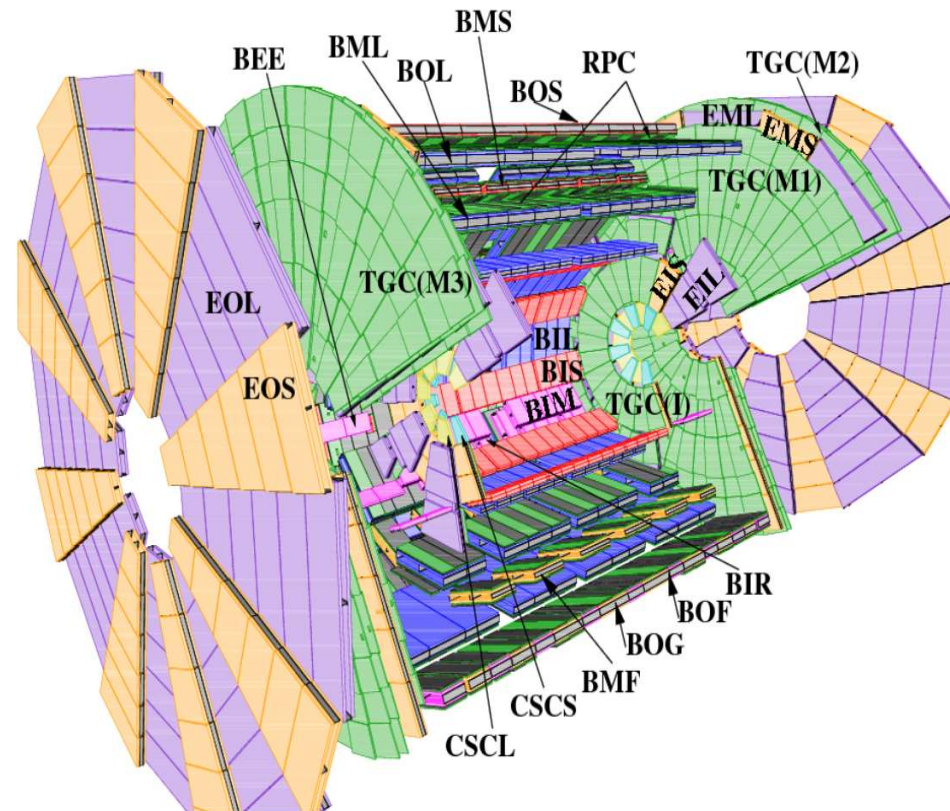
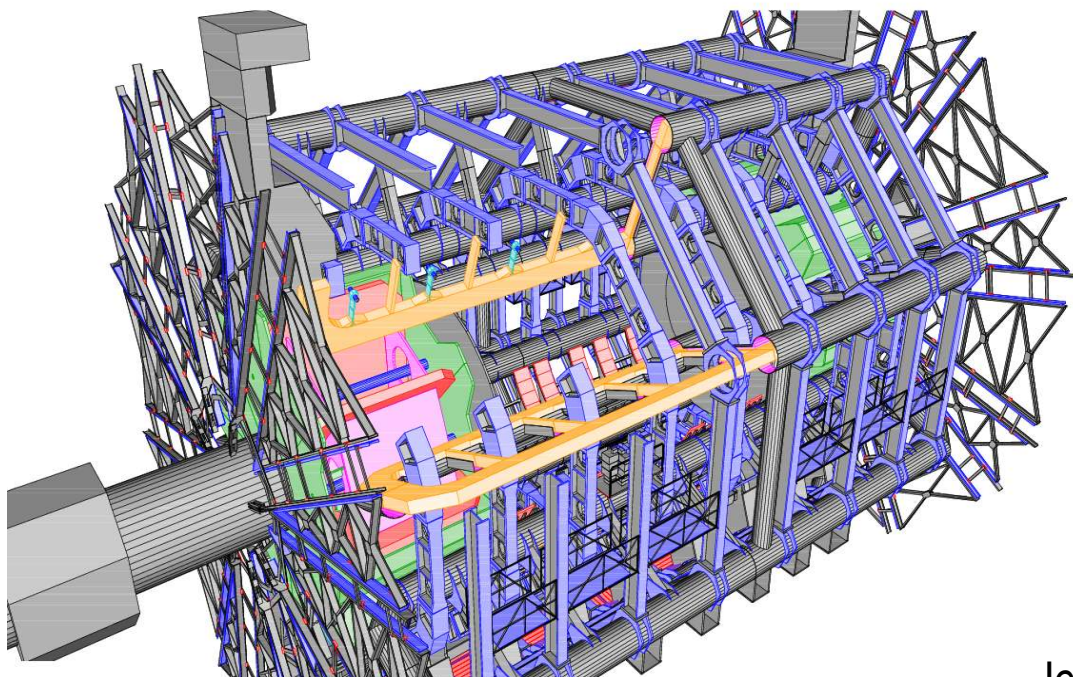


