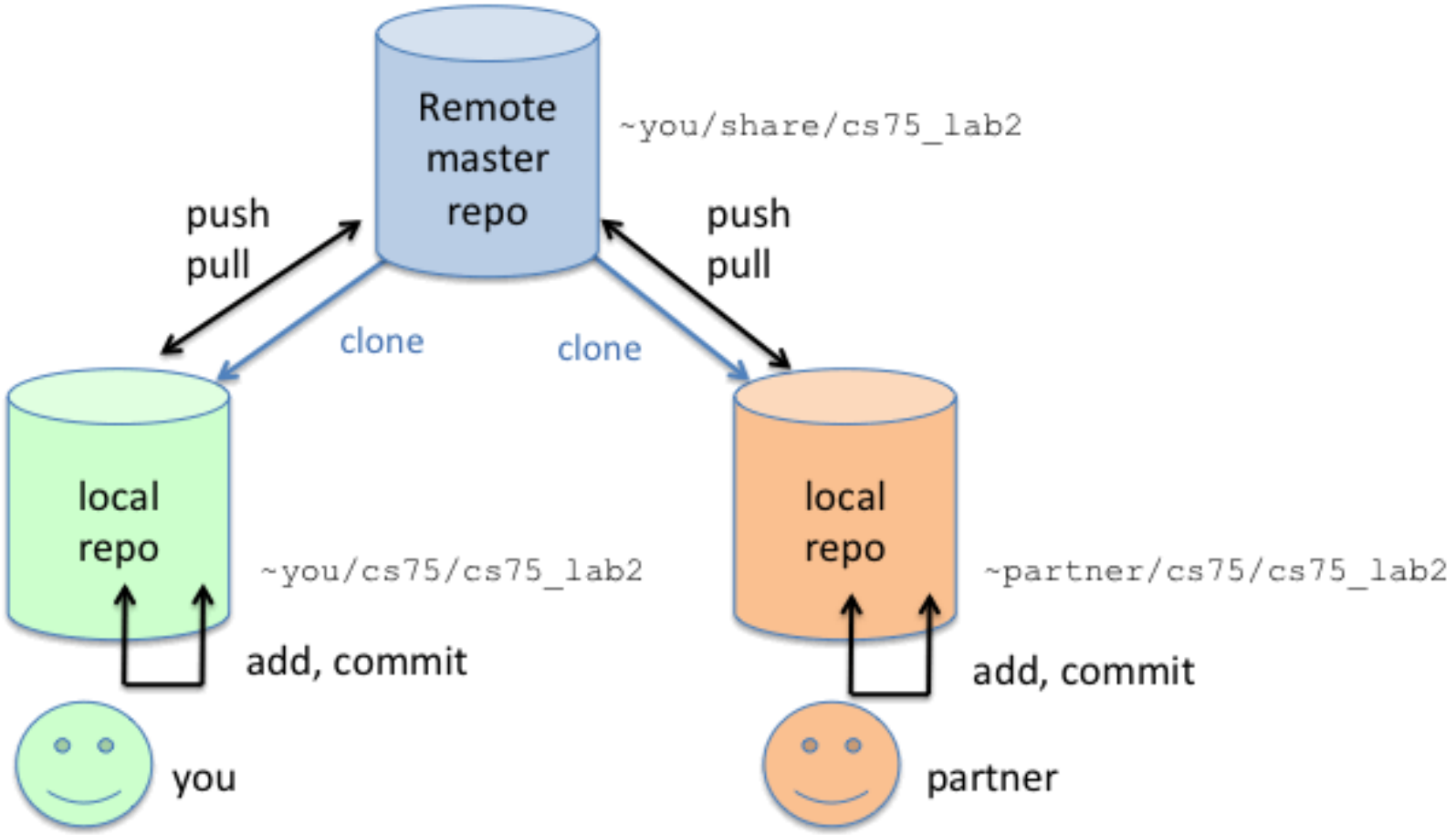
Git lab 4

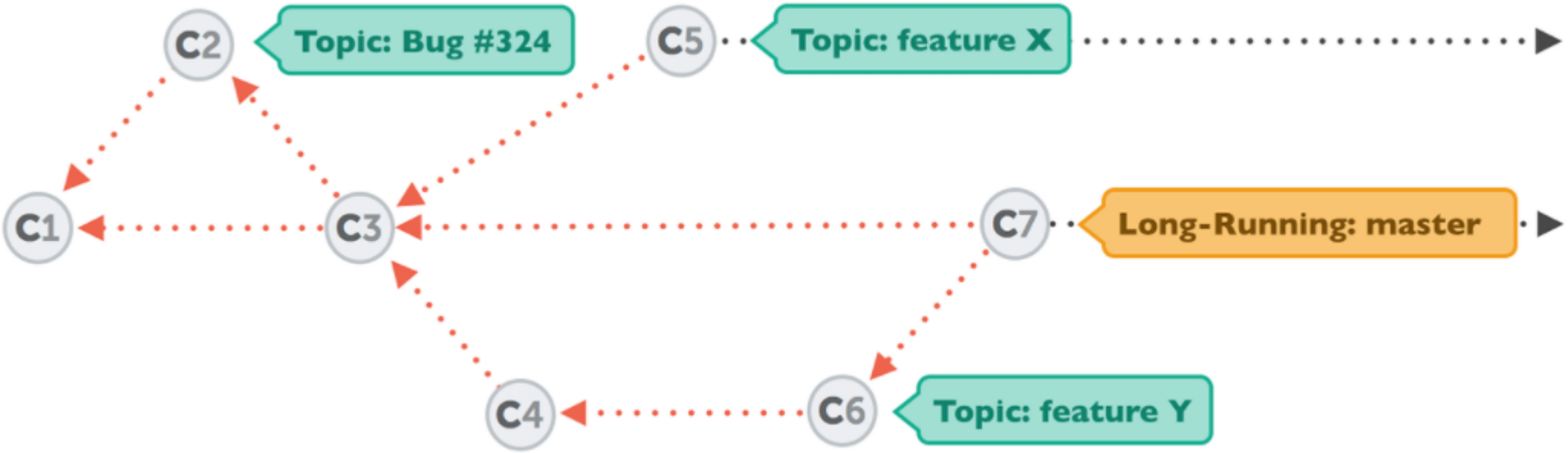
3 Collaborative development workflow

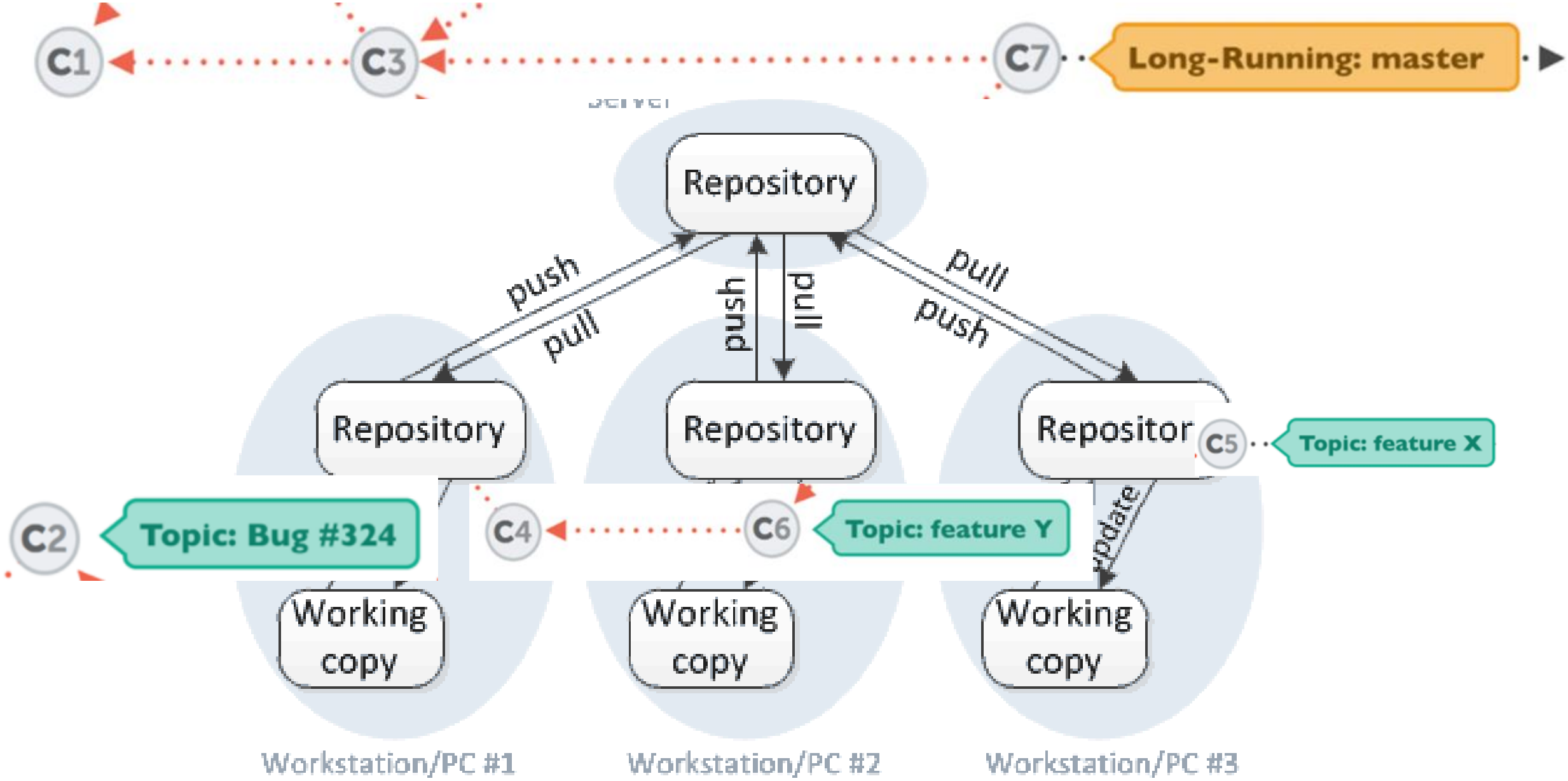
Remote repos



Using branches in Git

When a particular line of work in a side branch is complete, we can merge it back into the main / master branch





