South Caucasus Software & Computing Workshop - October 2014

Conditions Coordination Report

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2014/10/21

Albert-Ludwigs-Universität Freiburg

UNI FREIBURG

Condition Documentation on the ATLAS twiki:
https://twiki.cern.ch/twiki/bin/viewauth/AtlasComputing/CoolProdTags

outline

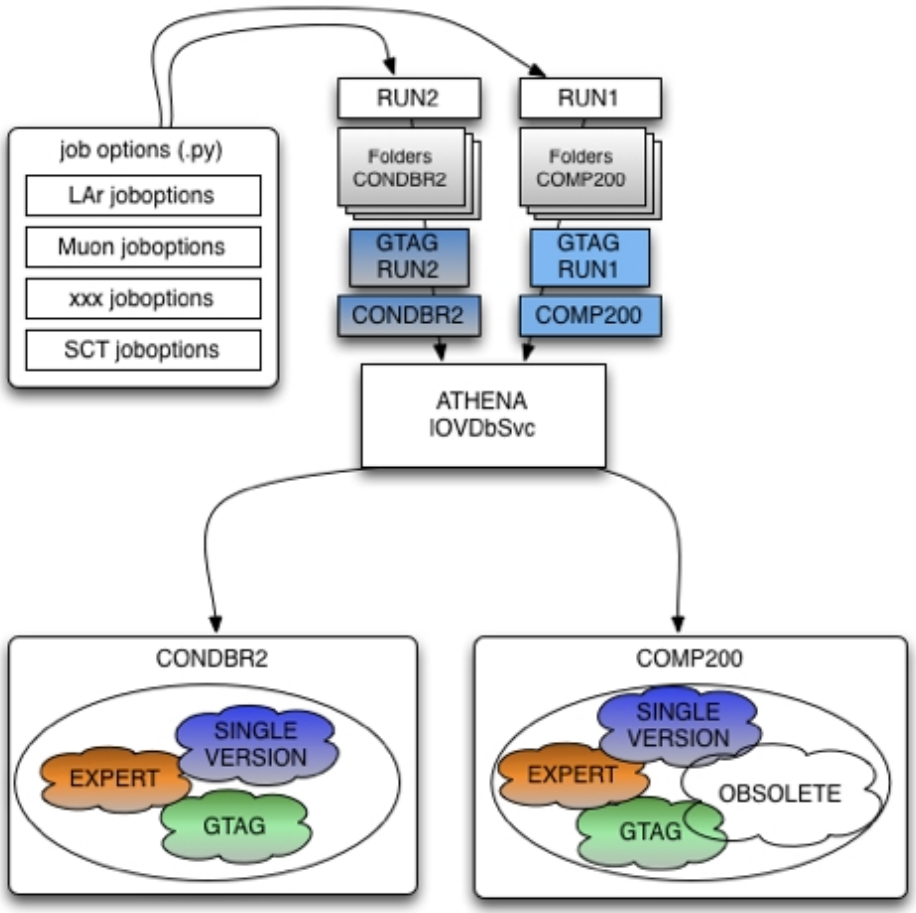
Conditions Tag Coordination

Tasks of Conditions Coordinator:

- **creation and management** of global conditions tags for data and Monte Carlo
- ensuring that all **conditions data** used in production is **reproducible**
- includes various **conditions** such as the **prompt calibration, express stream, etc.**
- **coordinating**, advising and assisting the **subsystem conditions experts**
- managing conditions development as subsystems change their use of conditions (add new conditions folders, remove old ones) and ensuring that all **locked global tags are still functional**.
- **development** work on the **tag infrastructure/tools** may be needed to support the work model as it evolves.

Extract of the conditions coordinator mandate

Reminder: New conditions DB for run-2



Motivation:

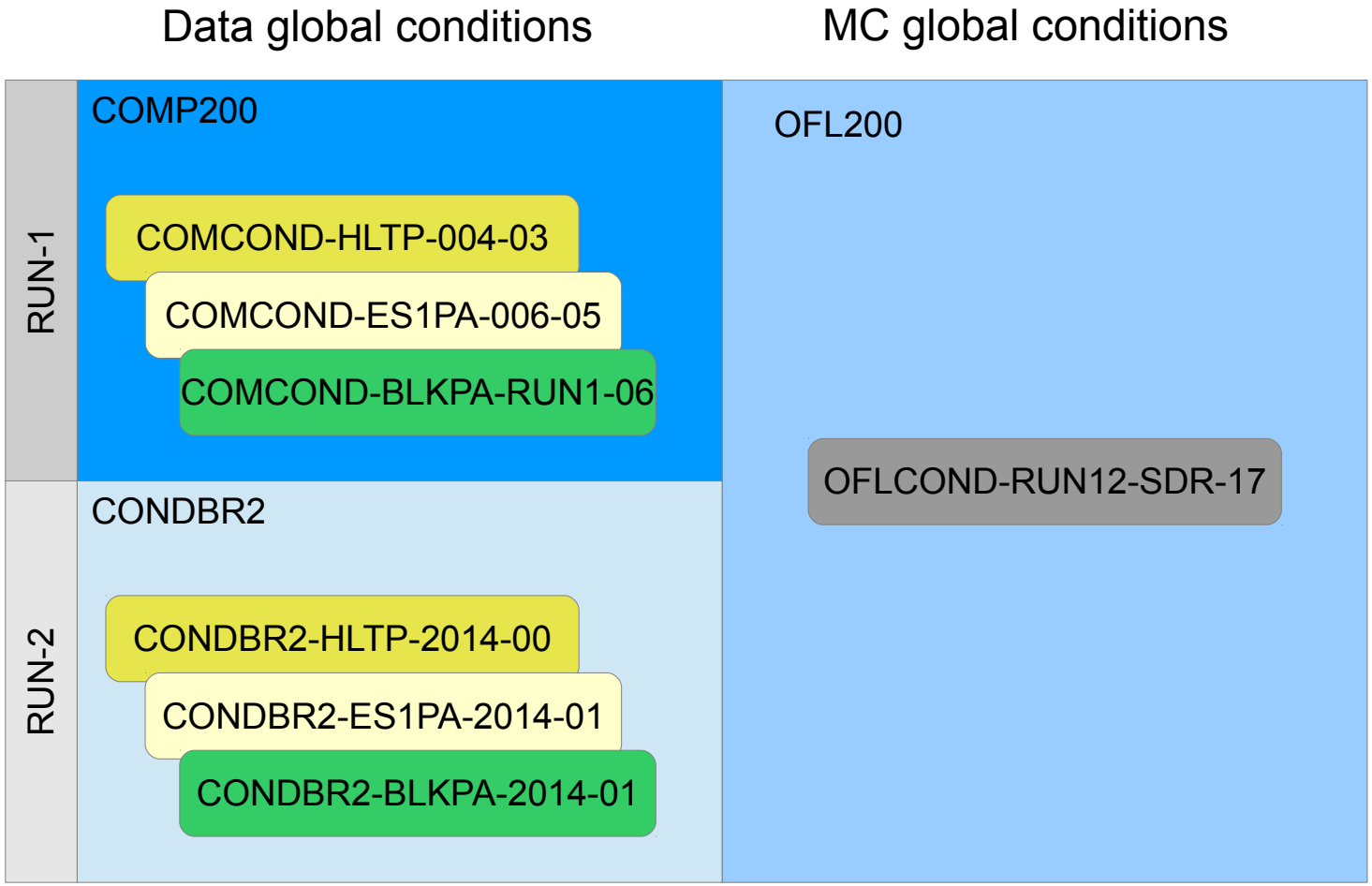
- COMP200 status
  - big folders size
  - unclear mixing in online/offline folders
  - big amount of useless info, also in tags & chan.
  - long term maintenance difficult
  - hard to understand the DB structure for incoming experts
- CONDBR2
  - gives experts possibility for fresh start in Run-2
  - benefits of knowledge collected during Run-1

Setup:

- Run-1
  - use COMP200 for conditions updates
- Run-2
  - use CONDBR2 for conditions updates
- No change in schema names
  - ATLAS_COOLxxx_(System)
- Software release
  - have to read both instances

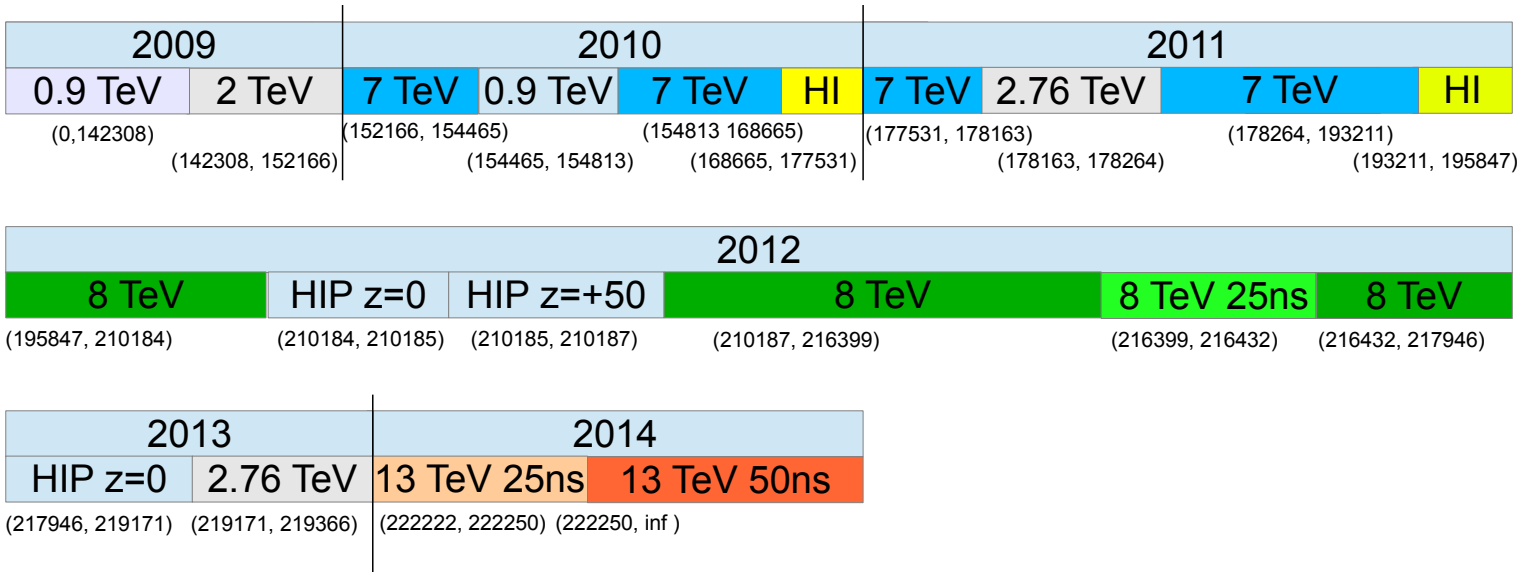
- no change for MC conditions (uses OFLP200)

