Controls & the AFT Tool

Chris Roderick

9th LHC Operations Evian Workshop,
30-01-2019

https://indico.cern.ch/event/75185

Acknowledgements

Thanks to the input from many people:

Markus Albert, Vito Baggiolini, Bartosz Bielawski, Ylenia Brischetto, Riccardo De Maria, Stephane Deghaye, Laurent Delprat, Reiner Denz, Lukasz Felsberger, Jean-Christophe Garnier, Manuel Gonzalez Berges, Marine Gourber-Pace, Ana Guerrero, Klaus Hanke, Eugenia Hatziangeli, Fred Hoguin, Giovanni Iadarola, Stephen Jackson, Gerd Kotzian, Jiri Kral, Alessandro Masi, Bettina Mikulec, Eric Montesinos, Jesper Nielsen, Arto Niemi, Laurette Ponce, Javier Serrano, Katarina Sigerud, Wojtek Sliwinski, Benjamin Todd, Jan Uythoven, Marc Vanden Eynden, Rolf Wegner, Jorg Wenninger, Christos Zamantzas, Markus Zerlauth

Outline

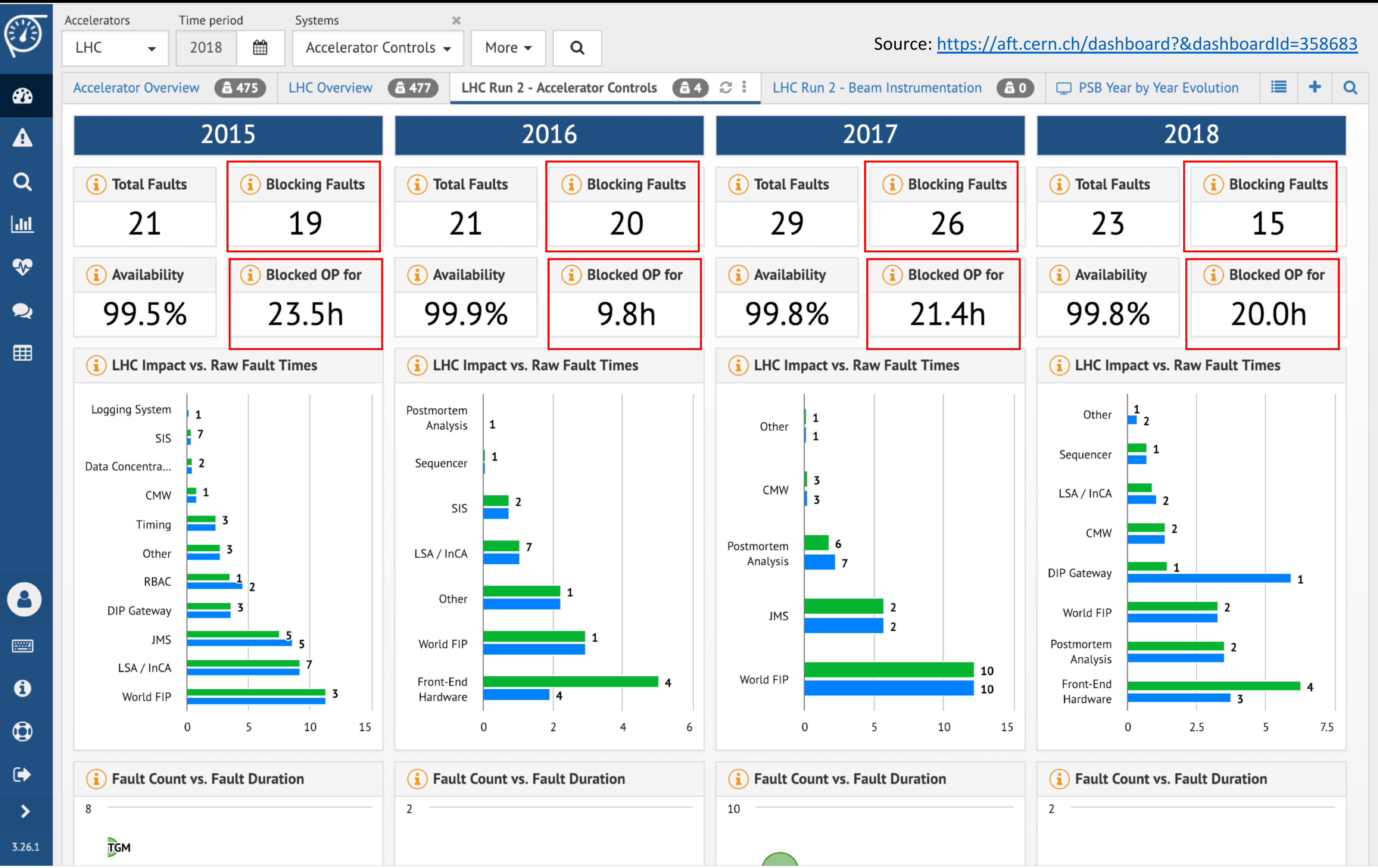
Controls

- Performance 2015 – 2018
- Evolution during Run 2 (including ***Smooth Upgrades***)
- Major changes during LS2 (including End-Of-Life, GUIs, ***NXCALS***, etc.)
- Re-commissioning & outlook for Run 3