Git lab 4

11 Cloning shared repo

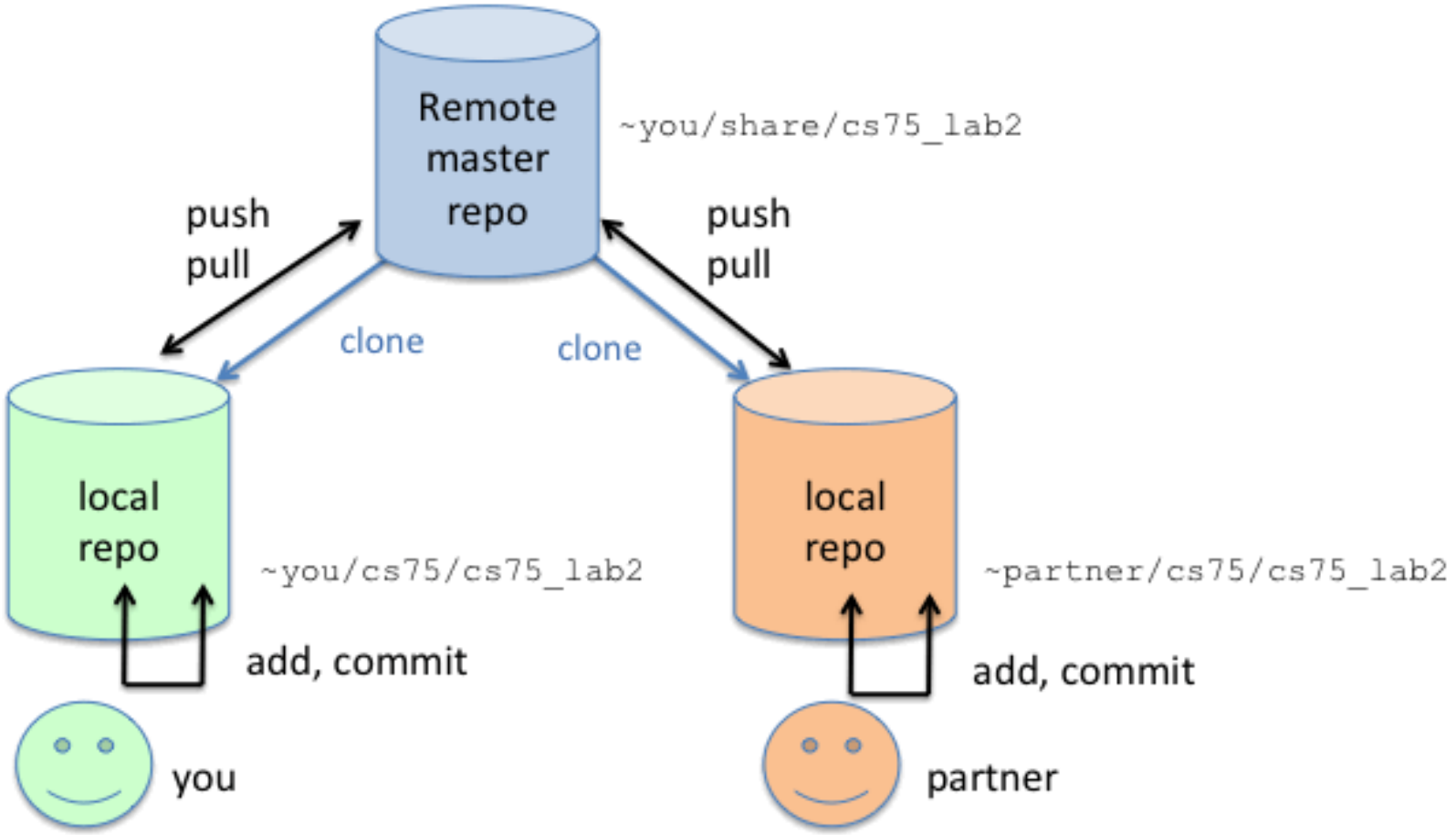
Interacting with remote repos

- Users will clone the remote repo to a local repo on their individual machines
  - This is known as the working copy
  - Subsequent development work will be done in this working copy
- Interactions occurs in both directions
  - Users will periodically push (upload) some or all of the latest content in their local repo to update the remote repo
  - Other users can then pull (download) from remote repo to update their local repo with the changes pushed up by a particular user

