



Geant4 with External Geometry Model

Just the ideas ...

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Motivation

Why to marry Geant4 with Root?

- Root geometrical modeller has been highly optimised for performance
 - *Let's see what it gives in the context of Geant4*
- Root modeller has some features not available in Geant4
 - *Marriage with Geant4 will make them available here, too*
- Root supports G3 features that are problematic to be put in Geant4 - "MANY" positions
 - *ALICE has still one detector which geometry is not possible to be converted via G3toG4 due to too many MANY*

First ideas

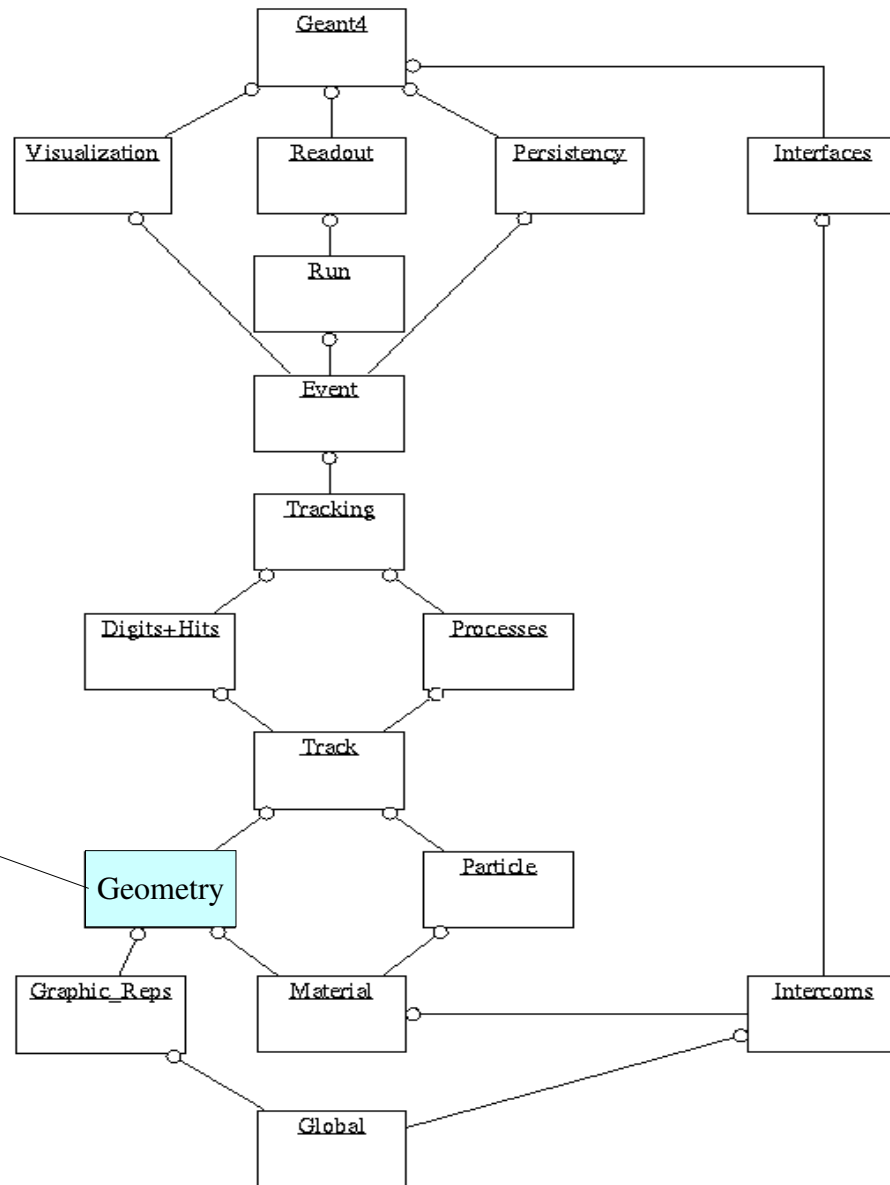
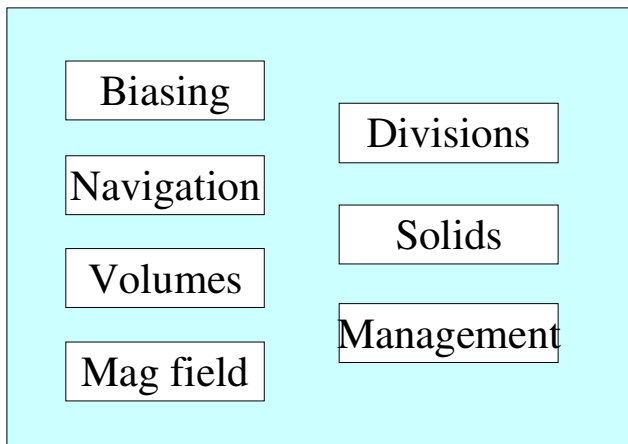
- Already discussed (a very little) in ALICE
 - Start from the key class *G4Navigator*
 - Override it with some *TGeoG4Navigator*
 - Wrapping of some *G4* geometry classes will be necessary
- “Extreme” programming approach
 - Progressing rapidly at the beginning
 - As not much discussions and agreements needed
 - But leading to problems in a long time scale
 - Strong dependence on the concrete *Geant4* classes would require adapting code for each change here