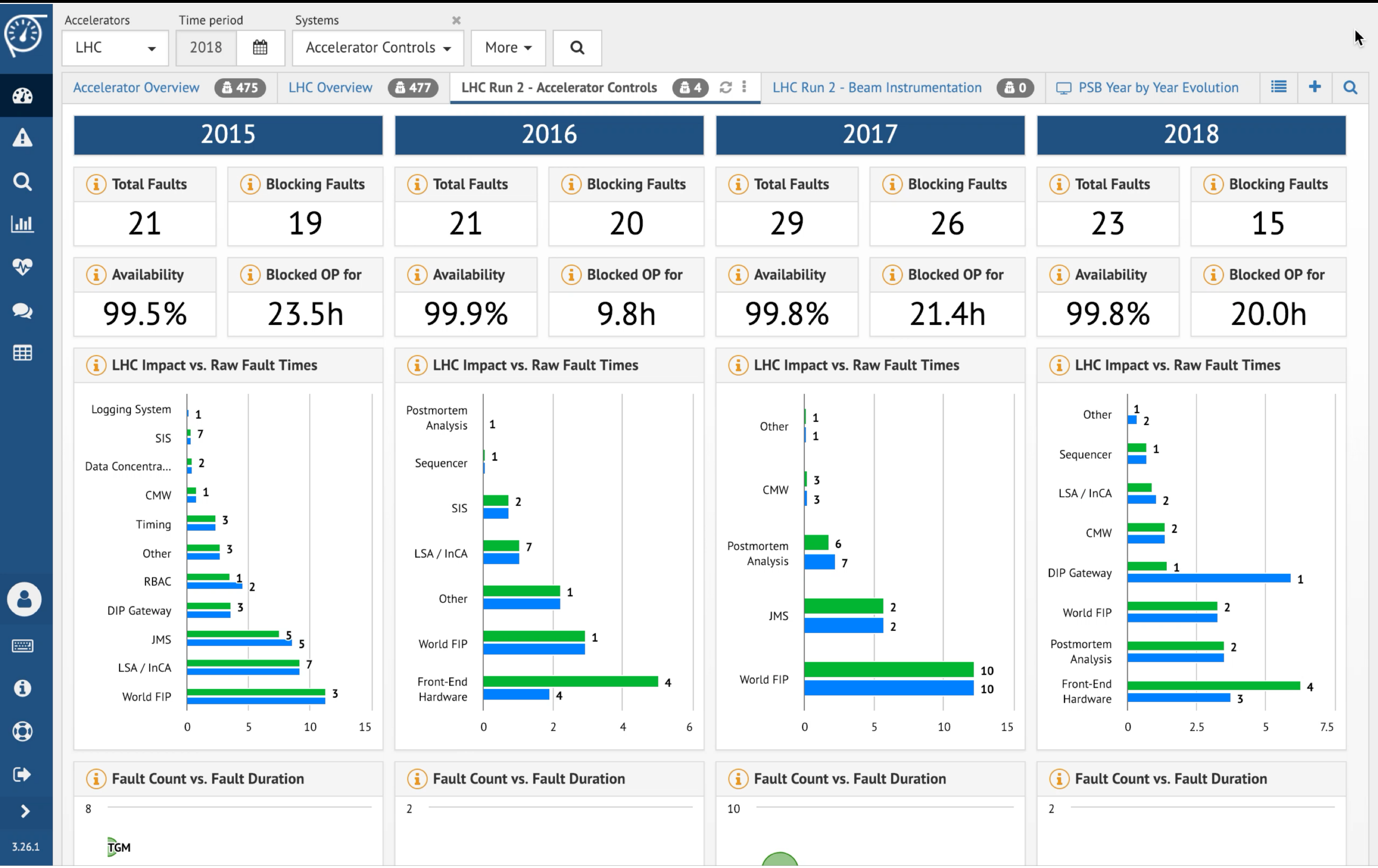
The AFT Tool

- Where we came from
- What it brought
- Where we should go next

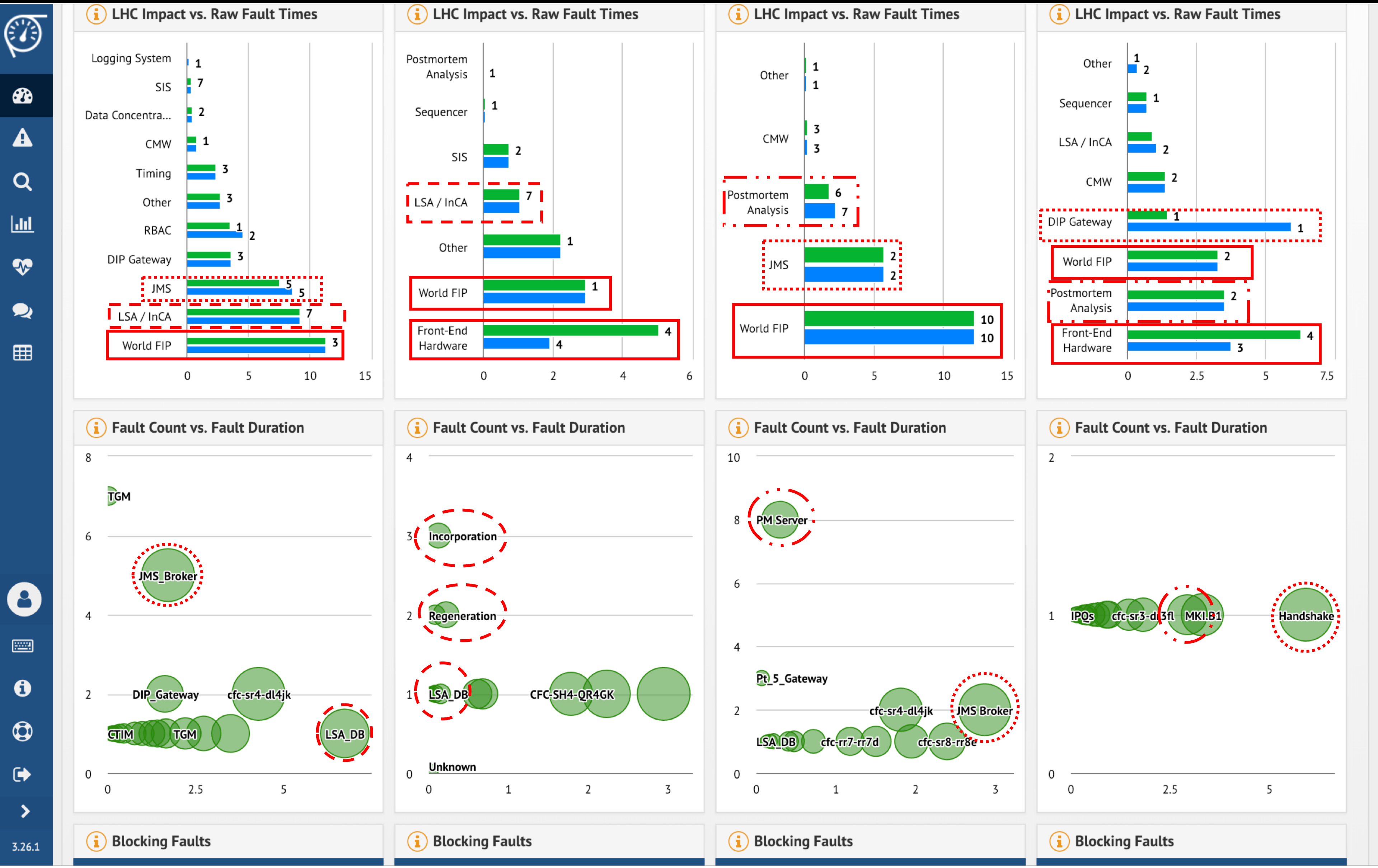
Controls Performance 2015 – 2018



Controls Performance 2015 – 2018



Controls Performance 2015 – 2018



Controls Evolution during Run 2

Controls have evolved significantly during Run 2, both in functional and organisational aspects….

