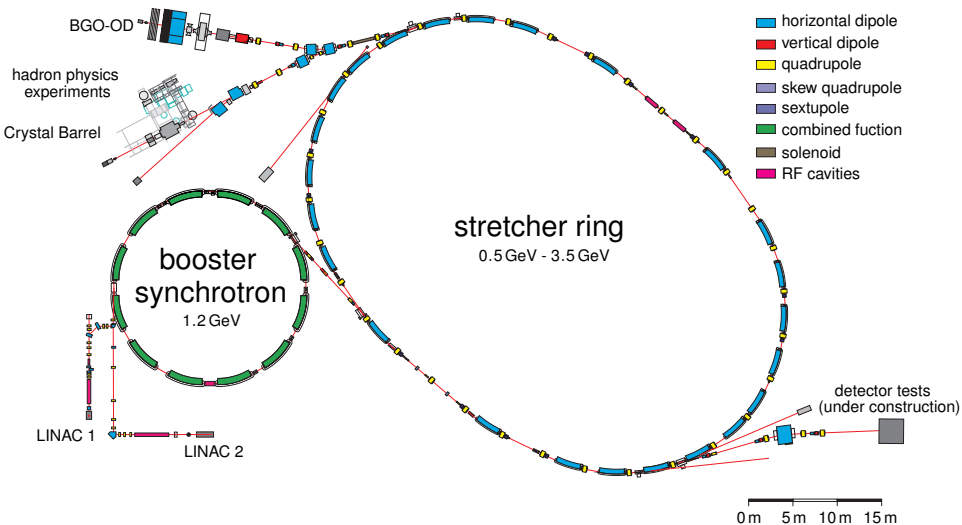# Overview of the ELSA accelerator control system

Dennis Proft

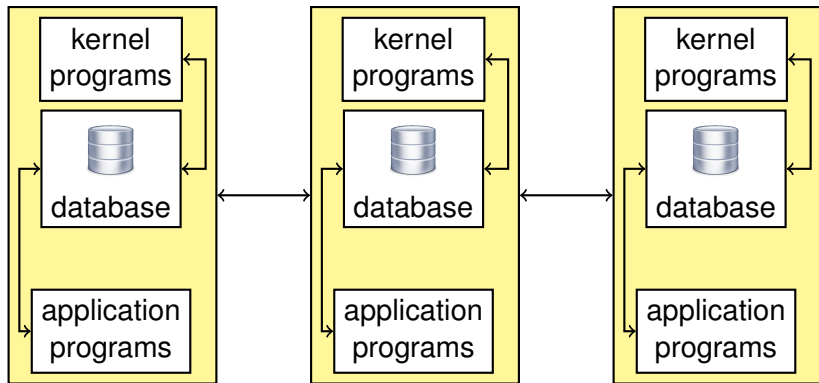Physics Institute of the University of Bonn, Germany

