collaborate

R^3 train
noaa-iea.github.io/r3-train

Ben Best
2021-06-14

Overview

Motivation

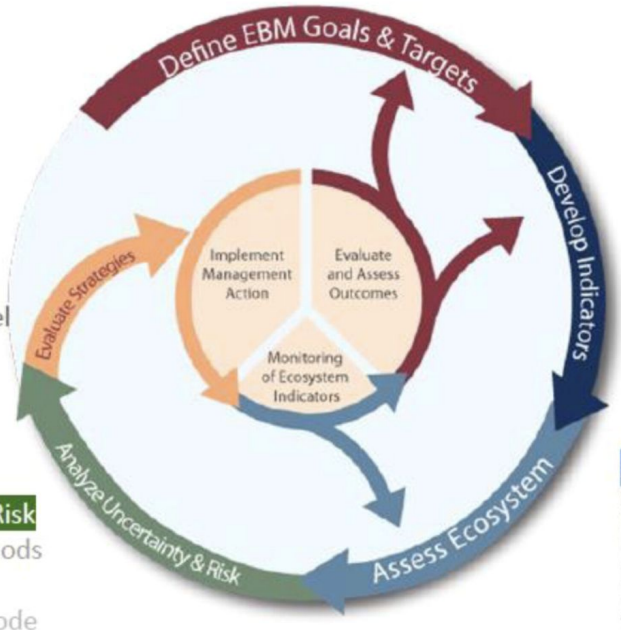
WGNARS

The Working Group on the Northwest Atlantic Regional Sea (WGNARS) helps develop scientific support for integrated ecosystem assessments (IEAs) of the Northwest Atlantic region and to support ecosystem approaches to science and management.

Term of Reference f:

f	Develop best practices for increasing efficiency in product development that can lead to improved responsiveness to management requests	4.1, 4.2, 4.3	1 year (2020)	Workshop on best practices for improving efficiency, transparency, and workflow Timely provision of information to managers (e.g. annual SOEs, Risk assessment) Improved data accessibility Manuscript on best practices

Integrated Ecosystem Assessment (IEA) approach



Evaluate Strategies
Management Strategy Evaluation, Summary products, Web-based visualizations, Model inputs, outputs and parameters, Analysis/Visualization code, R packages*

Develop Indicators
Indicator data sets, Web-based visualization apps, Metadata documentation, R packages/Shared R scripts

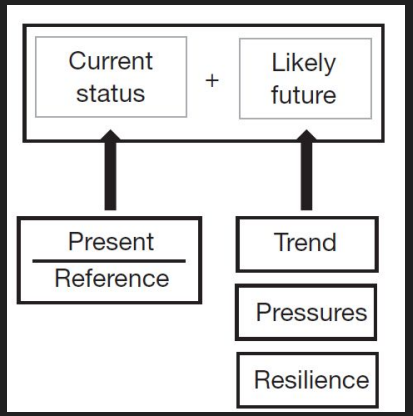
Analyze Uncertainty & Risk
Risk Assessments, Methods documentation, Analysis/Visualization code

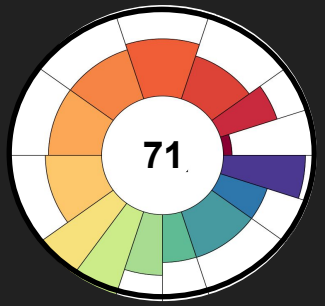
Assess Ecosystem
Ecosystem Status Reports, Report templates, Methods documentation, Analysis/Visualization code

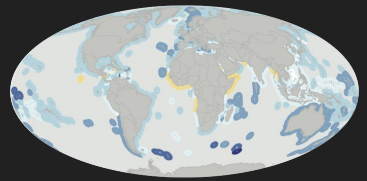
Audience: general, scientific, technical

Bastille et al (2020) **Improving the IEA Approach Using Principles of Open Data Science**

Motivating Example: Ocean Health Index (OHI)