Objective

- NOT to interface Geant4 to Root geometry model
- BUT to interface Geant4 to an external geometry model
 - Identifying the requirements of such interface will then guide the implementation of the interface for Root modeller

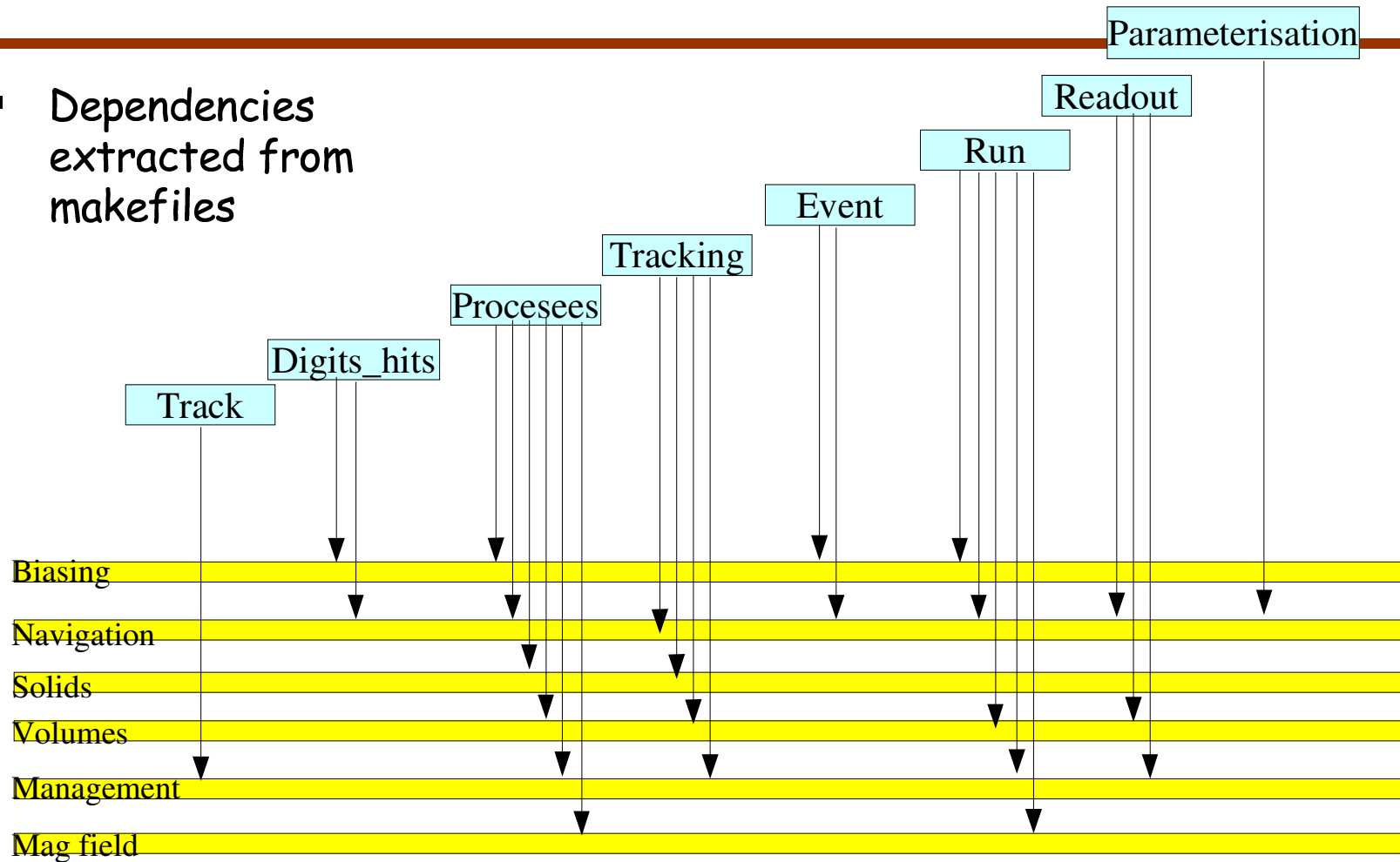
