בקרת תצורה עם GIT & GITHUB לניהול פרויקט גמר

המכללה האקדמית להנדסה 8/12/21

ראובן יגל

https://github.com/robi-y/presentations

בסוף המפגש:

אמילי – אז מה יצא לי מזה ☺

- מהי בקרת תצורה ולמה זה טוב?
- מה ההבדל בין git ל- github?
- האם זה יעזור לי בפרויקט הגמר? בתעשיה?
- ולפי הזמן, איך גיט עובד

איך נעשה את זה?

- מבוא לבקרת תצורה
- קצת על גיט וגיטהאב
- תרגול
- "משל גיט"

- HTTPS://GITHUB.COM/RAMBLINGCOOKIEMONSTER/GIT-PRESENTATION
- HTTPS://GITHUB.COM/JCE-IL/SE-CLASS-MATERIALS/TREE/MASTER/LECTURE
- HTTP://TOM.PRESTON-WERNER.COM/2009/05/19/THE-GIT-PARABLE.HTML

A Crash Course in Version Control and Git

Warren Frame

Agenda

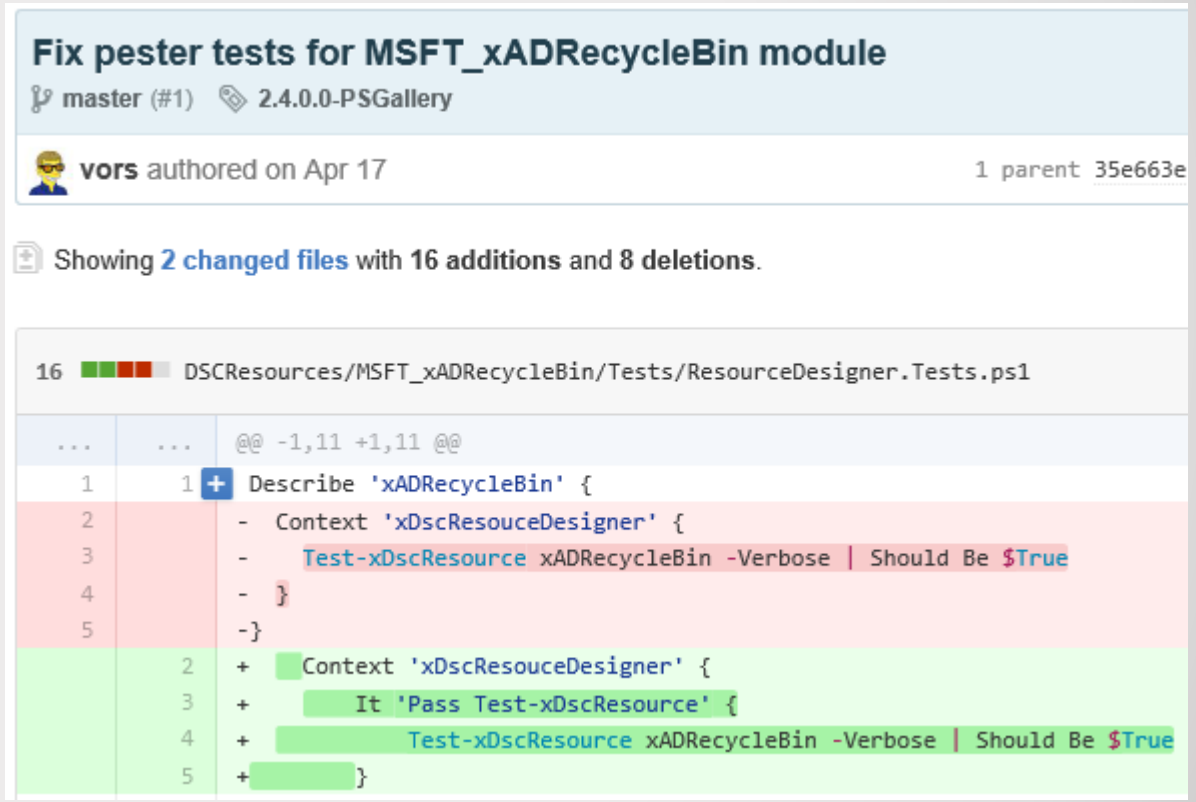
GitHub

git

What is Version Control?

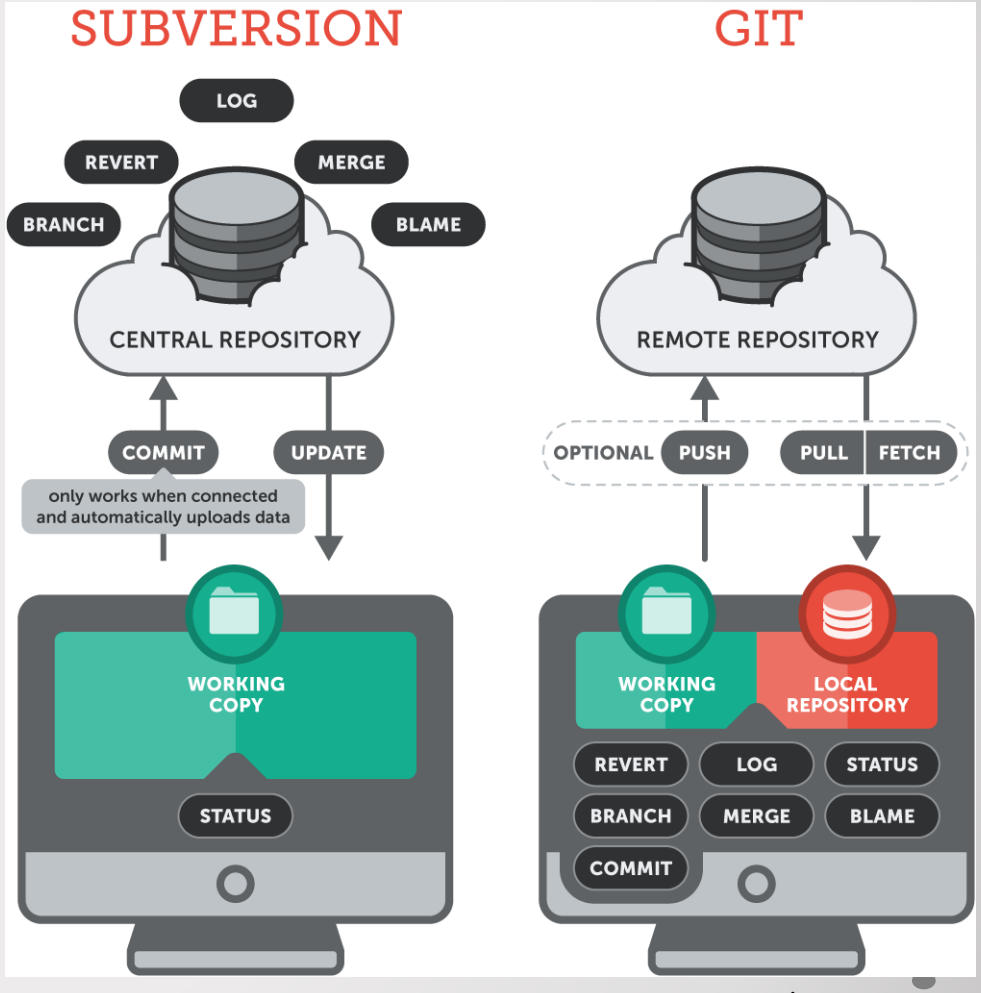
- System to manage changes to files
  - Who vors
  - When April 17
  - What Files and differential
  - (Sometimes) Why To fix Pester tests

- Why use it?
  - Revert to or review prior changes
  - Maintain multiple versions
  - Compare differences
  - Share and collaborate
  - Modern solutions might assume you have it!
    - Infrastructure-as-code
    - Continuous Integration and Delivery
  - Google around for many more reasons!



Version Control Systems

- Centralized
  - Work directly against a central server
  - Subversion, CVS, Perforce, etc.
- Distributed
  - Work locally, optionally push to remote repositories
  - Git, Mercurial (Hg), etc.
- Hosted solutions
  - GitHub, BitBucket, Visual Studio Online, etc.
- On-Premise solutions
  - GitHub Enterprise, Stash, Team Foundation Server, etc.



git-tower.com

Terminology

- Nope nope nope

Exploring and Using GitHub

- Demo!

GitHub

Command Line Git

- Demo!

Further Reading

There's a lot out there. Here are some highlights. Don't be intimidated, you don't need all this, but it may come in handy if you want to dive a bit deeper into the weeds. The key is starting to use it, just like PowerShell!

- Interactive guides
  - GitHub's interactive guide – Learn Git in 15 minutes: https://try.github.io/
  - Learn Git Branching: http://pcottle.github.io/learnGitBranching
  - Interactive Cheat sheet: http://ndpsoftware.com/git-cheatsheet.html
- References
  - Official git reference: http://git-scm.com/docs
  - Pro Git (free!): http://www.git-scm.com/book/en/v2 - the first two or three chapters are a great intro
  - Understanding Branches: http://blog.thoughtram.io/git/rebase-book/2015/02/10/understanding-branches-in-git.html
  - Git Explained: For Beginners: http://www.dotnetcodegeeks.com/2015/06/git-explained-for-beginners.html
  - GitHub Flow – GitHub from a Browser: https://github.com/blog/1557-github-flow-in-the-browser
- Contributing to Microsoft's DSC Resources on GitHub
  - Guide to getting started with GitHub: https://github.com/PowerShell/DscResources/blob/master/GettingStartedWithGitHub.md
  - DSC Contributions guide: https://github.com/PowerShell/DscResources/blob/master/CONTRIBUTING.md
  - DSC Resource Style Guidelines: https://github.com/PowerShell/DscResources/blob/master/StyleGuidelines.md
- More references
  - Pro Git (free!): http://www.git-scm.com/book/en/v2 - the rest of the book :)
  - A Visual Git Reference: http://marklodato.github.io/visual-git-guide/index-en.html
  - Git From the Inside Out: https://codewords.recurse.com/issues/two/git-from-the-inside-out
  - Git For Computer Scientists: http://eagain.net/articles/git-for-computer-scientists - Great read with pictures, don't be intimidated by the title
  - Branching, forking, other concepts explained: http://stackoverflow.com/questions/3329943/git-branch-fork-fetch-merge-rebase-and-clone-what-are-the-differences
- Oh shoot, something went wrong!
  - So you have a mess on your hands workflow: http://justinhileman.info/article/git-pretty/git-pretty.png
  - How to undo (almost) anything with Git: https://github.com/blog/2019-how-to-undo-almost-anything-with-git
- A few recent articles:
  - Git Disciplined: http://blog.8thlight.com/makis-otman/2015/07/08/git-disciplined.html - Thanks for sharing Steve!
  - Git for IT Professionals: Getting Started: http://www.powershellmagazine.com/2015/07/13/git-for-it-professionals-getting-started-2/ - Thanks to Ravikanth! More to come in this series

בואו ננסה

- http://pel-daniel.github.io/git-init/
- https://github.com/jlord/git-it-electron/releases
- https://docs.github.com/en/get-started/quickstart
  - (Try: https://education.github.com/pack)

- Lab: https://lab.github.com/githubtraining/introduction-to-github

משל גיט

- Tom Preston-Werner http://tom.preston-werner.com/2009/05/19/the-git-parable.html
- Herland, http://www.infoq.com/presentations/git-details, slides: https://github.com/jherland/git_parable

The Git Parable

Johan Herland

johan@herland.net

The Git Parable

- Shamelessly stolen from Tom Preston-Werner
  http://tom.preston-werner.com/2009/05/19/the-git-parable.html
- I'm lazy...
- Also: Best introduction to Git I've found so far

The Git Parable

- Git - simple & powerful

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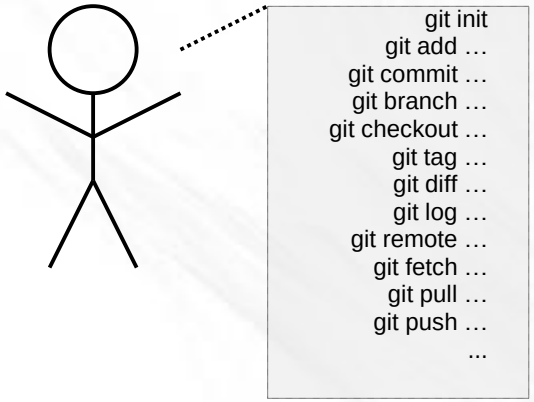

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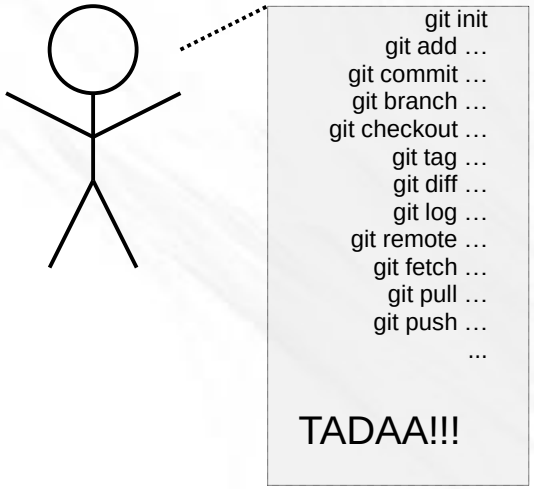

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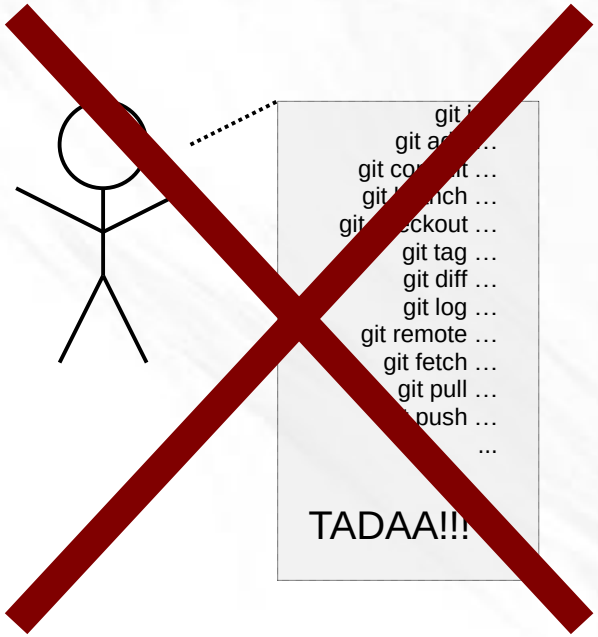

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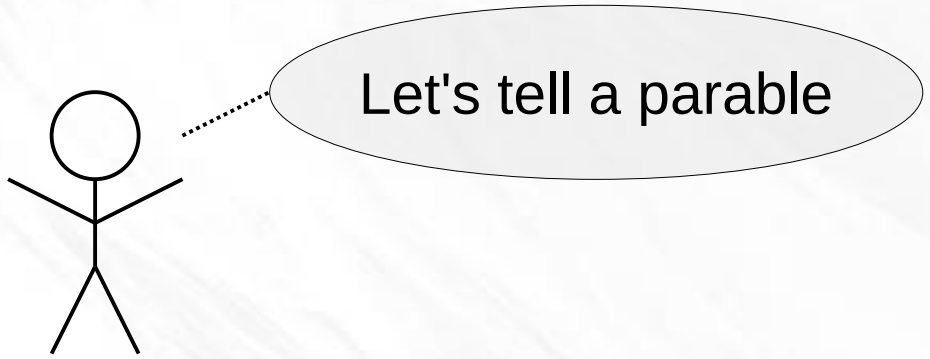

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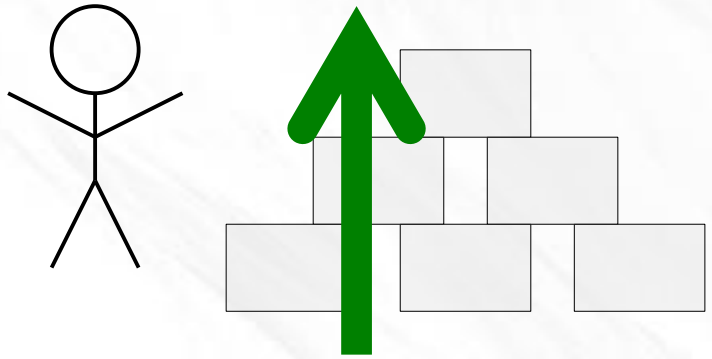

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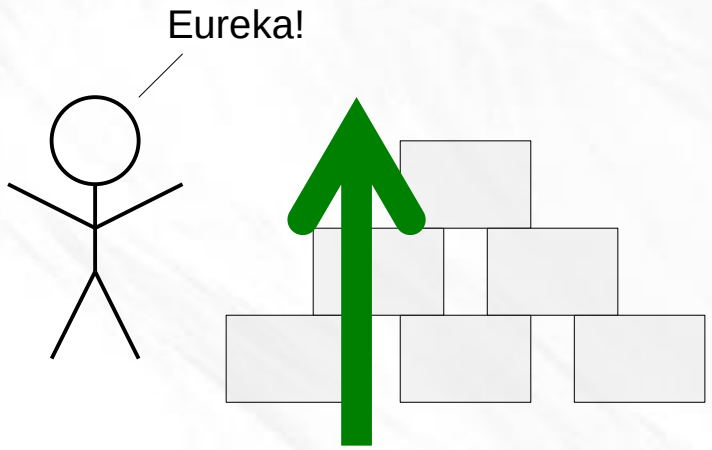
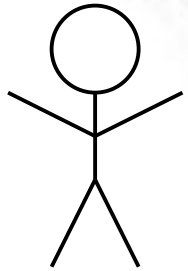


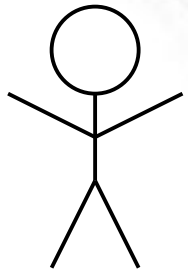
The Parable

- A simple computer
  - A text editor
  - A few filesystem commands



The Parable

- Write a large software program

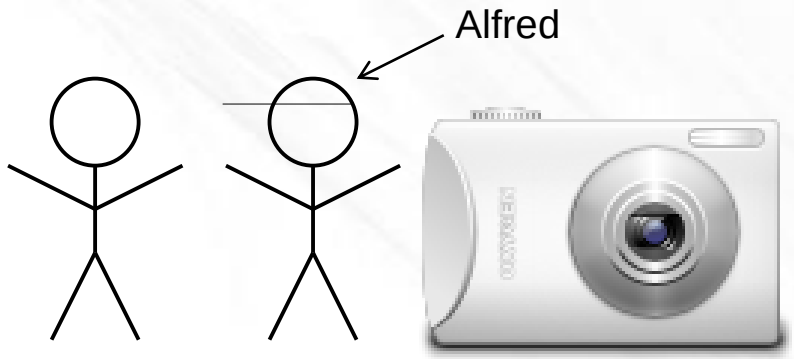


The Parable

- Write a large software program
- Invent some method to keep track of versions
  - retrieve code that you changed/deleted

Snapshots

- Alfred, the photographer



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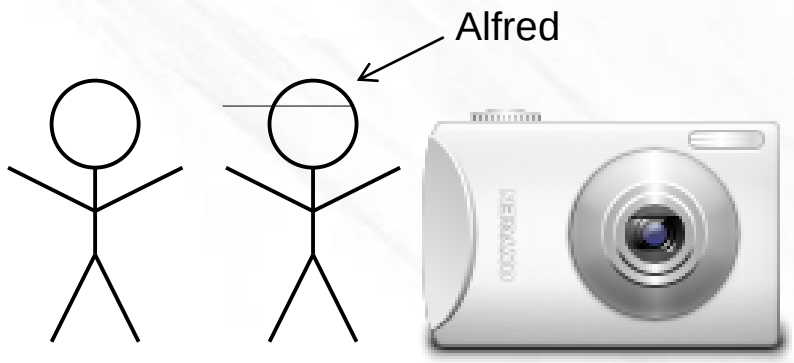
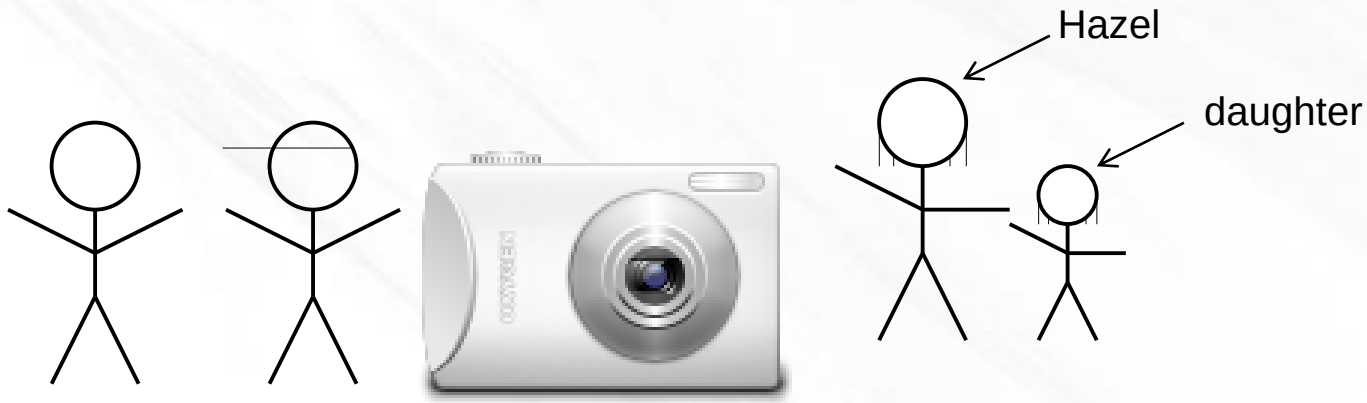


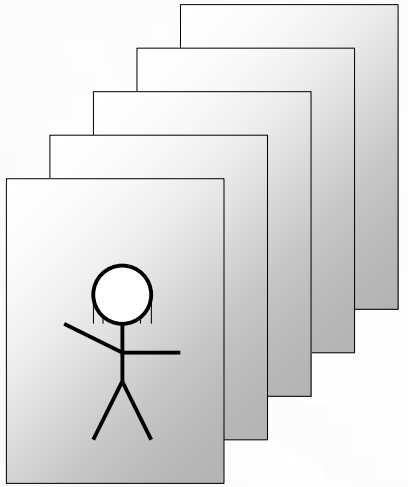
Snapshots

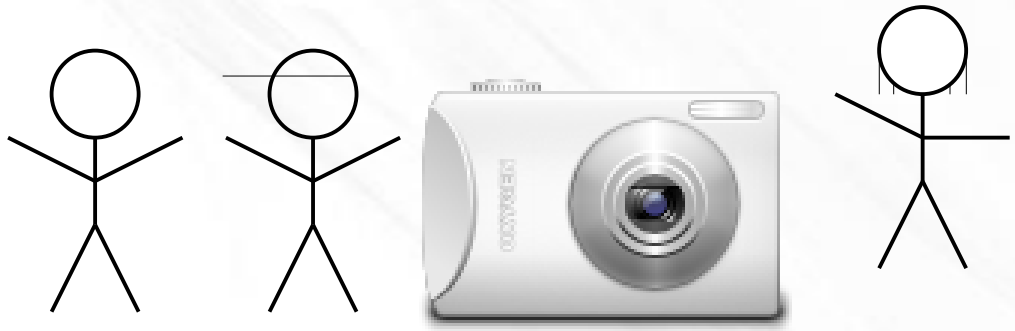
- Alfred, the photographer
- Hazel and her daughter



Snapshots

- Alfred, the photographer
- Hazel and her daughter
  - Remember what the daughter was like at each different stage





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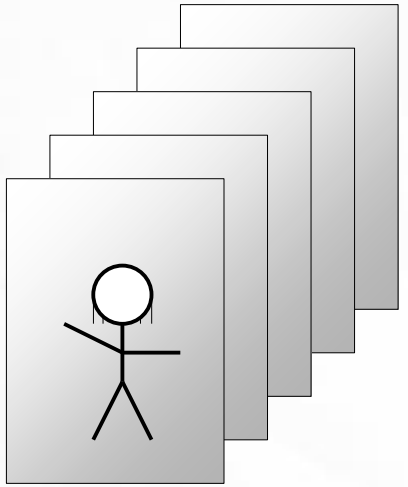
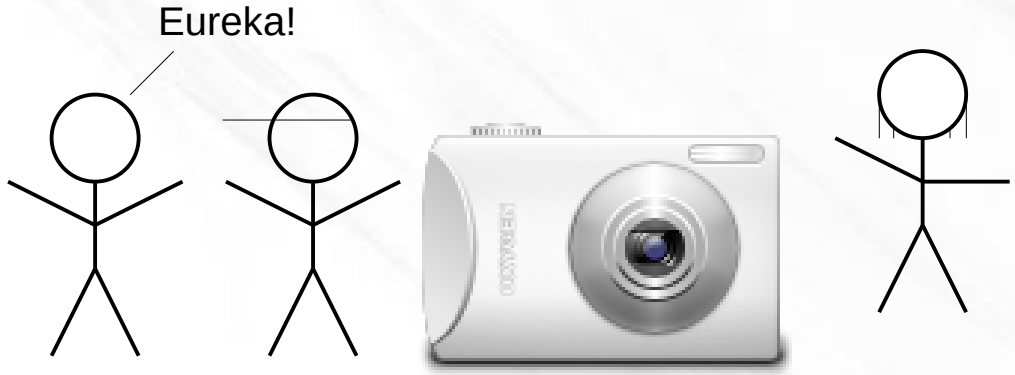
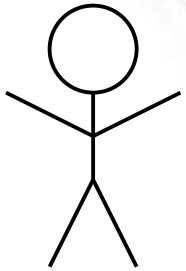


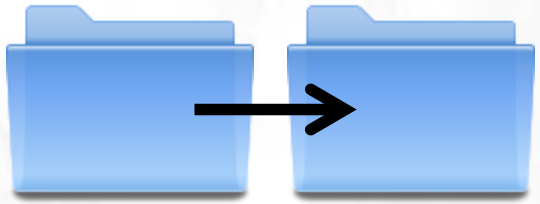


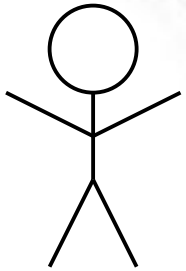
Snapshots

working

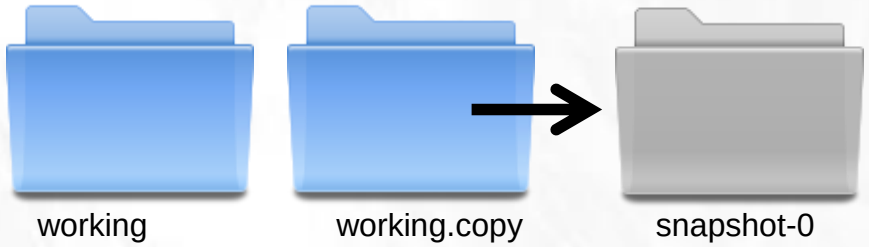


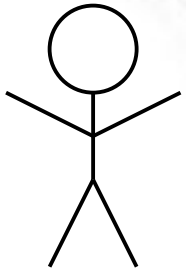
Snapshots





Snapshots





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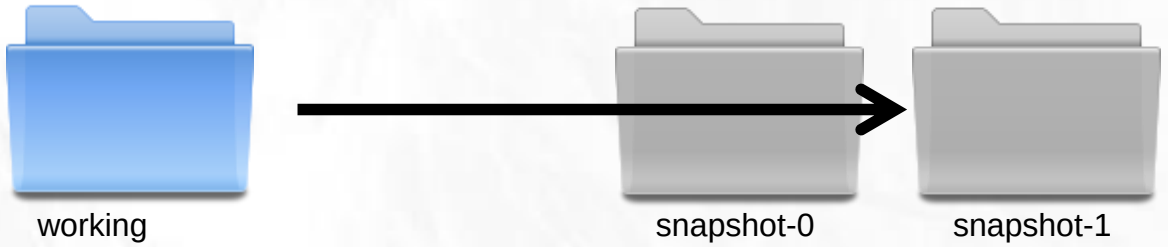
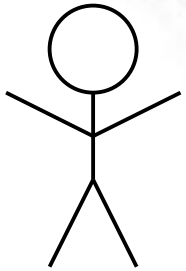
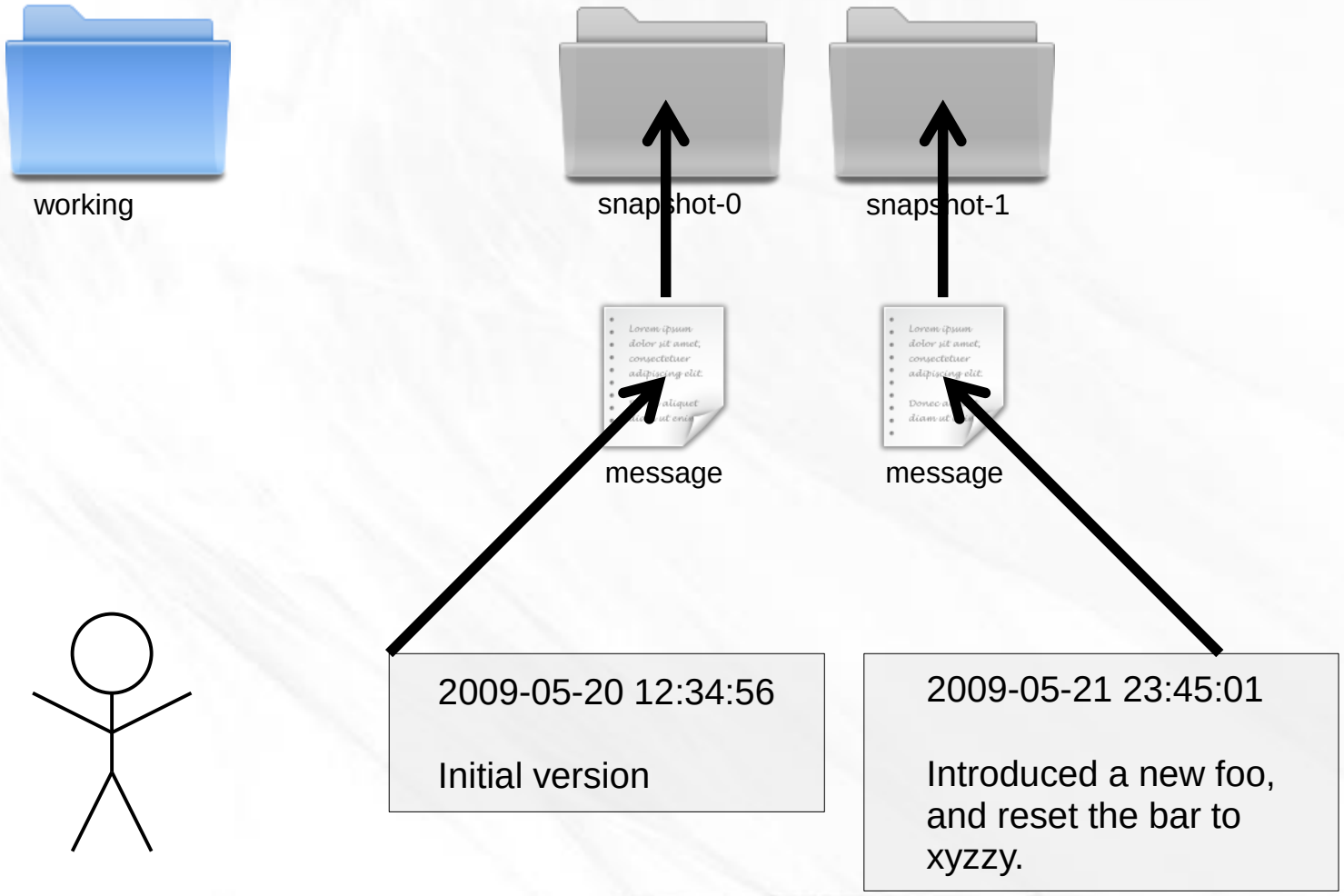




Snapshots


working
snapshot-0
snapshot-1
message
message
2009-05-20 12:34:56
Initial version
2009-05-21 23:45:01
Introduced a new foo, and reset the bar to xyzzy.

Branches

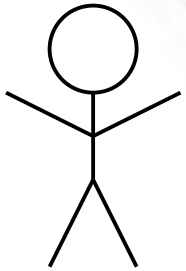
working

snapshot-0

snapshot-1

. . .

snapshot-99



Branches

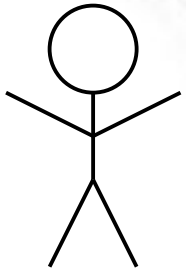
working

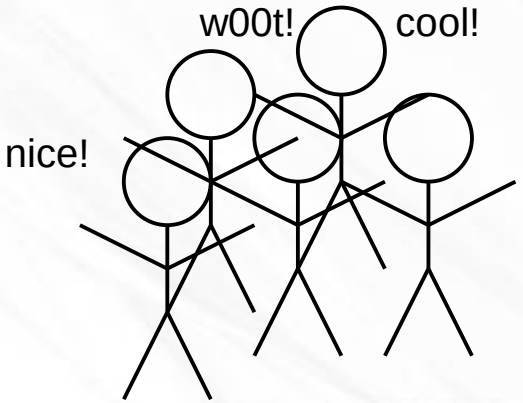
snapshot-0

snapshot-1

. . .

snapshot-99





Branches

working

snapshot-0

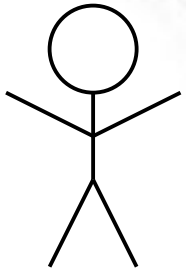
snapshot-1

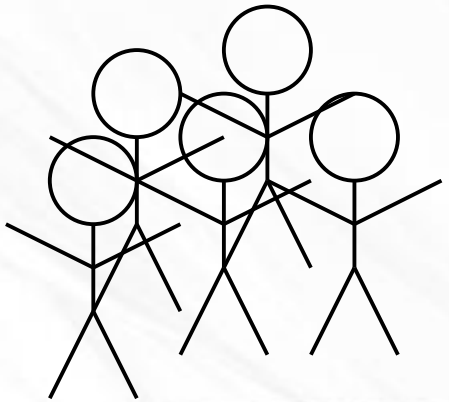
. . .

snapshot-99

. . .

snapshot-109





Branches

working

snapshot-0

snapshot-1

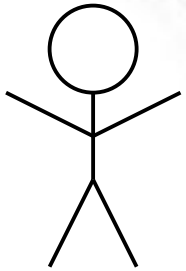
. . .

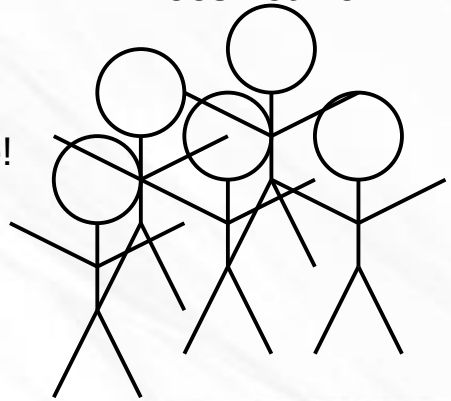
snapshot-99

. . .

snapshot-109

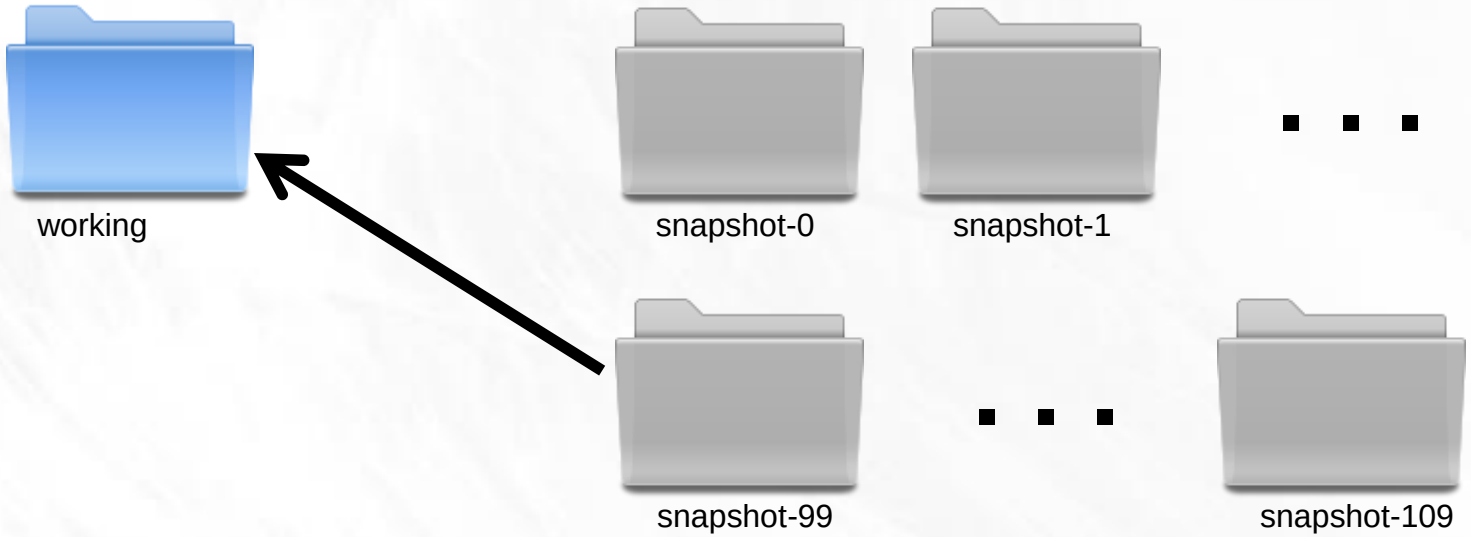
Does not work!

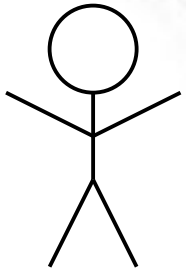




Boo!