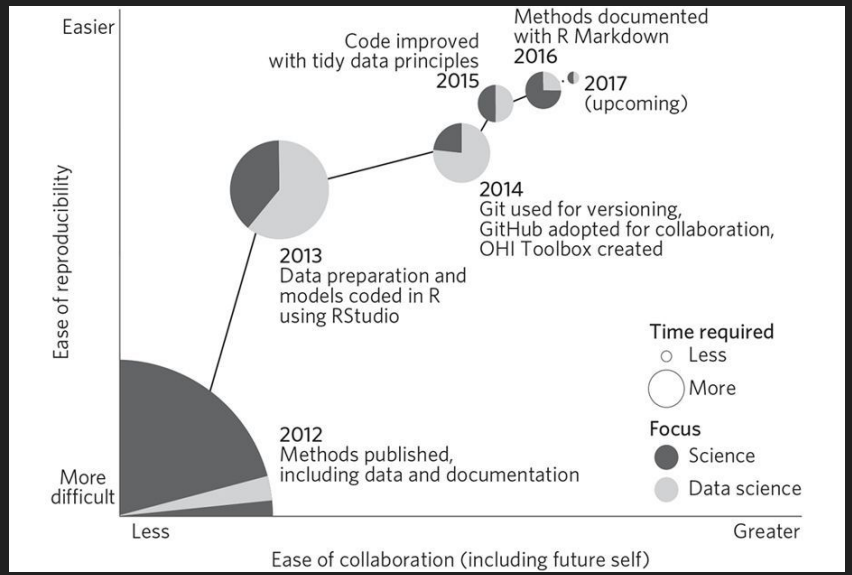


planning & data → goals → models → scores

Halpern et al (2012) An index to assess the health and benefits of the global ocean. *Nature*

