

Eclipse with (E)git Training

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Backlog

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 - <https://git-fork.com/>
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8. Documentation
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 - <https://git-scm.com/book/de/v2>
 - <https://git-lfs.github.com/>
 - https://de.wikipedia.org/wiki/Liste_von_Git-GUIs
 - <https://git-scm.com/download/gui/windows>
9. Off-Topic
- [Alternatives jira/confluence](#)

SHA1 - checksums & backgrounds

- git extensively works with checksums in the background
- a checksum is a 40-char long hex-string (a unique checksum of the data)
- every object gets a checksum
 - blogs
 - trees
 - commits
 - tags

Lab 4: Find created object

```
# Works only within git bash or Linux
# Just for reference here !!
cd .git
cd objects
ls -la
# you will find a directory name with the
# first 2 chars of the object, e.g.
# drwxr-xr-x  3 jmetzger  staff  102 26 Okt 16:28 4f
```

```
# change into that directory
# Hint: Replace name with your directory name
cd 4f
# your object
ls -la
# 51d02eb27b6bdf1741ad48ccf6f7dc3326bbd2
```

```
# now let us see the content
# (taking the 4 letters of the object is sufficient)
git cat-file -p 4f51
my first line
```

```
# and the type of object
git cat-file -t 4f51
blob
```

Merge changes -> merge

- You can merge, if you want to get changes from another branch
- A typical scenario would be:
 - You are in master
 - Checkout a feature branch
 - Work on a feature
 - Checkout master
 - merge changes from feature-branch
- You merge feature from another branch into your current branch
 - with -->
 - git merge your-feature-branch

Lab 10: Exploring HEAD (commandline)

```
cd .git
cat HEAD
# ref: refs/heads/master
cat refs/heads/master
# f80891db4afa604b243bd06a5779fee88c3cad53
# compare this with the last commit - id
# What do you notice ?
git lg -1
```

Replay changes in other branch + changes on current branch -> rebase (commandline)

- Change into branch (z.B.feature-4711)
- git rebase master
- -- how does it work ? ->
 - go back to the point where the branch was created
 - apply change from master
 - at the end apply changes from feature-4711
- -- ATTENTION ->
 - only do rebasing in your own "local" branch (NO ! collaborative branches)
 - never rebase, after push is done and branch is shared with others !

Cancellation -> revert (commandline)

- Take back the last change \ But: you will have an additional log entry

```
# commandline
git revert
```

```
# Eclipse/EGit
1) Go to Log -> Right Click -> Show In -> History
2) Right Click on Commit (you want to revert) -> Revert
```

From -> local repository -> to -> remote repository -> why ?

Why ?

- data is saved outside of my system
- others can access it too (collaboration, e.g. on a feature)

Publish the local changes remote

- (commandline) git push origin master
- (Eclipse/Egit): Right click -> Team -> Push to Upstream

Tagging of a current version (locally)

- eclipse/EGit -> Team -> Advanced -> Tag

```
git tag -a v0.0.1 -m "Commit Message"
git push --tags
```

Getting an old revision of a file

```
1) Rechte Maustaste
2) Replace With (on top of entry Team) Previous Revision/Commit
```

Clone an online session into a new (none existant) directory ====

- git bash (on the desktop - right click)
- git clone <https://url> schulung2

where is configuration saved ?

- on your local system the general configuration is saved in a file.
- Linux/Mac: ~/.gitconfig
- --
- example Mac: /Users/jmetzger/.gitconfig
- example Linux: /home/jmetzger/.gitconfig
- example Windows: C:\Users<user_name>\.gitconfig

Commit - messages: what for and why should they be speaking ?

- other participants should be able to see changes based on commits
- good commit - message: reduces the time for search (for other participants) - more efficient
- search more easily and thoroughly (e.g. for later debugging)
- eventually included in the changelog and other tools

Commit - message : structure

- line 1: short! summary only(!) chars and letters
- line 1: max. 50 chars
- line 1: best practice -> issue number/logical unit, then ":", then summary \ e.g. \ modulexy: Fixed problems with memory management
- line 2: EMPTY
- line 3: thorough description of commit
- line 3: max. 72 chars
- line 3: to structure: *, -, # possible
- line 3: time: presence
- line 3: do not write, what do you did, but why.

