

2018 International Radiance Workshop

Automatic for the People - Automated Build/Test/Packaging for Radiance

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Outline

Continuous Integration (CI) for Radiance

- Motivation, definition, etc.
- Implementation
 - Workflow
 - GitHub Mirror
 - GitLabCI
- Case Study
- Next Steps

Motivation

Motivation

- OpenStudio project (NREL 2010)
- Cross platform, most users on Windows
- Other efforts:
 - Axel Jacobs (last update ~2016)
 - Francesco Anselmo (mingw, ~2008, no rvu, etc)
 - Georg Mischler (Rayfront ~2002, Windows rvu!)
 - LBNL Desktop Radiance (2000?)

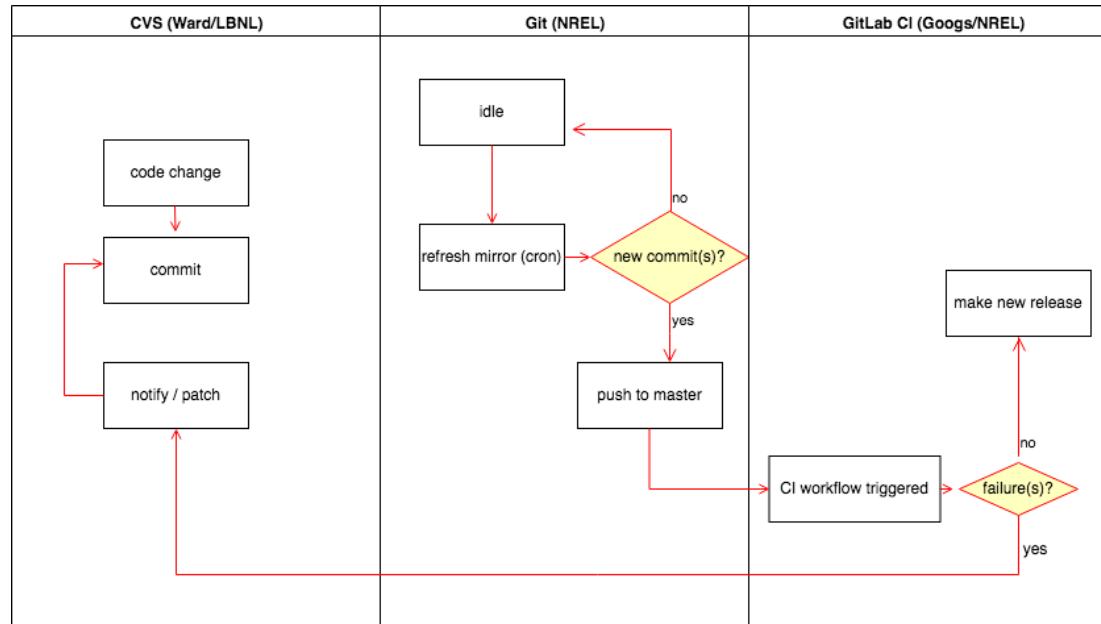
Needed easy way to produce reliable, cross-platform Radiance installers,
keep up with HEAD

- Windows versions of GUI apps e.g. rvu
- Releases tied to OpenStudio releases
- CMake build system (implemented ~2013)

How it Works

[GitHub, GitlabCI, CMake]