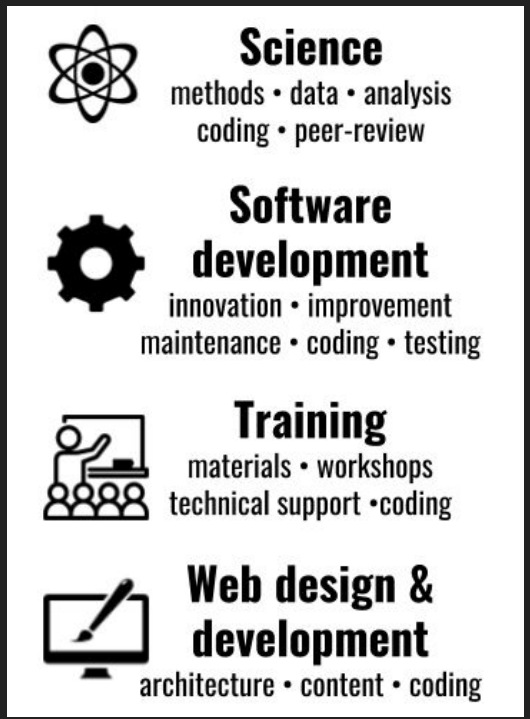
Better science in less time

Tools

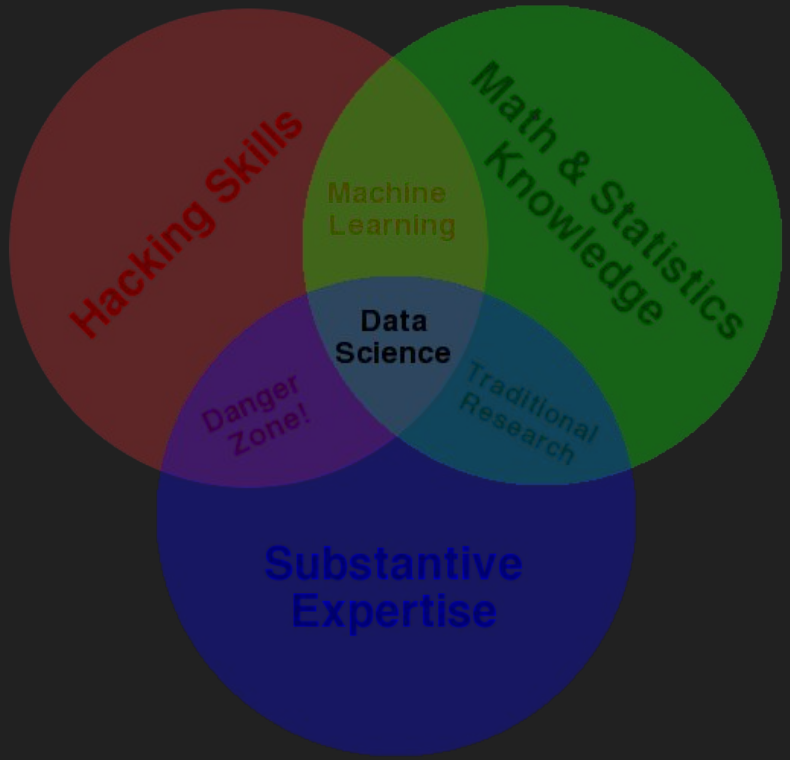


Lowndes, Best, … Halpern (2017) [Our path to better science in less time using open data science tools](). *Nature Eco & Evo*

Process



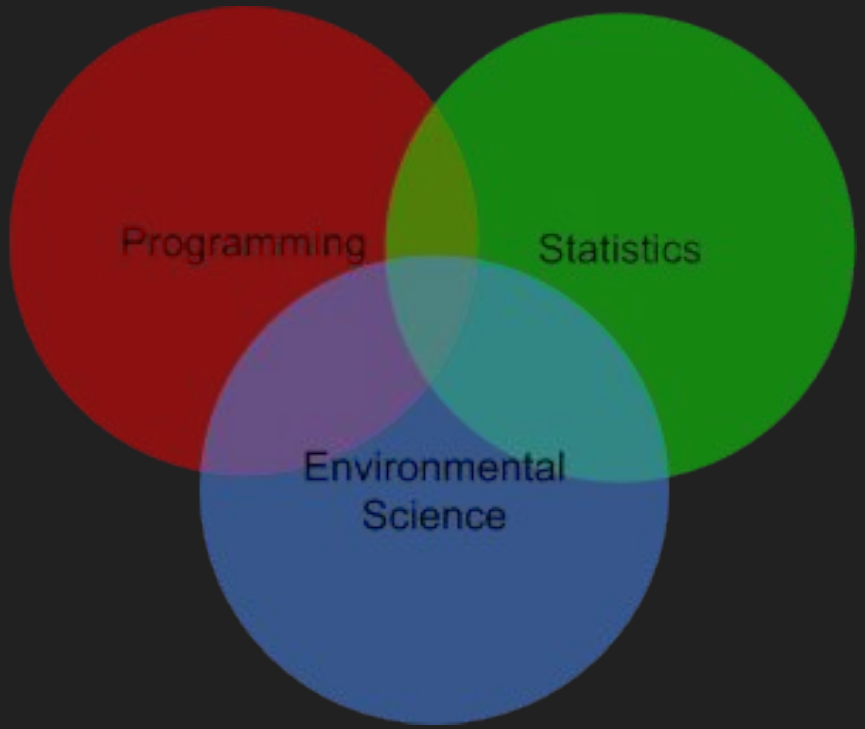
Data Science



- **Hacking Skills**
  scientific programming, web interfaces, database design
- **Math & Statistics Knowledge**
  AI, machine learning, statistical inference, spatial analysis
- **Substantive Expertise**

