

# Status of Detector Description

SPD Software&Computing meeting

# SPD detector description in SPDRoot

# SPDRoot detector description

- The detector description in SPDRoot is located in the code of framework.
- The geometry description is completely parameterized. The parameters for the code that generates the geometry are located in **spdroot/common** directory. The files format here is unfriendly for new users.
- The main part of the geometry description is contained in **spdroot/spdgeometry** and **spdroot/passive** directories.
- The description of a part of the detectors is right in head directory. For example: **spdroot/farish**.
- Geometry version control is performed at Git level.

# SPDRoot detector description

## Advantages:

- SPDRoot allows the user to quickly change the geometry of the detector.

## Disadvantages:

- The user needs to recompile the entire framework to change the geometry parameters.
- Several versions of the same subsystem' geometry are contained in directories.

# SPD detector description in GeoModel

# Current status

- The description of the detector is a C++ project.
- It contains several classes:
  - SPDMaterialBuilder - a class in which materials are defined
  - SPDMaterialList - a singleton class is responsible for accessing materials.
  - The geometry is described in separate classes.
- Currently, 3 subsystems have been described in full and 1 partially.
- Access to the detector description is carried out through working with the db file.

# Sensitive detector in Geant4 (now)

adding a flag «\_sens» + «\_type of sensitive volume» to GeoModel logical volume name

creating of Geant4 geometry from GeoModel geometry

getting logical volume store, filtering volumes

adding selected volumes into sensitive detectors

# Sensitive detector in Geant4 (plan)

**writing sensitive volumes names into external file**

**creating of Geant4 geometry from GeoModel geometry**

**getting from logical volume store volumes with names from external file**

**adding selected volumes into sensitive detectors**



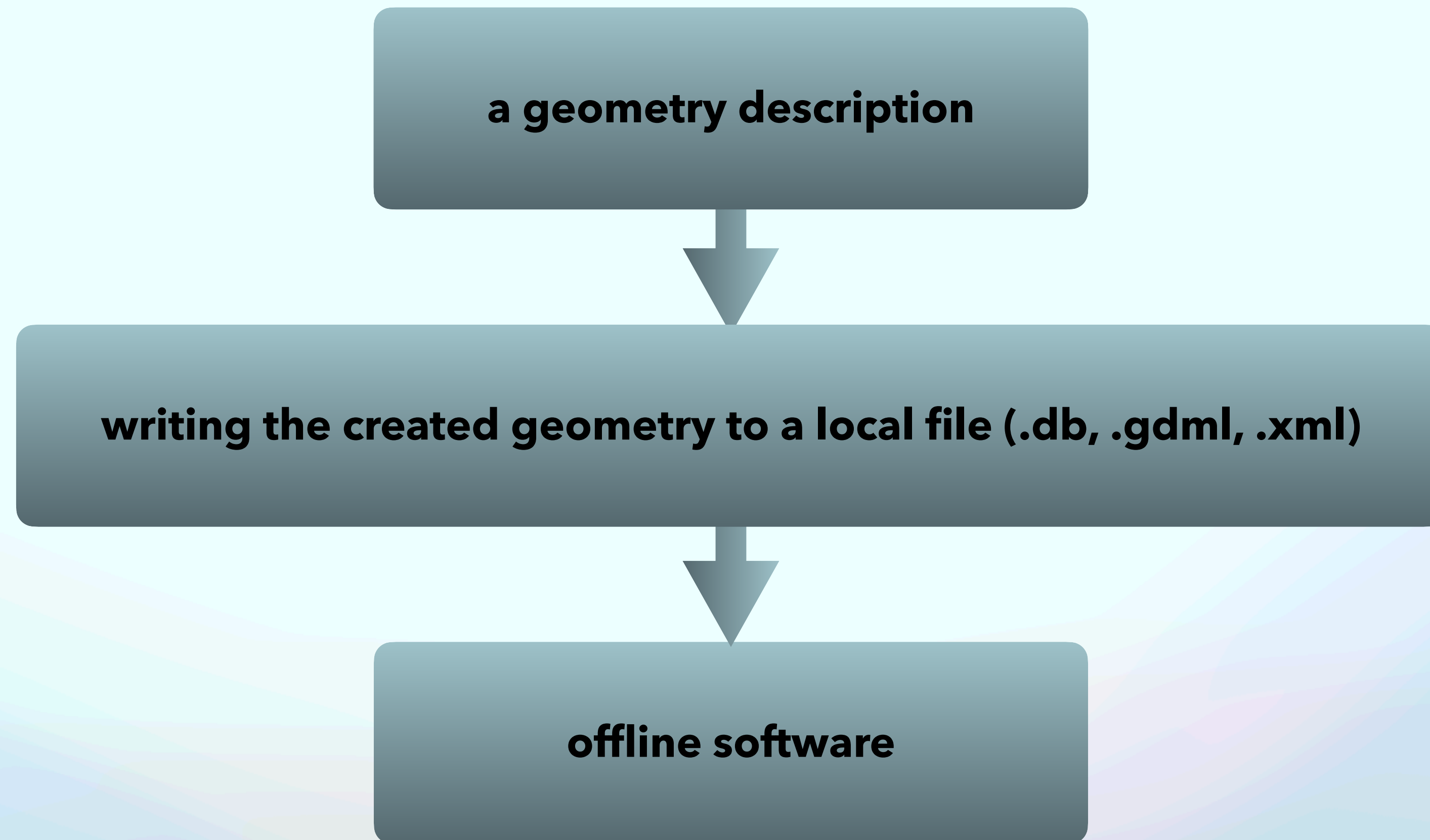
# SAMPO and GeoModel

# Status integration

- **GeoModelSvc** - provide access to the db file, build the GeoModel geometry
- **G4GeoModelTool** - build the Geant4 geometry from GeoModel geometry
- **G4DetectorConstructionSvc** - declaration of sensitive volumes
  
- **G4FieldTool** - need to be developed
- Usage of detector description in reconstruction?

# Geometry versioning

# The mechanism of interaction with GeoModel



# Geometry versioning

- The detector description will be stored in a separate directory. SAMPO just needs the path and the db files' name.
- The version of the detector description will be coded into the name of the db file. **Naming convention is required.**
- **Is it possible to extract only one subsystem without loading the entire detector description into memory?**

No, neither the GeoModel DB manager nor the conversion mechanism of GeoModel data to a Geant4 geometry allows us to do this.

**Solution:** after each detector description edit, generate a database with a description of the entire detector and generate separate databases with a description of the subsystems.

# Next steps

- Update sensitive detector mechanism;
- Range system inner structure description;
- Usage detector description in reconstruction.

Thank you for your attention!