

Geant4 CMake System 9.5 to 9.6

September 2011 —————→ *Summer 2012*

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Timetable for 9.5

- End-of-Life of Configure/Make for Users.
- Deprecate Configure/Make for Developers.
- Only CMake developed from now on.



Readiness for Release



```
Terminal — ccmake
Page 1 of 1
CMAKE_BUILD_TYPE Release
CMAKE_INSTALL_PREFIX /usr/local
CMAKE_OSX_ARCHITECTURES
CMAKE_OSX_DEPLOYMENT_TARGET
CMAKE_OSX_SYSROOT /Developer/SDKs/MacOSX10.6.sdk
GEANT4_BUILD_EXAMPLES OFF
GEANT4_ENABLE_TESTING OFF
GEANT4_INSTALL_DATA OFF
GEANT4_INSTALL_EXAMPLES OFF
GEANT4_USE_G3TOG4 OFF
GEANT4_USE_GDML ON
GEANT4_USE_QT ON
GEANT4_USE_RAYTRACER_X11 OFF
GEANT4_USE_SYSTEM_CLHEP OFF
QT_QMAKE_EXECUTABLE /usr/bin/qmake

CMAKE_BUILD_TYPE: Choose the type of build, options are: None Release TestReleas
Press [enter] to edit option CMake Version 2.8.4
Press [c] to configure Press [g] to generate and exit
Press [h] for help Press [q] to quit without generating
Press [t] to toggle advanced mode (Currently Off)
```

Whither Windows?



VS2010 build needs full shakedown.

Impact on Configure/Make deprecation.

Remaining Support Items



OpenInventor



Geant4Py

Please let us know of any further items!

Documentation



Installing from Source/Binary.



Develop Geant4 using CMake.
What do you need?



How to Build Applications.

What Tools to Support?



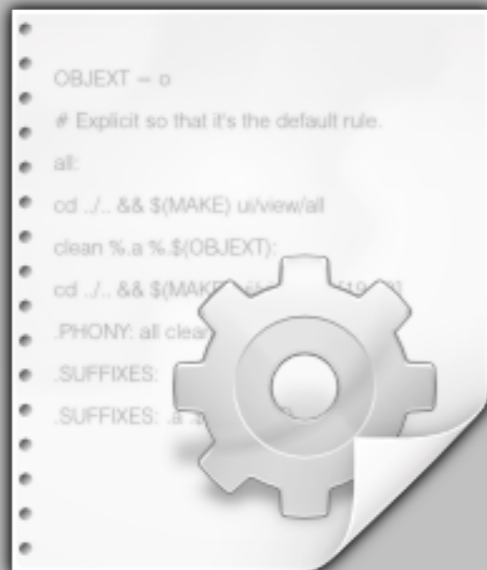
Makefile



Xcode



Tools for App Developers



Makefile

Write Makefile
«interface»
binmake.gmk



CMake

Write CMakeLists.txt
«interface»
Geant4Config.cmake



geant4-config

Write Buildscript
«interface»
geant4-config

«SourceTree»

Geant4 Sources

```
+ - CMakeLists.txt
+ - source/
  + - global/
  + - ...
```

cmake <ARGS> <DIR>

«BuildTree(s)»

DebugBuild

```
+ - Makefile
+ - Geant4Config.cmake
+ - outputs/
  + - libG4global.so
```

ReleaseBuild

```
+ - Makefile
+ - Geant4Config.cmake
+ - outputs/
  + - libG4global.so
```

«InstallTree»

/usr/local

```
+ - include/
  | + - Geant4/
+ - lib/
  + - libG4global.so
  + - Geant4-9.5.0/
    + - Geant4Config.cmake
```

make install

CMakeLists.txt

```
# - My Geant4 Application CMakeLists.txt
cmake_minimum_required(VERSION 2.6 FATAL_ERROR)
project(MyGeant4App)

find_package(Geant4 9.5.0 REQUIRED gdm1)
include(${Geant4_USE_FILE})

set(MYAPP_SOURCES src/MyDetector.cc ...)

include_directories(${PROJECT_SOURCE_DIR}/include)
add_executable(MyApp myapp.cc ${MYAPP_SOURCES})
target_link_libraries(MyApp ${Geant4_LIBRARIES})
```


My Application

```
+-- CMakeLists.txt
+-- include/
|   +- MyDetector.hh
+-- src/
    +- MyDetector.cc
```

cmake <ARGS> <DIR>

Geant4Debug

```
+-- Makefile
+-- Geant4Config.cmake
+-- outputs/
    +- libG4Global.so
```

BuildYourApp

```
+-- Makefile
+-- MyApp.exe
```

«use»