Controls Evolution: Middleware

Middleware was significantly consolidated during the Run:

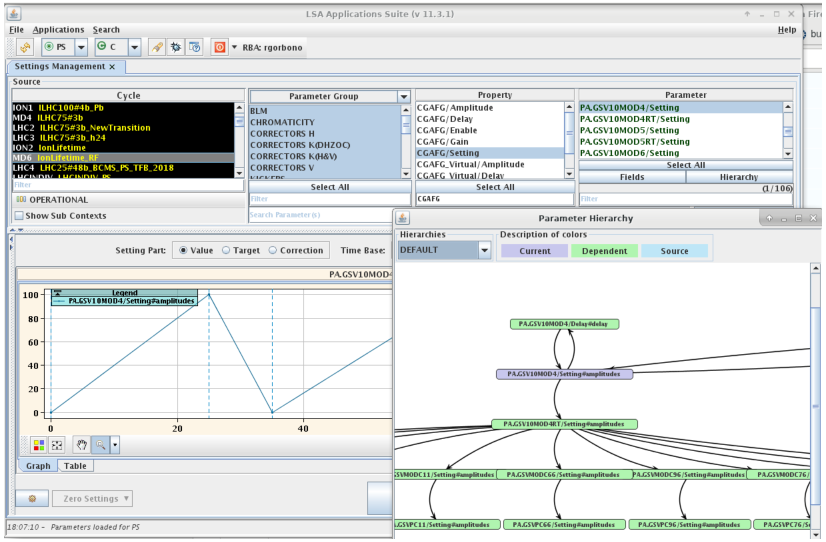
The CMW Directory Service was renovated to use a scalable and fault tolerant architecture (article), as was the RBAC Service.

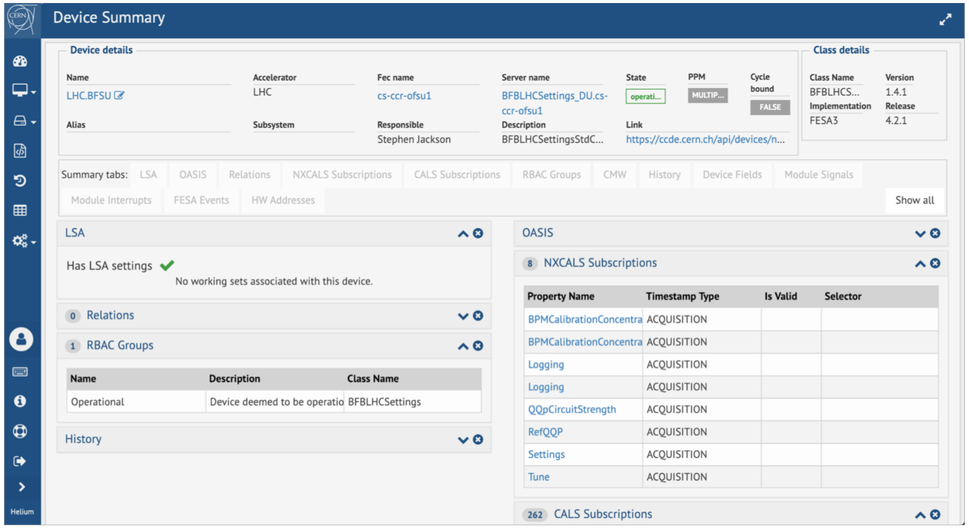
The mission critical JMS service was consolidated and received a major upgrade – mitigating operational issues seen in 2017.

In 2018, a new major version of the CMW/DIP Gateway was provided, using modern technology which is far more reliable than the old RDA2-based Gateway. This addresses the issues observed during the run.

Controls Evolution: Usability

LSA App Suite introduced – combining many tools into 1, to be shared across all accelerators and teams





New Controls Configuration Data Editor (CCDE), integrating data from several systems.

Number of FESA 3 improvements during the run – very positive feedback during the preparation of this talk.

Controls Evolution: Dev Tools & Python

Deployed a new Java build system "CBNG".

Started adapting to IT-provided Gitlab, given de-support of SVN (on-going).

To support TE-MPE "Magnet Powering & Protection Test Bed", collaborated to provide "Controls Test Bed" with major systems.

In 2017, BE-CO embraced Python (finally!).

Joined the existing CERN Python community, launched a Focus Group "PyFG".

First achievement: agreed on distribution (collaboration with EP to use the LCG distribution – making it available on all BE-CO infrastructure).

Controls Evolution: coop

A CO-OP development collaboration started in 2017.

Very positive, motivating experience for all parties.

Developed powerful luminosity levelling software working with separation and crossing angle

Intend to continue on this track in 2019.

Delphine's talk from 2016

Controls Evolution: Smooth Upgrades I

The Smooth Upgrades Working Group is a coordination body, mandated by LMC, ~25 participants (Equipment groups, OP and CO).

Introduced in 2012 by Vito, led by Marine since early in Run2.

Aim: Ensure we can apply necessary Control system upgrades during TS / (E)YETS whilst avoiding unplanned down time.

As requested by OP, the process to introduce Controls changes was increasingly formalised during the run.

New ASM Controls Changes tool since 2017: Track all changes and request / give approval by OP to Equipment groups.

Controls Evolution: Smooth Upgrades 2

Controls Changes

Provide search criteria

Basic | DSL | Advanced search, e.g. Name like "% Shelby"