Workflow

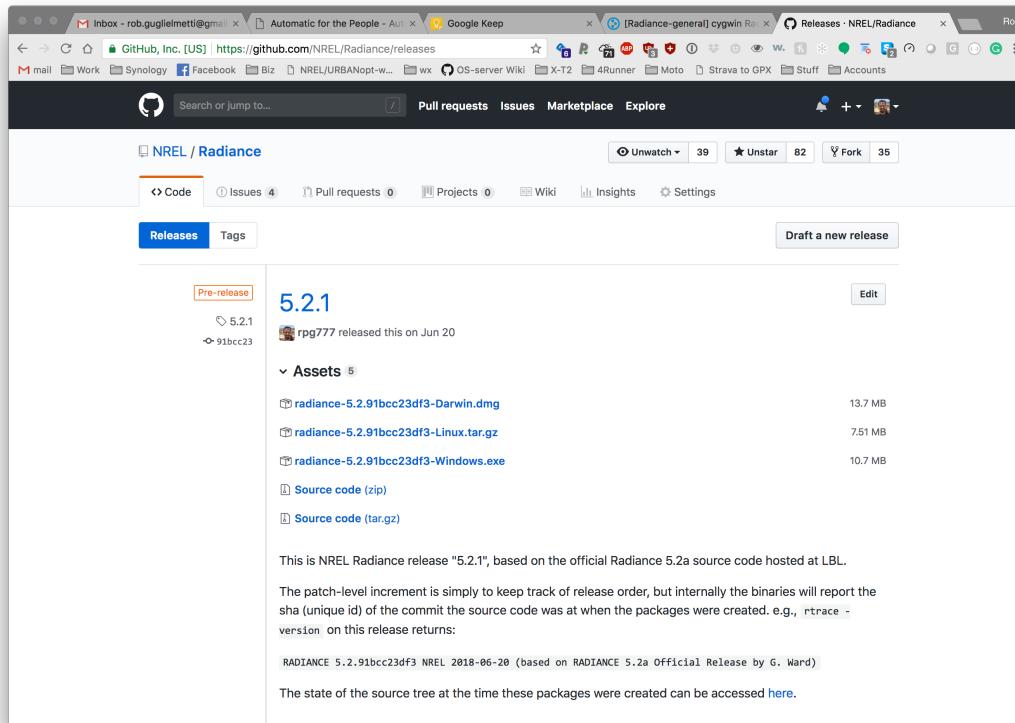


GitHub Mirror of CVS

Mirror of the master Radiance cvs source repo, used for the creation of Radiance installers for the NREL OpenStudio project

Commit	Message	Date
Gregory J. Ward	Added missing file from last commit	a day ago
InstallRules	Update to CMake build system from Rob G. and Alex S., adding test cases	8 months ago
build_utils	SCons Option to build Pmap with OOC data on unix	8 months ago
doc	Added missing file from last commit	a day ago
platform	Updating to SCons 3.x, adding support for Python 3	8 months ago
resources	Fixes to changes that were not applied fully the first time for CMake	8 months ago
src	Added missing file from last commit	a day ago
test	Fixes to changes that were not applied fully the first time for CMake	8 months ago
.gitignore	Added missed files from CMake update	8 months ago
.gitlab-ci.yml	Added missed files from CMake update	8 months ago
CMakeLists.txt	Updates to package installers from Rob G.	2 months ago
INSTALL.scons	SCons Option to build Pmap with OOC data on unix	8 months ago
License.txt	Changes for 5.0 release	3 years ago
MANIFEST	Added files needed by cmake	7 years ago

GitHub Releases Page



GitHub Issues Page

The screenshot shows the GitHub Issues page for the NREL/Radiance repository. The browser title is "Issues - NREL/Radiance". The page header includes the repository name "NREL / Radiance", a search bar, and navigation links for Pull requests, Issues, Marketplace, and Explore. On the right, there are buttons for Unwatch (39), Unstar (82), Fork (35), and a bell icon. Below the header, a modal window titled "Label issues and pull requests for new contributors" explains that GitHub will help first-time contributors discover issues labeled with "help wanted" or "good first issue". A "Go to Labels" button is at the bottom of the modal. The main content area shows a list of issues with filters for "is:issue is:open". There are four open issues listed:

- Test Perl version of optics2rad, add to packages** (#26) - Opened on Apr 13 by rpg777
- Compiling 5.1 on linux** (#17) - Opened on Aug 31, 2017 by rgsouthall
- Some .cal files missing from release** (#15) - Opened on Oct 19, 2016 by markstoc
- Radiance package uninstaller clobbers RAYPATH** (#3) - Opened on May 11, 2015 by rpg777

At the bottom of the page, a ProTip! message says "Updated in the last three days: updated:>2018-08-30."