Muon Spectrometer Detector Description

Outline:

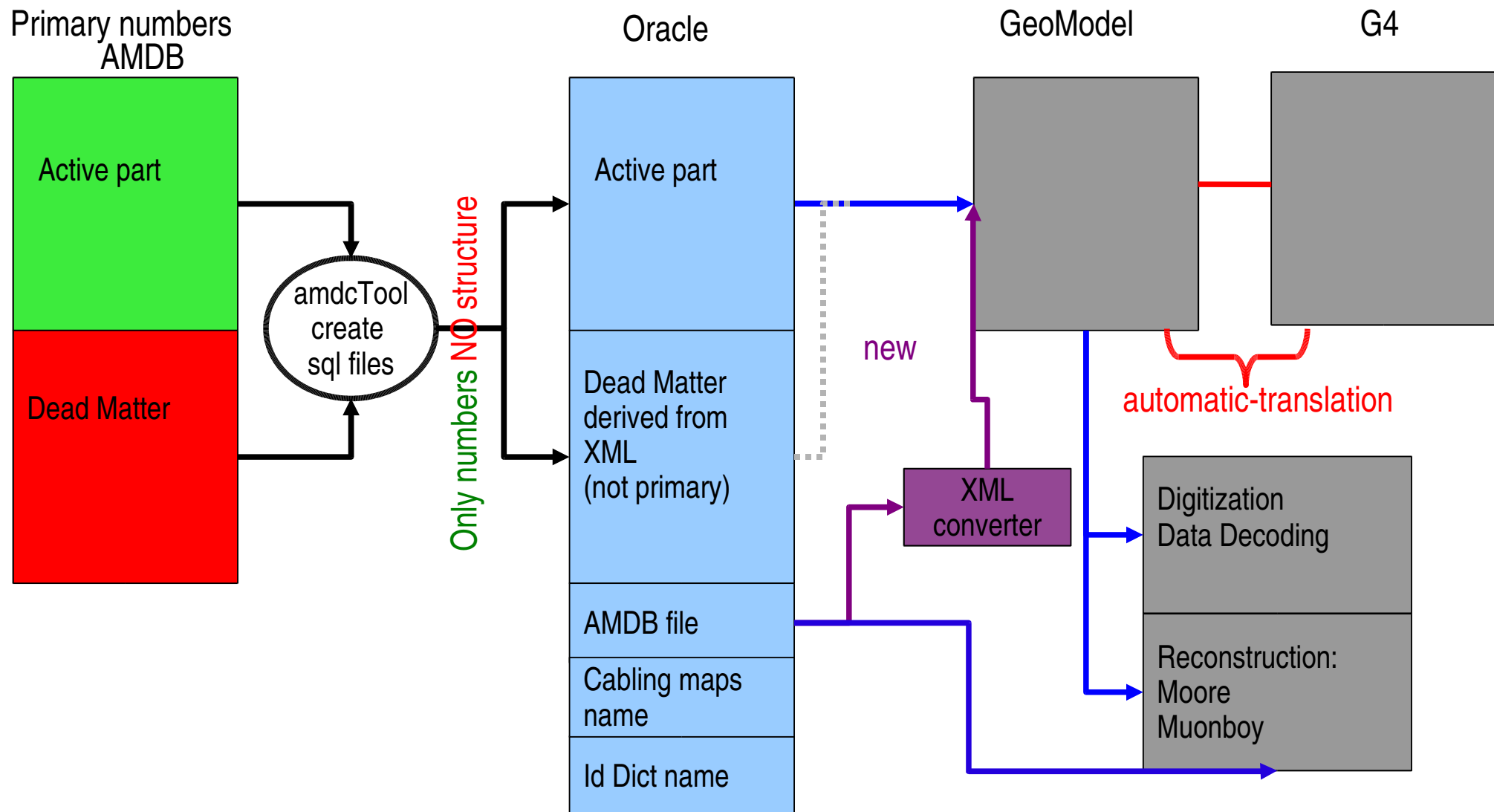
- Present situation
- Dead Matter
- Validation
- GeoModel..



