
Slow Controls Planning

DAQ meeting in LHC-B week
4 December 1996
P. Mato, CERN

Outline

- ◆ Why am I talking about Controls now?
- ◆ Requirements for the LHC-B Control System
- ◆ Some words about EPICS
- ◆ Our Plans

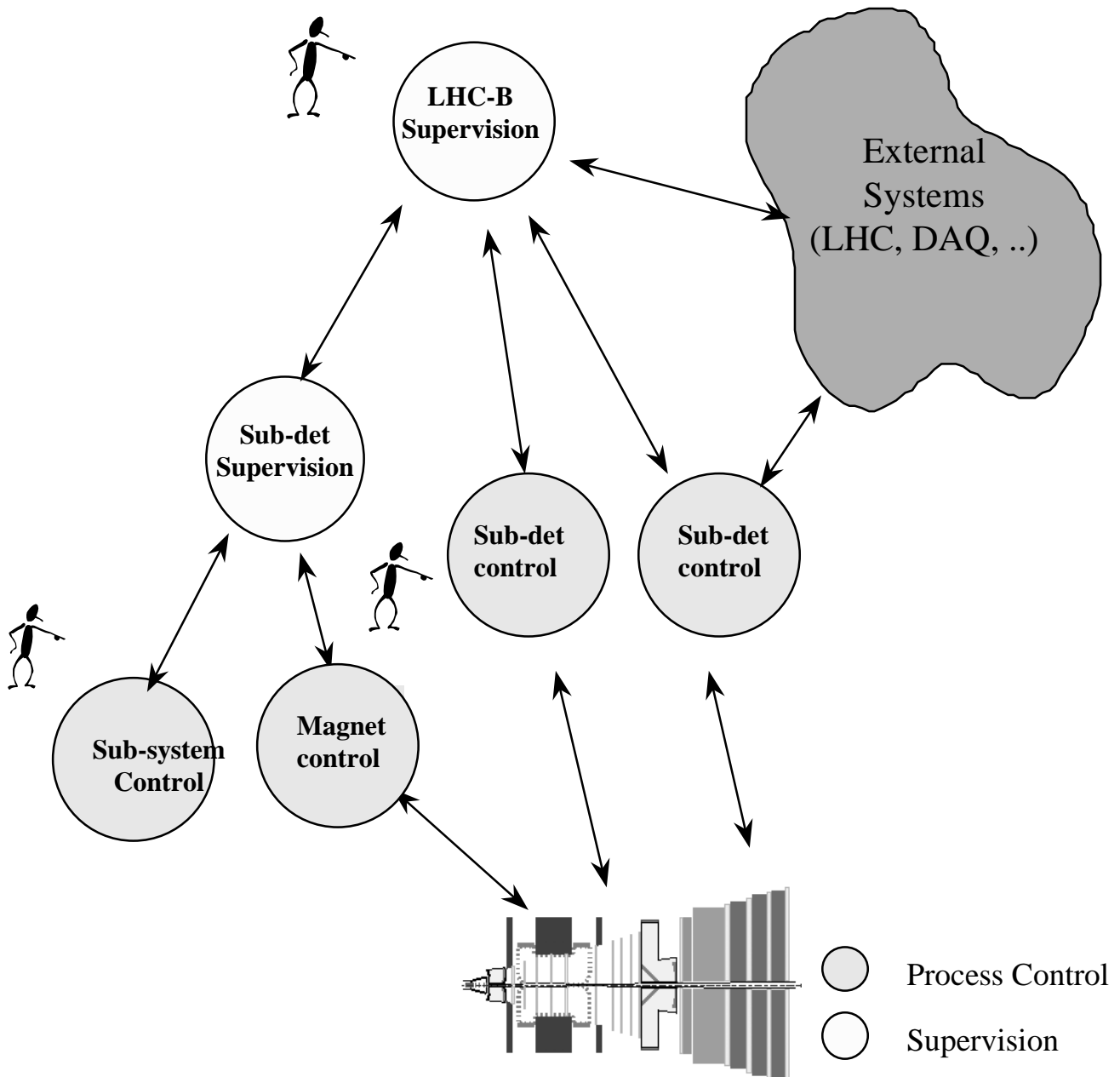
Why am I talking about Controls now?