Geant4 Class Categories

- What would it mean to replace the geometry box with something else?

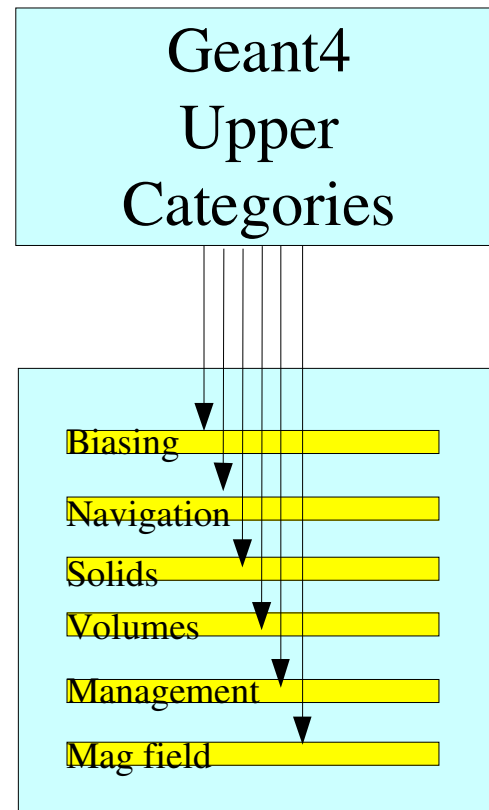


Use of Geometry

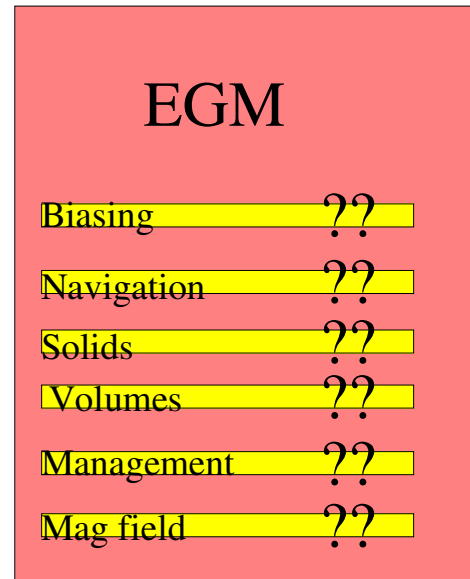
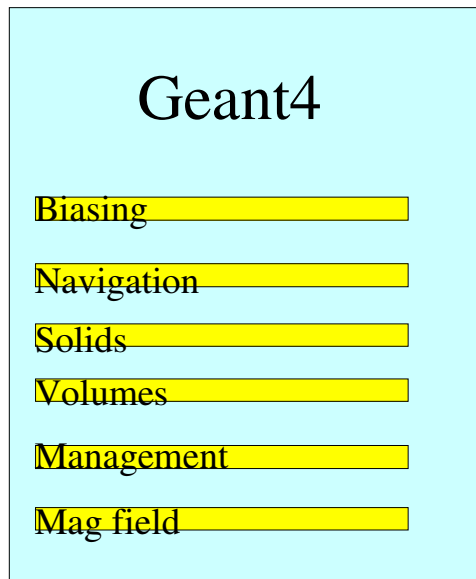
- Dependencies extracted from makefiles



