



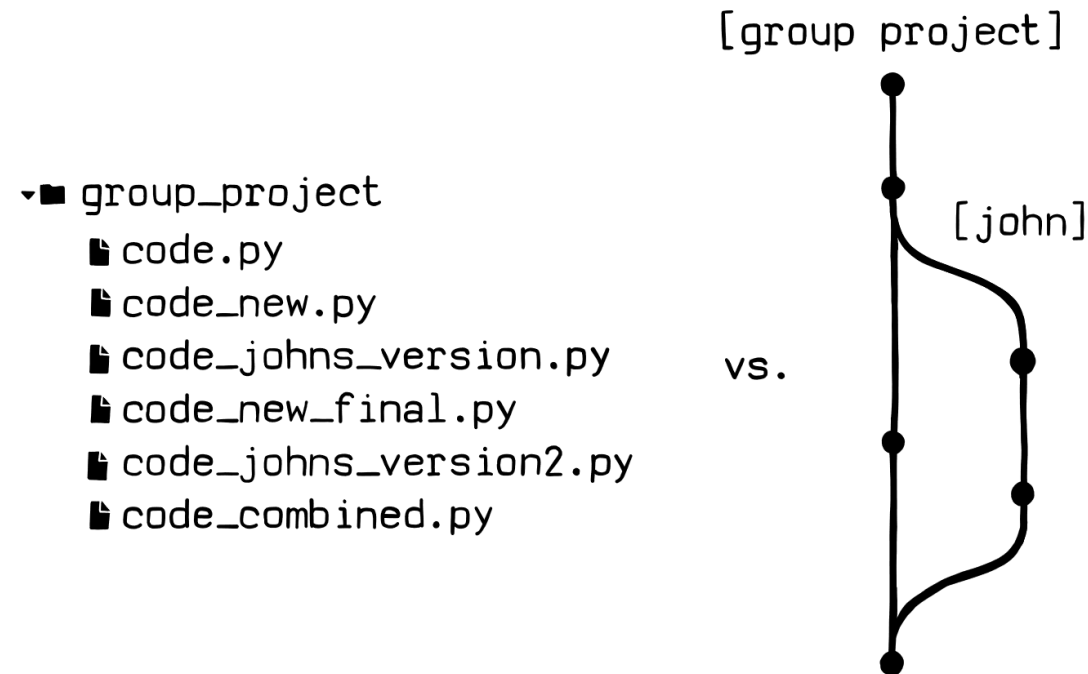
University
of Basel

Git und Github - Eine kurze Einführung -

Marcel Lüthi

2⁵ Things I learned in Computer Science

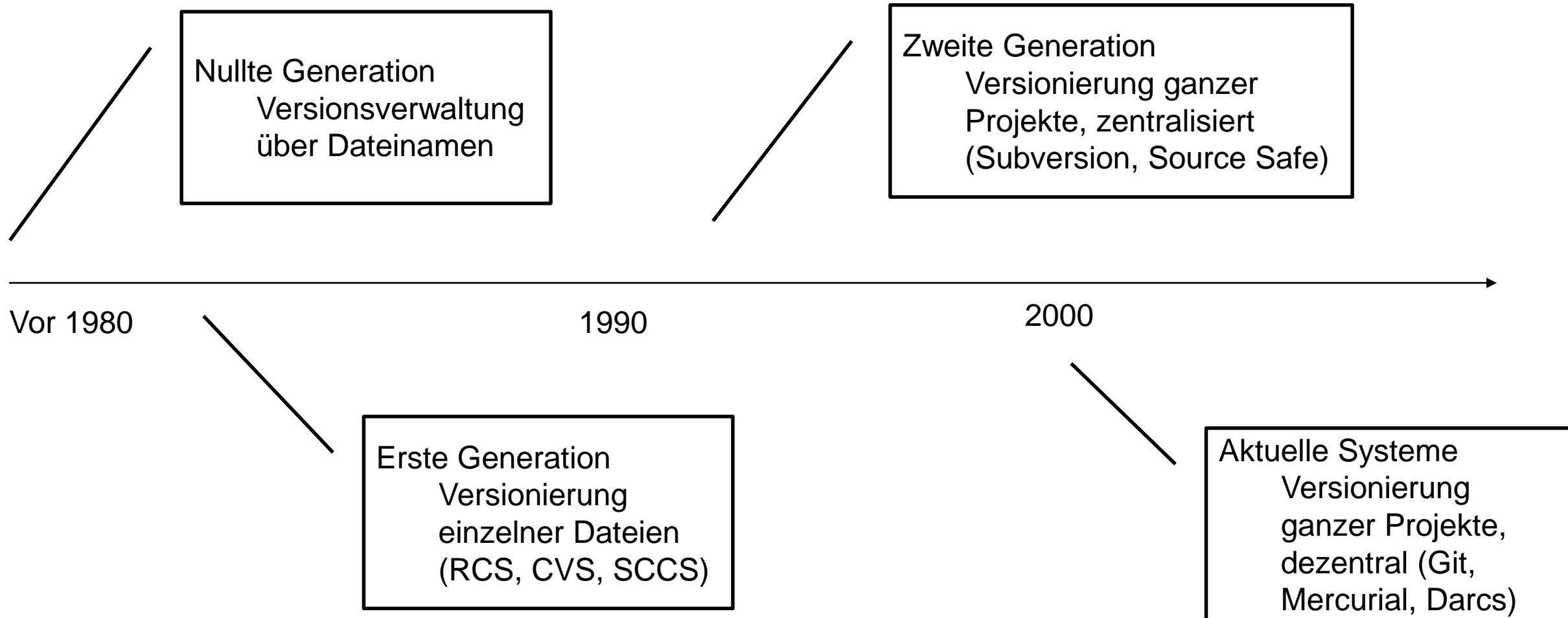
Always use a Version Control System



It's no secret that backing up your data is a good idea, and the same goes for your code. However, keeping a lot of slightly renamed versions of your files for every little modification is probably not the way to go.

Version Control Systems (VCS) allow not only to back up your files, but also, more importantly, help you to keep track of the different versions and what changed in each of them. Even better, multiple people can simultaneously work on one file and then easily combine the different changes.

Versionsverwaltung (historisch)



