Continuous/Deployment (CI/CD) for R

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Introduction

- Version Control in Analytics
- Continuous Integration
- Continuous Deployment
Version Control

- Version Control in Analytics?
- Benefits
- Integrate Analytics Feedback Life Cycle with SDLC
  - Software Development Life Cycle
    - Define Requirements, Design, Development, QA, UAT, Release
  - Analytics Development Life Cycle
    - Identify Problem, Data Prep, Explore, Transform, Select, Modeling, Validate Models, Deploy, Monitor Results
Continuous Integration (CI)

- CI?
- Benefits

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IT WORKS

on my machine
Continuous Deployment

- CD?
- Testing
- Delivery
The workings – R/Studio

```r
> library(usethis)
> prij.path <- file.path(~\gitlab/gaspedemo", "gaspedemo")
> usethis::create_package(~\gitlab/gaspedemo")
> Setting active project to 'C:/Users/Westat/gitlab/gaspedemo'
> Creating 'R/
> Creating 'man/
> Writing 'DESCRIPTION'
> Writing 'NAMESPACE'
> Changing working directory to 'C:/Users/Westat/gitlab/gaspedemo'

> usethis::use_roxygen_md()
> Setting Roxygen field in DESCRIPTION to 'list(markdown = TRUE)'
> Setting RoxygenNote field in DESCRIPTION to '6.1.0'
> Run `devtools::document()`
> usethis::edit_file("DESCRIPTION")
> Modify 'DESCRIPTION'

Package: gaspedemo
Title: Package Developed For CICD Demonstration
Version: 0.0.0.9000
Authors@R:
  person(given = "Zech",
  family = "Kottilil",
  role = c("aut", "cre"),
  email = "me@anon.org")
Description: This package is developed to demonstrate the
  continuous integration and deployment from within R.
Encoding: UTF-8
LazyData: true
RoxygenNote: 6.1.0

> usethis::use_r("gasp_hello")
> Modify 'R/gasp_hello.R'
```
The workings – R/Studio (contd.)

```r
# Show the CI/CD functionality
#
#' @param x The name of the Person who is being welcomed
#'
#' @return The output from \code{\link{print}}
#'
#' @export
#'
#' @examples
#' hellox("Zech")
#' \donttest{
#' hellox("Rose")
#' }

hellox <- function(x) {
  print(paste0("Hello, ", x, "! Welcome to the world of CI/CD at GASP!"))
}
```

- Add Unit Test

```r
> usethis::use_testthat()
✓ Adding 'testthat' to Suggests field in DESCRIPTION
✓ Creating 'tests/testthat/'
✓ Writing 'tests/testthat.R'
> usethis::use_test(name = "gasp_hello.R")
✓ Writing 'tests/testthat/test-gasp_hello.R'
• Modify 'tests/testthat/test-gasp_hello.R'

context("Just Testing Functionality")

test_that("Whether the hello gives us the same output", {
  res = hellox("Zech")
  expect_output(hellox("Zech"), "Hello, Zech! Welcome to the world of CI/CD at GA")
})
```
The workings – R/Studio (contd.)

- Test the Package

```r
> devtools::test()
Loading gaspdemo
Loading required package: testthat
Testing gaspdemo

<table>
<thead>
<tr>
<th></th>
<th>OK</th>
<th>F</th>
<th>W</th>
<th>S</th>
<th>Context</th>
</tr>
</thead>
</table>
| / | 0  |   |   |   | Just Testing Functionality[1] "Hello, Zech! Welcome to the world"
| V | 1  |   |   |   | Just Testing Functionality |

== Results ==

OK:  1
Failed:  0
Warnings:  0
Skipped:  0
```

- Run a Check

```bash
* checking for unstated dependencies in 'tests' ... OK
* checking tests ...
  Running 'testthat.R'
OK
* DONE

Status: OK

R CMD check results
0 errors | 0 warnings | 0 notes
```
The workings – R/Studio (contd.)

- Add a YAML file (.gitlab-ci.yml) for the CI to the project folder

image: r-base

test:
  script:
  - R -e 'install.packages(c("testthat"))'
  - R CMD build . --no-build-vignettes --no-manual
  - R CMD check *tar.gz --no-build-vignettes --no-manual

- Initialize the GitLab Repository and Commit

```r
> usethis::use_build_ignore(".gitlab-ci.yml")
✓ Adding '\\.gitlab-ci\\.yml' to '.Rbuildignore'
> usethis::use_git()
✓ Initialising Git repo
✓ Adding '.Rhistory', '.RData', '.Rproj.user' to '.gitignore'
OK to make an initial commit of 9 files?
1: Not now
2: Yup
3: No

Selection: 2
✓ Adding files and committing
```
Push to GitHub from R/Studio.

C:\Users\Westat\gitlab\gaspdemo>git push --set-upstream https://gitlab.com/kottilils/gaspdemo.git master
Enumerating objects: 20, done.
Counting objects: 100% (20/20), done.
Delta compression using up to 4 threads.
Compressing objects: 100% (15/15), done.
Writing objects: 100% (20/20), 3.70 KiB | 631.00 KiB/s, done.
Total 20 (delta 0), reused 0 (delta 0)
remote:
remote: The private project kottilils/gaspdemo was successfully created.
remote:
remote: To configure the remote, run:
remote:    git remote add origin https://gitlab.com/kottilils/gaspdemo.git
remote:
remote: To view the project, visit:
remote:    https://gitlab.com/kottilils/gaspdemo
remote:
To https://gitlab.com/kottilils/gaspdemo.git
 * [new branch]   master -> master
Branch 'master' set up to track remote branch 'master' from 'https://gitlab.com/kottilils/gaspdemo.git'.
The workings – GitLab

- After Push on GitLab

![GitLab dashboard](image)

CI/CD in R

2018-10-24
Enjoy CI/CD!

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