

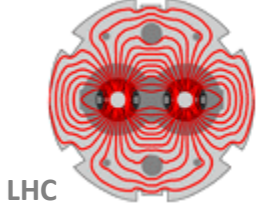
MCS BLM Tests

Results so far...

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Quick Reminder – Critical Settings (1)

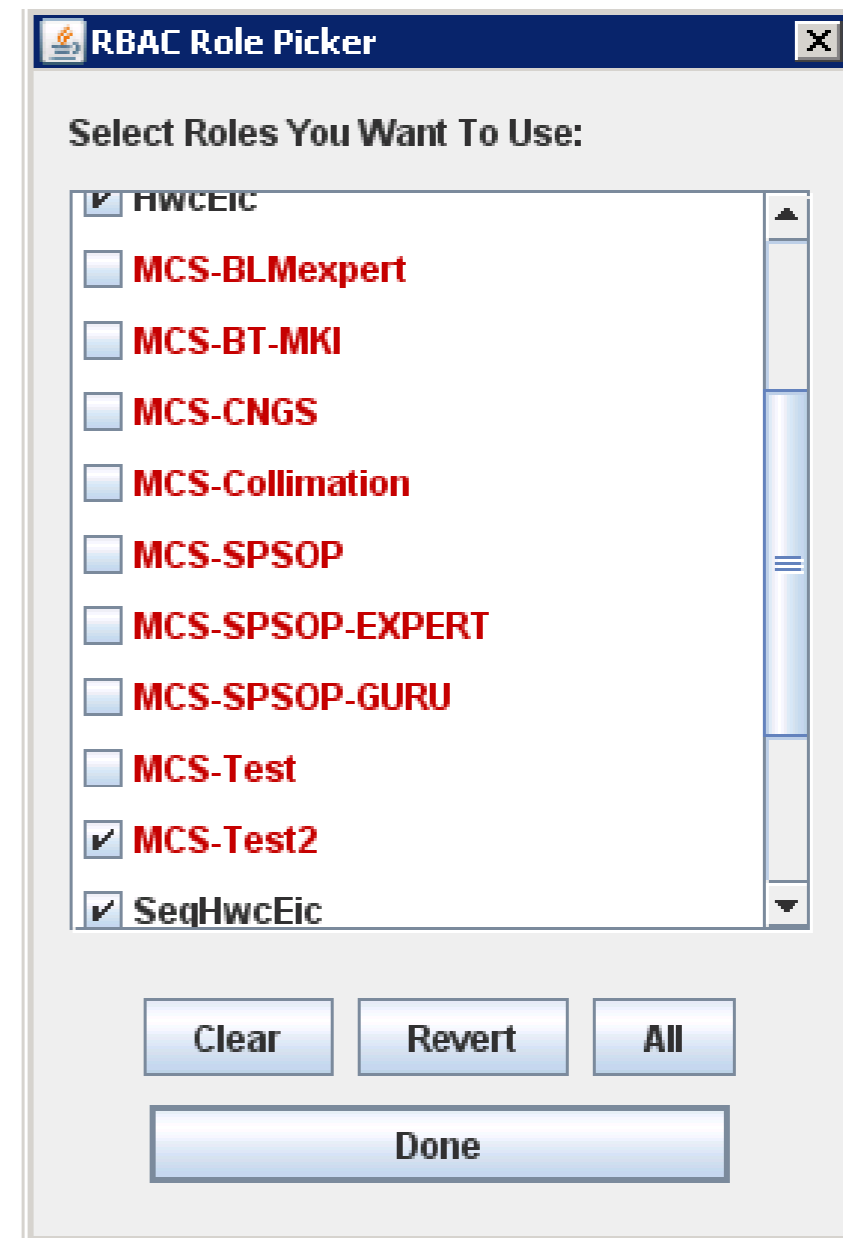


- o Critical settings are special LSA settings stored with a digital signature in the LSA DB.
- o Signing of critical settings is done through the LSA trim client
- o RBAC provides MCS-roles and key storage
- o FESA is MCS aware – MCS configuration files