Zentrale Versionverwaltung

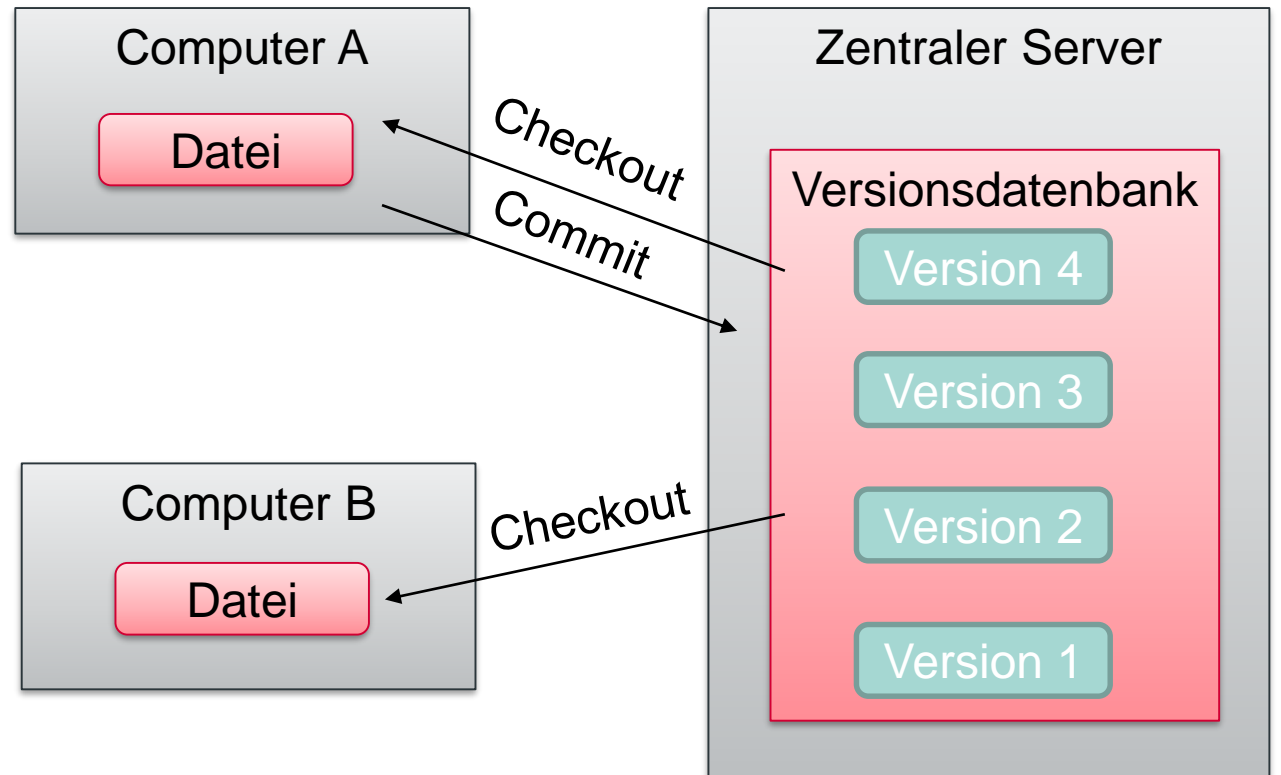
Checkout auf lokalen Computer

- Dateien sind lokal nicht versioniert

Änderung gemacht

- Commit auf Server

- Neue Version wird angelegt



Verteilte Versionsverwaltung

