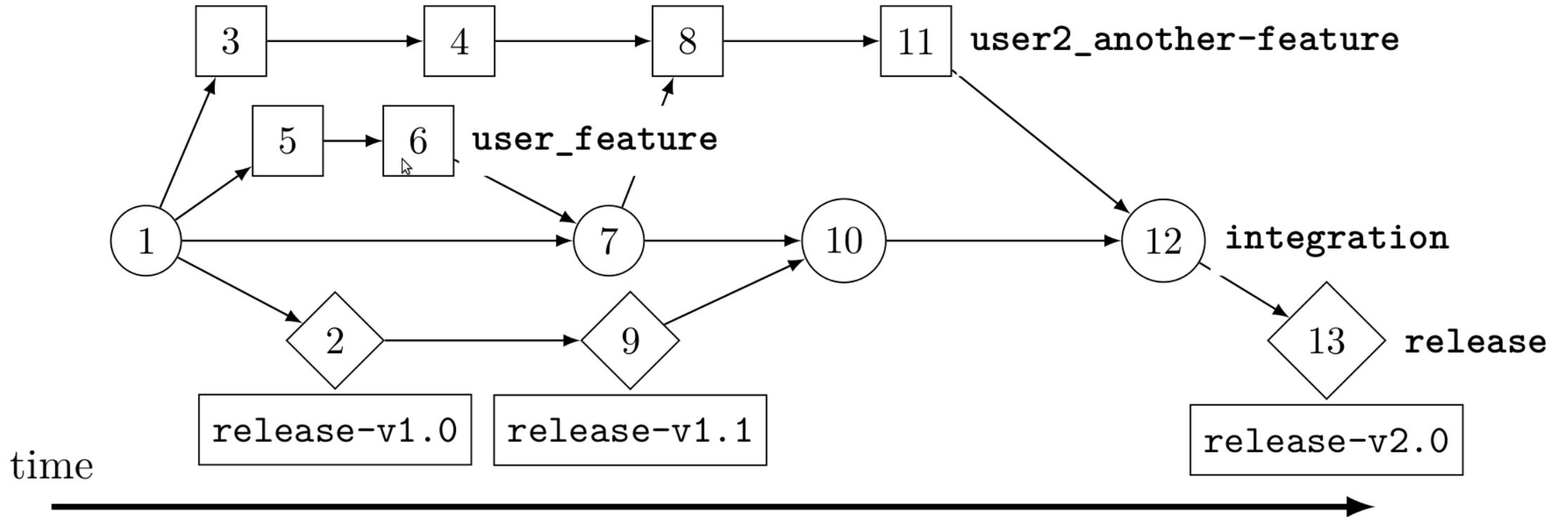


# Git branching

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# HPCSSS Gitflow



# HPCSSS Gitflow

**HPCSSS:** High Performance Computing for Scientific Simulation Software

- Circle, square, diamond: commits
- Numbers: commits' ordering in time
- Arrow: starting point is the parent, arrival is the child
- Text in bold: branches with commits that were made in this branch in the same horizontal line
- Rectangles at the bottom: tags

# Merge or Rebase, that is the question

## Merge: the historian view

- The commit history of the project should not be changed
- Repository should contain what actually happened

## Rebase: the project maintainer view

- The commit history is the story of how the project was made
- You would not publish the first draft of a book
- Telling a nice story is easier to read for future collaborators
- ⚠ intermediate commits might not work anymore...

# What about binary files ?

- git not really helpful with binary files
- but git can store them for small ones
- `git annex` should be preferred for large files (or `git lfs` at least)

