Muon Spectrometer Detector Description
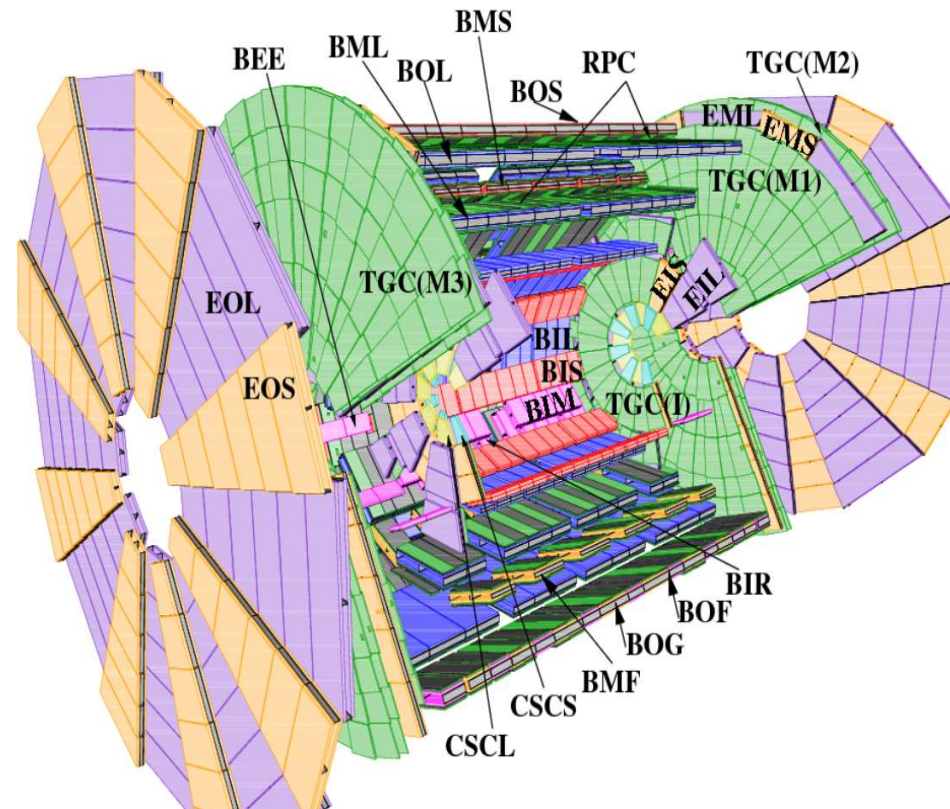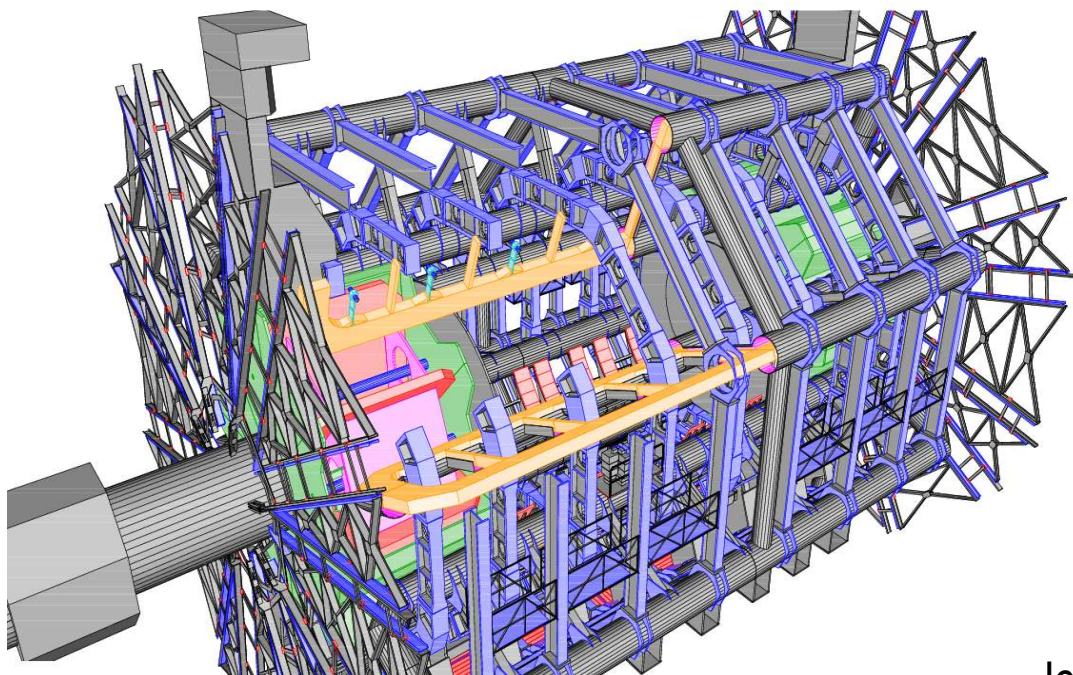
