Session: Reproducible Research

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September 12, 2017

Overview

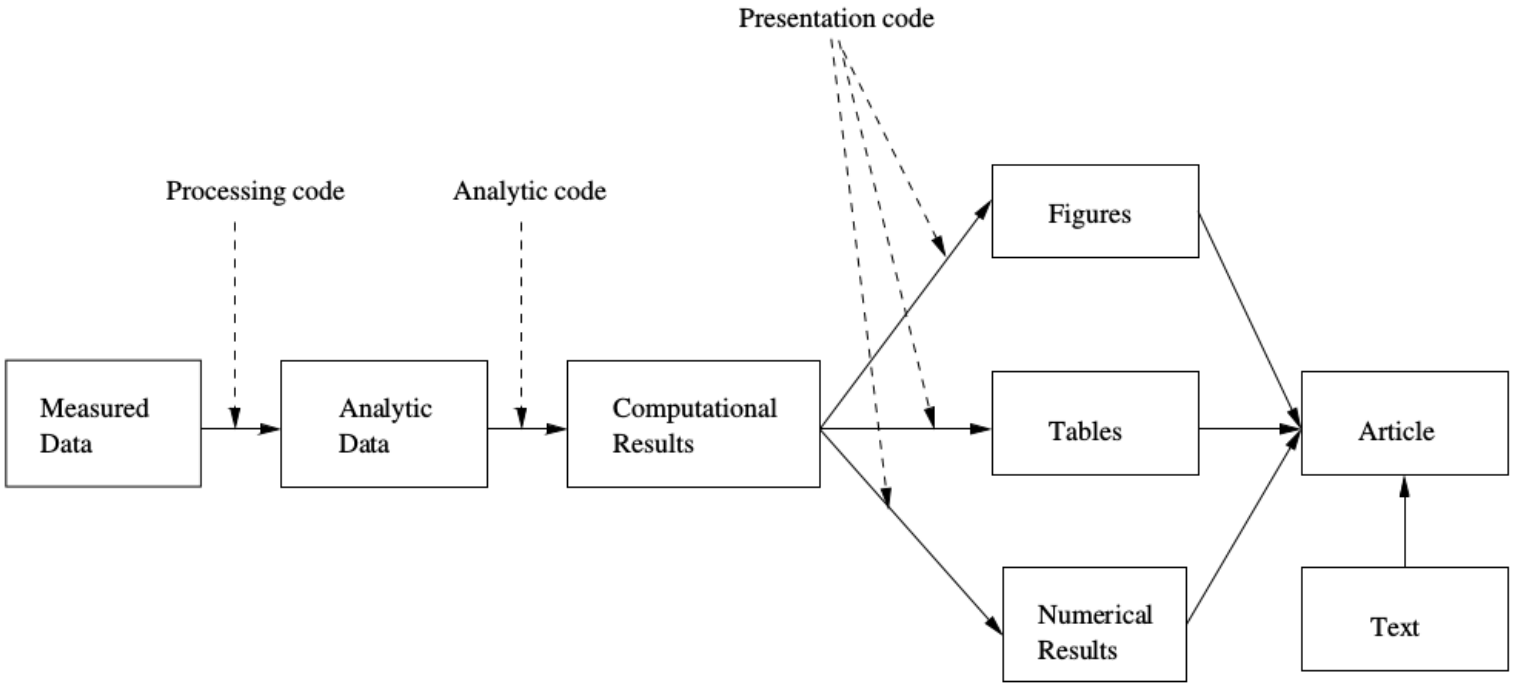
- Some general comments on Reproducible Research
- RMarkdown
- Git/Github

What Makes Research Reproducible?

According to Prof. Roger Peng, Department of Biostatistics and John Hopkins Bloomberg School of Public Health (Peng 2009):

- Analytic data are available
- Analytic code are available
- Documentation of code and data
- Standard means of distribution

Conceptual Look at Reproducible Research



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- It can map the entire process of statistical research in one document!

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- Pandoc Markdown (a slightly revised version of the markup language Markdown (by John Gruber) which can handle multiple output formats and has added new functionalities)
- which has been well integrated into the RStudio IDE.

Where can I find information regarding RMarkdown?

[RMarkdown] (`http://rmarkdown.rstudio.com`)

What can I use RMarkdown for?

[RMarkdown Gallery]
(`http://rmarkdown.rstudio.com/gallery.html`)

Let us do an example!

What should I use RMarkdown for?

- Homeworks
- Reports
- Not: Dissertation
- Not: Highly Standardized Reports

Version Control I

Version Control II

Version control becomes a LOT MORE DIFFICULT if more people are involved!