GitHub Issues Page (cont'd.)

The screenshot shows a GitHub issue page for a repository named "NREL / Radiance". The specific issue is titled "Some .cal files missing from release #15". The conversation between two users, "markstock" and "rpg777", is displayed:

markstock commented on Oct 19, 2016
I was running my benchmark on a new machine after installing the 5.0.a12 binary release, and it seems that picture.cal and dirt.cal are missing from radiance/lib. I didn't do an exhaustive search for other missing files.

rpg777 self-assigned this on Apr 2
Indeed @markstock, those files are not in the source tree, nor are they in the "supplemental files archive" anymore. So needless to say they are not getting baked into the NREL packages. Not sure where they went or when. Perhaps we could take this over to radiance-dev?

The right side of the interface shows standard GitHub issue management features: Unwatch (39), Star (82), Fork (35), Assignees (rpg777), Labels (None yet), Projects (None yet), Milestone (No milestone), and Notifications (Unsubscribe). It also indicates 2 participants (markstock and rpg777) and a lock conversation button.

GitLabCI

Continuous Integration

- Monitors Git Repo
- Any change triggers new build/test/deploy

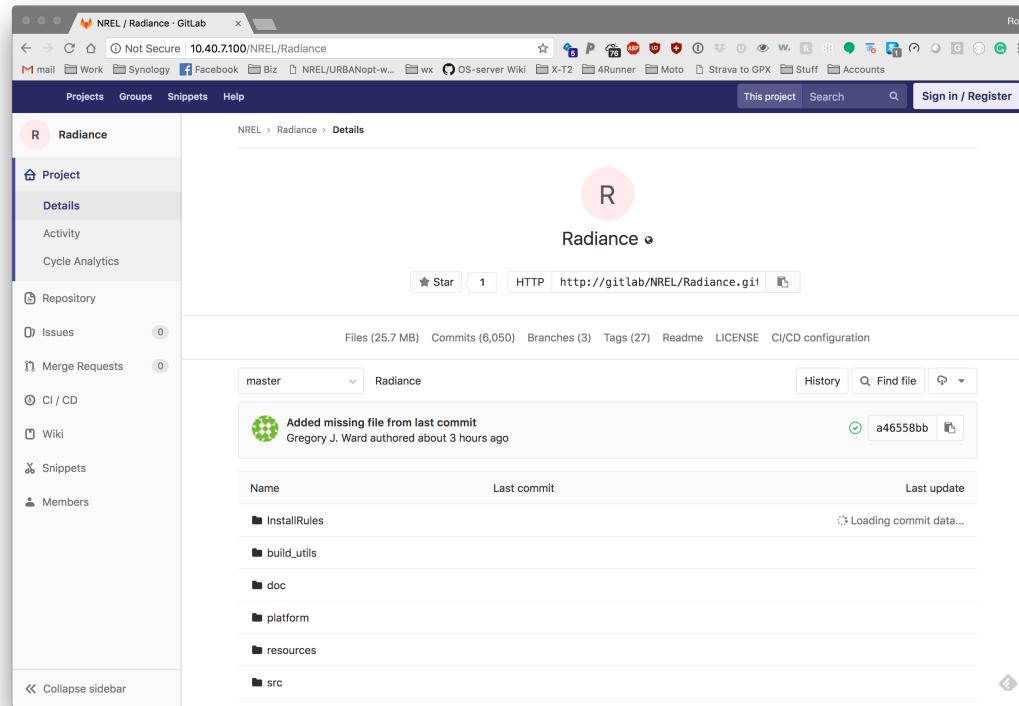


GitLabCI - Projects Page (overview)

The screenshot shows a web browser window titled "Projects · Explore · GitLab". The address bar indicates the URL is "Not Secure 10.40.7.100/explore/projects". The page header includes a "Projects" button, a search bar, and a "Sign in / Register" link. Below the header, the title "Explore GitLab" and the subtitle "Discover projects, groups and snippets. Share your projects with others" are displayed. A navigation bar at the top of the main content area includes "Trending", "Most stars", and "All" buttons, with "All" being the active tab. To the right of the tabs are "Filter by name..." and "Last updated" dropdown menus. The main content area lists ten projects, each with a small circular icon, the project name, and the owner. The projects listed are:

Owner	Project Name	Stars	Last Updated
E	NREL / EnergyPlus	1	updated 3 days ago
R	NREL / Radiance	1	updated about 2 hours ago
S	NREL / seed	1	updated about 21 hours ago
O	NREL / openstudio-standards	1	updated about 22 hours ago
O	NREL / OpenStudio-server	1	updated a day ago
O	NREL / OpenStudio	3	updated a day ago
W	NREL / wex	1	updated a week ago
L	NREL / lk	1	updated a week ago
D	NREL / docker-openstudio	1	updated a week ago

GitLabCI - Project Detail



The GitLabCI Experience [and a case study]

Prologue

From: Jan
To: Greg, Rob
Date: Friday, Aug 31 2018

Hi Greg,

I have some small changes to evalglare (change of default values) **and** an extended version of gendaylit (color option included). Both should compile without problems (I tested it **and** had also only small changes).

If you have time, please **include** them into the CVS.

Important: gendaylit needs now a second cal file (**for** the colored option, so please add the perezlum_c.cal to the lib folder).

Both tools have also updated manpages which are also included **in** the tar files.

Thx!

See you on Monday!

best

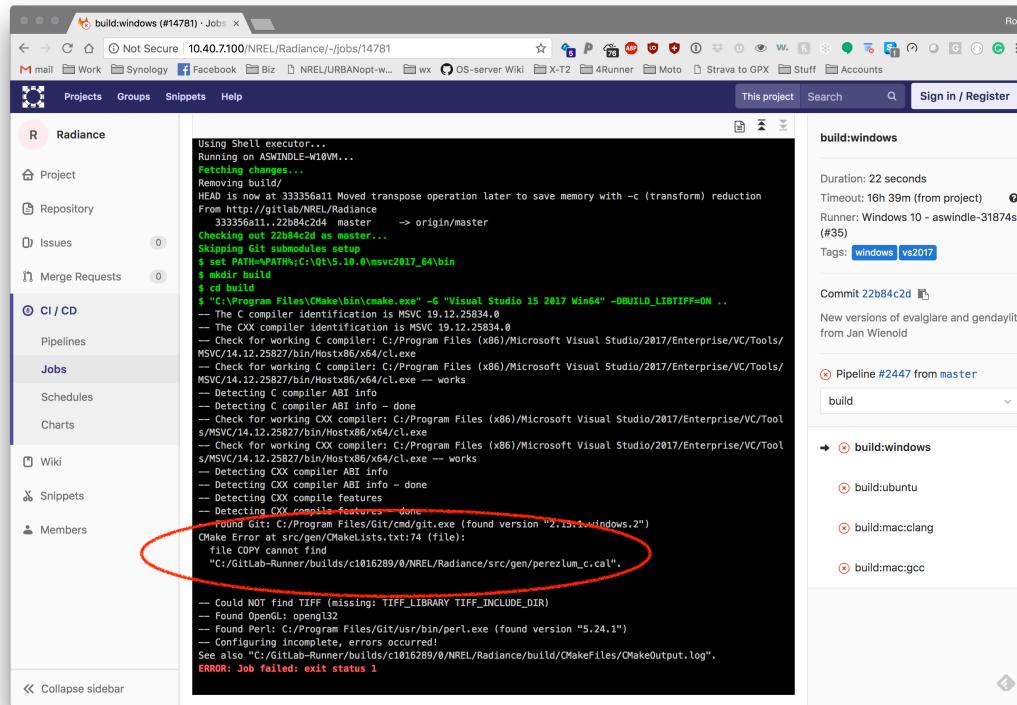
Jan

GitLabCI - Build fail

The screenshot shows the GitLab Pipelines interface for the 'Radiance' project. The sidebar on the left includes links for Projects, Groups, Snippets, Help, Repository, Issues, Merge Requests, CI / CD (with Pipelines selected), Jobs, Schedules, Charts, Wiki, Snippets, and Members. The main area displays a table of pipelines. The first pipeline, '#2449 by latest', is marked as 'passed' with green status indicators. The second pipeline, '#2447 by latest', is circled in red and marked as 'failed' with a red status indicator. This failed pipeline is associated with commit 'master -> a46558bb' and a note about adding a missing file from 'evalgla...'. The third pipeline, '#2408 by latest', is marked as 'passed'. Subsequent pipelines are also marked as 'passed'.