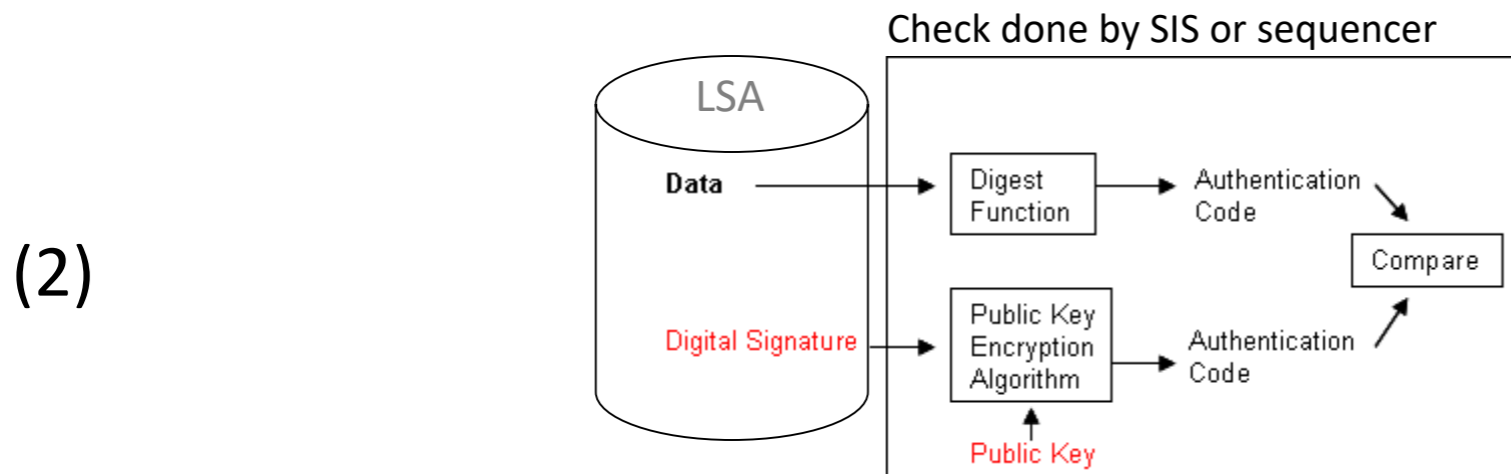
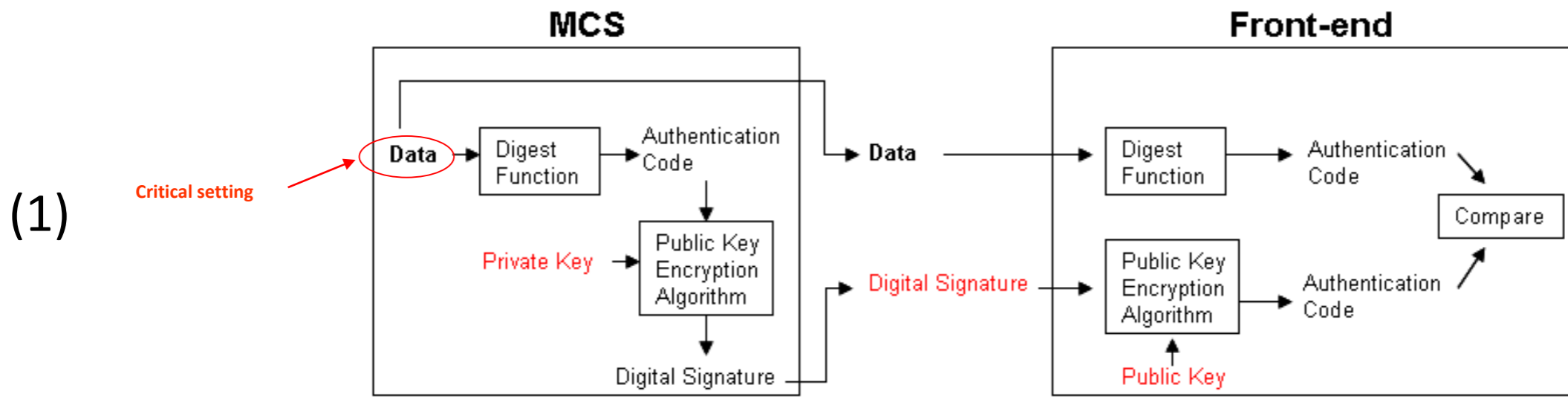
RBAC provides MCS roles. Each MCS roles is connected to a public-private key pair. RBAC signs for MCS.

