Muon Quality Word in Thumbnail

Available error flags in the data:

1) Turn number mismatch
2) Crossing number mismatch
3) Local crossing counter mismatch
4) Module ID mismatch
5) RVS error
6) Missing SRQ

These flags are available in the raw data since run 168128, Nov 14, implemented by Dennis Shpakov

This information is stored in ESR2 of the module headers.

Since p13.04.00 this information is accessed in Reco
and a summary "muon quality word" are put in the thumbnail.

The information is summarised in the following way:
– 5–bit summary for each crate,
– total of 60 bits stored in two 32–bit words
– bit 5=missing SRQ
– bit 4= RVS error

5	4	3	2	1

– bit 1,2,3: count of the number of module with turn number mismatch. Can only store 7 different values:
0 means 0 mismatch
1 means 1 to 3 mismatch
...
7 means more than 19 mismatch

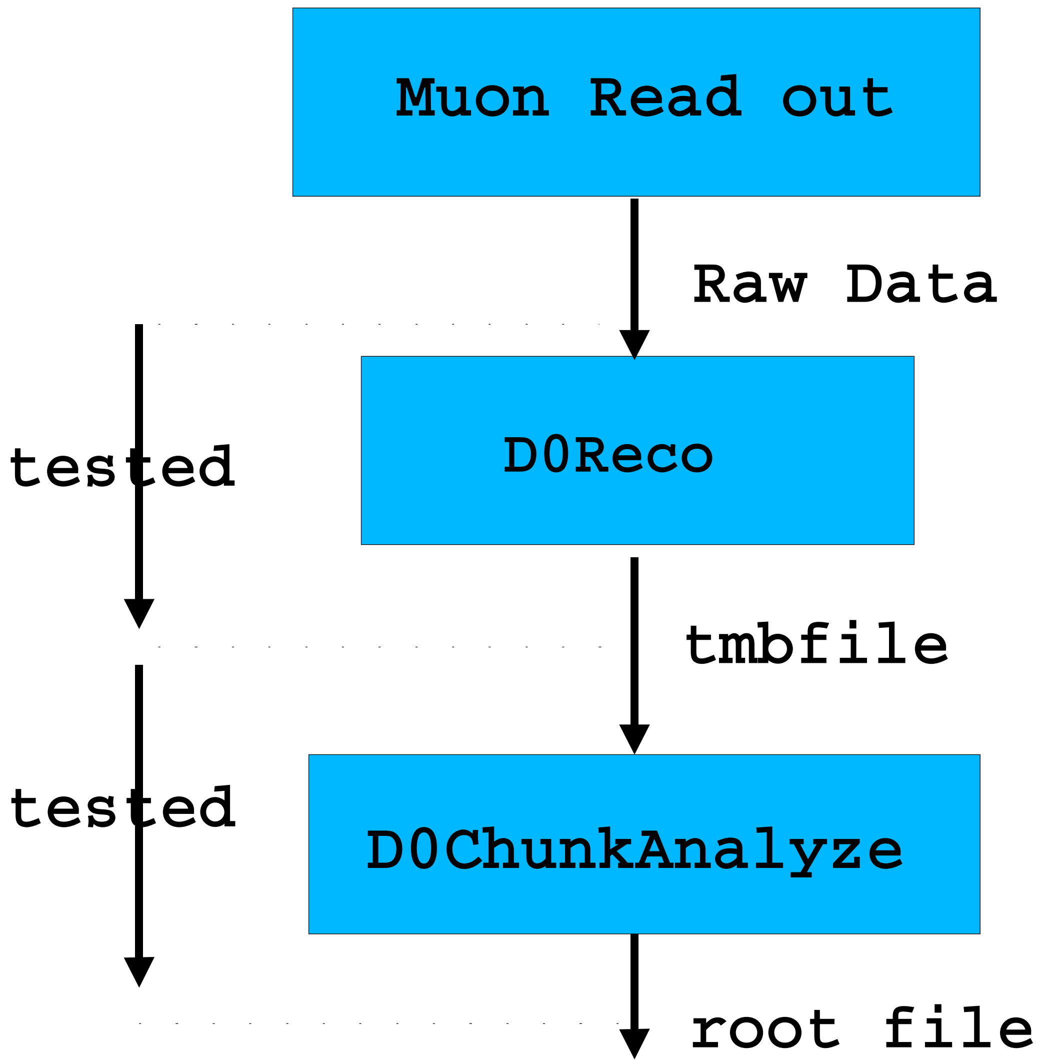
<u>From p13.04.00:</u>

–muon quality words calculated in
MuoHitReco::QualityWord(...)
–stored in TMBTriggerChunk::_Global
–can be accessed using
thumbnail::Global::instance().quality1()
thumbnail::Global::instance().quality2()

Soon available in muon candidate:

NXingMismatch(crate,TMBTriggerChunk)
RVSError(crate,TMBTriggerChunk)
SRQError(crate,TMBTriggerChunk)