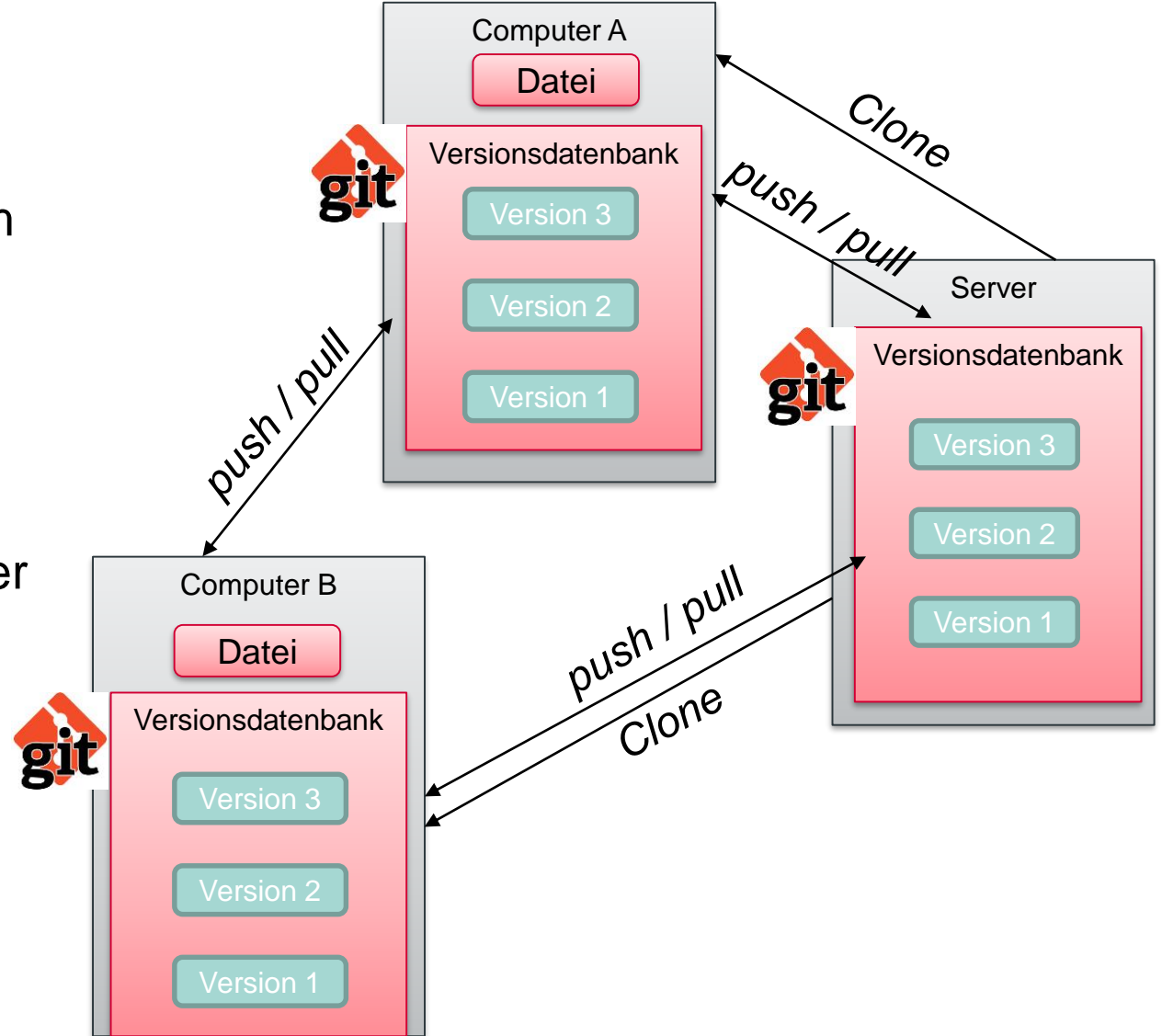
Lokales Repository ist komplette Kopie vom Server

- Genauso gut wie der Server

Operationen werden nur lokal ausgeführt

- Versionierung passiert lokal
- Checkin/Checkout und commit von lokaler Datenbank