Outline:
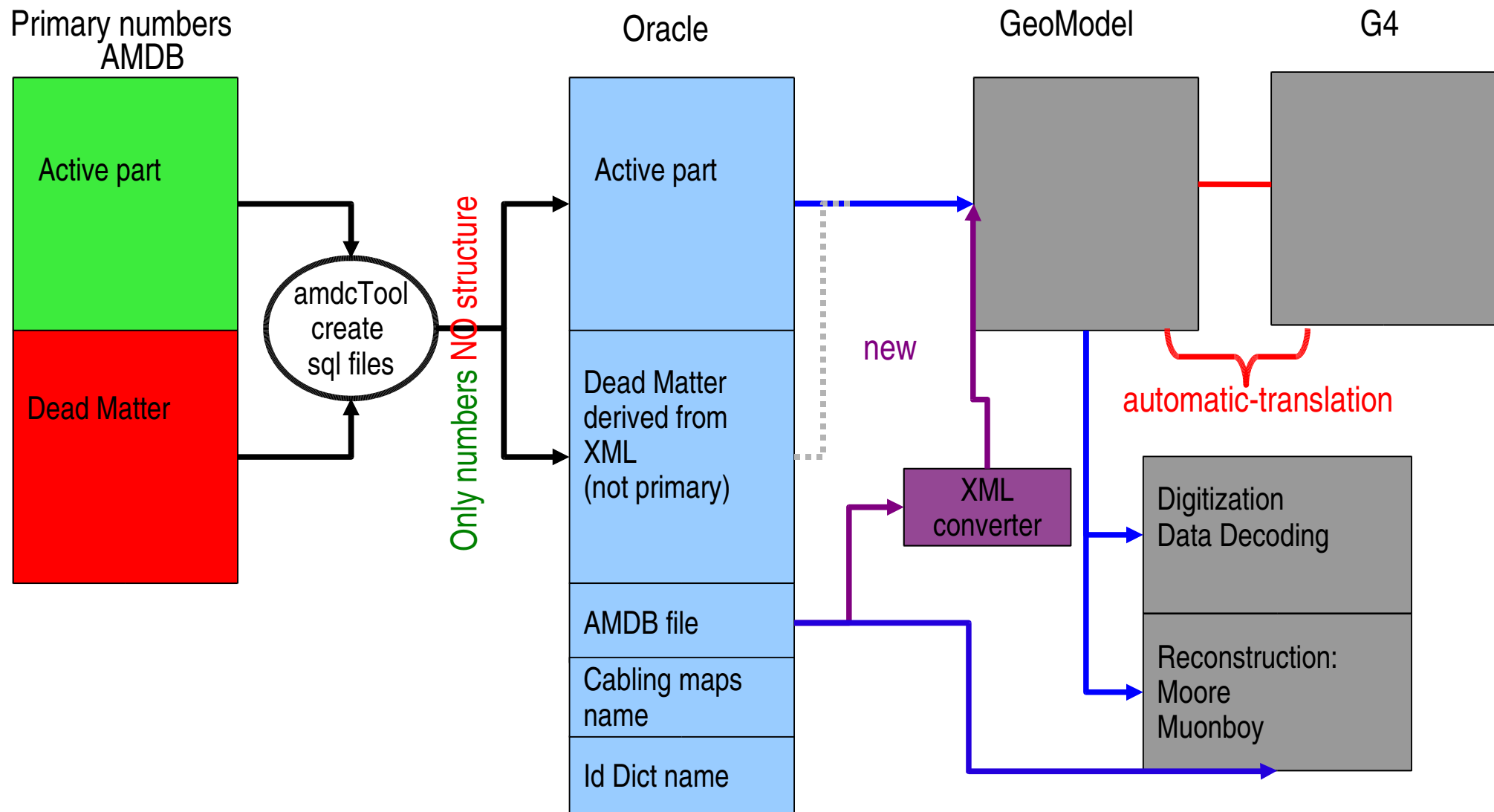- Present situation
  - Dead Matter
  - Validation
  - GeoModel..