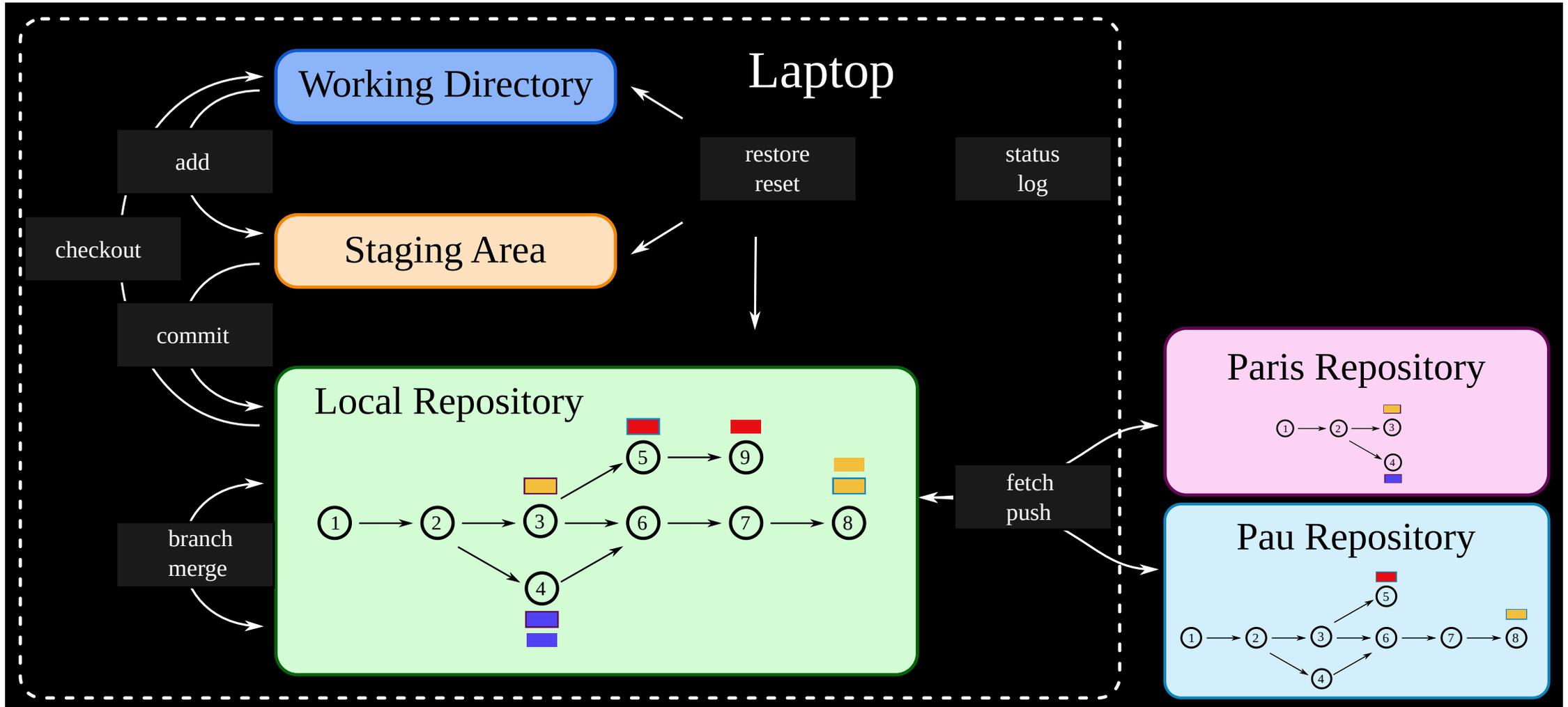
# References

- <https://git-scm.com/book/fr/v2>
- <http://git-scm.com/doc>
- <http://nvie.com/posts/a-successful-git-branching-model/>

# Hands-on: Shopping list

- Follow the next section "git in real life" of the [hands-on](#)
- **Fork the repository on gitlab (one per group) and clone it on your laptop and follow instructions.**

# Commands overview



# My god, a conflict !

1. Etienne and Markus clone their repository
2. Etienne modifies the value of Pi line 33  
Pi=3.1  $\Rightarrow$  Pi=3.14
3. Etienne commits
4. Etienne pushes
5. Markus modifies the value of Pi line 33  
Pi=3.1  $\Rightarrow$  Pi=3.1415
6. Markus commits
7. Markus pushes  $\Rightarrow$
8. Markus pulls  $\Rightarrow$

# Now in Markus' file

```
<<<<<<< HEAD  
Pi = 3.1415;  
=====  
Pi = 3.14;  
>>>>>> f6f2a6c975df9a06f353e6640997ca39c6d071e3
```

- Between the <<< and the === Markus's local version
- Between the === and the >>> Etienne's remote version
- Etienne and Markus have to agree on the value of Pi

# How to fix a conflict

- Replace everything between the <<< and the >>> by the correct version
- Etienne and Markus agreed on adding yet another digit
- Check that your program works
- git add file
- git commit
- Automatic commit message indicating conflict resolution

Pi = 3.14159;

# Undoing with git

## Un-stage staged files: `git restore --staged`

```
$ git status
On branch master
Your branch is up-to-date with 'origin/master'.

Changes to be committed:
  modified:   list.txt

$ git restore --staged list.txt
```

NB: `git restore --staged list.txt`  $\Leftrightarrow$  `git reset HEAD list.txt`

# Get back to last repo version: `git restore`

```
$ git status
On branch master
Your branch is up-to-date with 'origin/master'.

Changes not staged for commit:
  modified:   list.txt

$ git restore list.txt
```

- ⚠ modifications are not recoverable
- ⚠ files should not be staged

# Get back to a given repo version: `git checkout`

```
$ git status
On branch master
Your branch is up-to-date with 'origin/master'.

Changes not staged for commit:
  modified:   list.txt

$ git checkout eb2b909 -- list.txt # bring list.txt at version eb2b909
$ git checkout supermarket -- list.txt # bring list.txt at version pointed by branch supermarket
```

NB: `git restore list.txt <=> git checkout HEAD -- list.txt`

`<=> git checkout -- list.txt`

⚠ modifications are not recoverable (if any)

⚠ files should not be staged

# Reset the whole working dir to a given repo version: `git reset --hard`

```
$ git status
On branch master
Your branch is up-to-date with 'origin/master'.

Changes not staged for commit:
  modified:   list.txt
  modified:   README.md

$ git reset --hard eb2b909
```

`git reset --hard` moves `master` to `eb2b909` and updates the working dir  
=> Discards all modifications

⚠ modifications are not recoverable (if any)

# Reset whole working dir: `git reset --hard`

```
$ git status
On branch master
Your branch is up-to-date with 'origin/master'.

Changes not staged for commit:
  modified:   list.txt
  modified:   README.md

$ git reset --hard HEAD
```

`git reset --hard` moves the branch to the given commit and updates the working directory

=> As HEAD is pointing at master, master does not move.

=> Working dir reset to the master revision

=> Discards all modifications

 modifications are not recoverable (if any)

# Undo one or several commits: `git revert`

`git revert HEAD` => Undo last commit

`git revert HEAD^` => Undo second to last commit

`git revert HEAD~3` => Undo fourth to last commit

`git revert 9e7185e` => Undo a specific commit

`git revert HEAD^3..HEAD` => Undo a specific range of commits

New commits are created to undo older commits