Git lab 4

12 Getting info on the remote repo

Remote repos



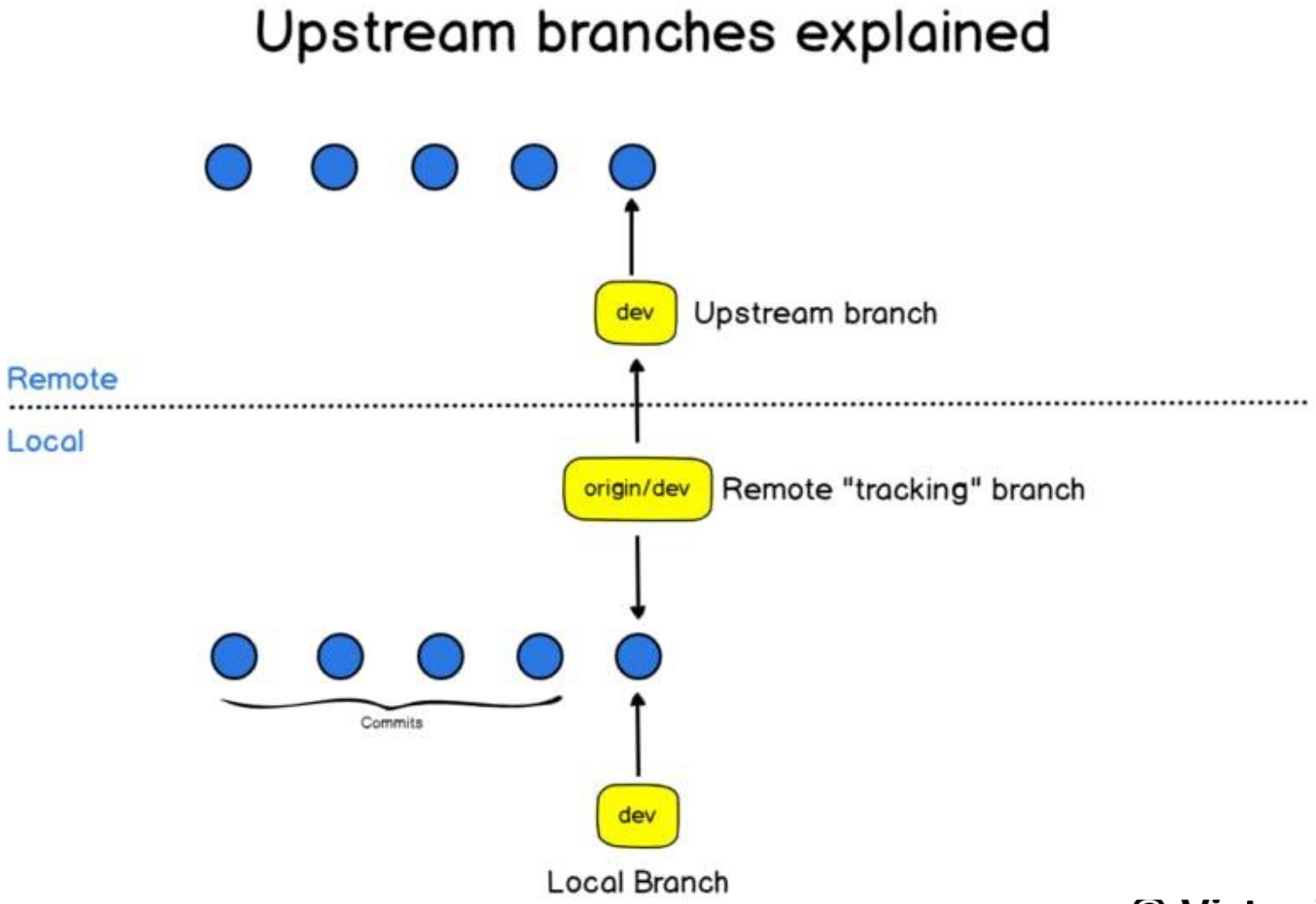
Remote repo vs local repo

- After initial clone operation
  - every branch (master / main + other branches) and their content in remote repo is duplicated on local repo
- Even though content is identical, these branches are distinct from each other
  - Branches in the remote repo -> **upstream / remote** branches
  - Branches in the local repo -> **local branches**

Remote tracking branches

- References to upstream branches that are stored in the local repo
  - Allows local repos to keep track of the evolving state of the remote repo
  - Have the format **remote-name/branch-name**
- Associates a local branch with a upstream branch (typically the same name)
  - The local branch is called the **tracking branch**
  - The association (tracking relationship) simplifies the process of transferring content between the local tracking branch and its upstream counterpart.

