

Controls Responsibility Boundaries inside the AB department

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Outline

- Front-ends
- PLCs
- Application software
- Infrastructure
- Data Management
- Conclusion

Front-end Hardware - 1

- CO specifies, procures (with FI/Purchasing), tests and supports a set of standard HW components:
 - Crates & Single Board Computers in VME and cPCI format
 - Industrial rackable PC Systems
 - WorldFIP HW (Bus arbiter, repeaters, FIPDiag)
 - MIL-1553 HW (Bus controller, repeaters, RTI)
 - A defined set (~40) of commercial VME and cPCI/other hardware modules as agreed in CO3
 - A defined set of CO-made hardware modules
- CO proposes a phasing-out and replacement scenario of CO-standard modules when appropriate, with associated funding.

Front-end Hardware -2

- Operational installations:
 - **Bulk installations** for LHC are coordinated by CO
 - **Bulk renovation** efforts on the PS-SPS complex are dealt within the scope of the CO₃ committee
 - Other installations or modifications of ANY front-end on ANY Accelerator are **ONLY** accepted through the **AB-CO Hardware Installation Portal** and dealt with on a weekly basis by AB-CO
- Development systems
 - Equipment groups finance their development systems

Front-end Hardware - 3

- Operational Installations:
 - CO Responsibilities:
 - **Fieldbuses:** install and qualify the MIL-1553 & WorldFIP buses (down to the RTI or MicroFIP module input)
 - **Timing:** install and qualify the copper and fibre distribution network, down to the Front panel of timing receiver modules. Also legacy PS long distance distributions to local equipment.
 - **Serial buses (RS-422):** CO installs cabling
 - **Industrial PCs:** Installation done by CO
 - For all other CO standard HW modules, **CO cabling responsibility stops at the front panel** of these modules or at the corresponding CO patch panels
 - **Specific agreements** exist for certain equipment e.g. PO
 - Installation of VME and cPCI crates is negotiated with each individual equipment group

Front-end Hardware - 4

- Equipment groups are responsible for their **specific hardware**:
 - Special crates and backplanes
 - Proprietary home-made or commercial cPCI and VME modules
- **Non-CO standard modules** will be managed by the equipment group concerned (PS complex)
- CO provides **asset and HW configuration database**, meta-data (related to HW type), entry forms, generation tools & support
- Equipment groups are responsible for asset and HW configuration **data entry** for their front-ends

Front-end Software

- Operating Systems
 - CO defines and supports **front-end operating systems** (LynxOS, Linux)
 - CO proposes **upgrade programs** to CO₃
- Device Drivers
 - CO develops and supports **device drivers and test facilities** for ALL CO standard hardware modules + **generic driver generation tools** (DriverGen)
 - CO gives **advice** for other driver developments
- Startup:
 - CO provides basic **startup database table**, entry forms, transfer.ref generation (including for multiple Front-ends) and support
 - EQ groups are responsible for **startup database data entry** for their front-ends

Front-end Software: FESA -1

- For the FESA Framework, CO:
 - reviews the requirements and submits to the CO₃ a **work plan for the next release** (up to a maximum of 3 Releases per year)
 - maintains up to a **maximum of 3 operational FESA versions**, including associated CO classes such as LTIM
 - offers full **operational support on all 3** operational versions, at equal level
 - provides **tools and procedures** to developers in order to migrate their classes to a new release
 - splits, when required, FECs currently **shared by more than one equipment group** (as only one version of FESA will run on a given FEC)

Front-end Software: FESA -2

- For FESA Framework, EQ groups:
 - decide, in agreement with OP, which FECs they want to upgrade to new releases
 - commit not to stay more than **2 releases behind**
- For FESA Equipment Classes, CO:
 - develops and supports classes for **equipment under CO responsibility** : OASIS, Timing, BIC, ...
 - assists equipment group developers and **may develop classes for groups having no controls competence** (on a case-by-case basis)
- For FESA Equipment Classes, EQ groups:
 - **Specify** in agreement with OP the operational properties
 - **Develop and maintain** classes under their responsibility
 - **Instantiate** associated devices

Front-end Software: Legacy

- CO maintains **existing GM classes** (bug fixes & minor modifications only)
- The equipment owners (equipment groups in most cases) will take responsibility for **eventual renovation using FESA**
 - as part of Controls Renovation and AB Consolidation projects
- **The renovation timescale will depend on the available resources**
- Where **backwards compatibility** of new front-end SW with legacy applications is needed:
 - CO provides **GM to FESA adaptation** layer
 - Equipment group provides requirements