MCS howTo:

<http://wikis/display/LSA/MCS+-+Management+of+Critical+Settings>



- o Key features:
 - o Only expert can change the value. In principle anybody can load (1)
 - o Continuous comparison of what is in the DB with what is in the hardware: DB **true** source (2)



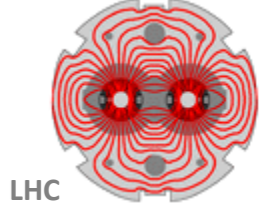
- o Did a very long list of tests to verify the main features:
- o E.g. Signatures are not kept for trim history

All the tests we did will be described in the specification – to be published.

Tests	acceptance/ robustness	description	mapping	tested 1 [date]	success	comment	tested 2 [date]	success	comments	tested 3 switch to SHA1	comments
T.1	a	trim critical setting within trim application, check DB signature.	A.2, C.1, C.8, A.8, C.6	19.2.2007	worked, signatures generated and verified in FESA	MCS signing mechanism implemented within the trim client and FESA. private key hard-coded; RBAC not yet implemented, everybody can modify critical settings from the "right" application.	8.3.2007	accepted by Jorg		15.5.2007	accepted
T.2	r	try T.1 with application equip state; expected result: exception no new signature generated	A.2, C.8	19.2.2007	worked. Tested for MCS_Test2_C: could send for scalars from equipstate, could not send for arrays from equipstate	idem	8.3.2007	accepted by Jorg			
T.3	r	use FESA navigator,	A.3, C.8, A.8	19.2.2007	worked. MCS_Test2_C and MCS_Test2_A	idem	8.3.2007	accepted by Jorg		15.5.2007	accepted
T.4	a	trim critical settings within trim application: integers, floats, arrays, etc.	A.4, A.8, C.6	19.2.2007	worked for all types in ad_Tests EXCEPT: property with mixed types, need to upgrade FESA 2.9 (bug fix); treatment of floats: did test with additional server; FESA navigator needs upgrade on treating characters with \n	idem, see worksheet ad_Tests	8.3.2007	accepted by Jorg		15.5.2007	accepted
T.5		test different FESA versions for floats		19.2.2007	problems occurred as expected with floats... used additional FESA version	FOR ALL NEXT TESTS, NEW FESA VERSION TO BE RELEASED					
T.6		remove configuration xml, test FESA navigator	F.4, A.7	19.2.2007	remove MCS_Test2AccessConfiguration.xml: MCS_Test2_A: use FESA navigator, can set any field in properties. Tested for long scalar and short array	idem					
T.7	r	test SIS API: change signature in DB; outcome: boolean false	C.9	8.3.2007	accepted	idem, small test API by Greg, put in the parameter to change, gives back boolean for check of signature				7.6.2007	accepted
T.8	a	test SIS API: original signature in DB; outcome: boolean true	C.9	8.3.2007	accepted	idem				7.6.2007	accepted
T.9	a	test of configuration file script: detect configuration file available for MCS device	F.5, A.8	19.2.2007	MCS_Test2AccessConfiguration.xml is available for all devices on server. Checked with check_config program... worked. Combines information from LSA and FESA. Files: /user/maciej/temp/mcs/check_config ./check_config (C++)	prototype only; a program by Maciej to verify existence of config file	9.3.2007	accepted			
T.10	r	test of configuration file script: remove configuration file, detect that configuration file no longer available for MCS device	F.5, A.8	19.2.2007	Check_config detected that configuration file was no longer there after T.6.	idem					
T.11	a	trim functions (test bed: collimators, thresholds have to be set critical - at the same time test for Maciej's tool to generate xml-files									
T.12	a	xml-configuration file automatic generation: remove xml file from server and try to generate it with the tool. See, whether FESA navigator works.		9.3.2007	accepted. proto-type C++ programme. Tested robustness and acceptance, by removing the file and reestablishing it	working on JAVA version, Jutta Netzel made prototype: parameters configuration					
						for each entry in the trim history, so far signature is kept as well. Somebody could getting this stuff					



