Computing Status Report

Plenary Meeting

June 10th, 1999

J.Harvey

Outline

- SICb software maintenance
- SICb production
- Proposal for dedicated LHCb batch facility in CERN computer centre
- Status and plans for GAUDI
- Reconstruction and Simulation Projects
- Status of DAQ and Controls
- Forthcoming events

As reported in …

2nd Software week , June 2-4

Computing Meeting, June 9

SICb software maintenance

- Profiling of SICb code to be made
  - cpu time increased by factor of 2.4, event size by a factor of 1.5
    - v117 (mbias) 45 sec 700 kB
    - v118 (mbias) 105 sec 1000 kB
  - monitor where the cpu time is spent and what data we store - tidy up!
- Quality control
  - establish reference set of histograms - to be established by relevant experts
- Configuration Management using CMT
  - manage collection of SICb packages
  - allow packages to evolve and be released independently
  - CMT builds makefiles to build libraries and/or executables
  - Florence has prepared a presentation “How to work with CMT”
- Next large production (end June) with version # 200
  - reflect use of new generators (P. Koppenburg)

SICb Production

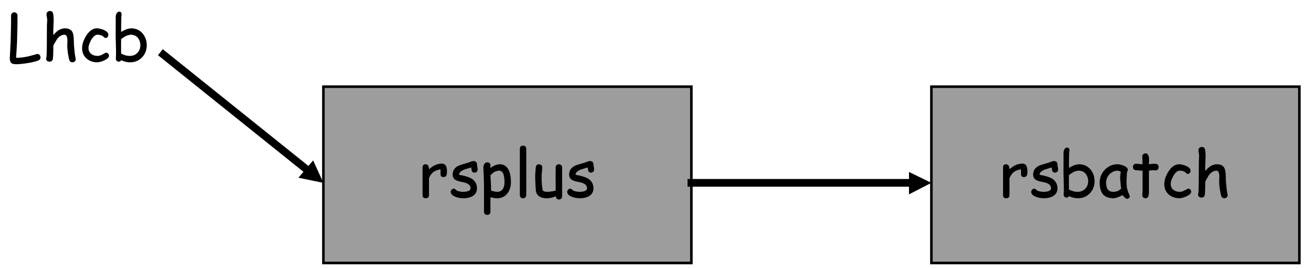
- Production centres for simulation
  - PCSF (v117 : 150k events/week, v118 : 200k events/week)
  - LHCb LSF cluster (corridor PCs - 75k events/week speculative)
  - RAL CSF (10k events/week)
  - RAL PCSF (~ CERN PCSF to be seen)
  - IN2P3/Lyon (50k events/week in practice)
  - Liverpool - special studies
- Next production starting end of June
  - 100k of signal events, 50k mbias, 1000k bbar inclusive (RAL/Lyon)
  - analysis for next LHC physics workshop in October
- Developments
  - bookkeeping project for end 1999

Proposal for a dedicated LHCb batch facility

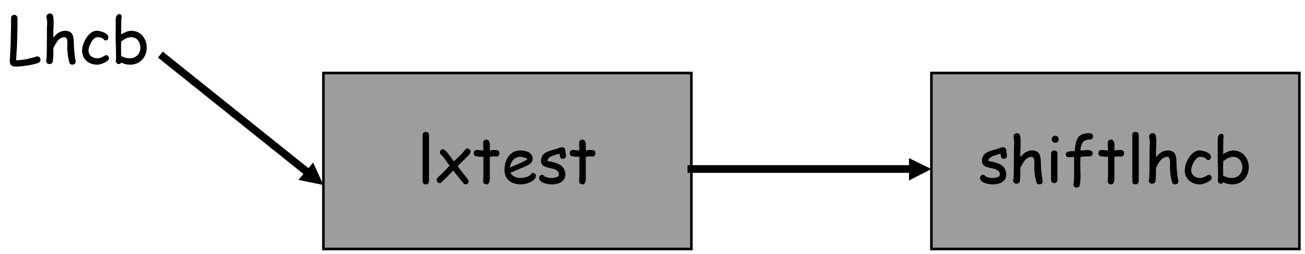
- All LEP experiments and the 3 other LHC experiments have dedicated batch facilities in the computer centre.
- These are managed by a Service Manager from IT with regular meetings with the collaborations to review performance and plan evolution.
- Till now LHCb has been using the public AIX batch and interactive services (RSBATCH and RSPLUS).
- It is clear our needs are rapidly outgrowing what can be provided on these public services.
- Conclusion - we should move to a private facility under our control.