Global Tag Overview



- 3 different data global tags:
  Trigger (HLT), express stream (ES1), and physics reconstruction (BLK)
- 3 additional global tags for run-2 during commissioning of new conditions DB
- only 1 global tag needed for MC
  - run dependent conditions via IOV structure introduced to MC conditions

Towards Run-2 changes in MC global Tags - IOV dependent MC tags



- IOV dependend MC conditions allow to use one single global conditions tag for all periods with rather different conditions
- the run numbers of 2014 have been choosen after run-1 and before run-2 in order to provide MC conditions for run-2 in advance:
  - 13 TeV with a bunch spacing of 25 ns (planed for data taking from Jun-Nov)
  - 13 TeV with a bunch spacing of 50 ns (planed for data taking from May-Jun)
- later run-2 dependend MC conditions will be added according to the corresponding run numbers

Towards Run-2 changes in MC global Tags - IOV Ranges check for holes/data

- check IOV dependent data via *AtlCoolConsole.py*

```
Using tag selection: IndetBeampos-ES1-UPD2-08

     [0,0] - [141749,0) (0) [status (Int32) : 0],   [posX (Float) : 0], [posY (Float) : 0], [posZ (Float) : 0],
                                                    [sigmaX (Float) : 30], [sigmaY (Float) : 30], [sigmaZ (Float) : 500],
                                                    [tiltX (Float) : 0], [tiltY (Float) : 0], [sigmaXY (Float) : 0],
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                                                    [tiltXErr (Float) : 0], [tiltYErr (Float) : 0], [sigmaXYErr (Float) : 0]

[141749,0] - [141749,11) (0) [status (Int32) : 83], [posX (Float) : -0.22424], [posY (Float) : 1.04335], [posZ (Float) : -35.2592],
                                                    [sigmaX (Float) : 30], [sigmaY (Float) : 30], [sigmaZ (Float) : 500],
                                                    [tiltX (Float) : 0.000521409], [tiltY (Float) : 0.00019282], [sigmaXY (Float) : 0],
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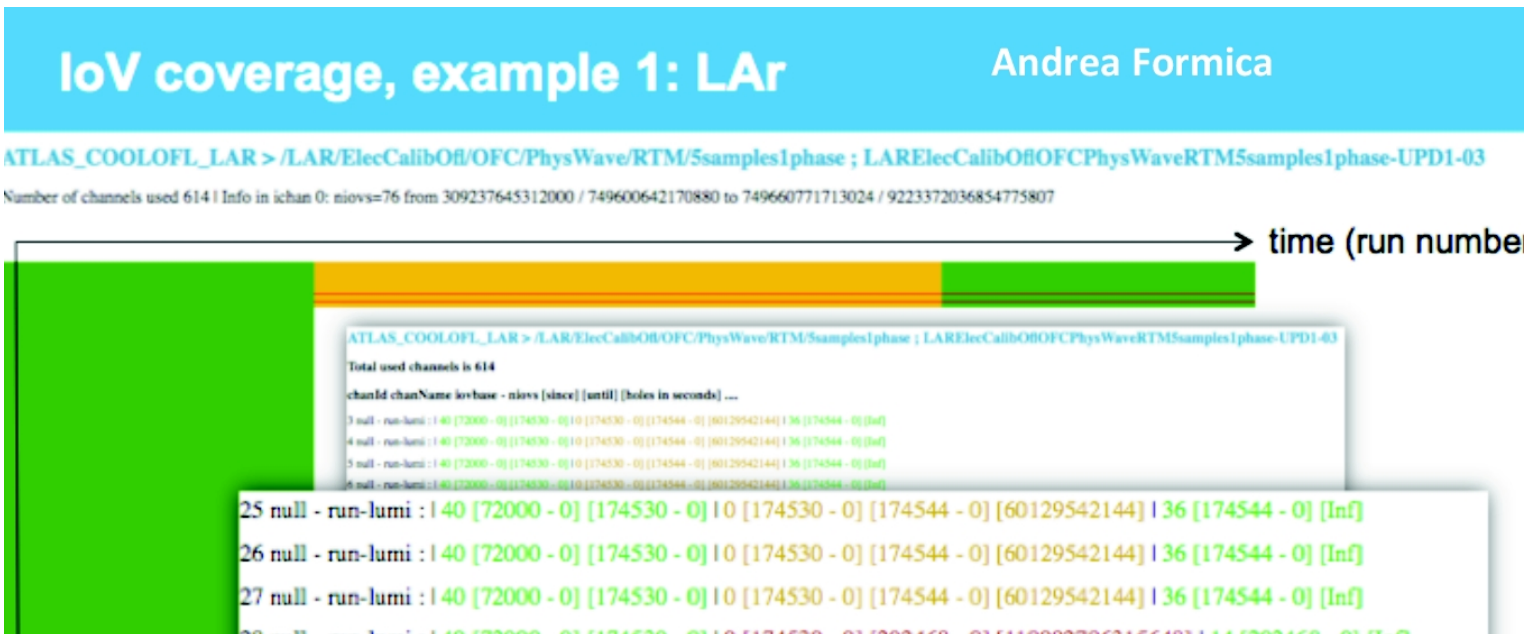
```

...

- IOV-Tool from Andrea e.g.:
  http://voatlas135.cern.ch:8080/JBRestCool/rest/coolgtag/ATLAS_COOLOFL_MUONALIGN/COMP200/COMCOND-BLKPA-RUN1-02/svg/summary