Remote tracking and upstream branches



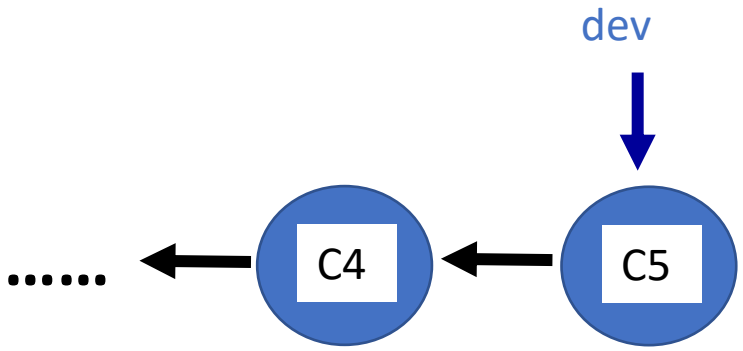
Git lab 4

13 Pushing feature branch to remote repo

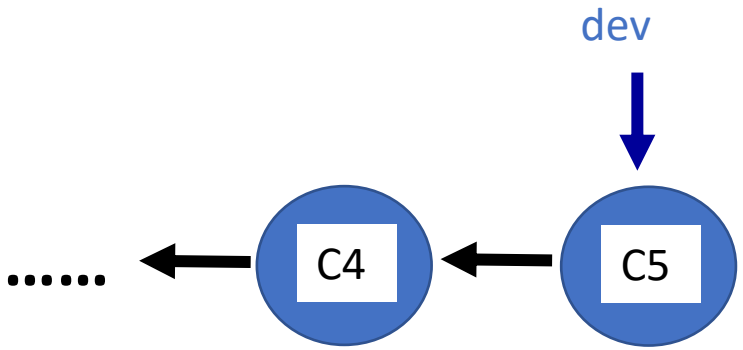
Push / pull

- The local and upstream branches are updated independently of each other

Immediately after initial clone

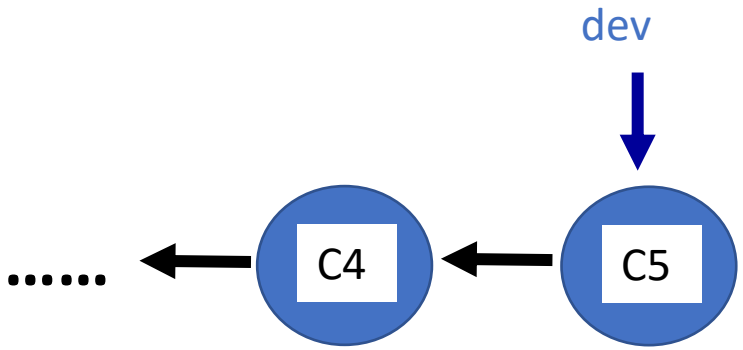


REMOTE REPO

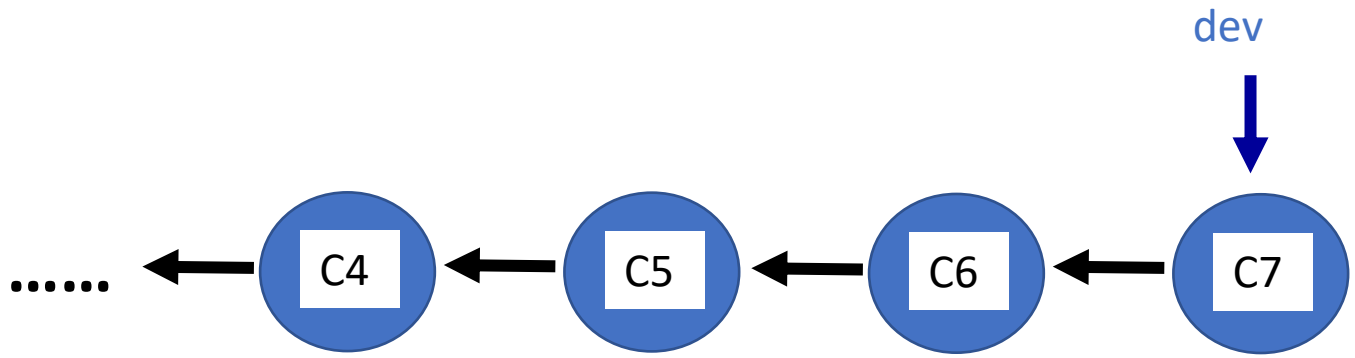


LOCAL REPO

Additional commits added to local branch over time



REMOTE REPO



LOCAL REPO

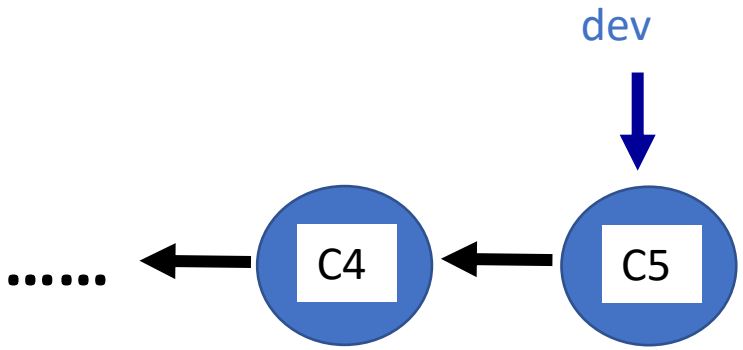
Push / pull

- The local and upstream branches are updated independently of each other
  - The contents of these two branches can be integrated (merge / rebase)
- Push
  - integrates content from local branch into upstream branch
- Pull
  - integrates content from upstream branch into local branch

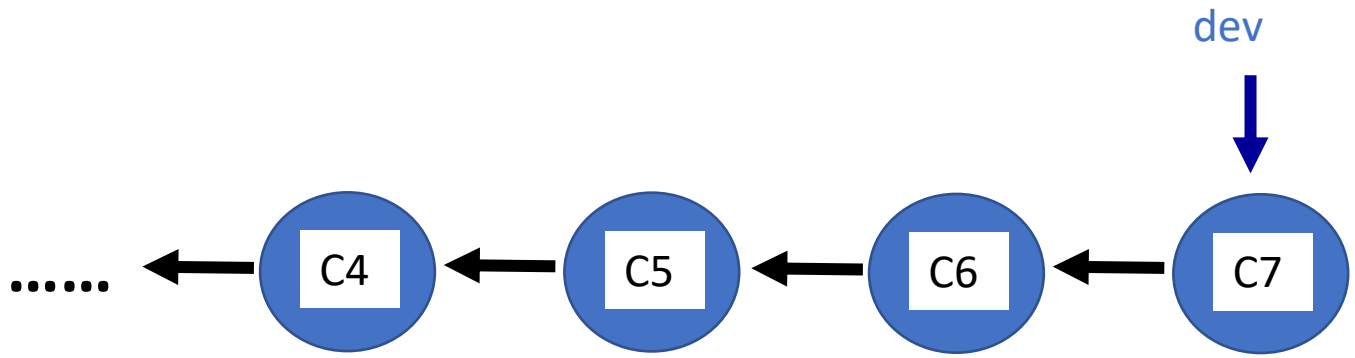
Integrating branches

- 2 general strategies
- Merge
  - The most commonly used
  - Fast forward merge (non-divergent) or 3-way merge (divergent)
- Rebase
  - More complex
  - Use for specific situations