drewconway.com/zia/2013/3/26/the-data-science-venn-diagram

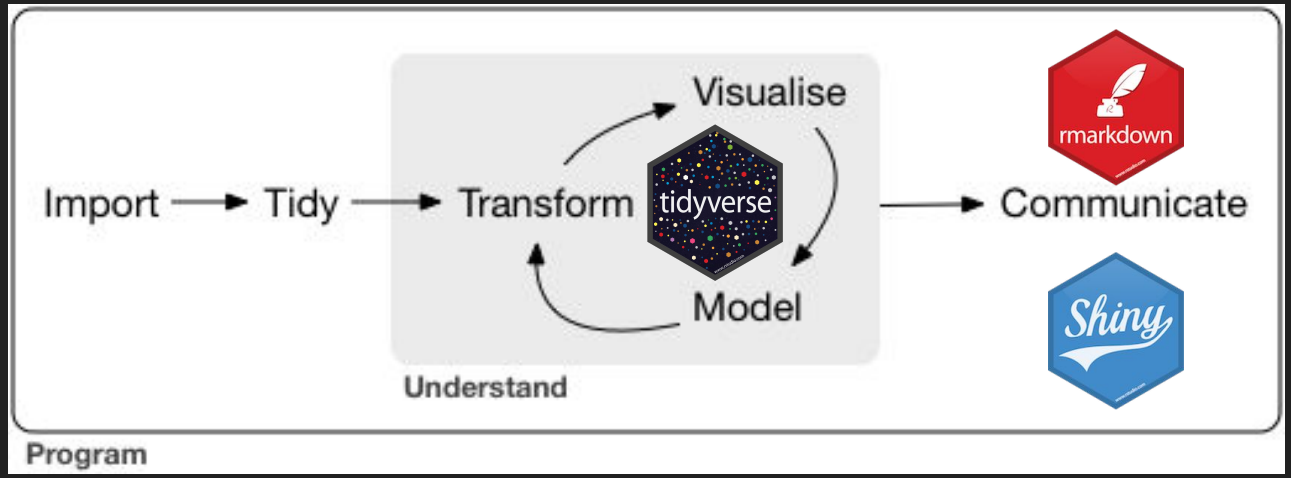
Environmental Data Science

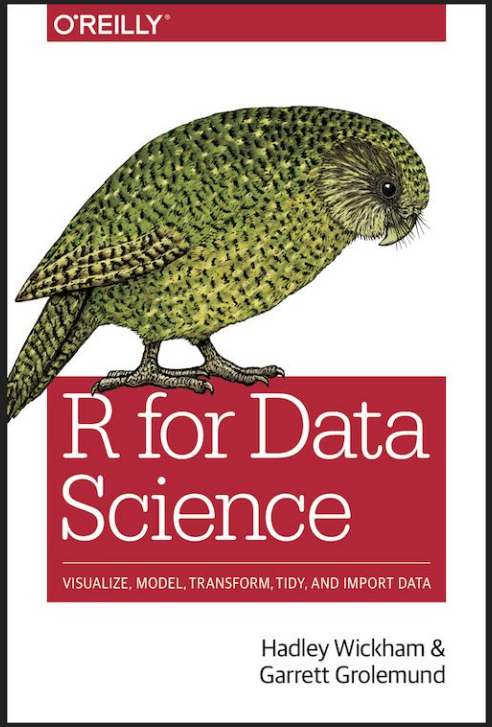


- **Programming**
  scientific programming, web interfaces, database design
- **Statistics**
  AI, machine learning, statistical inference, spatial analysis
- **Environmental Science**
  ecology, evolution, species distributions, connectivity, environmental laws & regulations

drewconway.com/zia/2013/3/26/the-data-science-venn-diagram

R for Data Science





Exploratory Data Analysis

- book: Tukey (1977) Exploratory Data Analysis
- software: **S** (at Bell Labs) → **S-plus** → **R**

What is Rmarkdown?

rmarkdown.rstudio.com

Matching Needs with Capabilities

- Perfect Product Principle **P^3**
  Father Norm Best
  Mechanical engineer, high speed automation machines
  RoboDisk: palette to the robot for microfactories
- **Reproducible Reporting using R^3**
  Ben Best
  Software engineer, automation for ecology
  Data to Decision: report generation