Towards Run-2 changes in MC global Tags - IOV Ranges check for holes/data

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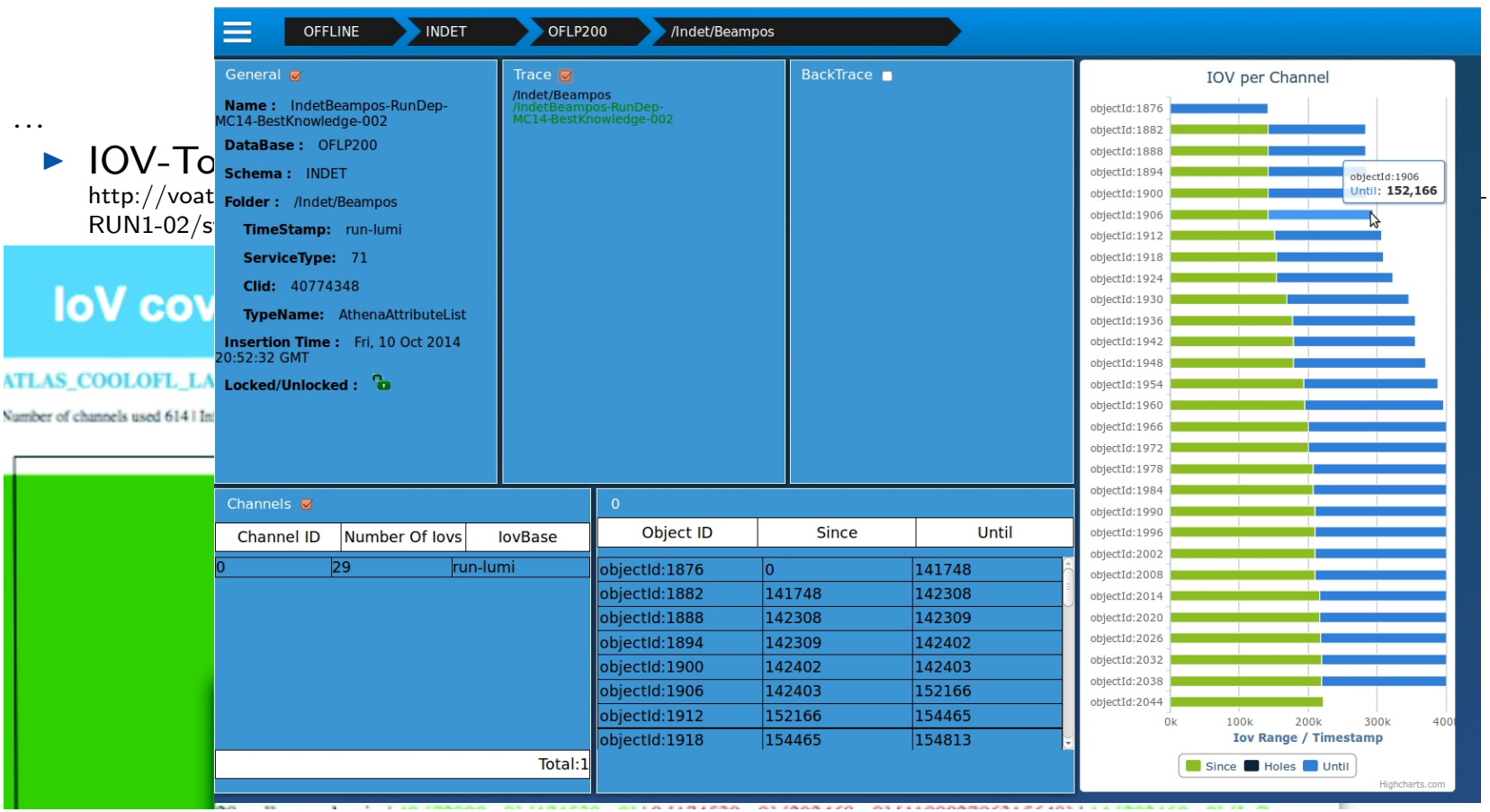
[141749,0] - [1417
```

- also available in latest version of CoolTagBrowser: R11

...

- IOV-To
  http://voat
  RUN1-02/s

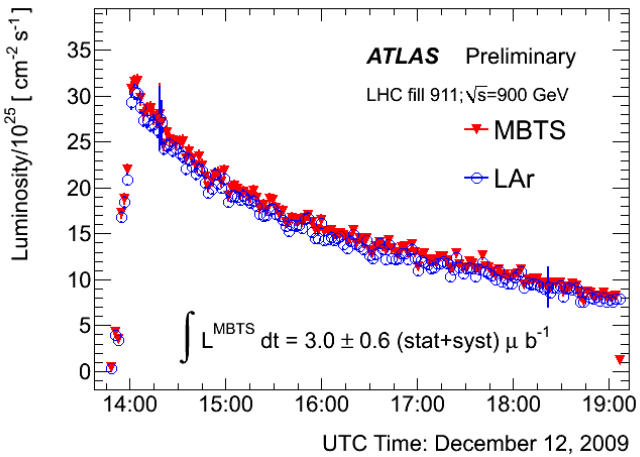


2009 Conditions - Data Preservation

Reminder - Data taking in 2009:

Time period	All	Pixel	SCT	TRT	LAr	Tile	MDT	RPC	TGC
All stable beams	76.2	80.9	86.2	100	99.0	100	87.4	88.6	84.4
Dec 12, 2009	88.6	88.8	92.8	100	100	100	94.0	94.6	92.2

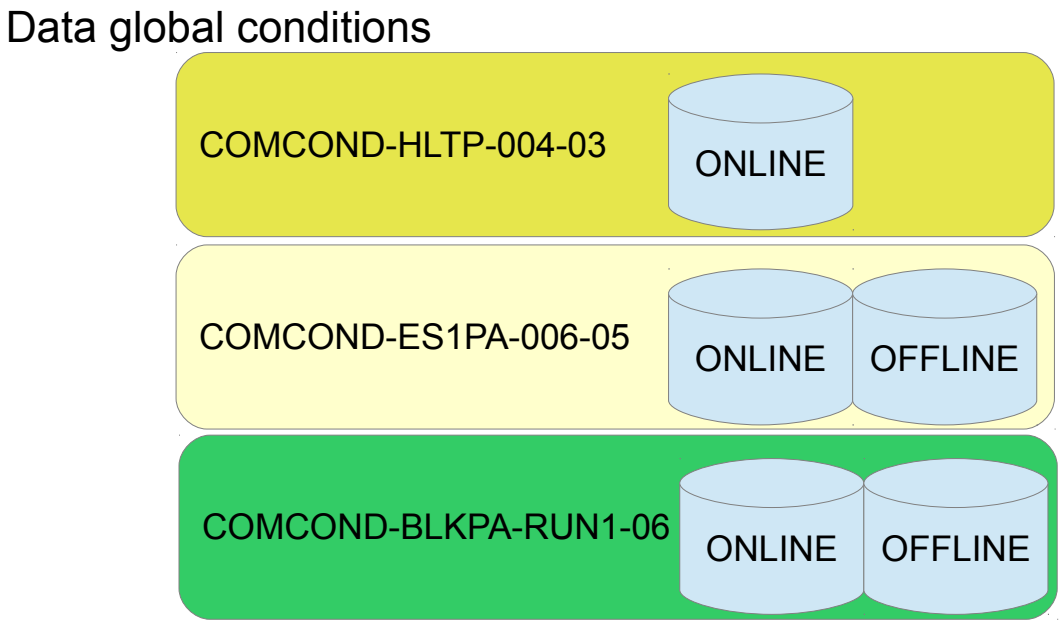
Luminosity weighted relative detector uptime and good quality data delivery during 2009 stable beams (in %)



2009 Conditions:

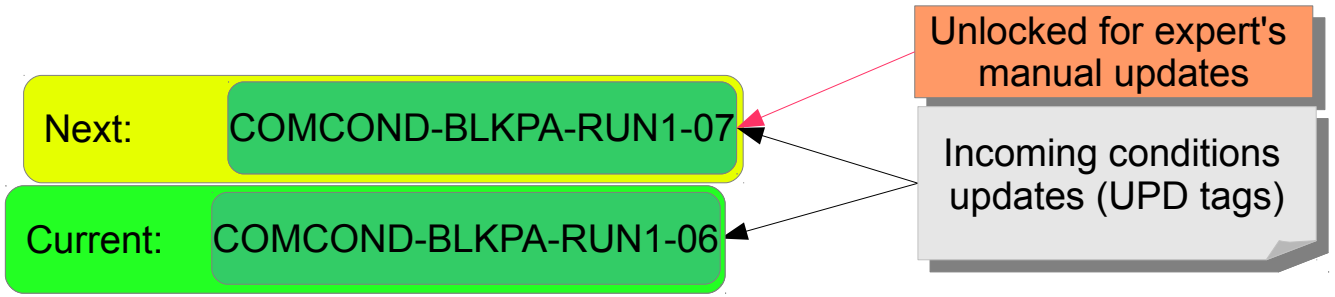
- both MC & data conditions for 2009 (900 GeV and 2 TeV) should be preserved
- allows 2009 reprocessing, if needed re-simulation
- coordinated with the ID experts to provided 2009 conditions until end of Oct
  - INDET (bspot), INDET (Align), PIXEL, SCT, TRT.
- other detector systems, just need to include the corresponding IOV ranges, such that the reconstruction code does not crash
- for this kind of tasks we need tools which provide IOV ranges of conditions data and check for holes

Global Tag Overview Data - DB access



- HLT global tag used for high-level trigger ONLINE at P1, **must** be completely decoupled from OFFLINE DB (maximum availability)
- other data global tags include OFFLINE information e.g. beam position

Current and Next - Mechanism



- both current and next global tag (data) receive automatic conditions updates
- for experts: current tag is locked; only next tag can be opened for manual updates
- thus both manual and automated go into the next global tag
- when production moves to a new global tag:
  - next $\rightarrow$ current
  - and a new next will be created
- this mechanism is (will be) handeled by AMI interface :

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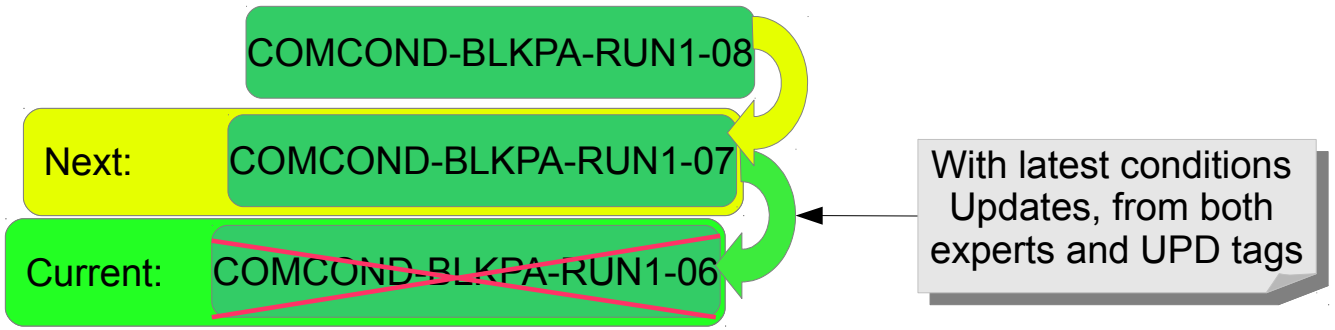

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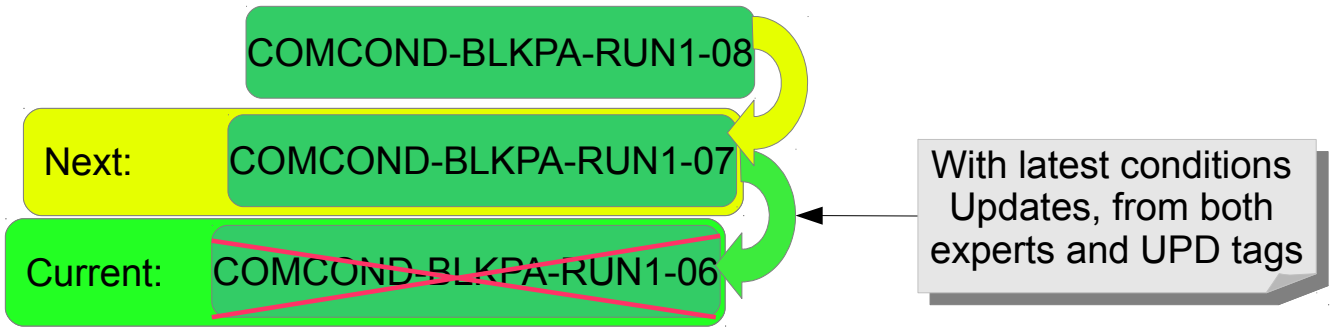

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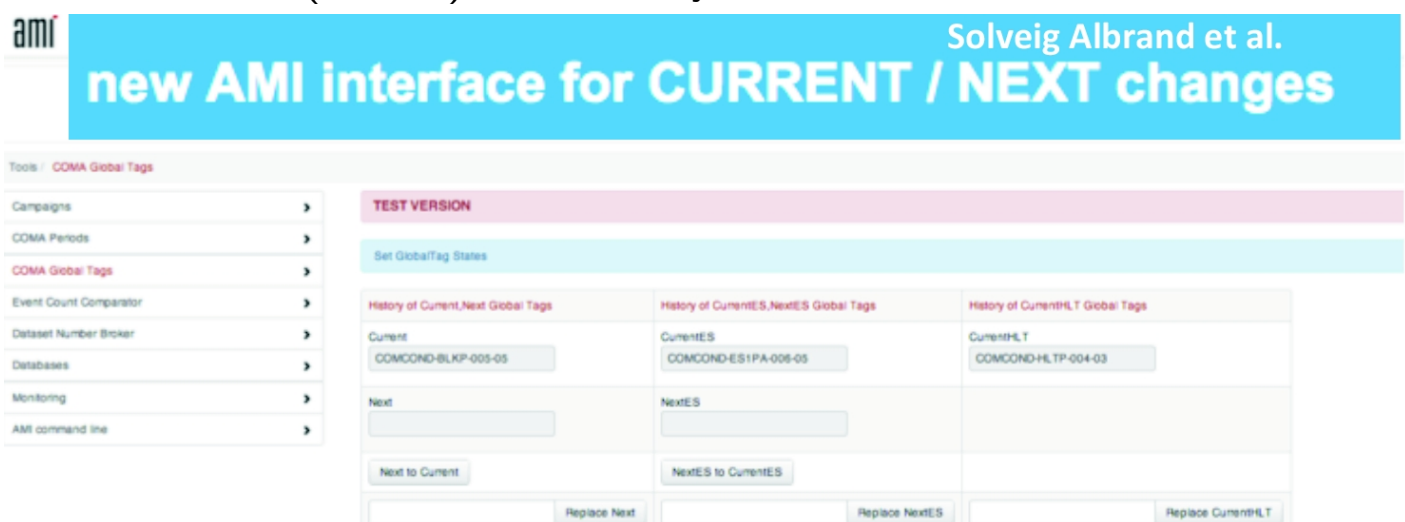


Global Tag Overview MC - DB access

- **must not** access ONLINE DB guarantee database availability for critical online applications during data-taking
  - this was not the case during run-1: several MC conditions had ONLINE access
  - by removing all dependencies from the ONLINE DB
    $\rightarrow$ (re)-introduced security layer as defined in the original design

Towards Run-2 changes in MC global Tags

Special Tasks preparing run-2:

OFLCOND-RUN12-SDR-07

System	SubSystem	Folder Tag Count	COOLOFL Count	COOLONL Count
Calorimeter	CALO	114	54	60
"	LAR	21	21	0
"	TILE	27	27	0
Muon	CSC	8	8	0
"	MDT	9	7	2
"	MUONALIGN	5	5	0
"	RPC	5	5	0

...

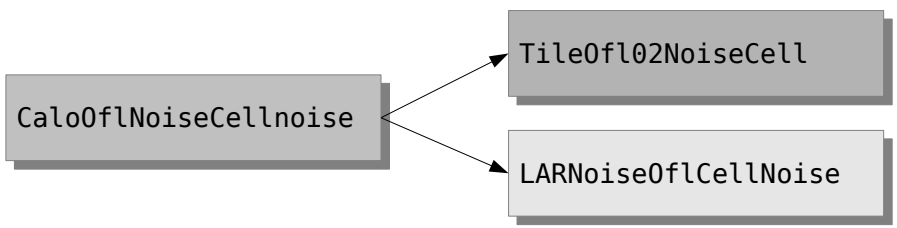
Now:
no online folders in MC global tags left

OFLCOND-RUN12-SDR-08