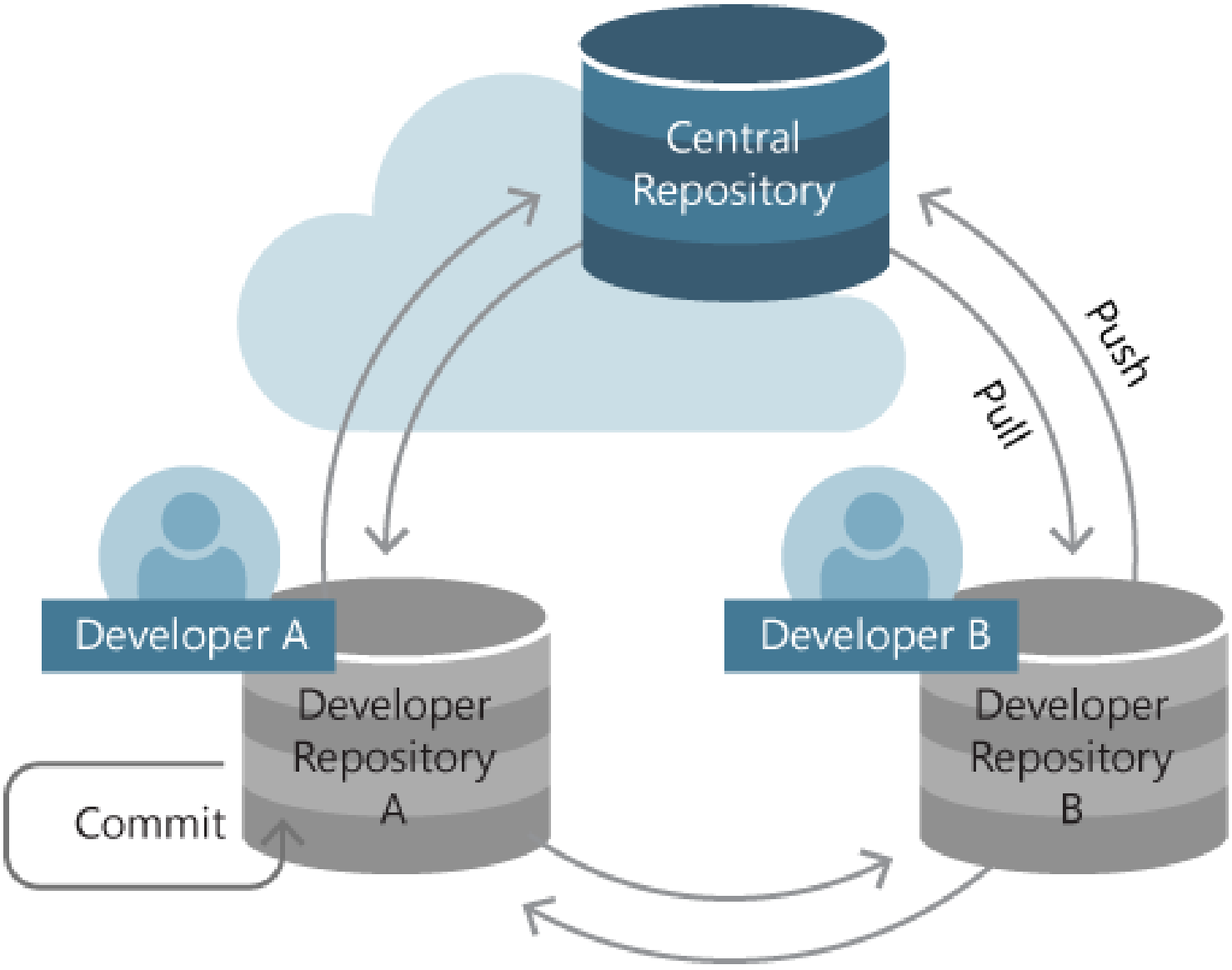
What is Git?

Git is a version control system, originally developed by Linus Torvalds. Its original purpose was to help groups of developers work collaboratively on big software projects. Git manages the evolution of a set of files – called a repository – in a sane, highly structured way.