Status	Pipeline	Commit	Stages	Time	Last Run
passed	#2449 by latest	master -> a46558bb	Added missing file from...	00:10:59	about 2 hours ago
failed	#2447 by latest	master -> 22b84c2d	New versions of evalgla...	00:00:22	about 20 hours ago
passed	#2408 by latest	master -> 333356a1	Moved transpose opera...	00:12:09	4 days ago
passed	#2371 by latest	master -> caee32c4	Clarified wording on wa...	00:09:56	5 days ago
passed	#2275 by latest	master -> 8859c070	Removed removal of co...	00:10:37	3 weeks ago
passed	#2272 by latest	master -> 407ba984	Fixed inconsistent treat...	00:11:12	3 weeks ago
passed	#2208 by latest	master -> c1b1daac	Switched to minimum s...	00:12:01	4 weeks ago
passed	#2204 by latest	master -> 122110cd	Created MAXMTLEN t...	01:03:45	4 weeks ago

GitLabCI - Build fail - STDOUT



The screenshot shows a GitLabCI build log for a project named "Radiance". The log output is as follows:

```

Using Shell executor...
Running on ASHTNDLE-W10VM...
Fetching changes...
Removing build/
HEAD is now at 333356a11 Moved transpose operation later to save memory with -c (transform) reduction
From http://gitlab/NREL/Radiance
  333356a11...22b84c2d4 master      -> origin/master
Skipping Git submodules setup
$ set PATH=$PATH;C:\Qt\5.10.0\msvc2017_64\bin
$ mkdir build
$ cd build
$ "C:\Program Files\CMake\bin\cmake.exe" -G "Visual Studio 15 2017 Win64" -DBUILD_LIBTIFF=ON ..
-- The C compiler identification is MSVC 19.12.25834.0
-- The CXX compiler identification is MSVC 19.12.25834.0
-- Check for working C compiler: C:/Program Files (x86)/Microsoft Visual Studio/2017/Enterprise/VC/Tools/MSVC/14.12.25827/bin/Hostx86/x64/cl.exe -- works
-- Detecting C compiler ABI info
-- Detecting C compiler ABI info - done
-- Check for working CXX compiler: C:/Program Files (x86)/Microsoft Visual Studio/2017/Enterprise/VC/Tools/MSVC/14.12.25827/bin/Hostx86/x64/cl.exe
-- Detecting CXX compiler ABI info
-- Detecting CXX compile features
-- Detecting CXX compile features - done
-- Found GIt: C:/Program Files/Git/cmd/git.exe (found version "2.15.1.windows.2")
CMake Error at src/gen/CMakeLists.txt:74 (file):
  file COPY cannot find
  "C:/GitLab-Runner/builds/c1016289/0/NREL/Radiance/src/gen/perezum_c.ca1".
-- Could NOT find TIFF (missing: TIFF_LIBRARY TIFF_INCLUDE_DIR)
-- Found OpenGL: opengl32
-- Found Perl: C:/Program Files/Git/usr/bin/perl.exe (found version "5.24.1")
-- Configuring incomplete, errors occurred!
See also "C:/GitLab-Runner/builds/c1016289/0/NREL/Radiance/build/CMakeFiles/CMakeOutput.log".
ERROR: Job failed: exit status 1

```

A red circle highlights the error message: "file COPY cannot find "C:/GitLab-Runner/builds/c1016289/0/NREL/Radiance/src/gen/perezum_c.ca1"".