System	SubSystem	Folder Tag Count	COOLOFL Count
Calorimeter	CALO	54	54
"	LAR	21	21
"	TILE	27	27
Muon	CSC	8	8
"	MDT	7	7
"	MUONALIGN	5	5
"	RPC	5	5

...

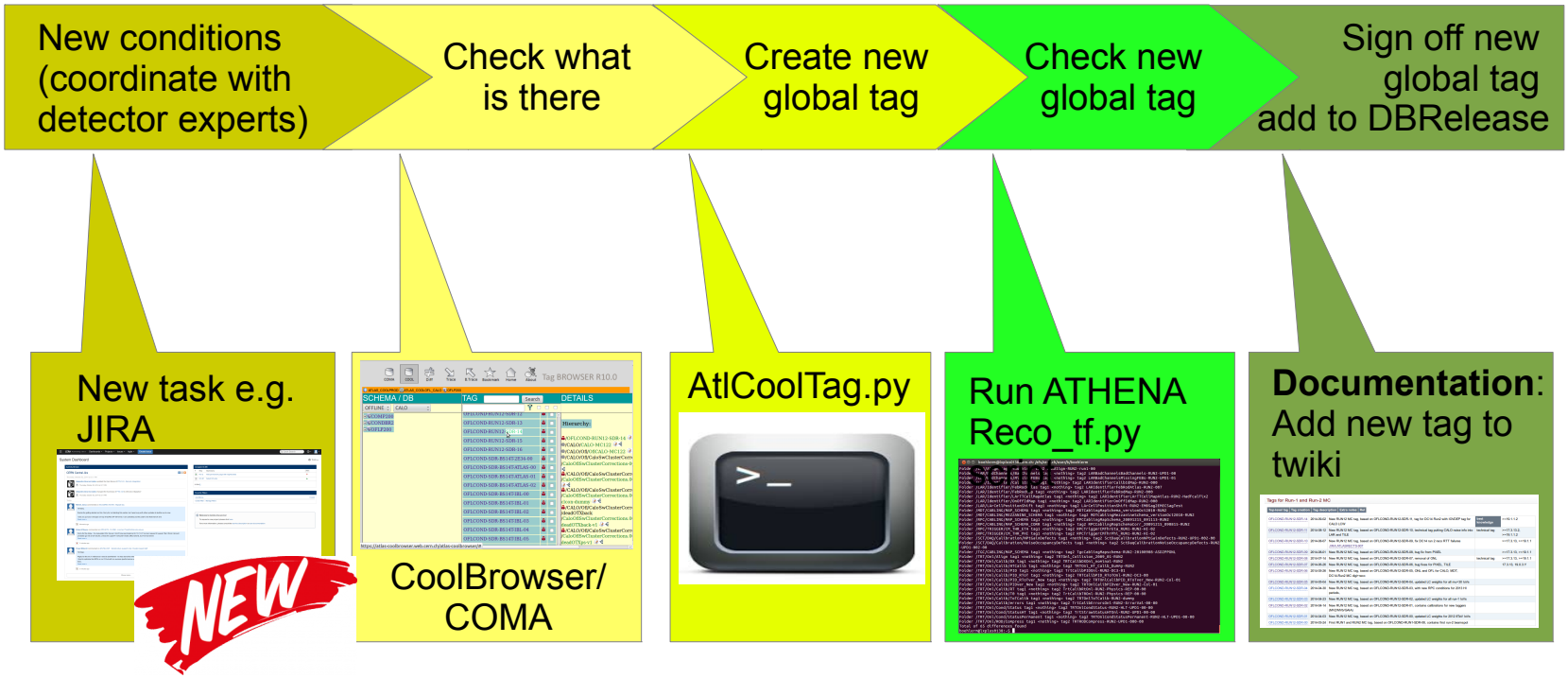
- (re)-moved 60 CALO and 2 MDT ONL folders which should be in OFFLINE by design



- separate noise information from CALO noise to TILE and LAr

- this kind of restructuring is not included in typical workflow
- many adjustments in ATHENA software neccessary
- dedicated technical and physics validations were needed

Workflow of global Tag coordination



- JIRA Project ATLAS Conditions Database: ATCONDDB
- CoolTagBrowser / COMA web browser
- twiki AtlCoolTag.py
- twiki ATHENA test recipies
- twiki CoolProdTags

Folder Classification - with COMA Browser

- all conditions data folders have been classified in the following categories:
  - allRuns
  - run-1 only
  - obsolete
- according to this classification, folders have been copied/not copied to the new conditions DB (CONDBR2)
- COMA Browser shows the corresponding tags and classification

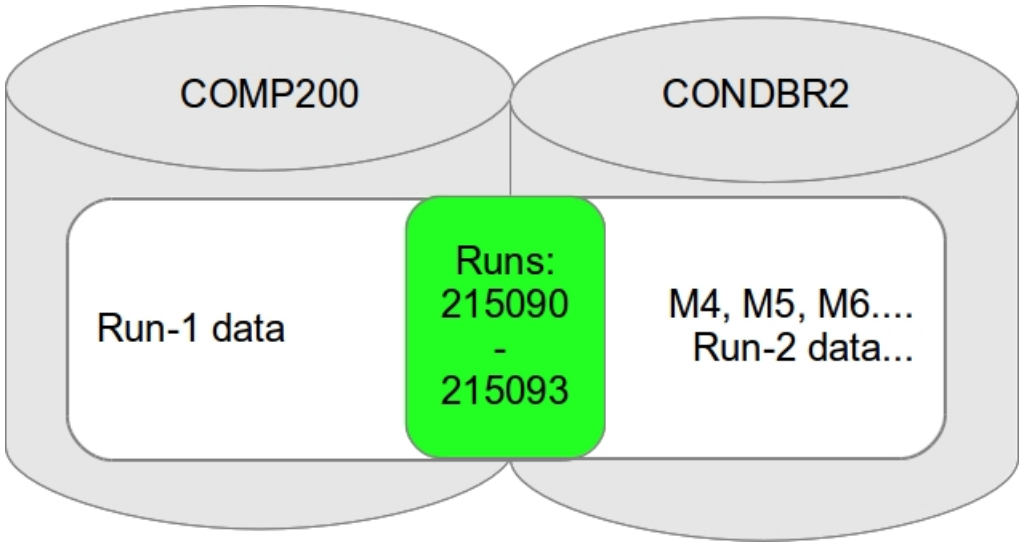
Global Tag **COMCOND-BLKPA-RUN1-06** includes 266 Folder Tags meeting input criteria.
A summary of folder tag count per subsystem is shown here.
Use links here to jump down this page to the folder tag detail.

System	SubSystem	Folder Tag Count	COOLOFL Count	COOLONL Count
Calorimeter	CALO	79	4	75
"	LAR	28	17	11
"	TILE	53	27	26
Muon	CSC	20	8	12
"	MDT	9	5	4
"	MUONALIGN	5	5	0
"	RPC	5	1	4
"	TGC	1	0	1
Other	FWD	1	1	0
"	GLOBAL	17	14	3
"	TRIGGER	1	1	0
Tracking	INDET	4	4	0
"	PIXEL	10	10	0
"	SCT	3	1	2
"	TRT	30	15	15

CALO

Cool Schema	Folder	General, GlobalTag Class	Folder Tag	Lock Stat	Rows	Created / Last_Insert
COOLOFL_CALO/ COMP200	/CALO/Ofl/HadCalibration2/CaloJetEnergyScale	Run1Only Run1BKGT	CaloOflHadJESCorr2-GEO16-QGSP-BERT	1	1	10Dec16_16:28
"	/CALO/Ofl/Noise/CellNoise	Run1Only Run1BKGT	CaloOflNoiseCellnoise-UPD4-09	1	7	14Jan23_19:56
"	/CALO/Ofl/Noise/PileUpNoiseLumi	AllRuns	CALOOflNoisePileUpNoiseLumi-UPD4-02	1	24	13May22_12:38

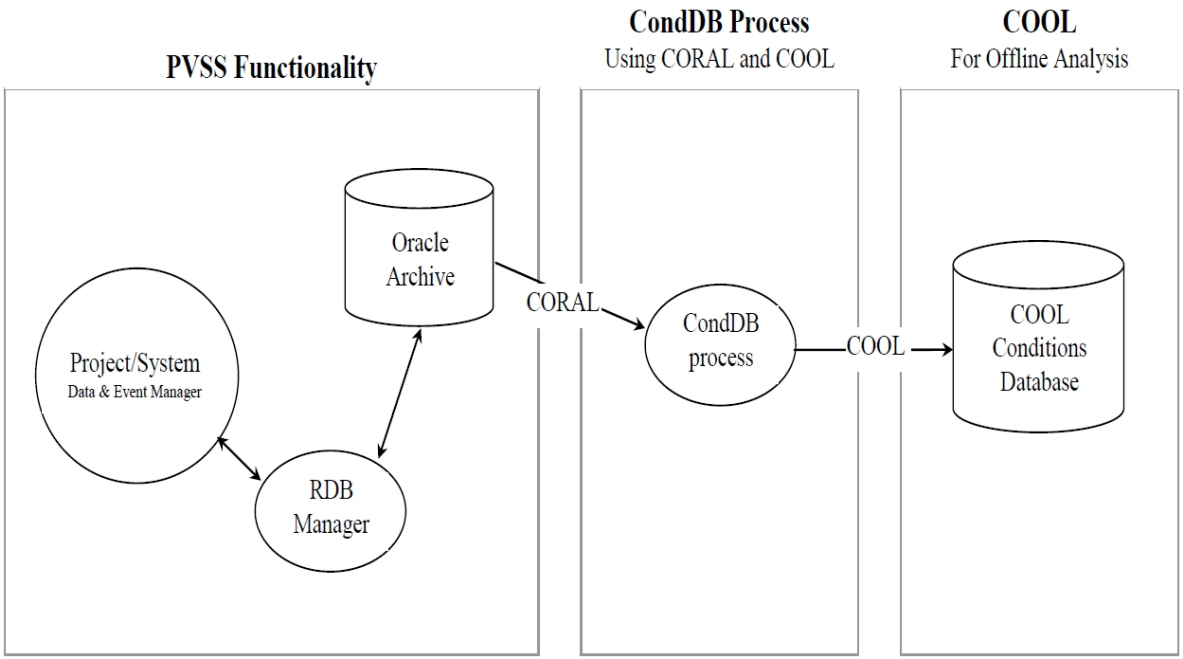
Towards Run-2 changes in Data global Tags - CONDBR2 Validation



- copied runs from run-1 to new conditions database
  - runs: 215090 - 215093 stored in both conditions DBs
  - overlapping runs allow direct validation
- when reconstruction software functional with CONDBR2
  - run reprocessing on overlapping runs
- this kind of validation step is absolutely neccesary
  $\rightarrow$ not all conditions data folders have been copied (clean up)

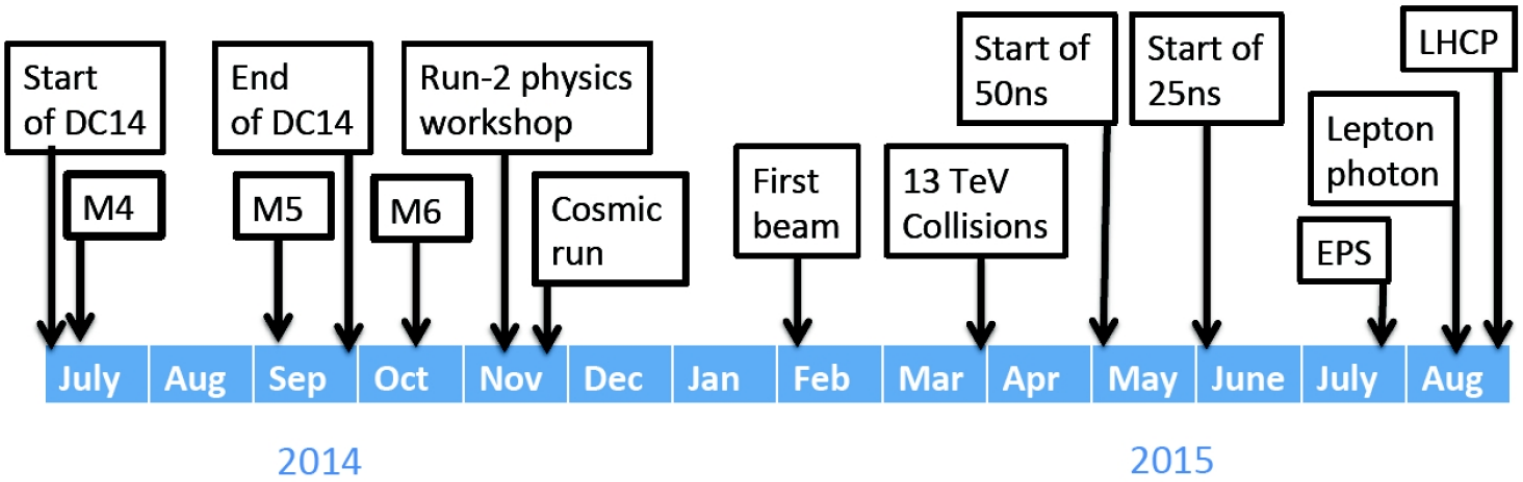
Towards Run-2 changes in Data global Tags - Copy mechanism for DCS folders

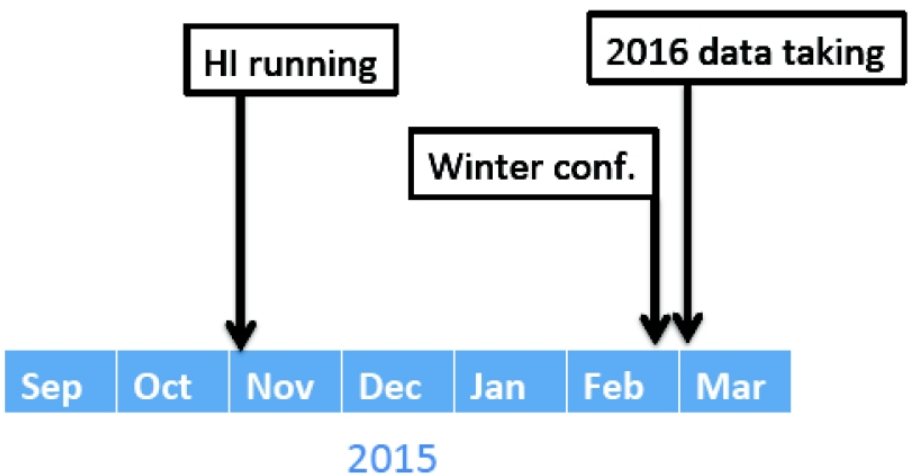
- the Detector Control System back-end of ATLAS uses PVSS
- any data required by offline reco has to be copied to COOL database via the condDB process



- DCS folders can not be copied directly from COMP200 to CONDBR2
  → PVSS to COOL copy mechanism was used
- Problems with DCS folders created by channel name