Schedule

1. June 14: **Collaborate**
   Git, Github and Rstudio

2. June 21: **Manipulate**
   readr, dplyr, tidyr

3. June 28: **Visualize**
   ggplot2, plotly, dygraphs

4. July 12: **Map**
   sf, raster, leaflet

5. July 19: **Report**
   rmarkdown, bookdown, flexdashboard, Github Actions

6. July 26: **Infographics**
   infographiqJS, infographiqR

7. August 2: **Applications**
   Shiny, Crosstalk

8. August 9: **Packages**
   usethis, devtools, Roxygen2

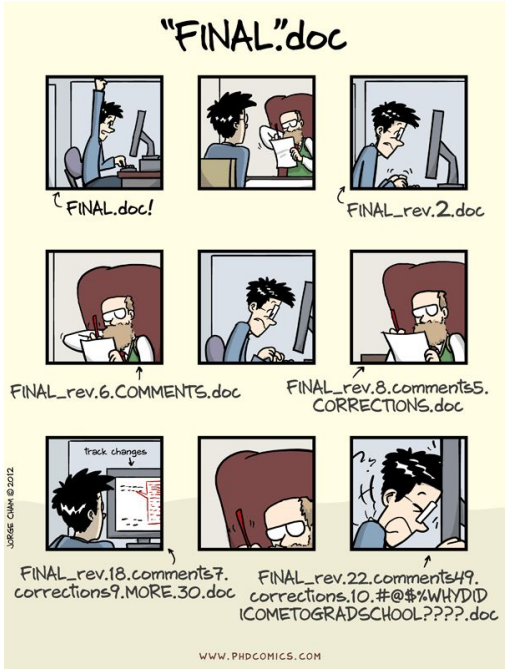
Feedback

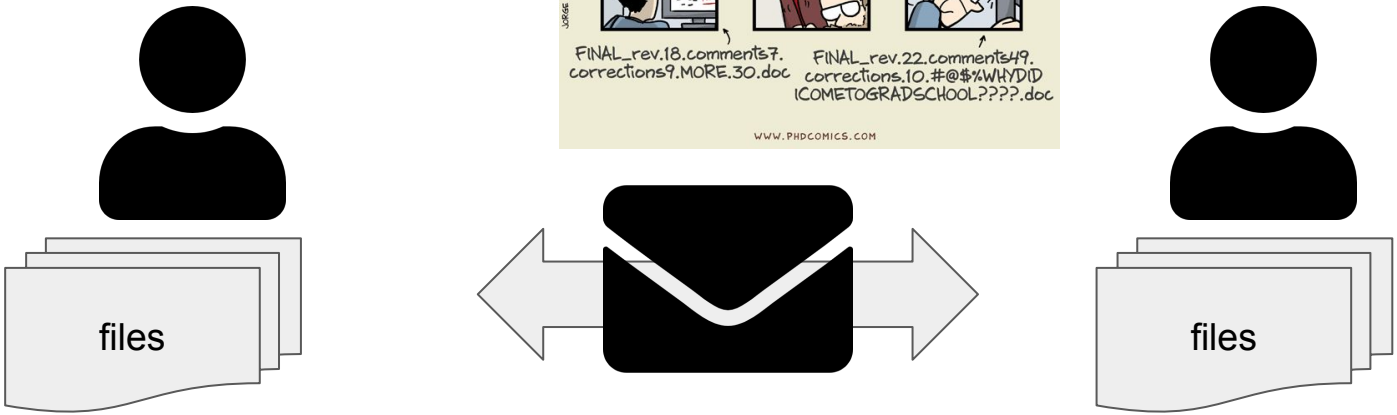
- Webex
  - Chat
  - Raise hand raise to request to speak (after sharing question in Chat)
- Google
  - Slides (here): add comment
  - Doc: add questions/suggestions/references
    notes | r3-train - Google Docs
- Github
  github.com/noaa-iea/r3-train
  - Create Issue
  - Create a Pull Request
- Email
  ben@ecoquants.com