30/09/08

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Wright

Detector description parameters chain: present situation

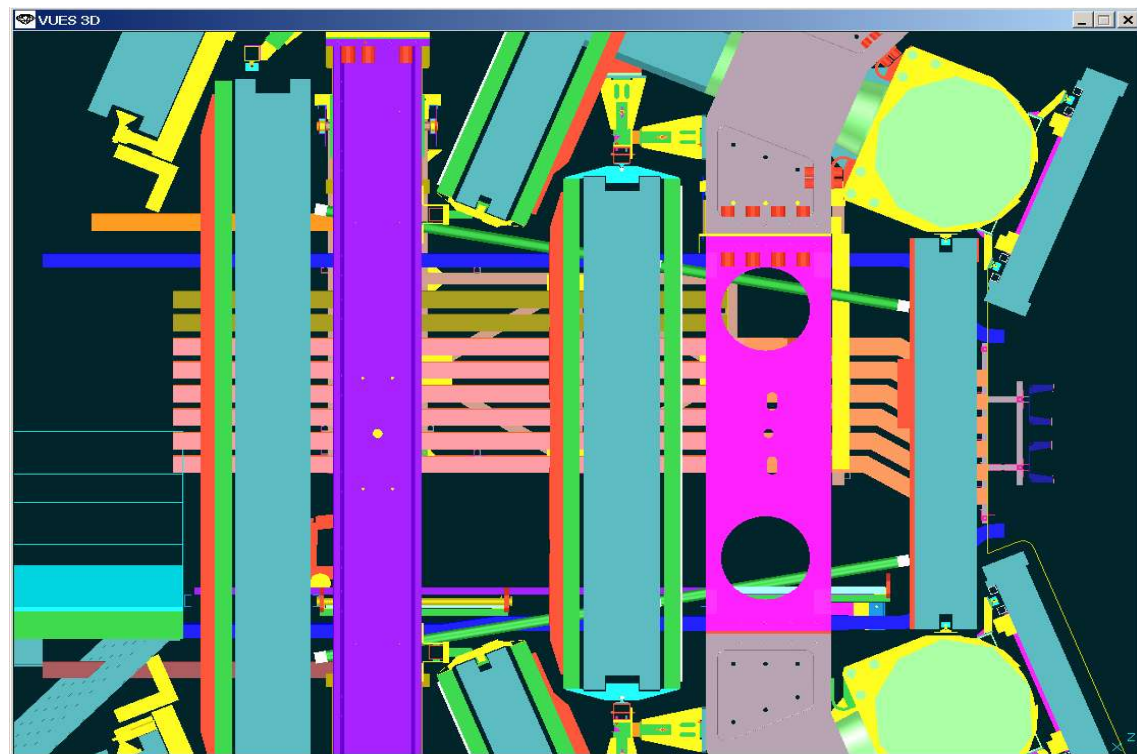
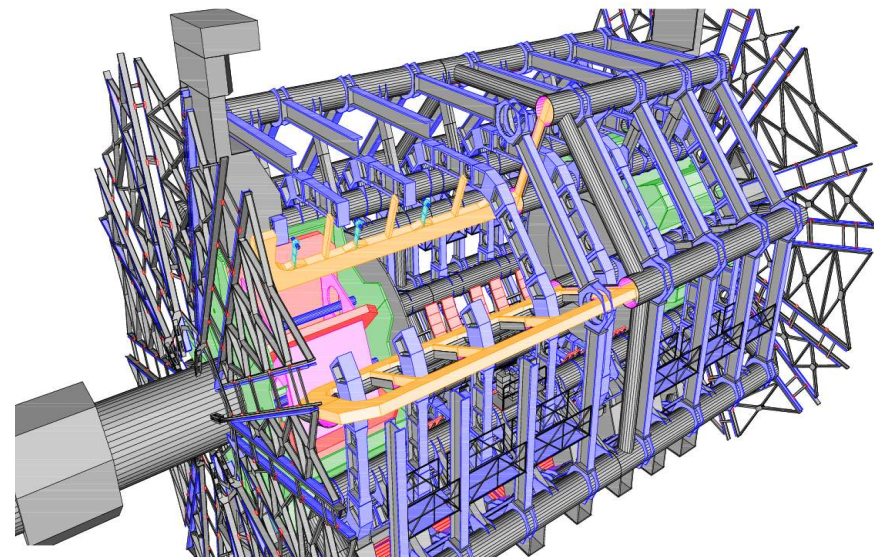


Volume description

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

Update primary numbers dead matter part

- amdb_simrec.r.03.03:
 - New feet
 - EEL update
 - Cabling maps name
- Missing
 - Services
 - Tomograph
- Validation:
 - on going in forward region
 - 10GeV,100GeV
 - μ^+/μ^-
 - 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)
- Missing strategy for implementation of tomograph data