Proposal for dedicated Linux Farm for LHCb

Now

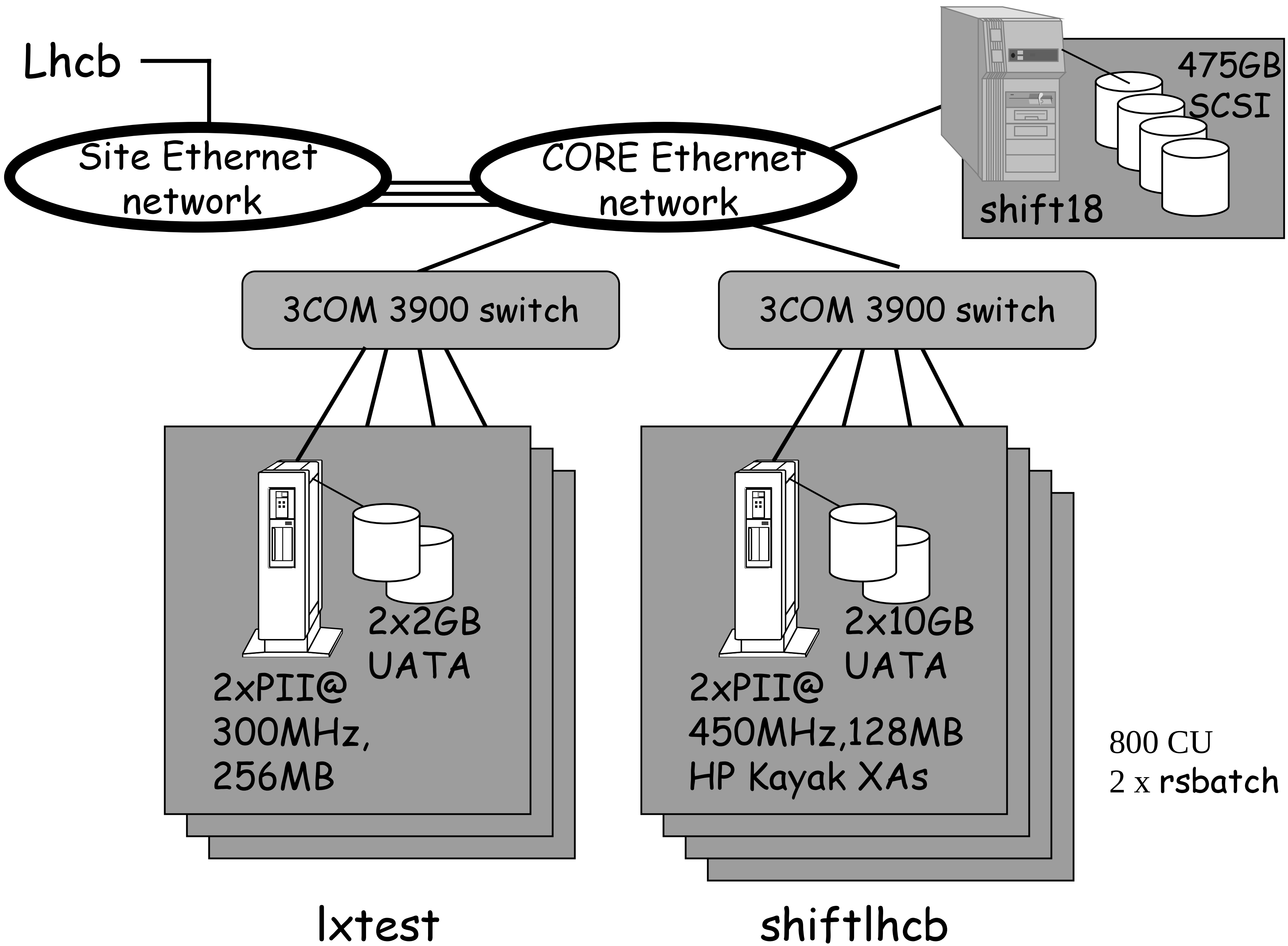


Will be



Why Linux Farm?