- ◆ Common project for all LHC experiments
 - Support from the ECP/CO group.
 - It seems reasonable to start collaborating from now.
- ◆ Other LHC collaborations are **taking decisions** now:
 - They want to equip test beams with the “*definite*” system.
 - They are in favour of EPICS.
 - They are requesting a long term commitment from ECP/CO.

Current ideas about the Control System

- ◆ **Function:** Control, monitor and supervise all the detector components and the infrastructure of the experiment.
Does not include the physics data acquisition.
- ◆ Scope of the system
 - Wider than the traditional *Slow Control* (including *Run Control*?)
 - All levels: from the hardware to the interaction with the operator
- ◆ A supervisory hierarchy of loosely coupled sub-systems
- ◆ Natural integration with other systems (Safety, DAQ, Data monitoring, etc..)

Control hierarchy



Some General Requirements

- ◆ The control system should integrate smoothly with other systems at the experiment.

Examples:

- Sharing the network & computing infrastructure with DAQ
 - Same user interface (GUI, status display, etc..)
 - Interconnected configuration databases.
- ◆ Well defined and flexible architecture is needed.
 - Built out of well defined functional components (building blocks).
 - Sharing building blocks ==> helps integration.
 - Technology evolution is done by changing components.

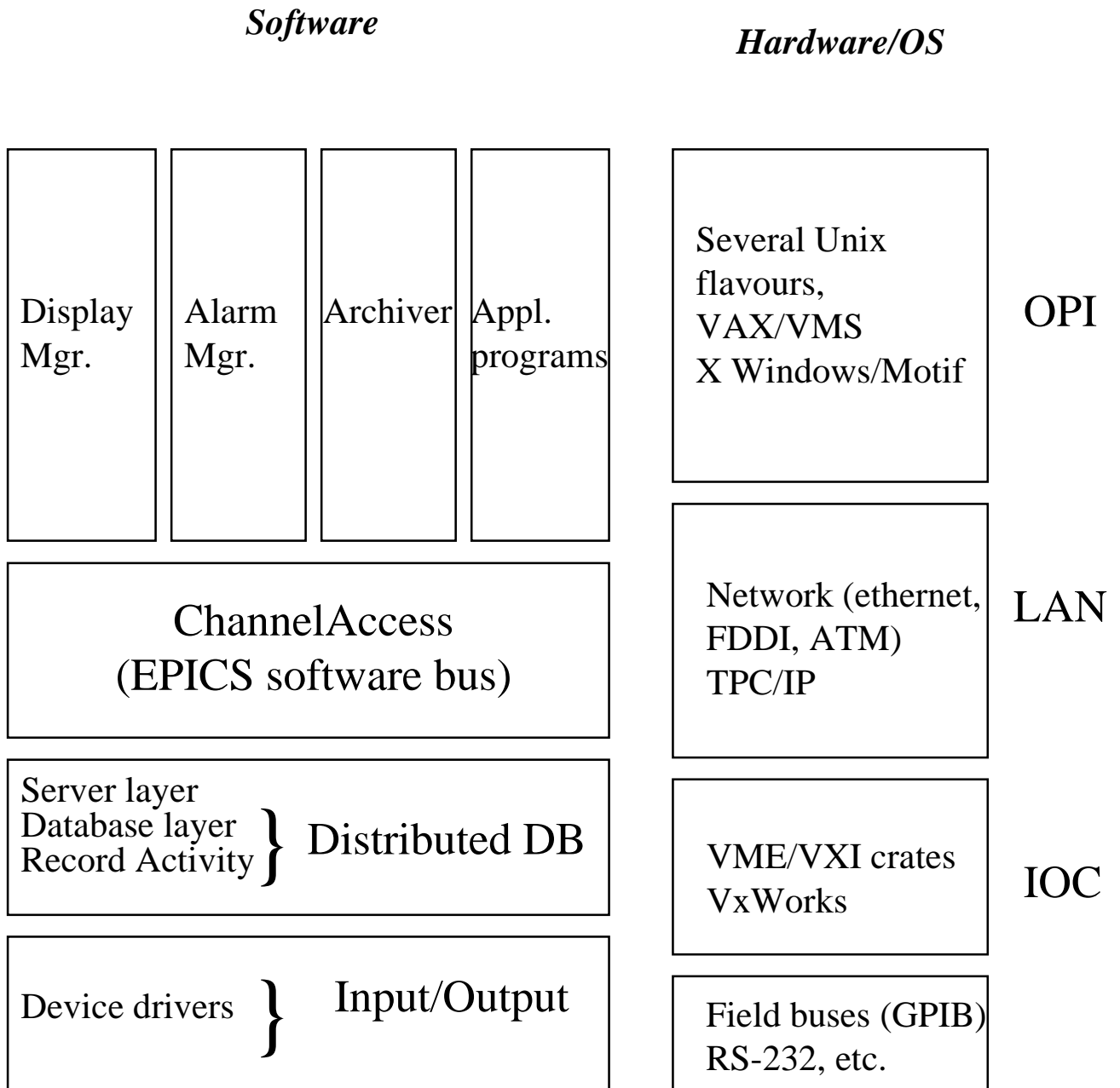
What's EPICS

- ◆ An architecture for building scaleable control systems.
- ◆ Collection of code and documentation (software toolkit)
- ◆ Collaboration