Branches





Branches

working

snapshot-0

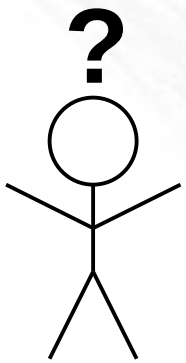
snapshot-1

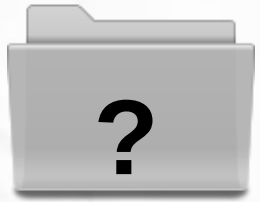
. . .

snapshot-99

. . .

snapshot-109

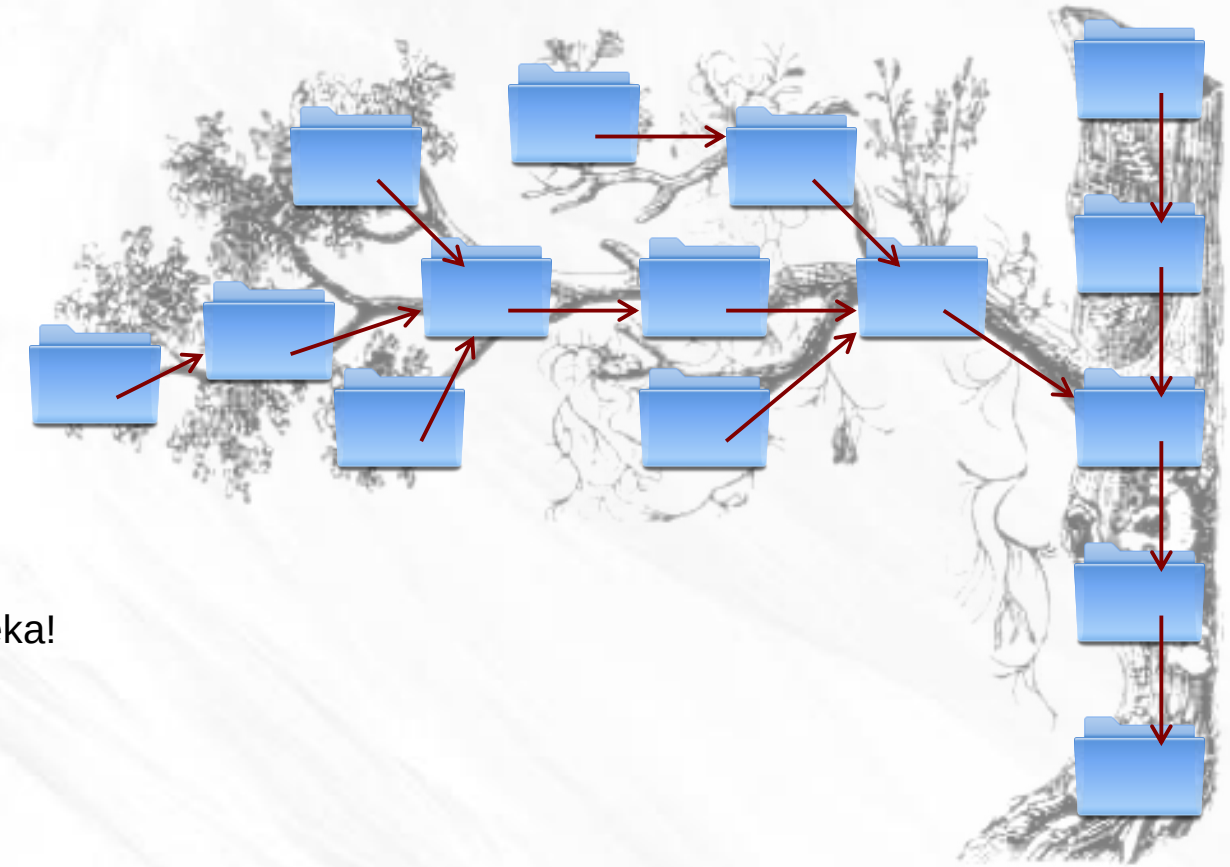


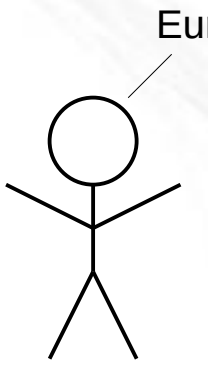


snapshot-110

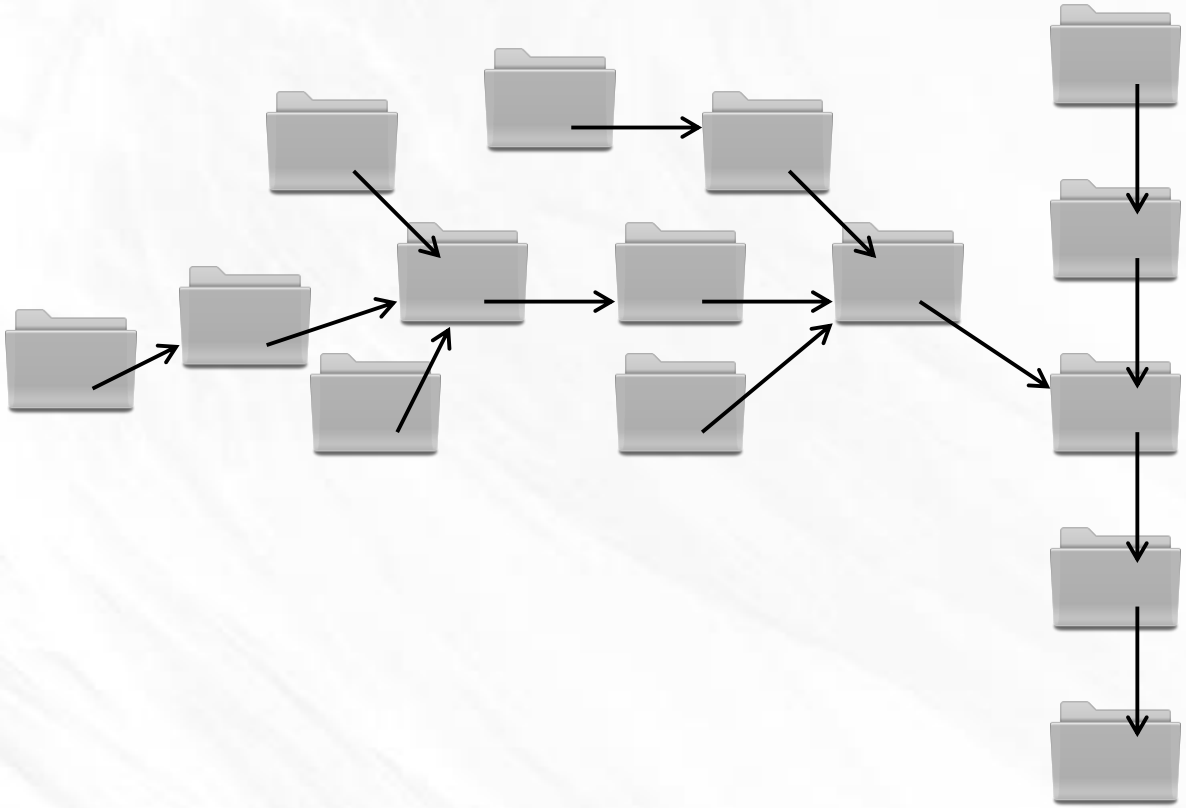
Branches

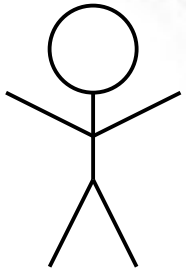
Branches





Branches





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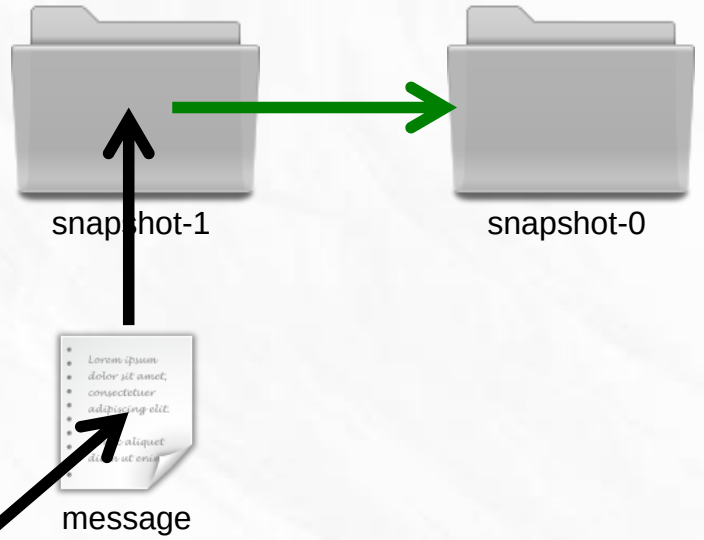
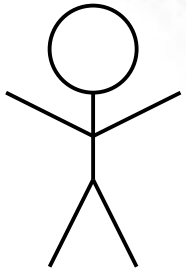


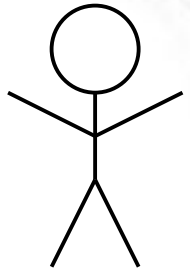


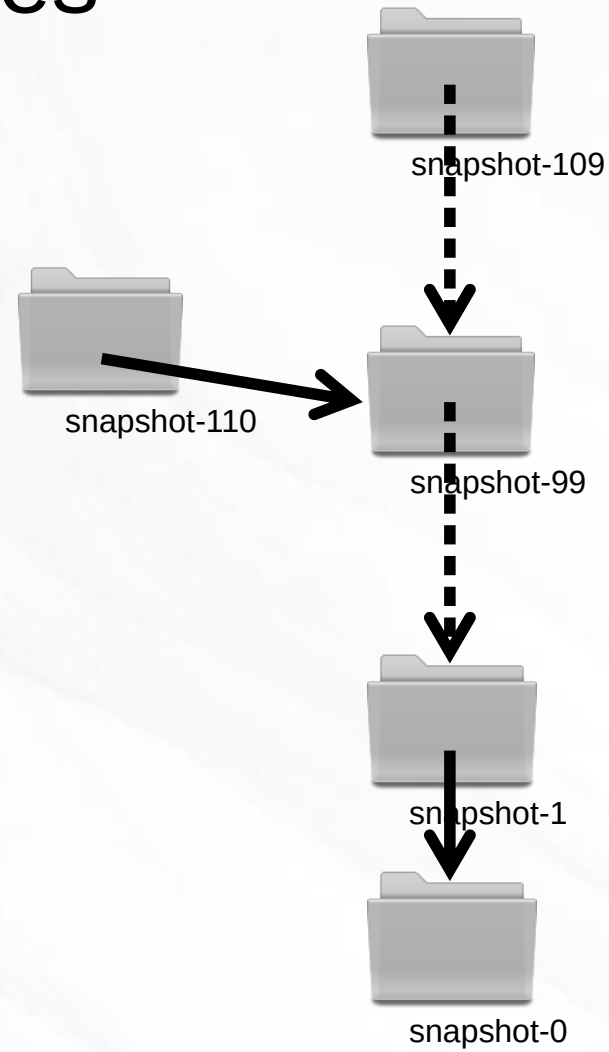
2009-05-21 23:45:01
parent: snapshot-0

Introduced a new foo, and reset the bar to xyzzy.

Branch Names

working





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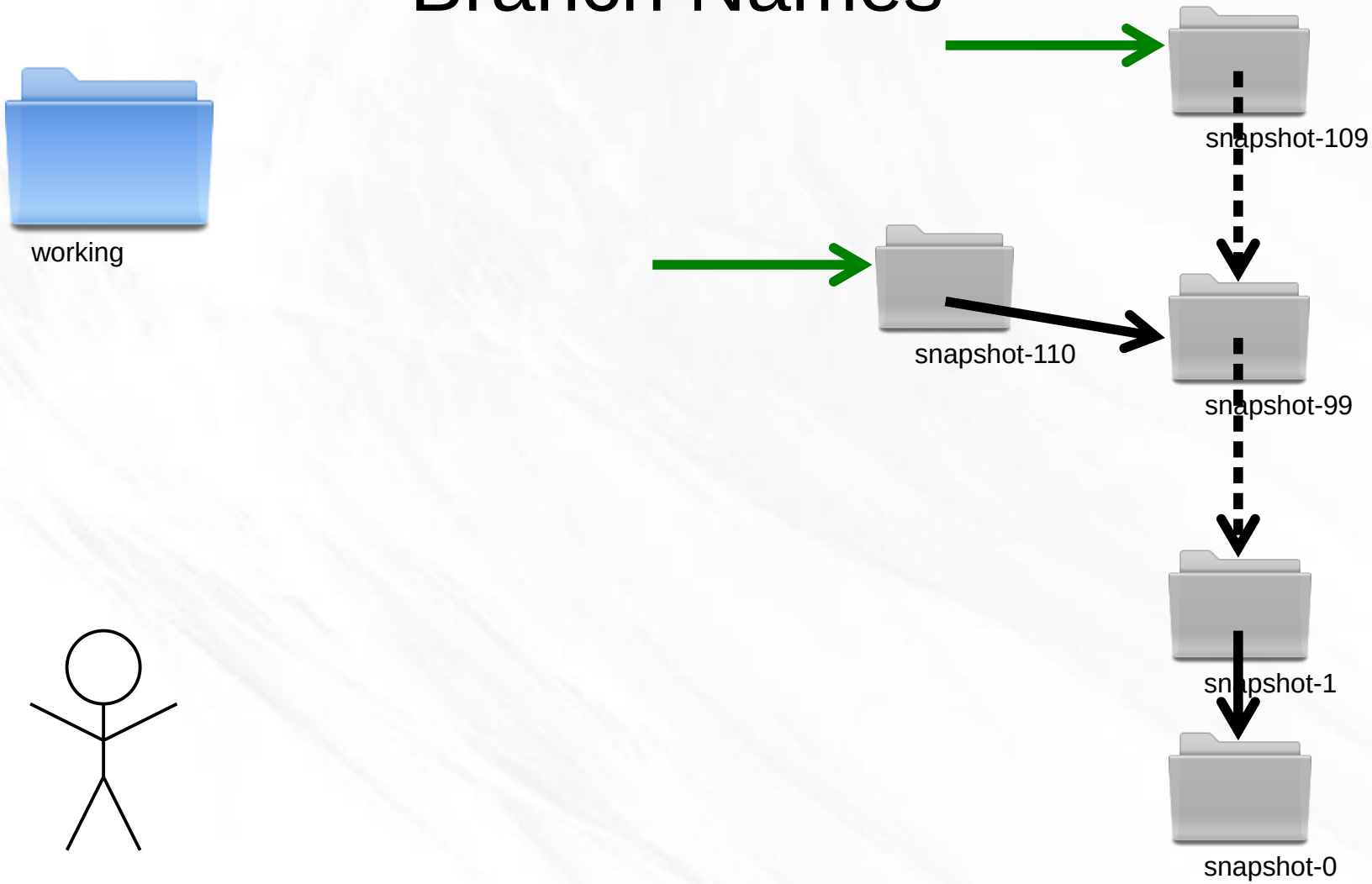

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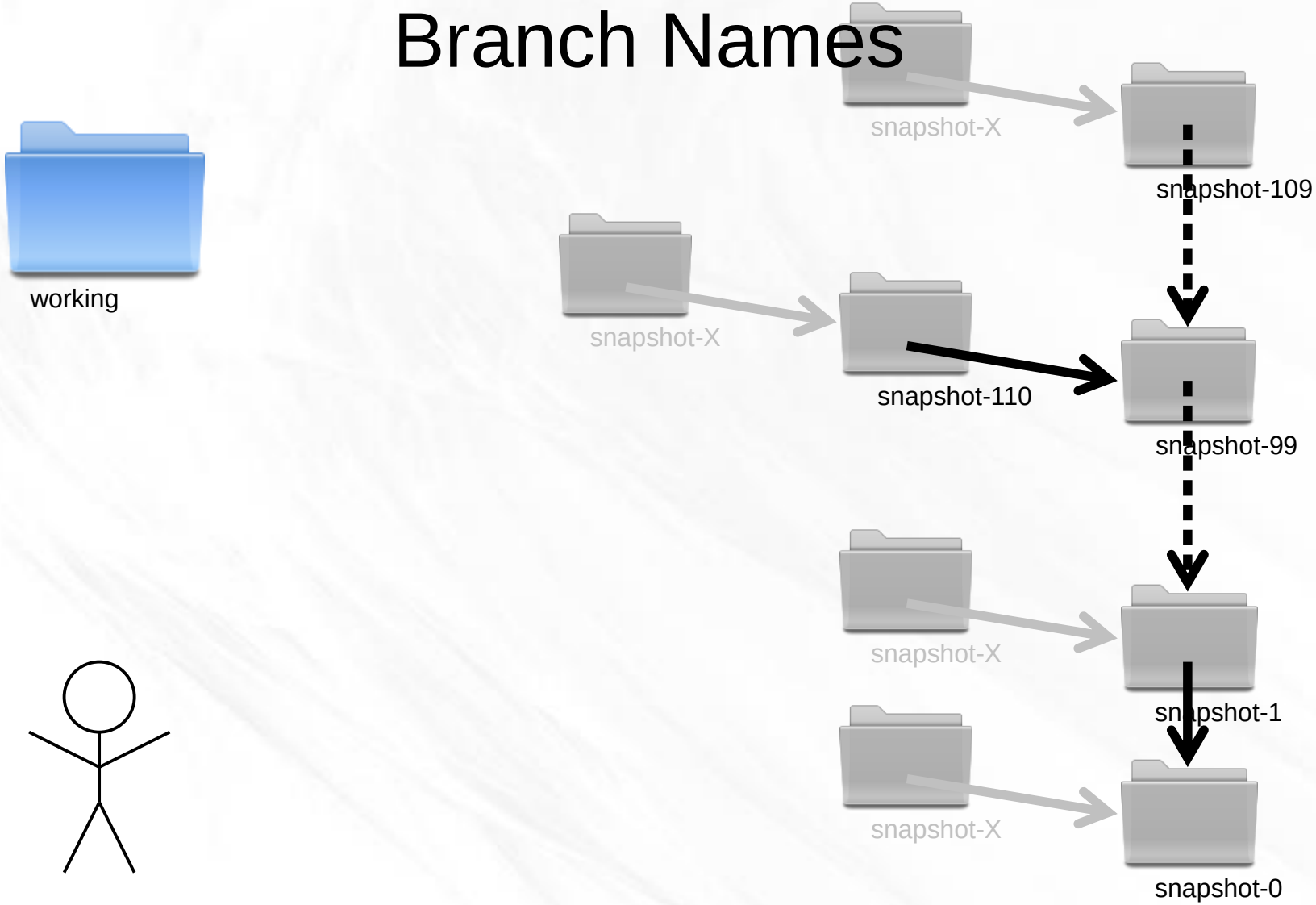

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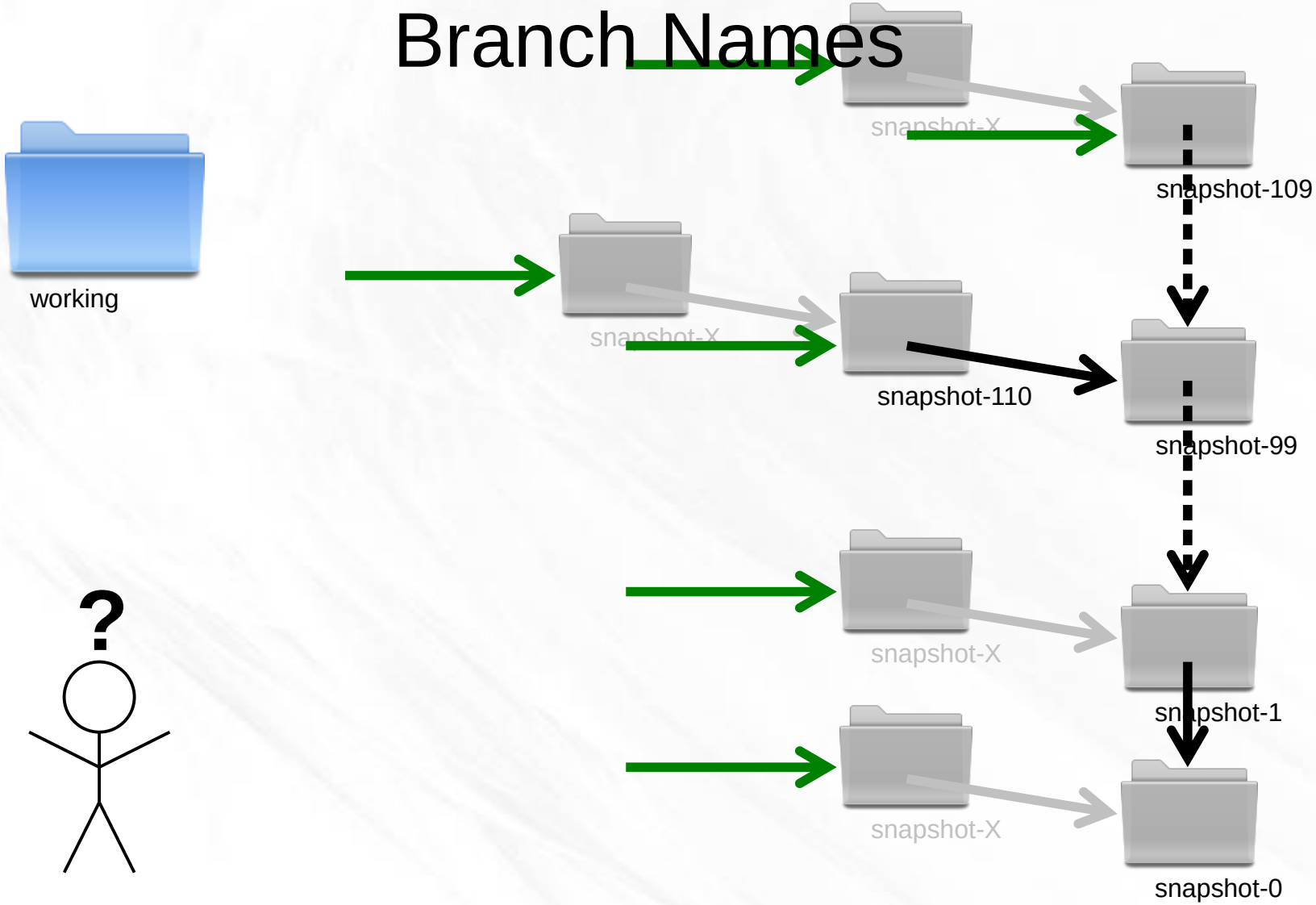

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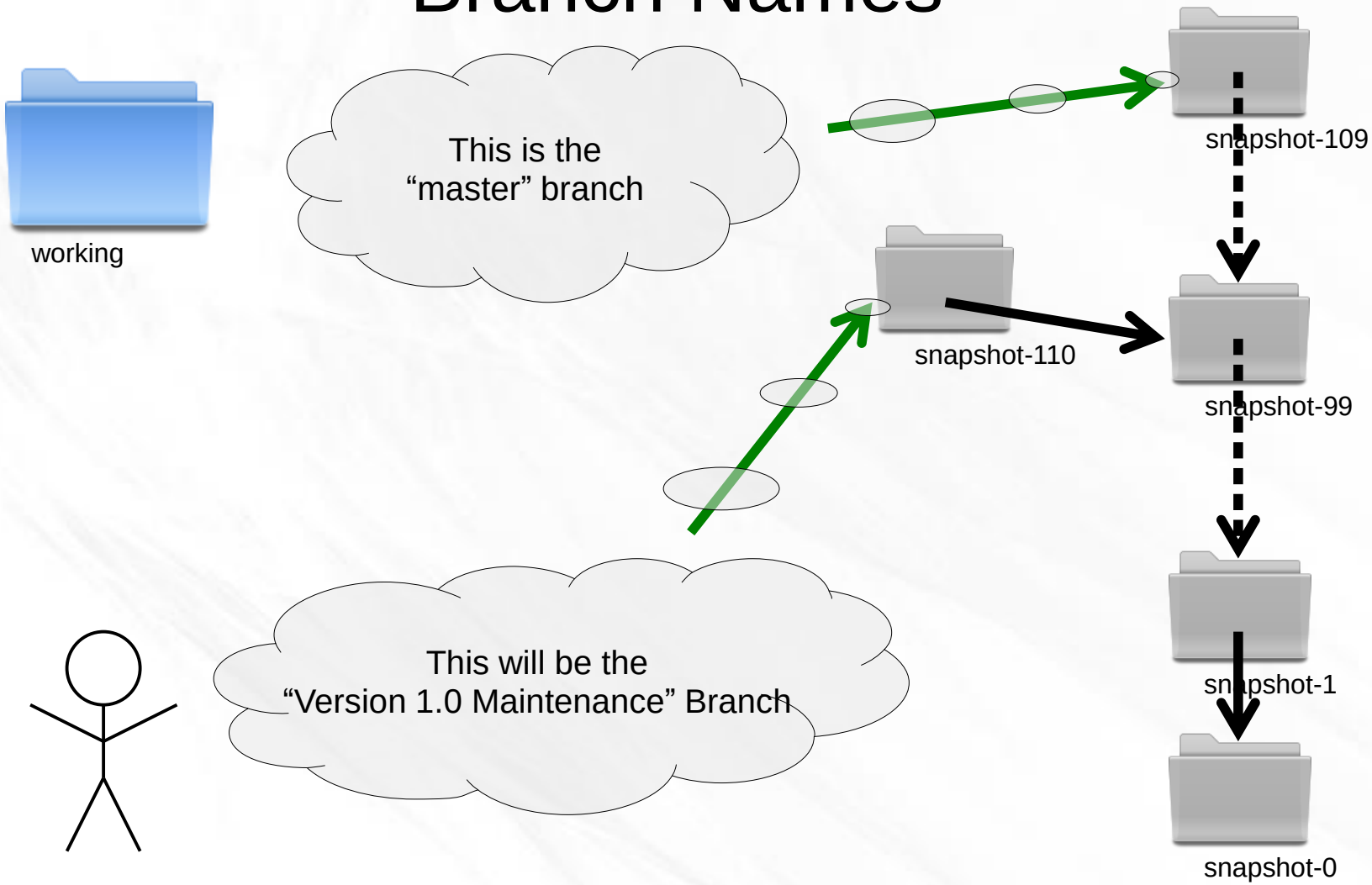

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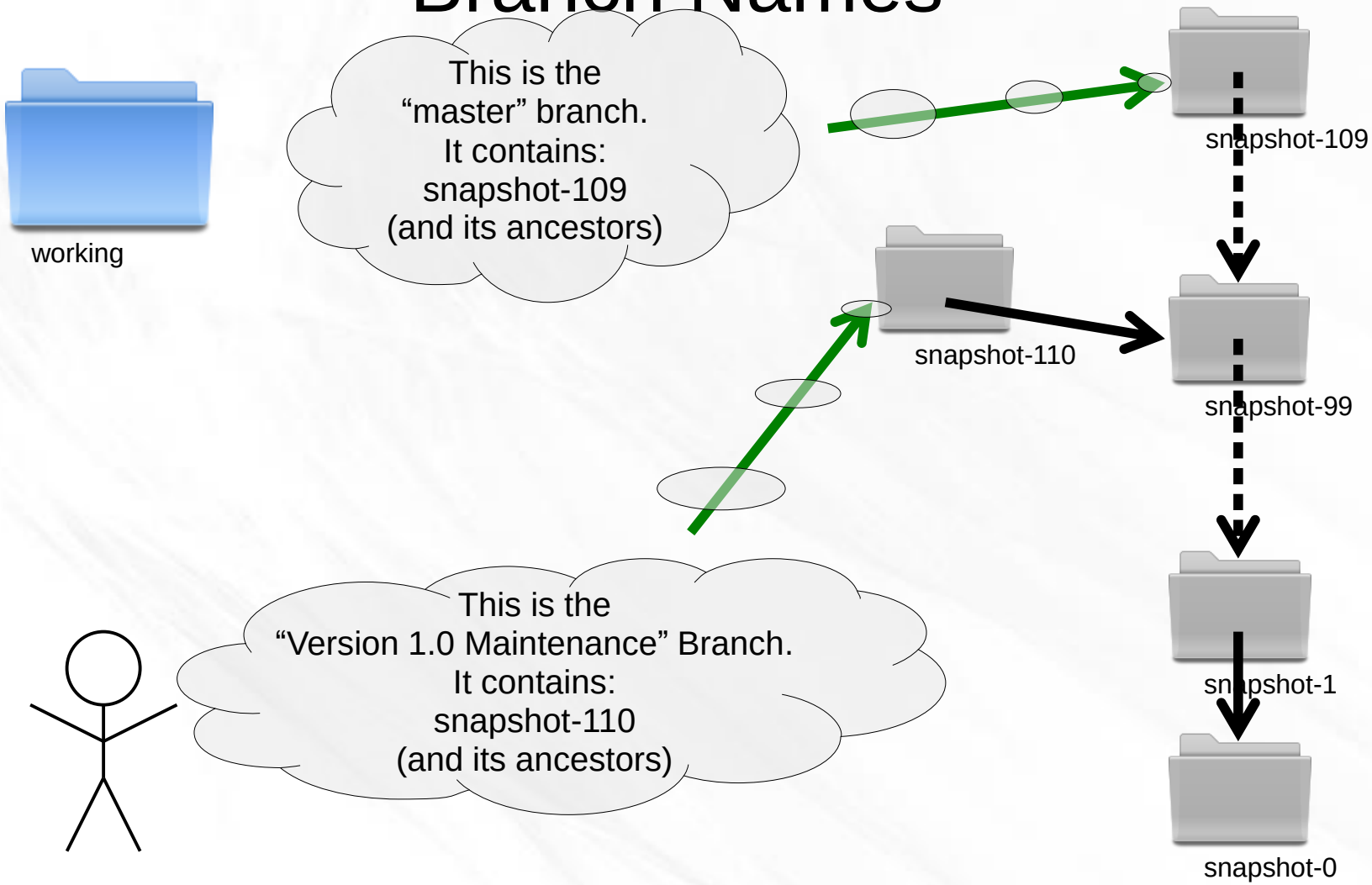

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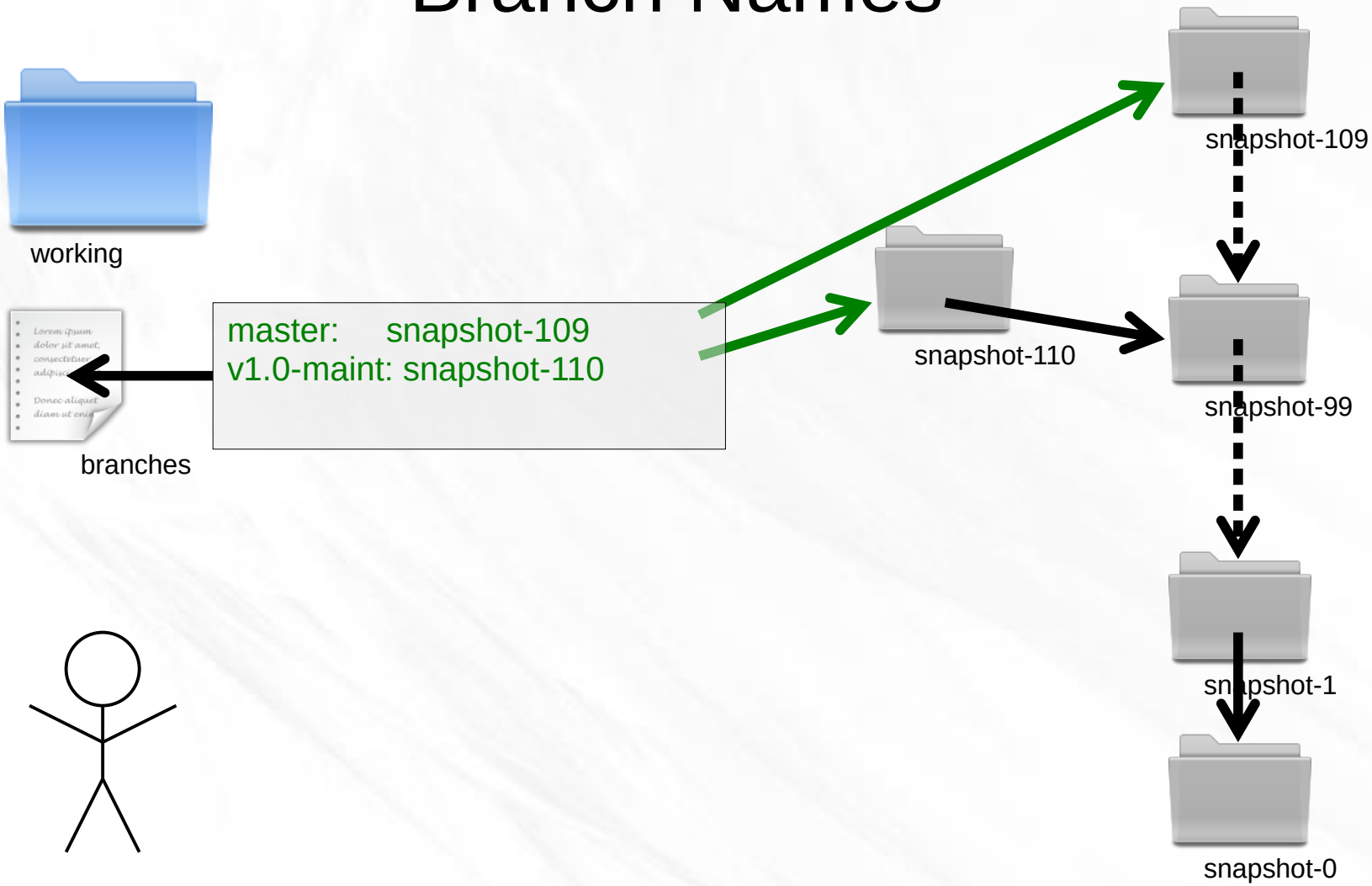

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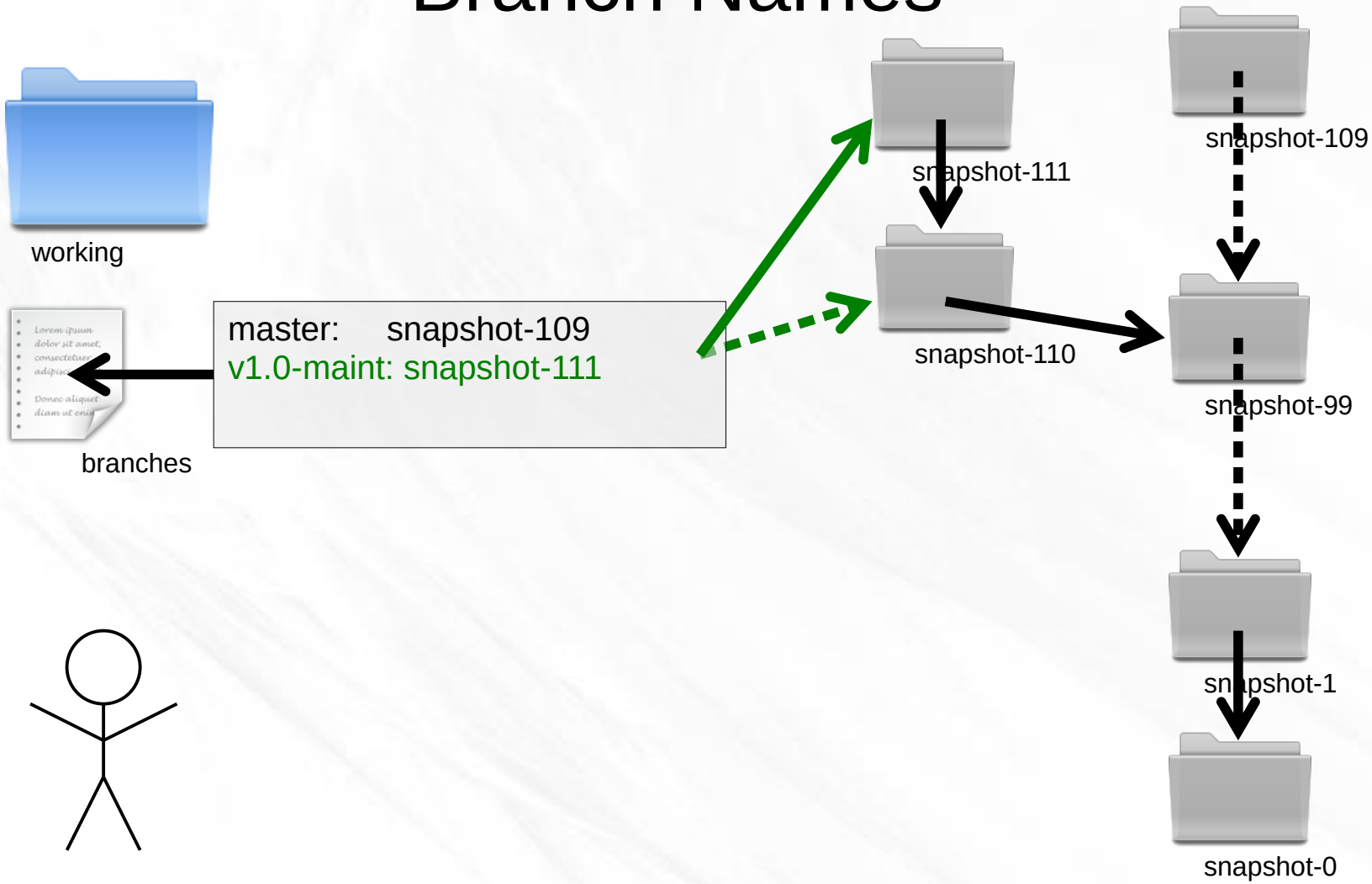

