Services to Equipment Groups, AB/CO Viewpoint

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Topics

- Hardware Selection & Procurement (Marc)
- Hardware Test and Installation (Marc)
- Hardware Layout Management (Ronny)
- Front-end System Software (Franck)
- Front-end Equipment Software (Franck)
- PLC (Philippe)
- Controls Configuration (Ronny)
- Application (Eugenia & Adriaan)
- Piquet CO (not here)
- Timing (not here)

Hardware Selection & Procurement General Service Description

- Standard CO hardware
  - VME Technology **(~ 700 systems)**
    - CES PowerPC RIO2/3 family Processor boards (Contract B1206/AB covering 2004-2006)
    - Standard Wiener Crates (Fan Tray and standard backplane). CERN/Wiener contract
    - Collection of commercial Boards (ADCs, RS232, RS422, Mil-1553 BC, I-O line drivers, etc) and their associated device drivers
  - Gateway PC Technology **(~250 systems)**
    - Diskless Pentium IV Intel processor board (19' rack)
    - Alstom FullFIP2 Bus arbiter @ 31.25 kbits/s, 1 Mbits/s and 2.5 MBits/sec

Hardware Selection & Procurement General Service Description

- Standard CO hardware
  - cPCI and VXI
    - cPCI Wiener crates (crate, fan tray, backplane)
    - cPCI Concurrent Technology Intel processors (Pentium III 1 GHz)
    - VXI crates (HP)
    - Scopes 1Gsample and more : cPCI and VXI
  - Timing Receiver cards
    - CTR-V (VME form factor)
    - CTR-I (PCI form factor)
    - CTR-P (PCM form factor)
  - Many other Home made HW modules : GFAS, BIC, SLP, CTGs, BST Master, optical Tx/Rx modules, …

Hardware Selection & Procurement General Service Description

- Procurement and delays
  - Bulk orders placed once or twice/year (quantities, budget, milestones)
  - Margins taken into account for spares and unforeseen developments
  - **!!! Mandatory to evaluate your global needs (per project or per machine) for the next 12 months !!!**
  - **Procurement of even small quantities can take up to 4 months**
- Specific hardware : no CO support
  - Boards bought or developed by an equipment group for a specific application and for which the integration (device driver, etc …) is not done by AB-CO
  - Special crates specified and bought by an equipment group for a particular application (I.e. BDI VME crates with specific back plane and power supply)

Hardware Selection & Procurement Specific Answers

- LHC and LEIR
  - All VME, cPCI and Gateway PCs HW procurement (and installation) on track for all equipment groups (crates, SBCs, timing modules, ...)
- RF SPS Faraday cage
  - VME CPUs and Crates ready
  - Opto coupler transition modules and special cables : Mid October 2005
- RF LINAC 3Mev test stand and CTF3
  - hardware requests and medium term needs are defined (J.Serrano, S.Deghaye)
- How to see the LHC CPU situation (ordered, received, installed ...) ?
  - Orders and stock managed in HT proprietary DB. Could be improved and made public
  - Items installed : cf slide on asset management

Hardware Test & Installation General Service Description

- **Tests** performed by CO
  - Individual HW module system tests (visual and functional test)
  - System integration and burn-in sequence (I.e. Gateway PC with processor board, CTR-I timing receiver, CC144 WorldFIP bus arbiter)
  - Low level HW configuration (BSP, firmware, etc)
  - System naming
  - System boot file preparation (device drivers, O/S kernel settings, etc)
  - System boot and functional test in lab (with Ethernet, timing and FIP)