  Solution: recreate and refill affected folders → might take up to one week

2015 Overview Timescale



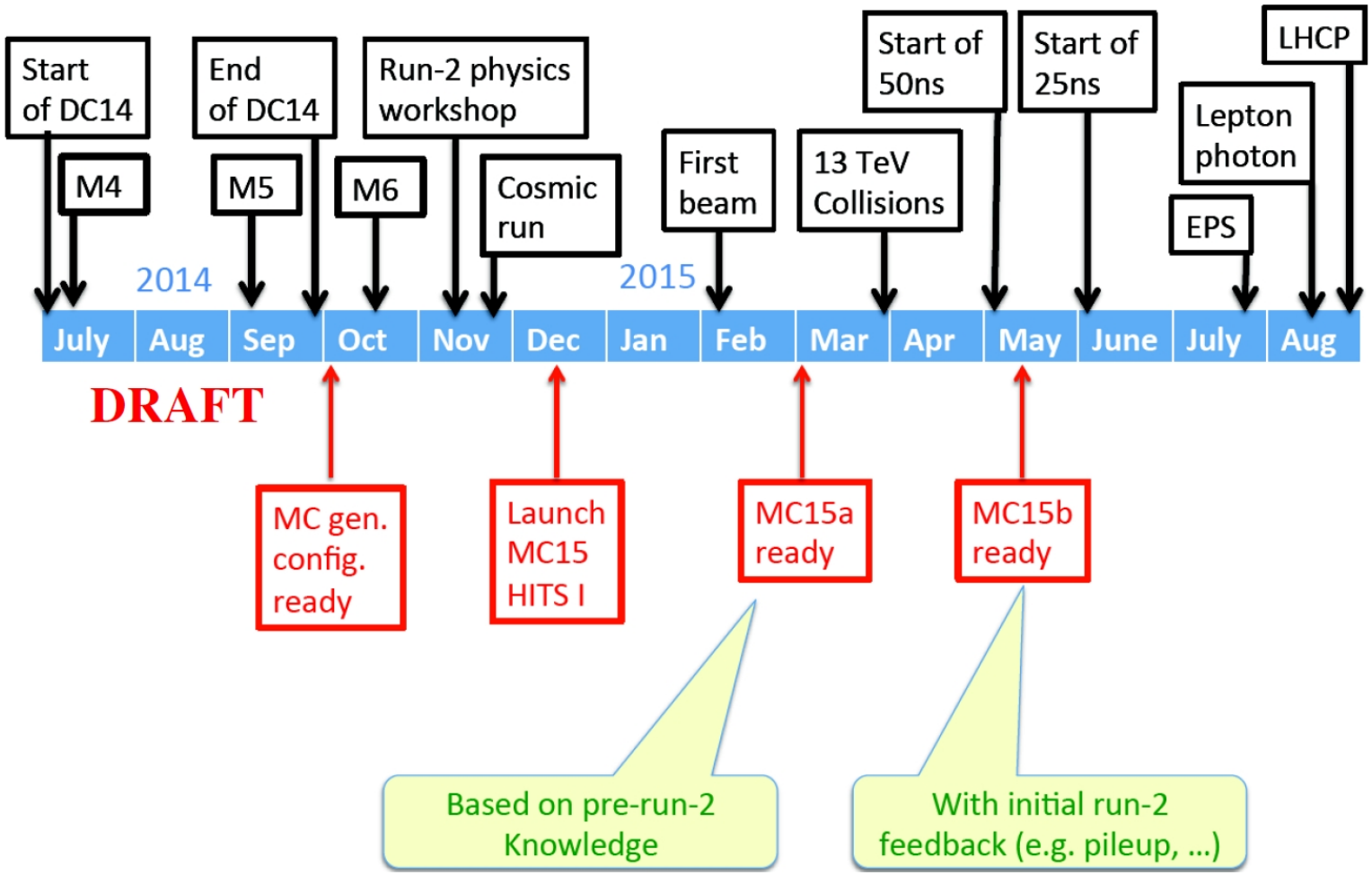


Key milestones in 2015:

- March: first 13 TeV collisions.
- May: 50 ns data up to $9{\cdot}10^{33}$, $< \mu > \approx 40$ (and up to 1 fb^{-1}).
- June: start of 25 ns collisions $45{\cdot}10^{33}$, 12 fb^{-1} by first week of July.
- End of the year: Switchover from pp to HI program.

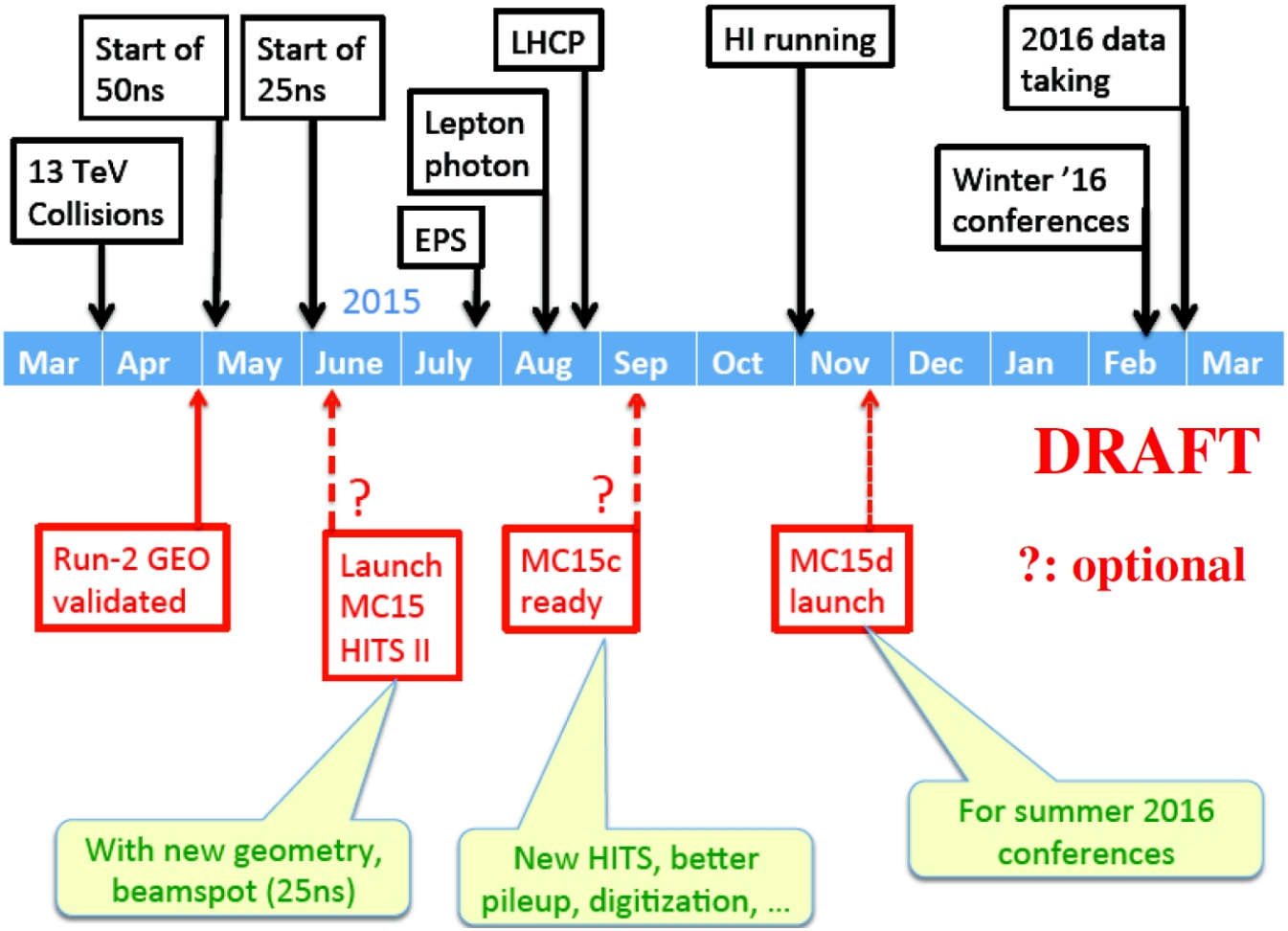
Following timescales taken from Luca Fiorini's talk: "Offline Schedule beyond DC14"

MC15 schedule (Summer)



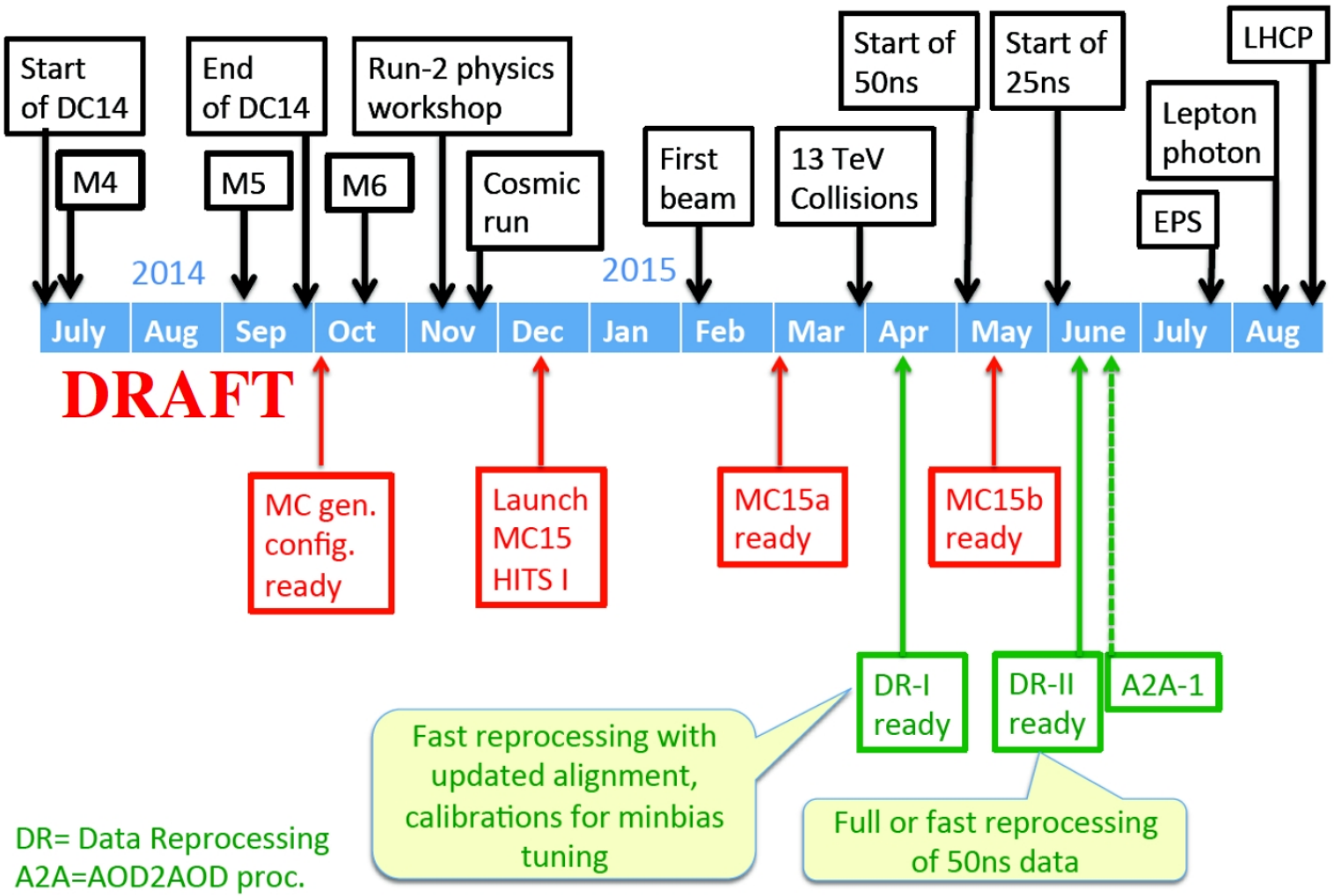
- MC15 HITS: same HITS could be used in principle during the whole 2015
- MC15a: initial data ramp-up and preparation of early analysis
- MC15b: analysis of 50+25ns data for summer conferences

MC15 schedule (Autumn)



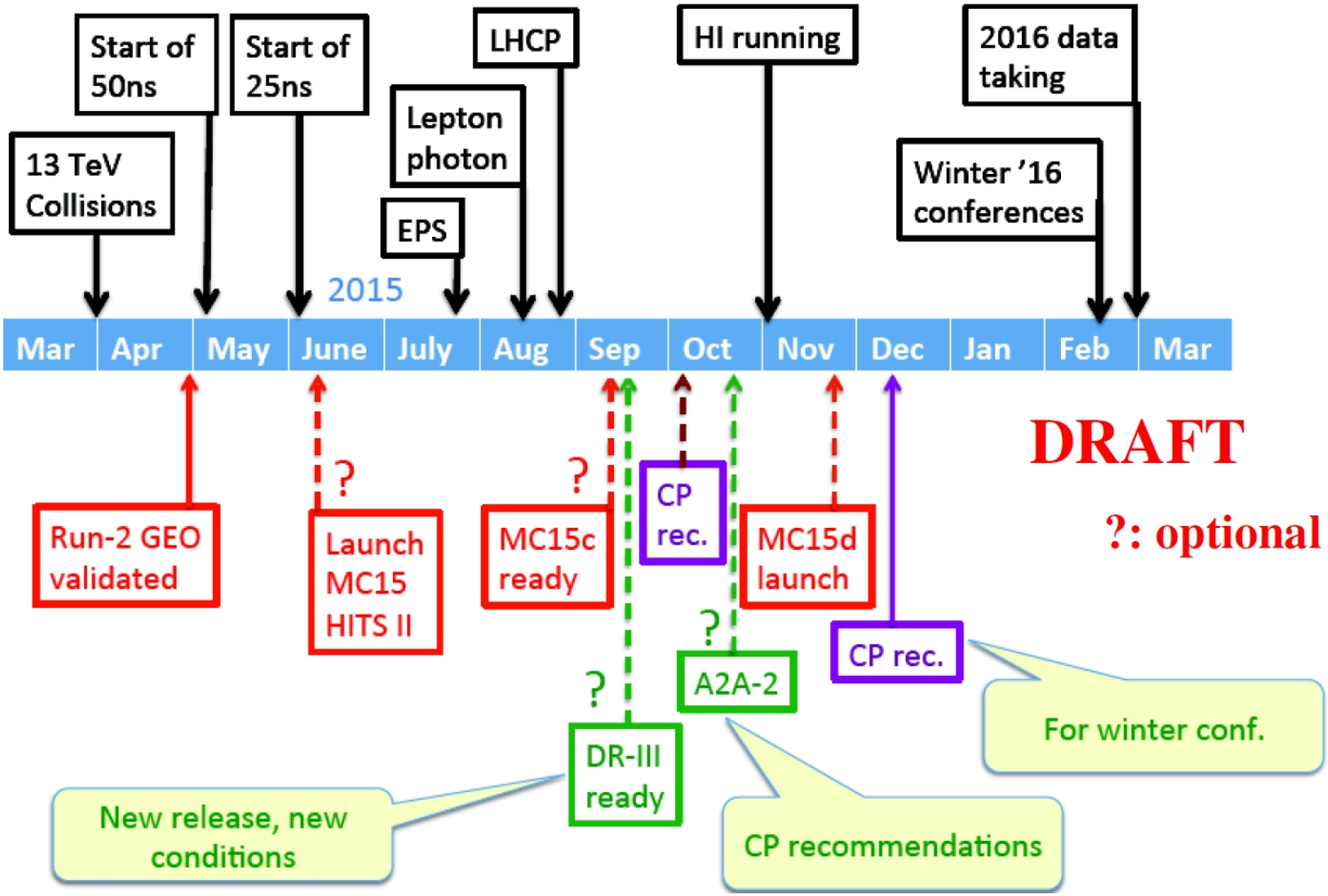
- MC15c: most likely needed if new HITS production in Summer 2015.
  - can collect improvements in: conditions, digitization, new reconstruction release, trigger simulation & menu
  - Need to be decided by June 2015
- MC15d: with final conditions and pileup at the end of the datataking.

Data Reprocessing schedule (1)



- DR1: Aiming for minbias tuning, just after ID alignment available.
- DR2: Reprocessing of 50ns data for summer conferences: to be analyzed together with 25ns data and mc12b. It should contain MS alignment and 'precise' ID alignment.

Data Reprocessing schedule (2)



- DR3: Reprocessing of the data with new release. More likely to happen is in conjunction with MC15c.
  - Need to be decided in June 2015
- DR4: Final Reprocessing of 2015 data with final conditions and new release.
  - Most likely to happen if DR3 is not done

Global Conditions Status

MC global Conditions Tags:

SDR: Simulation-Digi-Reco global Tag:

- OFLCOND-RUN12-SDR-17: current best knowledge for DC14 (incl. 50ns conditions)
- OFLCOND-RUN12-SDR-16: TRT test scenario
- OFLCOND-RUN12-SDR-15: TRT test scenario

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Data global Conditions Tags Run-1:

- COMCOND-HLTP-004-03 - ONLINE
- COMCOND-ES1PA-006-05 - express stream
- COMCOND-BLKPA-RUN1-06 - bulk reconstruction

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Data global Conditions Tags Run-1:

- COMCOND-HLTP-004-03 - ONLINE
- COMCOND-ES1PA-006-05 - express stream
- COMCOND-BLKPA-RUN1-06 - bulk reconstruction

Data global Conditions Tags Run-2:

- CONDBR2-HLTP-2014-00 - ONLINE
- CONDBR2-ES1PA-2014-01 - express stream
- CONDBR2-BLKPA-2014-01 - bulk reconstruction

https://twiki.cern.ch/twiki/bin/viewauth/AtlasComputing/CoolProdTags

Conclusion

- Conditions DBs and global conditions tags
  - Data: 2 condDB instances (COMP200 and CONDBR2)
    - with 3 actual global conditions tags each
  - MC: 1 condDB instance (OFLP200)
    - one main global tag (without any ONLINE folder)
- Several tools needed in the process of building a new global conditions tag