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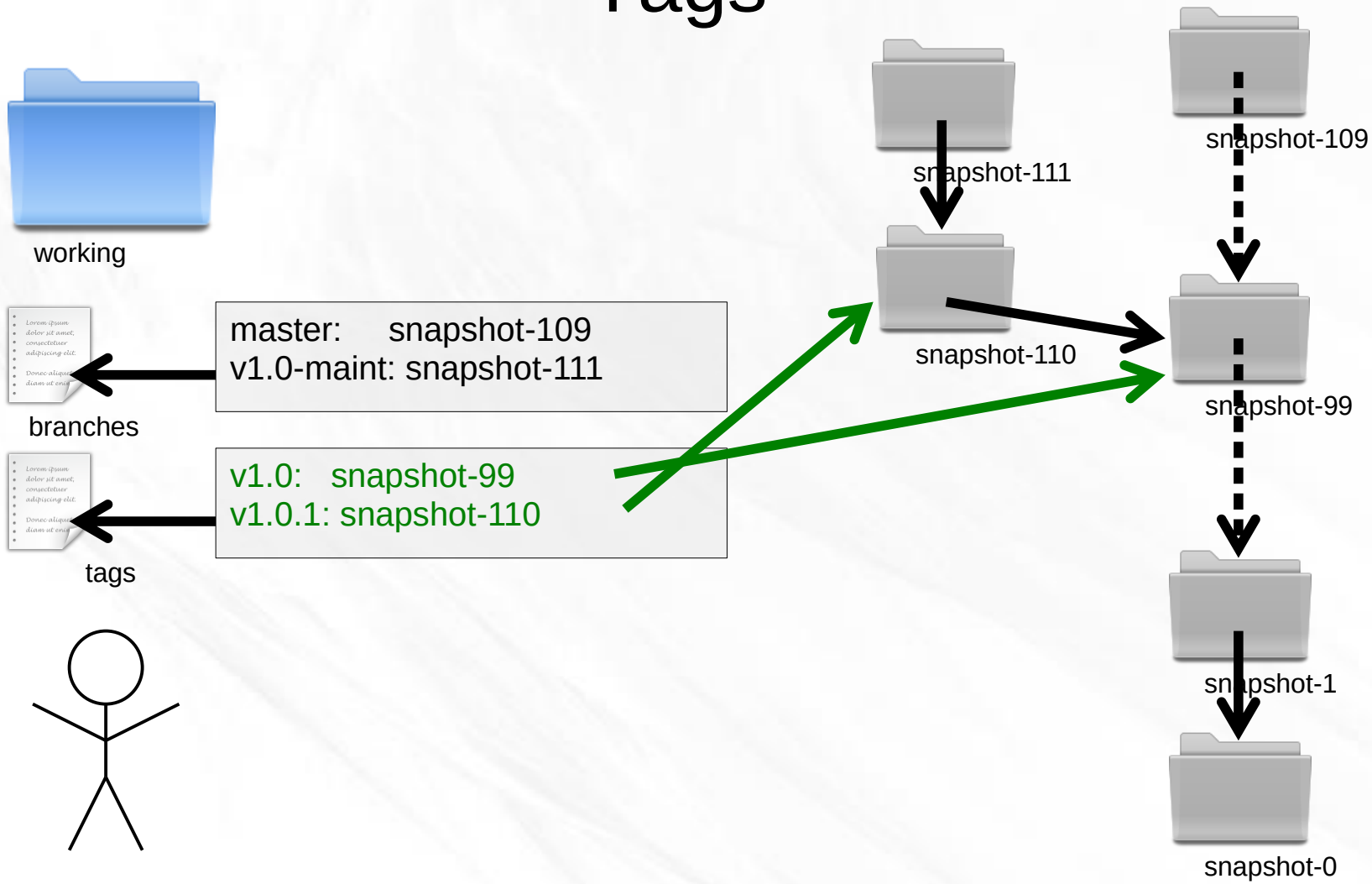
working
branches
tags
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v1.0-maint: snapshot-111
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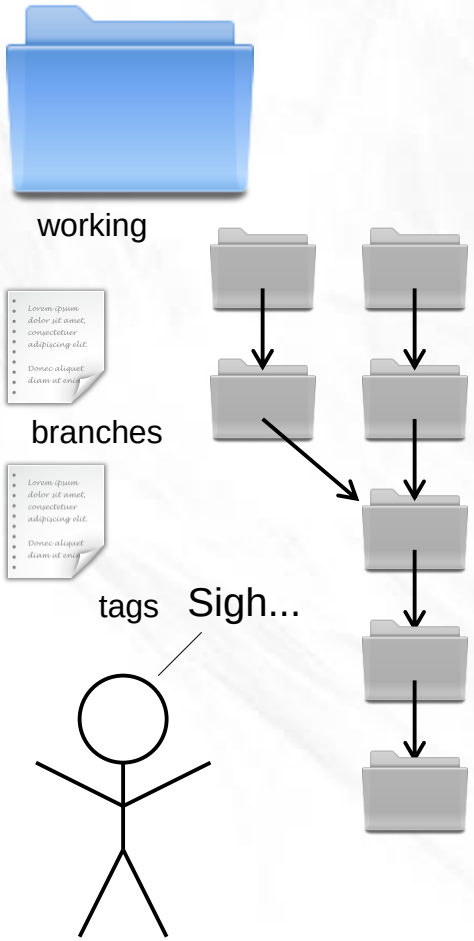
Distributed



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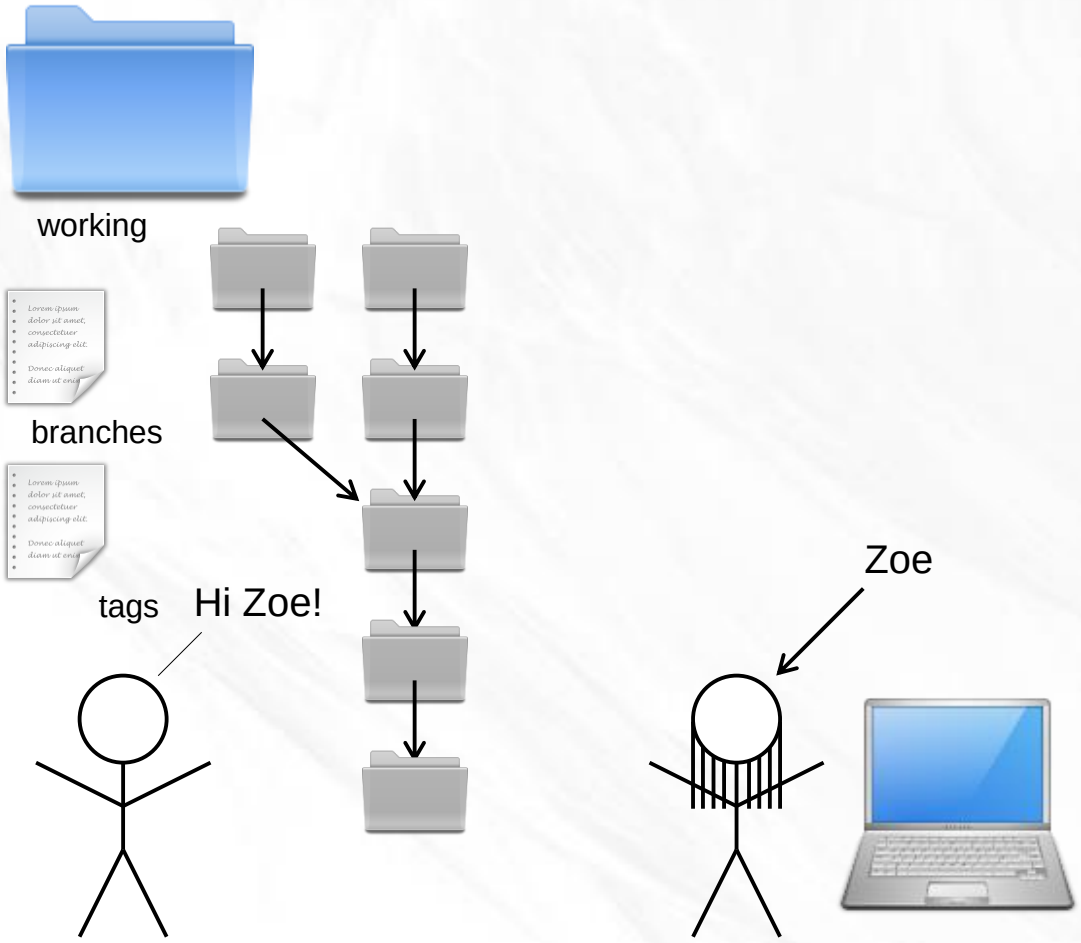

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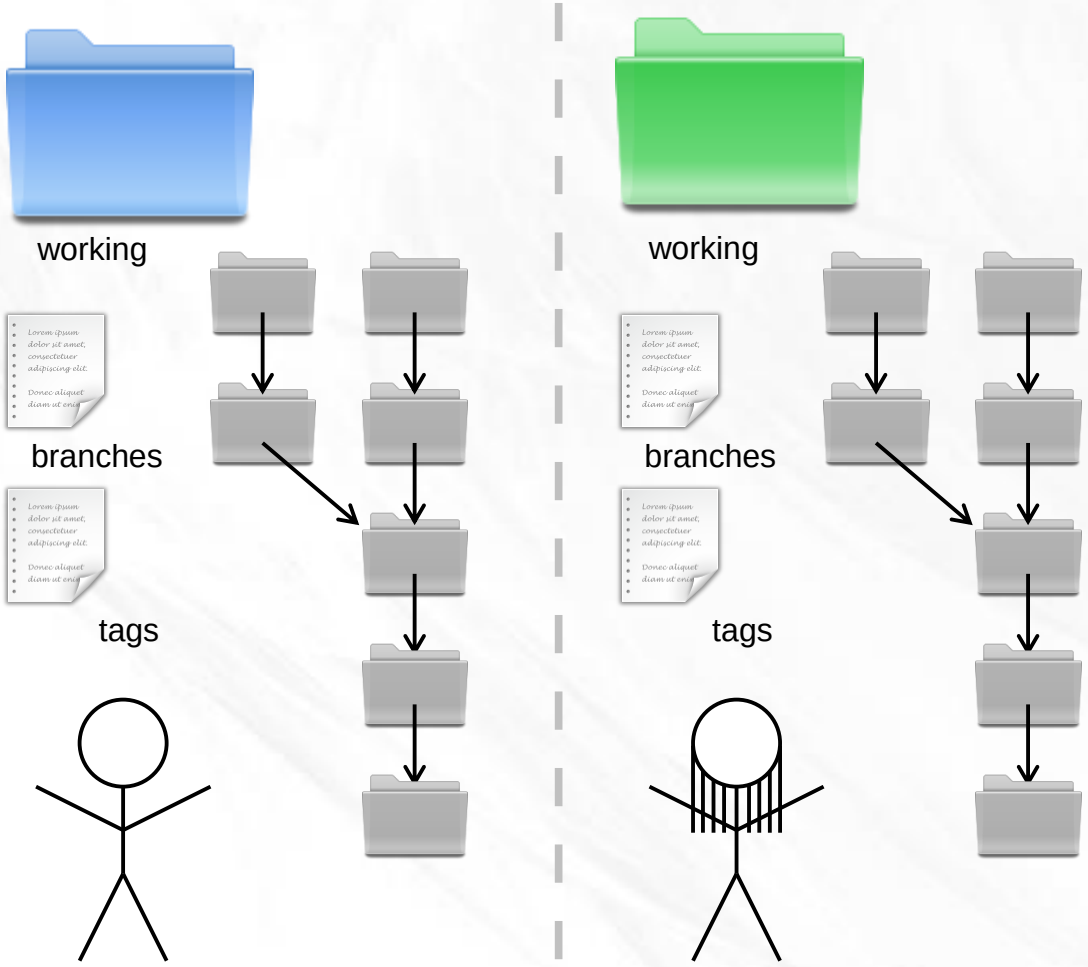

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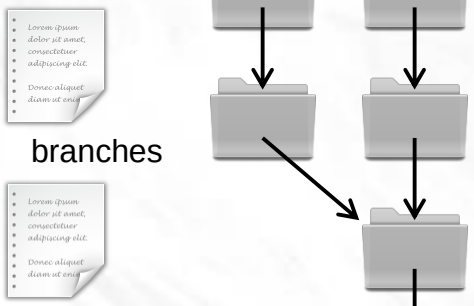

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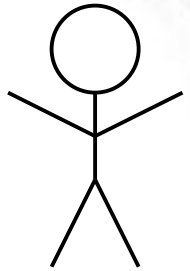
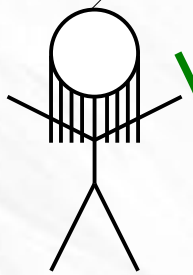


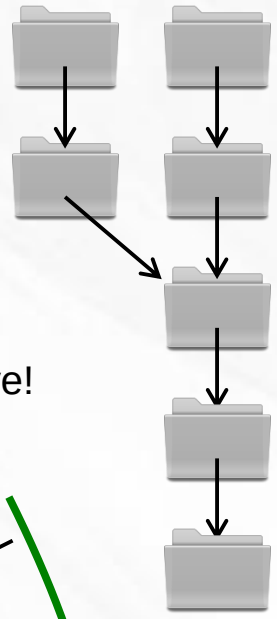
working

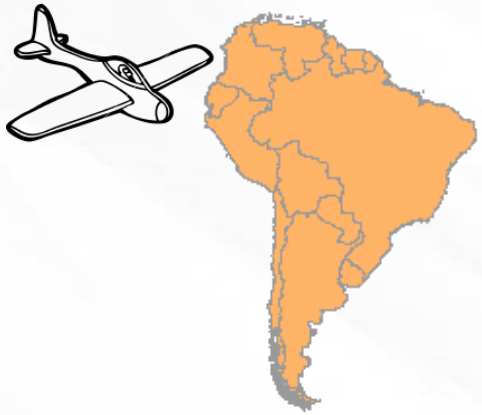
branches

tags

Bye!







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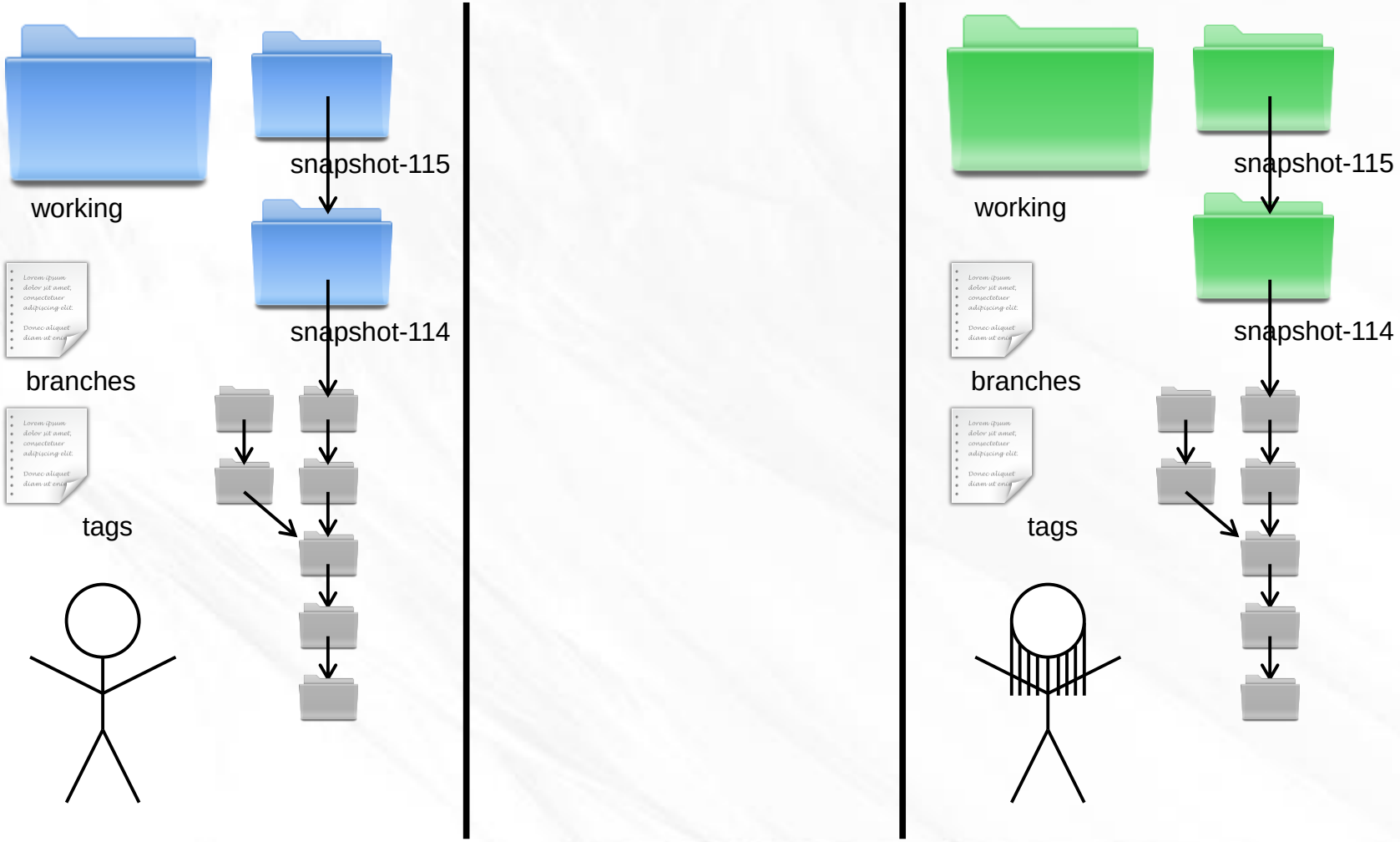

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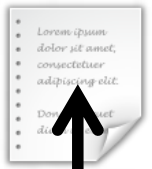
snapshot-114

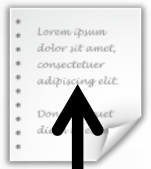


message

2009-05-22 12:12:12
parent: snapshot-113
author: Me <me@me.me>

Blarfle, a cool new feature; extends the existing blorg.

snapshot-114



message

2009-05-21 23:45:01
parent: snapshot-113
author: Zoe <zoe@z.oe>

Introduced a new foo, and reset the bar to xyzzy.

Distributed

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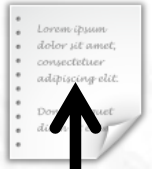
SHA1



message

2009-05-22 12:12:12
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author: Me <me@me.me>

Blarfle, a cool new feature; extends the existing blorg.

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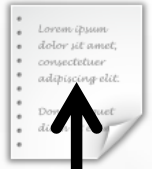
SHA1

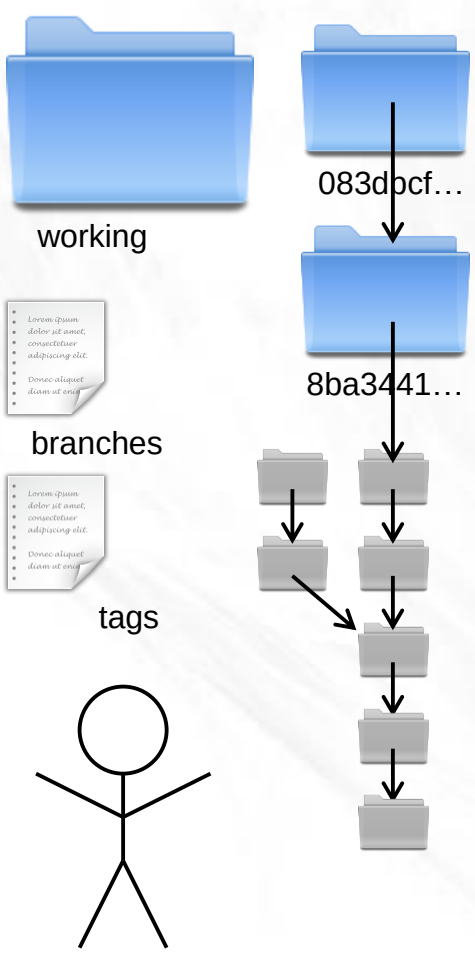


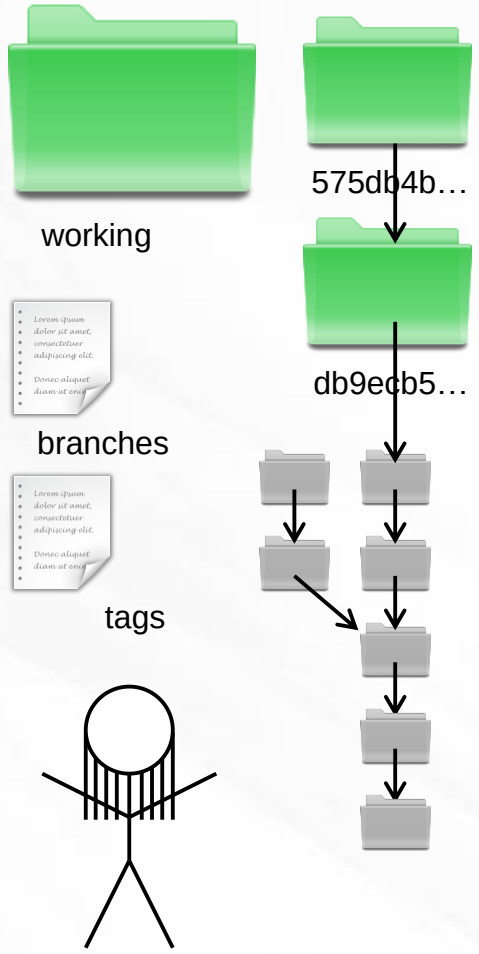
message

2009-05-21 23:45:01
parent: snapshot-113
author: Zoe <zoe@z.oe>

Introduced a new foo, and reset the bar to xyzzy.

Distributed





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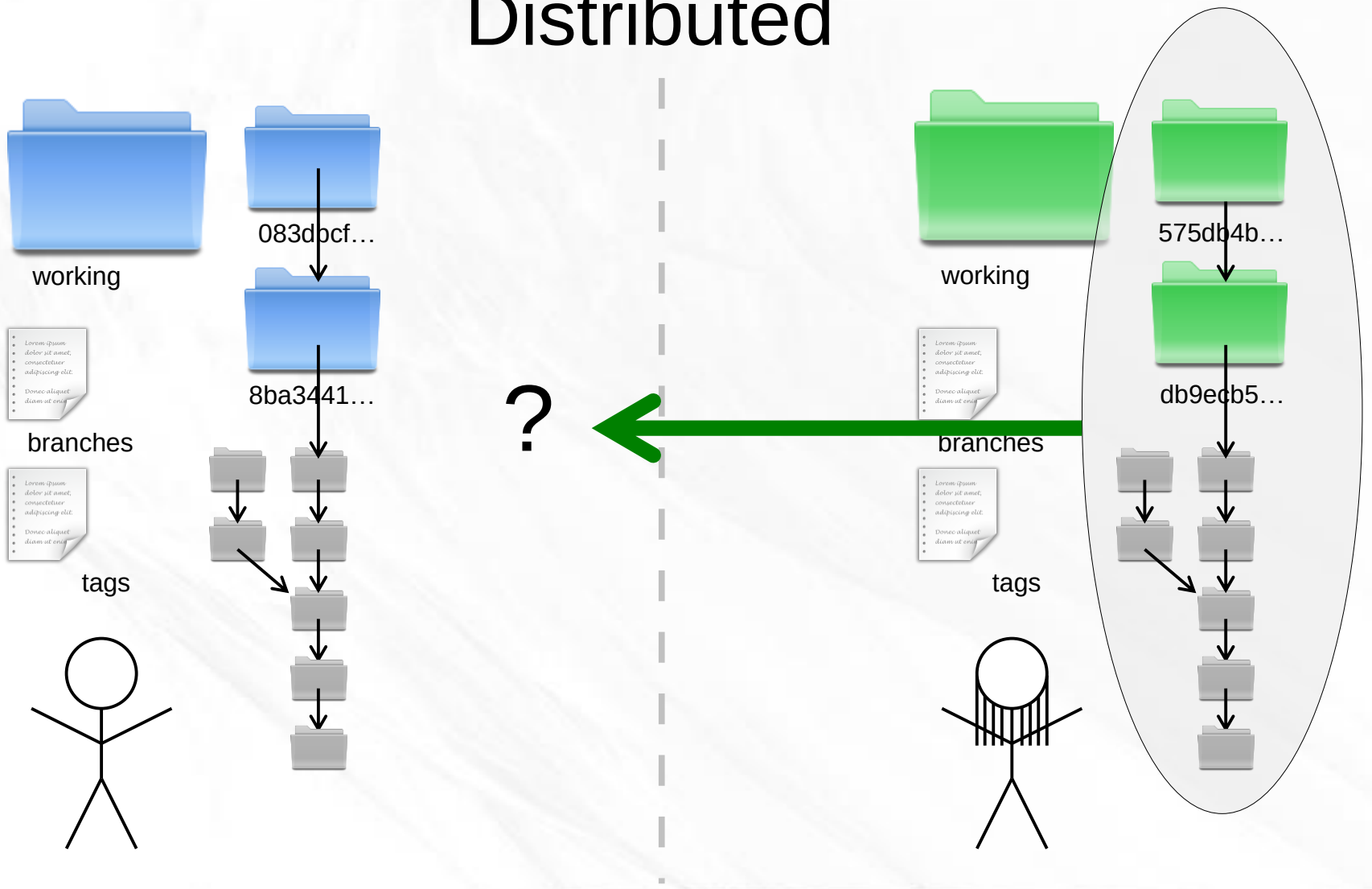

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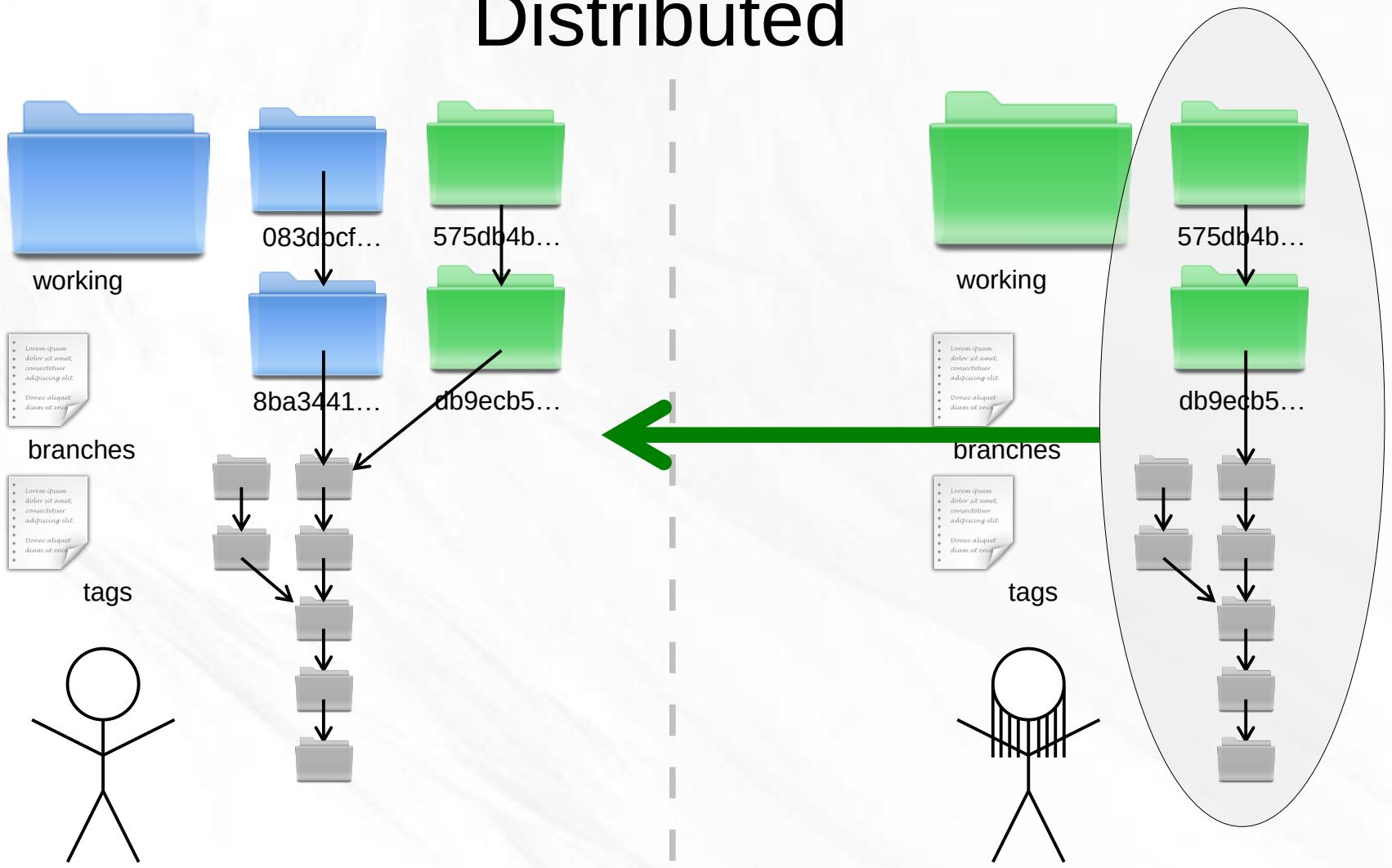

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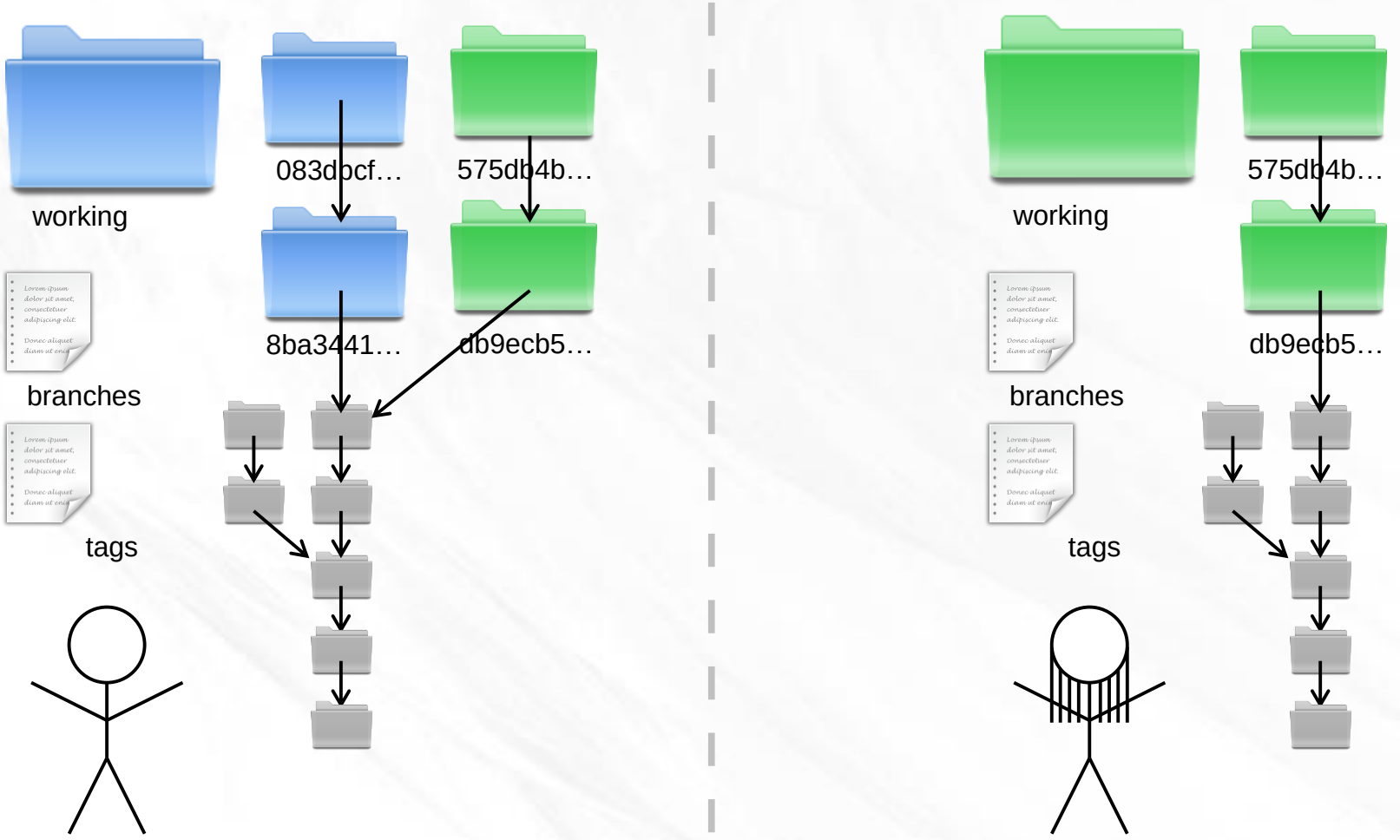

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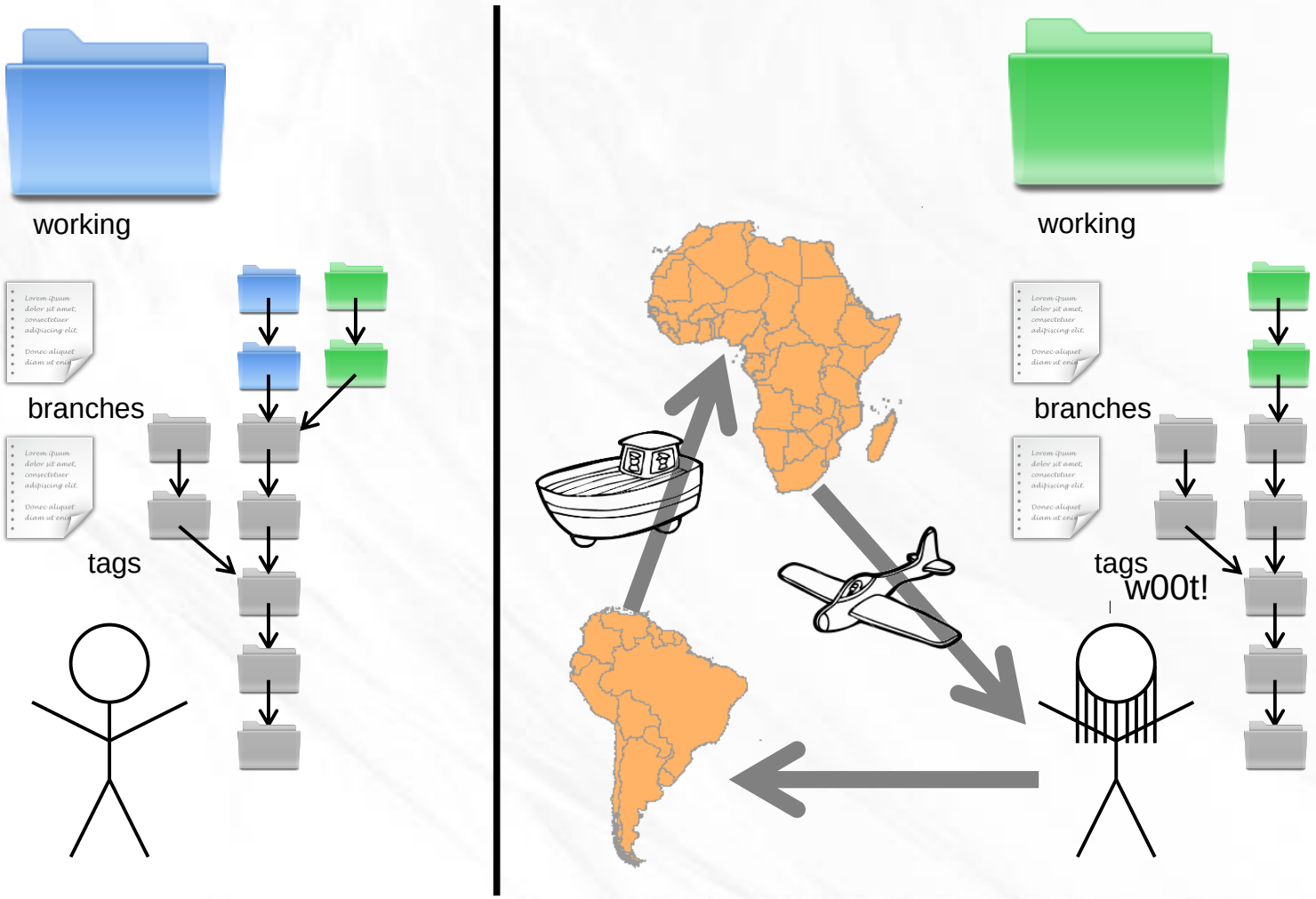