The cleanup: removal and untracking : git rm (commandline)

```
git rm
# removes the files locally (working directory)
# as well as for next staging.
# In the next commit the file will not be contained anymore.

git rm --cached
# if i only want to "untrack" a file (so it should be in the repo anymore),
# but want to keep it locally)
```

Troubleshooting ssh -> repo (tortoise/openssh)

```
It is either possible to use openssh or plink.exe.
Here are the most important settings for ssh.
```

- git bash: echo \$GIT_SSH \ it should be: C:\Program Files\Git\usr\bin\ssh.exe here
- if not: export GIT_SSH="C:\Program Files\Git\usr\bin\ssh.exe"
- in addition in tortoisegit under settings -> network the should be the following: \ C:\Program Files\Git\usr\bin\ssh.exe

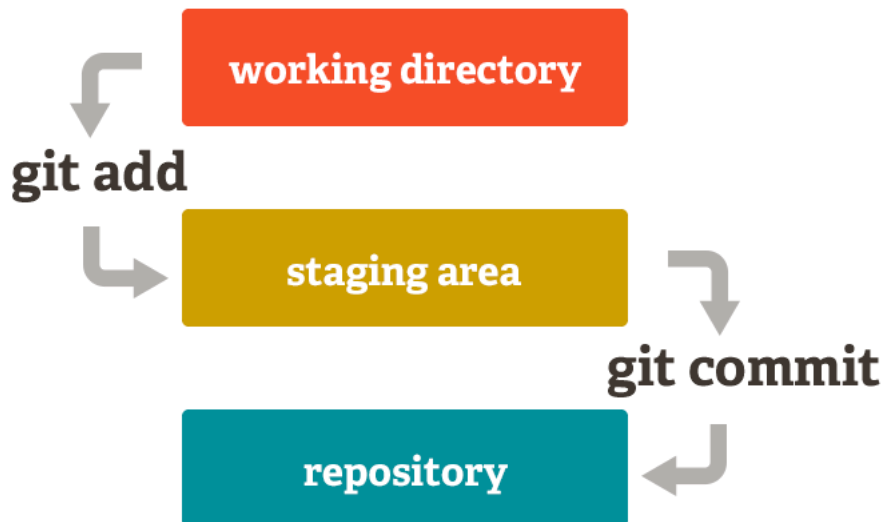
Projects with git

- Linux kernel project
- github
- ruby on rails
- phpmyadmin

How does it work?

- git takes snapshots
- git works offline
 - (git saves the complete project including all versions)
- all files are saved in objects.

The flow of git



Git and its objects

Git and its objects

- To manage its data, git uses objects
- e.g. when you add a file with `git add filename` a new object is created
- There are 4 types of objects
 - blobs
 - trees
 - commits
 - tags

5-goldene-Regeln - Zerstörung

```
1. Kein git commit --amend auf bereits veröffentlicht (gepushed) commit.

2. Kein git reset vor bereits veröffentlichte (gepushed) commits
(1234 (HEAD~1 -vorletzter Commit) < 5412 (vö - HEAD - letzter Commit) -> kein reset auf 1234)

3. Mach niemals ein git push --force (JM sagt)

4. Kein Rebase auf bereits veröffentlichte commits (nach vö von Feature branchen)
- ausser Feature-Branch kann online gelöscht und nochmal erstellt werden

Ausnahme (Brechen der Regeln): ich veröffentliche einen branch auf dem NUR ICH arbeite.
```

Prepare Perspective for good user experience

- It is important to have the right perspective/view

Walkthrough

```
Todo 1:
Menu -> Window -> Show View -> Other -> Git -> Git Repositories

Todo 2:
Menu -> Window -> Show View -> Other -> Git -> Git Staging
```

Todo 3:
Menu -> Window -> Perspective -> Customize Perspective -> Action Set Availability -> Git && Apply & Close
Tab -> Menu Visibility -> Activate Git Checkbox (if not checked)
Tab -> Toolbar Visibility -> Activate Git Checkbox (if not checked)

Todo 4: Save perspective for further usage
Menu -> Windows -> Save Perspective As -> e.g. GIT/Workspace