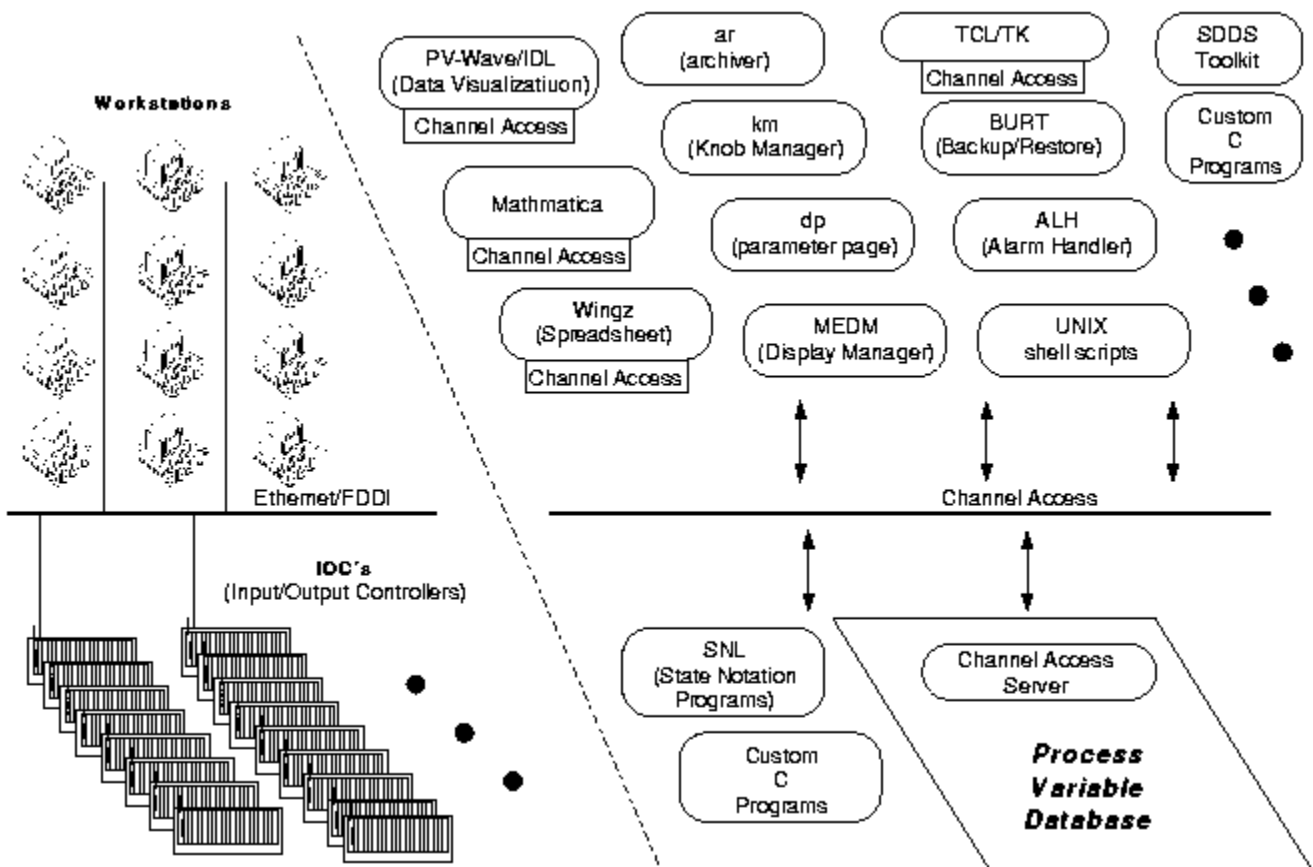
EPICS Collaboration

- ◆ Primarily the work at Los Alamos & Argonne.
- ◆ Groups at CEBAF, LBL and DESY have joined.
- ◆ There are 44 EPICS sites in total:
 - Accelerators
 - Detectors
 - Telescopes
 - Commercial

EPICS Architecture



EPICS Architecture (2)



EPICS Architecture (3)

- ◆ The kernel of the Architecture is the *Channel Access* (EPICS software Bus).
- ◆ The fundamental entity is a record in the distributed database. It has a name, value, other attributes, etc.
 - 25 different record types (Input, Output, Algorithms)
 - The user can link several records to create complex control functions. (Programming)
- ◆ The IOC (VME processor) initializes with a local configuration text file.
- ◆ The Channel Access is asynchronous.
- ◆ A change in a value of a record may trigger an event to be send to the client application.

EPICS Software toolkit

- ◆ Tools for configuration and edition. Utility tools.
 - Alarmer, Archiver, ...
- ◆ EPICS is free of charge
(Other tools in kit are not always free)
- ◆ Distribution via source code.
 - Guaranteed flexibility.
 - Bugs can be fix quickly.
 - **Expertise in-house needed.**
 - Many flavours...
- ◆ Some documentation and training exists. It lacks consistency.

Some issues about the suitability of EPICS for LHC-B

- ◆ With the existing EPICS products we could build the system we need. If there is reasonable support from CERN.