Generic MCS tests – system



- o Regular tests: only started last year
- o Test after each RBAC release and each major LSA release

- o Have test FESA server MCS-Test2 with several devices

- o To test all data possible types of FESA
- o Multiplexed and non-multiplexed

- o All collected in web pages:

<http://vkain.web.cern.ch/vkain/MCSTests.htm>

Example:

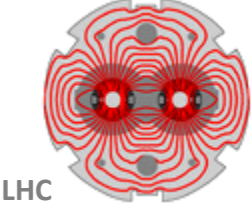
<http://vkain.web.cern.ch/vkain/MCS-Tests/MCS-Test-10Feb09.xls>

field_array2D_char
field_array2D_double
field_array2D_float
field_array2D_long
field_array2D_longlong
field_array2D_schar
field_array2D_short
field_array_char
field_array_double
field_array_float
field_array_long
field_array_longlong
field_array_schar
field_array_short
field_double
field_float
field_long
field_longlong
field_schar
field_short

Example of one MCS-Test2 property with different field types



MCS tests – individual settings



- o Decided this year: every new critical setting has to go through a set of pre-defined tests
 - o Verify expected behaviour of make rules,...in operational applications with critical setting
 - o Generation
 - o Trim
 - o Drive
 - o Copy
 - o Specific applications (e.g. BLMs: Fabio's threshold editor)
 - o Collected on the web
 - o Example:

<http://vkain.web.cern.ch/vkain/MCS-Tests/BLMChecks-9March09.xls>

Tests of the BLM critical settings

- o Tests were carried out on

3rd of March

9th of March

- o 3 crates out of the 24 were tested:

- o HC.BLM.SR8.L, HC.BLM.SR8.C, HC.BLM.SR8.R → critical property BLETCFlash

- o Properties were set critical + MCS configuration files were put on the front-ends

HW Group	Parameter	Parameter Type Groups	Critical Property	Crit. Prop. Check
Device Types			Devices	
BLMI (v1)			HC.BLM.SR8.C	
BLMLHC (v2)			HC.BLM.SR8.L	
BPTLOG (v2)			HC.BLM.SR8.R	
LHCCollimator (v1)				
LhcMKBkicker (v0)				
LhcMKDkicker (v0)				
LhcMKIkick (v3)				
LhcMKIstate (v2)				
MCS_Test2 (v0)				
			Select All	Select All
Check existing configuration			Create new configuration files	
Check deployed config	Online check selected	DB check selected	Create all FESA Configs	Create config for selected..
Check config for class	Check config for device	Print LSA critical props		