Additional commits added to local branch over time

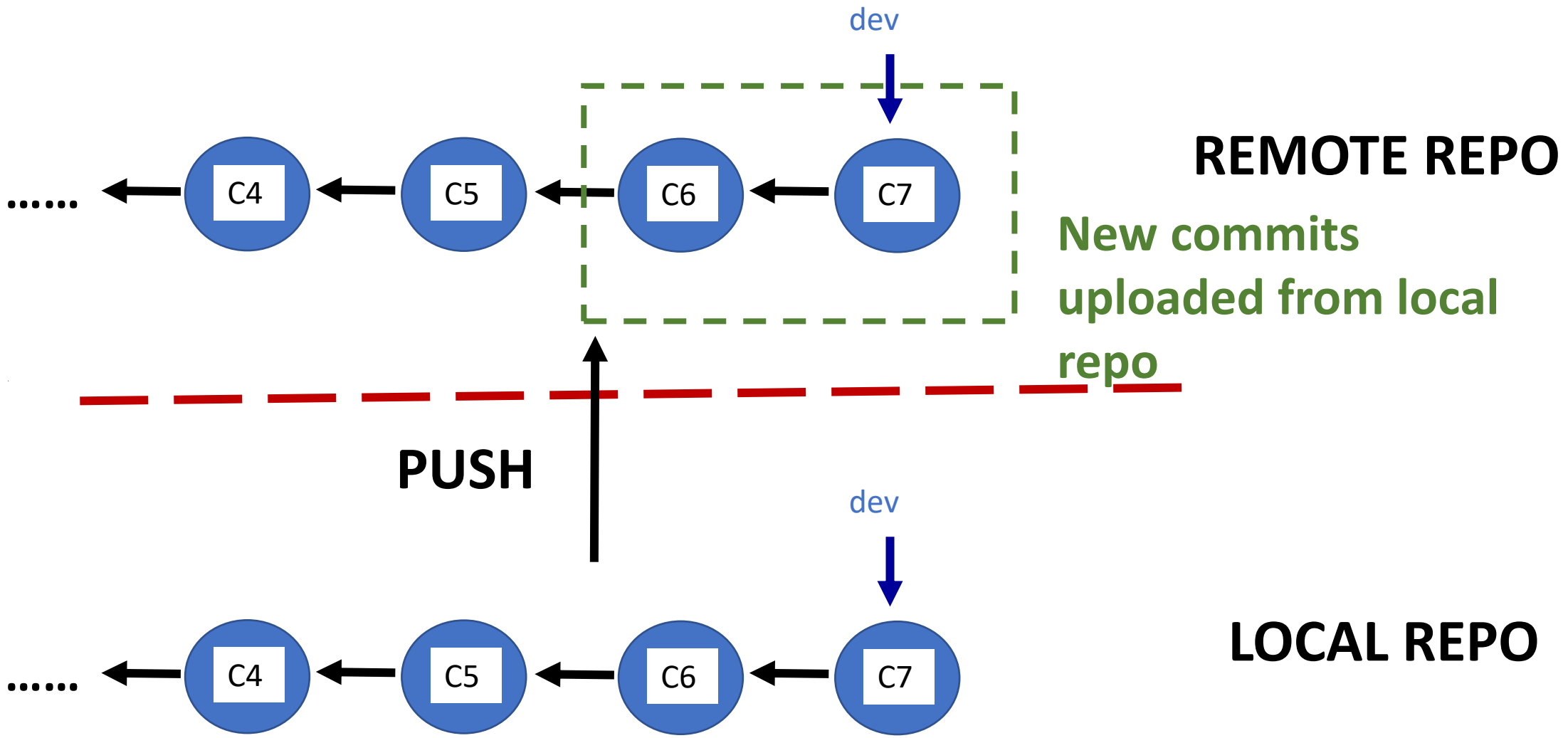


REMOTE REPO



LOCAL REPO

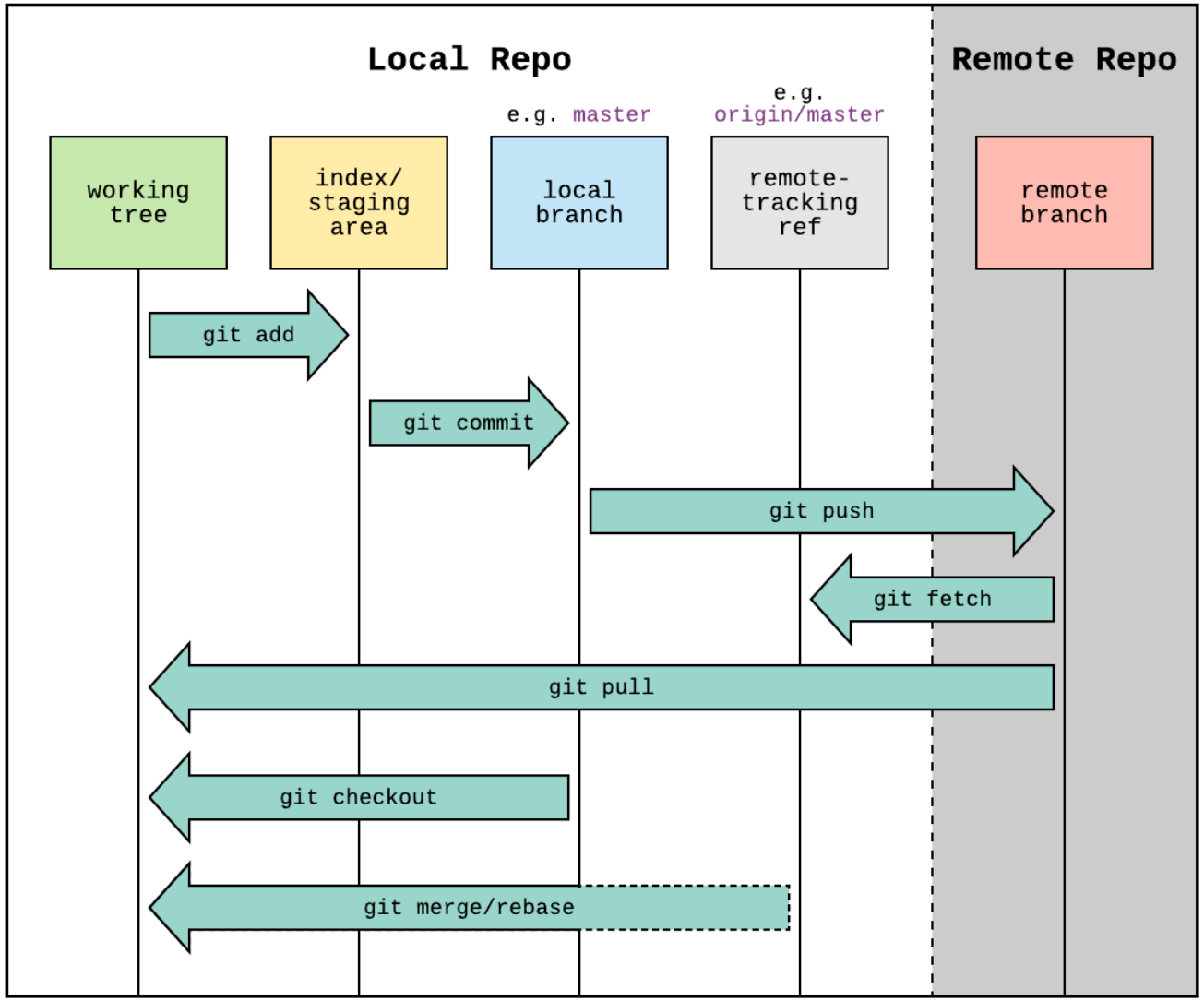
Fast forward merge when upstream and local branch are non-divergent