Collaborate

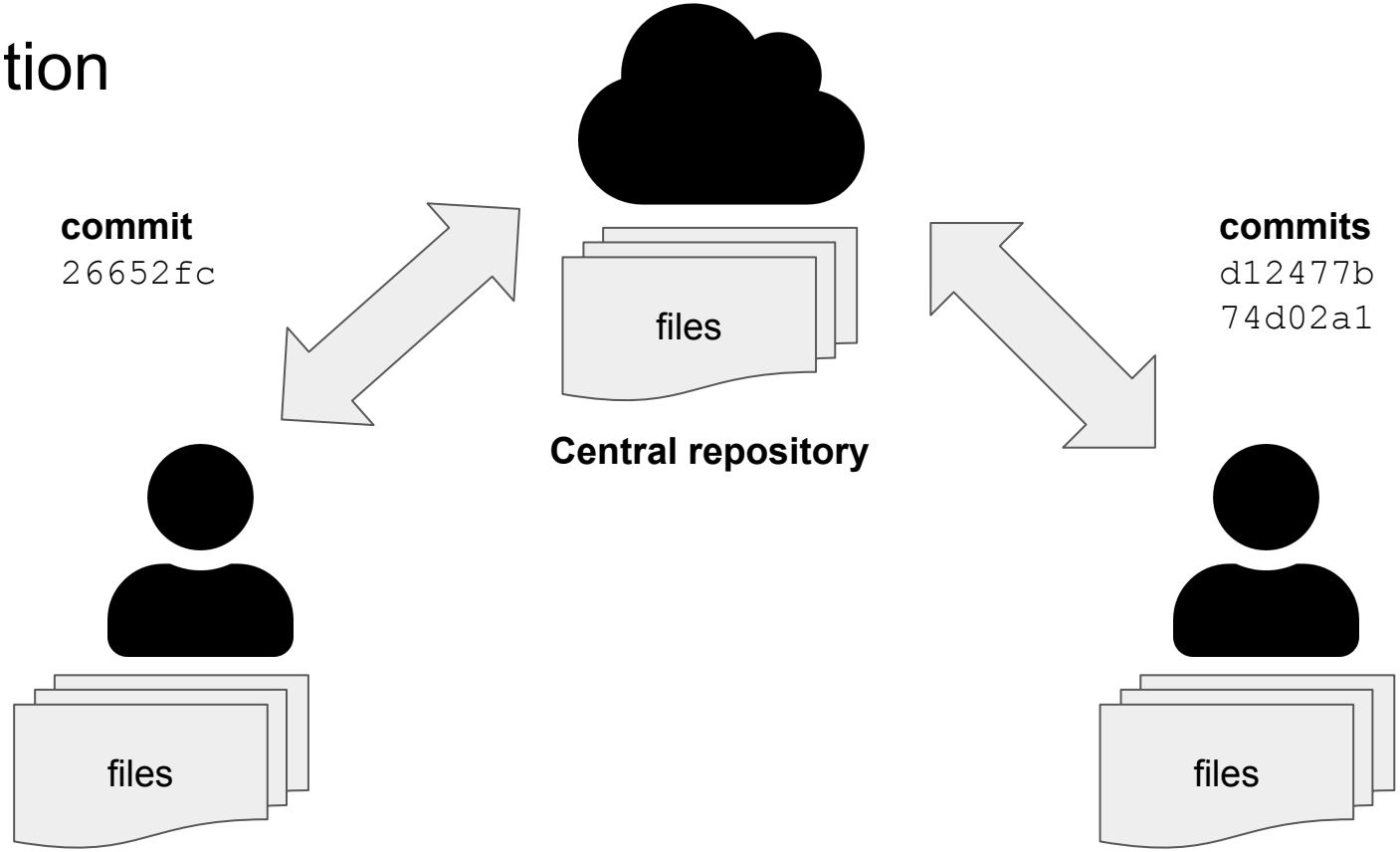
Git, Github, Rstudio

Problem sharing files

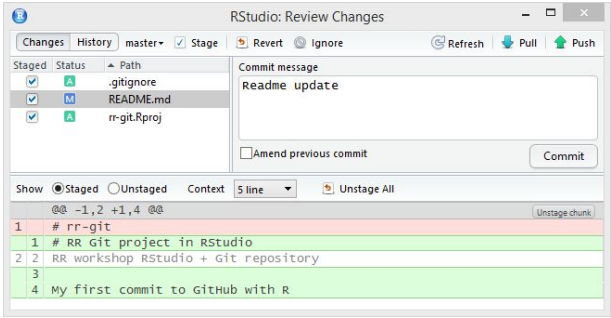




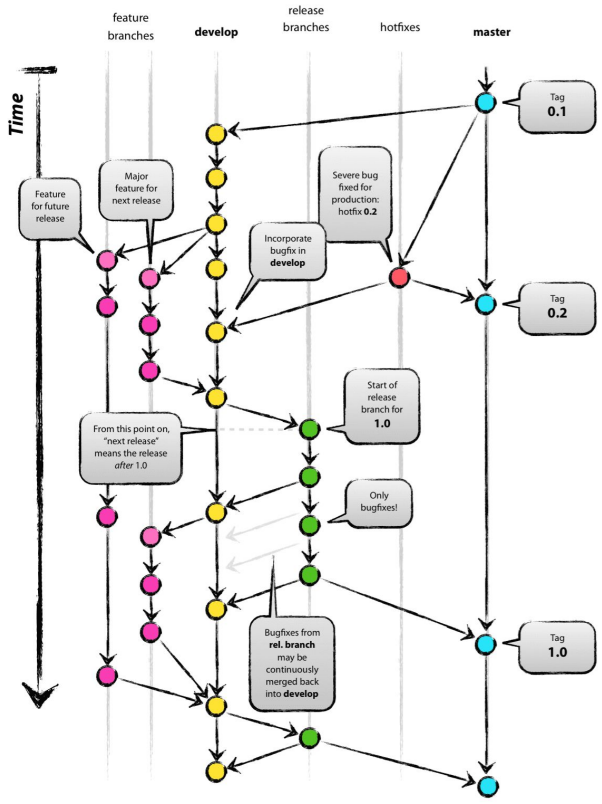
Solution


commit
26652fc
files
Central repository
commits
d12477b
74d02a1
files
files

```
git clone https://github.com/user/repo.git
cd repo
git commit -m "fixed …"
git push
git pull
```



Git and Github can be confusing