  - JIRA, CoolTagBrowser, COMA Browser, AtlCoolTag.py Tool, Twiki
- Clean-up during LS1:
  - Data (CONDBR2 only):
    - removed unused foldes (classification)
  - MC:
    - removed ONLINE dependency, splitting
- CONDBR2 consolidation and validation still ongoing
- Next years LHC schedule contains many tasks for conditions coordination
  - data taking - adjust conditions for different periods (50ns, 25ns bunch spacing)
  - data reprocessing - new calibration constants and beam positions recalc (DR-I, DR-II,..)
  - MC Production - (MC15a,MC15b,...)

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  - data reprocessing - new calibration constants and beam positions recalc (DR-I, DR-II,..)
  - MC Production - (MC15a,MC15b,...)

Conclusion

- Conditions DBs and global conditions tags
  - Data: 2 condDB instances (COMP200 and CONDBR2)
    - with 3 actual global conditions tags each
  - MC: 1 condDB instance (OFLP200)
    - one main global tag (without any ONLINE folder)
- Several tools needed in the process of building a new global conditions tag
  - JIRA, CoolTagBrowser, COMA Browser, AtlCoolTag.py Tool, Twiki
- Clean-up during LS1:
  - Data (CONDBR2 only):
    - removed unused foldes (classification)
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Backup

Towards Run-2 changes in Data global Tags - Issue with DCS folders

Problem spotted by ATHENA test run → crashing with:

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- After investigating the folder /EXT/DCS/MAGNETS/SENSORDATA in the COOLOFL_DCS/CONDBR2 schema → Toroids_Current:
  - channel ID = 2 in CONDBR2
  - channel ID = 3 in COMP200

What happened:

- PVSS to COOL copy mechanism:
  - copy the folder definition given by folder designers (detector experts)
  - DCS folders may be created by channel id or by channel name
  - reco code can access the data by channel id or channel name
  - it was found:
    - if copied by channel id → order was correct
    - if copied by channel name → order was random
  - if data was copied by name and accessed by channel id → DESASTER!

Solution:

- Provide a version of the COOL lib which does the unambiguous conversion of ID and name. Then all folders are to be dropped and we have to recreate and refill them → might take up to one week

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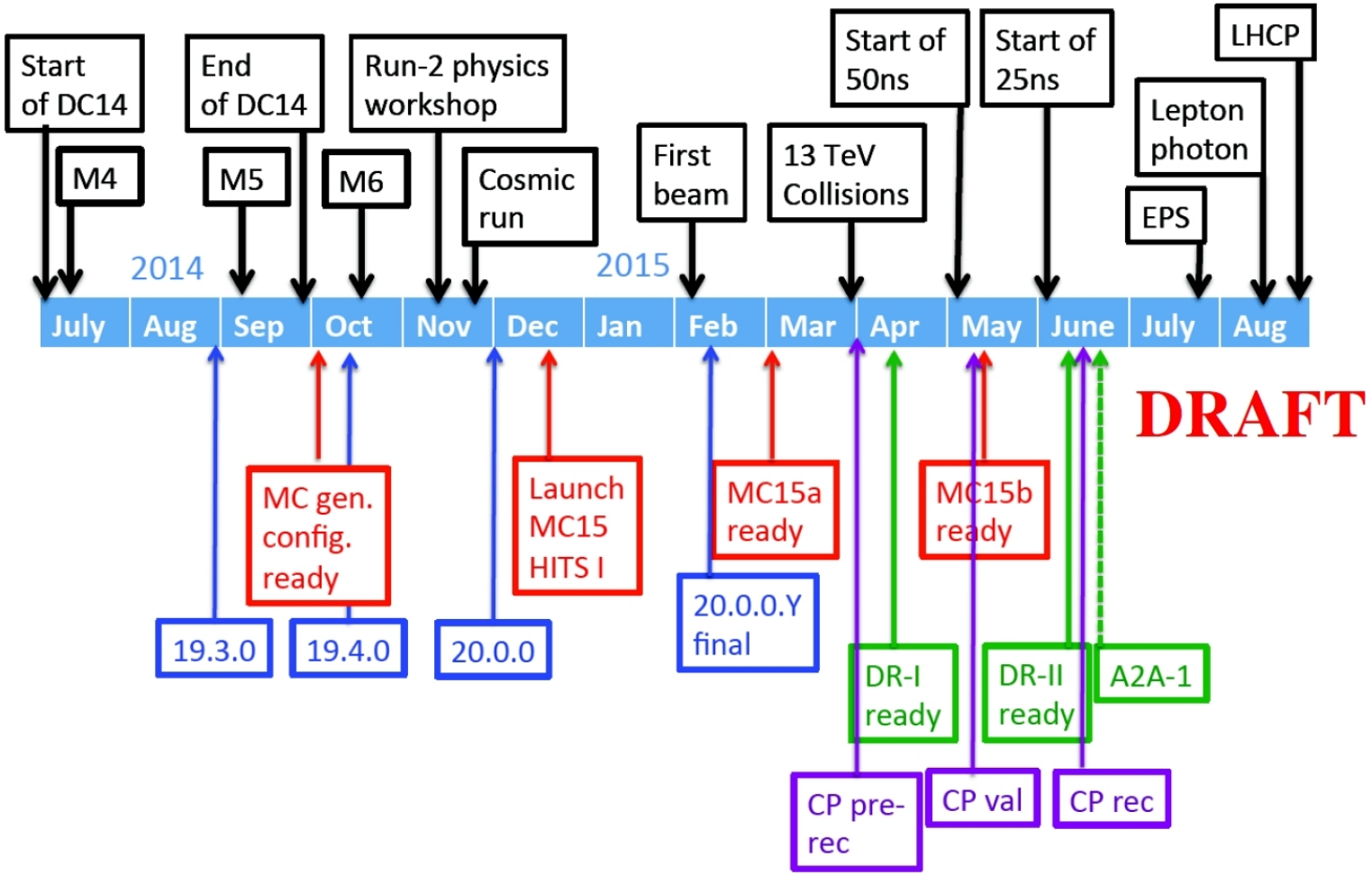
Software Schedule



- Rel 19.3.0: reserved for switch to Root6 & Cmake beginning of September 2014
  - If this is late, migration will be postponed by 1 year
- Rel 20.0.X: will be the frozen Tier0 release for mc15a and Tier0.

Current State of Conditions for Run-1 Data

Tags for HLT

twiki

Top-level tag	Tag creation	Tag description	Extra notes
COMCOND-HLTP-004-03	2012-04-23	Based on COMCOND-HLTP-004-02, without the updated JetCalib	In Use
COMCOND-HLTP-004-02	2012-03-28	Based on COMCOND-HLTP-004-01, updates to LAr, CALO, TILE and GLOBAL for 2012 data taking	