Hardware Test & Installation General Service Description

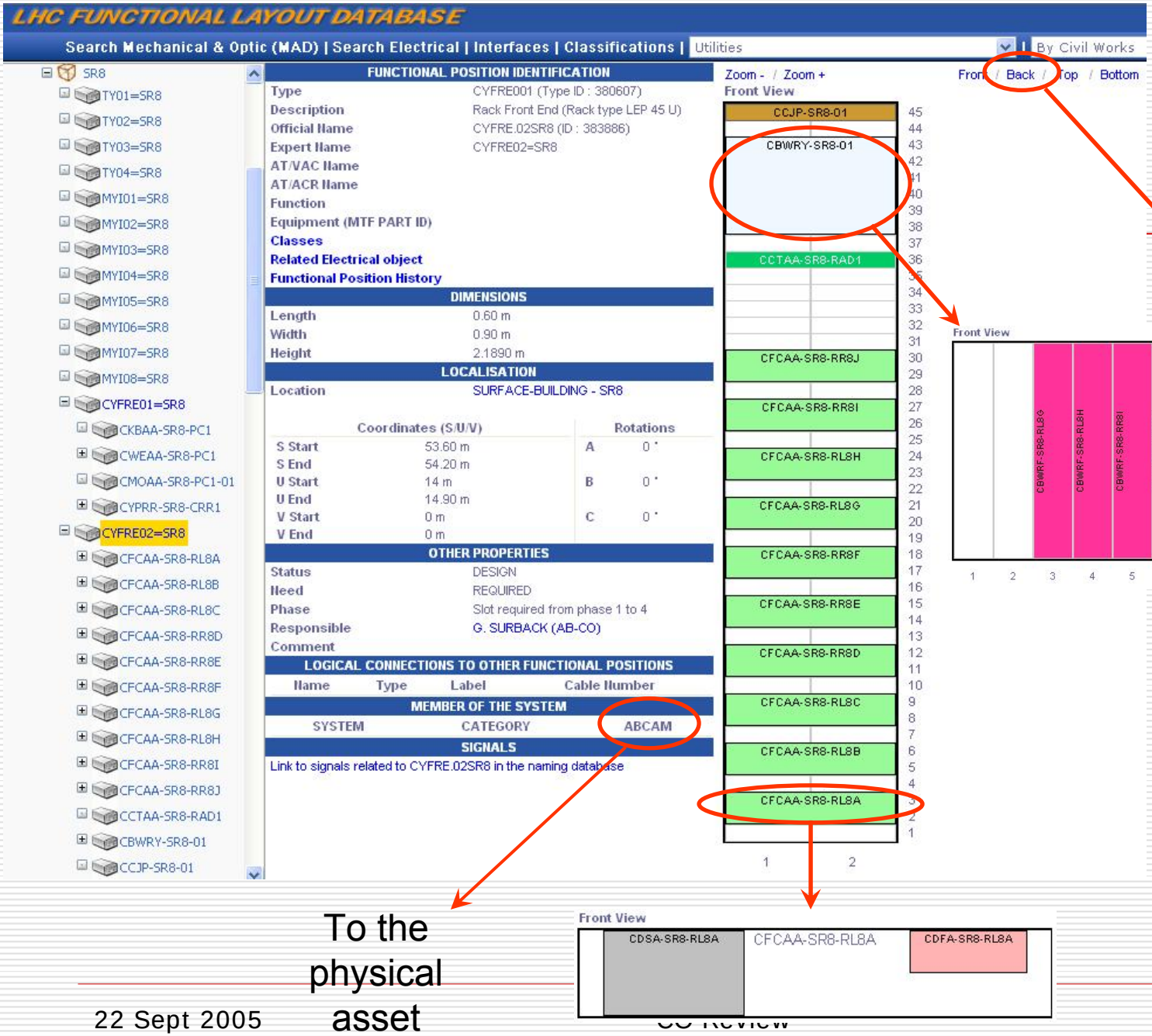
- **Installation** performed by CO
  - For CO systems (composed of CO standard HW only)
    - In-situ installation, cabling and functional test
    - Declaration in the LHC Layout Reference DB
    - Declaration in the ABCAM Asset management System
  - For hybrid systems (containing both CO and equipment group HW modules)
    - No general statement
    - Case by case agreement with the equipment groups as the way systems are tested and installed can be different
  - Remote Reset infrastructure
  - Terminal Service
  - WorldFIP infrastructure (copper and fibre cables, repeaters, FIPDiag)
  - Timing infrastructure : VME HW of MTGs, fibre Tx/Rx modules, copper distribution, repeaters, timing receiver modules

Hardware Test & Installation Specific Answers

- Who takes care of the installation requests?
  - Large installations or upgrade programs
    - LHC as example
      - fairly good organization in place and already used for LHC Pt 8,1 and 7 (for HW commissioning only)
      - Control system installation reviews twice a month with equipment groups, IT, TS, … (Cl.Dehavay)
      - **We want to apply this model to future large scale upgrades or new machines**
  - Upgrades or single installations
    - **Still to many request "channels" routed to different CO system administrators and/or HW specialists (LEIR, LHC, SPS EA, …)**
    - → new WWW based interface
    - Weekly "CO Hardware installation reviews" to be put in place from October 2005 onwards.