Synchronisation der Änderung via *push / pull*



Git

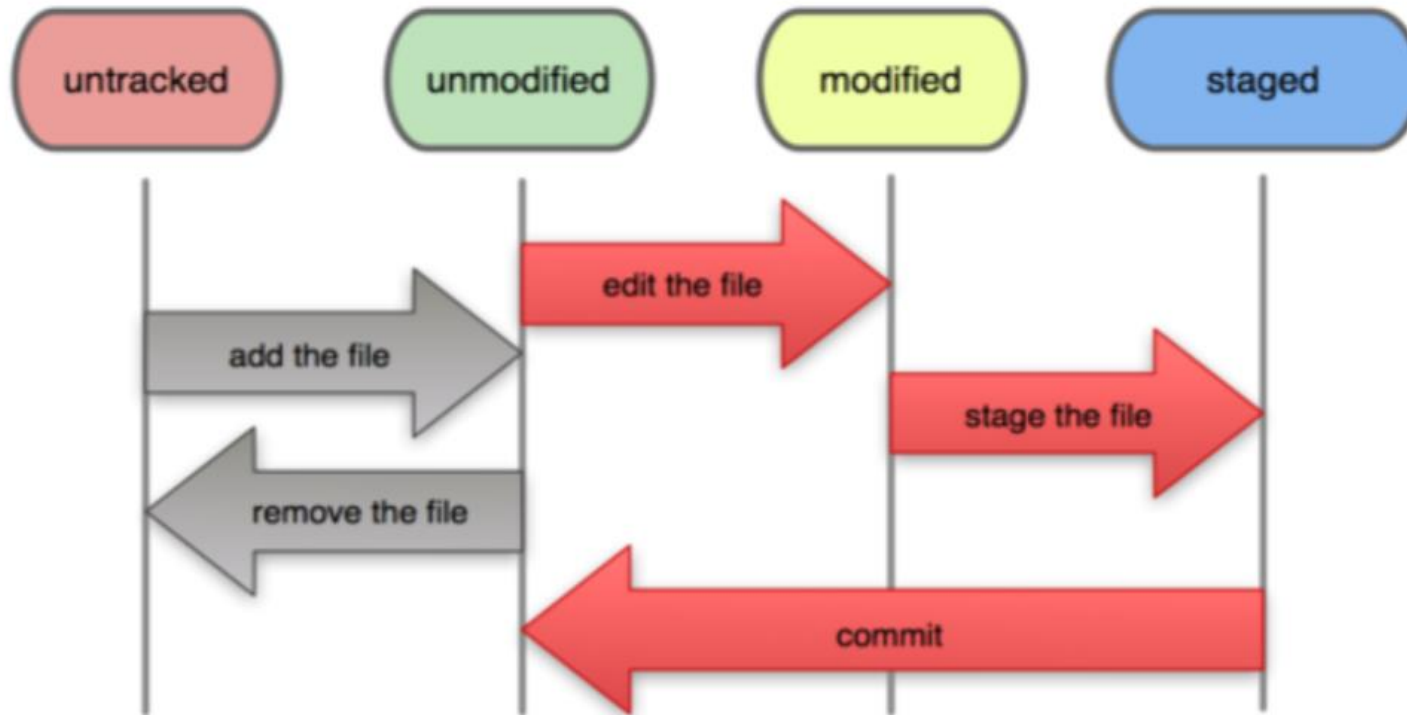
- Verteiltes Versionsverwaltungssystem
- Entwickelt von Linus Torvalds
- Open Source (GPL 2)
- Designed für Versionsverwaltung von Linux Kernel
 - 100 von verteilten Entwicklern
 - Grosse Codebasis
 - Viele parallele Features



Linus Torvalds: Quelle: Wikipedia

Git workflow

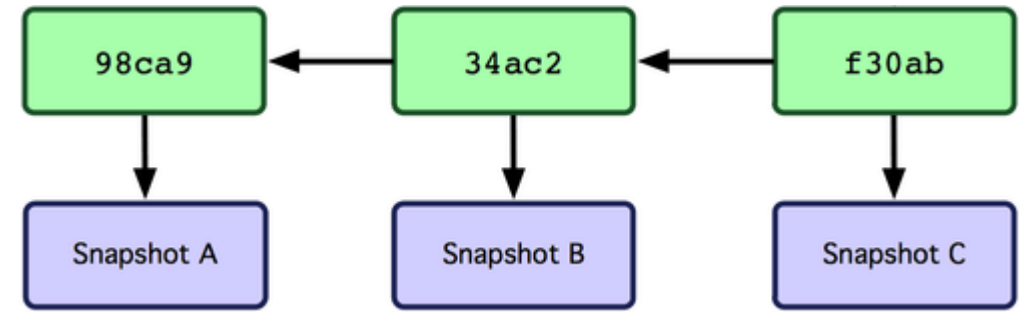
Life-cycle von Dateien in Git



Quelle: git-scm.com

Git Commit

- Jeder Commit führt zu neuem *Snapshot* (Zustand aller Dateien)
- Jeder Commit hat eindeutigen Hashwert