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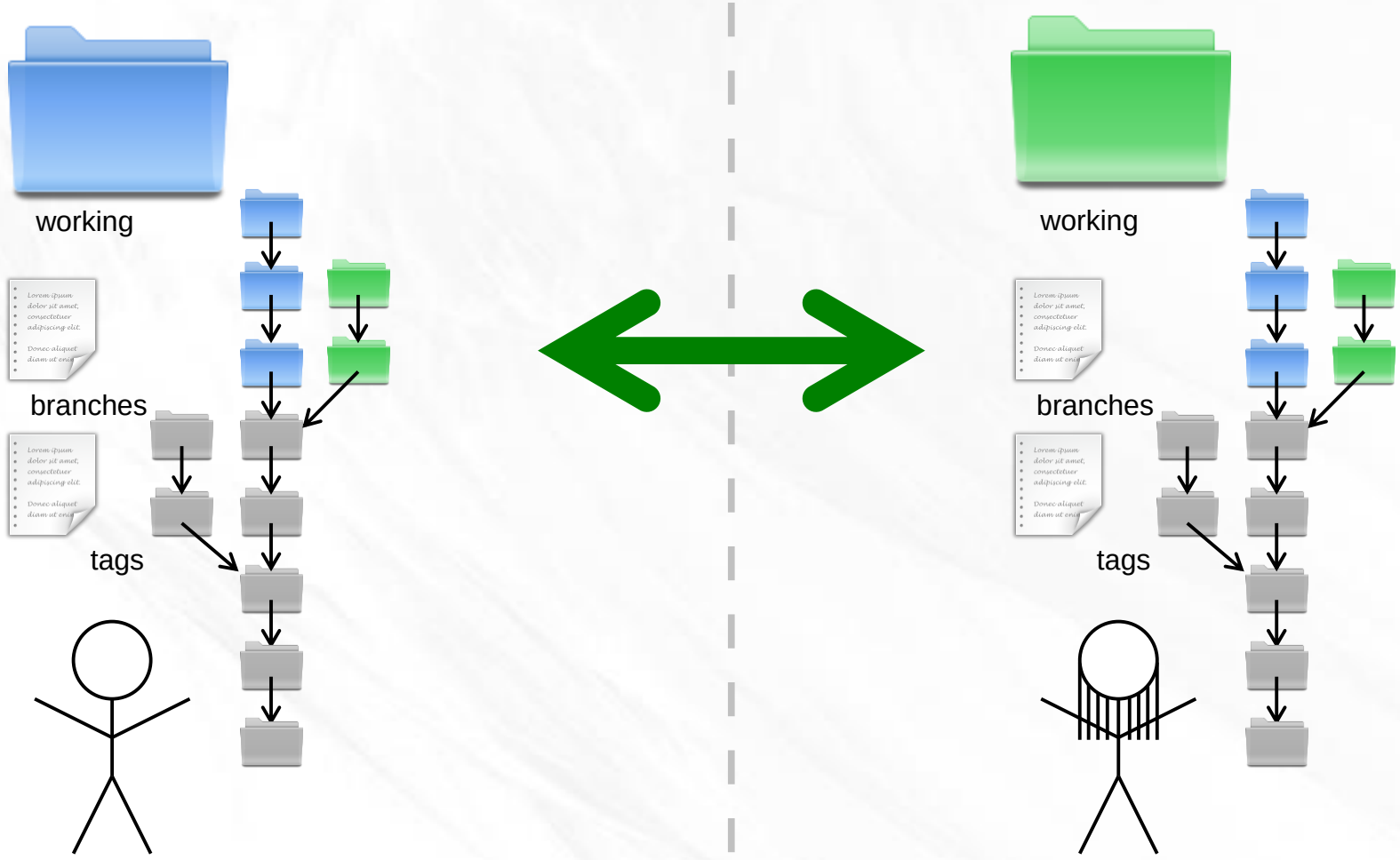
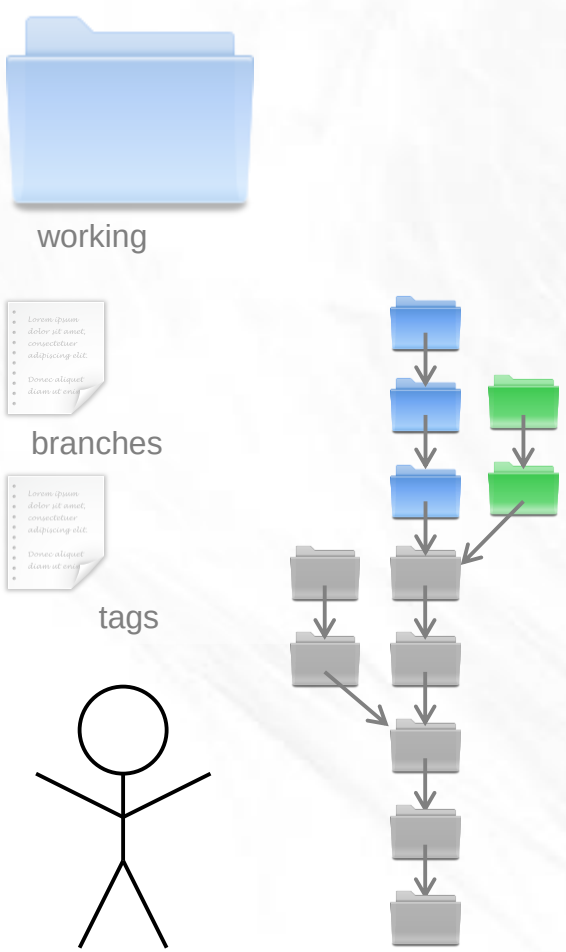
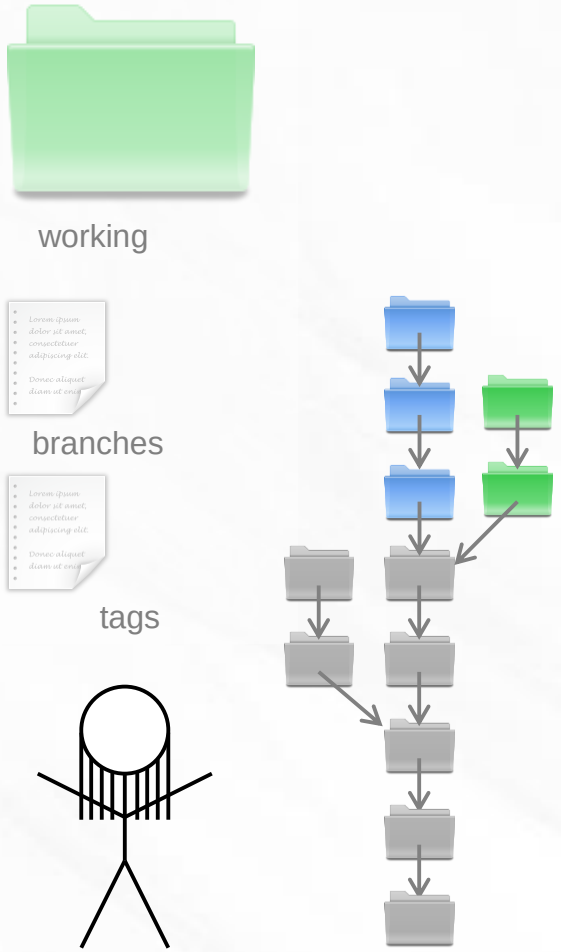
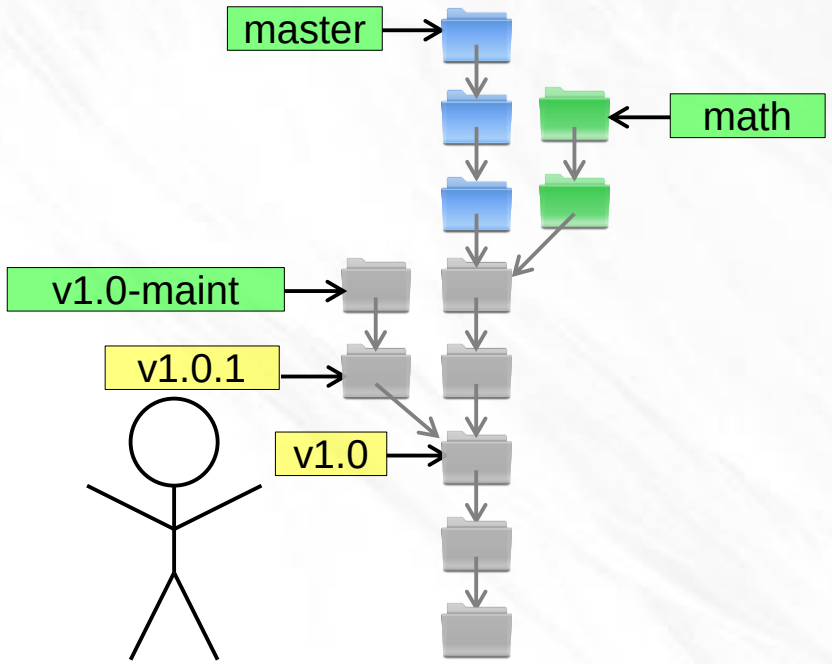


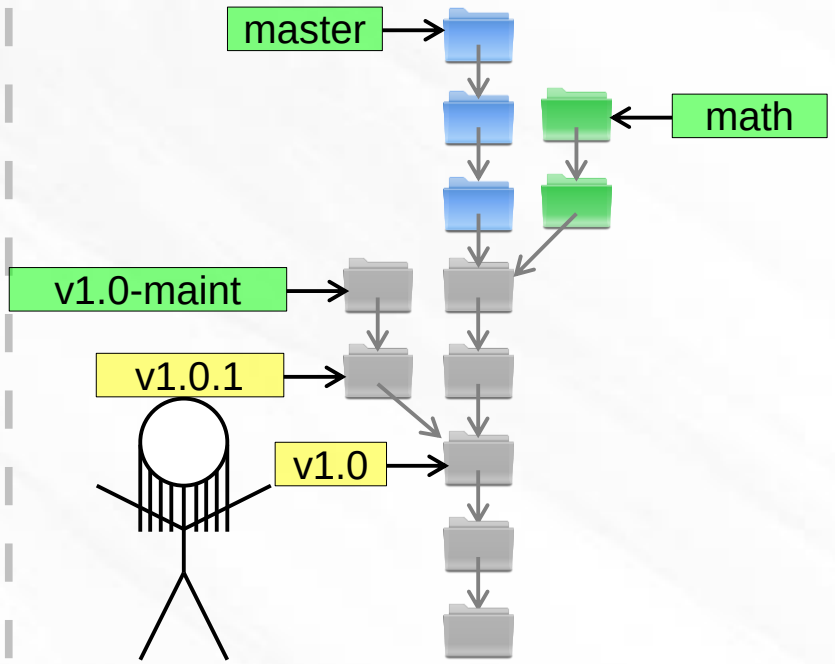
(simpler drawings)



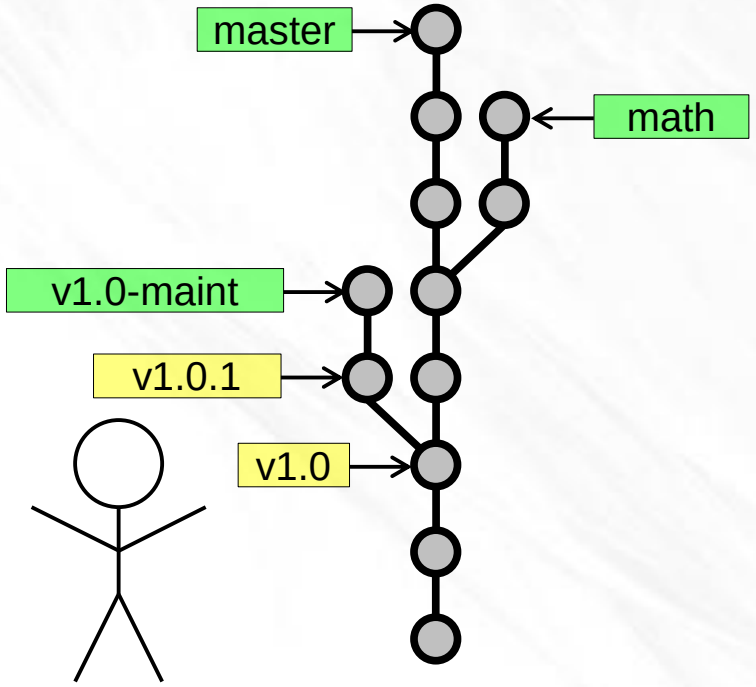


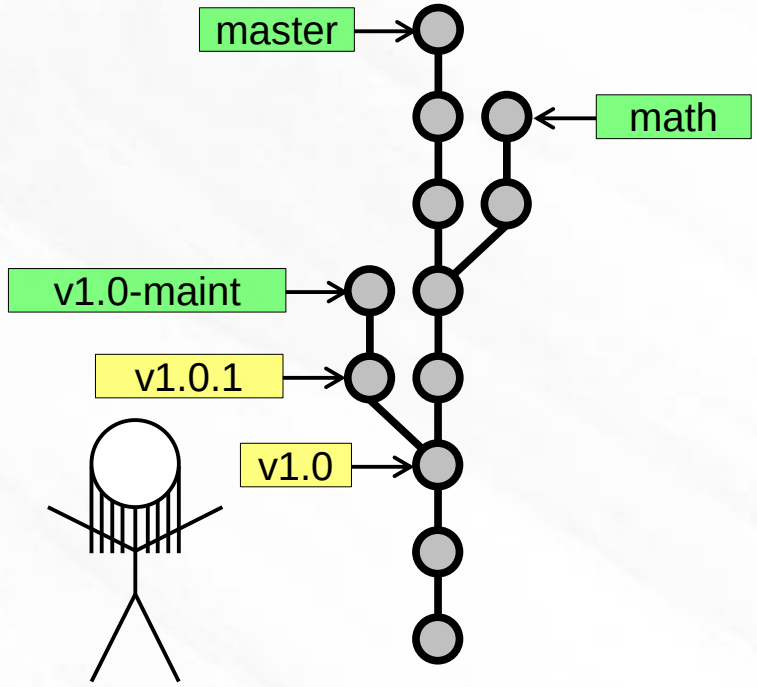
(simpler drawings)



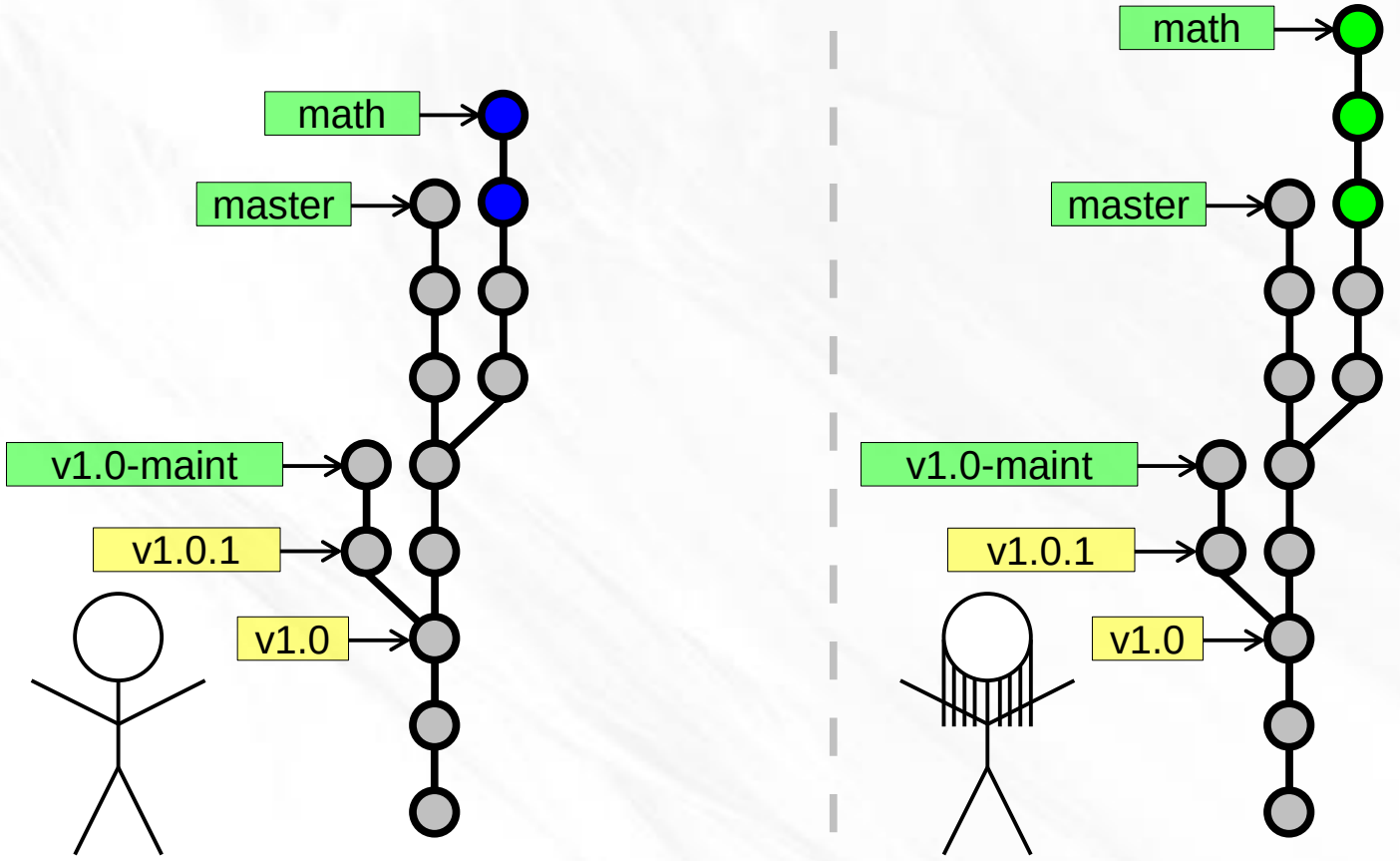


(simpler drawings)





Merges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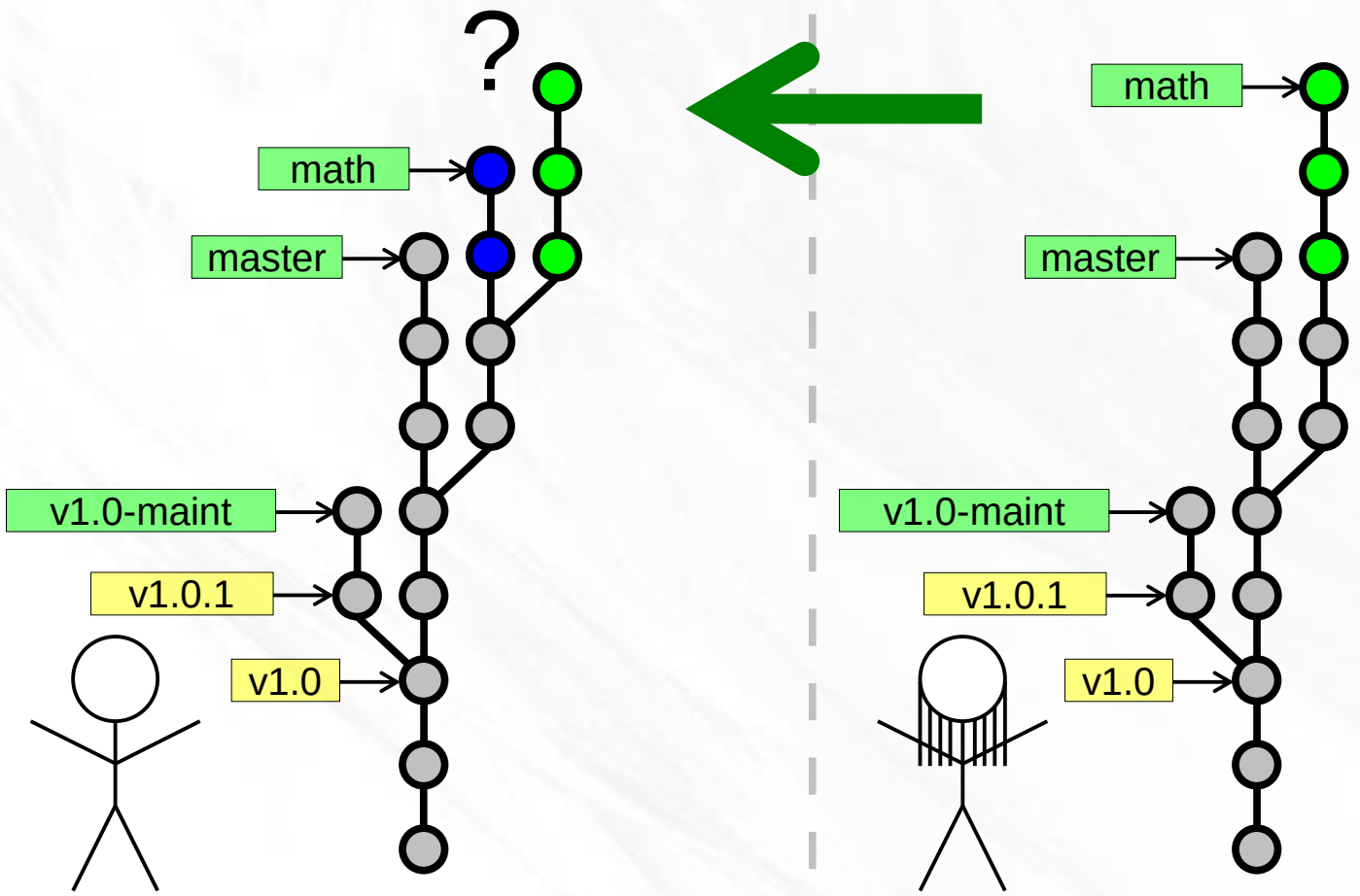
v1.0

Merges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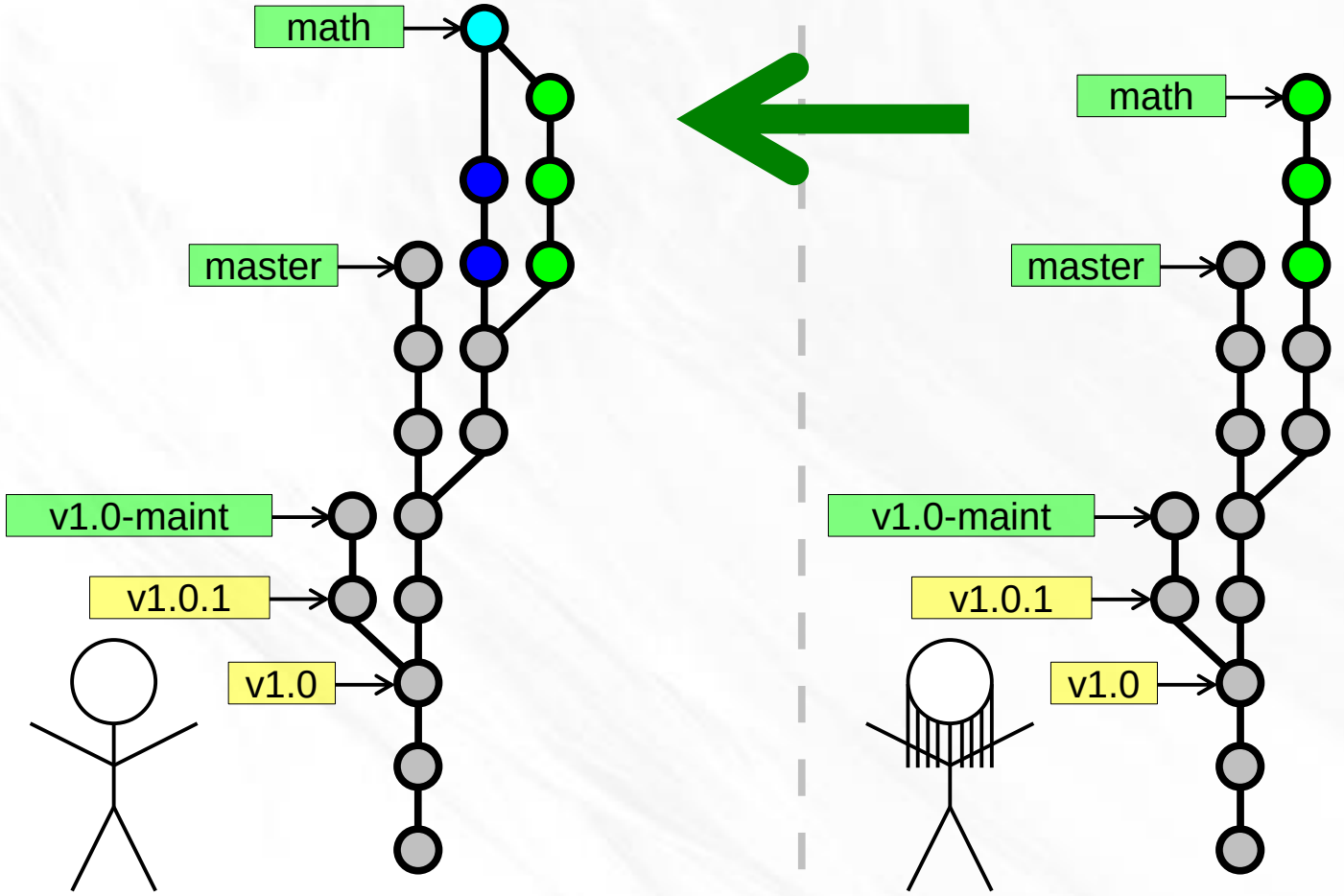
v1.0

Merges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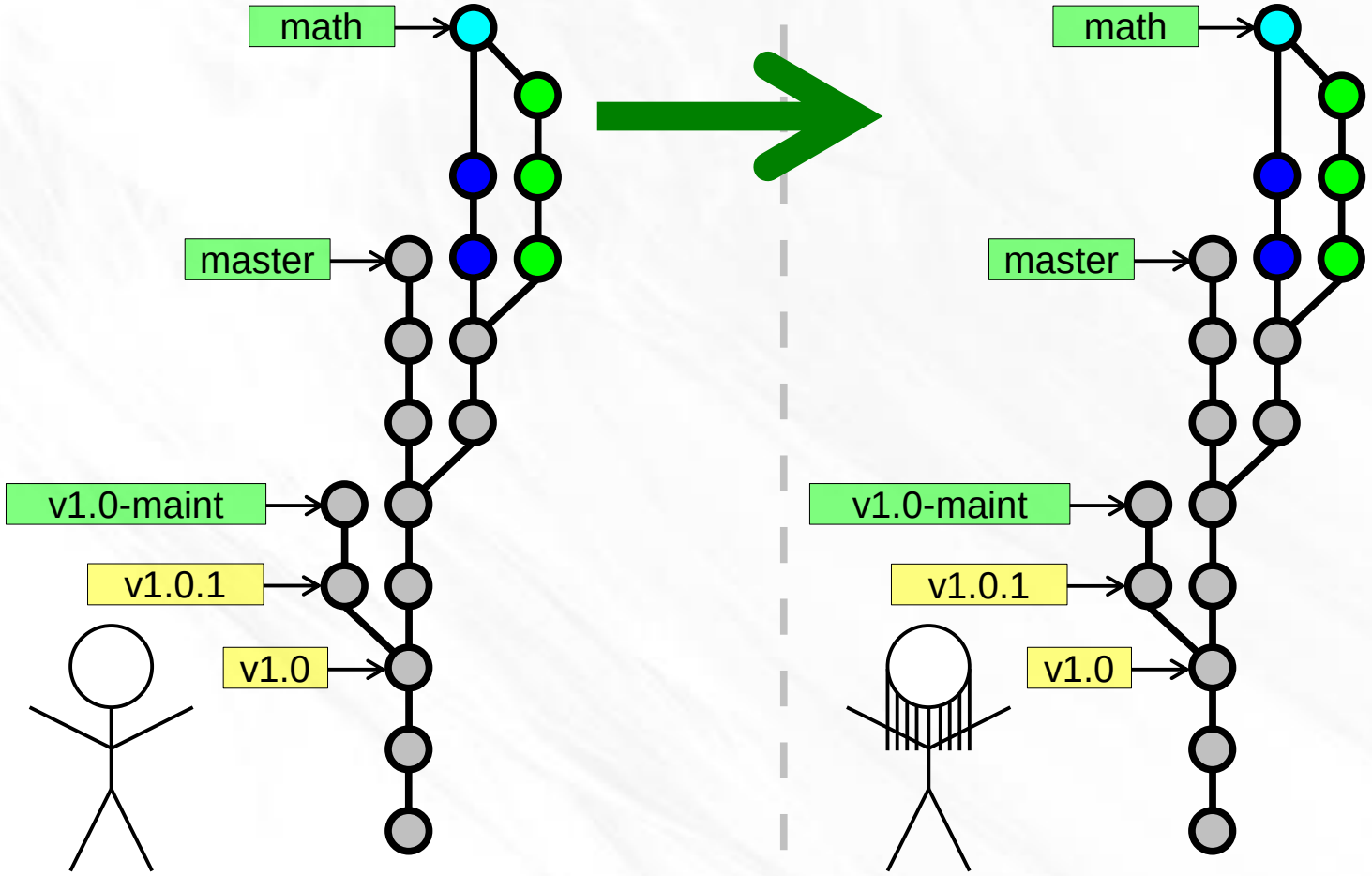
Merges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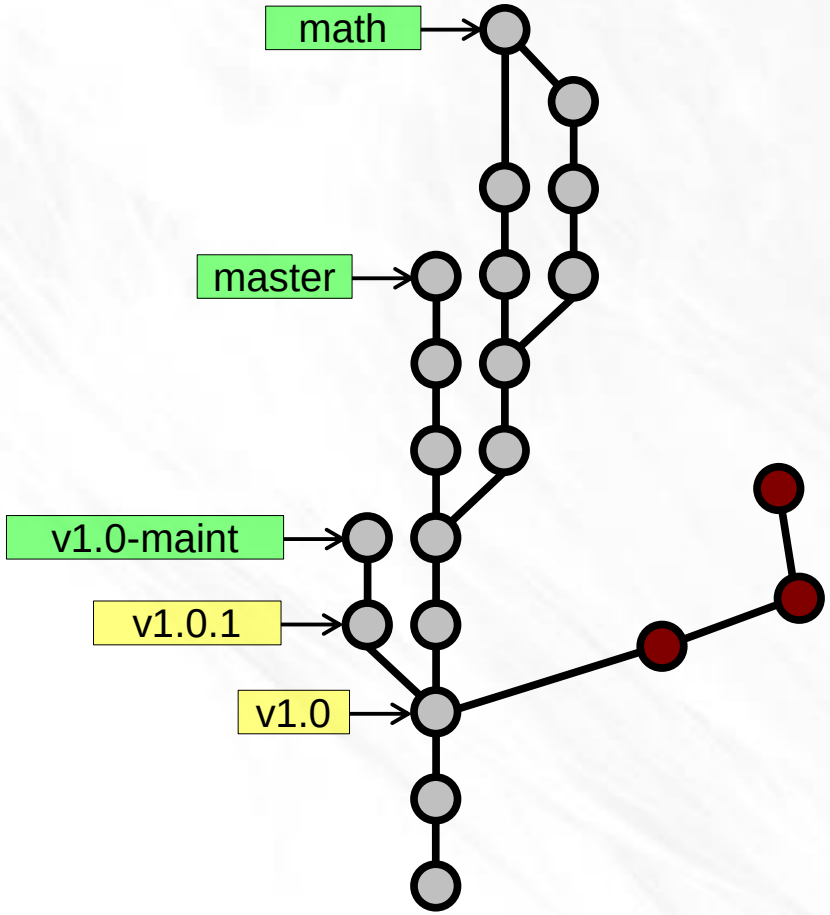
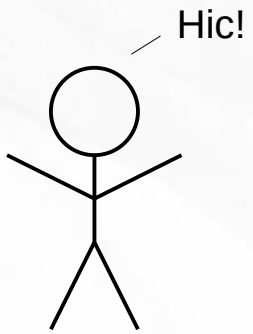
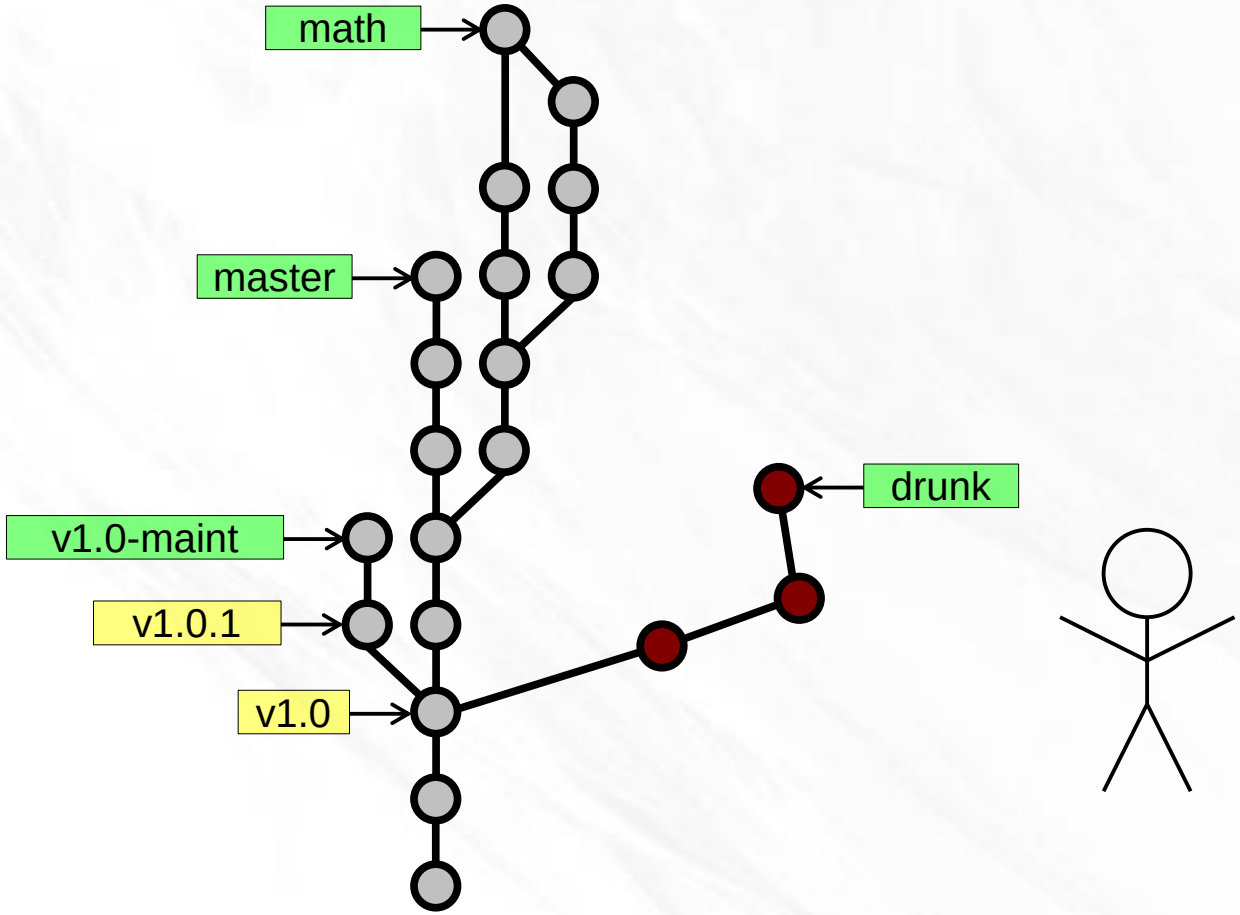
Rewriting History





