Controls Renovations and End of Life (EoL) plan of major components of the controls infrastructure

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CERN
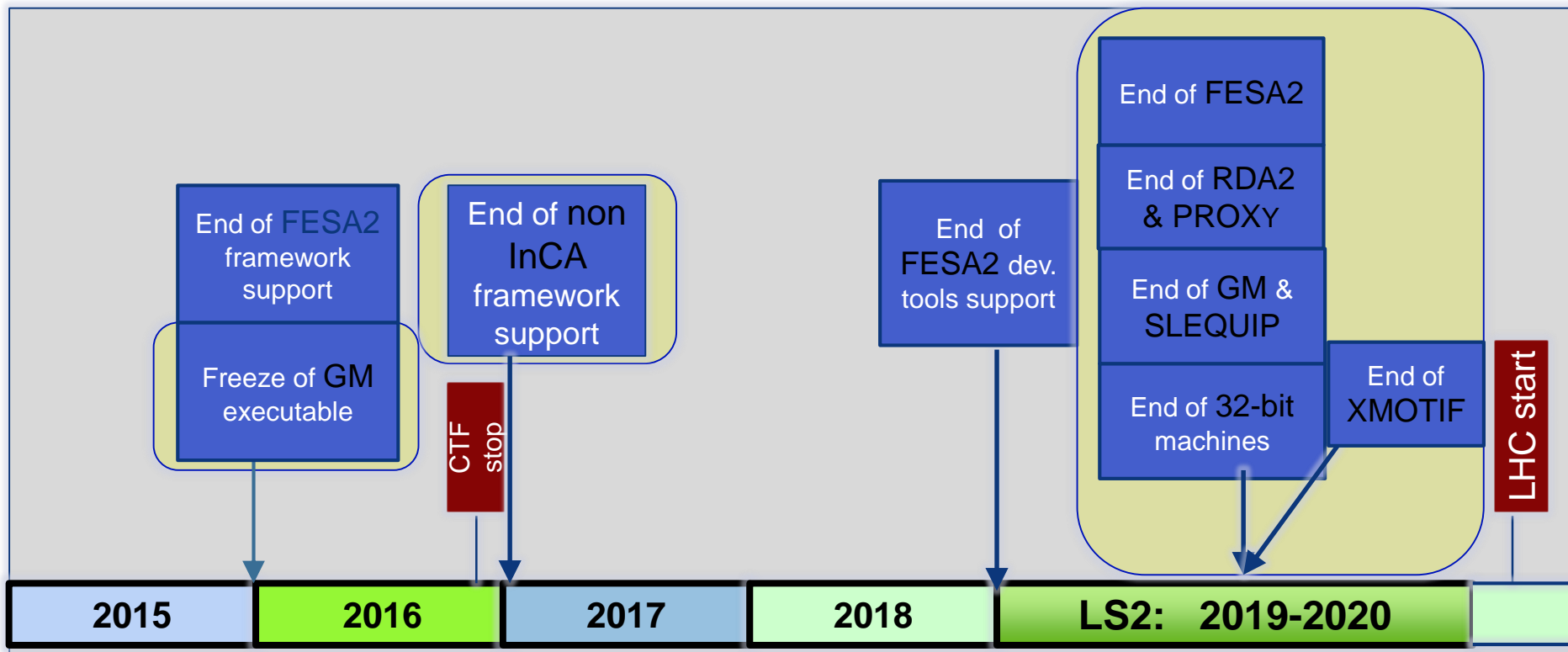
LS2 DAYS

29-30 SEPTEMBER 2015

http://indico.cern.ch/event/436424/

Contents

- **Post ACCOR Renovations and End of Life (EoL) of major Controls components**

- Controls Consolidations & Renovations

CO Roadmap - EoL and Support

- **YETS 2015-2016**
  - **Freeze of all GM executable**
- **End 2016**
  - **All FE installations and non-InCA JAVA AP framework for CTF will be stopped end 2016.**