Demo

```
commit 853c4fd15d516b067a6cd8c19936d1ed4559d32c (HEAD -> master, origin/master)
Author: dependabot-preview[bot] <27856297+dependabot-preview[bot]@users.noreply.github.com>
Date:   Mon Sep 2 12:47:12 2019 +0200

    Bump com.github.ben-manes.versions from 0.22.0 to 0.24.0 (#5272)

    Bumps com.github.ben-manes.versions from 0.22.0 to 0.24.0.

    Signed-off-by: dependabot-preview[bot] <support@dependabot.com>

commit 3d30ea0f1aa7c0239a87dce961de815600e230ee
Merge: 850563444 57875249a
Author: dependabot-preview[bot] <27856297+dependabot-preview[bot]@users.noreply.github.com>
Date:   Mon Sep 2 09:16:11 2019 +0000

    Merge pull request #5274 from JabRef/dependabot/submodules/src/main/resources/csl-styles-fa125ec

commit 57875249a59adcba5144df2bd9340590159cbfff
Author: dependabot-preview[bot] <27856297+dependabot-preview[bot]@users.noreply.github.com>
Date:   Mon Sep 2 09:10:50 2019 +0000

    Bump src/main/resources/csl-styles from `f5a7311` to `fa125ec`

    Bumps [src/main/resources/csl-styles](https://github.com/citation-style-language/styles) from `f5a7311` to `fa125ec`.
    - [Release notes](https://github.com/citation-style-language/styles/releases)
    - [Commits](https://github.com/citation-style-language/styles/compare/f5a731144d4b0a838e66ce60cd62a92f7a9e66df..fa125ec03c6270dea5881ec1623f1b741da6e759)

    Signed-off-by: dependabot-preview[bot] <support@dependabot.com>

commit 8505634441c8930ed897381320616806efbd4379
Merge: d79028f09 f04e84a65
Author: dependabot-preview[bot] <27856297+dependabot-preview[bot]@users.noreply.github.com>
:
```

Branching

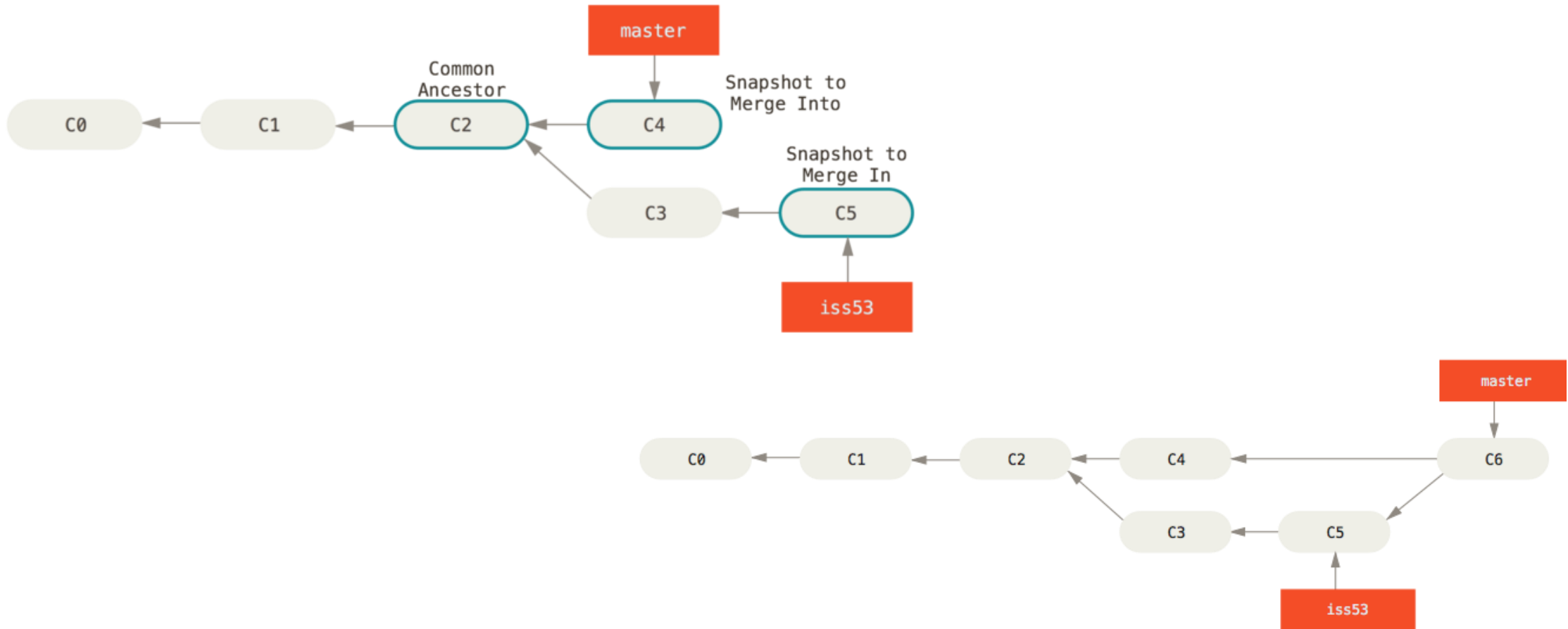
- Parallele Entwicklung verschiedener Features => verschiedenen Sequenzen von Commits
- Konzept in Git: Branches



*Jedes Feature soll in eigenem Branch erstellt werden.
Ermöglicht Wechsel zwischen Branches.*