Title	Accelerators	Needed by	Accelerator event	Responsible	CCR EDMS Status	
[ACC-ADM] Change Ansible default hash behaviour	ALL	19-06-2018	ITS1	Jean-Michel Elyn	Not required	SU
[CMW] Deployment of Kerberos authentication in RBAC	ALL	19-09-2018	ITS2	Wojciech Sliwinski	Not required	OP
[FESA 2.10] Update Oracle jars dependencies for database upgrade...	ALL	30-04-2018		Frederic William Hoguin	Not required	SU
2019/01 Sysadmin days: Continue hardware migration of CO and E...	ALL	24-01-2019	LS2	Enzo Genuardi	Not required	SU
2019/01 Sysadmin days: Upgrade Video, Media-center, Vista, ...	ALL	24-01-2019	LS2	Alastair Bland	Not required	SU
Bending magnets for AD injection line	ADE	01-03-2020	ILS2	Raul Murillo Garcia	Not discussed	OP
BI.SMV10 septum magnets upgrade	PSB	01-03-2020	ILS2	Raul Murillo Garcia	Not required	OP
Booster injection (correctors, quadrupoles and steerers) upgrade	PSB	10-12-2019	ILS2	Raul Murillo Garcia	Not required	OP
Booster Injection BI.BSW Magnets	PSB	01-03-2020	ILS2	Quentin Andrew King	Required	OP
Booster Injection QStrip converters	PSB	01-03-2020	ILS2	Raul Murillo Garcia	Not discussed	OP
Booster main magnets Dipole and Quadrupole (POPS-B) and trims	PSB	01-03-2020	ILS2	Quentin Andrew King	Required	OP
BPMLE: put back calibration after migration to L866 / FESA3	LEI	01-03-2020	ILS2	Guillaume Jacques Baud	Not required	SU
BTV FESA3 server for BA80 BTVs	NORTH	01-04-2019	ILS2	Ana Guerrero Ollacarizq...	Not discussed	OP
BTV system for SPS beam dump	SPS	28-02-2020	ILS2	Stephen Jackson	Not discussed	OP
Capacitor discharge power converters for ADE machine	ADE	01-03-2020	ILS2	Raul Murillo Garcia	Not discussed	OP
Change property names for 200-800MHz cavities controls	SPS	01-03-2021	LS2	Ylenia Brischetto	Not discussed	OP

104 items shown

Feedback | OP Contacts - Doc | CCR Template | Show 'Deployed' | Delete (0) | Duplicate (0) | Bulk update (0) | Create

2.0.40

Controls Evolution: Smooth Upgrades 3

Does the SUWG / Controls Changes process work?

Agreement: changes to Controls during the run are desirable
(to deliver new / improved functionality for Operations, test new things with beam, avoid big bang changes later on, etc.)

In general, SUWG and registration of Controls changes is seen positively. Having a trace of what was changed and why, with OP in the loop ahead of time, is a good thing. Meetings considered valuable to participants.

Having to register changes in advance, forces people to plan and coordinate work and seriously consider potential impact. Still some scepticism about so-called “Transparent” changes.

The process continues to be refined e.g.

- 2018 TS1: 1 change (out of ~70) failed - big impact on LHC restart.
- Change was not validated properly before deployment.
- pre-deployment validation step added to the process - outcome of CCC validation conditions approval for the operational deployment.

Controls Evolution: Smooth Upgrades 4

Does the SUWG / Controls Changes process work?

Registration of changes – not a replacement for direct communication between Equipment groups, OP colleagues in CCC and CO teams.

For LHC, preferable to deploy some significant system changes between fills in coordination with OP-LHC (allows fast reaction, but must have an efficient rollback strategy).

Restarts on a Friday evening / Saturday morning are not ideal for all parties (OP, Equipment groups, CO).

Some wishes to go further – track / manage dependencies between Controls changes.

Major Controls Changes during LS2

Controls changes during LS2 are aimed at providing the best possible functionality and usability, whilst ensuring a continued high-availability.

BE-CO's offering is enlarging (Python, Web, AFT, ASM,…) and the outside world is evolving (hardware & software) - need to remove legacy and upgrade to survive.

LS's perceived as main opportunity to tackle technical debt and make necessary breaking changes.

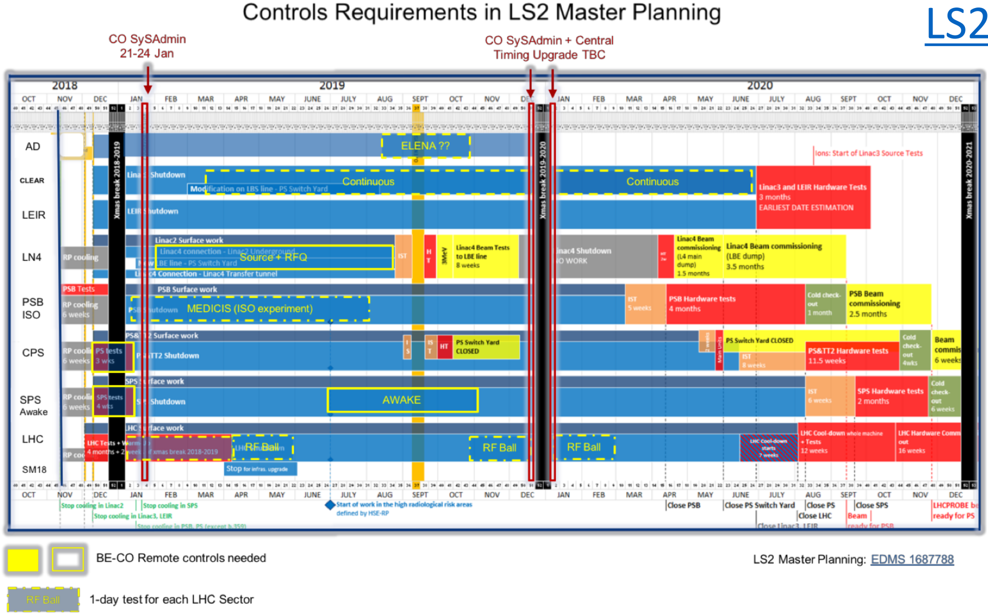
LS2 – increased challenge (also for other groups) due to continued running of some facilities – i.e. no "shutdown".

Major Controls Changes during LS2

Feedback from LS1 Controls Review* taken into account:

Publish a global planning, in advance, with all upgrades:

LS2 Days - Controls Upgrades



Need for stable Controls at the start of the LS:

January 2019: delivered the first “Controls Baseline” – coherent set of Controls software with support until LS3.

LS2 Controls Planning

* see Marine’s Summary at Evian 2015 for more details

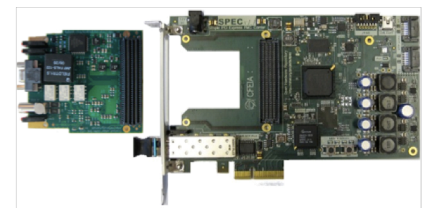
LHC World FIP

Migration of Industrial Front-end computers: Kontron → Siemens

Full replacement of LHC WorldFIP machines (200)

WorldFIP MASTER renovation →

Deploy CERN-designed bus arbiters & software stack to replace proprietary Alstom solution.



Solves Front-end computers freezes (experienced 2016-2018).

Successfully validated on LHC FGCs in 2018. Thanks to TE-EPC (early adopter) for their trust in our new system.

Alstom Cu/Opt repeaters replaced by in-sourced design (GOFIP)

more details

End Of life

The End-Of-Life program has been announced in 2015.