BLM critical settings - Trim

- o Only MONITOR_FACTOR can be trimmed: this is not the real critical setting

Trim Editor

RBA: vkain LHC OP BP

Beam Processes

- NON_MULTIPLEXED_LHC
- DISCRETE_LHCRING_INJ_KICKER_V1
- INJ-TEST-NB_V1@0_[START]
- RAMP_5TeV_V1
- CollimatorInjectionBP_V1
- CollimatorInjectionBP_V1@0_[START]
- DISCRETE_LHCRING_INJ_KICKER_Clone_V1
- INJ-DECAY_V1
- INJ-TEST-NB_V1
- INJ-TEST-NB_V1@0_[START]_180908
- INJ-TEST-NB_V1@0_[START]_clone-110908
- INJ-TEST-NB_V1@1
- INJ-TEST-NB_clone-110908
- INJ-TEST-NB_clone-180908
- INJ-TEST-S78_V1
- INJ-TEST-S78_V1_Clone
- INJ-TEST_V1

Parameter selection - LHCRING

System	Type Groups	Parameters
BLM	LHC_BLM/MONITOR_FACTOR	BLM2I.04L2.B2I10_MBRC_MBRC/MONITOR_FACTOR BLM2I.04L8.B1E10_MBXA_MBXA/MONITOR_FACTOR BLM2I.04L8.B2I10_MBRC_MBRC/MONITOR_FACTOR BLM2I.04R2.B1I10_MBRC_MBRC/MONITOR_FACTOR BLM2I.04R8.B1I10_MBRC_MBRC/MONITOR_FACTOR BLM2I.09L3.B2E21_MBB_MBB/MONITOR_FACTOR BLM2I.09L3.B2E24_MBA_MBA/MONITOR_FACTOR BLM2I.09L3.B2E30_MQ_MQ/MONITOR_FACTOR BLM2I.09R3.B1I21_MBA_MBA/MONITOR_FACTOR BLM2I.09R3.B1I24_MBB_MBB/MONITOR_FACTOR BLM2I.09R3.B1I30_MQ_MQ/MONITOR_FACTOR BLM2I.10L3.B2E21_MBA_MBA/MONITOR_FACTOR BLM2I.10L3.B2E21_MBB_MBB/MONITOR_FACTOR BLM2I.10L3.B2E22_MBB_MBB/MONITOR_FACTOR

Setting part: Value Target Correction Trim History Time base: SuperCycle Cycle/BeamProcess