Create/Initialize Repository/Project

Starting with a repo

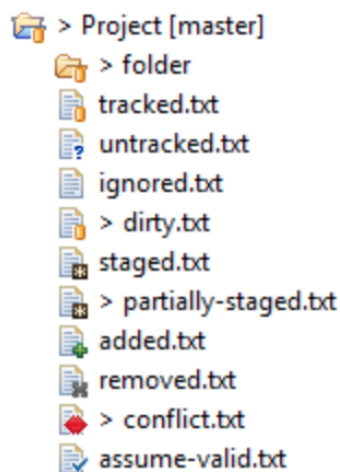
- New Repo in eclipse
 - Go to Window -> Perspective -> Open Perspective -> Other -> Git
 - Use Icon 3 (from the left) of the git icons \ (Create a new git repository and add it to this view)
 - It suggests (the userdir)/git. Please add the name of your directory to your path (e.g. training)
 - Leave the box "create bare repository" UNCHECKED.
 - Click "Finish"
 - Go to new Project -> Java Project (if you are using java)
 - IMPORTANT: Uncheck "Use default location" (otherwise the repo will
- after that: All the intelligence and logic is within the subdirectory .git
- this means: folders/files are fully functional, also if the .git - folder is deleted

Alternative: Starting with a project (recommended !)

- You can also start with a project
 - e.g. New -> Java Project ->
- After that make i a git-repo
 - Team -> Share
 - Do **Not** Check: Use or create repository in parent folder
 - Use the seperated git folder here
 - After doing that, all code will be moved to repo - folder
 - and here in the workspace
 - Example Structure
 - ~/git/RepoName/ <- Workspace
 - ~/git/RepoName/.git

Eclipse Icons

These are the default decorations:



Git-Commands in eGit

- https://wiki.eclipse.org/EGit/Mapping_Git_Commands

git	eclipse/EGit
add:	"Add to Index" -> toolbar/menubar item to add all changes in selected files. "Team -> Add to Index" to add all changes in selected files. Drag-and-drop in "Git Staging" view

	Drag-and-drop in "Synchronization" view. "Compare With..." to stage or unstage line-by-line
annotate:	"Team -> Show in Annotations"
branch:	"Checkout"/"Switch To" toolbar/menubar item to list, create, rename and delete local branches and remote-references. toolbar of Commit views to create a branch from that commit right-click menu of commits listed in history
checkout:	"Checkout"/"Switch To" toolbar/menubar item to checkout a local branch. "Replace With..." to checkout a single file. right-click menu of commits listed in history or relog right-click menu of branches in "Git Repositories" view toolbar of Commit views
cherry-pick:	right-click menu of commits listed in history. toolbar of Commit views
clone:	toolbar of Git Repositories" view
commit:	"Commit" toolbar/menubar item "Team -> Commit" "Commit" toolbar in "Git Staging" view
config:	"Properties" view Preferences: "Team -> Git" "Team -> Remote -> Configure..."
diff:	"Team -> Advanced -> Synchronize" to compare branches "Team -> Synchronize Workspace" to compare working tree to HEAD "Compare With" for specific files double-click items in either "Git Staging" changes windows
fetch:	"Fetch changes from upstream" toolbar/menubar "Team -> Fetch changes from upstream"
init:	toolbar of Git Repositories"
log:	"Team -> Show in history"
merge:	"Team -> Merge"
mv:	Implicit when file is renamed
pull:	"Pull" toolbar/menubar item "Team -> Pull"
push:	"Push to Upstream" toolbar/menubar item default push "Team -> Push to Upstream" \ ditto "Team -> Push..." for explicit push
rebase:	"Rebase" toolbar/menubar item "Team -> Rebase"
relog:	"Git Relog" view
remote:	"Team -> Remote" "Branches -> Remote Tracking" in "Git Repositories" view
reset:	"Reset" toolbar/menubar item to reset a branch "Team -> Reset" ditto
revert:	right-click menu of commits listed in history.
rm:	implicit when file is deleted
status:	implicit in decorations, "Git Staging View"
tag:	"Team -> Advanced -> Tag...", annotated tags only toolbar of Commit views, ditto

