

Spack ROOT Recipe Issues

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Context

ROOT major update of the Spack recipe [#8428](#)

- Accepted back in February
- Some of the most relevant changes:
 - Add `master` version, pulled from Github
 - Add most of the build options as variants
 - Define all needed dependencies, so that `root` does not download any `builtin` dependency, considering the defined variants.
 - Set to `default=OFF` all builtin dependencies that require to be downloaded
- Try to come up with a default recipe, flexible enough (with variants) to satisfy any special user requirement.
- Based on [Gentoo/Portage](#) to define the default options
 - Complete and maintained by one of the core root-developers (in charge of the build system)

ROOT Default options

- [builtin options](#) are all OFF
 - Except for llvm and afterimage (included in the package, no download involved).
 - These options **cannot** be modified by the user, are hardcoded on the recipe.

```
# ROOT should not download its own dependencies
options = [
    '-Dexplicitlink=ON',
    '-Dexceptions=ON',
    '-Dfail-on-missing=ON',
    '-Dshared=ON',
    '-Dsoversion=ON',
    '-Dbuiltin_llvm=ON',
    '-Dbuiltin_afterimage=ON',
    '-Dasimage:BOOL=ON', # if afterimage is taken from builtin
    '-Dastiff:BOOL=ON', # asimage and astiff must be ON too
    '-Dbuiltin_cfitsio=OFF',
    '-Dbuiltin_davix=OFF',
    '-Dbuiltin_fftw3=OFF',
    '-Dbuiltin_freetype=OFF',
    '-Dbuiltin_ftgl=ON',
    '-Dbuiltin_gl2ps=OFF',
    '-Dbuiltin_glew=OFF',
    '-Dbuiltin_gsl=OFF',
    '-Dbuiltin_lzma=OFF',
    '-Dbuiltin_openssl=OFF',
    '-Dbuiltin_pcre=OFF',
    '-Dbuiltin_tbb=OFF',
    '-Dbuiltin_unuran=OFF',
    '-Dbuiltin_vc=OFF',
    '-Dbuiltin_vdt=OFF',
    '-Dbuiltin_veccore=OFF',
    '-Dbuiltin_xrootd=OFF',
    '-Dbuiltin_zlib=OFF'
]
```

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 - These options **cannot** be modified by the user, are hardcoded on the recipe.
- [build options](#) based on variants
 - Value (ON/OFF) passed to CMAKE depends on the user input
 - Example: `spack install root+davix`
 - [Default values](#) based on Gentoo recipe (can be overridden)

```
# ##### ROOT options #####

options.extend([
  '-Dx11:BOOL=%s' % (
    'ON' if '+x' in spec else 'OFF'),
  '-Dxft:BOOL=%s' % (
    'ON' if '+x' in spec else 'OFF'),
  '-Dbonjour:BOOL=%s' % (
    'ON' if '+avahi' in spec else 'OFF'),
  '-Dcocoa:BOOL=%s' % (
    'ON' if '+aqu' in spec else 'OFF'),
  '-Dcxx14:BOOL=%s' % (
    'ON' if '+root7' in spec else 'OFF'),
  '# -Dcxxmodules=OFF # use clang C++ modules',
  '-Ddavix:BOOL=%s' % (
    'ON' if '+davix' in spec else 'OFF'),
  '-Dfftw3:BOOL=%s' % (
    'ON' if '+fftw' in spec else 'OFF'),
  '-Dfitsio:BOOL=%s' % (
    'ON' if '+fits' in spec else 'OFF'),
  '-Dfortran:BOOL=%s' % (
    'ON' if '+fortran' in spec else 'OFF'),
  '-Dftgl:BOOL=%s' % (
    'ON' if '+opengl' in spec else 'OFF'),
  '-Dgdml:BOOL=%s' % (
    'ON' if '+gdml' in spec else 'OFF'),
  '-Dgl2ps:BOOL=%s' % (
    'ON' if '+opengl' in spec else 'OFF'),
  '-Dgenvector:BOOL=%s' % (
    'ON' if '+math' in spec else 'OFF'), # default ON
  '-Dgsl_shared:BOOL=%s' % (
    'ON' if '+gsl' in spec else 'OFF'),
```

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 - Value (ON/OFF) passed to CMAKE depends on the user input
 - Example: `spack install root+davix`
 - [Default values](#) based on Gentoo recipe (can be overridden)
- [Fixed options](#):
 - Deprecated options
 - Packages not supported on Spack

```
# Fixed options
'-Dafdsrmd=OFF', # not supported
'-Dafs=OFF',     # not supported
'-Dalien=OFF',
'-Dcastor=OFF',  # not supported
'-Dccache=OFF',  # not supported
'-Dchirp=OFF',
'-Dcling=ON',
'-Ddcache=OFF',  # not supported
'-Dgeocad=OFF', # not supported
'-Dgfal=OFF',   # not supported
'-Dglite=OFF',  # not supported
'-Dglobus=OFF',
'-Dgminimal=OFF',
'-Dgnuinstall=OFF',
'-Dhdfs=OFF',   # TODO pending to add
'-Dmonalisa=OFF', # not supported
'-Drfio=OFF',   # not supported
'-Droottest=OFF', # requires network
'-Druby=OFF',   # unmaintained upstream
'-Druntime_cxxmodules=OFF', # use clang C++ modules, experimental
'-Dsapdb=OFF',  # option not implemented
'-Dsrap=OFF',   # option not implemented
'-Dtcalloc=OFF'
```

gminimal request

- Fermilab uses a slightly different recipe
- Trying to align with the upstream recipe
- **Request:**
 - *Could gminimal be ON by default?*
 - ON by default or variant ?
- Goal of gminimal
 - Do not automatically search for support libraries, but include X11

```
# Fixed options
'-Dafdsmsgd=OFF', # not supported
'-Dafs=OFF',      # not supported
'-Dalien=OFF',
'-Dcastor=OFF',  # not supported
'-Dccache=OFF',  # not supported
'-Dchirp=OFF',
'-Dcling=ON',
'-Ddcache=OFF',  # not supported
'-Dgeocad=OFF', # not supported
'-Dgfal=OFF',    # not supported
'-Dglite=OFF',   # not supported
'-Dglebus=OFF',
'-Dgminimal=OFF',
'-Dgndinstall=OFF',
'-Dhdofs=OFF',   # TODO pending to add
'-Dmonalisa=OFF', # not supported
'-Drfio=OFF',    # not supported
'-Droottest=OFF', # requires network
'-Druby=OFF',    # unmaintained upstream
'-Druntime_cxxmodules=OFF', # use clang C++ modules, experimental
'-Dsapdb=OFF',   # option not implemented
'-Dsrap=OFF',    # option not implemented
'-Dtcmalloc=OFF'
```

-isystem support in Spack

- `-isystem dir` (compiler option)
 - Search `dir` for header files, after all directories specified by `-I` but before the standard system directories.
- ROOT build system makes use of: `-isystem`
 - [Introduced](#) in versions 6.16.00 to 6.13.02
- Issue opened two weeks ago [#10850](#): ROOT installation fails
(conflict between `import.h` header defined in Python and TMVA)
- Spack [compiler wrapper](#) ignores `-isystem` option (correctly) defined by packages and uses `-I` instead.
- Work in progress:
 - Spack should support this option: other FNAL packages are affected, showstopper for HEP
 - Chris Green is currently working on Spack internals in an attempt to solve this issue.