

SCT Configuration Validation

Carl Gwilliam



UNIVERSITY OF
LIVERPOOL



12th September 2008

SCT Offline S/W Meeting

Introduction

- The bad module, chip & strip information is manually uploaded to the conditions DB from the online XML configuration files by Bruce.
- This is read from the conditions DB on the offline side by the SCT_ConfigurationConditionsSvc and used in clusterization etc.
- The question is whether what we see offline is correct?

Method

- Bruce sent me the XML file uploaded on the 3rd September, which corresponds to run 86370.
 - physics_HLT_Cosmics_NIM4/daq.NoTag0086370.physics.HLT_Cosmics_NIM4.LB0000.SFO-1._0001.data
- I modified the SCT_ConfigurationConditionSvc to output the corresponding offline information in an “XML” format.
- These were parsed and compared in C++ using TinyXML.
 - Because, I'm more used to C++. Shaun could probably do this more elegantly with XML tools :-).

Modules

- Bad modules are indicated by a negative group number.
 - Was changed from -1 to any -ve number. Code updated to reflect this.
 - E.g. `<module id="4" group="-1">20220330200169</module>`
- Looking at the number of modules and whether they're bad/good gave:
 - ONLINE: [TOTAL] 4040 [BAD] 134 [GOOD] 3906
 - OFFLINE: [TOTAL] 4040 [BAD] 134 [GOOD] 3906
- Comparing the individual module serial numbers gave identical results too. So we see the same module information.
- So far, so good!

Chip Masks

- For each of the 12 chips a bit-mask indicates whether any strips are bad. The 128 bits are stored as four 32-bit sub-masks e.g.
 - `<module><sn>20220330200304</sn><chip id="00" address="0x20" active="1"><config>1 3 0 0 0 0 0 0 0 1</config><mask>0xffffffff 0xfeffffff 0xffffffff 0xffffffff</mask></chip> ... </module>`
- Initially, found only half the number of chips offline as online!
 - Tracked down to a bug in SCT_ConfigurationConditionsSvc whereby an iterator was incremented twice. Fixed & tagged for 14.2.21, 14.2.30, 14.4.0
- After fix, see same numbers of chips offline:
 - ONLINE: [TOTAL] = 49296 [BAD] 41418 [GOOD] 7878
 - OFFLINE: [TOTAL] = 49296 [BAD] 41418 [GOOD] 7878
- Not sure why more modules, 4108, than in module info, 4040.

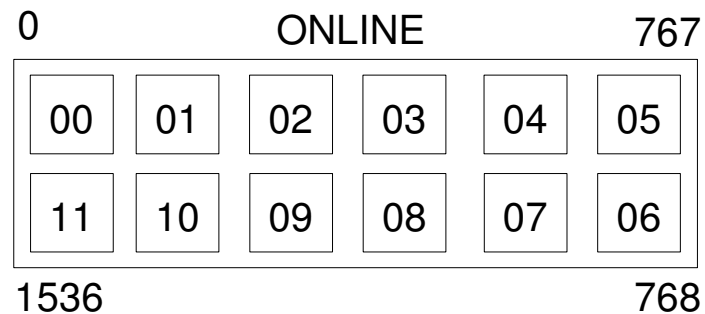
BAD ≥ 1 strip
masked
GOOD = no strips
masked

Chip Masks

- Offline sub-masks are in the opposite order to online:
 - `<module><sn>20220330200304</sn><chip id="00"><mask>0xffffffff 0xffffffff 0xfeffffff 0xffffffff</mask></chip> ... </module>`
- This could be a difference in convention or a possible bug
 - Shaun thinks the former. Check by looking at strips (next slide).
- Assuming it's convention & reversing all the offline masks, gives identical bit masks online & offline.
- So, it looks like we see the same strips masked, but are we getting the strip numbers/IDs correct offline?
 - Need to take into account the different numbering schemes here.

Strips

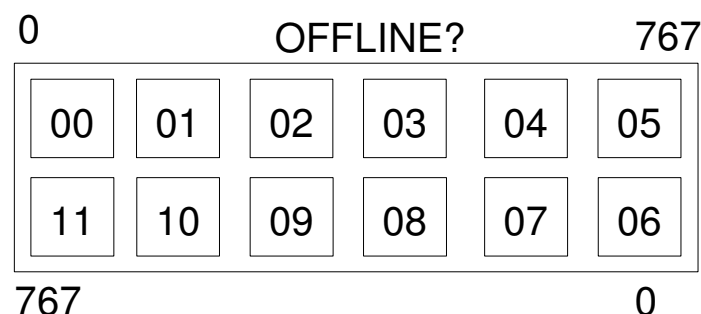
- Bad strips are indicated by unset bits in the mask. This gives:
 - 10239 bad strips for both online and offline.
- We can convert the position in the chip masks into the online strip numbers using the online numbering scheme, which is:



- This gives us e.g.
 - 20220330200304: 88 295 417 562 689 770 953 1130 1173 1390 1506

Strips

- In the offline numbering, the two sides are treated separately.
- Printing the corresponding offline strip numbers from SCT_ConfigurationConditionsSvc gives us e.g.
 - 20220330200304: 88 295 417 562 689 2 185 362 405 622 738
- So, as expected, side 0 is the same, but what about side 1? It's correct if the two sides are numbered in opposite directions:



- Is this the case? One way to check would be to use the monitoring to look for hits in strips we think should be dead.

Information Still Missing Offline

- We read the chip masks (i.e. bad strips) offline but we don't check if a chip itself is bad (i.e. bypassed).
- We also don't check for bad optical links. Some modules read out all 12 chips through one link (if the other is broken) but it can't be done for all and we can lose chips. We might need to check this.

Conclusions

- The offline configuration has been successfully compared to the online information up to the strip level.
 - We still need to check if we're masking the right strip number on side 1.
- At least one bug found and fixed in the process.
- There are still some things that need to be implemented offline
 - Bypassed chips and broken links.
- We need to make sure the online information is kept up-to-date.
 - We also need to periodically check that online and offline still agree.
Shall we commit the tests etc to the SCT_CondtionsServices?
- I learnt quite a bit about online stuff in the process :-).