- **Mid of LS2**
  - **No 32-bit OS machines (LynxOS + Linux)**
  - **No RDA2 communication & proxies**
  - **No GM or FESA2 executable**
  - **No SLEQUIP**
  - **No X/MOTIF AP**

Renovation Roadmaps by EQP Groups

- Roadmap received for almost all systems
  - Detailed planning available for each FE
  - More than **900 FEs** concerned
  - Roadmap provided by 10 EQP Groups
    - BE-BI (370 FEs): first feedback received but detailed roadmap expected end 2015
    - EN-EL (2 FEs): under discussion.
- Compilation of all roadmaps done
  - One document with shared access to come soon for approval
- **We are grateful for the excellent effort put in by all equipment groups**

Alignment of Renovation Plans & EoL (1/2)

- BE-CO EoL: freeze all GM executable by YETS 2015
  - CO proposal is not accepted for ABT, BI, RF
    - GM code should stay editable until LS2 to accommodate OP/MD requests
    - CO now in discussion with the Eq. groups to see how to facilitate this request
- CO EoL: All FE installations and non-InCA JAVA AP framework for CTF will be stopped end 2016
  - No objection from EQP & OP groups

Alignment of Renovation Plans & EoL (2/2)

- CO EoL: Stop of RDA2/FESA2/32bit OS/GM/SL/XMotif by mid LS2

  ✓ EQP Renovation roadmaps are compliant with CO EoL at 95%

    - For the most obsolete systems [GM, SLEQUIP], some renovation takes place late (LS2)

  - Very few renovations are not compliant with EoL

    - SPS BLM (10 FEs, LynxOS): renovation planning is LS3

    - Legacy B-TRAIN (~6 FEs) requested to be kept operational beyond LS2

      ➢ BE-CO ready to help them so they could meet the LS2 deadline to deploy 4 new systems during LS2: LEIR, AD, PSB and CPS

  ➢ In discussion now with corresponding groups to see how BE-CO can help

CO Tools for Renovation

- Massive Class/Device migrations (GM -> FESA, FESA2 -> FESA3) will take place until LS2
  - CO tools (FESA instantiation, CCDB migration) to be extensively used
- FESA Migration tools
  - Available in Eclipse since **end 2014**
  - FESA3 is stable -> priority can be increased on tools improvements, if required
  - Contact fesa-support for help & feedback on improvements
- Controls Configuration Service (CCS) tools
  - Presentation/demo of the new migration tools**: October 2015**
  - On-demand training sessions between CCS Support and EQP developers
  - Developers with new class design should contact CCS Support for migration tests on our testbed
- User feedback on tools improvements is essential as soon as possible
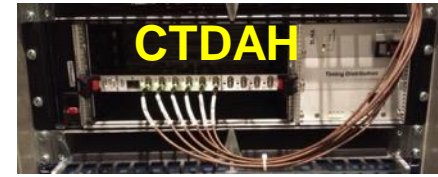
Post ACCOR Renovations and EoL Summary

- We have now an **agreed roadmap** with all Eq. groups for the remaining post ACCOR renovations (900 FEs) and EoL of controls components
  - EDMS, shared-access document will be available soon
- Remaining actions
  - BI roadmap by end 2015
  - CO ⬅➡ Eq. groups discussions on GM support until LS2
  - Dedicated meetings with Eq. groups to address the few renovations not compliant with EoL (SPS BLMs, B-TRAINs)
- Developers should provide feedback to Configuration Service and FESA tools for needed functionality

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- **Controls Consolidations & Renovations**

Renovation of Timing Pulsed Distribution Network

Aim : Replace obsolete 40y old cards TTL-BLO and RS485 (400 repeaters) with new VMEbus crates + modules + diagnostics