Only RDA3, FESA3 (v7+) and CentOS 7 will be supported going forwards.

January 2019 Controls Baseline release will remain compatible with future BE-CO releases until LS3.

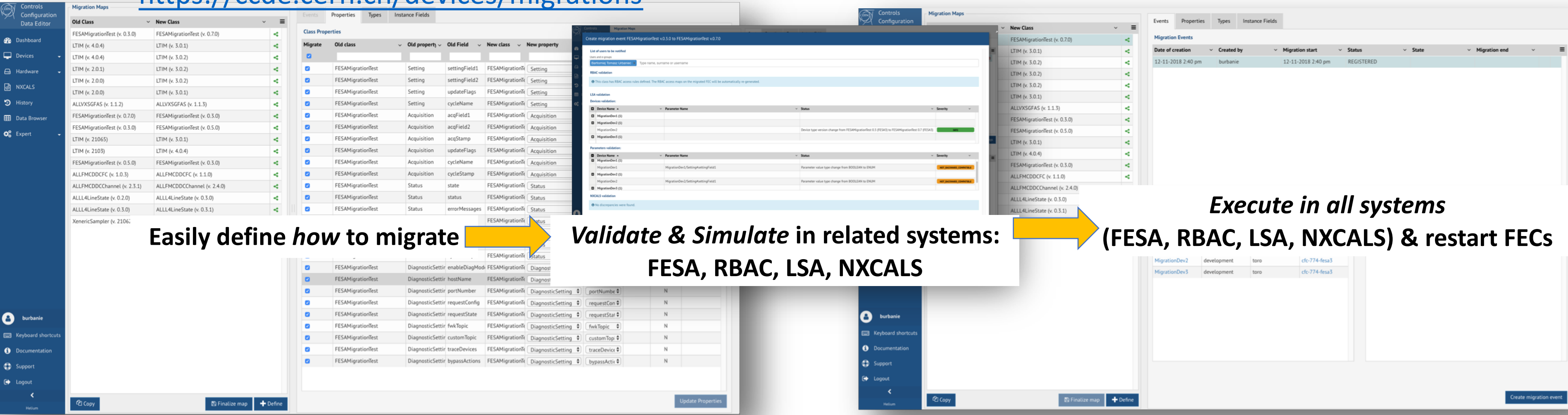
Equipment groups understand the need for the changes, but some are concerned about the amount of work required to not only adapt, but also to re-commission. This time takes away from their core activities.

Device lifecycle Improvements

Device Deletion, Promotion & Migration Tools – significantly developed during the run, to facilitate adoption of latest FESA 3 and ensure consistent integration with LSA settings.

Single Migration entry point (validation, simulation & subsequent execution in all CO related systems: FESA, RBAC, LSA, NXCALS).

https://ccde.cern.ch/devices/migrations



Kajetan Evian 2015

A step in the right direction

Stephane Evian 2016

NXCALS Status

NXCALS is the next generation CERN Accelerator Logging System based on modern "Big Data" technologies.

The core is essentially ready:

- Production hardware (20 machines, 960 Cores, 8 TB RAM) since April 2018, with internal storage compaction, metadata service, etc.
- CMW data ingestion processes operational.
- New logging can be configured with a click in CCDE (no more Excel).
- WinCCOA data ingestion processes developed in collaboration with BE-ICS – undergoing final testing.
- Apache Spark based data extraction / analysis software & SWAN integration (Web based analysis notebooks).

Part of the core has been developed via a very positive collaboration between BE-CO and TE-MPE, with the aim of using NXCALS for the new Post Mortem Archiving.

see status@LMC 360 for more details

NXCALS Data Analysis & Extraction I

How can I extract and analyse data?

Data can be extracted or analysed via the NXCALS client API (based on Spark).

For best performance, data analysis should be performed on the NXCALS cluster and only return the results.

Users can also perform interactive analysis using SWAN.

NXCALS Extraction Documentation with CALS equivalent examples: http://nxcals-docs.web.cern.ch

Work started on adapting the current CALS data extraction client API to pull data from NXCALS.

- Aim: enable existing CALS clients to move to NXCALS without re-writing their code.
- A first release with only the most common methods will be available ASAP and before mid-2019.

NXCALS Data Analysis & Extraction 2

What about Performance compared with CALS?

Based on feedback from early adopters in ABP, BI & ABT:

- CALS currently outperforms NXCALS for *extraction* of relatively small data sets.
  - There is scope to tune NXCALS, but this is time consuming and not currently a priority (will come back to this in the future).
  - On-going 3rd party developments should also help improve.
- NXCALS far outperforms CALS for *analysis* of big data sets.
  - Requires learning and using Spark to run analyses on the cluster.
  - Satisfy use cases not possible with CALS e.g.
    - Diamond BLM analysis at IP7 & 16L2 (20-50GB/day ~1 hour) J. Kral, BE-BI
    - Annual intensity analysis (~2 hours) A. Huschauer, BE-ABP

Reminder – change of paradigm:

- from: “extract, then analyse”(CALS)
- to: “send algorithms to where the data is” (NXCALS)

NXCALS Data Analysis & Extraction 3

Will "Variables" continue to exist?

"Variables" continue to exist with NXCALS in addition to new support for Device/Property based data extraction and analysis, which in-turn can facilitate "replay" functionality.

What about PyTIMBER?

PyTIMBER will continue to exist with NXCALS and users will not need to change their code.
Users should eventually use PySpark for best performance by running their processing on the NXCALS cluster.

What about TIMBER?