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Detector description parameters chain: present situation

Primary numbers AMDB

| Active part |
| Dead Matter |

amdcTool create sql files

Only numbers NO structure

Oracle

| Active part |
| Dead Matter derived from XML (not primary) |
| AMDB file |
| Cabling maps name |
| Id Dict name |

new

XML converter

GeoModel

G4

automatic-translation

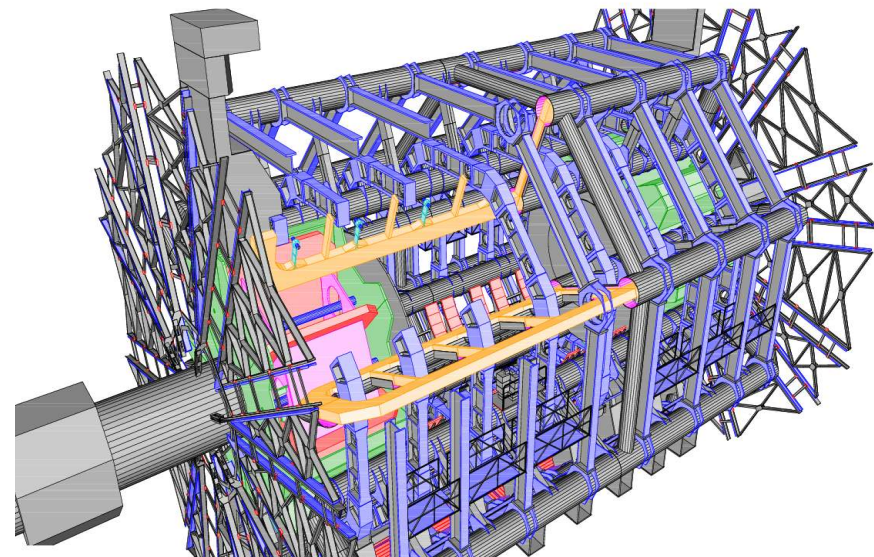Digitization Data Decoding

Reconstruction: Moore Muonboy

Volume description

- Active Part = GeoModel/G4 (<2microns)
- Dead matter = GeoModel/G4 (with the new XML converter)

2

Update primary numbers
dead matter part

- amdb_simrec.r.03.03:

    - New feet

    - EEL update

    - Cabling maps name

- Missing

    - Services ...

- Validation:

    - on going in forward region

        - 10GeV,100GeV

        - mu+/mu-

        - Eta [1.0,2.7]

        - Phi [0,45]
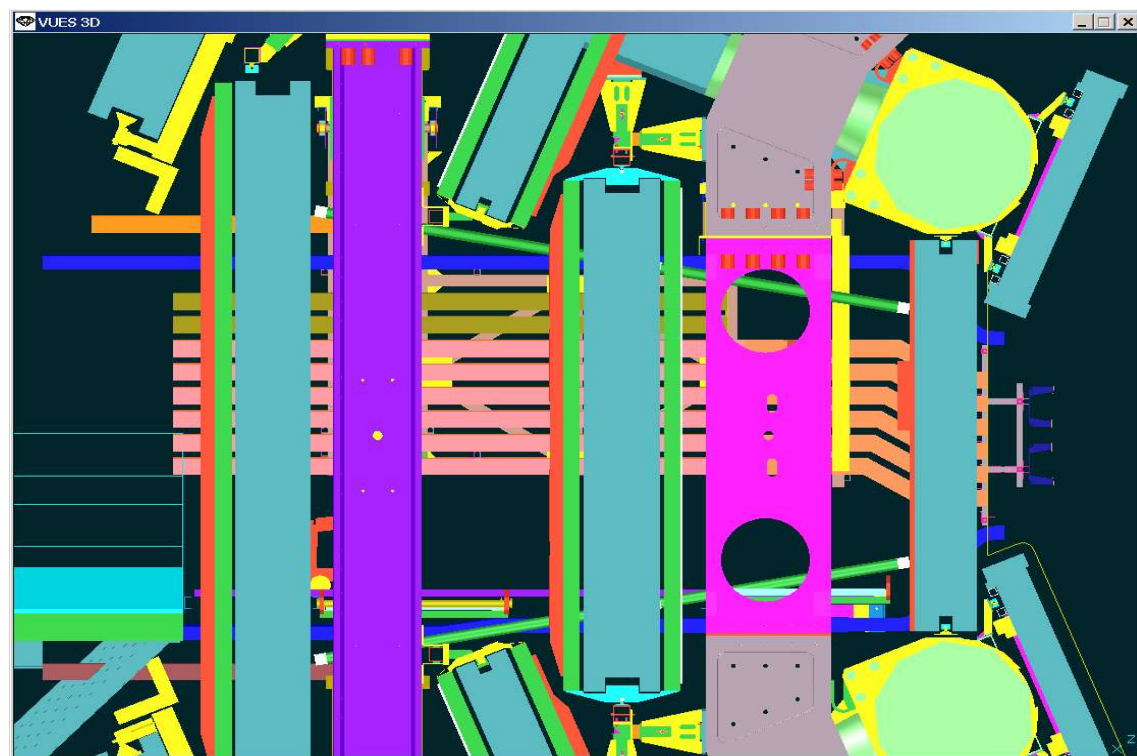
MuonGeoModel specific issues