Hardware Layout and Assets General Service Description

- CO provides the infrastructure for accelerator layout
  - Complete description of (to be) installed machine with all positioned, functional components and their inter-relations
  - Single source of reference data for *all* functional layout information
  - Central and vital hub to relate information to assets and signals
- You explain your structures and provide the data
  - Level of detail is client dependent
  - Can cover racks, crates, modules, connectors, WFIP addresses
- CO captures your data and provides tools to keep it up-to-date
  - Excel-type bulk loading and Forms-like data manipulation
- CO assists in your asset management
  - Follow-up of physical components for maintenance, ...
  - Push towards & guide into central EDMS tools, namely MTF
  - CO provides additional (portal) functionality when required



To the physical asset

Topics

- ✓ Hardware Selection & Procurement (Marc)
- ✓ Hardware Test and Installation (Marc)
- ✓ Hardware Layout Management (Ronny)
- ☐ Front-end System Software (Franck)
- ☐ Front-end Equipment Software (Franck)
- ☐ PLC (Philippe)
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- ☐ Application (Eugenia & Adriaan)

Front-end System Software General Service Description

- Supported platforms:
  - VME/LynxOS: general purpose
  - cPCI/Linux: OASIS only.
  - PC/LynxOS or Linux (diskless & rackable): FIP and Ethernet gateways only.
- Operating System:
  - OS support: validation and support of new versions, boot service, file systems…
  - Configuration and management tools for hardware and software
  - System initialization and monitoring
- Drivers & I/O libraries:
  - We provide complete drivers for all “standard” boards
  - You provide the software for your specific hardware
  - We provide you with tools and support for the development and deployment of your drivers or libraries.

Front-end System Software Specific Answers (1/2)

- Other PC/Linux? Only on special agreement.
  - Same Linux version (Kernel & GCC) as the other front-ends
  - Compatible hardware and provision for spares
  - Special hardware => source code of the driver (cf. OASIS)
- Windows XP? No front-end support provided
  - AB desktop only
- Support for N.I. systems?
  - Expertise provided by CO for their selection and use.
  - Other services to be defined on request.

  ->Adriaan Rijllart
- OS evolution support
  - We can help for porting to a new version. We always port our software first.
  - You are responsible for the required modifications in your code.

Front-end System Software Specific Answers (2/2)

- Configuration tools
  - Homogeneous process declaration for all front-end will be deployed for the 2006 start-up. Integration with FESA need to be completed.
  - Hardware/drivers configuration: no uniform procedure yet but PS procedure could be extended to LHC (2006?).
- System monitoring (CLIC/XCLUC)
  - Includes task monitoring & “warm-reboot” services.
  - Will be standardized on all front-ends for the 2006 start-up
  - Integration of hardware monitoring services (crate, FIP, PLC) into XCLUC or LASER need to be completed.
- Drivers and I/O libraries
  - Driver generation tool to improve with users’ requests and feedback.
  - We have the expertise to provide you with support.
  - Request for new standard boards will be treated by CO but new boards have to cover new needs and for more than one usage.
  - There are already some special agreements (WFG for CTF, BNL’s board for RF…). Stable commercial boards “preferably”.
  - Minimal team now. If the load increases, we’ll have to consolidate it.

Front-end Equipment Software

The 6th equipment group:

- PS/CO people that retired, left CERN or moved: A. Risso, L. Merard, V. Adorni, J.M. Bouche, F. Carollo, W. Heinze … (partially replaced by people with other duties)
- Still in charge of most of the PS equipment software (~60 equipment-modules)
- If they were consulted, probably: N'y touchez plus!

Front-end Equipment Software General Service Description

- CO provides the infrastructure (FESA)
  - New infrastructure for all developments (collab. BDI/CO). CO moved all its current front-end projects to FESA.
  - Focused on productivity: efficient tools and integrated services (Communications, Alarm… Post-mortem?).
- CO provides software for “standard” hardware: standard boards and basic controls components
  - Control modules for Timing receiver, Digital or Analog I/O, Function Generator, etc. (many FESA migrations required)
- CO provide you with the expertise and support
  - Many FESA experts
  - Widespread competence in equipment software development (responsible for some control software)
- You provide the equipment/process specific software
  - Instrumentation software, cavity control…

Front-end Equipment Software Specific Answers (1/2)

- Many requests to maintain efforts in the FESA support and development.
  - Put more technical resources (~1 FTE) to free organization resources.
  - Increase the number and availability of experts.
  - Reduce the maintenance and development of specific applications (before 2007!)
  - Provide specific support for gateway software, PLC and FIP. (many applications)
- Many planned FESA migration that will require support.
  - Some were or will be done by us (OASIS, GFA, I/O registers…)
  - Most have to be done by you with the help of CO experts (mini-projects).
  - Case by case agreements to be clarified: ROCS, SPS2001, GM/PLC, REX, PS/PO. "We develop and you maintain", who deploys?
- A lot of missing man-power that CO cannot compensate
  - You need C++ programmers
  - Operators could help. (thanks Bruno for QPS, thanks Jean-Michel for CTF and samplers).
  - Projects (ex: CTF) should provide associates.
  - CO can help for recruitment, training and tutoring.