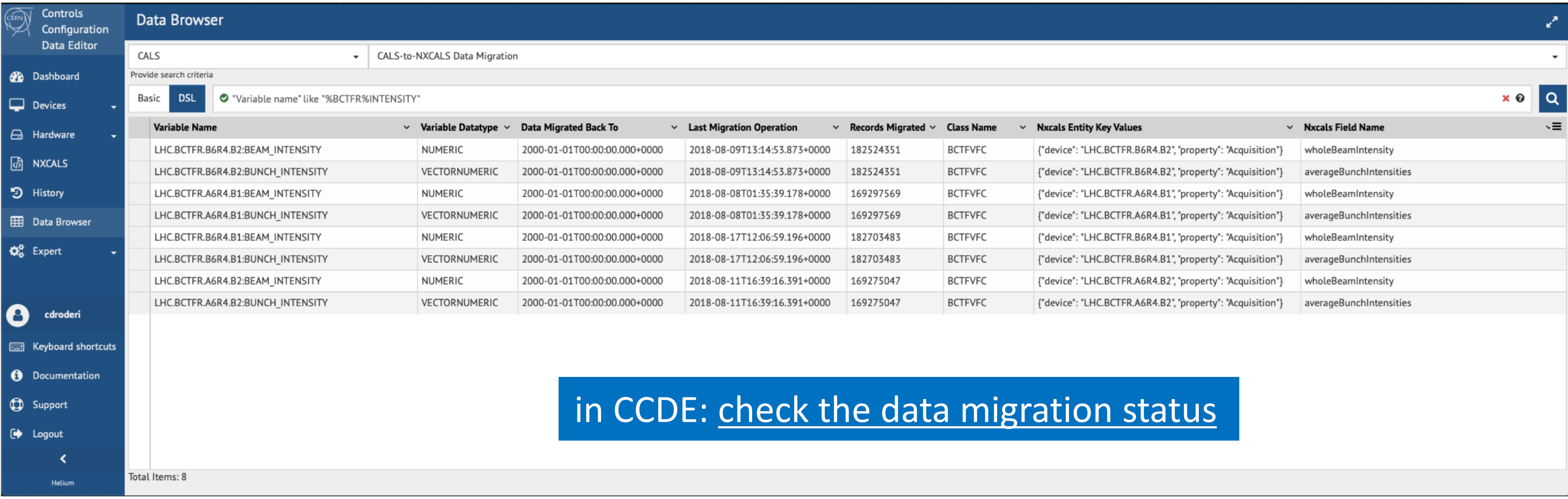
A new TIMBER web application will replace the current Java Swing application. Expect a first version before the end of 2019. Ideally it will combine with Statistics and be accessible from outside CERN (requires further analysis & discussions with IT).

NXCALS What about historical data?

Migration of historical CALS data is a huge undertaking:
Extract, transform and load > 1PB of data for ~2.1^6 signals.

Developed dedicated application to verify migrated data.

~9^{12} records migrated, for 1.75^6 variables (195^3 fully complete).



Variable Name	Variable Datatype	Data Migrated Back To	Last Migration Operation	Records Migrated	Class Name	Nxcals Entity Key Values	Nxcals Field Name
LHC.BCTFR.B6R4.B2:BEAM_INTENSITY	NUMERIC	2000-01-01T00:00:00.000+0000	2018-08-09T13:14:53.873+0000	182524351	BCTFVFC	{"device": "LHC.BCTFR.B6R4.B2", "property": "Acquisition"}	wholeBeamIntensity
LHC.BCTFR.B6R4.B2:BUNCH_INTENSITY	VECTORNUMERIC	2000-01-01T00:00:00.000+0000	2018-08-09T13:14:53.873+0000	182524351	BCTFVFC	{"device": "LHC.BCTFR.B6R4.B2", "property": "Acquisition"}	averageBunchIntensities
LHC.BCTFR.A6R4.B1:BEAM_INTENSITY	NUMERIC	2000-01-01T00:00:00.000+0000	2018-08-08T01:35:39.178+0000	169297569	BCTFVFC	{"device": "LHC.BCTFR.A6R4.B1", "property": "Acquisition"}	wholeBeamIntensity
LHC.BCTFR.A6R4.B1:BUNCH_INTENSITY	VECTORNUMERIC	2000-01-01T00:00:00.000+0000	2018-08-08T01:35:39.178+0000	169297569	BCTFVFC	{"device": "LHC.BCTFR.A6R4.B1", "property": "Acquisition"}	averageBunchIntensities
LHC.BCTFR.B6R4.B1:BEAM_INTENSITY	NUMERIC	2000-01-01T00:00:00.000+0000	2018-08-17T12:06:59.196+0000	182703483	BCTFVFC	{"device": "LHC.BCTFR.B6R4.B1", "property": "Acquisition"}	wholeBeamIntensity
LHC.BCTFR.B6R4.B1:BUNCH_INTENSITY	VECTORNUMERIC	2000-01-01T00:00:00.000+0000	2018-08-17T12:06:59.196+0000	182703483	BCTFVFC	{"device": "LHC.BCTFR.B6R4.B1", "property": "Acquisition"}	averageBunchIntensities
LHC.BCTFR.A6R4.B2:BEAM_INTENSITY	NUMERIC	2000-01-01T00:00:00.000+0000	2018-08-11T16:39:16.391+0000	169275047	BCTFVFC	{"device": "LHC.BCTFR.A6R4.B2", "property": "Acquisition"}	wholeBeamIntensity
LHC.BCTFR.A6R4.B2:BUNCH_INTENSITY	VECTORNUMERIC	2000-01-01T00:00:00.000+0000	2018-08-11T16:39:16.391+0000	169275047	BCTFVFC	{"device": "LHC.BCTFR.A6R4.B2", "property": "Acquisition"}	averageBunchIntensities

in CCDE: check the data migration status

Expect non-QPS Industrial Controls data to complete in the coming months. (QPS data is 80% of total, perhaps full history is not required)

Many use cases still to be looked at – on-going activity this year.

NXCALS Adoption

What will happen to CALS?

The current CALS system will be phased out before the end of LS2, once the following criteria have been satisfied:

- NXCALS contains all of the required historical CALS data.
- A backwards compatible Java client API has been provided.
- A new version of TIMBER is available in production.
- The data extraction performance is at least comparable with CALS.

Should I start using NXCALS now?

All feedback is welcome. If you have a challenging *analysis* use case, give it a go. Contact acc-logging-support@cern.ch

If you just want to extract data, or for your code to just continue working – wait for the adapted CALS client.

GUI Strategy

Important changes to the BE-CO GUI Strategy: Java (on the client) in decline, Python Qt and Web emerging.