- separating readout geometry (Manager+XxxReadoutElement+MuonStations[with alignable transforms] *used in reconstruction*) from bulk of GeoModel infrastructure

  - no show-stoppers; 14.4.0 is a candidate for such migration

  - at the same time: cleanup and make as uniform as possible (among technologies) reconstruction interfaces

- integrating recent improvements (cutout implementation) in production releases

  - in production: cutouts in MDT of BOG (feet region)

  - in 14.4.0 nightly builds: cutouts in all MDT(a few to fix in EC chambers)/RPC/TGC

  - validation issues: need to understand clearly the differences in the geometry model implemented with respect to previous version of the software for the same layout (a very few not yet fully understood)

- memory: 50 MB or raw geometry (for simulation) [a fraction can be disabled in reco.]+ 80 MB for common-tracking interfaces [fully disabled in simulation]

  - too much, why not moving in the TrkGeometry to the use of "lighter" representations of HepTransform3D ?

MuonGeoModel (ReadoutGeometry) and EDM

- Offline Data collections vs XxxReadoutElement granularity:

  - MDT data coll. (= MDT station) contains data in typically 2 MdtReadoutElements (one per multilayer)

  - RPC data collections (= plane of RPC at ~same radius in a muon station) groups data located in typically 2 RpcReadoutElements

  - CSC data collections = CscReadoutElements (in the staged-for-ever scenario)

  - TGC data collections = TgcReadoutElements

  - problem: *in a loop over the collection the detector element has to be retrieved for each datum*

- Proposal, investigated and *to be resumed*

  - new extra layer of ReadoutGeometry: XxxDetectorElement (with granularity a la EDM)

    - XxxDetectorElement holding pointers to relevant XxxReadoutElements (they keep the entire functionality)

  - tried and tested for performance for Mdt (profiling with callgrind)

  - gain in the CPU timing for a loop over PRD in a MDT collection using the new schema: 50 %

    - *how much this will impact on overall reco ?*

    - see http://indico.cern.ch/conferenceDisplay.py?confId=28777 for more details

MuonGeoModel and Alignment data

- Alignment parameters:

  - implementation of alignment parameters for a muon station (rotation angles + shift + order of transforms) coherent between optical alignment systems (barrel and end-cap) and MuonGeoModel.

  - reconstruction in mis-aligned geometry layouts widely exercised since CSC

  - little exercise of the use of alignment constants as condition data: i.e. changing constants during the run processing

    - FDR2b has been the best performance test of the system: MuonGeoModel reading from COOL alignment data for the barrel only, feeding to reconstruction algorithms (both Moore and Muonboy – via different mechanisms)

    - for the FDR2c multi-folder access in COOL ready: barrel optical constant + 2 sets of constants for EC but a lurking bug showed up (fixed).... need extensive exercise / stress tests !

- MDT deformation parameters:

  - implementation of main effects (leaving tube straight) in place

  - starting checking implementation against ARAMYS (optical al. system in the EC)

  - access to deformation parameters in COOL to be finalised (no show-stoppers foreseen)