CAD GDML

Http://cad-gdml.in2p3.fr

To provide an opensource CAD software with GDML support
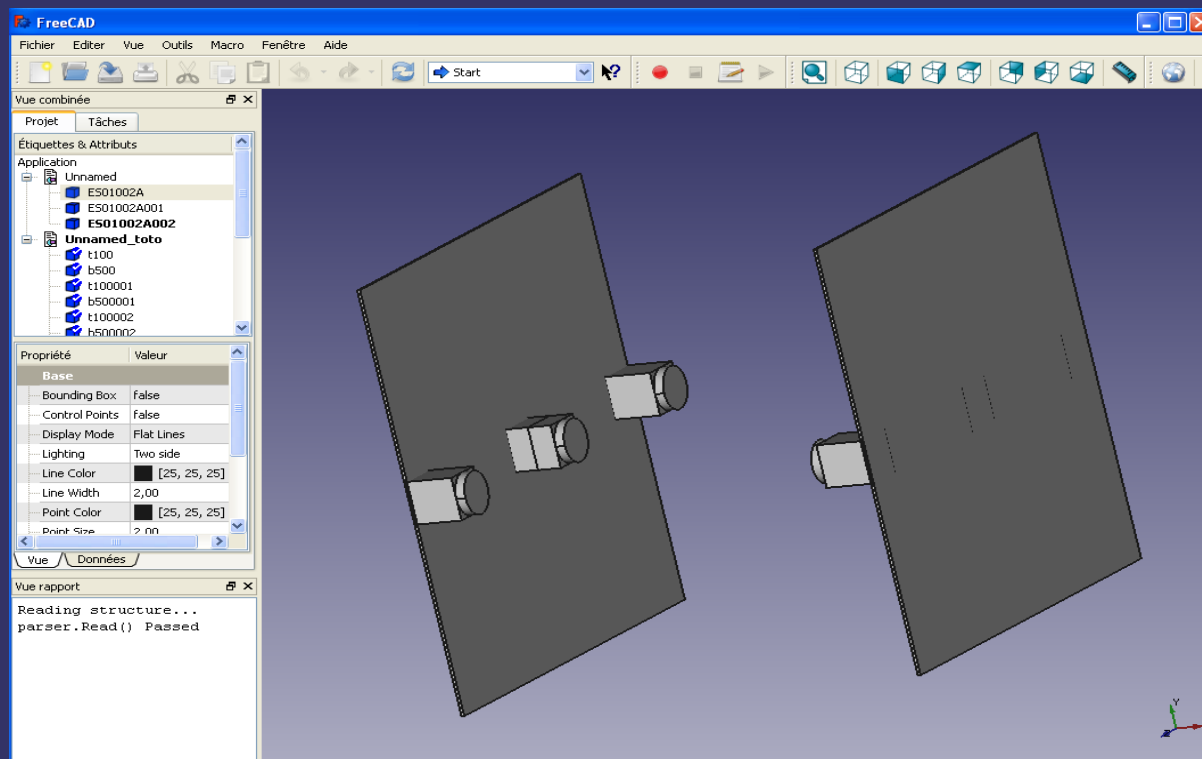
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SUMMARY

- ➲ FreeCAD Presentation
- ➲ A way to develop FreeCAD module
- ➲ Code structure and style
- ➲ Core interface
- ➲ Current development status
- ➲ Possible steps and scheduling
- ➲ Sustainability