<ARGS>
Geant4_DIR

/usr/local

```
+-- include/
|   +- Geant4/
+-- lib/
    +- libG4Global.so
    +- Geant4-9.5.0/
        +- Geant4Config.cmake
```

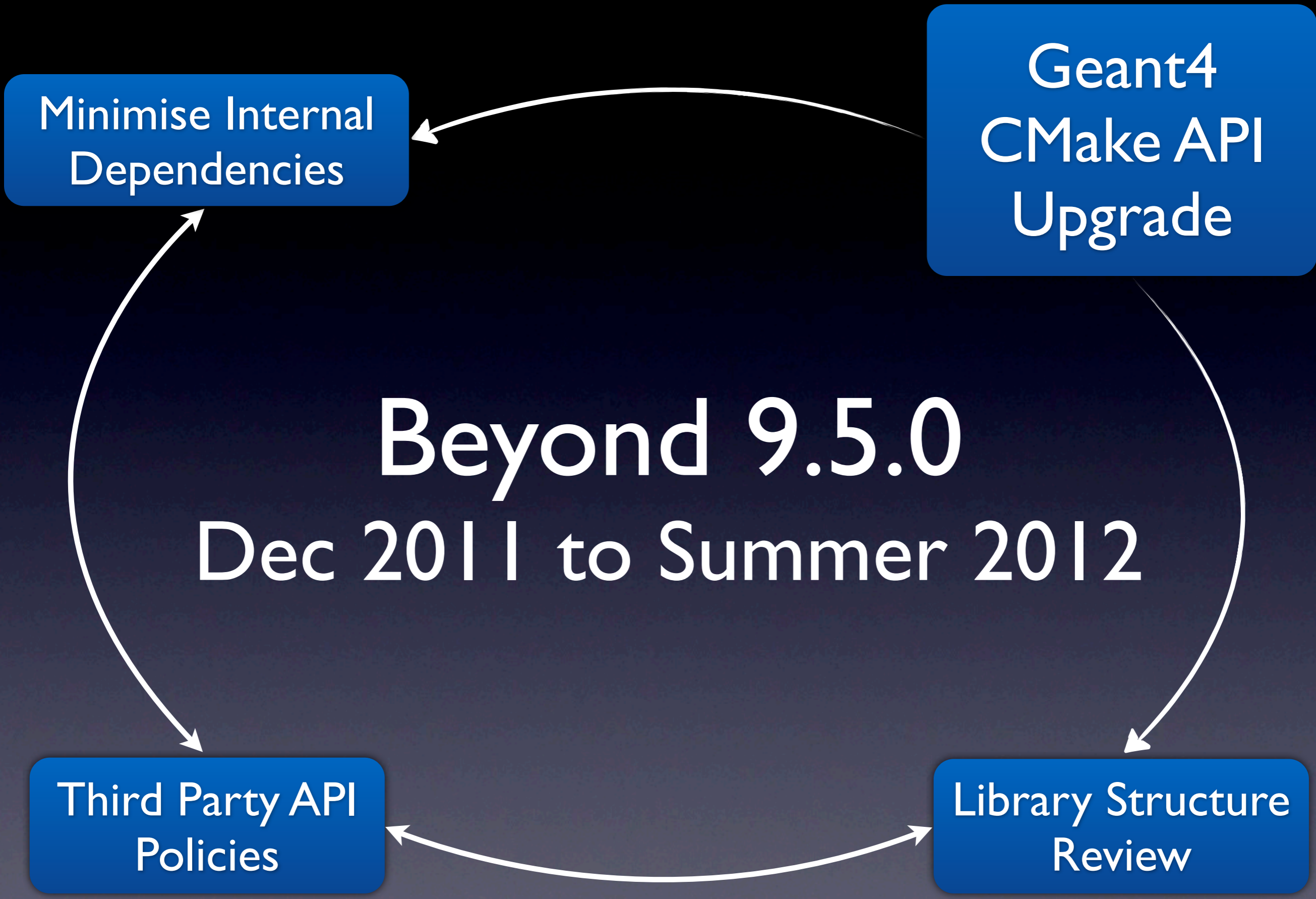
Minimise Internal
Dependencies

Geant4
CMake API
Upgrade

Beyond 9.5.0
Dec 2011 to Summer 2012

Third Party API
Policies

Library Structure
Review



Geant4/CMake API

sources.cmake

```
include_subdirectories(${D}/Bar/include)
```

```
GEANT4_DEFINE_MODULE(NAME G4Foo
```

```
  HEADERS
```

```
    G4Foo.hh
```

```
  SOURCES
```

```
    G4Foo.cc
```

```
  GLOBAL_DEPENDENCIES
```

```
    G4Baz
```

```
  GRANULAR_DEPENDENCIES
```

```
    G4Bar
```

```
  LINK_LIBRARIES
```

```
    ${EXPAT_LIBRARIES}
```

```
)
```

