



## REST-for-Physics Framework

### 0.3 REST-for-Physics compilation and installation

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- Install optional dependencies: Garfield++, Geant4
- Clone framework repository and submodules:  
versioning
- Install framework

- Geant4 is a toolkit for the simulation of radiation transport in matter ([more info](#))
- Necessary only for **restG4** package (simulations!)
- Source code can be found on [GitHub](#) or on CERN website
- A installation script is provided in the framework: Run this!  
`sh -c "$(curl -fsSL https://raw.githubusercontent.com/rest-for-physics/framework/master/scripts/installation/installGeant4.sh)"`
- Current supported version is 11.0.3, but other older/newer versions might also work (but validation is limited on our end)
- Relevant compilation flags:
  - **-DGEANT4\_USE\_GDML=ON** : support GDML geometry
  - **-DGEANT4\_USE\_QT=OFF** : do not link QT libraries (we don't use them but can be set to ON if they are installed).
  - **-DCMAKE\_CXX\_STANDARD=17** : needs to be the same across the framework and dependencies

- Garfield++ is a toolkit for the simulation of gaseous particle detectors ([more info](#))
- Necessary only for some features of the detector library (can be skipped if it causes issues)
- Source code can be found on [CERN GitLab](#)
- A installation script is provided in the framework: **Run this!**

```
sh -c "$(curl -fsSL https://raw.githubusercontent.com/rest-for-physics/framework/master/scripts/installation/installGarfield.sh)"
```

- The GitHub organization [REST-for-Physics](#) has many repositories
- Each independent component of the framework (library or package) is split into a separate repository
- This is organized via [git submodules](#)
- A version of the [framework](#) repo points to a fixed version of each submodule ([see how](#))

How to clone all repositories on the latest version (for each repo!):

- Clone framework: `git clone https://github.com/rest-for-physics/framework.git`
- Run python script to sync submodules:

```
cd framework
```

```
python pull-submodules.py --latest:master
```

- Before compiling REST-for-Physics you should make sure that ROOT, Geant4 and garfield are properly loaded in your terminal.
  - `root-config --version`
  - `geant4-config --version`
  - `env | grep GARFIELD`

You should get a clean version for ROOT and Geant4, or in the case of Garfield you should get the directory of the installation.

If not, you should load the ROOT, Geant4 and Garfield installations before attempting to compile REST.

- `source ~/apps/root-6.26.10/install/bin/thisroot.sh`
- `source ~/apps/geant4-v11.0.3-install/bin/geant4.sh`
- `source ~/apps/garfield6/share/Garfield/setupGarfield.sh`

**The directories here may change depending on where you have finally installed ROOT, Geant4, Garfield.**

- We are on the “framework” directory!
- Make a build directory: `mkdir -p build && cd build`
- Configure CMake: `cmake .. -DCMAKE_INSTALL_PREFIX=$HOME/apps/rest-for-physics -DREST_ALL_LIBS=ON -DREST_G4=ON -DREST_GARFIELD=ON`
- The C++ standard is automatically set from ROOT (can also be set via `-DCMAKE_CXX_STANDARD=17`)
- Individual libraries or packages can be turn on/off via options such as: `-DRETLIB_DETECTOR=OFF` ([more info](#), [full list of compilation options](#))
- After cmake command: `make -j4 install`



- Framework should be installed in `$HOME/apps/rest-for-physics`
- `source $HOME/apps/rest-for-physics/thisREST.sh` will load all dependencies (root, geant4...). **Add this line to .bashrc!**
- Run: `rest-config --version` to check framework is available!
- To check integration with python works:
  - `python3 -c ""import ROOT;import REST;ROOT.TRestRun();ROOT.TRestGeant4Event()""`

Official release: release tags

```
*****  
W E L C O M E   t o   R E S T  
  
Commit   : 3680798a (2023-01-12 15:27:43 +0100)  
Branch/Version : master/v2.3.15  
Compilation date : 2023-01-21 22:13  
  
Latest release: : v2.3.15 - David R. Nygren - Fri 30 Dec  
  
Official release : No  
Clean state      : No  
  
Installed at    : /usr/local/rest-for-physics  
  
REST-for-Physics site : rest-for-physics.github.io  
  
Remember that REST is made by physicists for physicists,  
who are supposed to toil and suffer till they become experts.  
*****
```

Clean state: no user modifications (pass `-clean` flag to `pull-submodules.py`)