The right sidebar shows the build details:

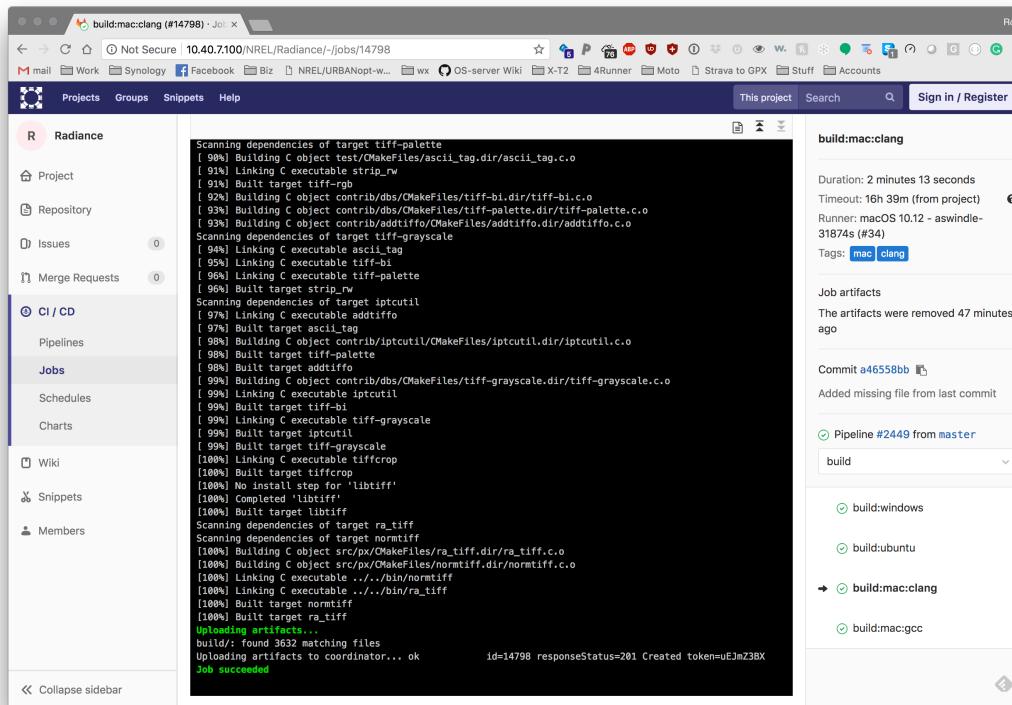
- build:windows**: Duration: 22 seconds, Timeout: 16:39m (from project), Runner: Windows 10 - aswindle-31874s (#35), Tags: windows vs2017
- Commit 22b84c2d**: New versions of evalglare and gendaylit from Jan Wienold
- Pipeline #2447 from master**: build
- build:windows**, build:ubuntu, build:mac:clang, build:mac:gcc

GitLabCI - CVS add

The screenshot shows the GitLab interface for the 'Radiance' project. The left sidebar is collapsed, and the main area displays a table of CI/CD jobs. The table has columns for Status, Job ID, Pipeline, Stage, Name, and Coverage. Most jobs are marked as passed. The stages include package, test, and build, running on various platforms like windows, ubuntu, vs2017, clang, mac, and gcc. The coverage column shows percentages ranging from 0% to 100%.

Status	Job	Pipeline	Stage	Name	Coverage
passed	#14807 🐕 master -> a46558bb	#2449 by 🐕	package	package:windows	0 02:13 about 2 hours ago
passed	#14806 🐕 master -> a46558bb	#2449 by 🐕	package	package:ubuntu	0 00:23 about 2 hours ago
passed	#14805 🐕 master -> a46558bb	#2449 by 🐕	package	package:mac	0 02:32 about 2 hours ago
passed	#14804 🐕 master -> a46558bb	#2449 by 🐕	test	test:windows	0 00:46 about 2 hours ago
passed	#14803 🐕 master -> a46558bb	#2449 by 🐕	test	test:ubuntu	0 00:23 about 2 hours ago
passed	#14802 🐕 master -> a46558bb	#2449 by 🐕	test	test:mac:clang	0 00:24 about 2 hours ago
passed	#14801 🐕 master -> a46558bb	#2449 by 🐕	test	test:mac:gcc	0 00:33 about 2 hours ago
passed	#14800 🐕 master -> a46558bb	#2449 by 🐕	build	build:windows	0 07:27 about 2 hours ago
passed	#14799 🐕 master -> a46558bb	#2449 by 🐕	build	build:ubuntu	0 00:51 about 2 hours ago