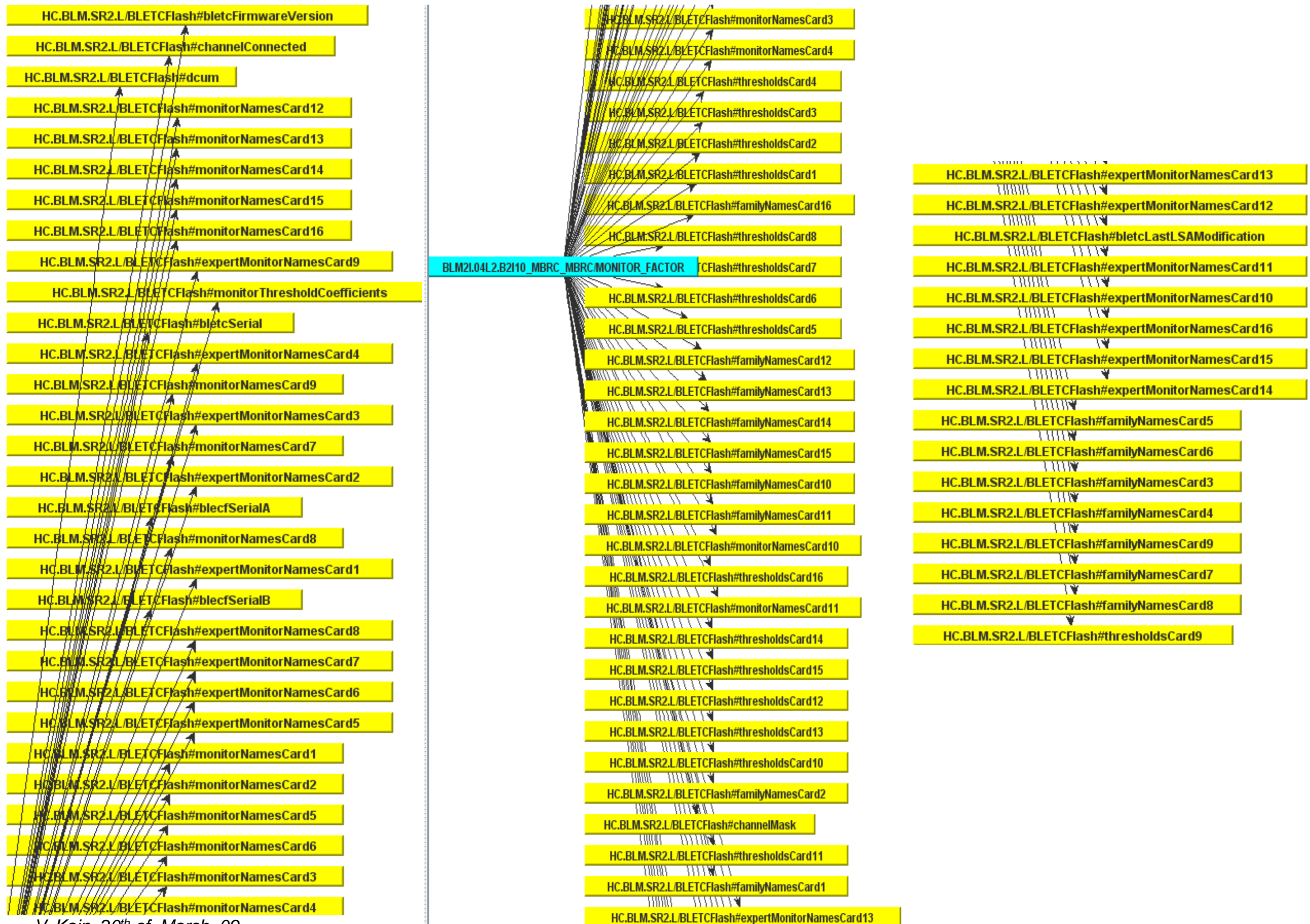
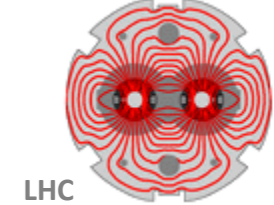
Parameter	Value
BLM2I.04L2.B2I10_MBRC_MBRC/MONITOR_FACTOR	0.1