Minimise Dependencies

```
#include "G4Bar.hh"  
#include "G4Baz.hh"
```

```
class G4Foo {  
    ...  
private:  
    G4Bar foo_;  
};
```



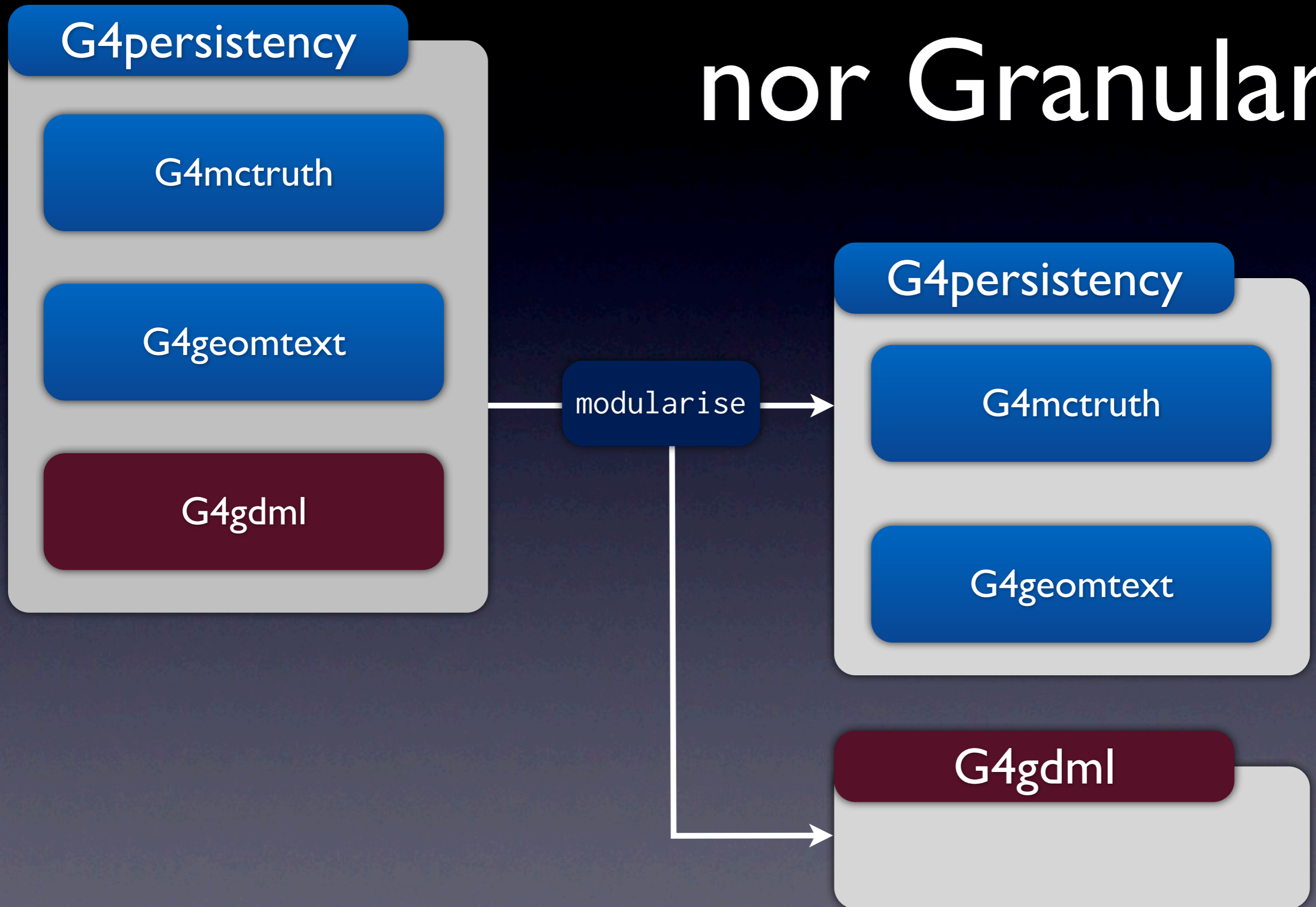
```
class G4Bar;
```

```
class G4Foo {  
    ...  
private:  
    G4Bar* foo_;  
};
```


Reviewing Library Structure

- Granular Libraries deprecated Jan 2012.
- Global Libraries only up to Summer 2012.
- *New modularisation for Summer 2012 Beta?*

Neither Global nor Granular?



