Exceptional service in the national interest
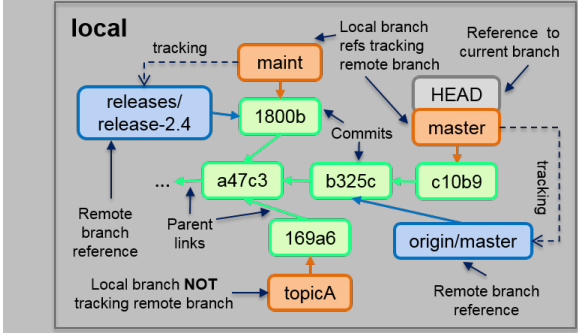
Intermediate Git

Dr. Roscoe A. Bartlett
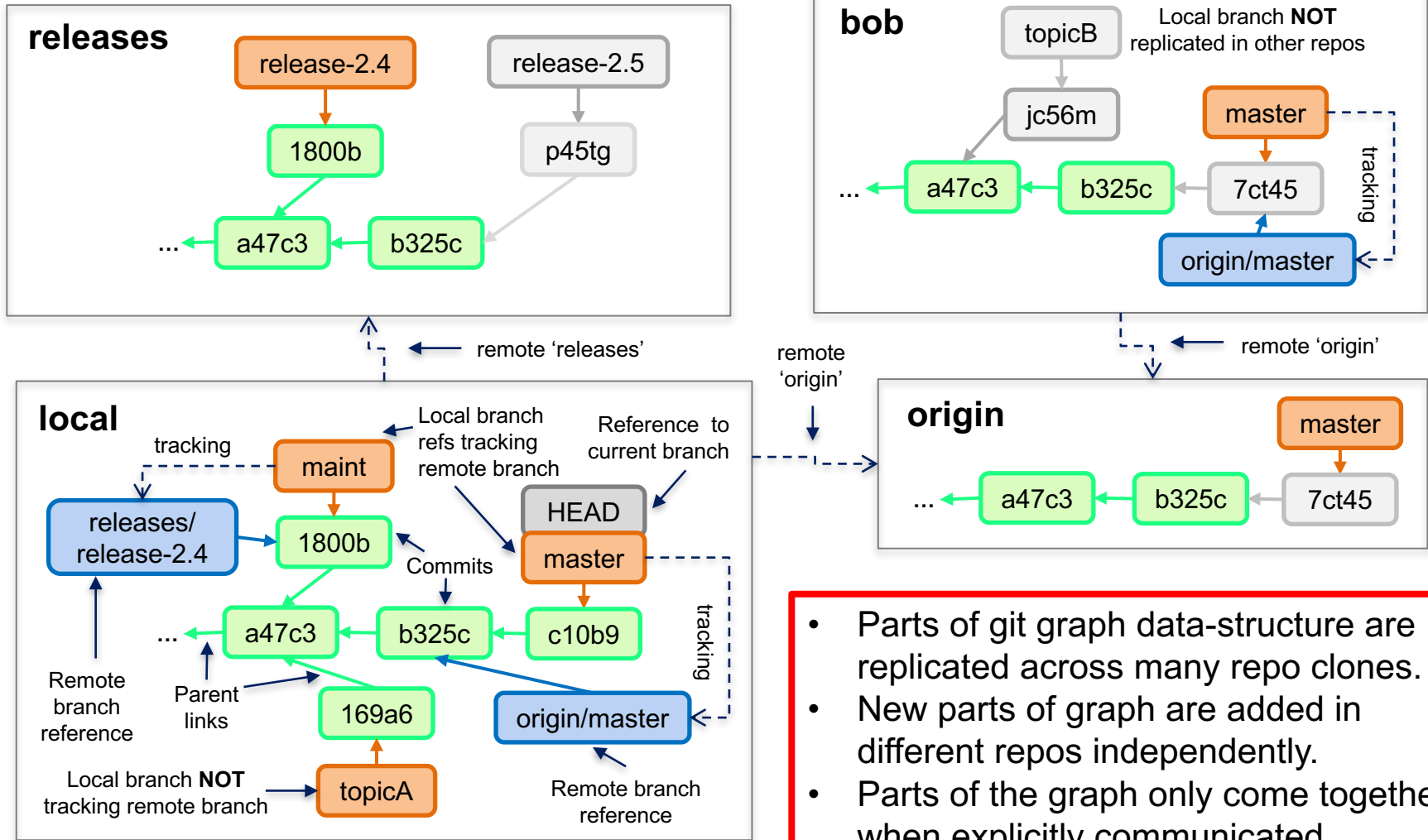
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Overview

- Learn git as a data-structure and set of core algorithms to query and manipulate that data-structure.

- The git data-structure **IS** the best conceptual model for git.

- This data-structure can be seen in local git repo using:
  - git log --oneline --graph <ref>
  - gitk &

- Adopting/adapting workflows is easier once you have a basic understanding of the git data-structure and algorithms.

- Write personal cheat-sheet and memorize just the basic git commands for your adopted workflows (and Google the rest).

- Each project should document commands for adopted workflows (e.g. PETSc and Trilinos).

Material Presented

- IDEAS Project What-is and How-To Documents (https://ideas-productivity.org/resources/howtos/)
    - ["What is Version Control?"](#) (just mention)
    - ["How to Do Version Control with Git in Your CSE Project"](#) (skim)
- [Git Tutorial and Reference Collection](#):
    - [Critical Beginner Git Usage Tips](#) (skim)
    - [Visual Git Reference](#) (in depth)
    - [Visualizing Git Concepts with D3](#) (git revert, fetch, pull, push, tag)
    - [The Git Object Model](#) (skim)

Goal: Present some basics and gain some comfort & familiarity with these sites so that you can go back and complete the learning of the basic git data-structures and core algorithms.

The Distributed Git Data-Structure

releases

release-2.4 → 1800b → a47c3 ← b325c

release-2.5 → p45tg → b325c

...

bob

Local branch **NOT** replicated in other repos

topicB → jc56m → a47c3 ← b325c ← 7ct45

master → 7ct45

... tracking

origin/master

remote 'releases'

remote 'origin'

local

tracking

Local branch refs tracking remote branch

Reference to current branch

maint → 1800b

releases/ release-2.4 → 1800b

HEAD → master

master → c10b9

Commits

a47c3 ← b325c ← c10b9

... ← a47c3

Remote branch reference

Parent links

169a6

origin/master

tracking

Local branch **NOT** tracking remote branch → topicA → 169a6

Remote branch reference

origin

master → 7ct45

... ← a47c3 ← b325c ← 7ct45

remote 'origin'

- Parts of git graph data-structure are replicated across many repo clones.
- New parts of graph are added in different repos independently.
- Parts of the graph only come together when explicitly communicated.
- All parts of the distributed replicated graph may never come together!

Legend: | xxxxx | objects are not in 'local' repo

4

Summary

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