CTARA

CTDAH

Activity	Impact
Ethernet socket	EN/EL, IT/CS
HW production : • TTL-BLO : 500 CTARA + 500 CTDAH done • RS485 : Design to be completed	Design : BE/CO/HT Production : TE/MPE/EM Asset InforEAM: GS/ASE
Planning, Commissioning	EN/MEF, BE/OP, LS2 CO Coordinator

Planning
Small nodes during TS
Medium nodes during EYETS 2016-17, YETS 2017-2018
Big nodes during LS2

Budget

400 KCHF request to Consolidation Budget covering:

- ELMA contract for VMEbus crates (to be extended)
- VMEbus cards proto from BE-CO-HT
- Work will be done by BE-CO FSUs

GMT Central Timing Renovation

Aim : renovate the GMT Central Timing with White Rabbit (WR)
Why : driven by lack of stocks of current GMT receivers (CTRx) (>1000 installed)
stock 200 remaining – 50/y consumed –> lack of components

| Activity	Impact	Budget
Fibers + Ethernet sockets	EN/EL, IT/CS	Covered by our operational budget
HW production • WR Switches : launch additional production • WR HW modules (Timing Master + CTR WR version) : First design in 2016	Design : BE/CO/HT Production : TE/MPE/EM Asset InforEAM : GS/ASE	• White Rabbit modules and switches • Cabling and sockets • Work will be done by BE-CO FSUs
Planning, Commissioning	EN/MEF, BE/OP, LS2 CO Coord	

Planning
Develop hybrid GMT/WR master and hook the existing timing distribution to its GMT output. Then have a parallel WR distribution to gradually migrate front ends to WR   => This would allow us to recuperate the CTR modules in those front ends to replenish the stock
YETS 2017-2018 : Deploy pilot for proof of design before LS2
LS2: Low intensity migration of part of LIC towards WR to recuperate CTRx stock
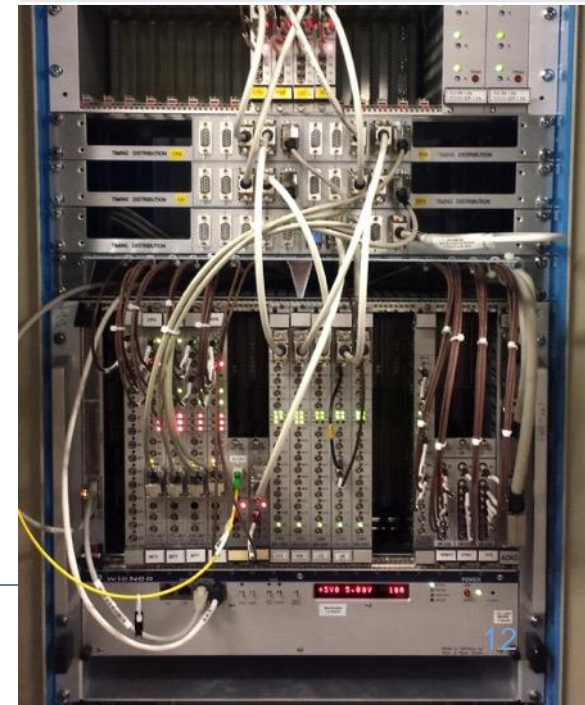
Renovation of GMT External Conditions

Aim : replace the old GMT "external conditions" infrastructure with WR
Why : present installation on unreliable legacy hardware with long coax cables and unreliable contact interfaces – already issues – anticipate further degradation

Activity	Impact	Budget
Fibers + Ethernet sockets	EN/EL, IT/CS	200 KCHF in consolidation request
HW production • WR Switches : launch additional production • WR contact interface : New design • BE-CO Fellow will work on translation of the on/off switch to WR contact interface	Design : BE/CO/HT Production : TE/MPE/EM Asset InforEAM: GS/ASE	• White Rabbit modules and switches • Cabling and sockets • FSU Jobs
Planning, Commissioning	EN/MEF, BE/OP, LS2 CO Coord	