Setup Identity

- http://wiki.eclipse.org/EGit/User_Guide#Identifying_yourself

```
Click Preferences > Team > Git > Configuration
Click New Entry and enter the key value pairs:
Key: user.name
Value: YourUsernameHere

And
Key: user.email
Value: YourEmailHere
```

Staging Area

- In Eclipse you will see this information in the staging area:
 - New / Modified files (git status)

```
Right Click (Mouse) -> Team -> Commit
or:
Windows -> Show View -> Other -> Git -> Git Staging
```

Log

```
Right Click -> Show In -> History
or:
```

```
Right Click -> Team -> Show In -> History
```

Alternative: (Recommended)

-> Simply do it from the staging area

Commit

- 1) Right Click on Project
- 2) Team -> Commit

Alternative

Do it directly in the staging area

Add

- Done within the Git Staging Area in EGit / Eclipse

```
Right Click (Mouse) -> Team -> Commit
```

or:

```
Windows -> Show View -> Other -> Git -> Git Staging
```

Commands - Commandline (with tips & tricks)

git add + Tips & Tricks

Trick with -A

```
## only adds from the folder you are in recursively
## but not above (you might miss some files, when you are in a subfolder
git add .
```

```
### Fix -A
```

```
## adds everything no matter in which folder you are in your project
```

```
git add -A
```

git commit

commit with multiple lines on commandline (without editor)

```
git commit -am "New entry in todo.txt
```

```
* nonsense commit-message because of missing text-expertise"
```

```
## enter on last line
```

Change last commit-message (description)

```
git commit --amend
```

```
## now you can change the description, but you will get a new commit-id
```

git log

Show last x entries

```
##
## git log -x
## Example: show last 2 entries
git log -2
```

Show all branches

```
git log --all
## oder wenn alias alias.lg besteht:
## git lg --all
```

Show first log entry

```
## Step 1 - log needs to only show one line per commit
git log --oneline --reverse
```

```
## Step 2: combine with head
```

```
git log --oneline --reverse | head -1
```


Multiple commands with an alias

```
git config --global alias.sl '!git log --oneline -2 && git status'
```

Beautify Logs

Walkthrough

```
git config --global alias.lg "log --color --graph --pretty=format:'%Cred%h%Creset \
-%C(yellow)%d%Creset %s %Cgreen(%cr) %C(bold blue)<%an>%Creset'"
```

PRETTY FORMATS

- all documented in git help log (section PRETTY FORMAT)
- <https://git-scm.com/docs/git-log>

git config

How to delete an entry from config

```
## Important: Find exact level, where it was added --global, --system, --local
## test before
## should contain this entry
git config --global --list

git config --unset --global alias.log
```

git show

Show information about an object e.g. commit

```
git show <commit-ish>
## example with commit-id
git show 342a
```

Needed commands for starters

```
git add -A
git status
git log // git log -4 // or beautified version if setup as alias git lg
git commit -am "commit message" // "commit message" can be freely chosen
## for more merge conflict resolution use only
git commit # to not change commit - message: must be message with merge
## the first time
git push -u origin master
## after that
git push
git pull
```

git branch

Show branches

```
## locale branches + active branch (mit *)
git branch
## remote branches
git branch -r
## alle branches
git branch -a
```

Create branch based on commit (also past commit)

```
git branch lookaround 5f10ca
```

Delete unmerged branch

```
git branch -d branchname # does not work in this case
git branch -D branchname # <- is the solution
```

git checkout

Checkout (change to) existing branch

```
git checkout feature/4711
```

Checkout and create branch

```
## Only possible once
git checkout -b feature/4712
```

git merge

Merge without conflict with fast-forward

```
## Disadvantage: No proper history, because only one branch visible in log
## after fast-forward - merge

## Important that no changes are in master right before merging
git checkout master
git merge feature/4711
```

Merge (3-way) also on none-conflict (no conflicts present)

```
git merge --no-ff feature/4711
```

git tag

```
## set tag on current commit -> HEAD of branch
git tag -a v1.0 -m "my message for tag"
## publish
git push --tags

## set on specific commit
git tag -a v0.1 -m "Initial Release" a23c

## checkout files of a specific tag
git checkout v0.1
## or
git checkout tags/v0.1
```

git remote -v

Examples

```
## show configured remotes
git remote -v

## configure origin remote
## if it works -> no output
git remote add origin https://myurl.to/repo.git
```

git reflog

command

- show everything you (last 30 days), also stuff that is not visible in branch anymore

Example

```
git reflog
```

when many entries a pager like less (aka man less) will be used

```
## you can get out of the page with pressing the key 'q'
```

git reset - Back in Time

Why ?

