

# Git: Release Publication

# CMake: Library Structure

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# **Git and Geant4: Publishing Releases on Gitlab/GitHub**

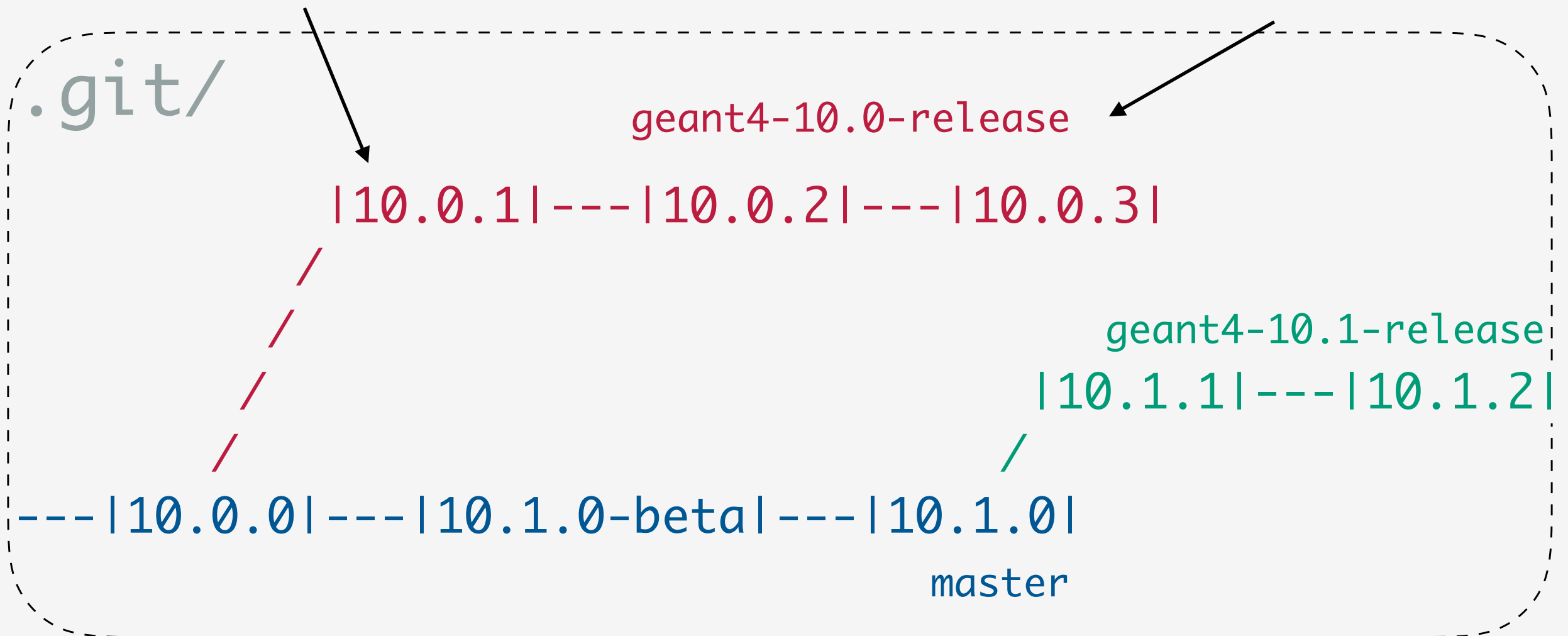
# Geant4 Releases in a Git Repository(ies)

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- Request from LHCb:
  - *For easy code browsing, including version diffs*
  - *Tags/generated tar balls can be compact release route*
  - *Also helpful for recording/applying custom patches*
- ***NB: Not a migration of Geant4 development to Git***
- ***Just another publication route for official releases***

One commit/tag  
per release

One branch  
per release line



*Complete commit history not imported*

# Release Branches/Tags

Inspired by git-flow:  
<http://nvie.com/posts/a-successful-git-branching-model/>

# Git Hosting: Gitlab and GitHub

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- Hosting simply serves the repo, plus a web-based front end for browsing and other tools
- **Use CERN's Gitlab service as “authoritative” repo**
  - Direct support, permissions model is more granular
- **GitHub mirror, updated automatically by Gitlab**
  - Purely for visibility given popularity of platform


gitlab.cern.ch/geant4/geant4

geant4 / geant4

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 **geant4**   
Geant4 toolkit for the simulation of the passage of particles through matter - NIM A 506 (2003) 250-303

★ Star 4 [HTTPS](#) <https://gitlab.cern.ch/geant4/geant4.git> 

[Files \(160 MB\)](#) [Commits \(41\)](#) [Branches \(33\)](#) [Tags \(86\)](#) [Changelog](#) [LICENSE](#) [Contribution guide](#)

[4ec577e5](#) Import Geant4 10.3.0.beta source tree · 2 months ago by [Gabriele Cosmo](#)

Geant4 public releases Git mirror

<https://gitlab.cern.ch/geant4/geant4>

GitHub, Inc. github.com/geant4/geant4

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Geant4 toolkit for the simulation of the passage of particles through matter - NIM A 506 (2003) 250-303