Planning
Take the opportunity to make installation more coherent => need help from equipment groups
Migration during LS2

Timing PLS-SU Receivers

Aim : Replace these very old modules used by equipment specialists to diagnose timing locally, with a physical knobs and buttons and LEDs interface.
Why : Legacy hardware which we cannot produce any more - no stock problem

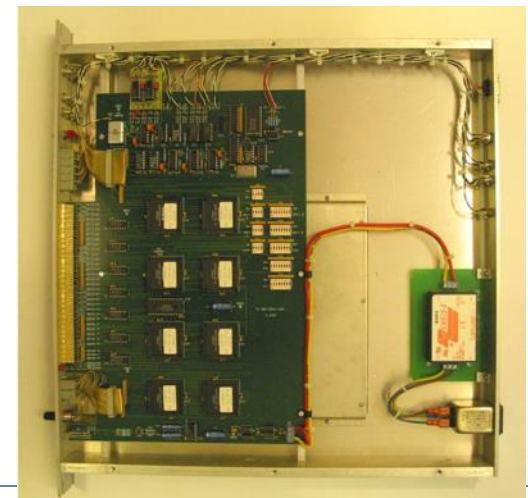| Activity |
|---|
| Possible replacement using a software-based system |
| Need prior discussions with the users |
| No cabling work is required |

Planning
Migrate some of the PLS-SU boxes out there, sometime before LS2
Perform a bigger migration during LS2

Budget
450 KCHF request to Consolidation Budget

OASIS – Consolidation of Oasis Triggers

Aim: Replace OASIS trigger system by WR
Why : obsolete hardware – not enough stock of legacy CTC modules spares
(components are not available)

Activity	Impact
Fibers + Ethernet sockets	EN/EL, IT/CS
HW production • WR switch • TDC Mezzanines & Fine Delay	Asset InforEAM: GS/ASE
Planning, Commissioning	EN/MEF, BE/OP, LS2 CO Coord

Planning
Prototype in next 2 years
• LS2: Full renovation

Budget
• Money already obtained from the consolidation project
• Hardware is in process to be procured

OASIS - Eradication of VXI systems

Aim : Replace OASIS VXI systems by White Rabbit
Why : VXI systems are >10years, very expensive,
*   performance problems (not enough memory, not enough samples)*

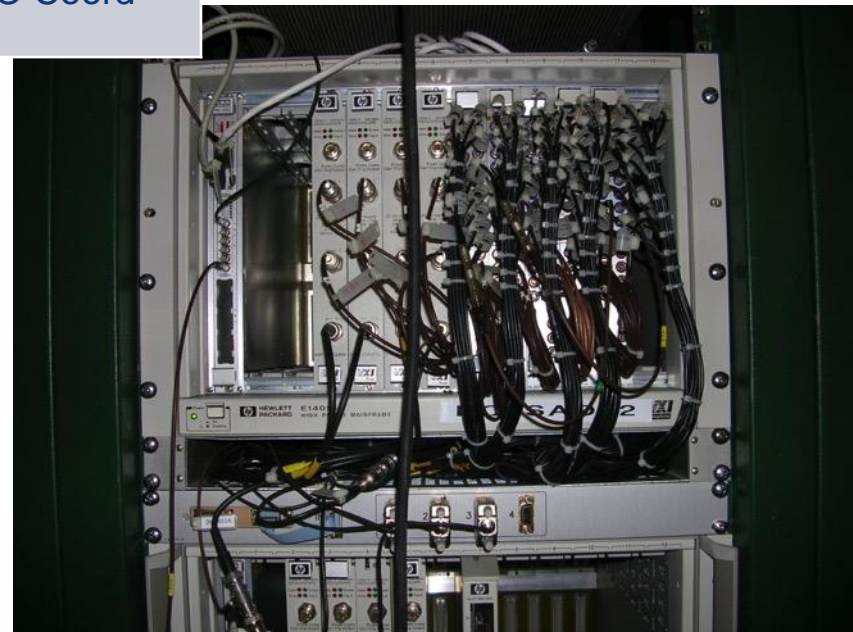| Activity	Impact
Fibers + Ethernet sockets	EN/EL, IT/CS
HW production • SVEC + FMC/ADC Mezzanine	Asset InforEAM : GS/ASE
Planning, Commissioning	EN/MEF, BE/OP, LS2 CO Coord