Rewriting History



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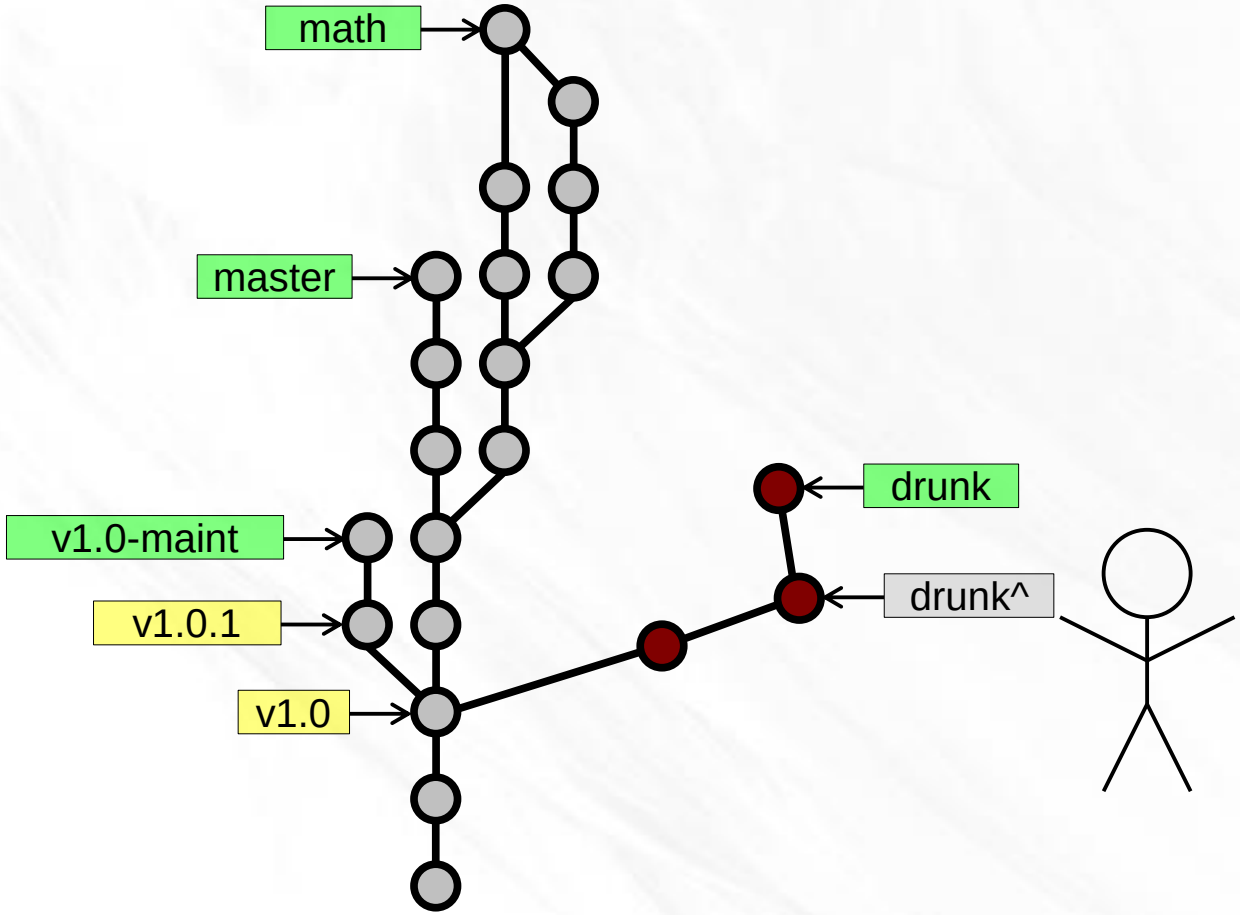
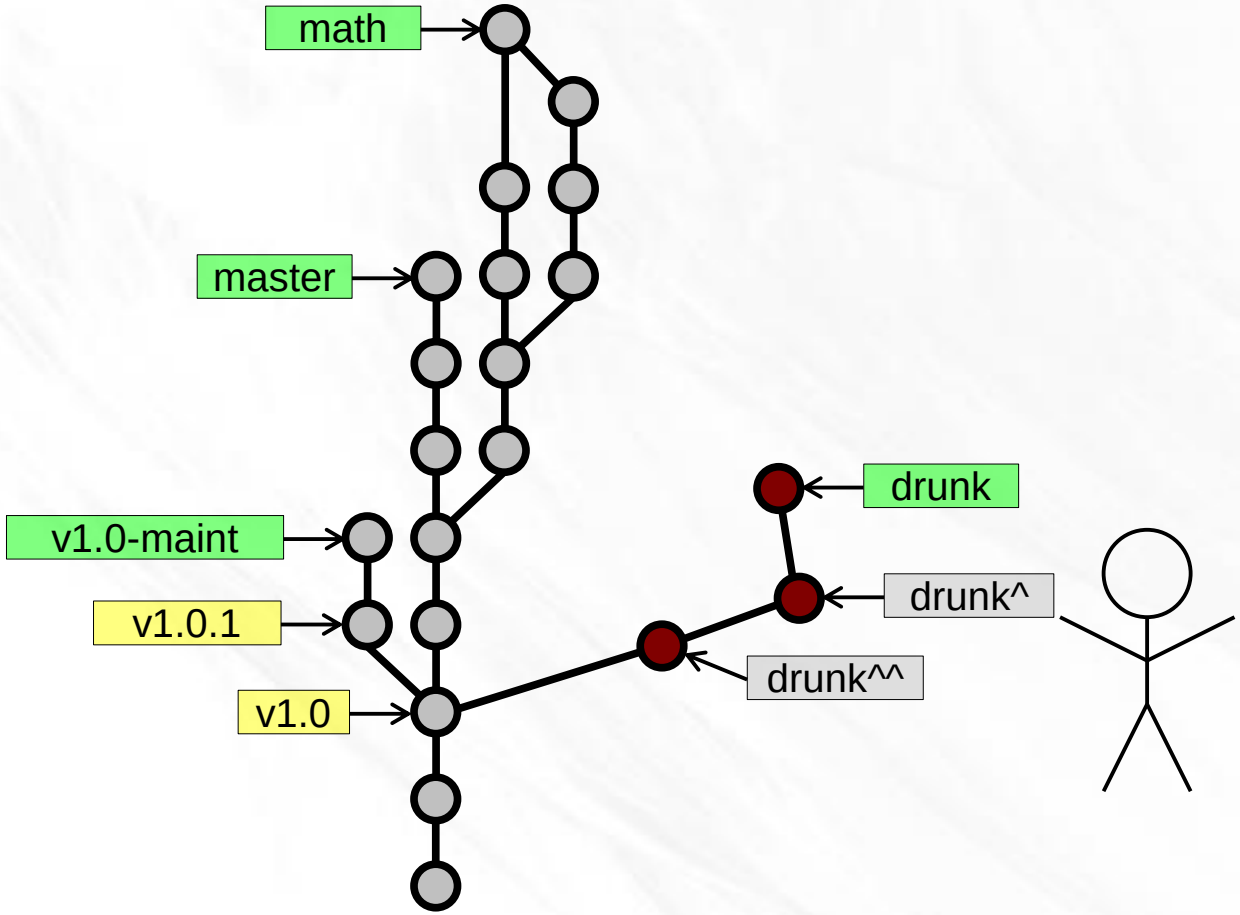
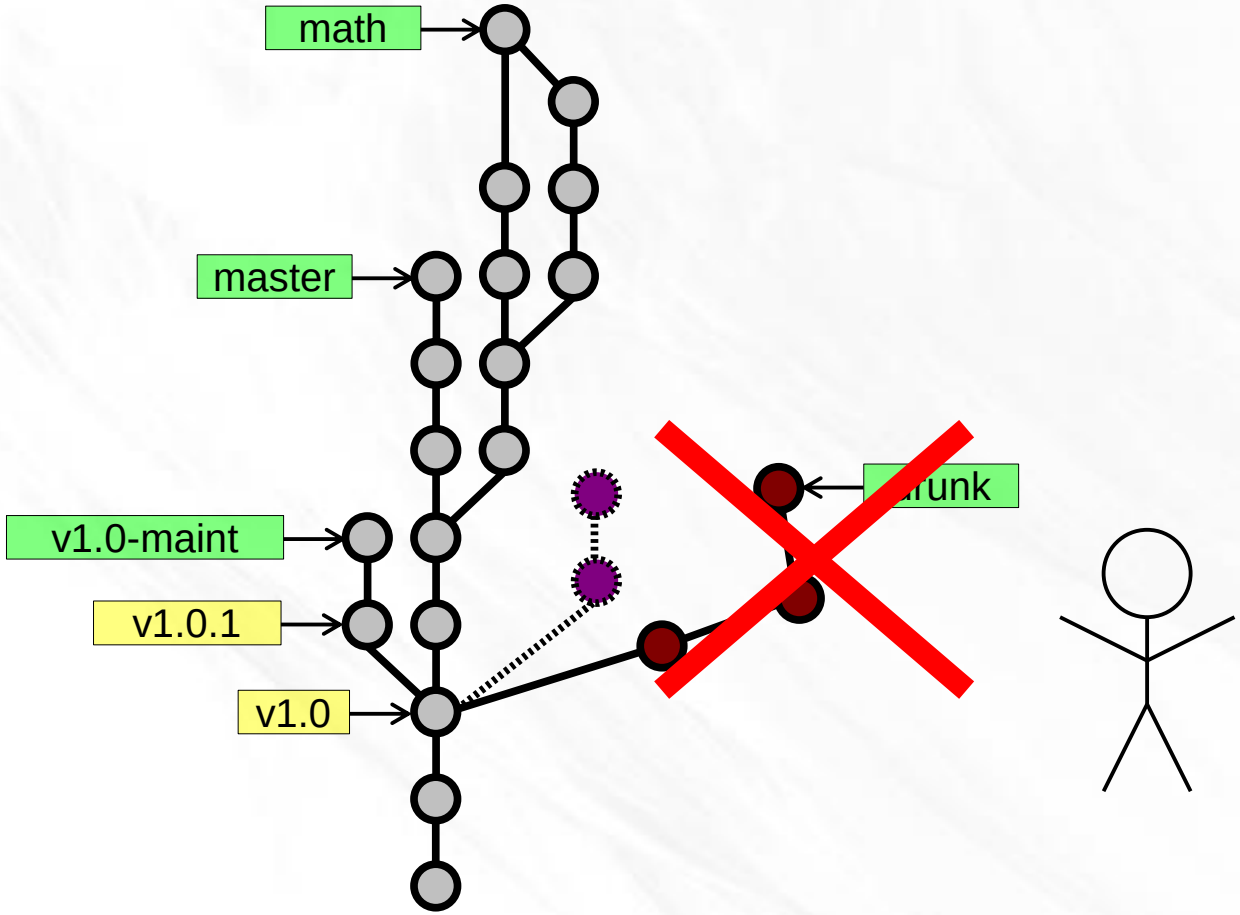


Rewriting History



Rewriting History



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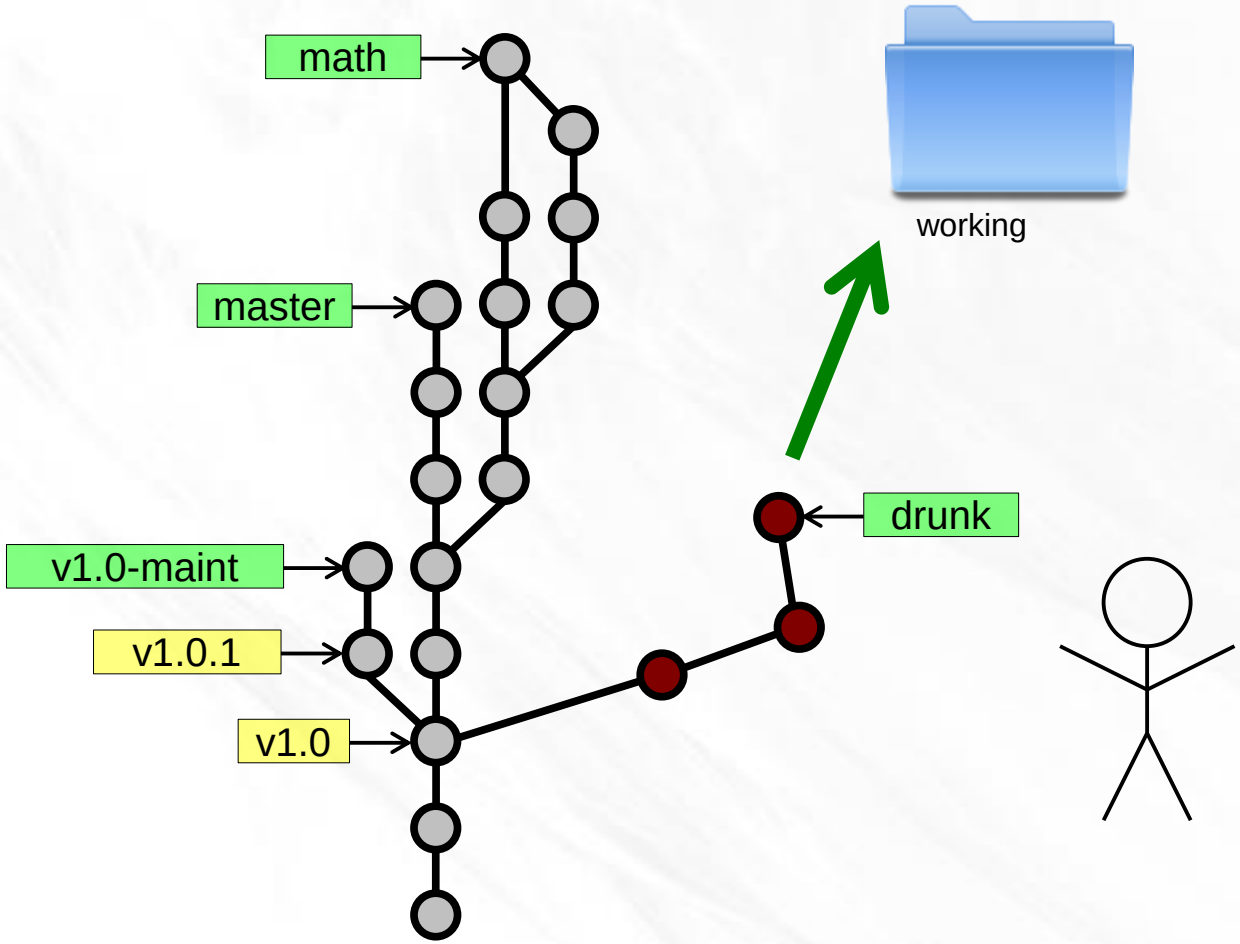

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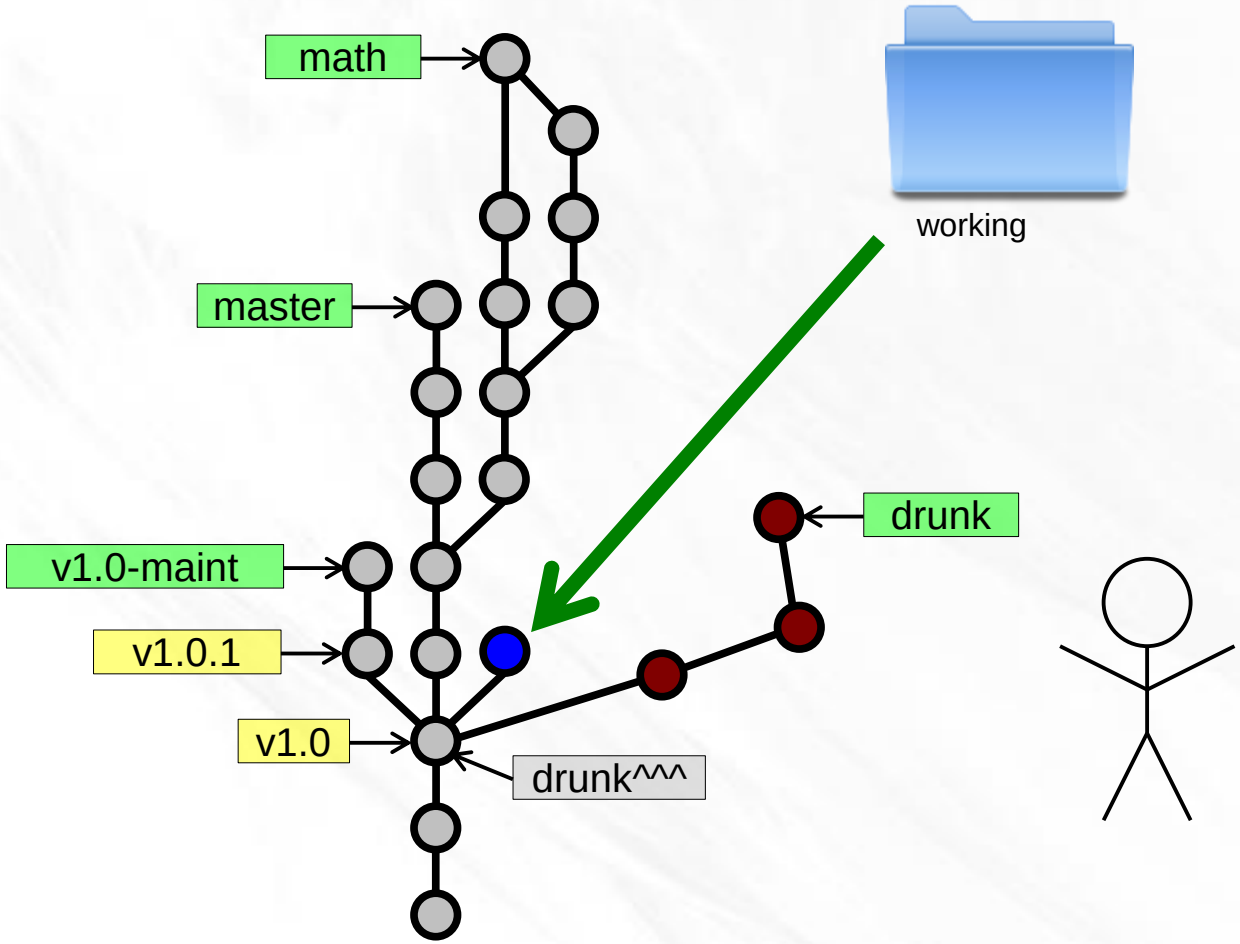

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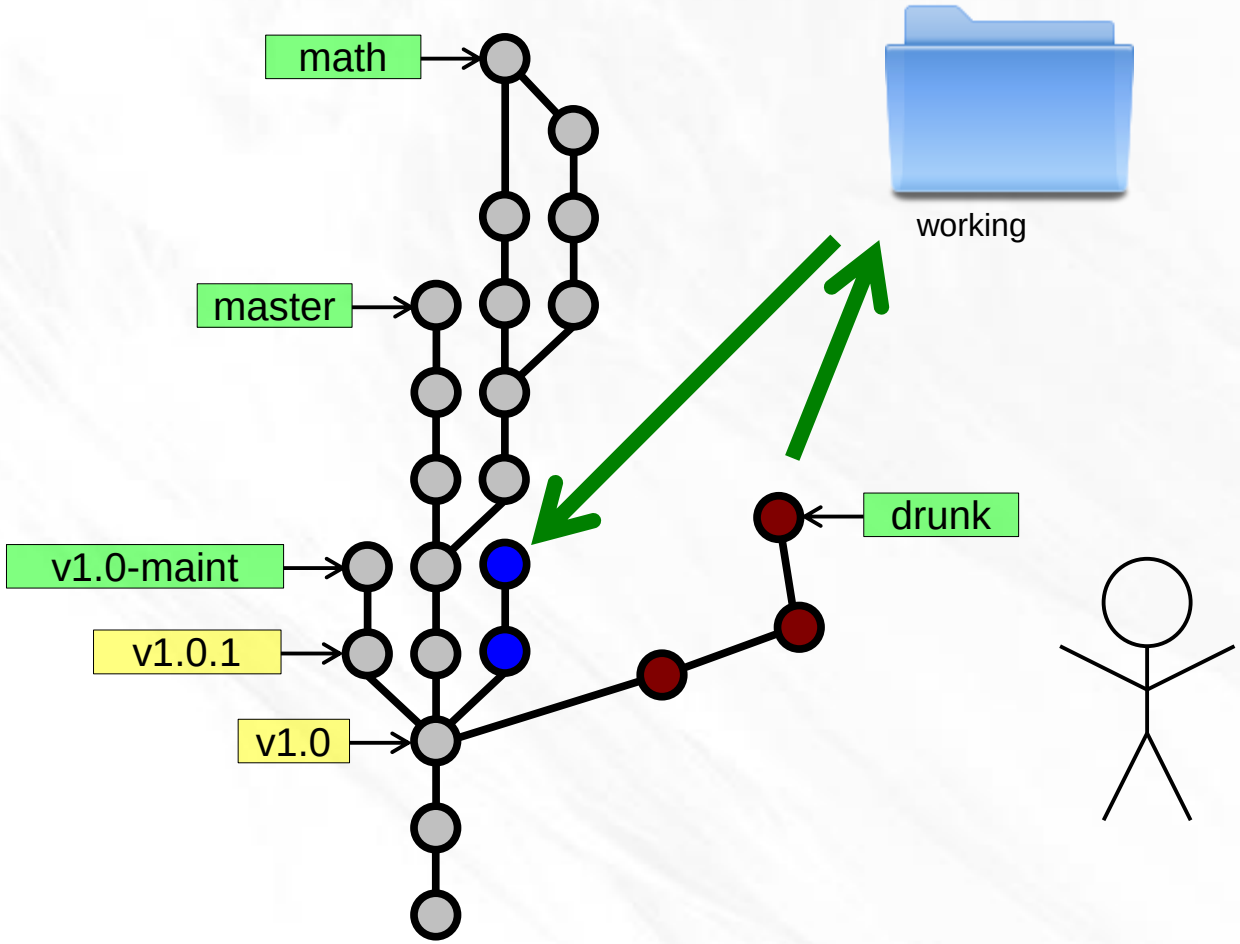

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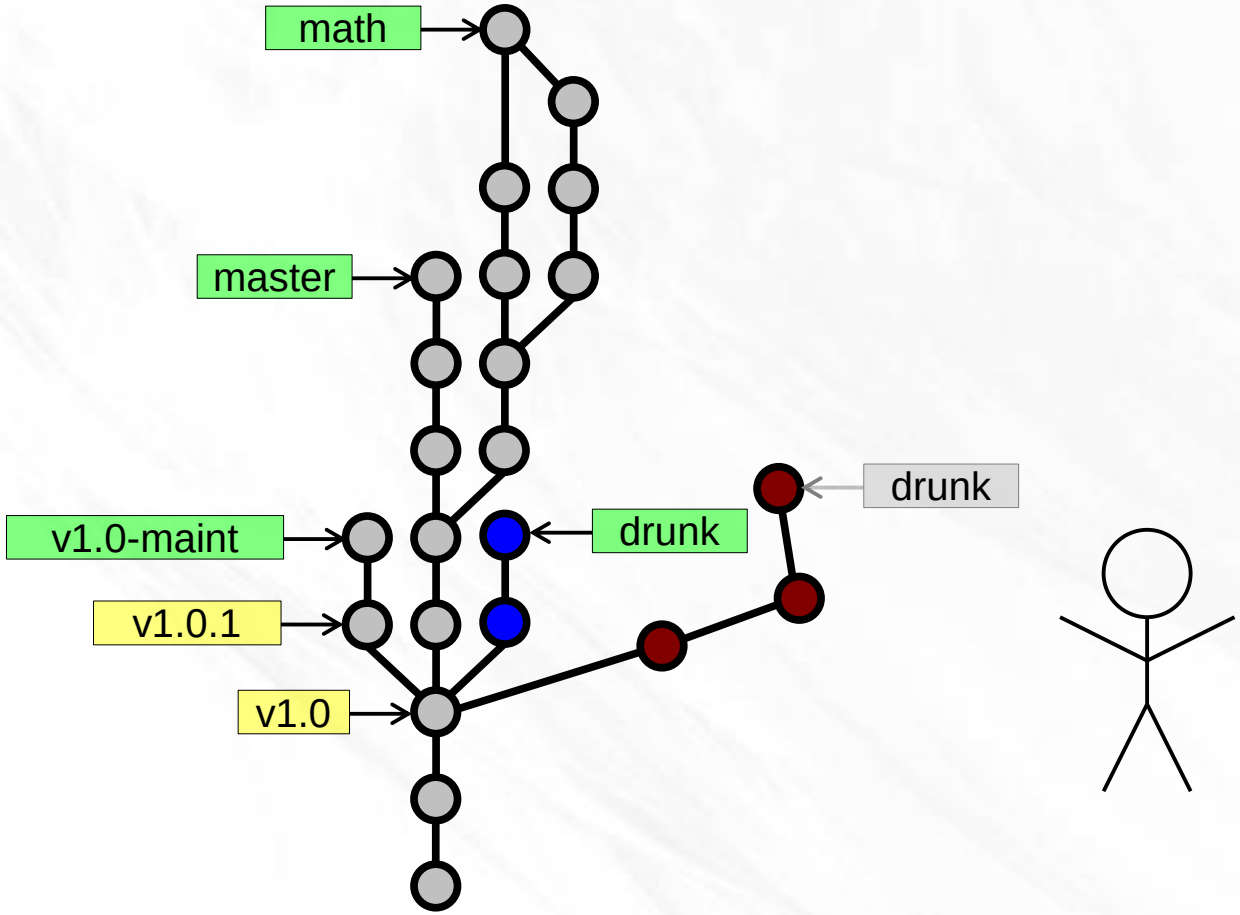

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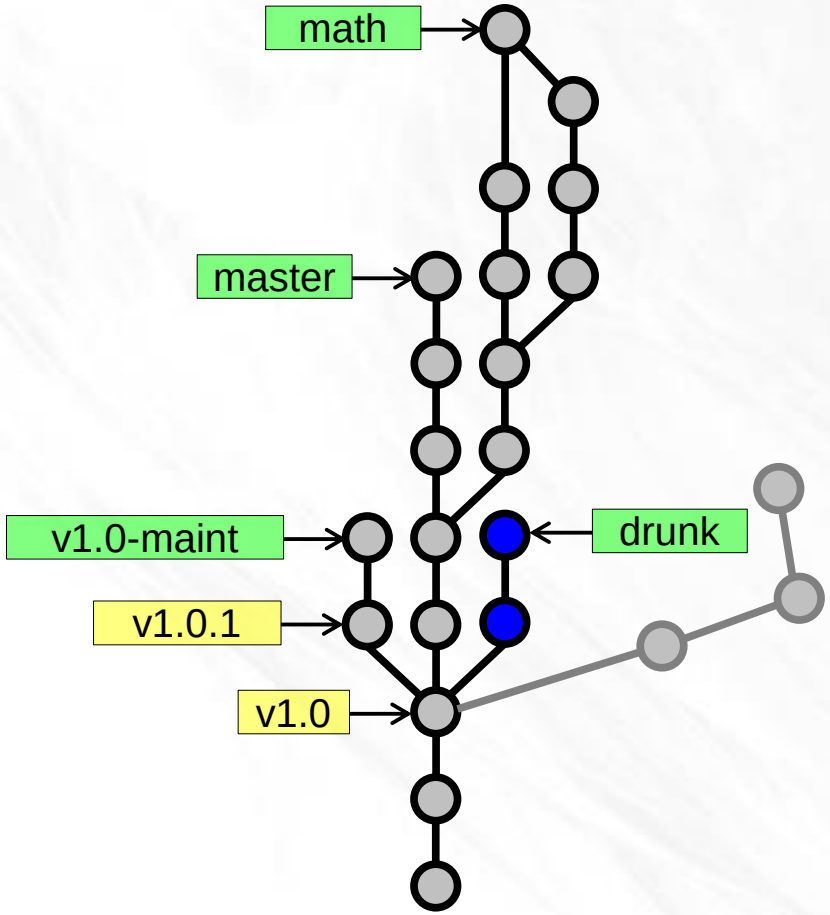
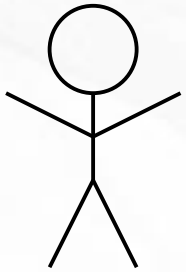
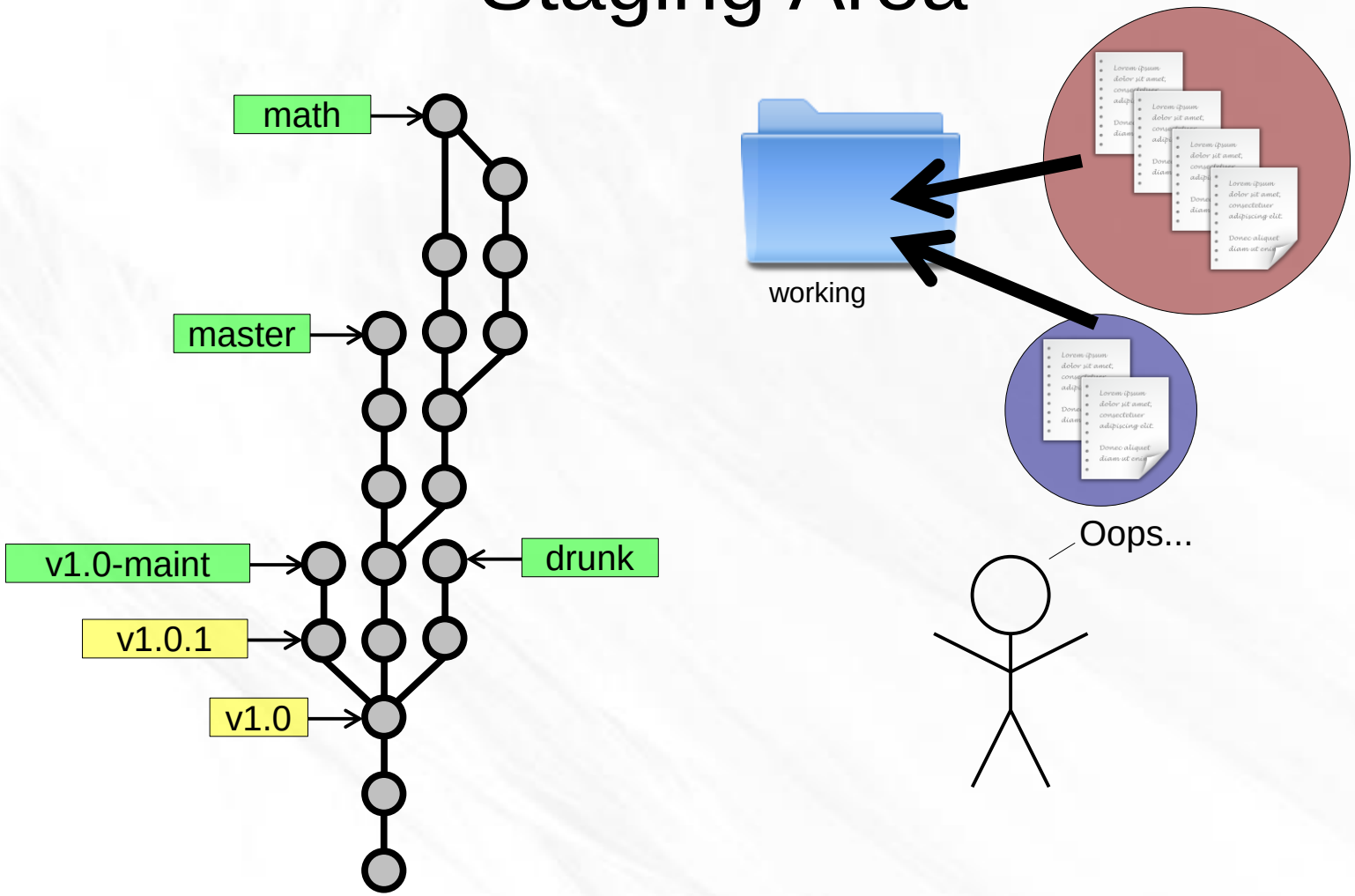
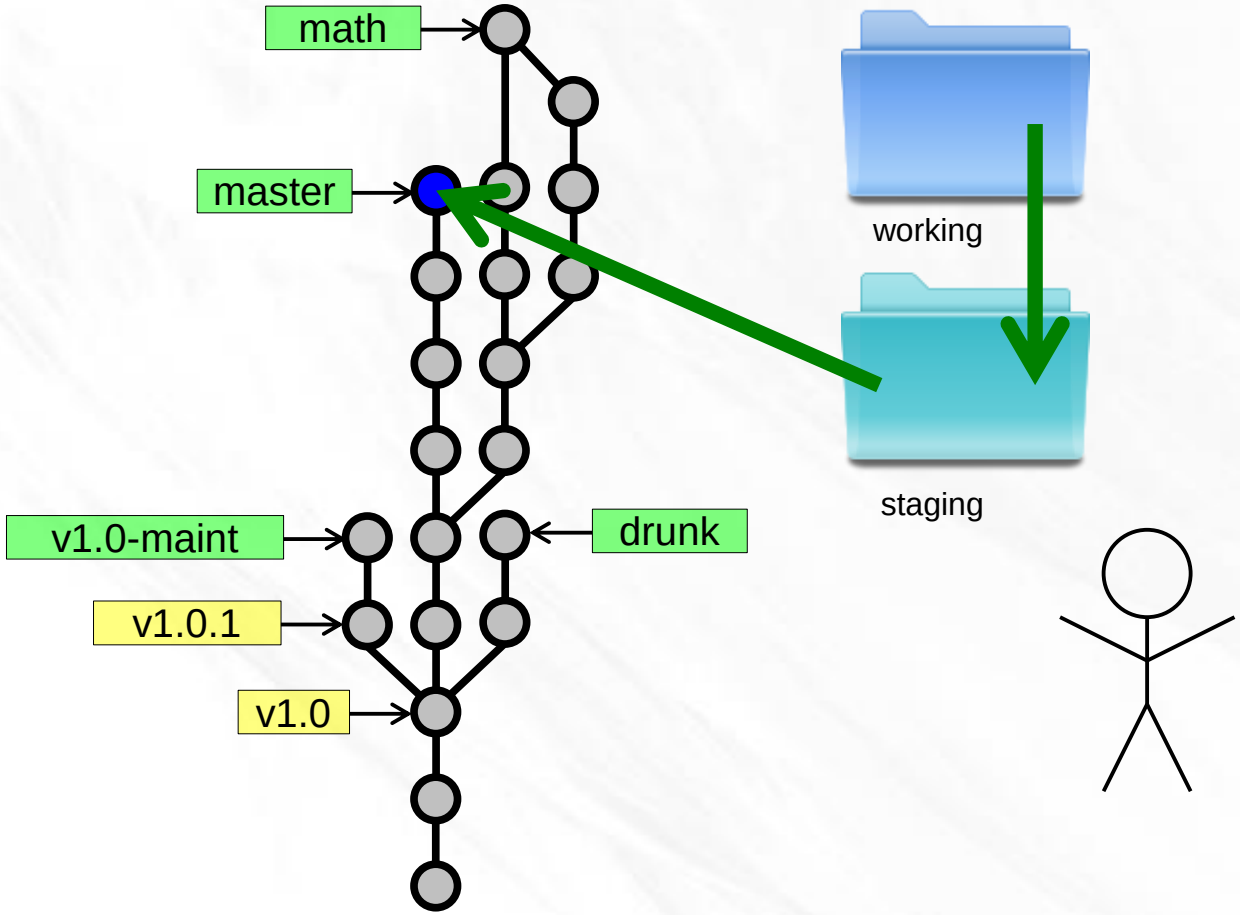




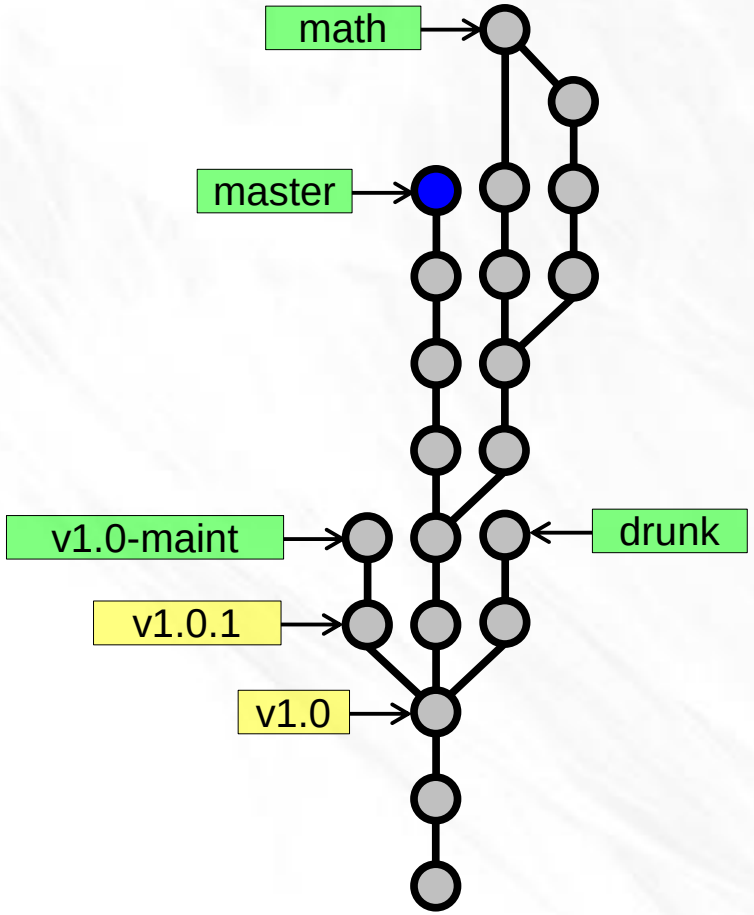
Staging Area

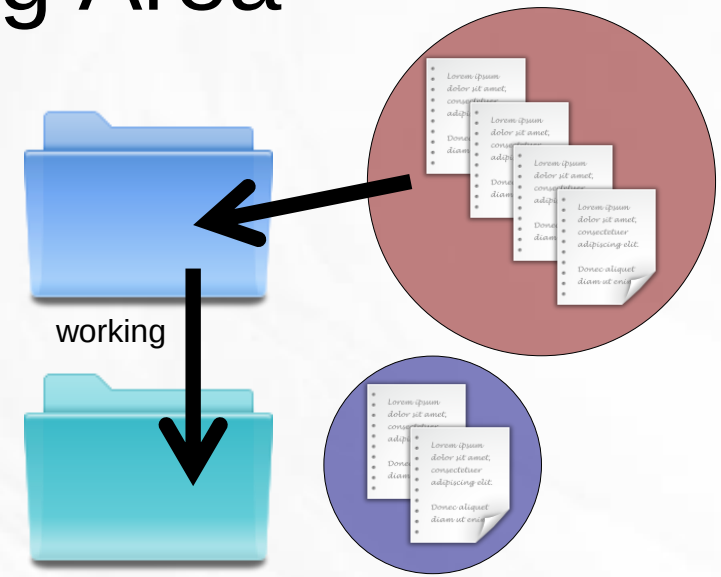


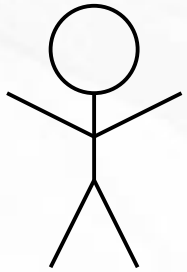
Staging Area



Staging Area







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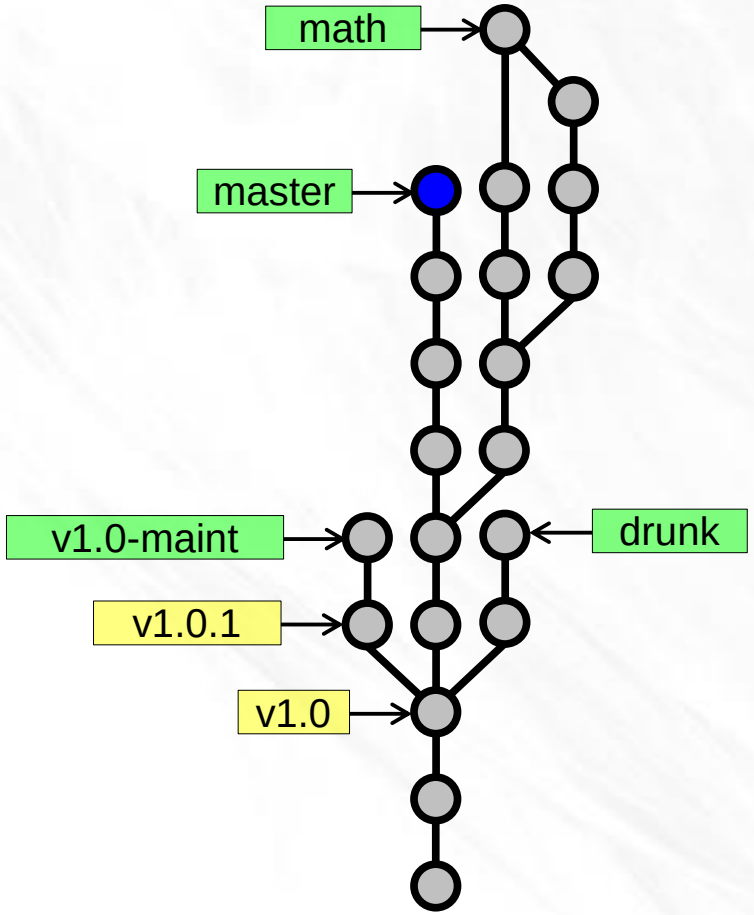