41 commits 33 branches 86 releases 1 contributor

Branch: master New pull request Find file Clone or download

gcosmo Import Geant4 10.3.0.beta source tree Latest commit 4ec577e on Jun 30

ReleaseNotes	Import Geant4 10.3.0.beta source tree	3 months ago
cmake	Import Geant4 10.3.0.beta source tree	3 months ago
config	Import Geant4 10.3.0.beta source tree	3 months ago
environments	Import Geant4 10.2.0 source tree	3 months ago
examples	Import Geant4 10.3.0.beta source tree	3 months ago
source	Import Geant4 10.3.0.beta source tree	3 months ago
CHANGELOG	Update CHANGELOG	3 months ago
CMakeLists.txt	Import Geant4 10.3.0.beta source tree	3 months ago
CONTRIBUTING.md	Add contribution members	3 months ago
LICENSE	Import Geant4 8.1.0 source tree	3 months ago

<https://github.com/geant4/geant4>

# Handling Merge/Pull Requests

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- Cannot disable Gitlab/Hub “Merge/Pull Request” tools
  - User clones repo, makes changes, now wants to merge them into upstream repository
- These are development tasks, but we are only using Gitlab/Github for publication
  - Initial policy to handle cases where M/PRs are created (and they almost certainly will be)



# Merge/Pull Request Policy

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- **Triage:** If it's a bug or enhancement, tell user to report as Bugzilla ticket in appropriate category.
- **Treating:** Require submitter to supply changes as a patch (git format-patch/diff) to the Bugzilla ticket. Apply onto SVN as a simple patch. Test and tag.
- **Merging/Closing:** Never merge directly in git, close any M/PR as “moved to Bugzilla #X” once this is done.
- Software Management WG perform Triage/Close steps!

# Migrate Geant4 Development to Git?

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- Having said this is not a migration...
- CERN SVN service stopping from LS2 (2018/19)
- Git/lab/Hub could be very useful development toolset
  - Easy/Robust collaboration/contribution, Issue Tracking with commit cross-refs, etc.
- **Nevertheless, much to consider if we want Geant to develop using git, kick off discussion in Parallel 6B**

# **CMake in Geant4: Improving Library Structure**

# Reminder of the C++/Binary Problem

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- Geant4 “module”: headers/sources in include/src
- “Granular” structure == 1 module -> 1 library
  - ~144 libraries: Lack of coherence, complex deps
- “Global” structure == N modules -> 1 library
  - ~30 libraries: Large variance in size, lack of modularity
- *Solution: Move to single structure optimised for coherence, modularity, performance.*

# Reminder of the CMake Problem

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```
# sources.cmake
include_directories(... path to G4globman headers ...)
include_directories(... path to G4csg headers ...)
# ... need to know dependencies of dependencies of.. ..
include_directories(... path to headers used by G4csg ...)
...
include_directories(${ZLIB_INCLUDE_DIRS})

geant4_define_module(G4MyModule
  HEADERS G4MyModule.hh ...
  SOURCES G4MyModule.cc ...
  GRANULAR_DEPENDENCIES G4globman G4csg G4intercoms
# ... Need to know library structure(s) ...
  GLOBAL_DEPENDENCIES G4global G4geometry G4intercoms
  LINK_LIBRARIES ${ZLIB_LIBRARIES}
)
```

# Prototype Solution for Geant4 > 10.3

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- Improved *implementation* of Geant4's CMake functions:
  - Simpler sources .cmake, back compatible interface
  - Module-Module dependencies only, removing requirement to know which library structure is used
- **This allows different Library Structures to be studied with zero changes to module code or buildscripts**
- **Library Structure declares module content of each library, closes/resolves Module-Module links to Library-Library links automatically**

```
# sources.cmake
include_directories(... path to G4globman headers ...)
include_directories(... path to G4csg headers ...)
include_directories(... path to headers used by G4csg ...)
...
include_directories(${ZLIB_INCLUDE_DIRS})

geant4_define_module(G4MyModule
  HEADERS G4MyModule.hh ...
  SOURCES G4MyModule.cc ...
  GRANULAR_DEPENDENCIES G4globman G4csg G4intercoms
  GLOBAL_DEPENDENCIES G4global G4geometry G4intercoms
  LINK_LIBRARIES ${ZLIB_LIBRARIES}
)
```

# Easier CMake Scripts: 1

Module dependencies  
Usage requirements

```
# sources.cmake
include_directories(${ZLIB_INCLUDE_DIRS})

geant4_define_module(G4MyModule
  HEADERS G4MyModule.hh ...
  SOURCES G4MyModule.cc ...
  GRANULAR_DEPENDENCIES
    G4globman G4csg G4intercoms ZLIB::ZLIB
  LINK_LIBRARIES ${ZLIB_LIBRARIES}
)
```

## Easier CMake Scripts: 2

Full usage of CMake  
Targets/Requirements



# Declaring the Library Structure

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- Use **Global** Structure initially to test and validate that new implementation builds **identical** libraries, e.g.

```
geant4_add_library(G4Foo MODULES A B C D)
```

- New Structures can be studied by direct editing of Category level CMake scripts, or by providing a custom script with `geant4_add_library` calls, e.g.

...

```
geant4_add_library(G4Foo_ABC MODULES A B C)
```

```
geant4_add_library(G4Foo_D MODULES D)
```

...

# Summary

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- **Geant4 Releases (since 0.0.1!) published on Gitlab/Hub**
  - *Kick off discussion in Parallel 6b on topics/issues for migration of Geant4 development to Git.*
- **Updates to CMake system required for studying and improving library structure ready for use after 10.3**
  - *Discussion in Parallel 6b on implementation details, remaining tasks and rollout timetable after 10.3*