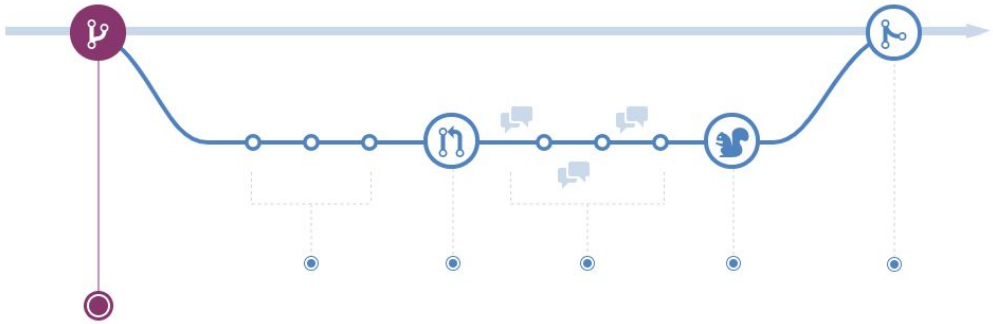


Source: xkcd.com/1597

Github Workflows

- **Simple**
  `pull` & `push`
- **Contribute**
  `fork` & `pull request`
- **Sandbox**
  `branch` & `merge`

- **Pro**
  `branch`, (`pull, commit & push`),
  `pull request`, discuss/iterate, `merge`



Understanding the GitHub flow · GitHub Guides

Lesson

noaa-iea.github.io/r3-train/collaborate.html