Git lab 4

21 Merging updates

Remote / local workflow

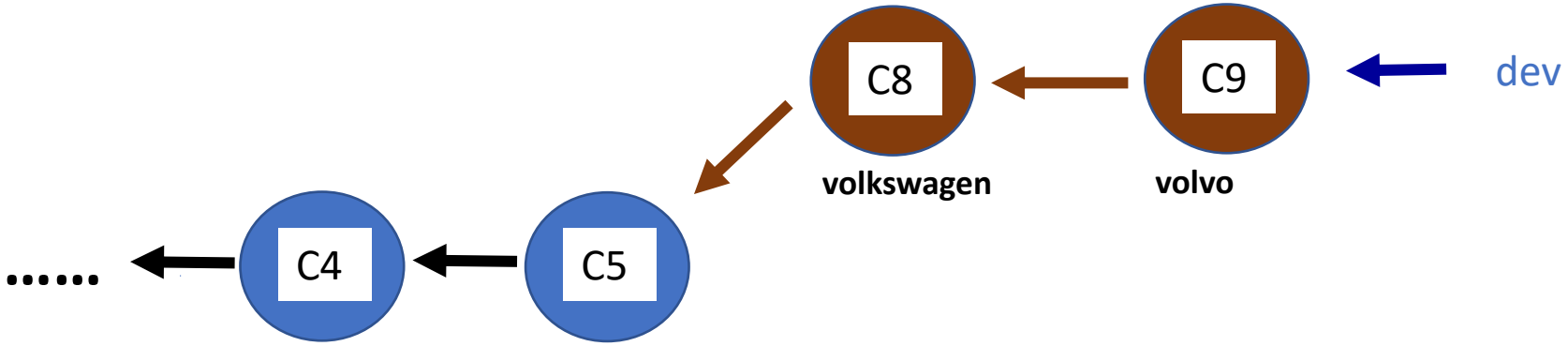


git pull =
git fetch (to update remote tracking branches) +
git merge / rebase (to integrate upstream into local branch)