Front-end Operations

- Basic principles:
 - Each front-end contains equipment belonging to **one equipment group** (+ CO standard HW, e.g. timing)
 - **OP** should not be responsible for front-end systems (e.g. PS FMR system, OASIS scopes, etc). CO takes over existing cases
 - CO provides **diagnostic tools** (e.g. DIAMON) for all hardware and software under CO responsibility
 - CO configures **local timings** according to equipment needs
- When CO diagnostic tools are **eventually mature enough**, equipment groups will assume first line responsibility for their front-end systems
 - CO experts or piquet are then called in second line
- **The policy for piquet and first-line services needs to be clearly defined at the department level**

PLCs

- For AB groups, AB-CO-IS:
 - provides support for PLC applications in the frame of the CERN Wide consultancy (GUAPI)
 - **Testing & validation** of new versions of PLC components firmware & hardware
 - **PLC supplier/CERN interface:** site licences, procurement, technical support
 - **Upgrade solution** proposals
 - **Generic solutions** e.g. for Stepping motors
 - Layout & Asset **databases**
 - Common **spare parts** management
 - **Software distribution** repositories
 - develops and maintains libraries for PLC communication (IEPLC) in collaboration with CO-FE

Application SW - 1

LHC Software for Applications (LSA):

- CO/AP is responsible for:
 - Development of LSA **core applications** (settings management, trim, exploitation, equip monitoring...)

- OP is responsible for:
 - project management
 - implementation of all **settings generation** and **trim** algorithms
 - magnet model, optics configuration, interface to MAD
 - development of **stand alone applications** for equipment control
 - development of dedicated **BI application**
 - development of sophisticated **controls applications** (e.g collimators)
 - **sub project management** (e.g. management of critical settings) etc.

Application SW – 2

- CO is responsible for:
 - CO/AP **generic applications** (working sets, knobs, archives, OASIS, FD, LASER, passerelle, CCM, SIS, sequencer, synoptic, application diagnostic tools, ...)
 - **Specialist applications** in domains under CO responsibility (e.g. BIC)
- Equipment groups are responsible for:
 - **Specialist applications** (expert GUI etc.)
- CO provides:
 - the development environment
 - common **GUI components** for application development
 - **training & technical expertise** for developments + quality assurance
 - **support** for OP applications during OP absences for unscheduled, urgent interventions

Application SW - 3

- OP is responsible for:
 - **Specifying requirements** for the (non generic) applications needed
 - Providing **development effort**, maintenance and first-line support for their applications
 - Creating the **configuration** (via one responsible/ accelerator) of:
 - visual applications (Fixed Displays), logging, CCM
 - Working Sets, knobs (in collaboration with Equipment group experts)
 - Managing **operational constants** for devices (e.g. min/max) when needed

Infrastructure: Consoles and servers

- CO:
 - selects, buys and installs the **consoles** in CCC or in technical buildings, and **file/application servers** in CCR
 - buys **development** file & database **servers/disks** in IT/513
 - **Windows Terminal Servers:** CO requests HW in IT, handles Access Lists and specific SW installation
 - installs equipment to control **CCC wall screens**
 - **video distribution:** CCC/CCR digital and analog distribution, analog/digital and digital/analog conversion
- Users:
 - install specific console software **only via the CMF framework**
 - are in charge of **content** of video distribution

Infrastructure: Middleware

- CO provides:
 - **Middleware** (CMW, JMS, ...) client libraries for applications and server libraries for Equipment groups
 - related **directory services** for name management
 - **CMW diagnostic tools** (admin console application and logging).
 - support for the Windows Passerelle and the TGM server
 - **CMW interfaces** to JAPC, PVSS, LabView, FESA, FGC (with AB/PO)
 - **CMW server gateways** for **SL-Equip** (CESAR), **FESA** (from legacy SPS apps), **DIP** (TS, GTPM, LHC experiments), **GM**

Data Management

- **Machine layout, controls configuration, assets** (EDMS-MTF, ABCAM, quality assurance, naming), **operational data** (settings, measurement & logging)...

General principles:

- CO/DM provides:
 - **Database and interfacing software**
 - **Data migration & bulk loading** of initial data sets
 - **Tools** for data browsing and manipulation
 - **Support, advice and guidelines** on database and tools usage
- Clients (Equipment Groups, AB/CO and AB/OP) are responsible for:
 - **Entering** the data
 - Semantically **validating & maintaining** correctness of the data
- The **data is owned** by the **client**

Conclusion

- As requested by CO, the division of controls responsibilities between CO, OP and the equipment groups has been clarified in a series of discussions in the CO₃ committee.
- The conclusions outlined here will be presented in detail to ABMB on 4th February.
- There remain some outstanding issues, the most critical of which is the need for a coherent policy on first-line and standby services.