Planning
EYETS 2016-17 : Partial renovation
LS2: Full renovation

Budget
• Money already obtained from the consolidation project
• Hardware is in process to be procured

LS2 DAYS
29-30 SEPTEMBER 2015

LHC WorldFIP Infrastructure

Aim : install the new in-house bus arbiters cards and associated high-level libraries to replace the WorldFIP Bus Arbiters (WorldFIP master) for all LHC systems (Power converters, QPS, Cryogenics, ..)

Alstom PCI BA

Activity	Impact
HW production • Bus Arbiter PCI cards done	BE/CO/HT + TE/MPE/EM
New device driver + SW libraries: Proof-of-concept OK	Power Converters, Cryogenics, QPS, Survey, Beam Instrumentation
Agreement + Testing : Backwards compatible layer for clients who keep the old API • Encourage clients towards the new API	Power Converters, Cryogenics, QPS, Survey, Beam Instrumentation
Planning, Commissioning	EN/MEF, BE/OP, LS2 CO Coord

FMC mezzanine board, to be plugged on the PCIe carrier (SPEC)

Planning

Deploy the new master in selected places before LS2 to get confidence and a general replacement during LS2 :
- TS 2016: install few non critical pilot(s) in LHC
- EYETS 2016-17: install few pilot(s)
- LS2: Full replacement

Budget

400 KCHF allocated in consolidation covering
- cards production
- FSUs Job

Cu/Optical repeaters were already insourced (GOFIP) and we plan to insource the Cu/Cu repeaters before LS2 to ensure adequate stock. No need to replace the existing ones so far as they are not giving any problem

Removal of Obsolete Cables

- **133** obsolete control cables will be removed from the Booster (out of 1540) in 2015-16 YETS

  - Already checked with the CO DB and GESMAR

  - More obsolete cables should be in the paper lists of EN/EL (not in GESMAR)

- Possible Improvements

  - Move all information from paper to digital (big gain as paper contains the oldest cables)

  - Put fiber optic cables in a DB

  - Electronic follow up of all (de)cabling demands would ease the work progress follow up from the clients

  - Asset management of the cables and GESMAR could be part of the Asset management system

- An excellent initiative in the form of a WG was set up by EN/EL to establish a single common method/process for cable disconnection with all users and BE-CO is participating
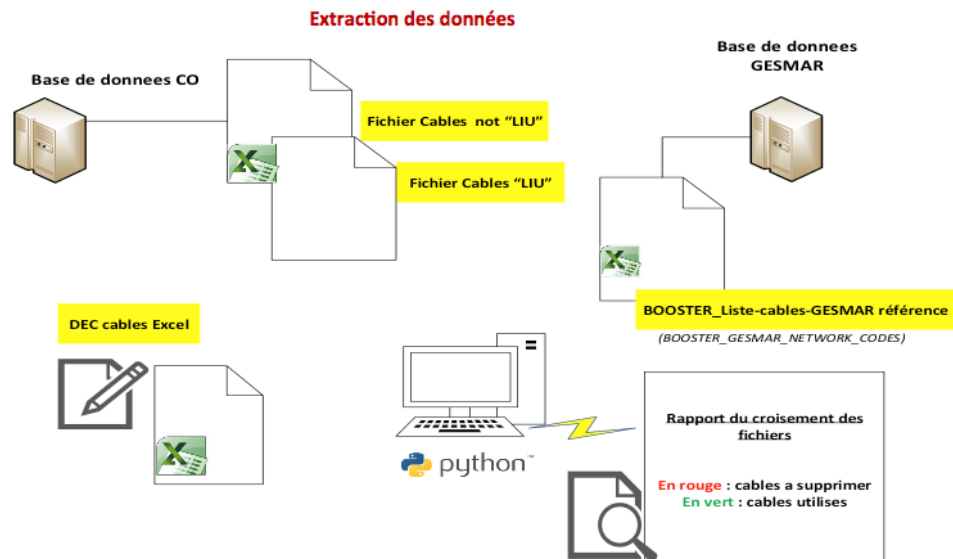
Other Hardware Upgrades in a glance