- AIX is not a well supported platform
  - only at CERN
  - stuck with old compilers not maintained by IBM (in or order to run existing HEP codes)
  - these compilers do not support new language constructs (e.g. C++ namespaces)
  - lack of support for GNU products (gmake)
  - difficult to debug
- "Platform for future is the PC running NT or Linux" (FOCUS policy statement)


Lhcb
Site Ethernet network
CORE Ethernet network
475GB SCSI
shift18
3COM 3900 switch
3COM 3900 switch
2x2GB UATA
2xPII@ 300MHz, 256MB
2x10GB UATA
2xPII@ 450MHz,128MB HP Kayak XAs
800 CU
2 x rsbatch
lxtest
shiftlhcb

Software Details

- CERN certified version of Linux
  - RedHat 5.1 (will be upgraded to RedHat 6.0)
  - Kernel 2.2.6 (best kernel for SMP systems)
  - LSF batch system
  - AFS / SUE environment
- environment identical to `rsbatch`
- g77/gcc instead of xlf/xlc

shiftlhcb status

- Lxtest available now
- shiftlhcb available by end of July
- Expansion envisaged next year
  - to be discussed in next COCOTime round this summer
- Service Manager for shiftlhcb cluster

  catherine.charbonnier@cern.ch
- Service Manager for lxtest cluster

  pietro.martucci@cern.ch

What can be done using v2 of GAUDI?

- Develop algorithms to do simple analysis in C++
  - Access more “banks” from SICb data e.g. AXTK
  - More services such as the particle properties service
- Structure in place to deliver information on the detector structure and geometry
  - Hooks to implement specific detector description code.
  - Persistent storage using text files.
- Store new data in a ROOT file maintaining links to the original SICb information using RIO
- Read event data from SICb and/or RIO files

Coming soon

- Test that files written using ROOT can be read using new RIO package
  - Access to test beam data.
  - Allow to re-use the same code for testbeam analysis and LHCb reconstruction.
  - Allow to reuse the same detector description for testbeam and simulation/analysis.
- Display detector and events (LHCb , testbeam,…)
  - Aid for developing pattern recognition algorithms
  - Aid for developing detector geometry
  - Data monitoring

Feedback from Software week

- ❑ Little feedback from Gaudi v1 so far
  - ➢ understandable due to its limited functionality
- ❑ Ready to integrate GAUDI in various software activities e.g.
  - ➢ test beam activities
  - ➢ reconstruction
- ❑ Actions:
  - ➢ We propose to help (people+software) sub-detectors to get their work done.
  - ➢ Activate the role of the sub-detector software contacts.
    - ➥ Planning, setting priorities, spreading information, etc.

Next steps with Gaudi

- Consolidation of basic functionality:
  - Event model
  - Detector description model
  - Statistical utilities: histograms, n-tuples,…
- Consolidation of infrastructure
  - Input/output, software interfaces, shareable libraries,...
- Data visualization
  - Event display prototype ready within few weeks
  - Review of the design