- ◆ Is the **architecture** right?
 - Record (channel) as basic entity.
 - Supervisory hierarchy.
 - Central configuration database.
- ◆ Is the **technology** right?
 - Will it be available in 2005?
 - What about C++? Corba? Object databases?
 - Web interface?

Some issues about the suitability of EPICS (2)

- ◆ How integrates with the other systems?
 - Safety system
 - Data acquisition system
 - Data quality/monitoring system
- ◆ Is EPICS a turn-key system? If not: How much manpower is needed?
- ◆ Can we decide TODAY what should be the LHC-B control system in 2005?

Plans

- ◆ EPICS should be evaluated.
 - ECP/CO has already started an evaluation.
 - ATLAS & CMS plans to use it in test beam.
 - An EPICS course was organized (LHC-B was represented).
 - **We should follow closely this activity.**
- ◆ ECP/CO should soon nominate a “link-man” for LHC-B.
- ◆ We have started to put together our User Requirements.
 - ATLAS & CMS have produced URD drafts.
 - After the evaluation is done we should confront our Requirements with EPICS.

Plans (2)

- ◆ Field-buses and hardware interface standards
 - We should understand them.
 - Better if we use CERN wide standards.
 - Guidelines should be provided to sub-detector groups.
- ◆ We do not plan to use EPICS neither the “final” Control System for our test beam activities.