Trim

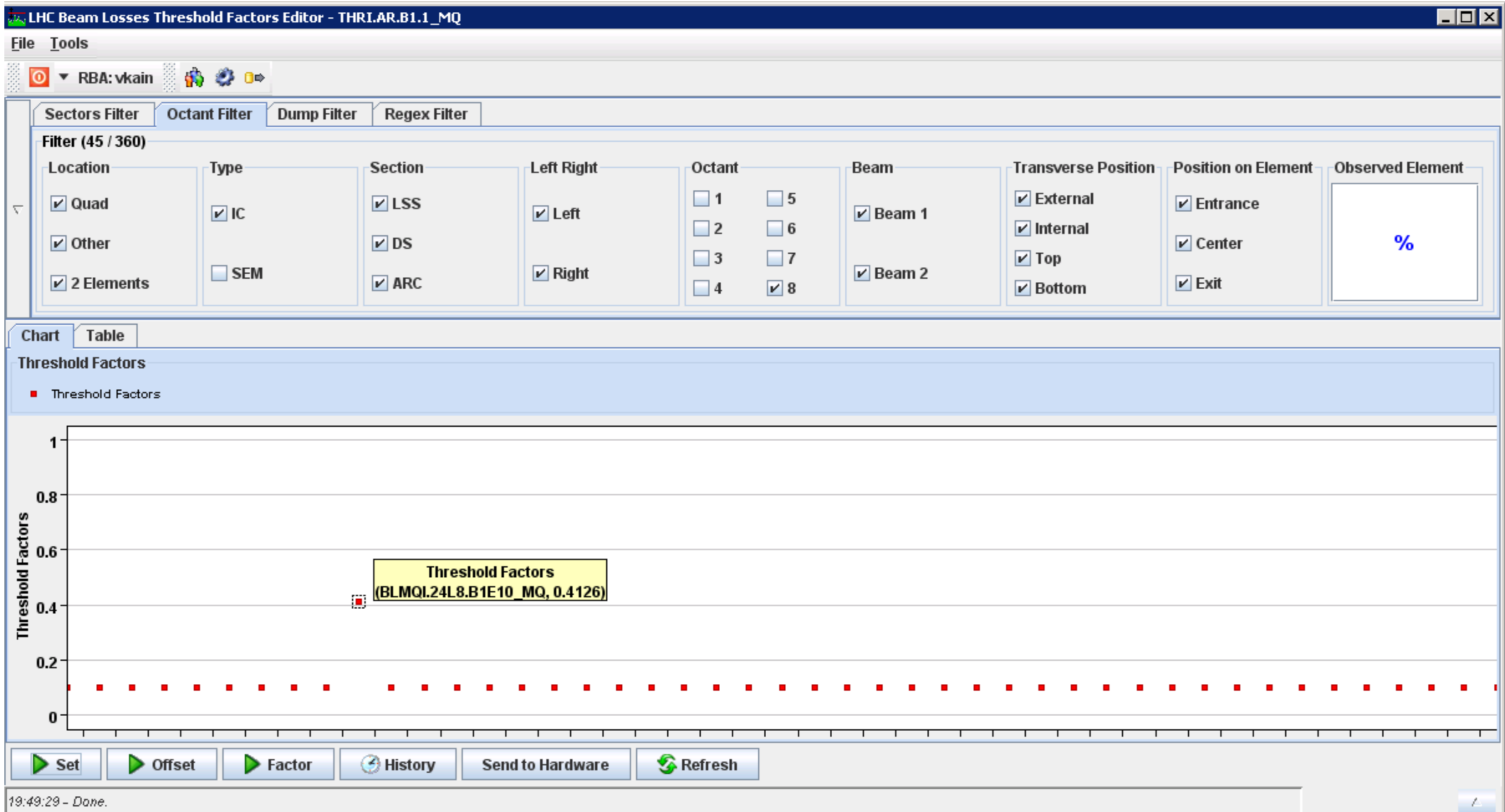
- o ...the critical setting (the threshold table) depends on it



The BLM critical property

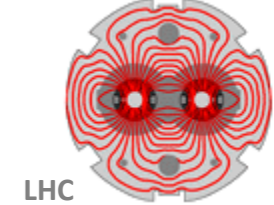


- o Fabio's application: trimming by drag & drop
- o Goes through trim client





BLM critical settings - Trim



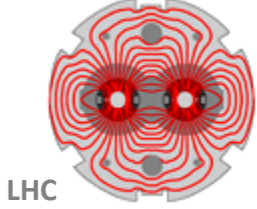
- o Results:
 - o Had to stop first test – not conform ‘setting aware device’: all settings rejected at front-end
 - o Initially field “bletcLastFlashModification” was only updated during sending, not through trim
 - o This field was then moved to another property

Application	Tests	specifics	comment	outcome
Trim editor (+ possibly drive)	trim critical property	<p>A.1 try to trim without login, with wrong role, with several roles: expected outcome: rejection</p> <p>(configuration file needs to be on front-end). Trim with correct role: property should be accepted on front-end. Remove property from critical. Trim property, should be rejected by front-end.</p>	could not proceed with tests as the property BLETCFlash contains a field (bletcLastFlashModification) which is only updated when sending, not when trimming in the DB. This field always causes the new settings to be rejected at the front-end.	<p>successful:</p> <p>trim without login: refused trim with wrong critical role: refused trim with correct critical role+other role: refused. Configuration file on front-end was successfully accepted.</p>
	trim history	tests as before		<p>trim history did not allow to revert with the wrong role.</p> <p>BUT: did not revert to the old setting with the correct role either. Even though it says that it has done it. In the history you find: "REVERTED to blah", but it is still the same setting.</p>