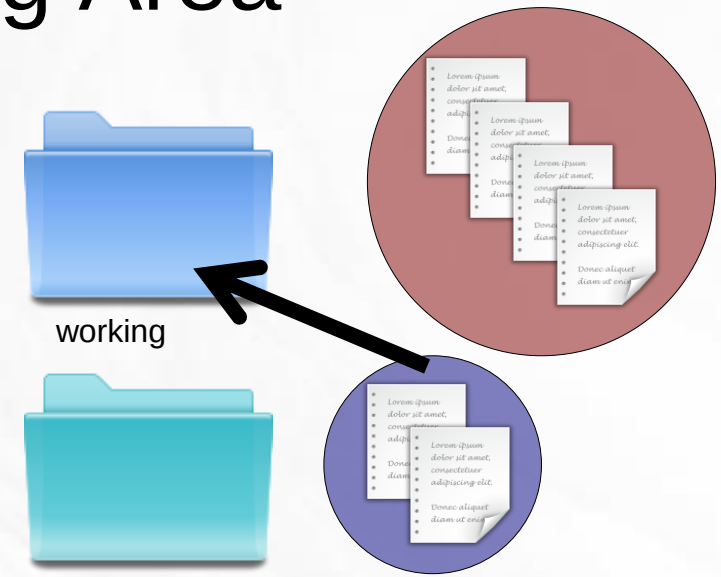

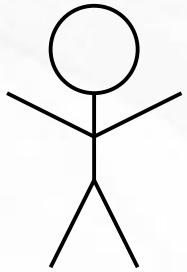

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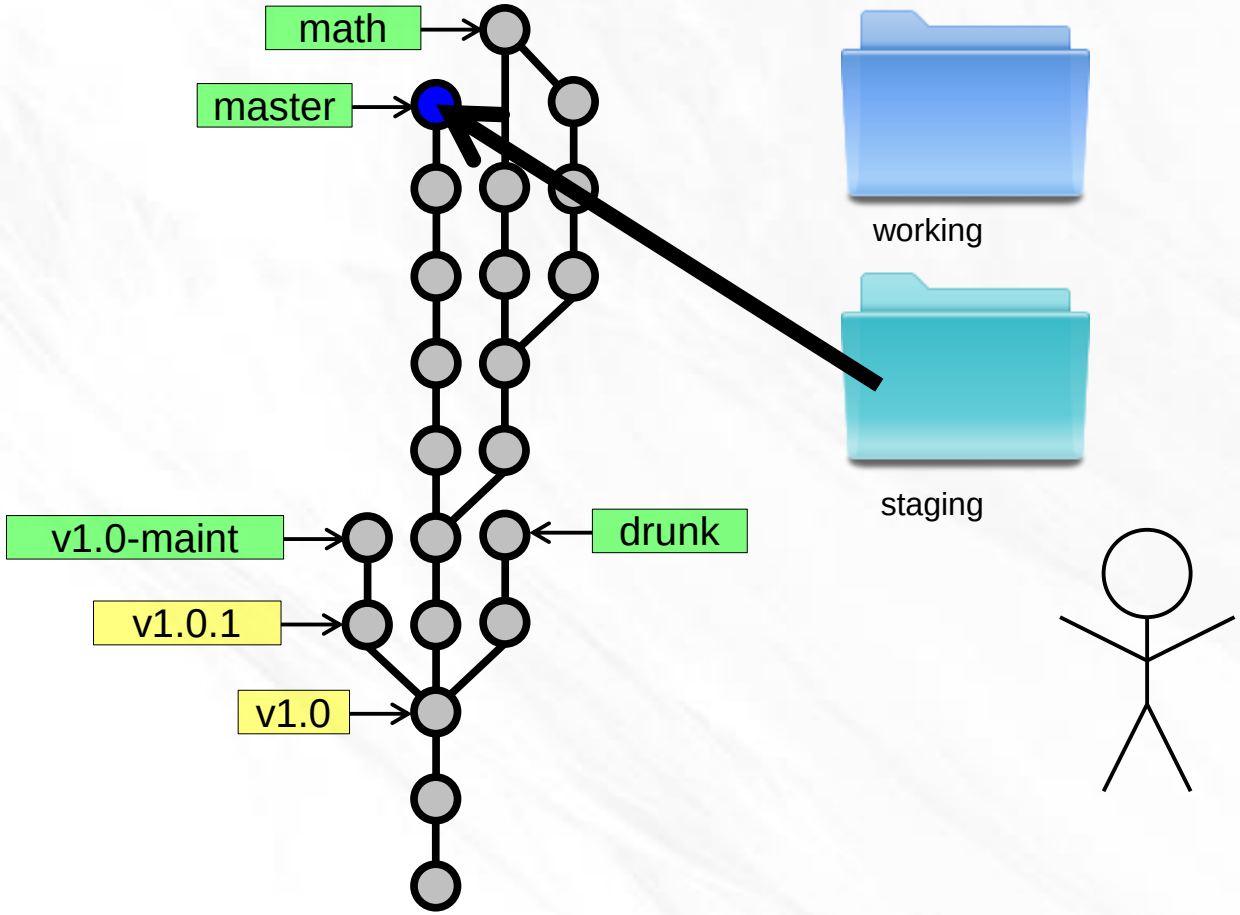
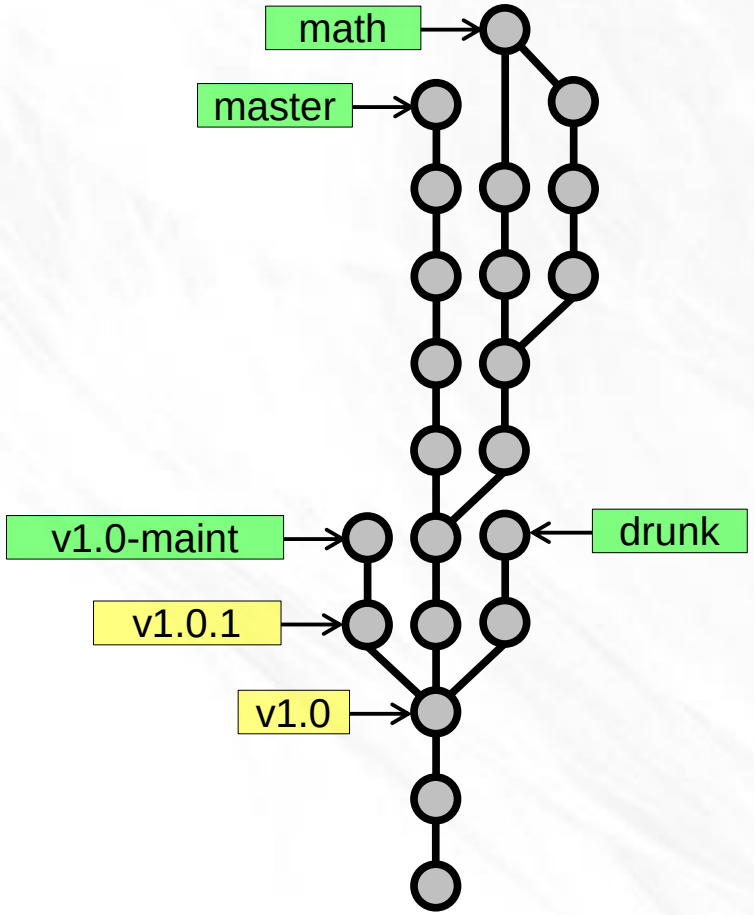
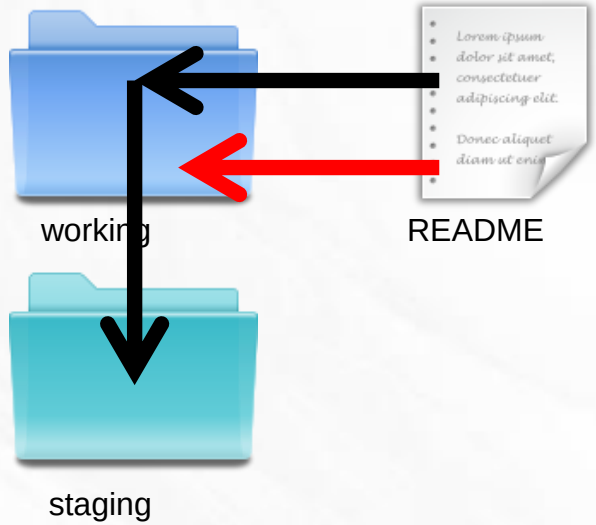
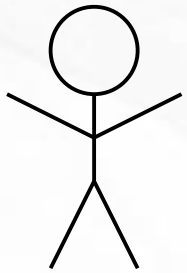


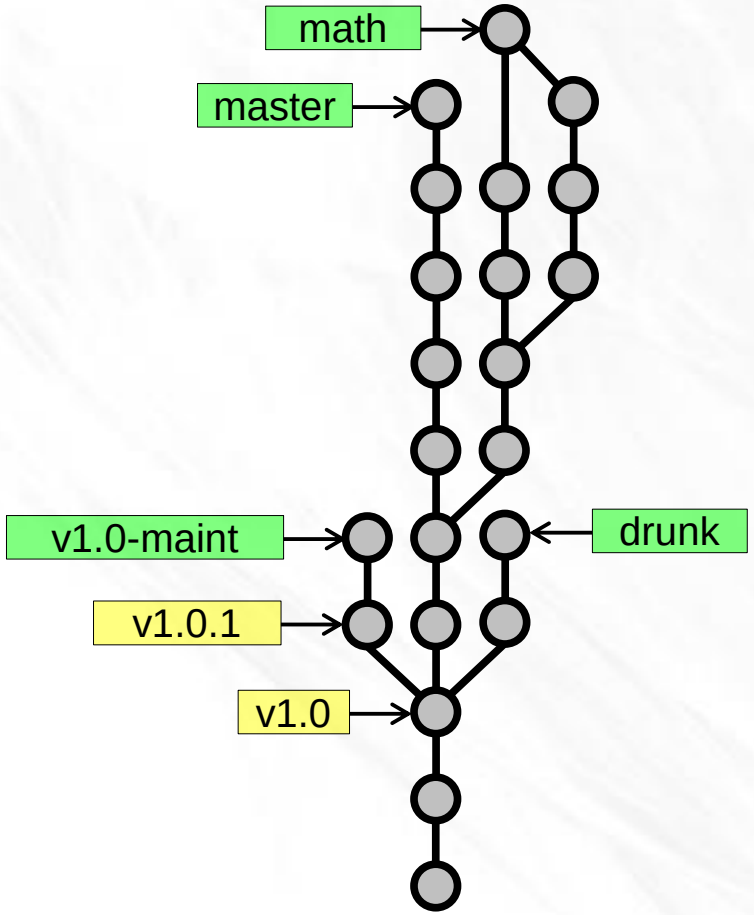
Staging Area

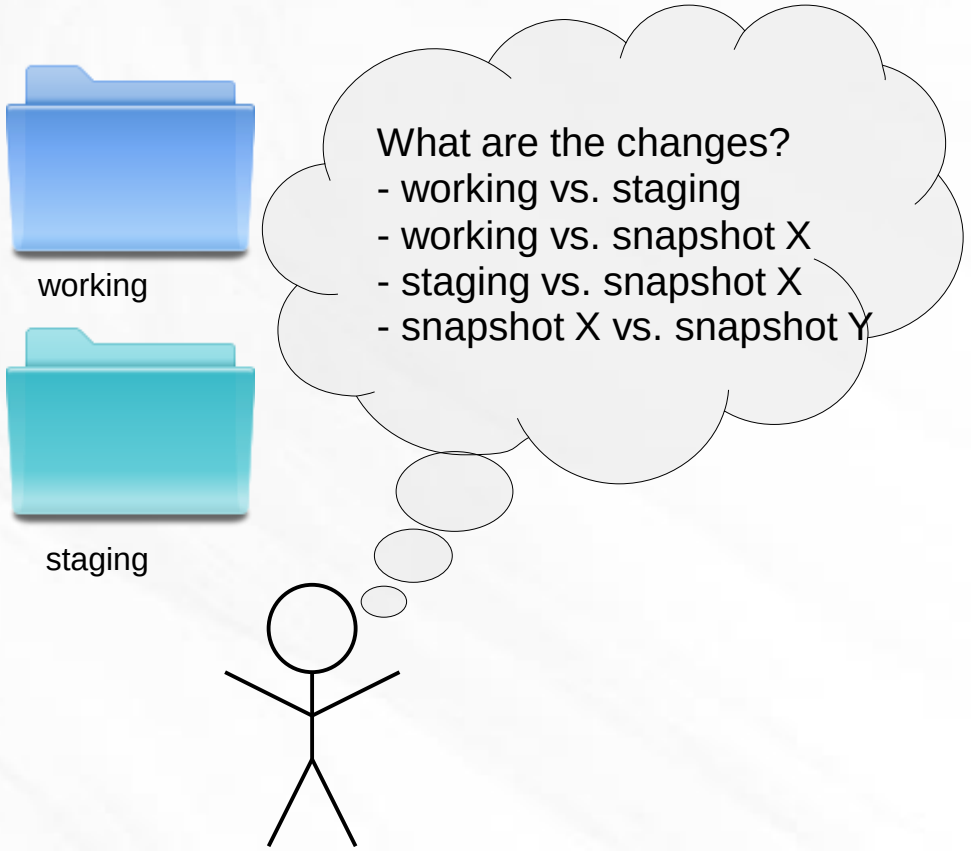




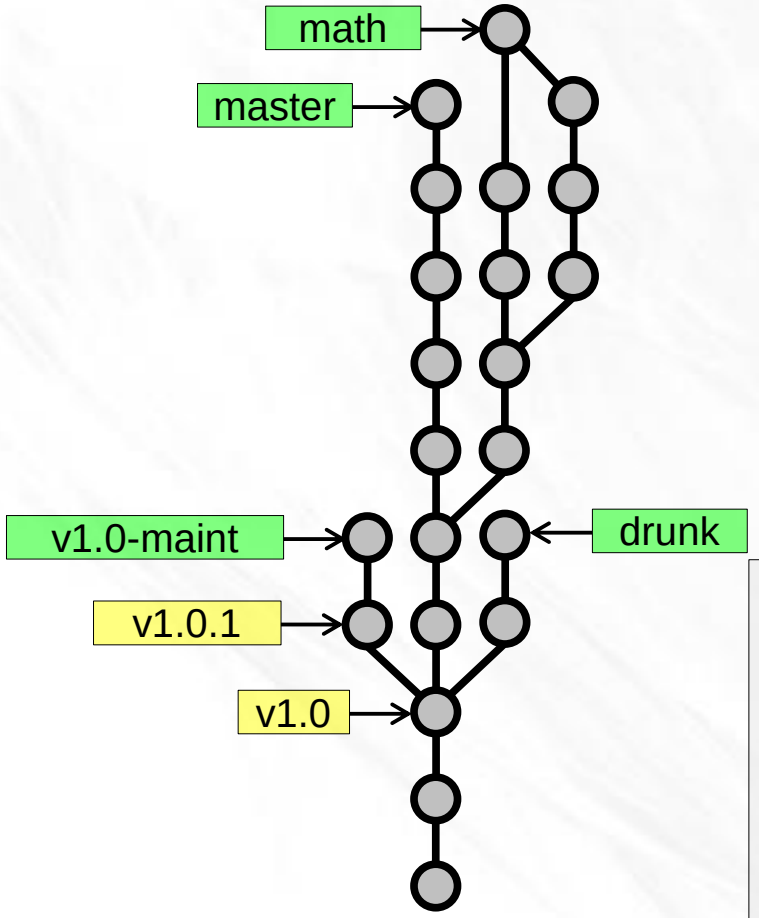


Diffs


math
master
v1.0-maint
drunk
v1.0.1
v1.0


working
staging
What are the changes?
- working vs. staging
- working vs. snapshot X
- staging vs. snapshot X
- snapshot X vs. snapshot Y

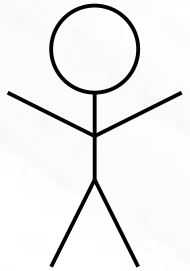
Diffs



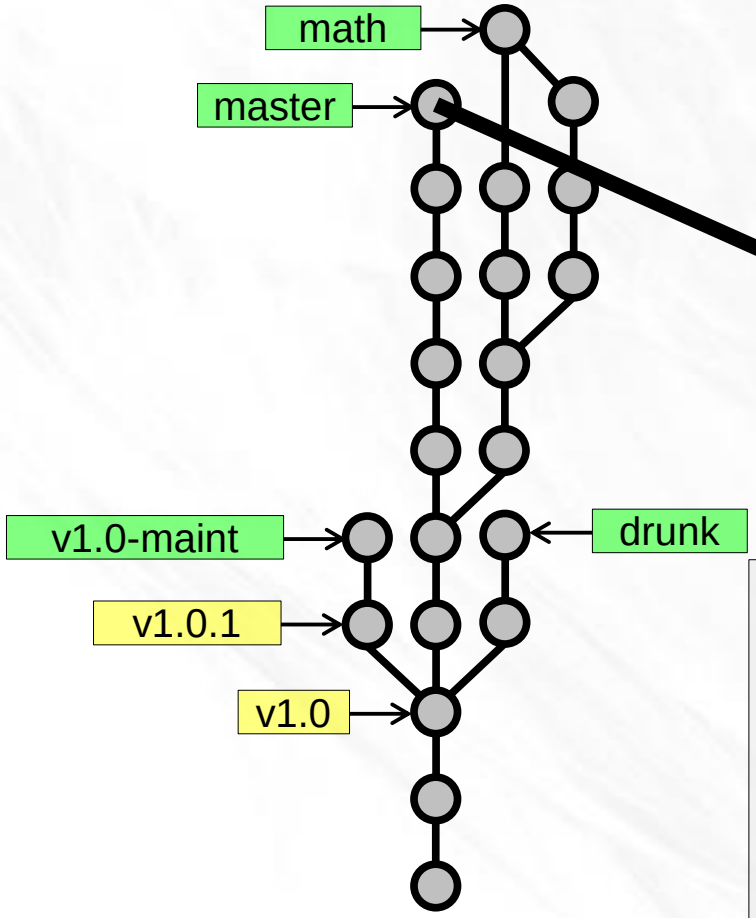
Diff algorithm

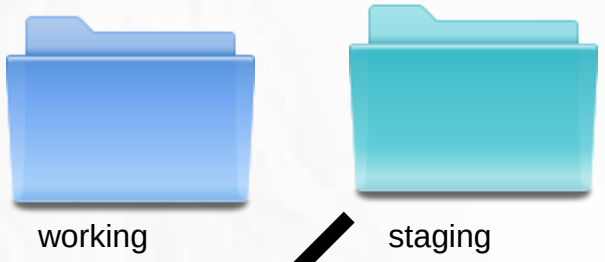
```
--- staging
+++ working

 foo
-baz
+bazzle
 xyzzy
```



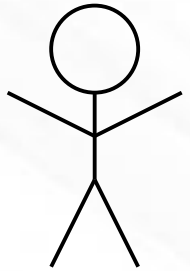
Diffs



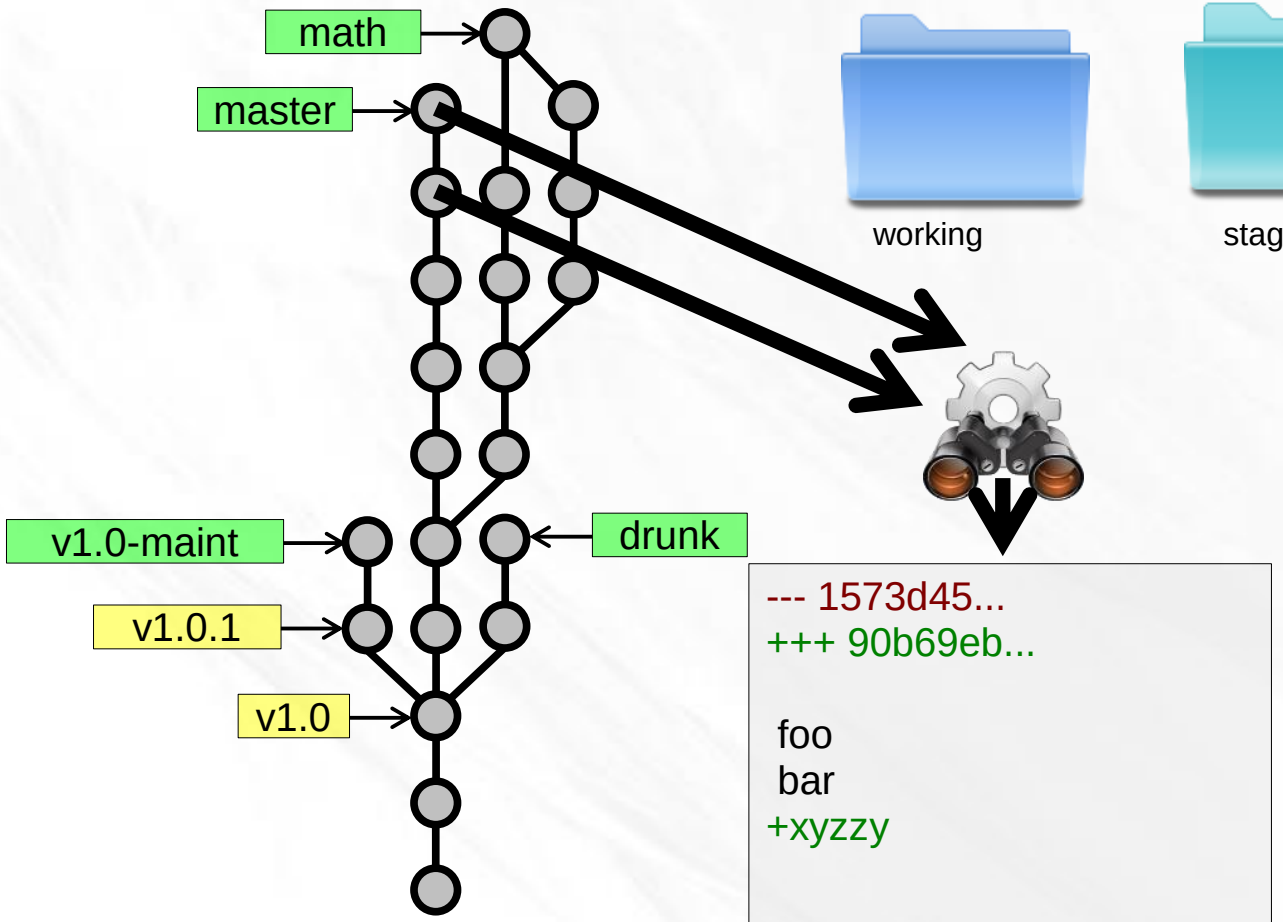


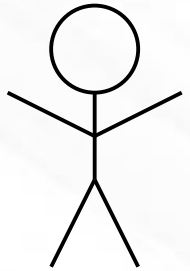
```
--- 90b69eb...
+++ staging

 foo
-bar
+baz
 xyzzy
```

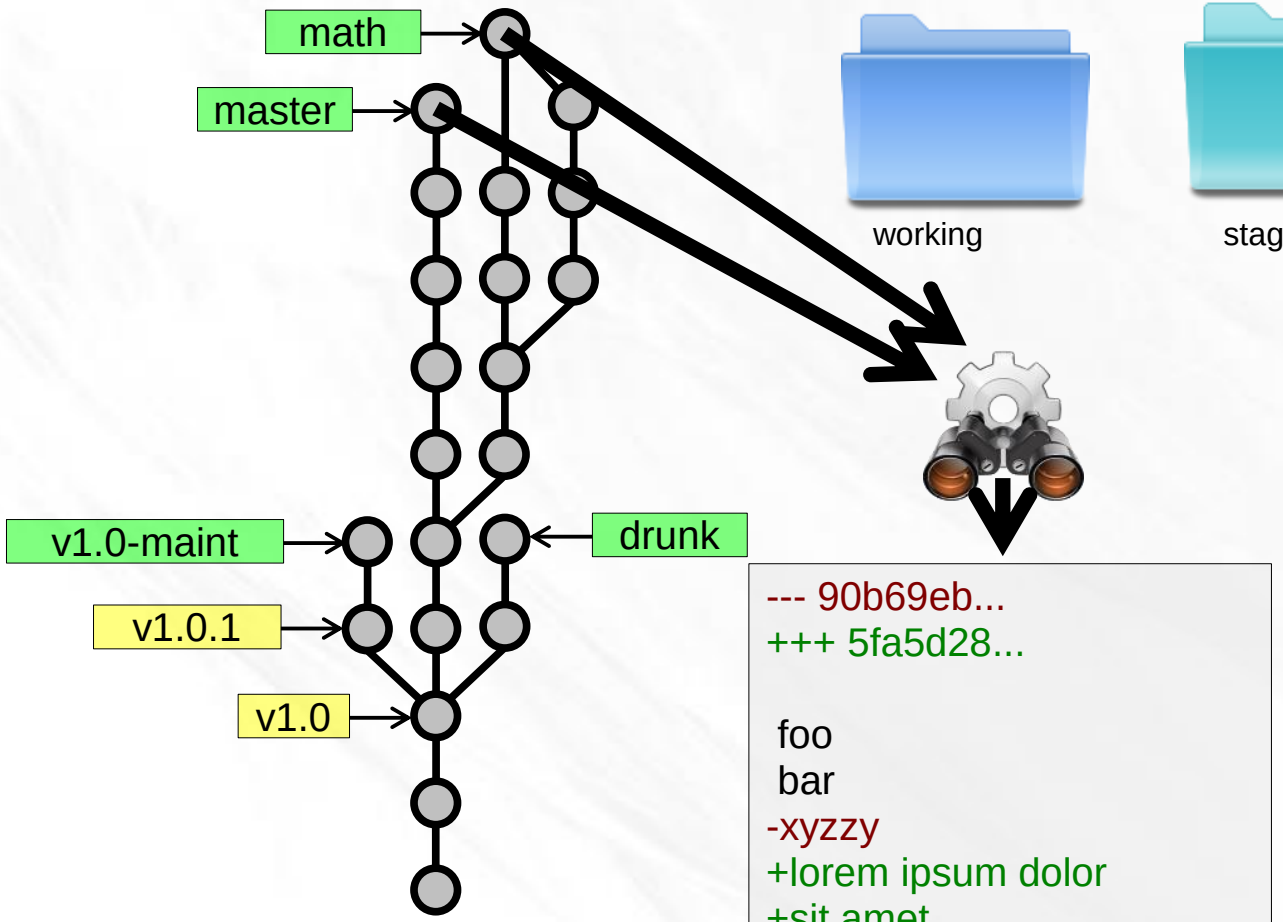


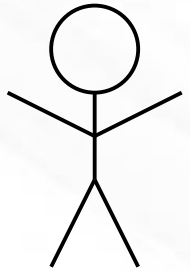
Diffs


math
master
v1.0-maint
v1.0.1
v1.0
drunk
working
staging
--- 1573d45...
+++ 90b69eb...
foo
bar
+xyzzy

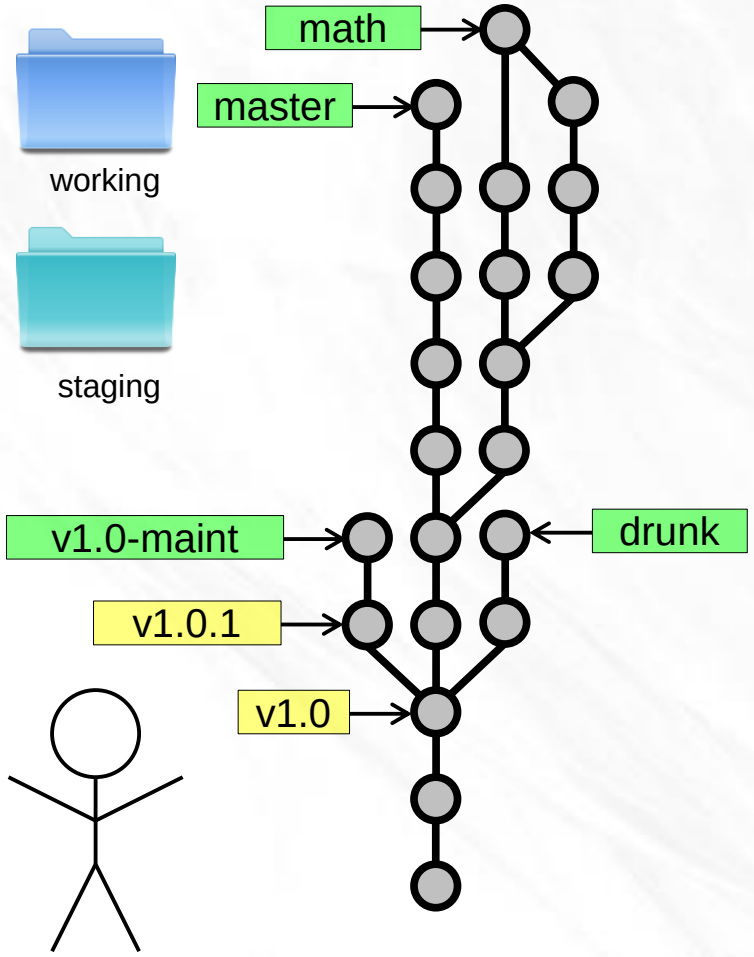


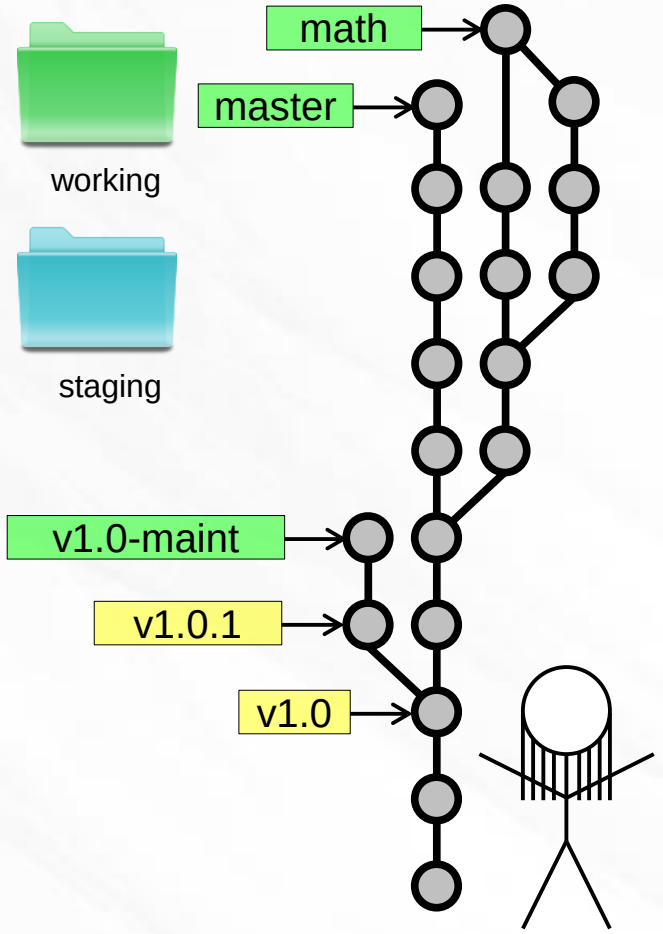
Diffs


math
master
v1.0-maint
v1.0.1
v1.0
drunk
working
staging
--- 90b69eb...
+++ 5fa5d28...
foo
bar
-xyzzy
+lorem ipsum dolor
+sit amet, ...