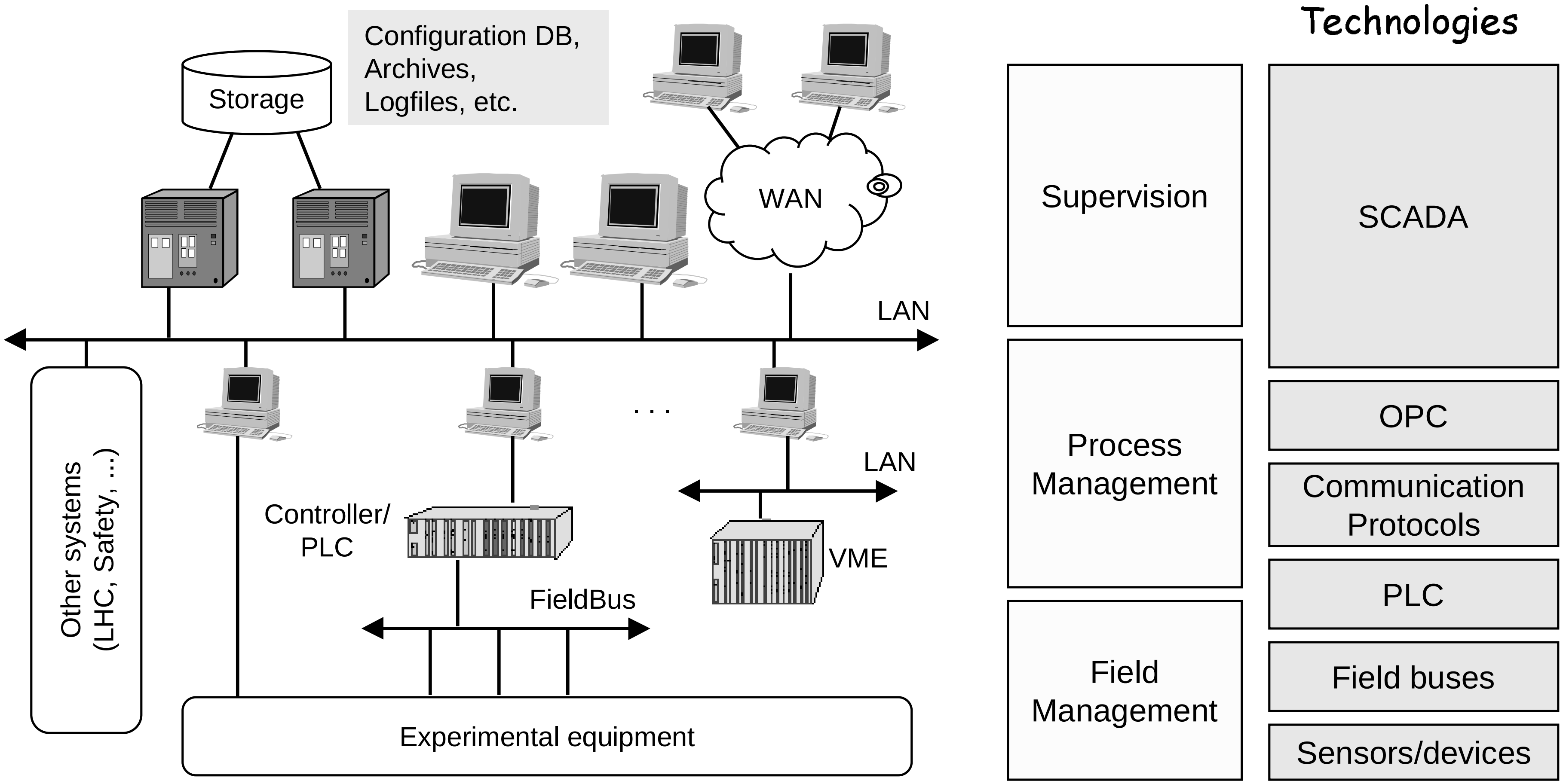
Reconstruction and Simulation

- Build team of programmers
- Define reconstruction strategies
- Build reconstruction skeleton using GAUDI
- Make reconstruction program independent of SICb
  - wrap old FORTRAN code, develop new OO code
- Regular meetings
  - informal (design and code reviews) - start now
- Decide soon on project leadership, subsystem participation, short term goals
- Start to get experience with GEANT4
  - install package, run examples, build small prototypes
  - first real step integrate with GAUDI (detector description and event model)

DAQ and Controls

- Controls:
  - SCADA evaluation continuing leading to a workshop in September.
    - We must provide our needs in form of use cases.
    - SCADA products evolving very rapidly.
    - Still early to decide on a specific product.
  - Andre Augustinus looking into area of field buses
    - to provide requirements specification of detector interfaces to controls
    - milestone end '99
- DAQ:
  - Simulation Studies of readout network give confidence that it can be realized with reasonable cost
  - Use of Readout Unit in Front-End Multiplexing needs studying.
  - Combined Front-End/DAQ Workshop 12-14 October.

Control/Monitoring structure



SCADA = supervisory control and data acquisition
OPC = OLE for process control
PLC = Programmable logic controller
Field buses = CAN, ProfiBus, WorldFip, ...

Forthcoming Events

- JCOP II workshop, Sept 6-8, CERN
- GEANT4 developers workshop Sept 20-24, ESTEC Holland
- LCB Workshop, Sept 27 - Oct 1, Marseilles
- Front-end/DAQ workshop, Oct 12-14, CERN
- 3rd LHCb Software Workshop, Nov 24-26, CERN