FreeCAD Presentation

- Open source CAD software
- Possibility to patch the official release
- Languages: **C++** and Python
- Librairies: OpenCascade, coin3D, Qt, **XercesC**
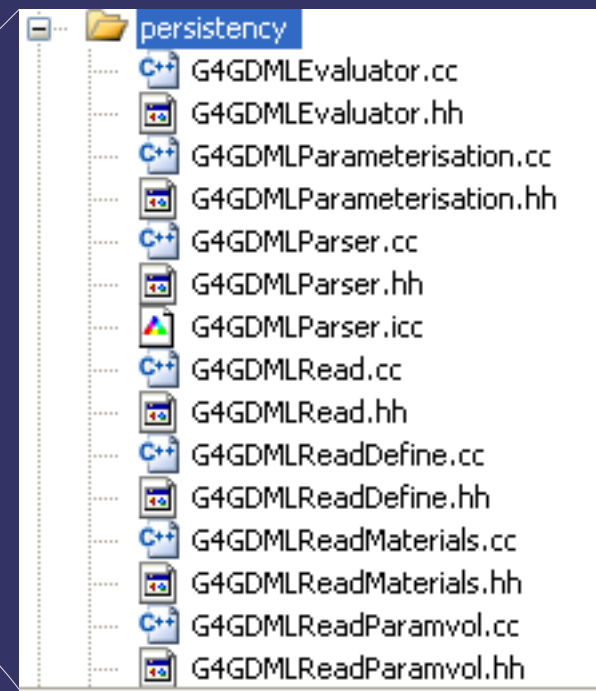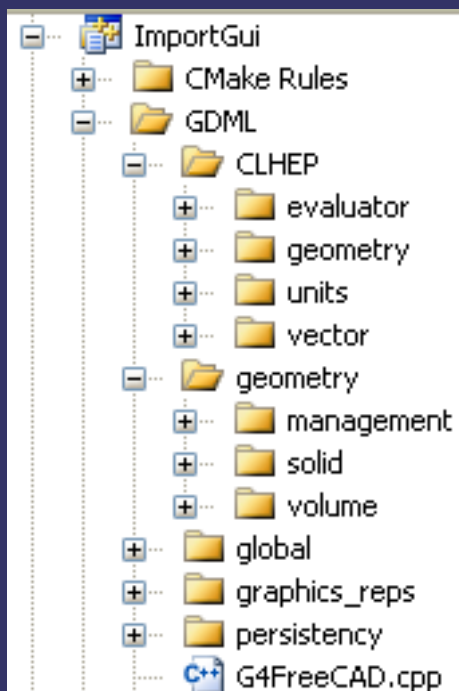- Operating systems: Windows, Linux, Mac OSX

A way to develop FreeCAD module

➲ My environment: Windows, VC++2008, CMAKE...
➲ To create a new module or to **develop the existing Import module**

```
#include "../PreCompiled.h"
#include <XXX/YYY.h>
XXX=Base, App, Gui...
```

➲ To send patches (sf.net allow only all or no-thing rights)

Code structure and style

⇒To make the development easier for the Geant4 community, I copy/paste the usefull (from this interface point of view) Geant4 files into FreeCAD code keeping the same directory tree. Then, I commented useless code.

Core interface

➲G4FreeCAD class rôle is to interface used Geant4 code and FreeCAD

➲G4FreeCAD object reads recursivly geometry parsed from G4GDMLParser and converts it into OpenCascade shapes (BrepLib.hxx, BrepPrimAPI_Make...)

➲FreeCAD integrates those shapes inside his Document/View architecture.

Current development status

➲ Read boxes and full tubes solids from GDML files
➲ Read placement and rotation (transformation)
➲ Draw those solids inside view and tree
➲ Crash for all other shapes (all other tags...)

➲ Demonstration...

Possible steps and scheduling

coeff :

- Verbosity implementation — 0.5
- Prevent unrecognized solids — 0.5
- Boolean solids implementation — 1
- Exportation: No hierarchy and generic material — 2
- Modelization under FreeCAD (add boxes and full tubes) — 1
- Write a developer documentation. — 0.5
- STEP, STL or PLY to GDML conversion (tessellated solids only). — 3
- Hierarchy and material implementation — 6
- Full GEANT4 geometry implementation... — ??

Sustainability

Still missing a user friendly interface to import in Geant4 a CAD geometry file keeping alive the volume's hierarchy

➲ Proposal to use FreeCAD
➲ Evaluation of this solution by G4 collaboration expert's before going on
➲ If positive
=>Request to be a G4 project with some support of G4 (part of a G4 Working Group?)
=>Call for contribution in G4 user community