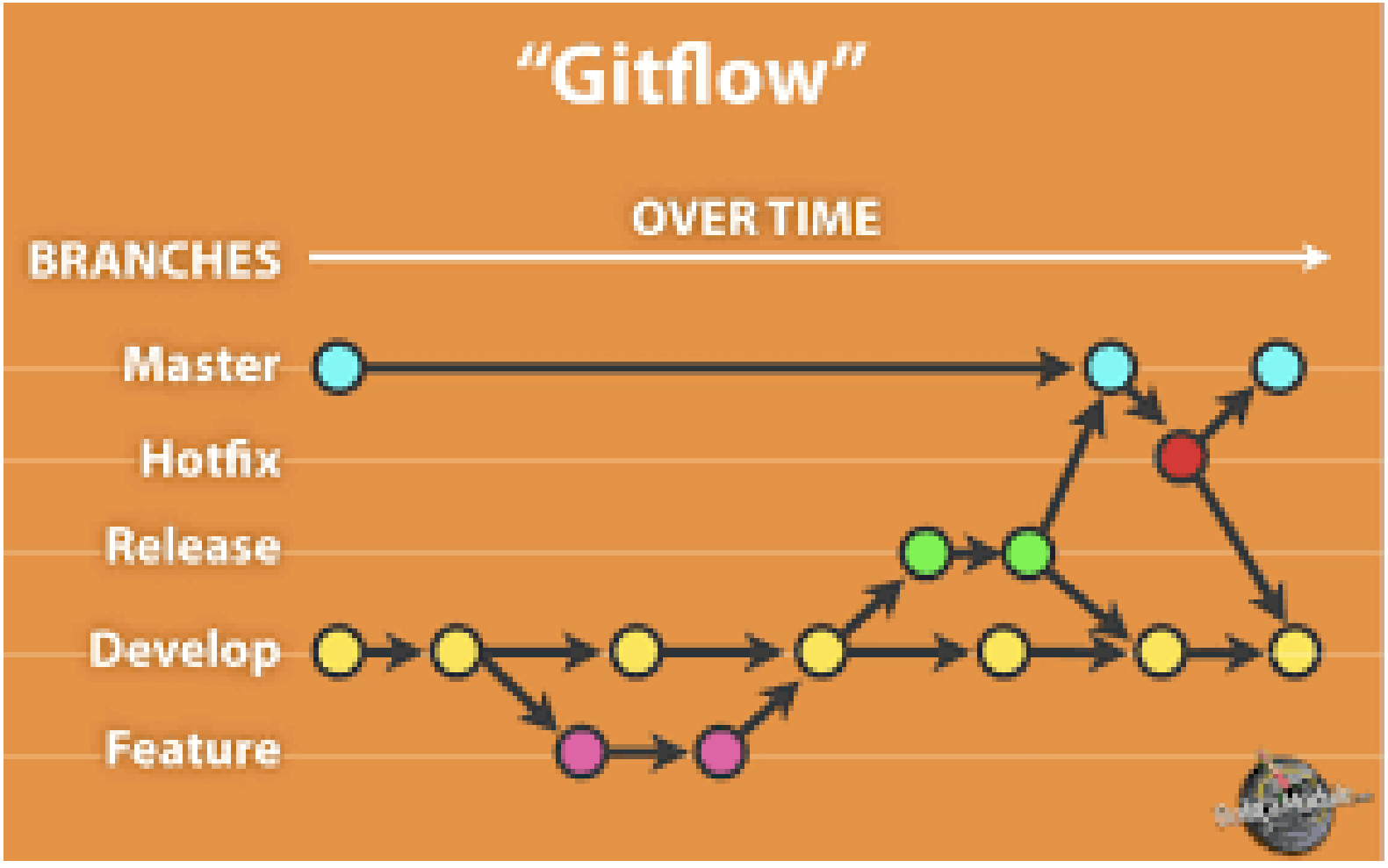
What is GitHub?

GitHub (like Bitbucket or Gitlab) is a hosting service for git-based projects. They add nice web-based interfaces to traditional Git servers.

How does it work?



A typical workflow



Good Resources

`http://happygitwithr.com/` (by Jenny Bryan)

`http://r-pkgs.had.co.nz/git.html` (by Hadley Wickham)

Git for the Data Scientist?

Let us do an example!

References

Leisch, Friedrich. 2002. "Sweave: Dynamic Generation of Statistical Reports Using Literate Data Analysis." In *Compstat 2002 - Proceedings in Computational Statistics*, edited by Wolfgang Härdle and Bernd Rönz, 575–80. Physica Verlag, Heidelberg. `http://www.stat.uni-muenchen.de/~leisch/Sweave`.

Peng, Roger D. 2009. "Reproducible Research and Biostatistics." *Biostatistics* 10 (3): 405–8. doi:10.1093/biostatistics/kxp014.

Xie, Yihui. 2017. *Knitr: A General-Purpose Package for Dynamic Report Generation in R*. `https://yihui.name/knitr/`.