Use of geometry

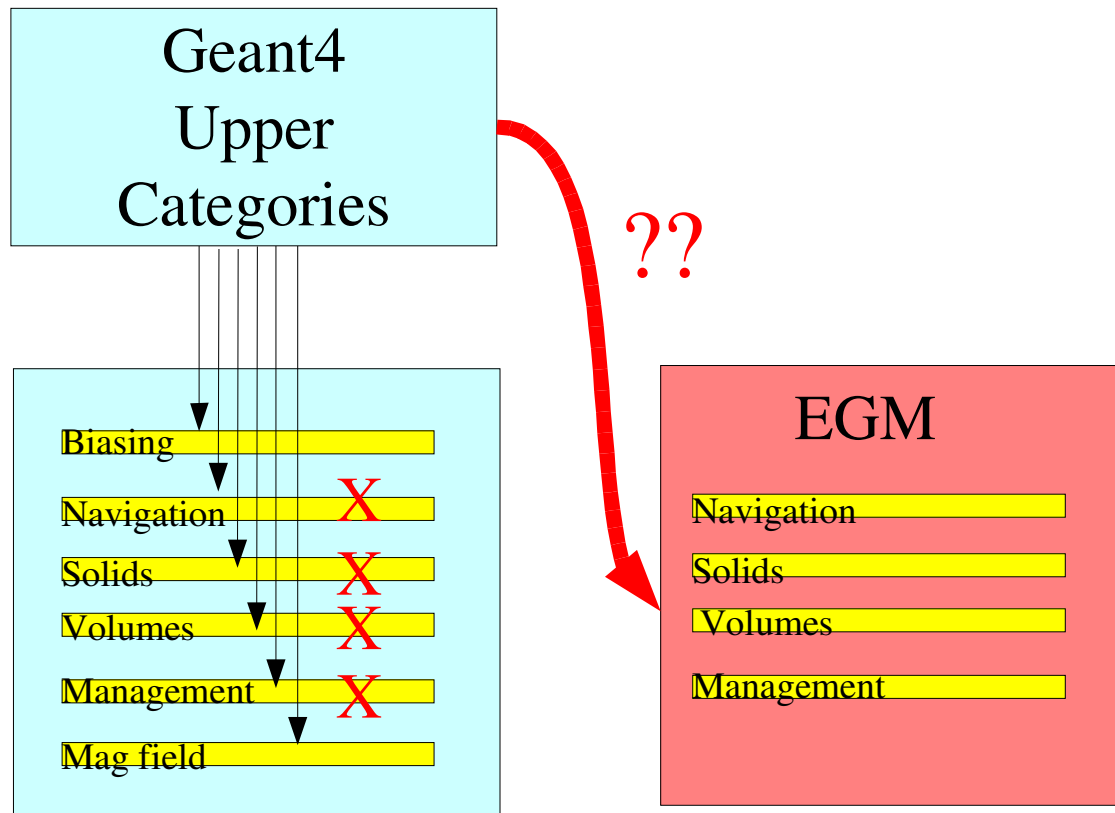


External Geometry Model

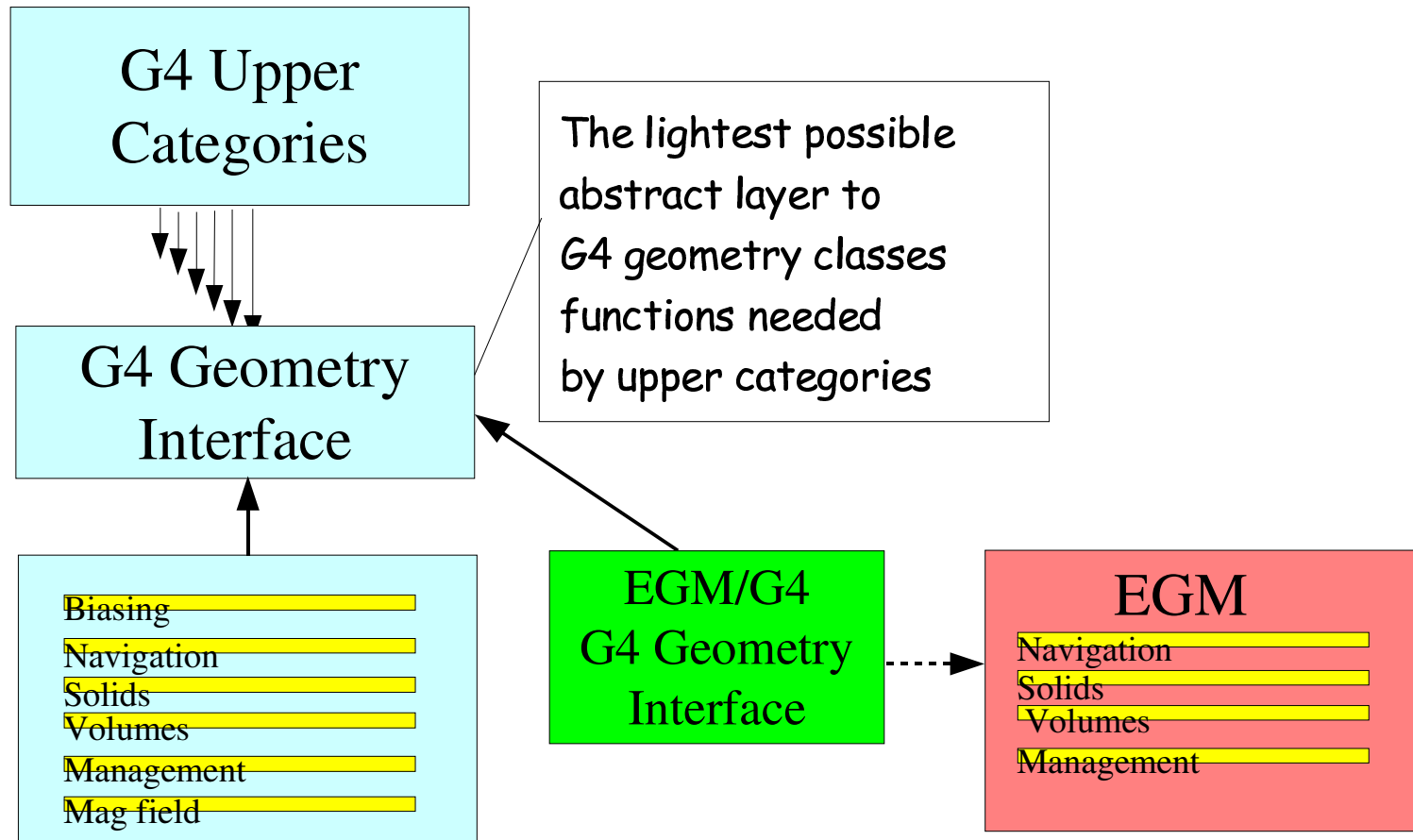


- Functions of which categories can be covered by EGM ?
- In case of Root - probably all except for Mag field, Biasing (?)

External Geometry Model



Geant4 Geometry Interface



Possible Solution

- Steps

- 1) Agreement on the interface approach (as the geometry interface will have to go to Geant4)
- 2) Revision of use of geometry in the upper categories
- 3) Definition of the Geant4 geometry interface + refactoring of Geant4 to use of the interface
- 4) Implementation of the interface for Root geometry model