Summary from Vito's CO3 presentation:

CO is committed to Python and has resources

- We will support PyQt as the obvious choice
- We will investigate PyDM or Taurus for Python RAD

CO does not take over Inspector

Java client technology is declining (Java on the server does well)

- We will (have to) keep Java Swing alive, but recommend to abandon JavaFX

We want to explore Web technologies as an alternative to Java desktop

We are actively seeking for collaborations

Python Support

BE-CO supports Python as an official language (next to Java and C++)

- For Controls, MDs, operational GUIs, RAD, Prototyping, HW Testing, etc.
- We provide a Python environment with development tools for the ATS sector
- We promote Python as the language for operational GUIs and RAD
- We join an existing community and try to leverage existing work and foster collaboration

Deliverables for Python environment and development tools

- The same kind of service as what we provide for Java
- A Python distribution (based on EP-SFT work) with 3rd party libraries
- A coherent set of tools (e.g. dependency management, building/packaging, a package repository, testing and CI/CD, deployment, monitoring, etc.).
- Python APIs to the controls system (we take over support for PyJAPC and PyLSA)

Deliverables for Python GUI + RAD

- Python RAD framework (probably based on SLAC's PyDM)
- Framework + Components for developing PyQt GUIs (as the successor of Java GUI technology)
- Guidelines and best practices for operational GUIs

Timeline: First *incomplete* offering end Q2 2019, more complete version end Q4 2019

More details in an upcoming Python FG Meeting

Slide courtesy of V. Baggiolini

Settings Management

LSA work strongly influenced by Delphine's Settings Management WG

Aim: simplify and homogenize settings management across machines

Roman and Michi (50% OP, 50% CO) are active members of the WG

During LS2: Improvements in trim usability; merge LINAC4 and PSB settings; introduce multiple non-PPM context for ISOLDE, CLEAR, AD and AWAKE; etc.

Nice slides here with lots of topics e.g. provide configuration tools.

Growing interest to increase protection of settings and configuration against accidental changes

Re-commissioning & Outlook for Run 3

Key takeaway from post LS1 re-commissioning:

Clear need for dry runs / dedicated commissioning time for Controls. Should be a collaborative effort driven by BCWG and with relevant OP, CO and Equipment experts present.

Already needed for LINAC 4 this year - will give experience on the effectiveness of the process.

Outlook for Run 3

No major changes during the run.

EOL of JavaFX after LS3.

CERN-wide Microsoft reduction – reduce use of Windows for Controls

Need to look at the NXCALS storage policy in order to scale:

- Revise retention policy on a case-by-case basis?
- Invoice for storage above a threshold?

AFT – Where we came from

Go back to 2012, prior to AFT – heroic efforts from the AWG:

2012 Availability

B. Todd, A. Apollonio, A. Macpherson, J. Uythoven, D. Wollmann

+ Cryo + QPS + Powering + Machine Protection +…

Evian workshop - 1v2

AFT – Where we came from

Go back to 2012, prior to AFT – heroic efforts from the AWG:

but…

operations logbook fault time and number of faults not consistent…
…responsibility for faults needs to be correctly assigned
…dependency between faults needs to be included
(e.g. power piquet stuck at a broken access door)

and…

many sources, view points, need cross-checking, interpreting, integrating…
The data from equipment groups doesn't align to the elogbook – consolidation headache…
Cannot always be done as no rigorous application of rules.
It not possible to have "correct" data

AFT – Where we came from

AFT project launched 2014, ready for operation start 2015

2015 Availability Summary

Andrea Apollonio, TE-MPE-PE
On behalf of the Availability Working Group (AWG) - L. Ponce, B. Todd
6th Evian Workshop, 15/12/2015

Acknowledgements: AWG-members, C. Roderick & AFT team, R. Schmidt, D. Wollmann, M. Zerlauth, A. Niemi, A. Siemko, T. Griesemer, B. Auchmann, R. Denz, A. Verweij, O. Rey Orozco, M. Jonker, F. Rodriguez Mateos.

AFT – Where we came from

Continuous evolution over the years…

2016 – Chamonix: CMAC – extend AFT to the Injector Complex
Improved LHC availability data quality & tools Evian 2016
Injectors - #1 cause of LHC unavailability

2017 – AFT deployed for Injector Complex
Andrea starts weekly reviews with Machine Supervisors
Alignment of data between TI + TIOC + AFT
Evian Availability report for LHC
First AFT-based Availability report for Injectors

2018 – AFT improvements throughout the year (15 releases)
See talk from Benjamin Todd…

AFT – What it brought

Requires high-quality data. Cannot overemphasize the importance of the work done by the AWG, the Machine Supervisors and quite a few equipment experts to review, correct and complete the fault data.

The AFT platform allows to streamline fault tracking across machines and systems.

It offers powerful and objective reporting that people usually agree on.

It used for regular / periodic reporting (FOM, LMC, AWG, Evian etc.).

Some teams use it to plan consolidation work (Goal for North Area after LS2).

People seem to like it….

AFT – Where we should go next

Feedback from various users:

“Management should use the data to direct consolidation”.

“Automatic fault registration for some systems”

“Fully Automatic generation of periodic reports”

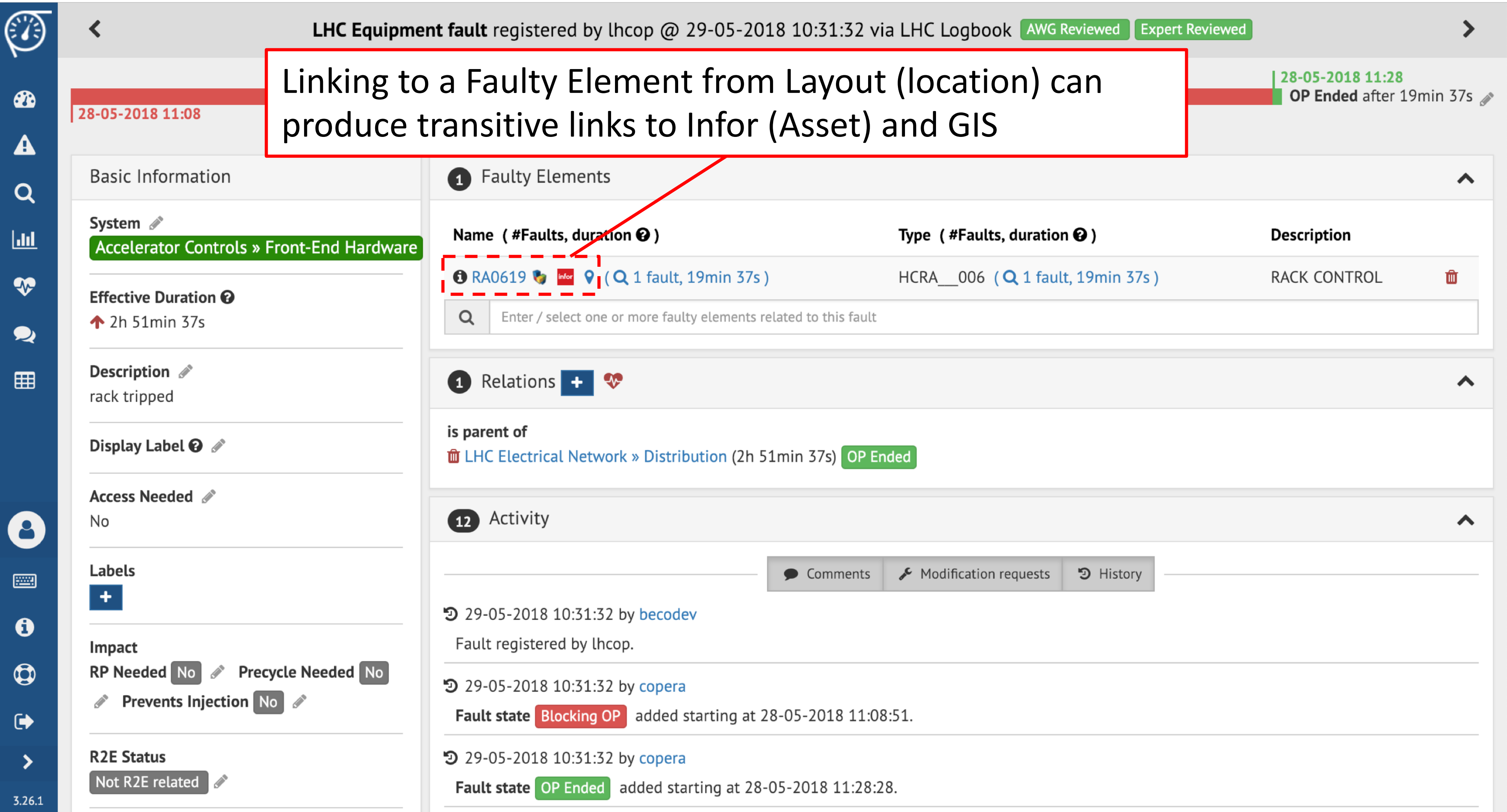
“Provide an API to programmatically register or annotate faults with analysis data”.