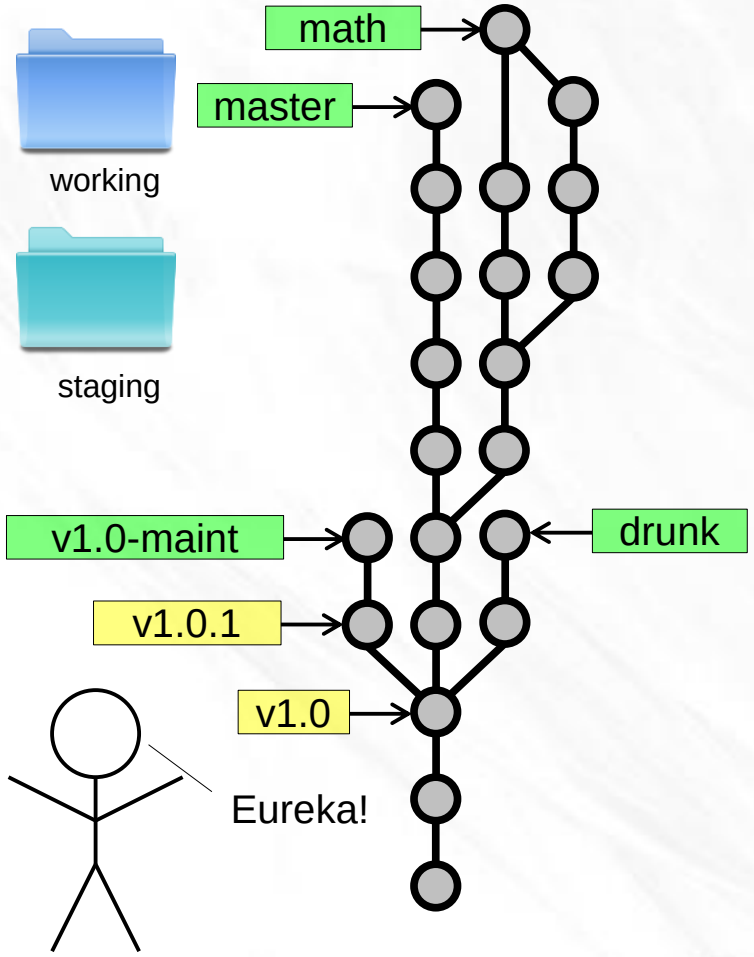


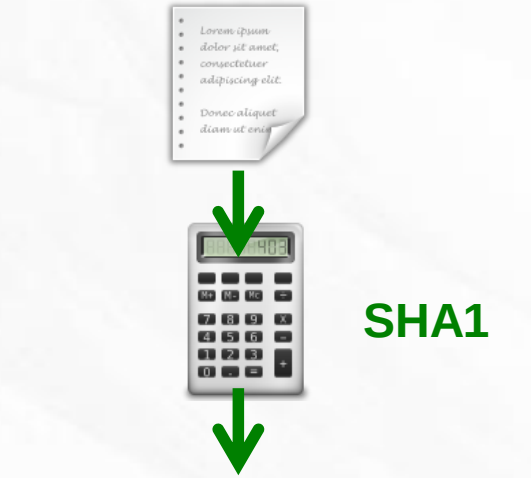
Eliminating Duplication



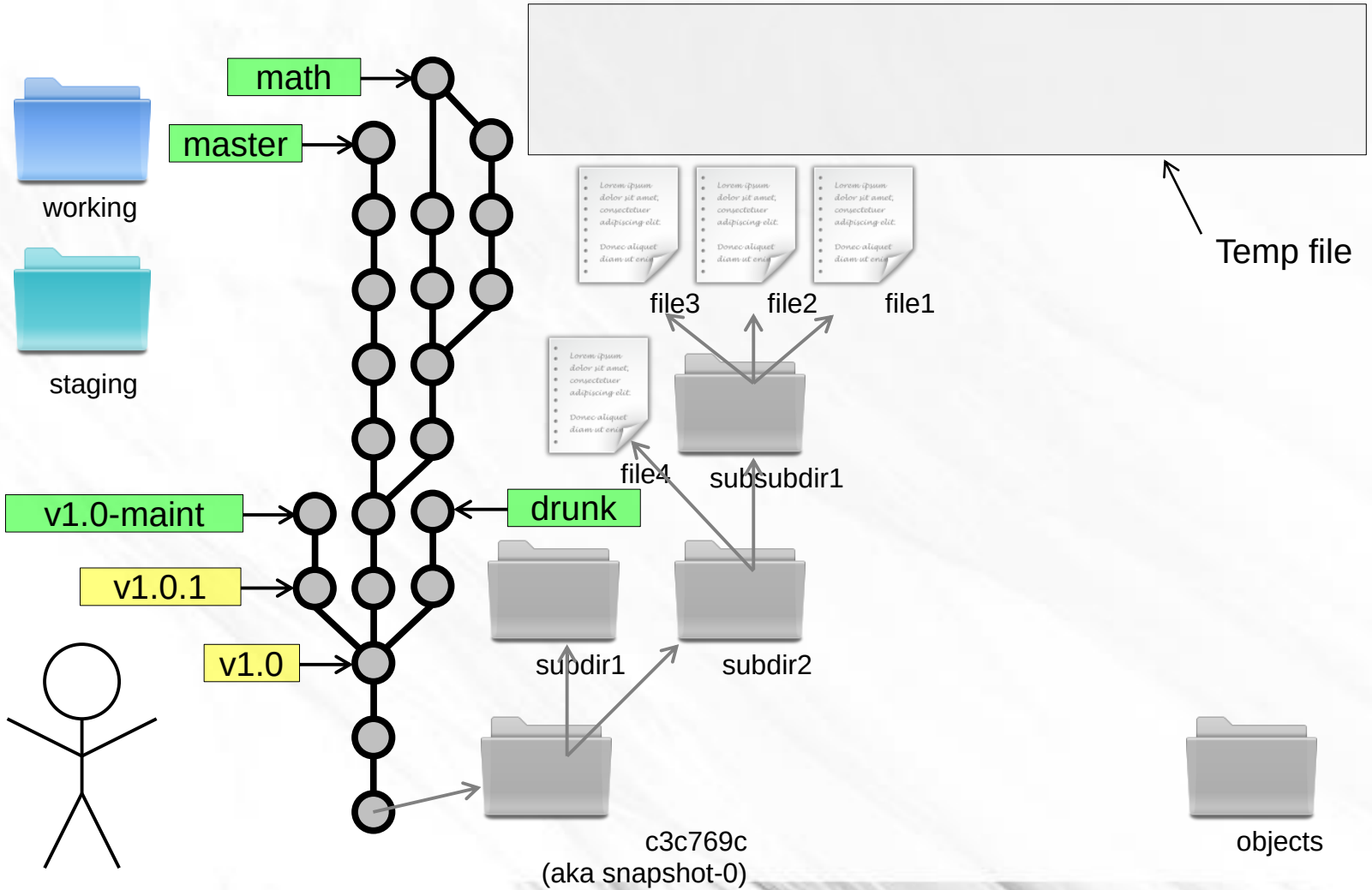


Eliminating Duplication

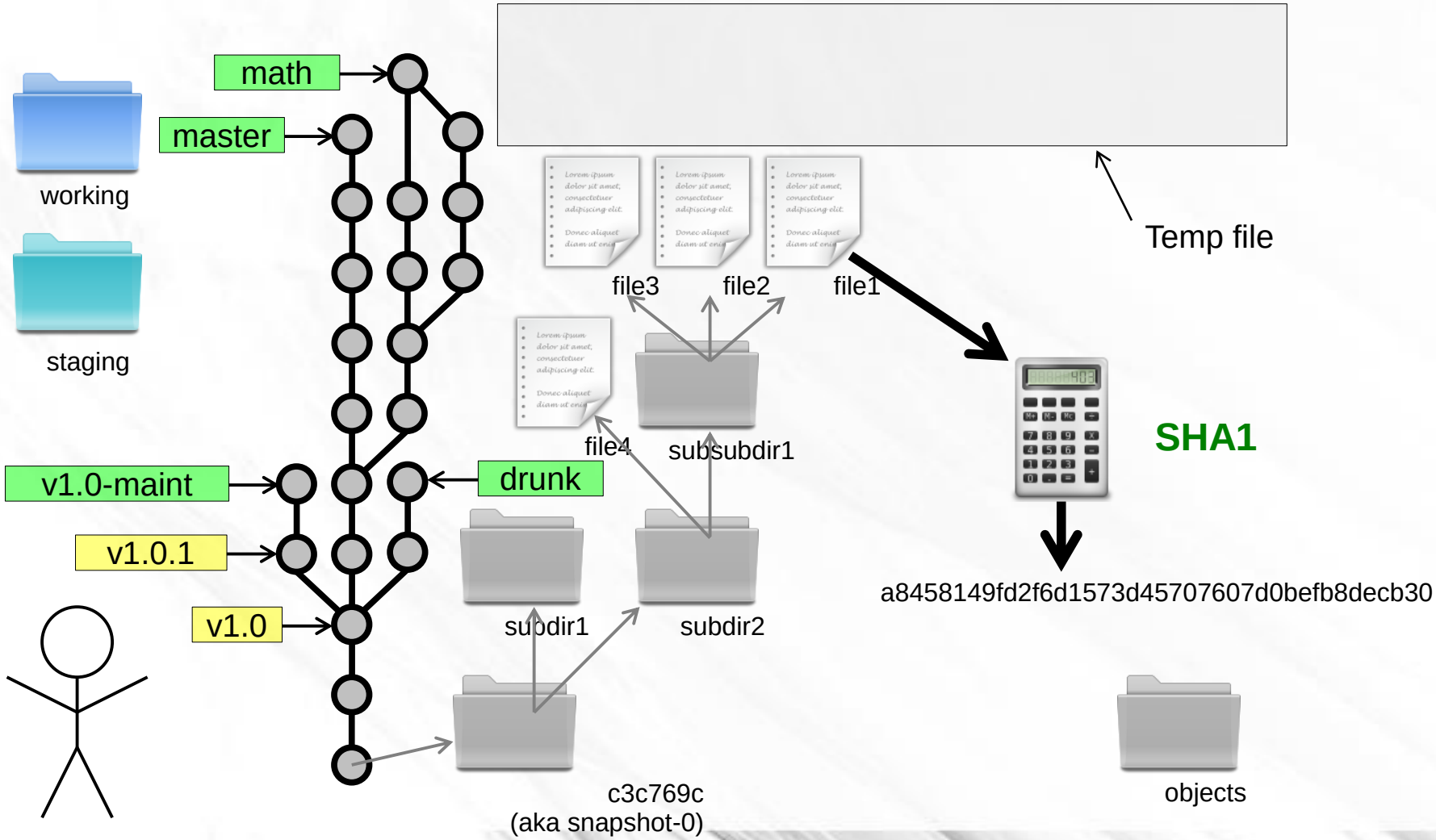




Eliminating Duplication



Eliminating Duplication



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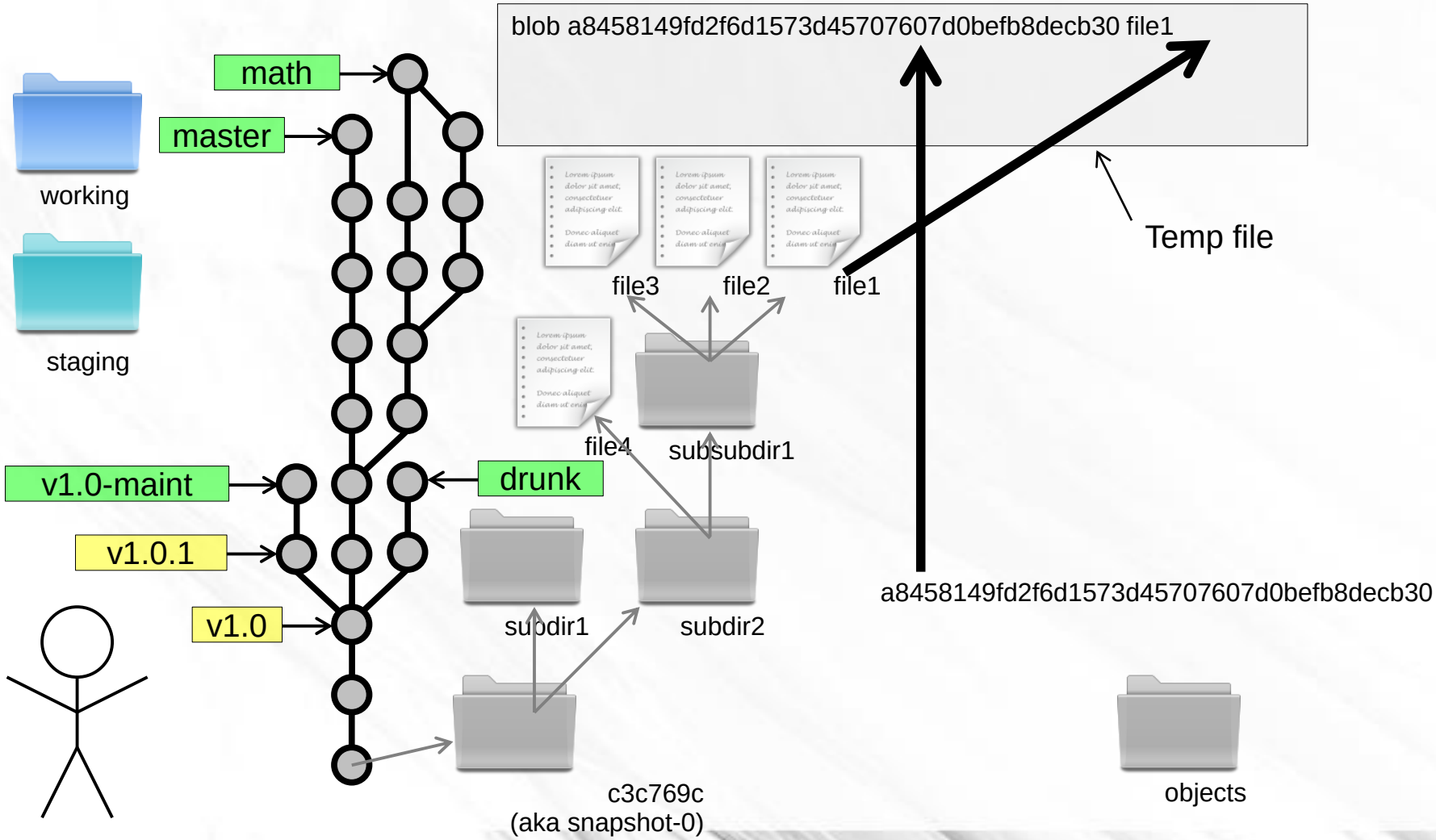

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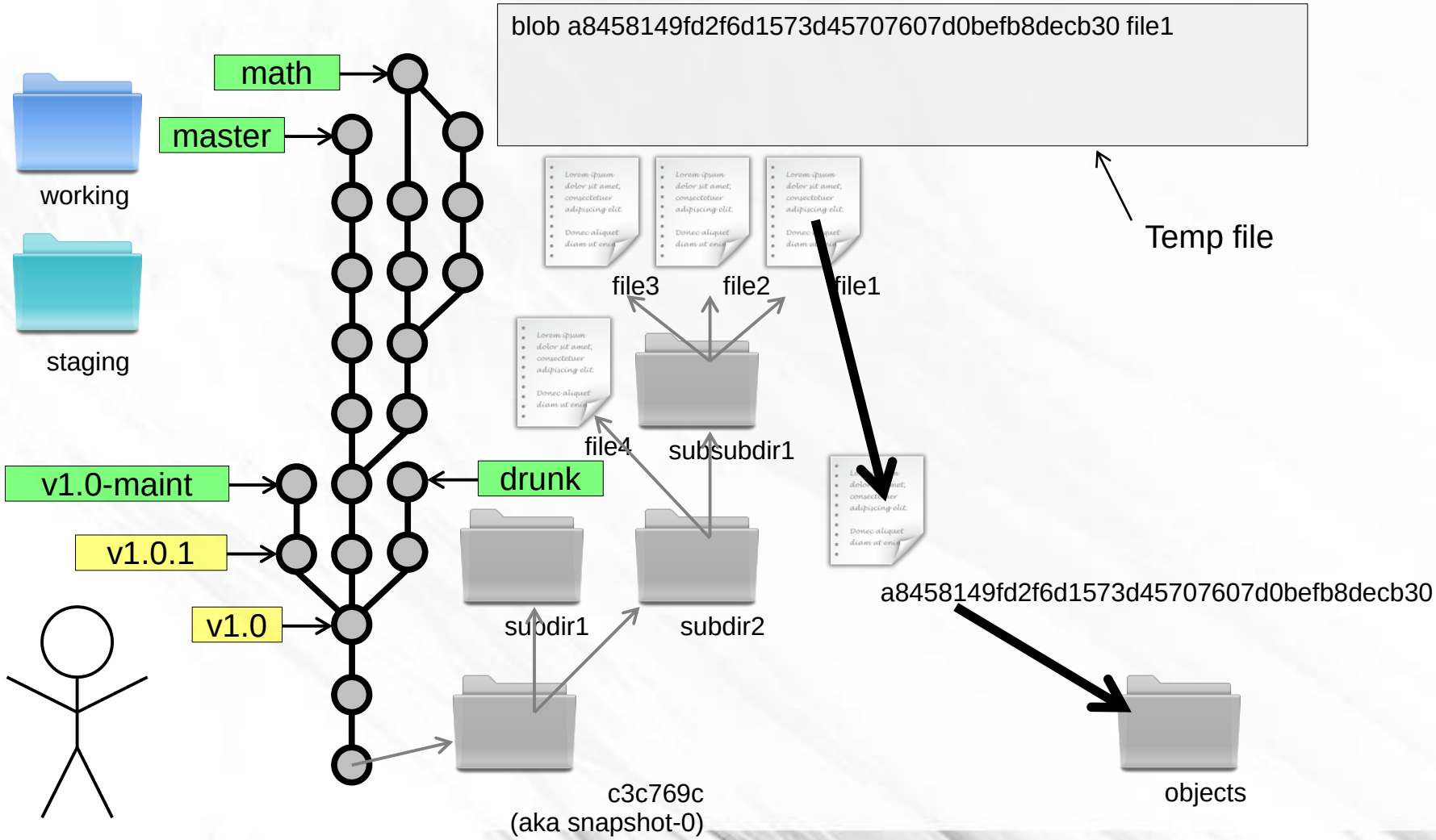
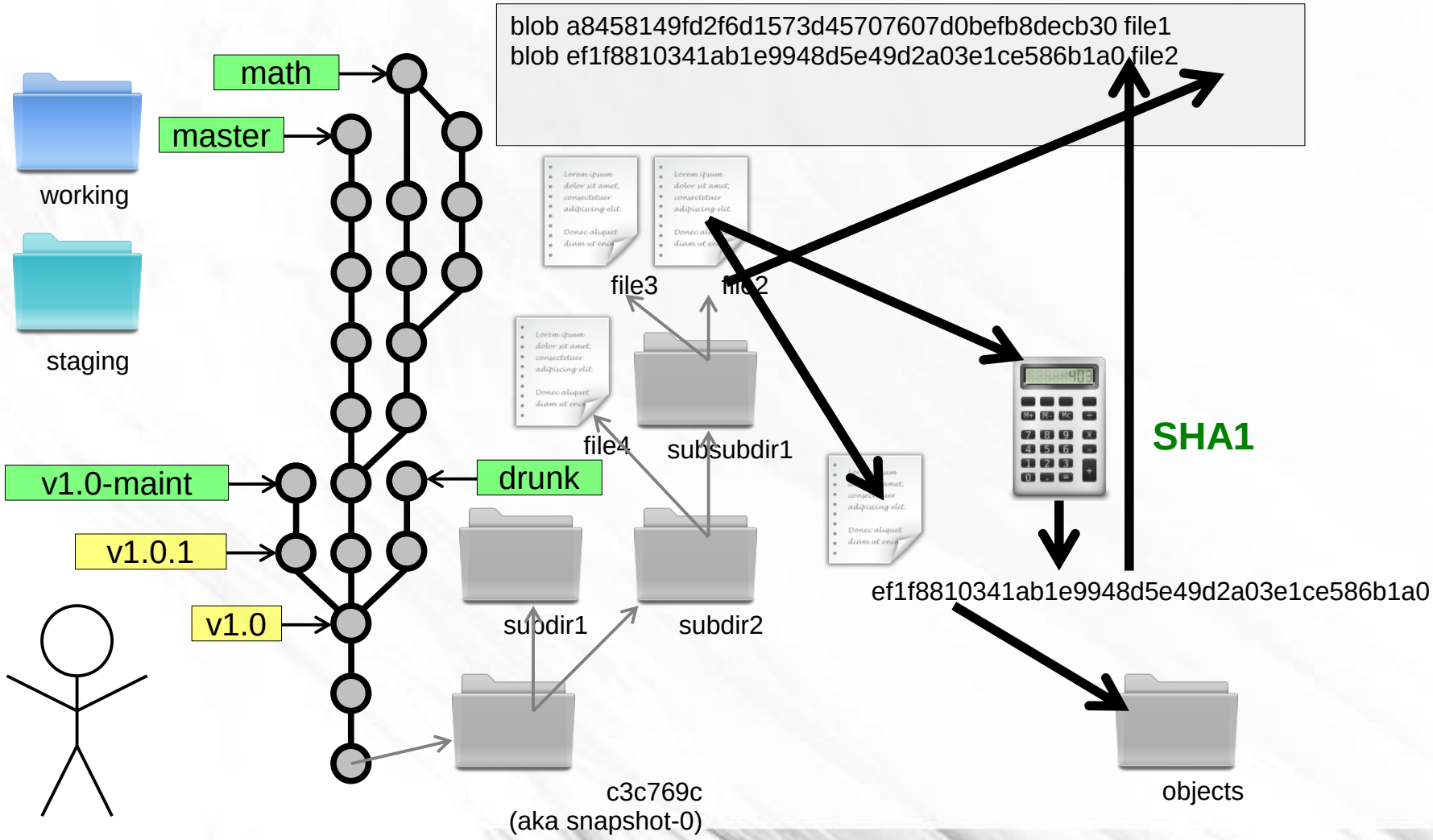
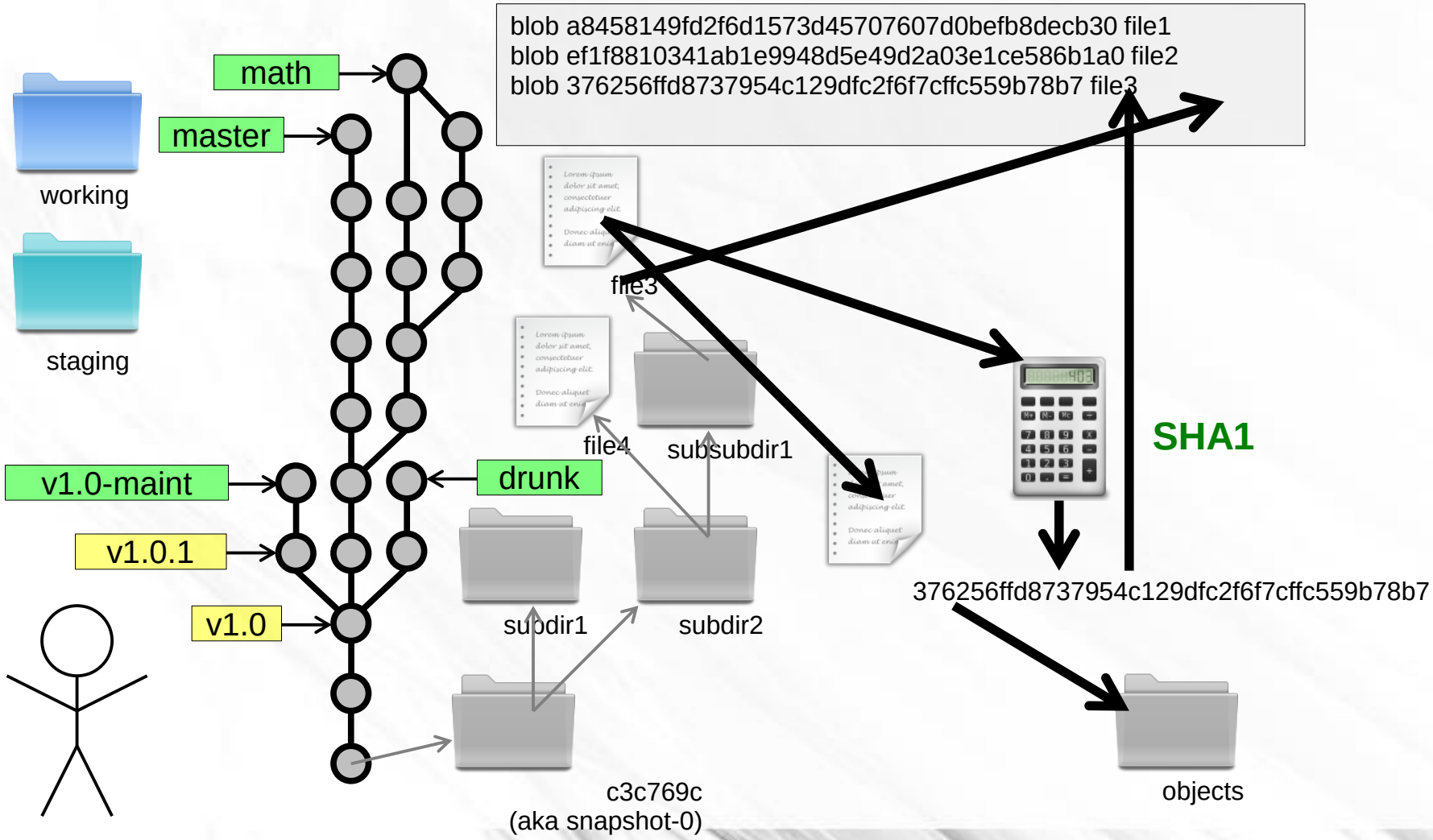


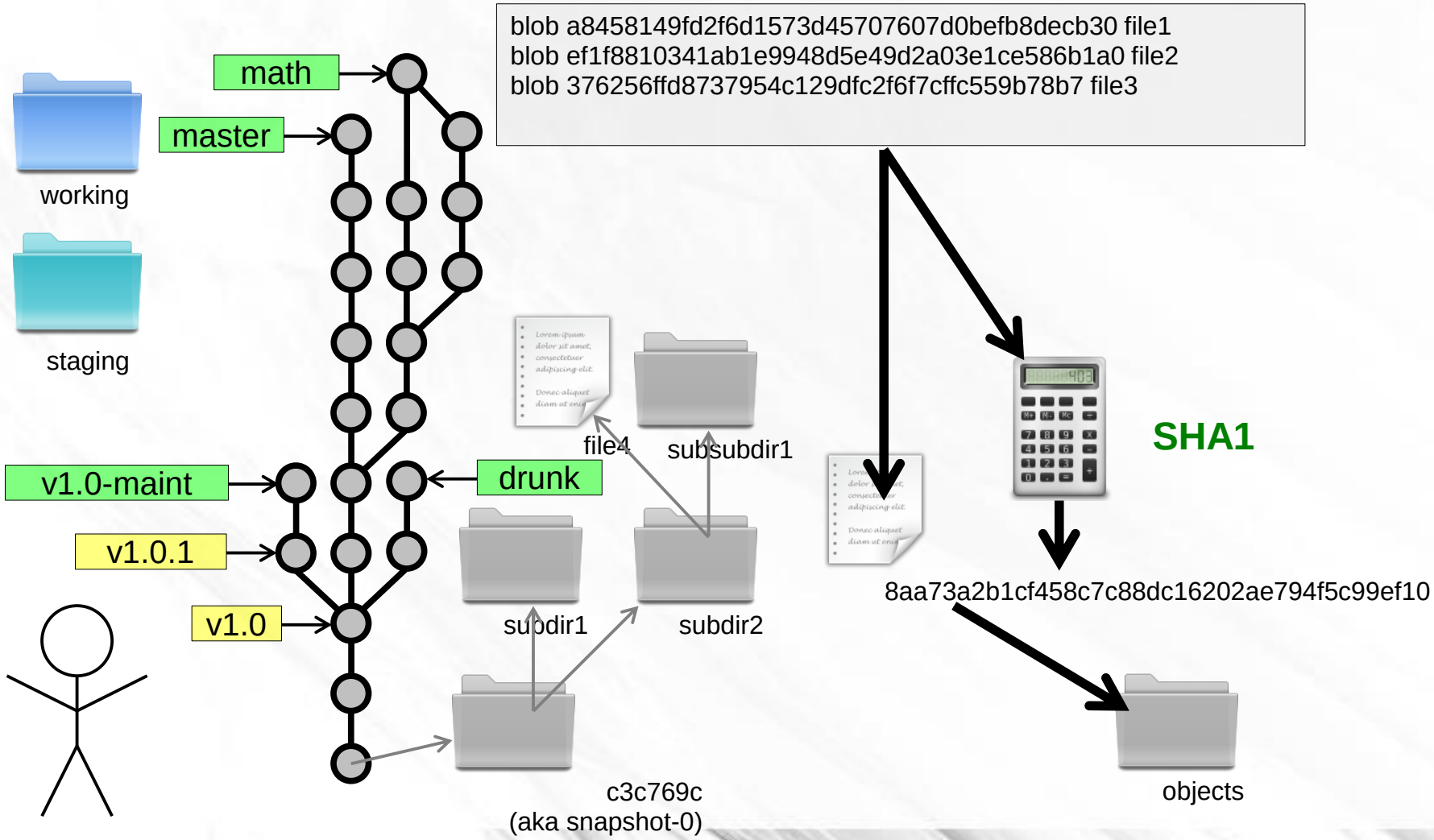
Eliminating Duplication



Eliminating Duplication



Eliminating Duplication



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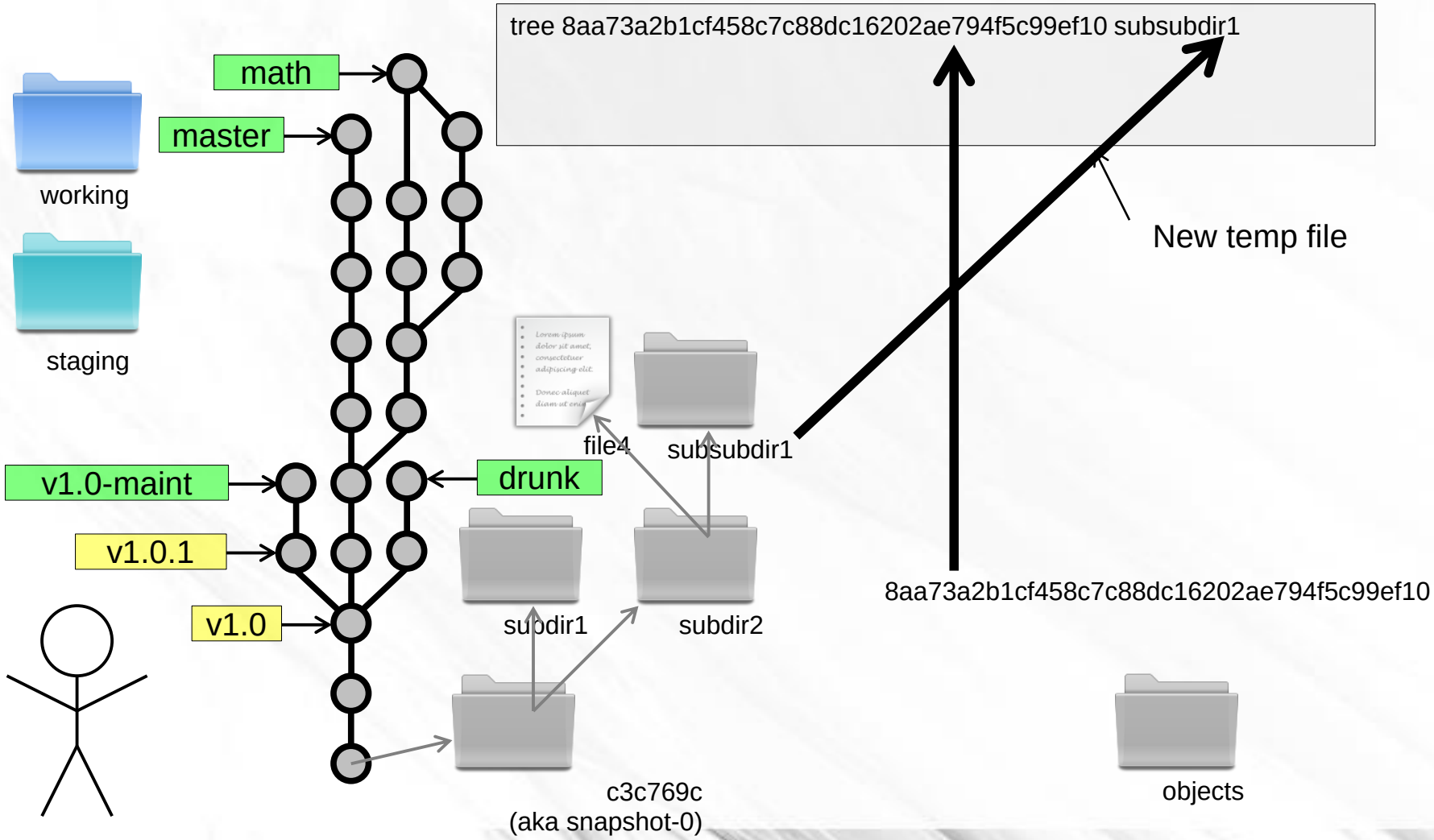
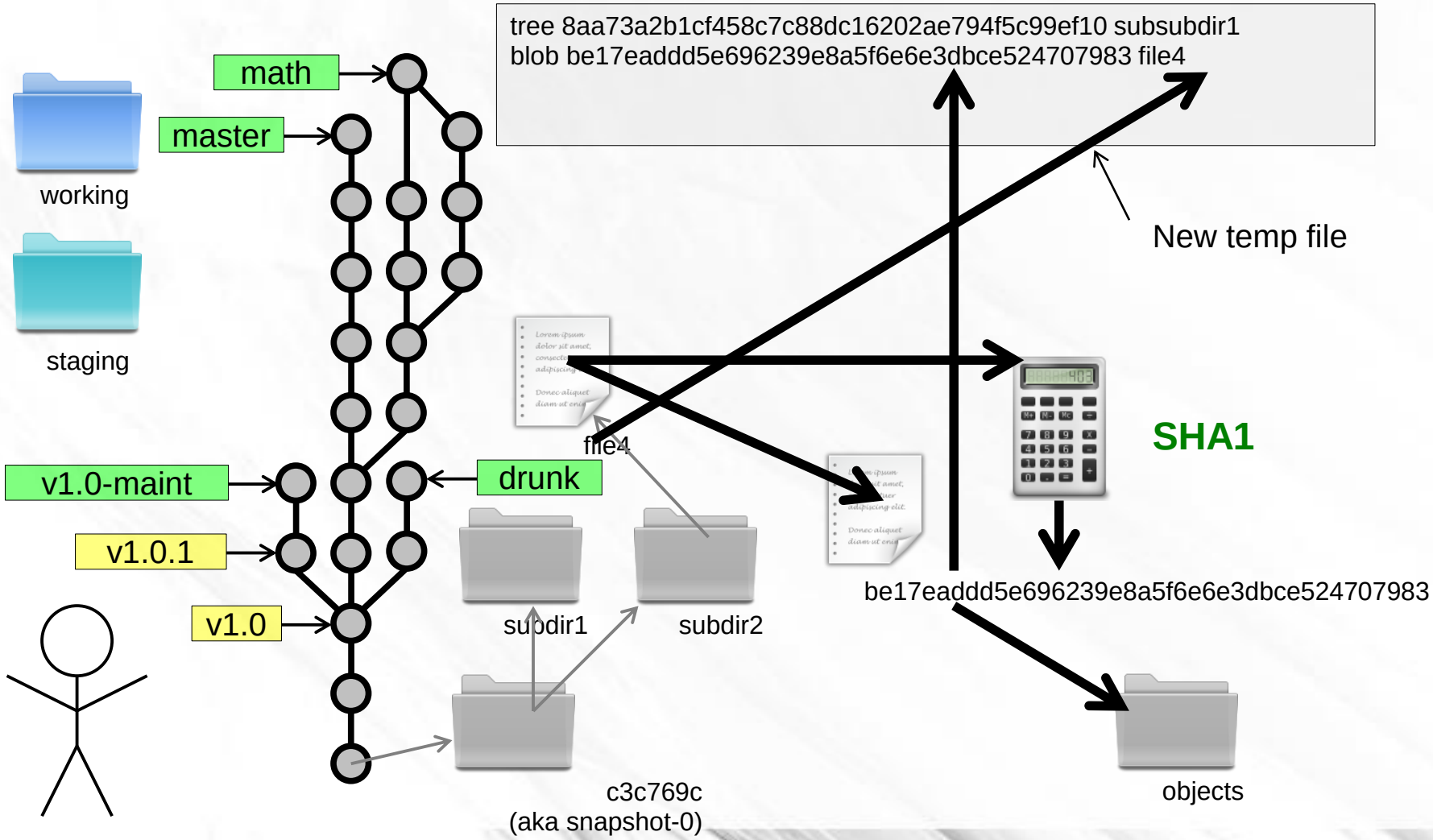


Eliminating Duplication



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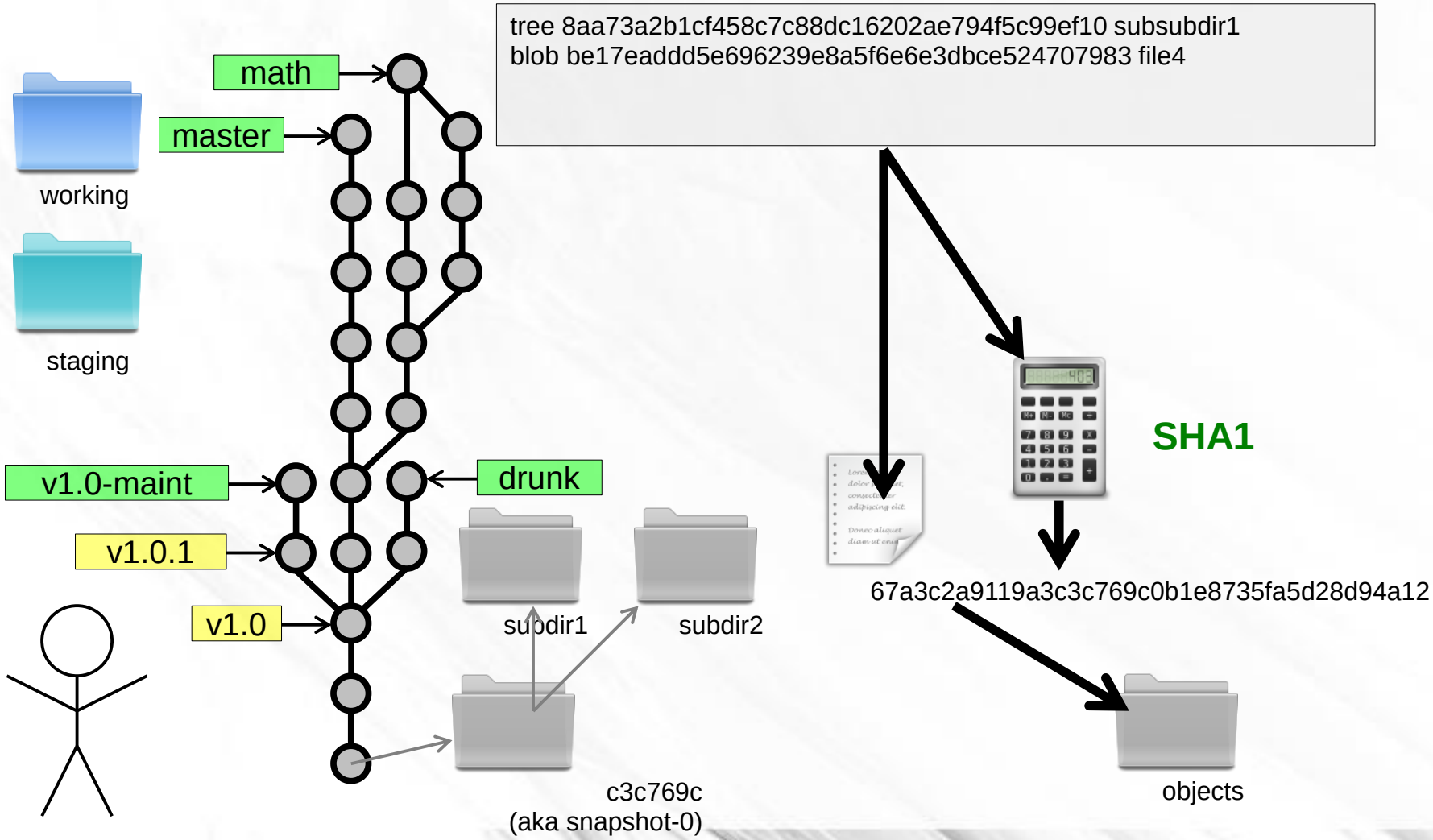

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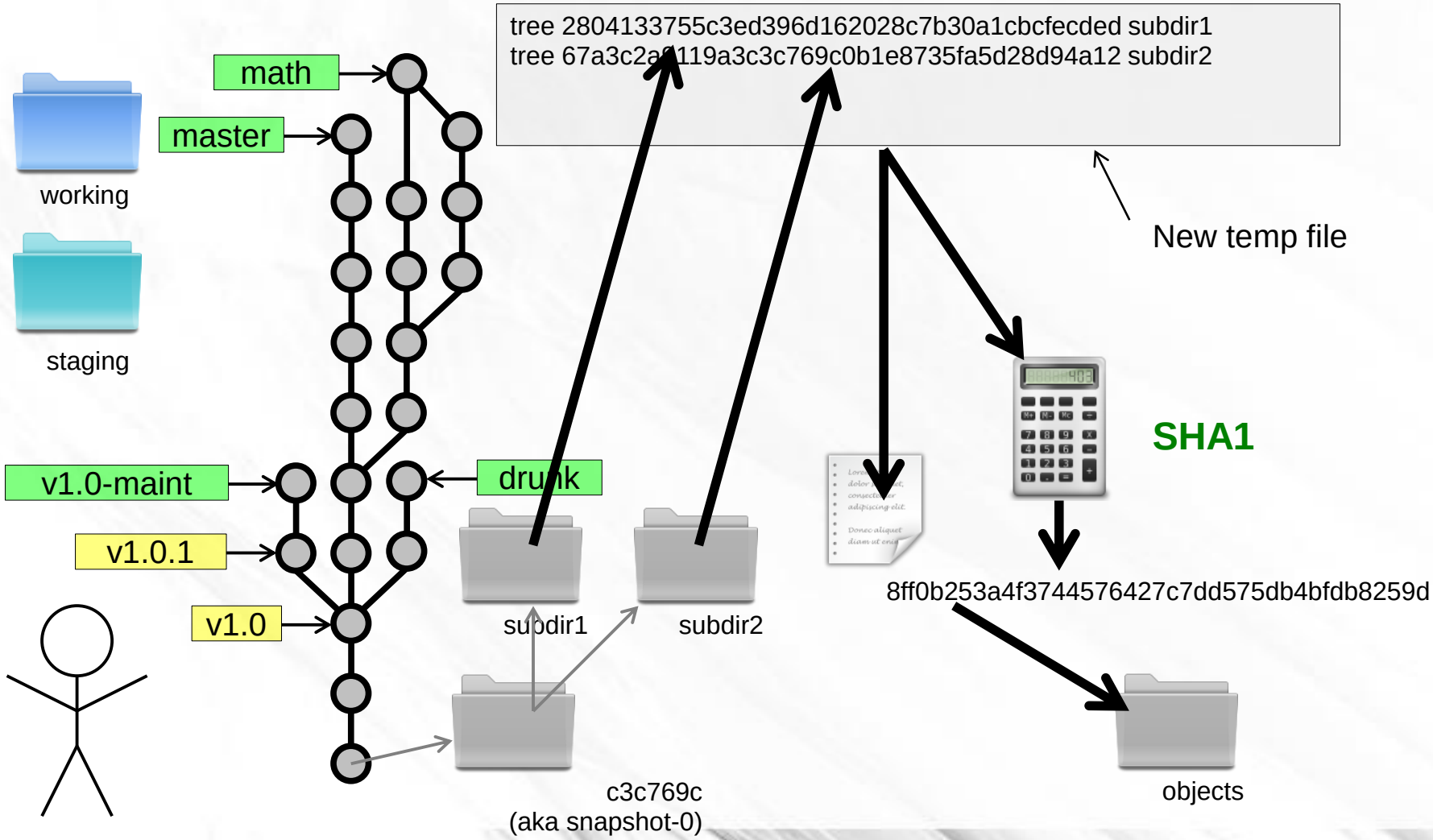