GitLabCI - Build Success



GitLabCI - Tests Passed, Make new release?

The screenshot shows a GitLab interface for a project named "Radiance". The left sidebar has sections for Projects, Groups, Snippets, Help, Issues (0), Merge Requests (0), CI / CD (Jobs selected), Pipelines, Schedules, Charts, Wiki, Snippets, and Members. The main content area shows a "passed" status for Job #14804. The log output is as follows:

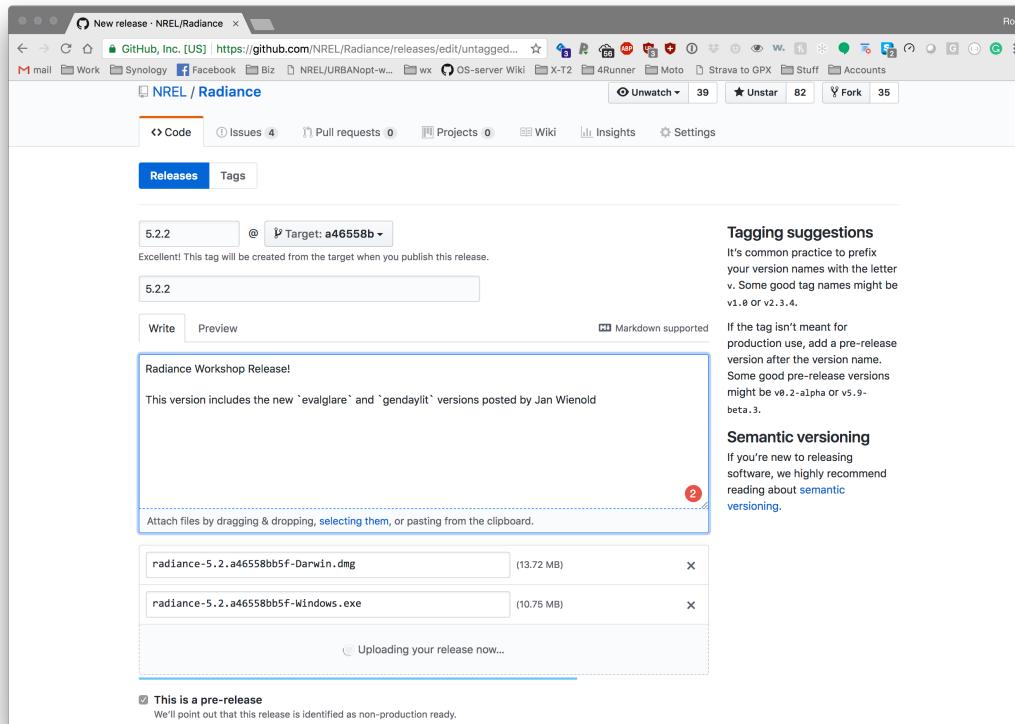
```
Running with gitlab-runner 10.5.0 (80b03db9)
on aswindle-W10VM c1016289
Using Shell executor...
Running on ASWINDLE-W10VM...
Patching changes...
Removing build/
HEAD is now at a46558bb5 Added missing file from last commit
Checking out a46558bb as master...
Skipping Git submodules setup
Downloading artifacts for buildwindows (14800)...
Downloading artifacts from coordinator... ok   id=14800 responseStatus=200 OK token=jbUPg5r3
$ cd build
$ "C:\Program Files\CMake\bin\ctest.exe"
Test project C:/GitLab-Runner/builds/c1016289/NREL/Radiance/build
  Start 1: test_setup ..... Passed  0.08 sec
  1/7 Test #1: test_setup ..... Passed  0.08 sec
  Start 2: test_rtrace ..... Passed  0.08 sec
  2/7 Test #2: test_rtrace ..... Passed  0.08 sec
  Start 3: test_rpict ..... Passed  2.95 sec
  3/7 Test #3: test_rpict ..... Passed  2.95 sec
  Start 4: test_stainfo ..... Passed  0.10 sec
  4/7 Test #4: test_stainfo ..... Passed  0.10 sec
  Start 5: test_pcnd ..... Passed  1.26 sec
  5/7 Test #5: test_pcnd ..... Passed  1.26 sec
  Start 6: test_evalglare ..... Passed  7.21 sec
  6/7 Test #6: test_evalglare ..... Passed  7.21 sec
  Start 7: test_falsecolor ..... Passed  7.74 sec
  7/7 Test #7: test_falsecolor ..... Passed  7.74 sec

100% tests passed, 0 tests failed out of 7

Total Test time (real) = 19.46 sec
Job succeeded
```