Front-end Equipment Software Specific Answers (2/2)

- MACSYS BT systems:
  - Minimum extensions for the 2006 start-up.
  - FESA migration by BT with CO support afterwards (2006?)
- Legacy software increasingly difficult to maintain (PS and SPS legacy, Isolde/REX, transfers from one group to another…).
  - Survive with old but stable software and plan the migrations according to maintenance or operation problems.
  - Set-up a FESA migration task force (another BDI idea)
- Requests for enhancing the coordination:
  - Keep the users informed, handcheck releases… this is the responsibility of the service providers (system, FESA…).
  - Improve solutions/resource sharing, coordinate FESA and GUI migrations… this is not.
    Identify the body(ies) for this. Create a new one if required.

PLC
General Service Description

- PLC hardware expertise
  - Hw selection, “veille technologique”, upgrade old Hw,
  - Hw trouble shooting (link to supplier hotline)
- PLC Asset management support
- PLC Central stock for spare parts
- PLC software expertise
  - Programming methodology
  - Generic Solutions (such as stepping motor, motor drives, synchronization)
  - Upgrade of programming environment
- PLC communication
  - PLC<>FE (IE PLC) for operation applications
  - PLC <> PVSS (TSPP) for expert tool
  - Mapping of devices in PLC (Schneider & Siemens), configuration tools from DB

PLC
Specific Answers

- AB-CO can train and support your dedicated team on AB-CO-PLC Standard (IEPLC, UNICOS...): Principles, Methodology, Tools....
- But cannot without new resources develop/maintain your applications

Controls Configuration
General Service Description

- CO provides the database for controls configuration
  - Properties of front-end software devices
  - Reboot & startup information for front-ends
  - Configurations for applications (working sets, console menus)
  - Dedicated control data (timing, PLCs,...)
- CO provides the data-entry tools
  - Dedicated tools (e.g. for FESA devices)
  - Forms-like data manipulation, or Excel-type bulk loading
  - Ad-hoc SQL interventions for expert operations upon request
- You keep your data up-to-date and correct
  - We cannot validate data beyond data rules and integrity
- CO provides components/tools to use the data
  - Java APIs/library for Java applications
  - Generation of data sets in specific format
  - On-line documentation and information

Controls Configuration
Specific issues

- The old (GM, SL-Equip) and new (FESA) paradigms have been federated, not integrated
- Several components and functionality needs to be out-phased and replaced
- Data entry interfaces are under revision, *cannot* be harmonized asap
- Data entry tools (Oracle Forms) are unstable on Linux
- Other, niche & industrial systems are still to be covered (Power Converters, PLC, SCADA,...)
- Opaque usage of out-phased/obsolete components in (versions of) JDS, Pro*C apps, console mgr, DB structures

Application General Service Description

- OP provides operational applications GUIs
- CO provides generic applications : working-set, knobs, synoptics, FESA navigator
- CO provides some development tools but you have to provide the specialist applications
  - Java GUI building components (Java Dataviewer, GUI frame, ASC Beans)
  - Jython for RAD
  - Passerelle for MDs
  - LabView
  - Plus support for development and deployment of operational applications
- Control software services:
  - Laser Alarm System
  - Console Manager
  - Logging
  - Fixed displays
  - MD archiving and browser (SDDS)

Application Specific Answer

- LabView:
  - An operational LabVIEW environment on Linux SLC3 (other platforms, to be discussed).
  - A framework, including templates and design rules for developing maintainable LabVIEW specialist programs.
  - Development and maintenance of a certain number of applications, in addition to the Post Mortem Analysis, to be discussed.

Conclusion

- Thanks for all the input!

- All LHC procurement is on track.
- All request for hardware shall be budgetized and registered enough in advance to allow planning over the year.
- We need now to work with a visible hardware consolidation plan.

- The software support is in place. It will be consolidated but the load increase implies reduced involvement in specific developments.
- Homogenization of PS/SPS/LHC controls will continue but it won't be complete in 2006.
- We also need to work with a visible software evolution plan.

- Sorry for the missing replies!