System	Aim	Motivation	Performed by	Potential impact	Impact on	When
SPS Intercom	Replace the present infrastructure with new technology	Old technology and spare parts - will not survive after LS2	GS-ASE + BE-CO (public address ++ system)	Change of habit	SPS Operations	LS2
CCC Consoles	Replace the consoles installed early 2015 and recycle them in the local CRs	Regular technological upgrade (working lifetime of 3-4 years)	BE-CO	Minimal to none	CCC Operators	End LS2
CCR Backend Servers	3 first days of the year for system maintenance and upgrades of all the servers	Dedicated end of year maintenance	BE-CO	Minimal to none		YETS 15/17 EYETS 16 LS2
Database servers and storage	Replacement certain hardware + additional disk storage	Regular end of maintenance replacement	IT-DB BE-CO	None		LS2

Upgrades of Control Software Services

System	Aim	Motivation	By	Potential impact	Impact on	When
Layout Services **new database & tools**	New approach: distributed data management (equipment groups manage their data in a reliable way using CO provided tools)	Layout Database Scale & Scope has evolved significantly over last 12 years Current system, tools and approach have reached their limits	CO-DS	**Generic access user/passwd will be replaced by specific per system user/passwd**	Current programmatic users of the Layout database will be impacted	Production in 2018
DIAMON	DIAMON with ALARM functionalities i	To simplify alarm definitions and allow immediate upgrades of alarm configuration	CO-IN	Minimal to none	Deployments in close collaboration with all users	TS, YETS 15/17, EYETS
CMW	New version of RBAC server	Server independence from online DB access	CO-IN	Minimal to none		EYETS, YETS 17
	New version of CMW<->DIP Gateways -> RDA3 driven by DB config.	Ensure consistency of deployed configuration				
	New major version of CMW Directory Server	Easier to evolve and maintain				

Upgrades of Control Room Applications

System	Aim	Motivation	By	Potential impact	Impact on	When
LSA DB	Change tables related to devices, properties and parameters to automate import of new FESA class versions.	OP request to automate the propagation of changes from CCDB to InCA/LSA	CO-APs	Applications accessing or changing settings via LSA/InCA.	OP applications developers	YETS 2015-2016
Settings Management	Consolidate and simplify the high level Settings management	Reduce complexity overall by extracting the exceptional cases.	CO-APs	All applications depending on APS public APIs	Application developers	LS2

Controls Consolidations/Renovations Summary

- LHC WorldFIP Bus Arbiters (FIP master), concludes the insourcing of WorldFIP technology inside BE-CO

- Timing Distribution Network (cabling requests)

- GMT Central Timing and External Conditions (cabling requests)

- OASIS Triggers and VXI systems (cabling requests)

- Removal of 133 obsolete cables in PSB (cabling requests)

  - Improvements to cabling data management & workflow would greatly facilitate (de-)cabling needs

- Upgrades of the hardware infrastructure, controls software services and high level applications

  - Work is planned and coordinated with the users

  - Impact on most work is estimated low

- The BE-CO work planning is followed up by the LS2 CO coordinator in close collaboration with the EN/MEF planning team