To the right, there's a sidebar titled "test:windows" with details: Duration: 46 seconds, Timeout: 16h 39m (from project), Runner: Windows 10 - aswindle-31874s (#35), Tags: windows, Commit a46558bb, and Pipeline #2449 from master. Below the pipeline are four green circular icons labeled "test:windows", "test:ubuntu", "test:mac:clang", and "test:mac:gcc".

New 'Workshop Edition' Release



Next Steps

More Testing

- Currently the CMake Test suite is a handful of regression, and simple sanity tests
- Need more tests, more coverage
- There is some DOE funding for this in FY19!

Improved Packages

- Still missing some supplemental files
 - `picture.cal` `dirt.cal` (and more!)
- Better control of setting `PATH`, `RAYPATH`, other env vars (Mac)
- Build pdfs of manpages for Windows users
 - Mac/Linux get manpages installed to `[radiance_install_dir]/man` automatically

Next Steps (Cont'd.)

More Package Options

- Better linux package options
 - Current "installer" is just a tarball of 64-bit executables and libs built on Ubuntu
 - Randolph Fritz working on a MacPorts "port" for Radiance
 - Other packages? (rpm? brew? what? WHAT!?)

More Automation

- Automatic Package Posting?
- Iteration builds (i.e. last successful HEAD commit always available)?

Documentation

- Help individual users make their own builds
- User-level repository

Bonus Slide

Your own Private Repo

1. Clone the NREL Git repository:

```
$ git clone https://github.com/NREL/Radiance.git
```

2. Refresh your local copy whenever you want:

```
$ git cvsimport -o master -v -d \
:pserver:anonymous@radiance-online.org:/home/cvsd/radiance \
-A ../authors.txt -a ray
```

authors.txt = maps CSH logins to GitHub usernames

Bonus Slide 2

What's a test?

```
execute_process(
    WORKING_DIRECTORY ${test_output_dir}
    COMMAND evalglare${CMAKE_EXECUTABLE_SUFFIX} -L 400 500 0.6 1.2 -B 0.4 \
        -b 2500 -d -c outputimage.hdr ${resources_dir}/evalglare/testimage.hdr
    OUTPUT_FILE evalglare_out.txt
    RESULT_VARIABLE res
)

file(READ ${test_output_dir}/evalglare_out.txt test_output)
if(test_output MATCHES "band:band_omega,band_av_lum,band_median_lum, \
band_std_lum,band_perc_75,band_perc_95,band_lum_min,band_lum_max: \
2.423399 2353.496003 1339.703125 2218.441248 3993.937463 5750.375098 \
68.348633 37142.499489")
    message STATUS "passed"
else()
    message STATUS "failed"
endif()
```

Questions?

robert.guglielmetti@nrel.gov

www.nrel.gov/buildings

github.com/NREL/Radiance

rob.guglielmetti@gmail.com

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[thank you.[!]]

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[thank you.[!]]