- o Trim history: security works, but...
 - o A bug somewhere in trim history in general...
- o Fabio’s application: as above. Everything fine



Parameter Configuration – online checks

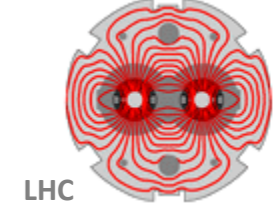


- o Online checks:
 - o Three types:
 - o Config file exists and is correct: only once a while
 - o DB check: signature vs. DB data: every fill
 - o Full online check: DB check + DB data vs. HW data: every fill
 - o BLMs: go into test mode, test their internal consistency of settings + need result of online checks to give user permit back

Application	Tests	specifics	comment	outcome
parameter configuration	check configuration file	<p>start with this test. Make property critical and don't put configuration file on the front-end yet. Should be detected. Put configuration file on it: should return true.</p>	<p>check detected that config file was not on front-end</p> <p>after installing the config files. The configuration check works successfully</p>	successful
	full online check	<p>trim + drive and verify that it returns true trim without drive: verify that DB online check is OK, but HW comparison returns false</p>		For the channels missing on the crate a default threshold factor was set. Initially this was 1. It had to be modified to 0.1 to be consistent with what LSA generates by default and sends therefore. The field bletcLastLSAModification in the critical property is updated when the master tables are changed. LSA generates the same value (a date value) for all channels even for missing cards. The front-end however sets these to zero automatically. So, the HW comparison fails. LSA generation will be modified to put zero for missing cards. Must not forget to wait some time (a couple of settings until can read back).
	DB online check	<p>simple DB online check should return true.</p> <p>modify signature in DB and verify that is caught by check.</p>		successful. Works in equip state only for the time being. Under "CHECK SETTINGS" (Read command)



Generation

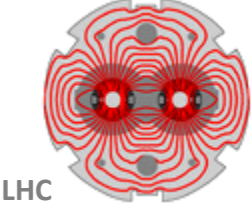


- o Worked – security as it should be
- o However: Need to make sure that for BLMs can only generate with dependant settings!!!

generation	generate new critical settings	<p>try to generate without login, try to generate with the wrong role, try to generate with several roles.</p> <p>Generate with the correct role. Do DB online check afterwards and drive.</p>	<p>successful. Works only with the correct role. Cannot generate with the wrong role. DB check afterwards gives the correct answer, comparison with HW fails. Drive works for the BLETCFlash property. As it will not be possible anymore to trim the lower level parameters, it also must not be possible to only generate the higher level parameters without propagation. If a higher level parameter depends on a lower level one, which is not trimmable, then "propagate to all dependants" must be automatically ticked and it must not be deselectable.</p>
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Acquire

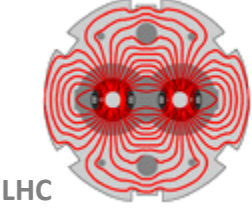


- o Should not be possible:
 - o No backwards compatible make rules
 - o Solutions still needs to be implemented

Acquire	acquire critical settings	try to acquire without login, with wrong role, with several roles. Trim setting without driving. Acquire with correct role, do DB online check afterwards. Do full online check afterwards.	Should not be applicable. Should not be able to trim the BLETCFlash directly. Do not trim up the hierarchy. Right now can do it.
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Conclusions



- o Looking good...
- o RBAC can deal with these quantities of data and sign them
- o Trimming and generating is protected
- o One key functionality of MCS not fully functional yet for BLMs: online checks
 - o Need to test again for consistency check: makerule has been updated.
 - o Need to sort out test mode issue, such that we can start online check again in case!!!