Some tests



Some results

Run 168389 (Nov 21)

part.	size	#xing mis.	Crates	#mismatch
1	19700	0	--	--
2	58493	365	x31	10
3	58764	425	x30	10
		191	x31	10
4	59374	0	--	--
5	28600	0	--	--
6	59259	1355	x30	10
7	58514	512	x30	10
8	60347	558	x30	10
9	7309	0	--	--
419000 evts		2850	x30	
		556	x31	

Some results

Run 169298 (Dec 16) 468287 events analyzed

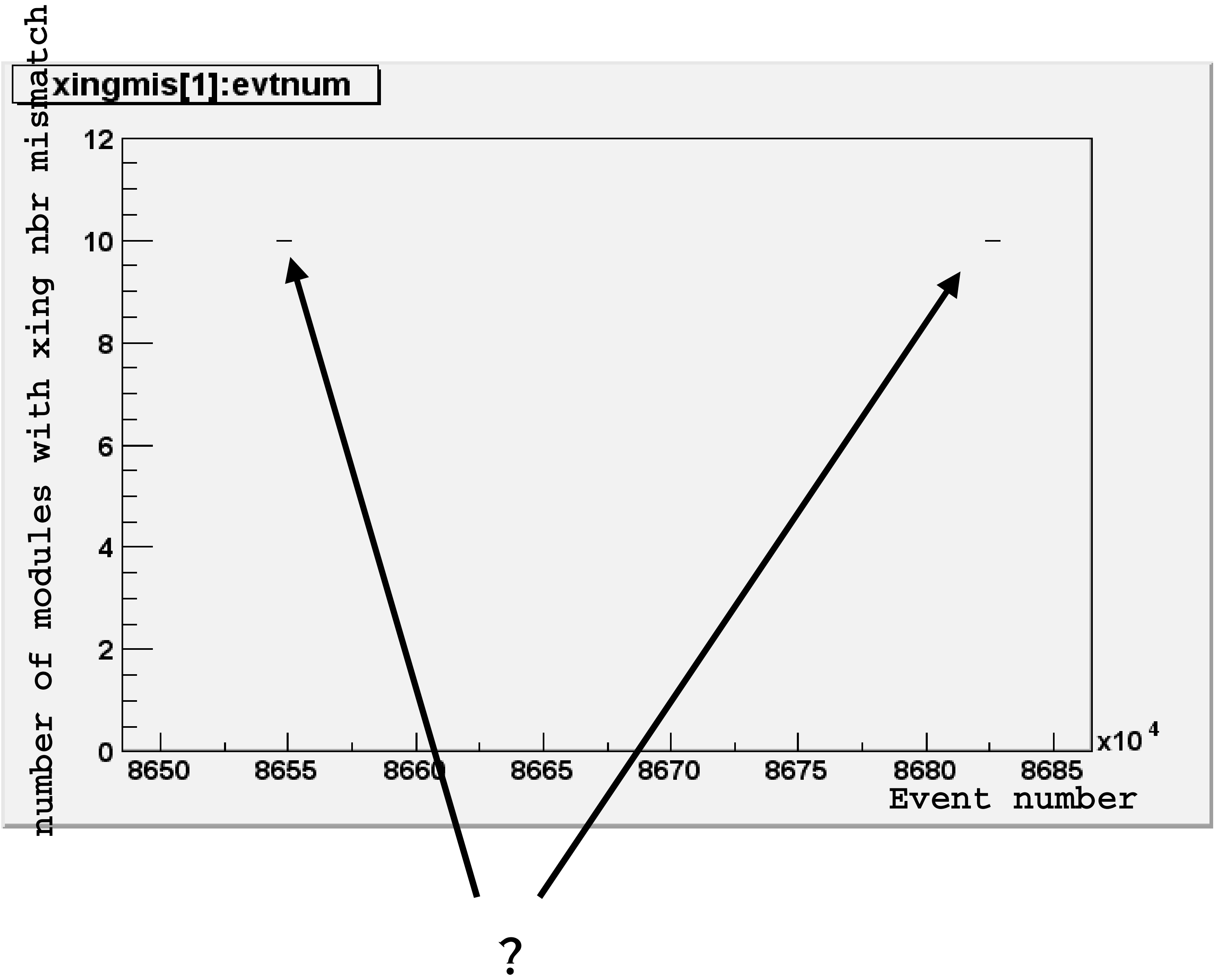
No Crossing number mismatch

Run 170374 (Jan 12) 39761 evts

No Crossing number mismatch

Time Evolution

Run 168389, nbr of xing nbr mismatch in crate x31 versus event number.



Conclusions

* Information about crossing nbr mismatch is available in the TMB from p13.04 and run 168128

* Methods to access the muon quality words available from me and soon from muon candidate.

* Some small fraction of events in a November run seems to have crates with crossing nbr mismatch. (A few in a thousand)

* Only crates x30 and x31 in analysed runs show a crossing nbr mismatch.

* 2 Later runs ok. Is the problem gone?

* Probably need a more systematic study.   Any volunteer?