“Better integration (or less problems) between Elogbook and AFT”.

A lot of uncertainty here – direction needs to be set quickly!

AFT – Where we should go next

Recommend increased usage from equipment groups e.g. providing faulty equipment details:



AFT – Where we should go next

Knowing where a fault occurred and the asset details open interesting possibilities…

We could get more value from the data:

Potential to combine AFT and NXCALS data as a basis for advanced analysis or machine learning.

e.g. If we know where a fault happens and we know which logging signals represent data acquired in proximity to the fault – we can look for events or hidden correlations in the data.

Look for possible radiation related affects... If we know since when an asset is installed (Infor) we can calculate the integrated dose received by the failing equipment – is there a pattern?

What about temperature effects?

What about…… the 2.1^6 signals in the NXCALS?

Summary

The **Control system** performed well during Run 2, with few faults, a high availability, and no known limitations remaining for Run 3.

Continues to evolve based on user feedback, at the same time focusing on reliability.

A number of successful collaborations in Run 2,
we would like to continue to participate in such endeavors.

LS2: important EOL changes – necessary to ensure continuity of high Controls availability. Also needed due to external influences.

Coherent Controls Baseline is available and valid until LS3.

AFT Tool arrived at start of Run 2, evolved throughout.

Brings tangible added value, still lots of untapped potential.

Additional investments and increased data completion by Equipment groups – pre-requisites to go to the next level.

Questions

Additional Slides

NXCALS Documentation

NXCALS Documentation

Search docs

Docs » Home

Welcome to NXCALS documentation

There are several possibilities for users to access NXCALS data using it's Data Access API.

In this guide we will explain and give examples of the functionality and the usage of this API. As we have built Data Access to serve as a Spark custom format, we can benefit using all the Spark APIs and supported languages.

The data can be accesses through Java, Python 3 and Scala clients. It is easy to notice that the API in all cases is almost identical, in terms of functionality and syntax as explained on our Data Access API page.

Examples presented in the documentation feature various query builders that data-access API provides such as CMW specific query builders, as well as a dictionary-like ones, in order to achieve a more generic, system-agnostic approach.

Note

Information about NXCALS such as: access request, kerberos authentication, NXCALS bundle installation is not covered by this document and can be found on our wiki pages at: NXCALS - Data Access User Guide

Next

Contact acc-logging-support@cern.ch for anything missing / unclear

Controls Evolution: Middleware details

Renovation of the CMW Directory Service (2017-2018)

New server-side architecture was designed to be scalable and fault tolerant (hw upgrades, db interventions, disk crash, etc.)

Higher availability is available to all service users, i.e. all CERN accelerators (including LHC)

The service renovation was described in the BE Newsletter December'18

New major version of the CMW/DIP Gateway based on the Reactive core (2017-2018)

In 2018 all critical LHC CMW/DIP Gateways (handshakes LHC<->Experiments, current LHC status, current experiments luminosity status) were migrated to the new major version

The new Gateway uses a modern non-blocking event processing engine (RxJava), which is far more reliable than the old RDA2-based Gateway

In the past, the old RDA2-based Gateway got blocked (deadlocks) on several occasions (5-10 times per year) and thus blocked LHC operation - could not ramp/squeeze the beams (Gateway restart was needed)

Since the operational deployment in June'18, LHC CMW/DIP Gateways have worked smoothly without any issues

The plan is to continue the deployment for all other Gateway instances this year (2019)

Consolidation and major upgrade of the BE-CO JMS service (2017-2018)

In 2017, JMS service instabilities caused several LHC beam dumps (Wojtek's presentation at LMC in May/June 2017)

A major service review and consolidation was done end 2017 and an upgraded service was deployed in YETS 2017/2018

Since that upgrade, there was no a single operational issue attributed to the JMS service instability – big improvement especially for LHC operation!

New fault tolerant architecture of the RBAC Service (2016-2017)

New server-side architecture was designed to be scalable and fault tolerant (hw upgrades, db interventions, disk crash, etc.)

Higher availability is available to all service users, i.e. all CERN accelerators (including LHC)

No more blocking of the RBAC service in case of: TN/GPN cut, IT Authentication service interruption, DB interventions, hw upgrades, etc.

Renovation of the CMW Configuration Server (2017)

CMW Configuration Server is responsible for sending the LHC Operational Mode to all LHC front-end servers after every OP mode change (e.g. after the accelerator mode change)

In 2017, occasional service instabilities were observed, mainly related to scalability and performance causing occasional problems to equipment groups as RF, BI, STI and MPE (wrong execution of the RBAC access rules as the OP mode was not delivered reliably to the front-end server)

In 2017, the server was reviewed and several major improvements were designed and implemented to improve the reliability, tracing, scalability and performance

Since the operational deployment in 2017 no more LHC related issues were reported.

content courtesy of W. Sliwinski