COMCOND-HLTP-004-01	2012-03-02	Based on COMCOND-HLTP-003-05, new global tag for HLT for 2012	

..

Tags for Express Stream Data Processing

twiki

Top-level tag	Tag creation	Tag description	Extra notes
COMCOND-ES1PA-006-06	2014-03-24	Based on COMCOND-ES1PA-006-05, new express stream tag with final LAR/CALO noise splitting	NEXTES
COMCOND-ES1PA-006-05	2012-10-09	Based on COMCOND-ES1PA-006-04, minimal updates for data taking after October MD3 week	CURRENTES
COMCOND-ES1PA-006-04	2012-04-26	Based on COMCOND-ES1PA-006-03, with updates for data taking after April TS	

..

Tags for Bulk Data Processing

twiki

Top-level tag	Tag creation	Tag description	Extra notes
COMCOND-BLKPA-RUN1-07	2014-07-24	Based on COMCOND-BLKPA-RUN1-06, new run-1 BULK tag	NEXT
COMCOND-BLKPA-RUN1-06	2014-03-04	Based on COMCOND-BLKPA-RUN1-05, new run-1 BULK tag	CURRENT
COMCOND-BLKPA-RUN1-05	2014-02-06	Based on COMCOND-BLKPA-RUN1-04, new run-1 BULK tag	
COMCOND-BLKPA-RUN1-04	2013-11-27	Based on COMCOND-BLKPA-RUN1-03, new run-1 BULK tag	

..

- COMCOND-BLKPA-RUN1-06 used for DC14 reprocessing

Current State of Conditions for Run-1 and Run-2 MC

Tags for Run-1 and Run-2 MC

Top-level tag	Tag creation	Tag description	Extra notes	Rel
OFLCOND-RUN12-SDR-14	2014-09-02	New RUN12 MC tag, based on OFLCOND-RUN12-SDR-11, tag for DC14 Run2 with IOVDEP tag for CALO LCW	best knowledge	
OFLCOND-RUN12-SDR-13	2014-08-12	New RUN12 MC tag, based on OFLCOND-RUN12-SDR-10, it is TEST tag for TRT using different volumes for Argon and Xenon-scenario 2	tag for TRT tests	19.1.1.1
OFLCOND-RUN12-SDR-12	2014-08-12	New RUN12 MC tag, based on OFLCOND-RUN12-SDR-10, it is TEST tag for TRT using different volumes for Argon and Xenon-scenario 1	tag for TRT tests	19.1.1.1
OFLCOND-RUN12-SDR-11	2014-08-12	New RUN12 MC tag, based on OFLCOND-RUN12-SDR-10, technical tag putting CALO noise info into LAR and TILE	technical tag	>=17.3.13.2, >=19.1.1.2
OFLCOND-RUN12-SDR-10	2014-08-07	New RUN12 MC tag, based on OFLCOND-RUN12-SDR-09, fix DC14 run 2 reco RTT failures JIRA:ATLASRECTS-907	best knowledge	
OFLCOND-RUN12-SDR-09	2014-08-01	New RUN12 MC tag, based on OFLCOND-RUN12-SDR-08, bug fix from PIXEL		
OFLCOND-RUN12-SDR-08	2014-07-14	New RUN12 MC tag, based on OFLCOND-RUN12-SDR-07, removal of ONL	technical tag	17.3.13, 19.1.1
OFLCOND-RUN12-SDR-07	2014-06-26	New RUN12 MC tag, based on OFLCOND-RUN12-SDR-06, bug fixes for PIXEL, TILE		17.3.13, 19.0.3.Y
OFLCOND-RUN12-SDR-06	2014-05-26	New RUN12 MC tag, based on OFLCOND-RUN12-SDR-05, ONL and OFL for CALO, MDT, DC14-Run2 MC digi+reco		

- latest tag during last S&C week: OFLCOND-RUN12-SDR-06
- most of the RUN2 conditions went into -SDR-06
- SDR-08 removed 60 CALO and 2 MDT ONL folders (cp to OFL before)
- SDR-09 contained a bug fix (spotted during rel 19 validation)
- SDR-10 needed to have a consistend before CALO $\rightarrow$ Tile/LAr-Noise splitting
- SDR-11 got the final CALO $\rightarrow$ Tile/LAr-Noise splitting
- SDR-14 included IOVDEP tag for LCW, for RUN1 and RUN2