Git lab 4

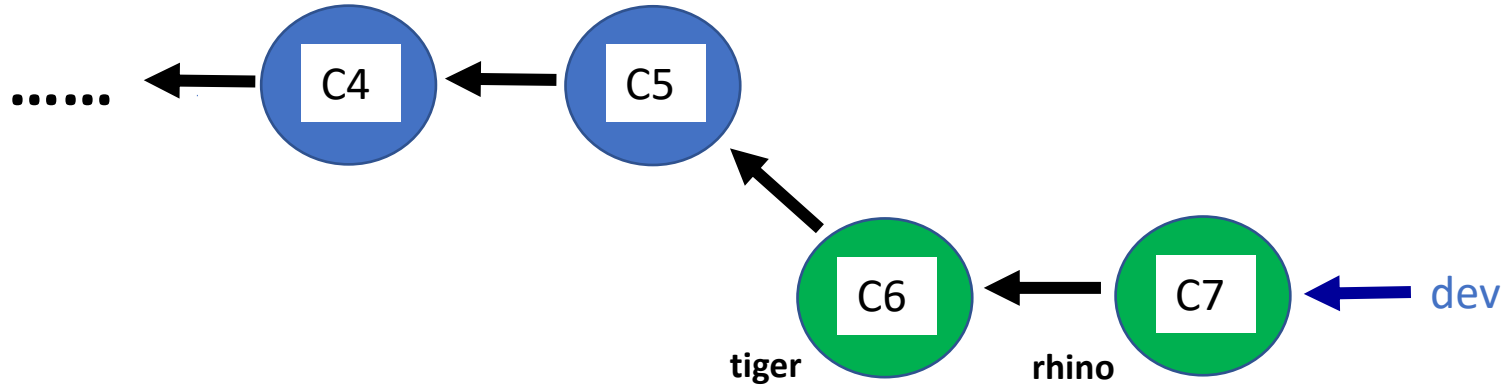
25 Resolving merge conflicts

Divergent local and upstream branches

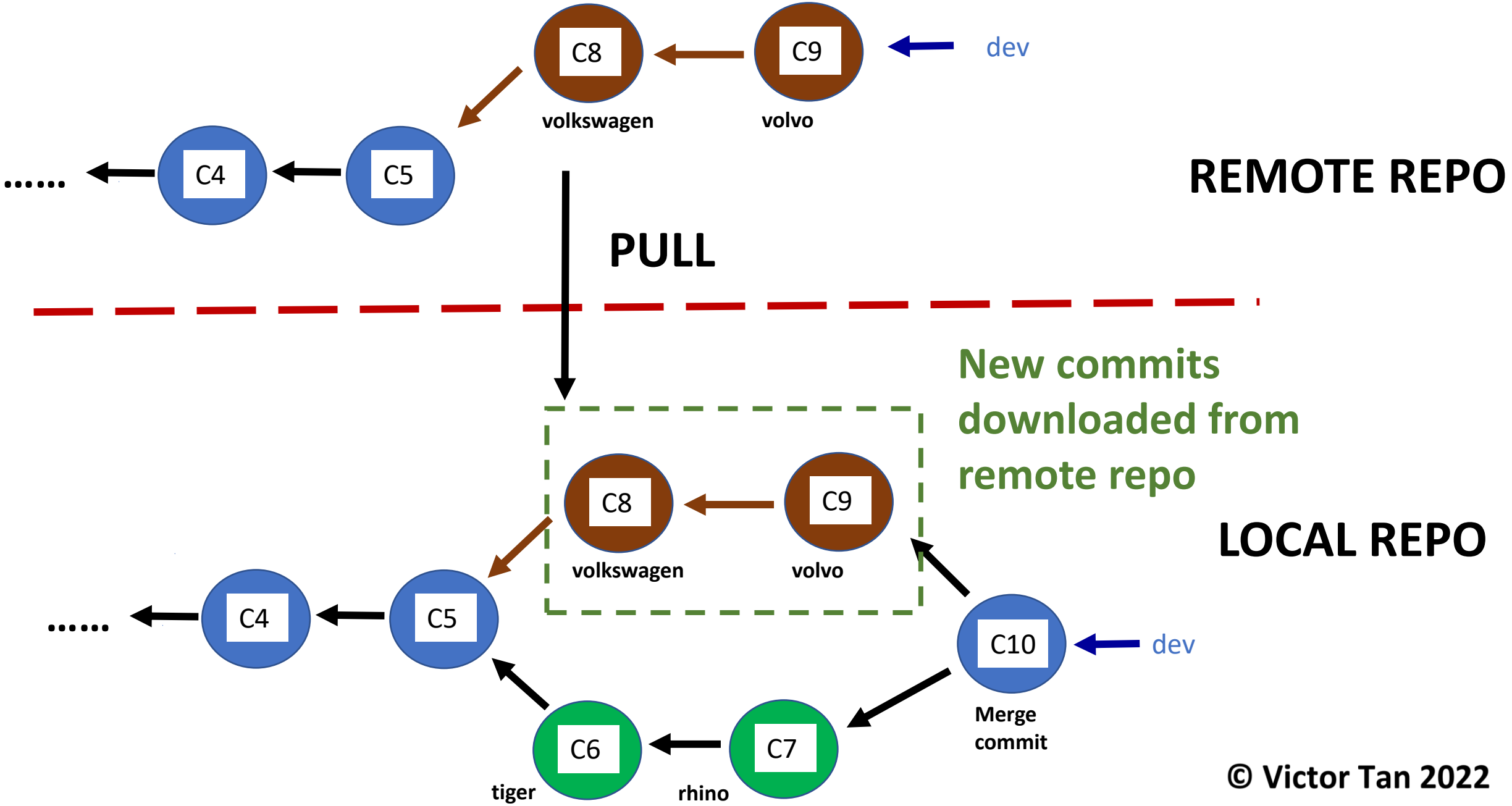


REMOTE REPO

LOCAL REPO



3 way merge for divergent local and upstream branches



Integrating local / upstream branches

- Fast forward merge can be applied in both directions
  - Push or pull
- 3 way merge can only be applied for pull
  - This is because merge conflict can only be resolved manually in a local repo
  - Git will prevent any attempt to push to remote repo that results in merge conflict