 0K 0K sleep 930:06 4.7 6.61 nfsd
1915 1902 root 20 0K 0K sleep 267:51 3.3 6.42 nfsd
1914 1902 root 20 0K 0K sleep 930:38 5.4 6.14 nfsd
1917 1902 root 20 0K 0K sleep 267:22 3.9 6.01 nfsd
0K sleep 928:38 4.9 5.78 nfsd
0K sleep 268:49 3.9 5.67 nfsd
0K sleep 267:37 4.2 5.62 nfsd
0K sleep 936:57 5.2 5.56 nfsd
0K sleep 267:06 3.3 5.34 nfsd
0K sleep 270:08 3.4 5.14 nfsd
0K sleep 930:37 5.2 4.94 nfsd
0K sleep 932:25 4.7 4.92 nfsd
0K sleep 268:22 3.7 4.90 nfsd
File Views Edit Options Help
Network Interface Activity
[hbserv] irix.network.interface.total.bytes eg1
[hbserv] irix.network.interface.total.bytes ef0
[hbserv] irix.network.interface.total.bytes hip0
[hbserv] irix.network.interface.total.bytes eg0
40
30
20
10
0
Mbyte / sec
Live
30:32
15:30:42
15:30:52
15:31:02
15:31:12
15:31:22
Thu Feb 15 2001 MET

Online Computing Infrastructure

- Problems in current configuration:
  - Linux upgrade has to be done in all online PCs
    - Old and several linux installations
  - Somewhat complicated configuration
    - Difficult maintenance: Manual installation and backup
    - Too many online servers (hblynxs, hbols1, hbsltsrv, hb4ltsrv)
  - Difficult to keep and reproduce DAQ running conditions
    - Executables and configuration files scattered around
    - User access to online executables
  - AFS dependence for online running
    - Last year 2 serious interruptions in data taking
    - No AFS client for LynxOS: cache and stability problems

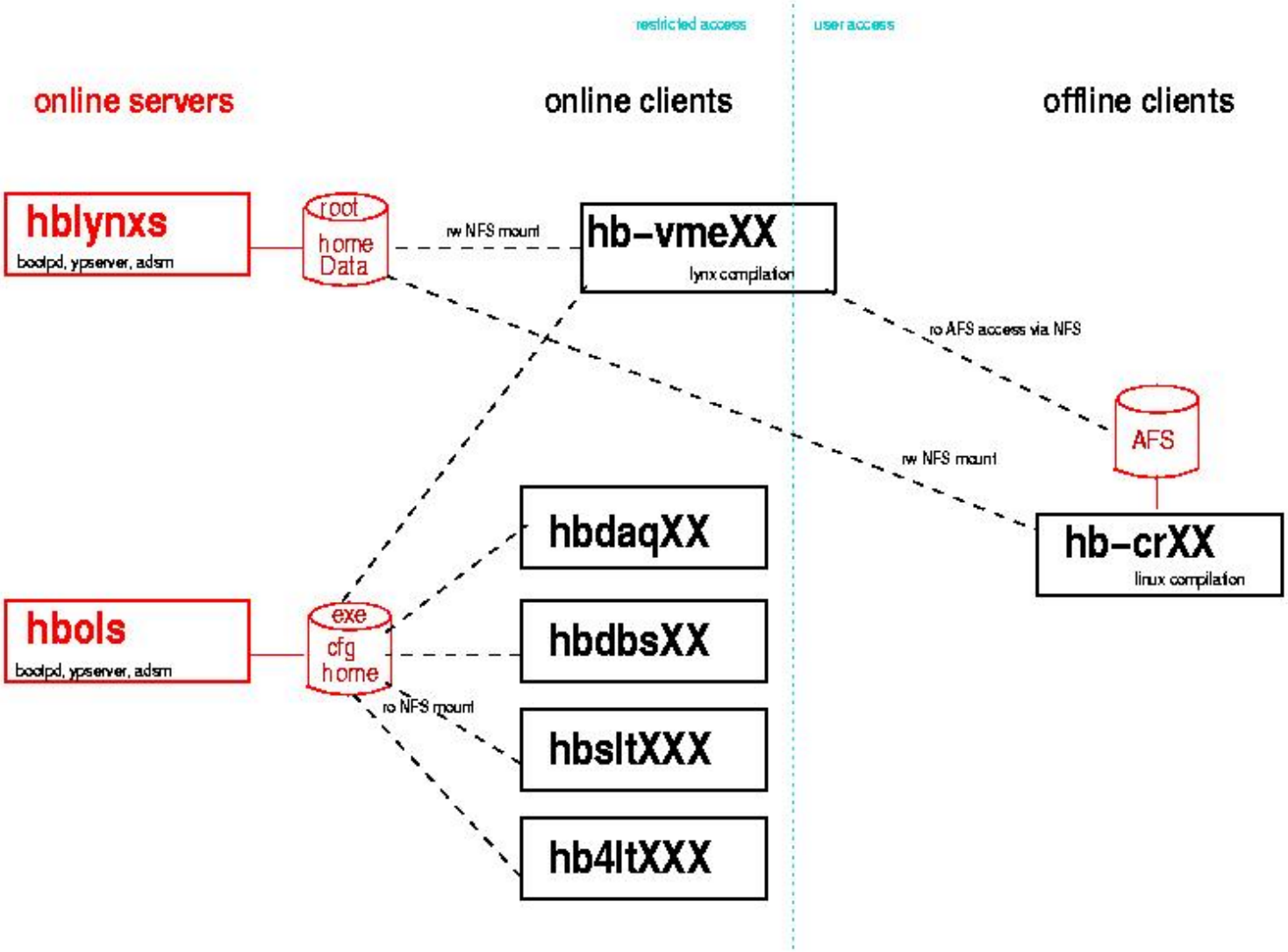
Current Configuration



Online Computing Reorganization

- Simplify configuration and maintenance
  - Reduce number of servers: hblynxs and hbols
    - DESY central ADSM backup system
  - Code development and access to online data disks from hb-cr machines (remove hb-con's)
  - Adopt AFS IDs for user and group online cluster accounts
  - Same linux distribution in all PCs
    - DESY central Linux installation server
    - Homogeneous and easy to maintain Linux installation
  - Decouple online running from AFS
    - Keep AFS for src repository, compilation & development
    - New online NFS server for executables and config. files
    - Dedicated non-AFS machines for running in control room (run/slow/target control, data quality)

New Configuration



Steps to Follow

- Adopt AFS IDs for online cluster accounts ➨
- NFS access to online data disks from hb-cr machines ➨
- Installation of new online server (hbols)
- Install ADSM backup system in online servers (hblynxs, hbols)
- Linux upgrade (hb-cr, hb4lt, hbdaq, hbdbs, hbslt)
- Installation of hbdaq machines in control room for running (run/slow/target control, DQ)
- Installation of dedicated logging machine

Prospects for 2002

- Absolutely necessary to keep the manpower
- Reprocessing is being the L4 FARM commissioning for the 2002 running:
  - Event distribution, logging and archiving
  - Loading of CnA constants
  - Data quality
  - Event Reconstruction
- With hardware upgrade and software improvements being done, smooth running and operation of the L4 Farm, Logging and Archiving are expected for 2002 run