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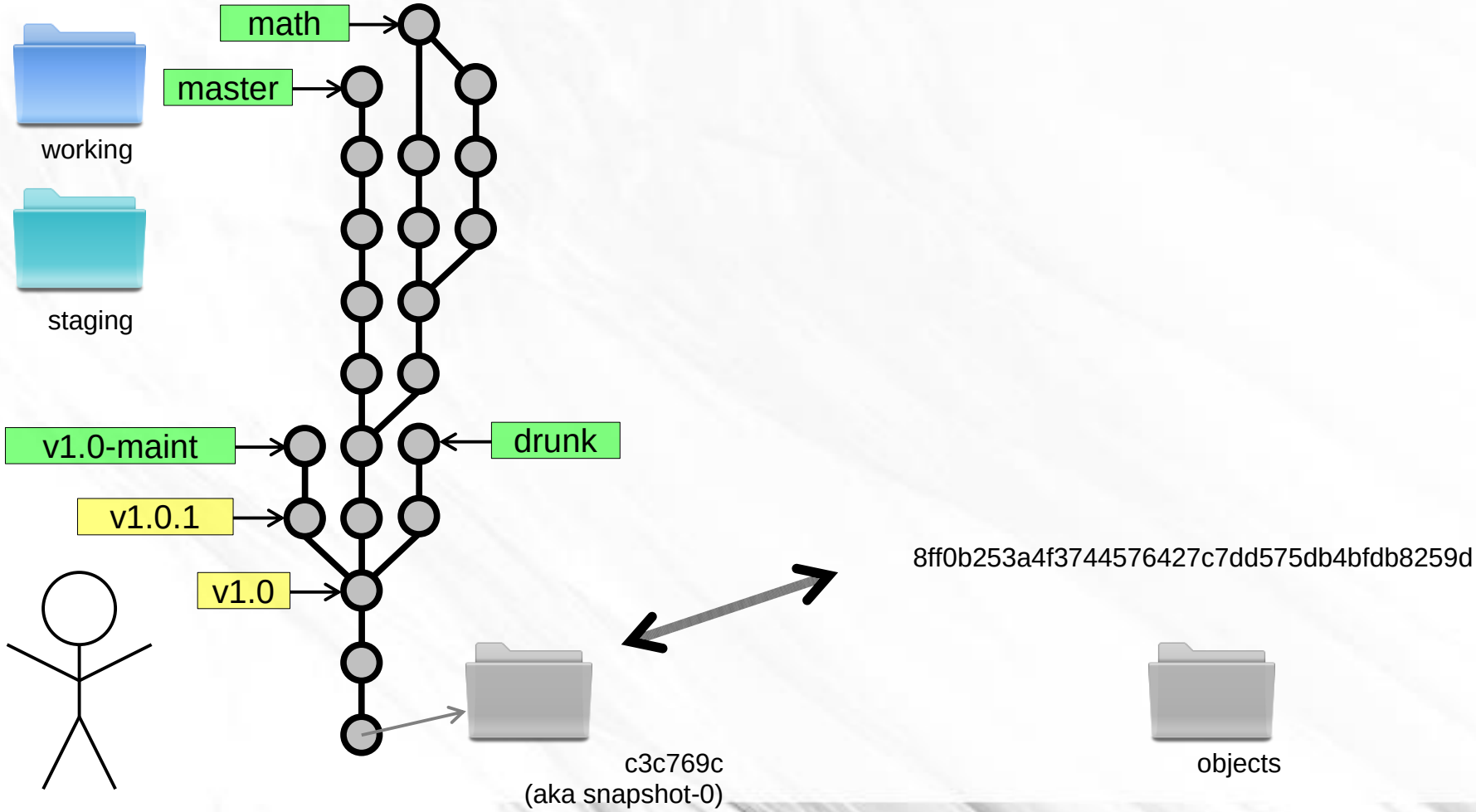

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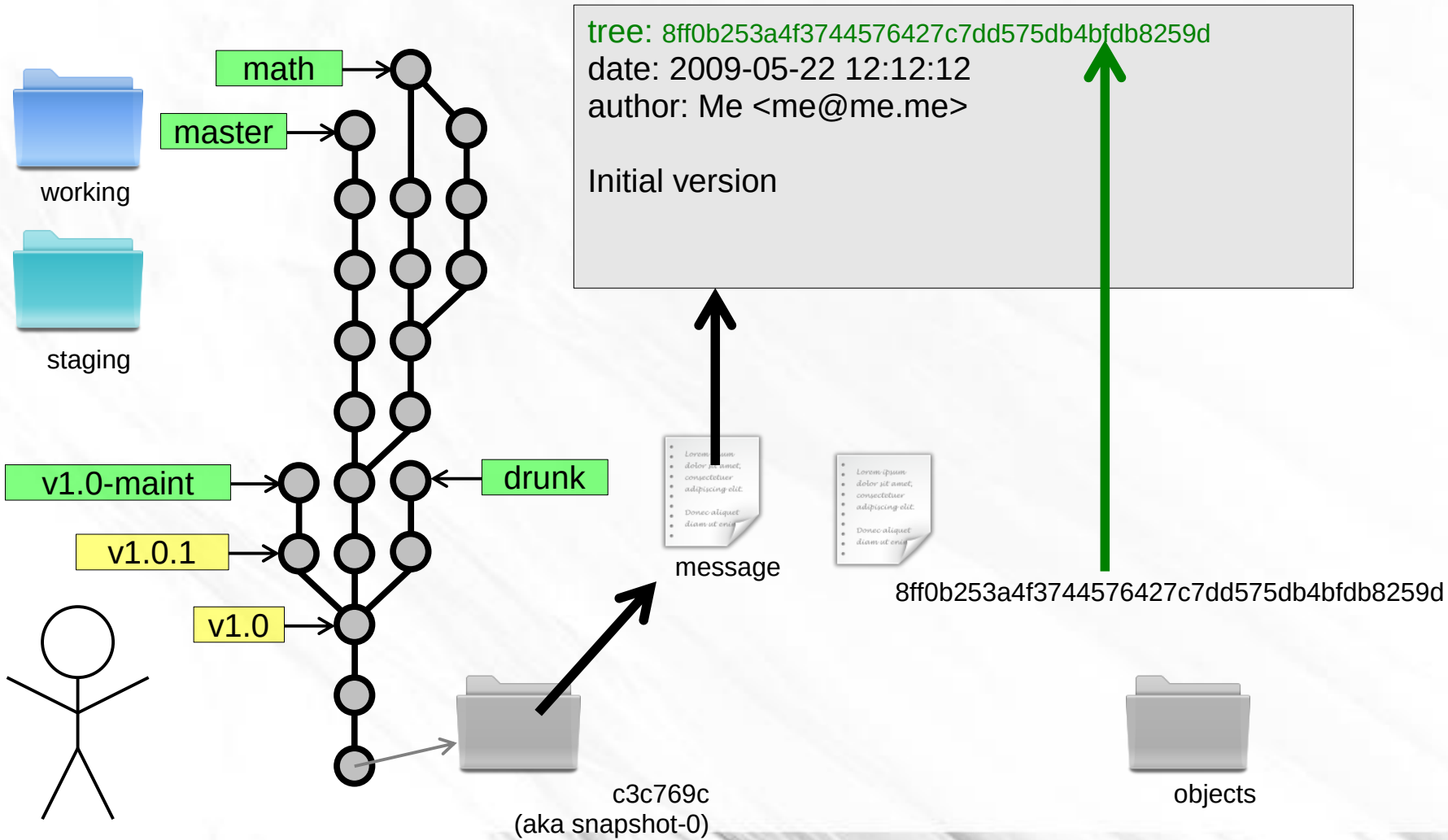

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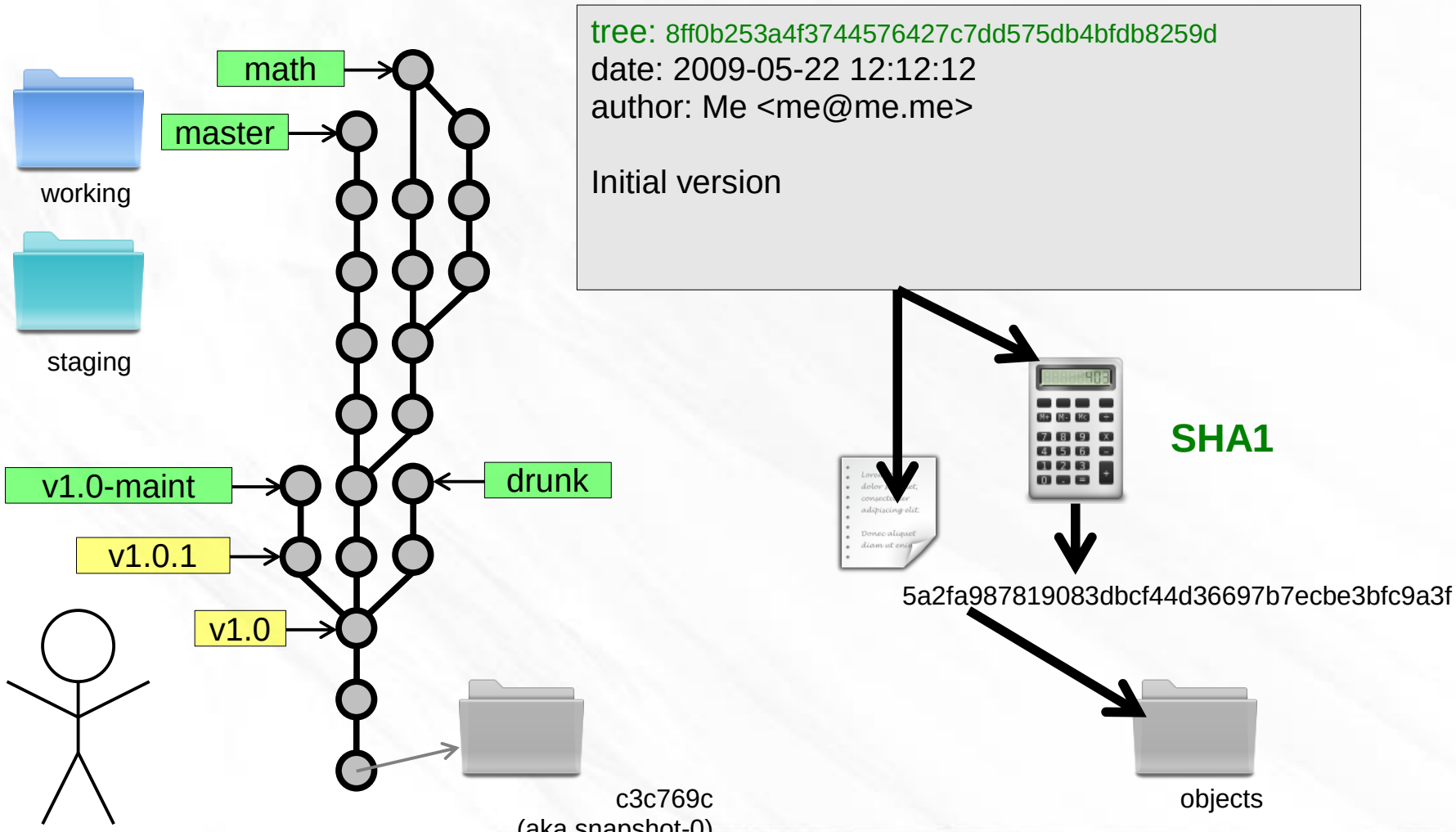

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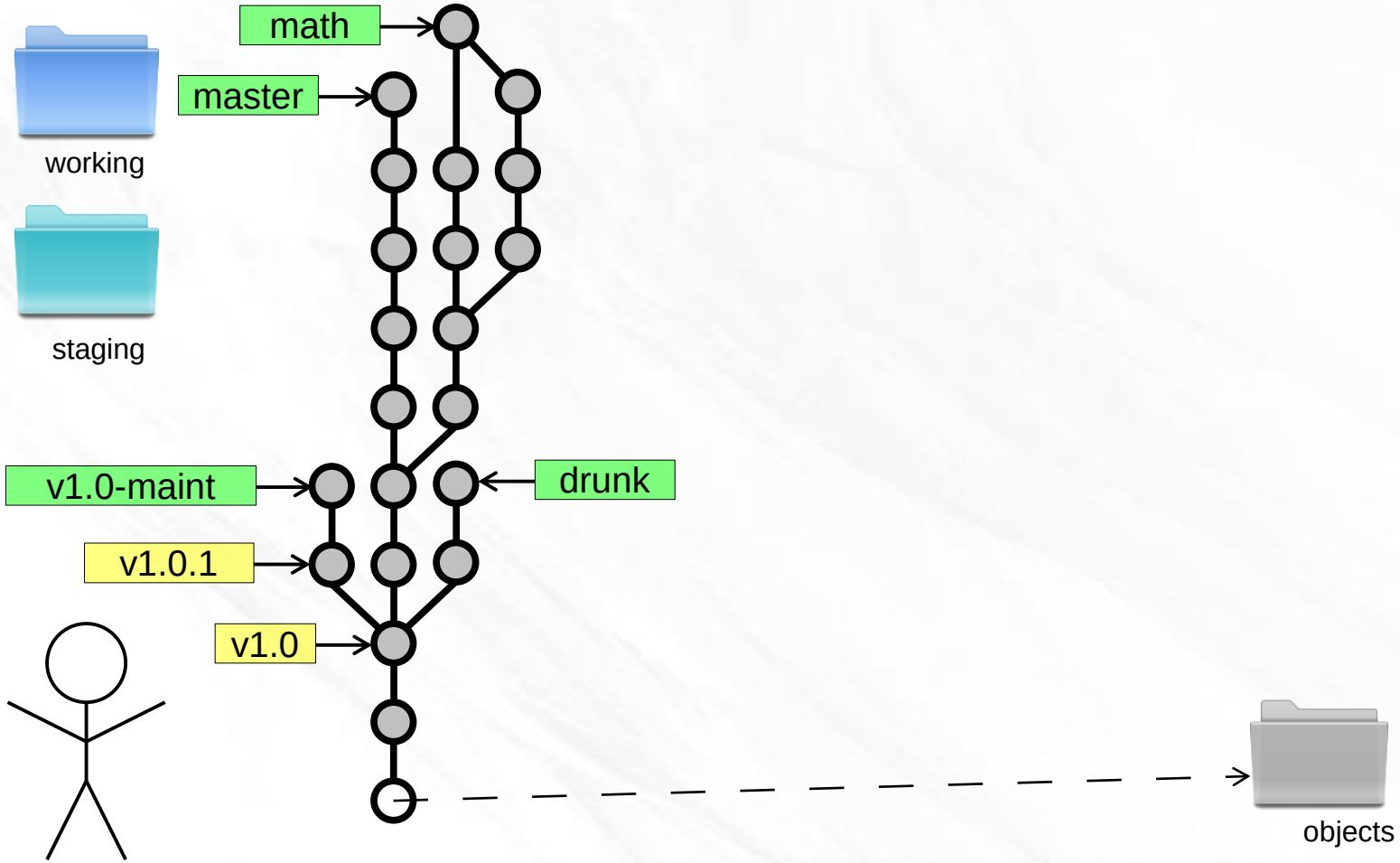
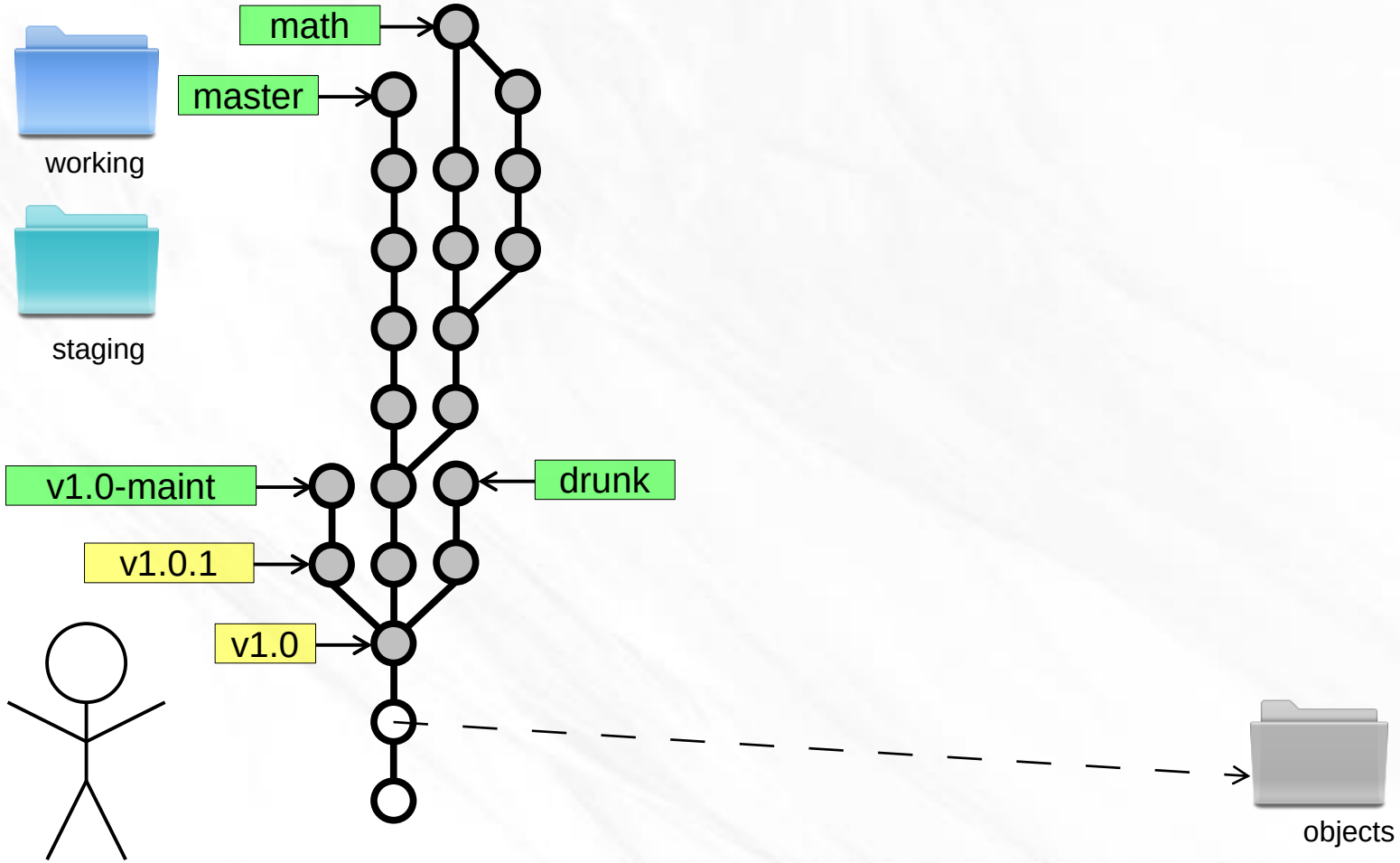
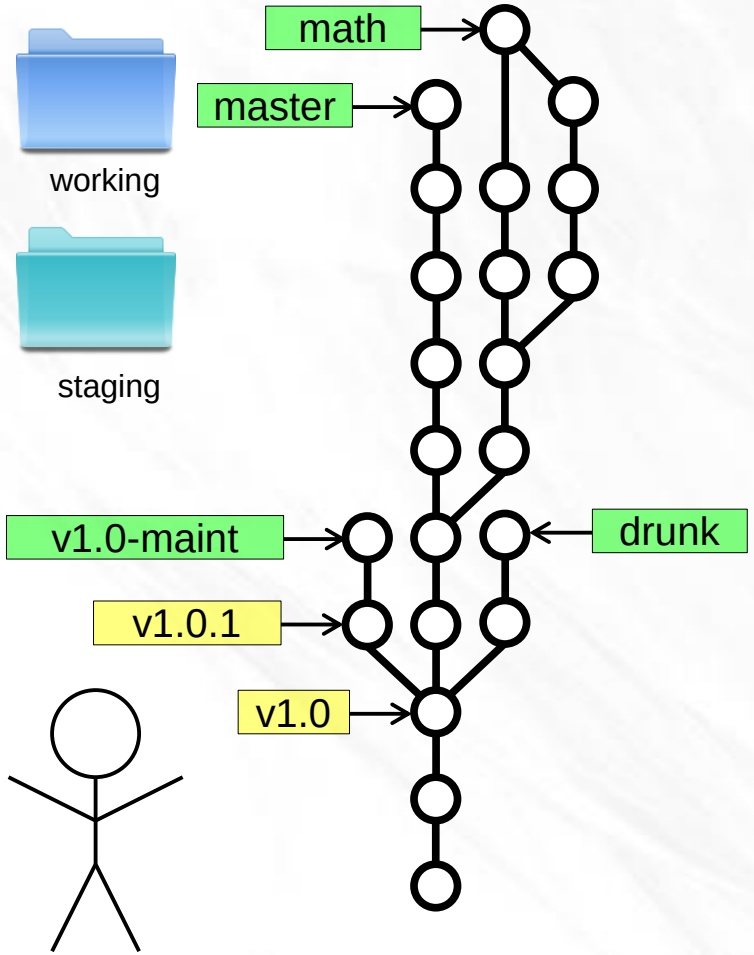


Eliminating Duplication

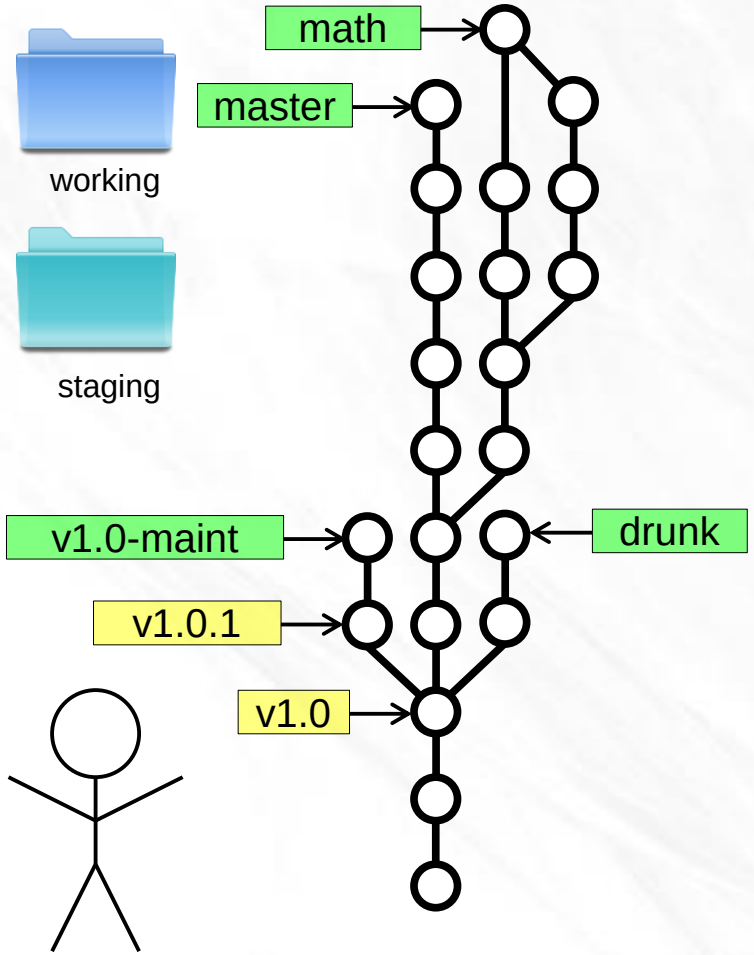


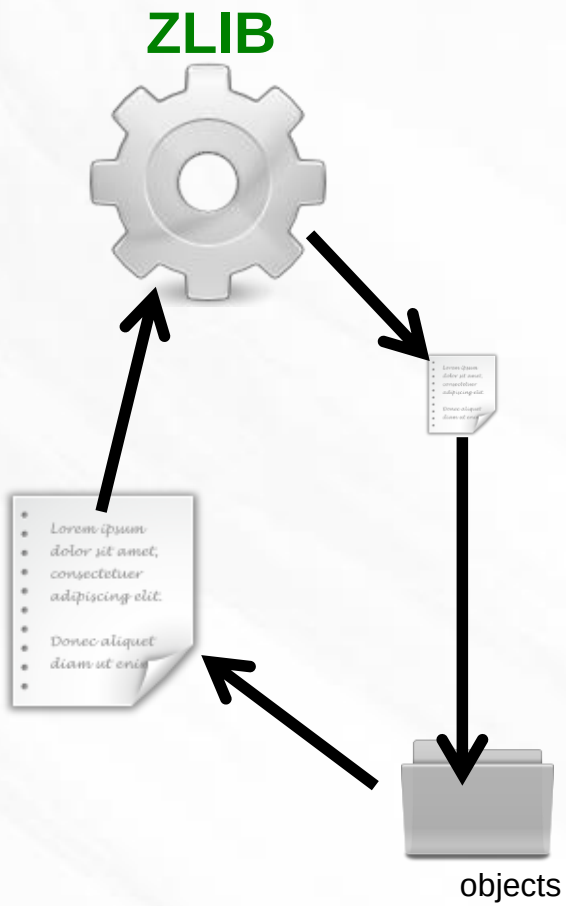
Eliminating Duplication



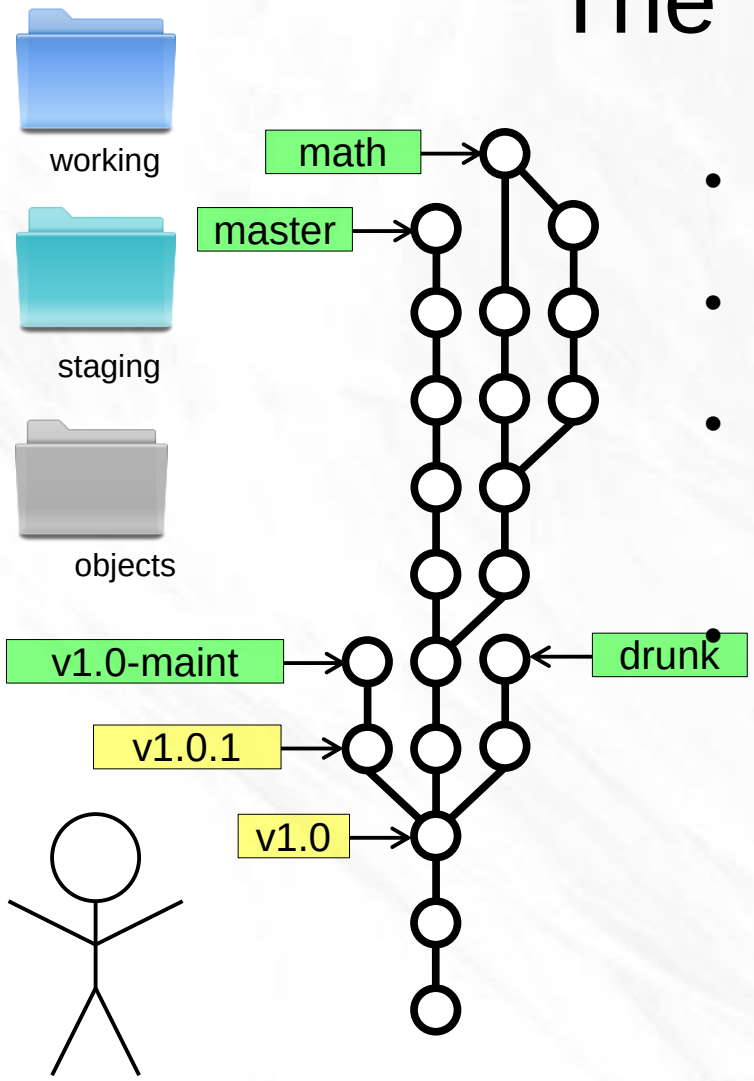
objects

Compressing Blobs





The True Git

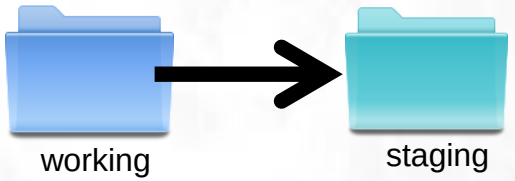


- TADAA!
- This is pretty much Git
- Nicer command line tools for all these operations
- Many, many other tools

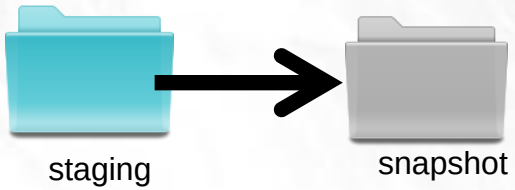
Commands: Getting Started

- First, tell Git who you are:
  - git config --global user.name “My Name”
  - git config --global user.email “my@email.address”
- Get help:
  - git <command> -h
  - git help <command>
- Start a new Git repository:
  - git init

Commands: Making snapshots



- git add

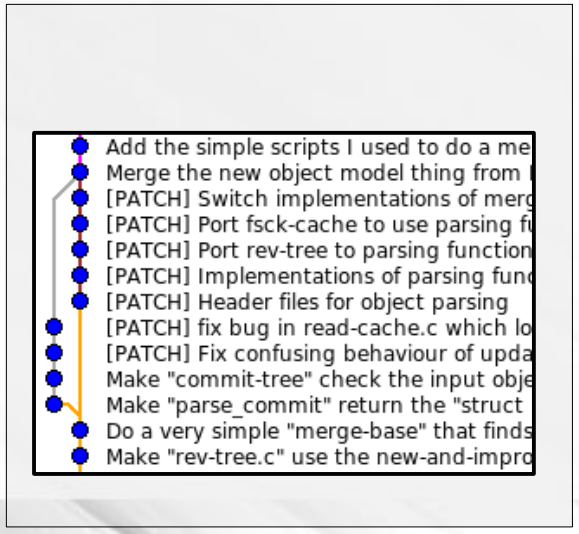


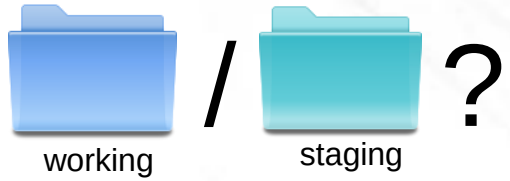
- git commit

} git commit -a

- git log

gitk

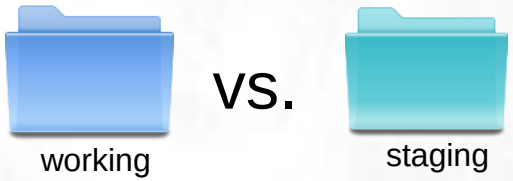




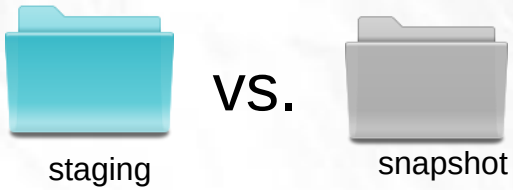
/ ?

- git status

Commands: Diffing



- git diff



- git diff --staged

- git diff HEAD

- git diff <from> <to>

Commands: Branches & Tags

- git branch
- git branch <branch>
- git checkout <branch>

} git checkout -b ...

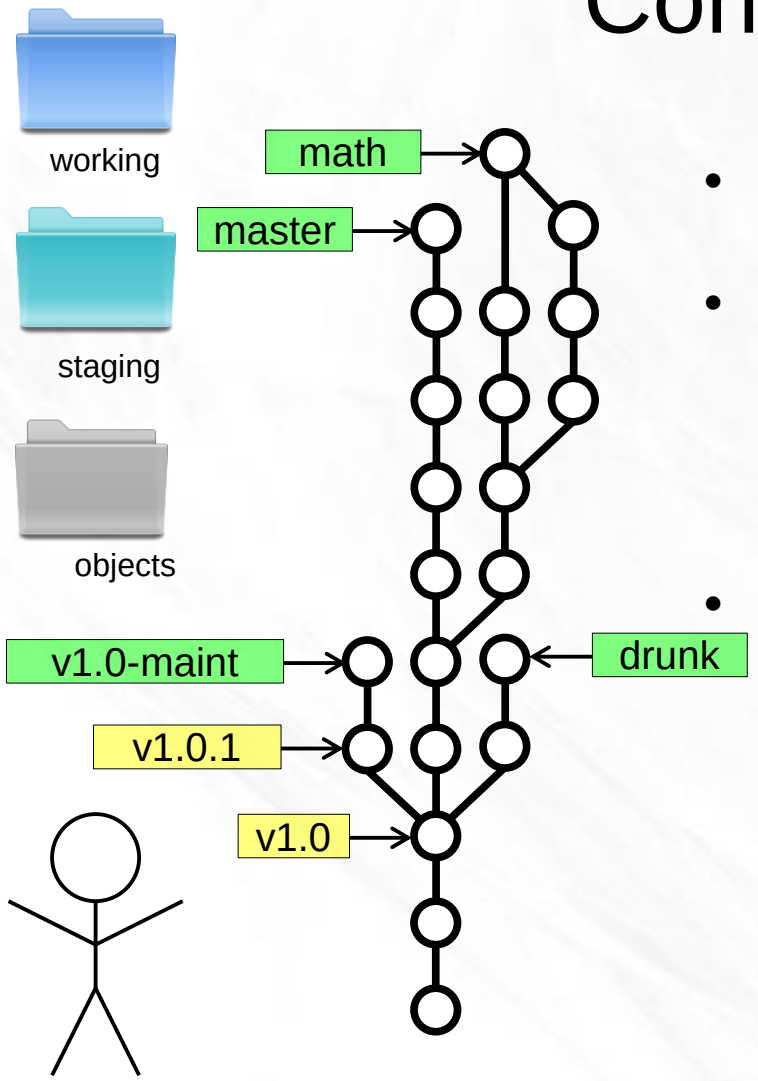
- git tag -l
- git tag <tag>

Commands: Fetching & Merging

- git remote add <name> <URL>
- git fetch <name>
- git merge <name>/<branch>
- Sync back: git push

} git pull

Conclusion



- Keep this parable in mind
- Git is simple and powerful

- One more thing:

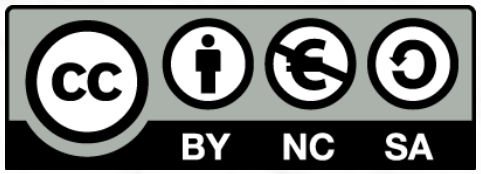
git reflog

Where to go next?

- Git homepage: http://git-scm.com
- Pro Git: http://git-scm.com/book
- Git Reference: http://gitref.org
- GitHub: http://github.com
- Gitorious: http://gitorious.org
- Gitlab

Questions?

- Thanks for your attention!
- These slides are available at:
  https://github.com/jherland/git_parable
- Reach me at <johan@herland.net>



Git Clients (Windows)

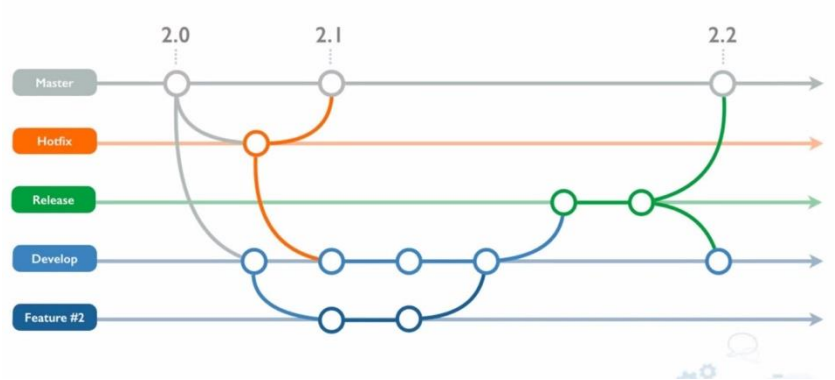
- CLI Shell: Git Bash
- Git Extentions: CLI +Windows Explorer Shell
- Github Desktop (+powershell)
- Bitbucket SourceTree
- IDE Integration
  - Visual Studio (Code / VS2013+ native)
  - Eclipse Egit
  - IntelliJ, Webstorm embedded
  - Brackets plugin
  - VS Code

הר' 7: הדגמה \ טיפים

- http://try.github.com
- http://learn.github.com/ (education.. - free student account)
- http://help.github.com/create-a-repo/
  Local user settings:
  git config user.name <user>
  git config user.email user@example.com
- git pull
- git add: add / stage
- git commit –a == add+commit

Git Workflows - הר' 8: שיטות

- Centralized Workflow
- Feature Branch Workflow
- Gitflow Workflow
- Forking Workflow (OSS)



- Github Flow
- Pull request
- דוגמא: תהליך העבודה בפרויקט Nuget:
  Contributing a Bug Fix or Feature
- קישורים נוספים בויקי

Git Workflow _ Atlassian Git Tutorial.pdf