Third Party API Policies

CLHEP

<eXpat/>

zlib

apache
Xerces

OpenGL

X

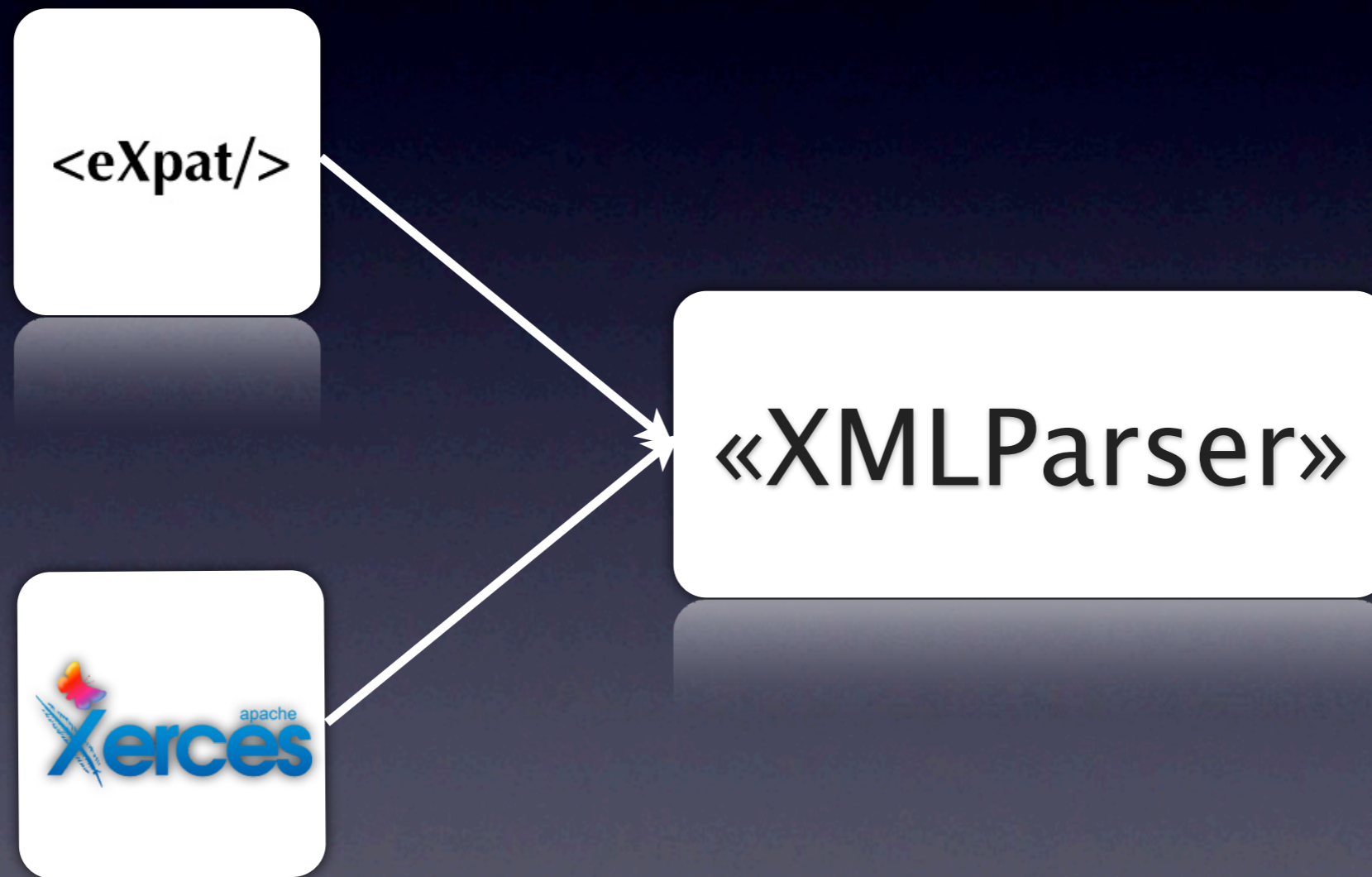
GL2PS

Qt

Open
Inventor

Motif

Avoid duplication of functionality:



Better management of internal APIs:

Single cohesive location
for current and future.



Minimise exposure of external APIs in Geant4 Public API:

«interface»

```
#include "GL/gl.h"

class G4Public {
  ...
private:
  GLfloat f_;
};
```

«libG4Foo»



«interface»

```
class G4Public {
  ...
private:
  class Impl;
  Impl* impl_;
};
```

«libG4Foo»



Summary

- CMake official buildsystem from December.
 - More testers, esp. Windows, required!
- Developer migration «Today»-June 2012.
- Work in 2012 focused on Developer Support.