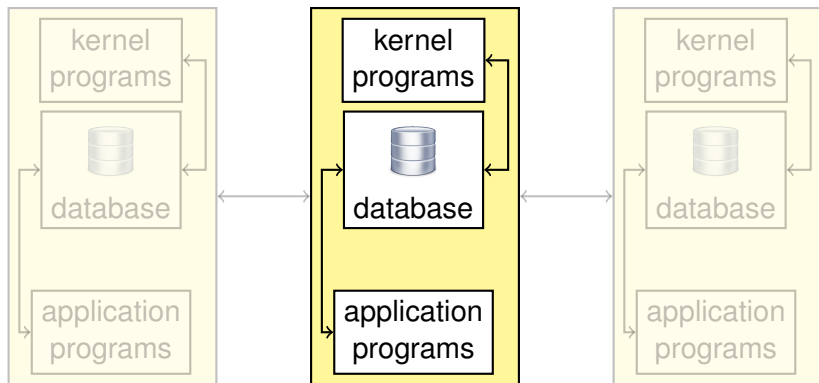ICALEPCS   2013

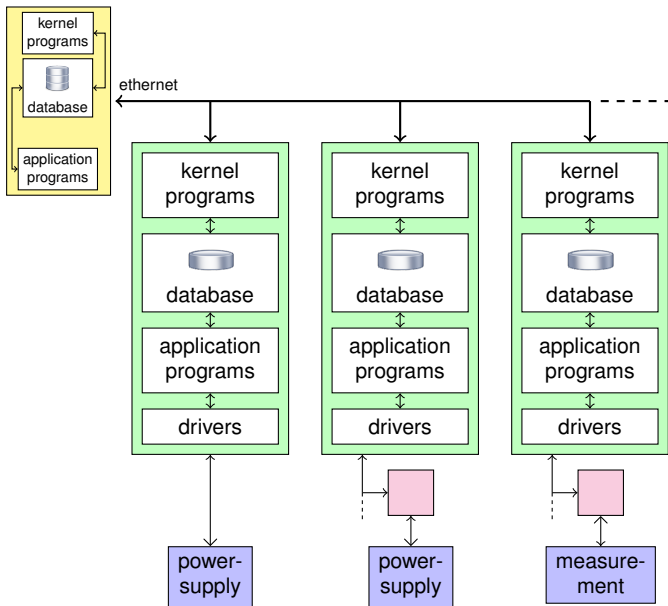# Electron stretcher facility ELSA

Hierarchy

- distributed database
- shared memory database

Hierarchy

- distributed database
- shared memory database
- 3 HP workstations $\Rightarrow$ now 1 linux PC

Hierarchy

kernel programs

database

application programs

ethernet

control layer
- Linux PC

kernel programs

database

application programs

drivers

kernel programs

database

application programs

drivers

kernel programs

database

application programs

drivers

process layer
- VMEs (VxWorks)
- Linux PCs

fieldbus layer
- MACS-systems
- PLC-systems

power-supply

power-supply
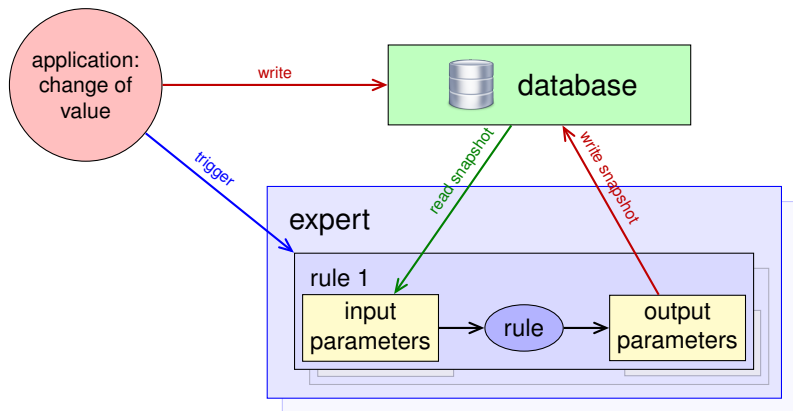
measure-ment

device layer

Menu system

- approx. 600 menus

- graphical menu editor
- 20 output widgets + 19 input widgets

- physical representation of all parameters
  - ⇒ hardware transparent

Expert engines

- rule: finite state maschine
- currently 50 rules in 19 expert engines

Interfaces

- local on control host(s):

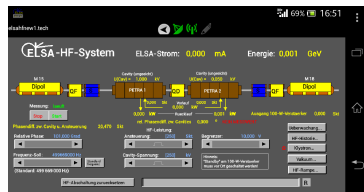 | | |
  |---|---|
  | C | native library |
  | | access to all subsystems of the control system |
  | C++ | high level applications |
  | | access to parameter values only |
  | TCL/TK | "quick-and-dirty" graphical tools |
  | | access to parameter values only |
  | MATLAB | further beam diagnostics |
  | | access to parameter values only |

- external interfaces:

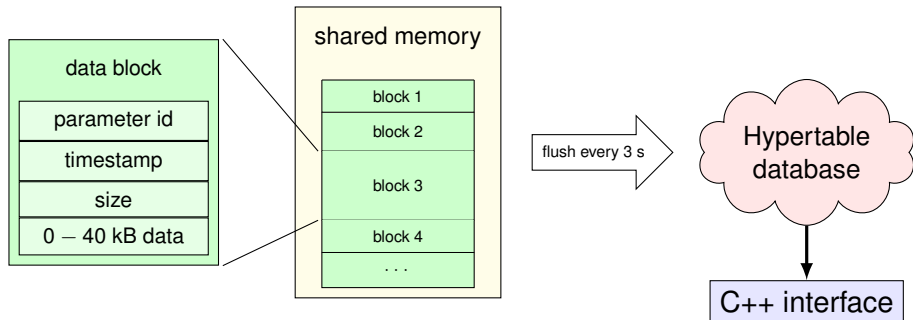 | | |
  |---|---|
  | EPICS | gateway on process layer |
  | | access to feedback systems |
  | TCP/IP | external connections |
  | | access to parameter values only |
  | JAVA | menu-system |
  | | Android based mobile devices |

History database

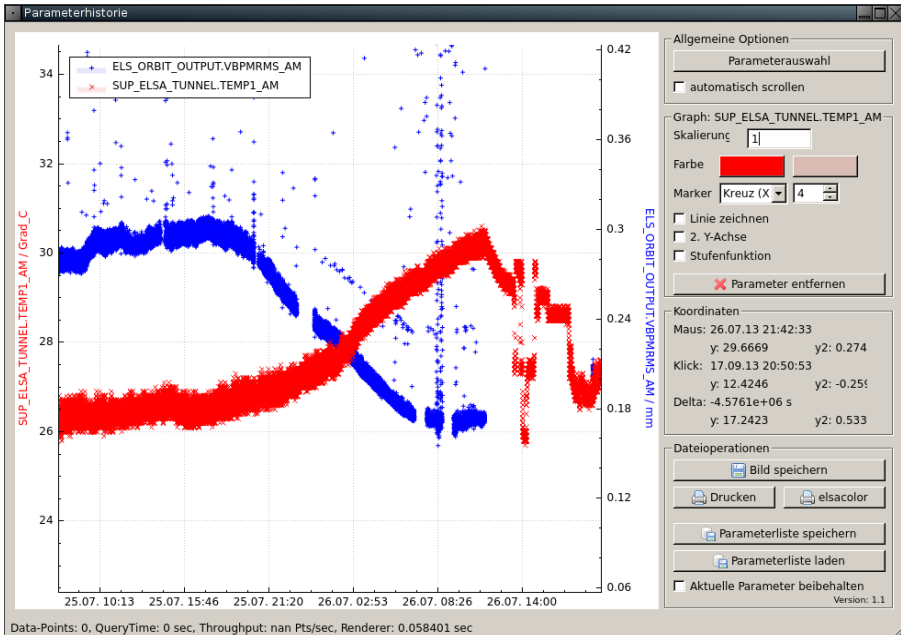- old cslogger subsystem
  - only pre-defined set of parameters
  - file storage without index
  - not suitable for large amounts of data

- new history database
  - average 3000 updates / sec
  - 6 GB of data each day
  - separation of kernel programs from database system
  - external, distributed database system

History database storage engine

- record any parameter change
  $\Rightarrow$ write data block
- millisecond timestamps

- Hypertable storage backend
- C++ interface
  - command line tool
  - Qt4 based graphical user interface

History database browser

Conclusion

Benefits of the control system:

- easy to use graphical menu system
- scalable by adding new hardware to the process layer
- ongoing development

Recent efforts:

- successful port of sources from HP-UX to Linux
- replacement of the HP-UX RISC workstations by one PC
- implementation of history database

Future plans:

- new timing system for single bunch accumulation

Thank you for your attention