Merging

Feature fertig? Branch kann zurückgemerged werden



Demo

```
commit 853c4fd15d516b067a6cd8c19936d1ed4559d32c (HEAD -> master, origin/master)
Author: dependabot-preview[bot] <27856297+dependabot-preview[bot]@users.noreply.github.com>
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    Bump com.github.ben-manes.versions from 0.22.0 to 0.24.0 (#5272)

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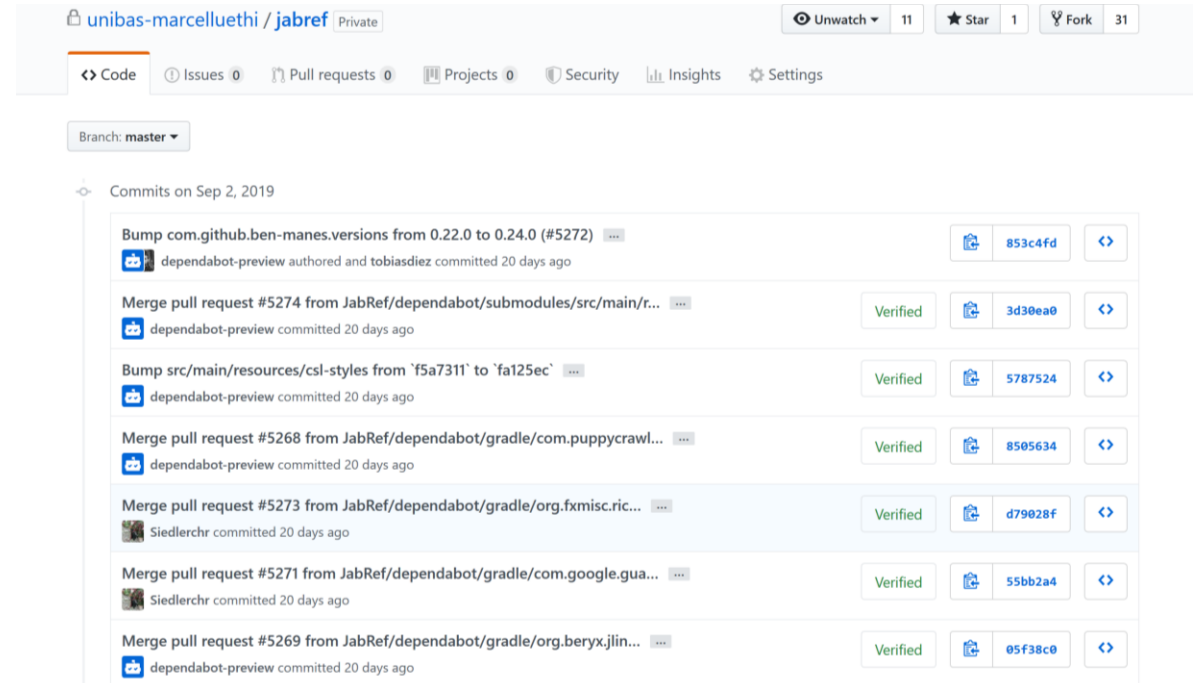
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Merge: d79028f09 f04e84a65
Author: dependabot-preview[bot] <27856297+dependabot-preview[bot]@users.noreply.github.com>
:
```

Github

- Webbasierte, grafische Oberfläche für Git Repositories
 - Soziales Netzwerk für Entwickler
 - Quasi standard für Open Source Projekte
 - Eigentümer: Microsoft
-
- Alternativen: Gitlab, Bitbucket