prepared for TRT to study the effect of 2 different scenarios with different volumes running in Argon and Xenon:

- SDR-12 = SDR-10 + TrtStrawStatusHT-MC-run2-**scenario1**_00-00
- SDR-13 = SDR-10 + TrtStrawStatusHT-MC-run2-**scenario2**_00-00

Calo ONLINE → OFFLINE migration

since there were several software updates needed in order to pick up the conditions correctly from OFL folders

- dedicated software tags needed to be added to release 19
- appropriate branch tags were created for release 17
- OFLCOND-RUN12-SDR-08 and newer RUN12-SDR tags **only work** with the following release series:

rel 19.1.1 and newer	rel 17.3.13 and newer
MDT:	
MuonCnvExample-02-05-04	MuonCnvExample-02-04-09-01
CALO:	
CaloTools-00-09-37	CaloTools-00-09-10-05
CaloRec-03-00-18	CaloRec-02-12-93-02
CaloConditions-00-01-67	CaloConditions-00-01-67
CaloClusterCorrection-01-00-10	CaloClusterCorrection-00-07-73-01

Calo LAr TILE splitting

- separate noise information from CALO noise to TILE and LAr
- implementation plan:
  1. add new empty tags for LAr and Tile
  2. add corresponding software to the latest releases
  3. switch CALO tag to empty and fill the empty tags with life
- since Tile was filled with life to early we needed to tag SDR-10
- SDR-11 then contained the setup after splitting
- the corresponding software tags are available in $\geq$ 19.1.1.2

New Naming convention for global tags in CONDBR2

- COMP200:
  - COMCOND-HLTP-004-03
  - COMCOND-ES1PA-006-05
  - COMCOND-BLKPA-RUN1-06
- CONDBR2:
  - **CONDBR2**-HLTP-**2014**-00
  - **CONDBR2**-ES1PA-**2014**-00
  - **CONDBR2**-BLKPA-**2014**-00

where 2014 - is the year of creation of the new global tag.
and 00 - is the initial global tag, will be incremented as before

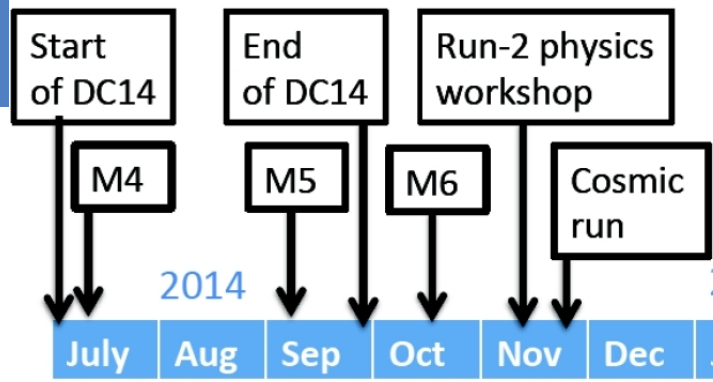
- CONDBR2 global tags have been used recently in M5 (as described by Andrea)
- the corresponding twiki entries do/will appear here

Tags for RUN-2 HLT

Top-level tag	Tag creation	Tag description	Extra notes
CONDBR2-HLTP-2014-00	2014-XX-XX	Based on COMCOND-HLTP-004-03, initial run-2 HLT tag	CURRENT (M5)

...

Status of CONDBR2 (follow up from last S&C Meeting)



- new run-2 global condition tags were based on run-1 conditions:
  - conditions for first M weeks in COMP200
  - conditions for run-2 data since M5 in new CONDBR2 (NOW)
- timescale for run-2 conditions for data to be ready in September
  - final full-dress rehearsal December 2014 twiki
- HLT tag was used for M5
- Recontruction with ES1PA, BLKPA had some problems
  - ATLASRECTS-1019, ATLASRECTS-1033, ATLASRECTS-1040, ATLASRECTS-1041
  - conditions data was cleaned up following the folder classification (twiki)
  - software needs to be adjusted accordingly
- after first usage of CONDBR2 there are several points to follow up
  - follow up on open issues concerning software conditions interactions
  - when this is done: validate overlapping runs reconstructed with COMP200 vs CONDBR2 (physics validation) ATLPHYSVAL-215

ATLAS Data Quality Operation Scheme