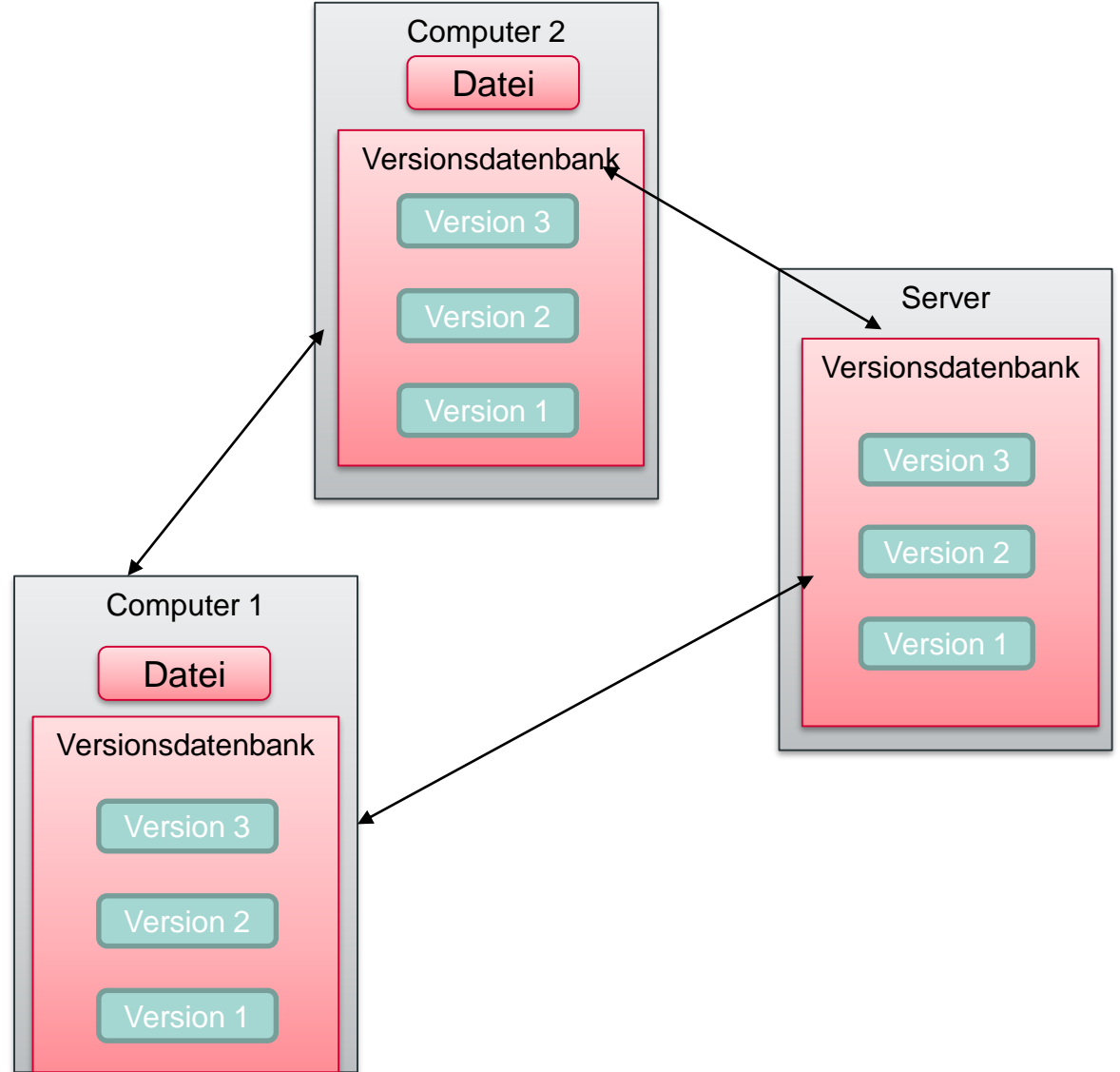


Erinnerung: Verteilte Versionsverwaltung

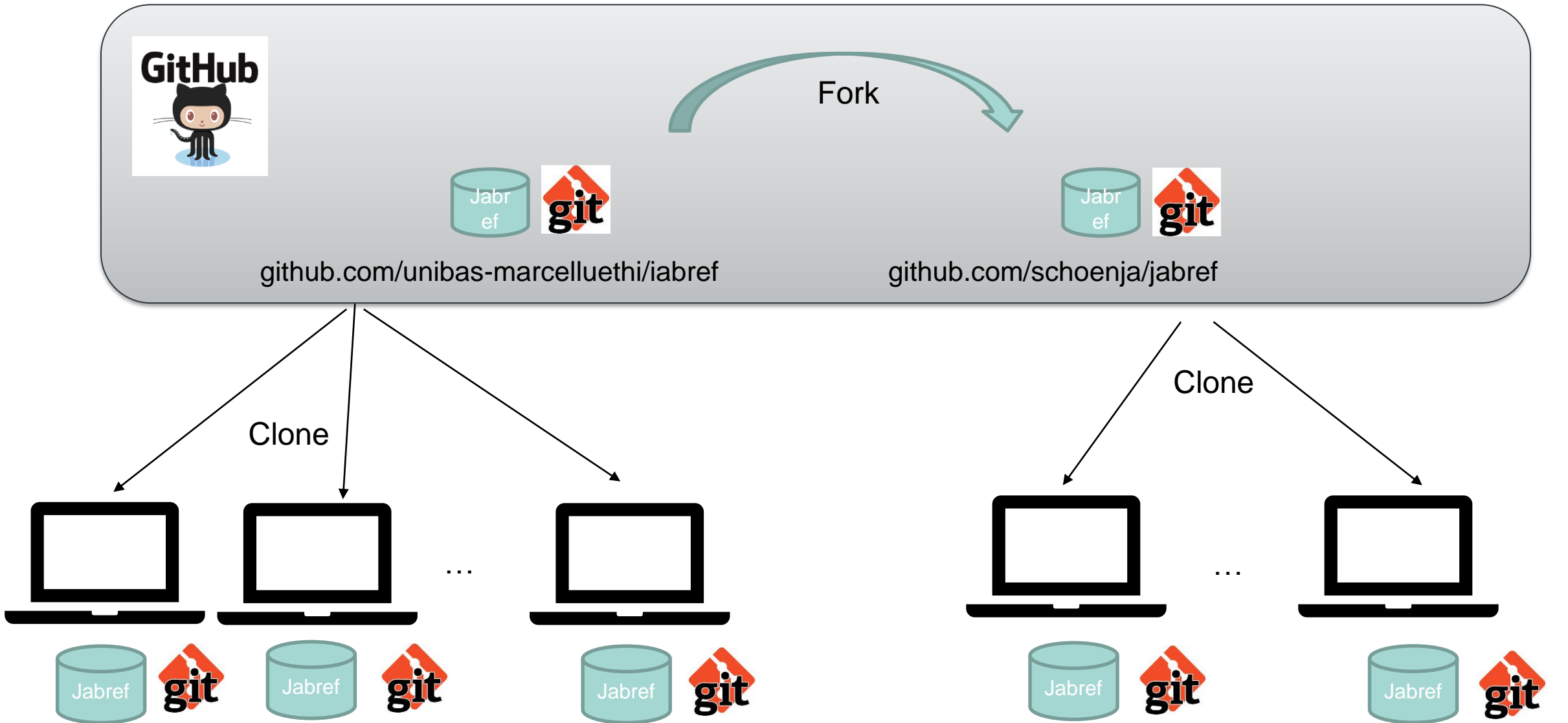
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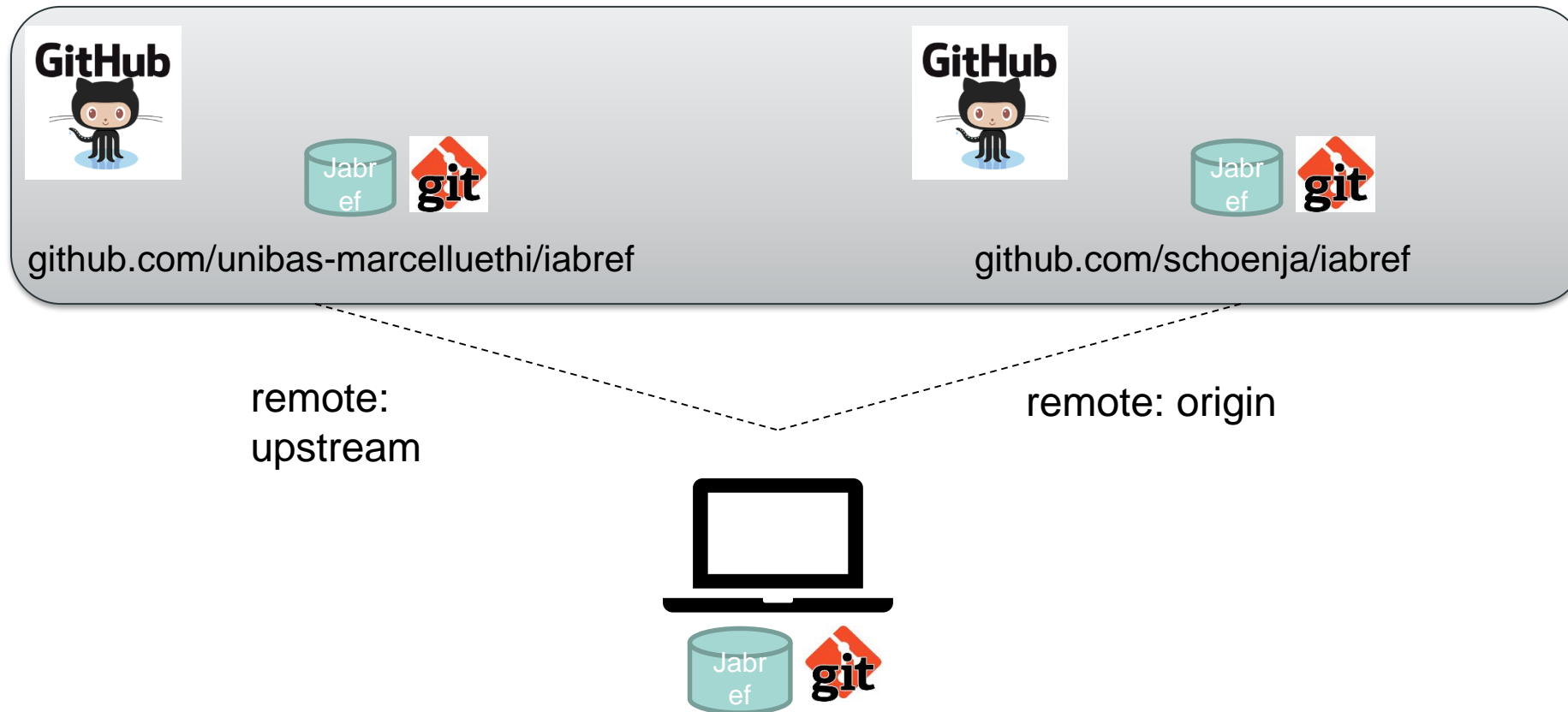
Synchronisation der Änderung via *push* / *pull*



Git und Github



Git remote repositories



Mehrere *remote repositories* erlauben synchronisation von Änderungen in geforkten Projekten