- Back in time -> reset
- e.g. git reset --hard e2d5
- attention: only use it, when changes are not published (remotely) yet.
- → It is your command, IN CASE your are telling yourself, omg, what's that, what did i do here, let me undo that

Example

```
git reset --hard 2343
```

git mergetools

Welche Tools sind auf dem System vorhanden

```
git mergetool --tool-help
```

Meld (Windows)

- <https://meldmerge.org/>

Meld - Configuration in Git for Windows (git bash)

```
## you have to be in a git project
git config --global merge.tool meld
git config --global diff.tool meld
## Should be on Windows 10
git config --global mergetool.meld.path "/c/Users/Admin/AppData/Local/Programs/Meld/Meld.exe"
## Windows 10 - different installation path
git config --replace-all --global mergetool.meld.path '/c/Program files/Meld/Meld.exe'

## do not create an .orig - file before merge
git config --global mergetool.keepBackup false
```

TortoiseGitMerge - Configuration

```
## If you have tortoisegit installed on your system, you can use tortoisegitmerge for git for windows as well
## Do not keep orig-file
git config --global merge.tool tortoisegit
git config --global mergetool.keepBackup false
```

How to use it

```
## when you have conflict you can open the mergetool (graphical tool with )
git mergetool
```

Eclipse/STS(Spring Tool Suite)

Increasing Icon Size

- You might want to have bigger icon size (tested on Windows)
- Search for "eclipse.ini"
- Open in editor (e.g. Notepad++)
- Add the following 3 lines (at the end of the file):

```
-Dswt.enable.autoScale=true
-Dswt.autoScale=200
-Dswt.autoScale.method=nearest
```

Installation of Eclipse

```
## go to https://www.eclipse.org/downloads
## Choose 32bit or 64bit
## in most cases 64bit (nowerdays)
## -> Downloads Eclipse installer

start eclipse installer
## -> choose "Eclipse IDE for Java Developers"

## Eclipse will be installed
```

Installation of STS (Spring Tool Suite)

- We can find the version we need here:
 - <https://github.com/spring-projects/sts4/wiki/Previous-Versions>

```
## We will use the version 4.10.0
## in our case for mac
https://download.springsource.com/release/STS4/4.10.0.RELEASE/dist/e4.19/spring-tool-suite-4-4.10.0.RELEASE-e4.19.0-macosx.cocoa.x86_64.dmg
```

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Walkthrough

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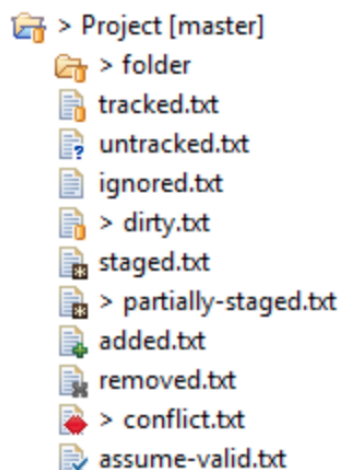
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- After that make i a git-repo
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 - Do **Not** Check: Use or create repository in parent folder
 - Use the seperated git folder here
 - After doing that, all code will be moved to repo - folder
 - and here in the workspace
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git	eclipse/EGit
-----	--------------

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log:	"Team -> Show in history"
merge:	"Team -> Merge"
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pull:	"Pull" toolbar/menubar item "Team -> Pull"
push:	"Push to Upstream" toolbar/menubar item default push "Team -> Push to Upstream" \ ditto "Team -> Push..." for explicit push
rebase:	"Rebase" toolbar/menubar item "Team -> Rebase"
relog:	"Git Relog" view
remote:	"Team -> Remote" "Branches -> Remote Tracking" in "Git Repositories" view
reset:	"Reset" toolbar/menubar item to reset a branch "Team -> Reset" ditto
revert:	right-click menu of commits listed in history.
rm:	implicit when file is deleted
status:	implicit in decorations, "Git Staging View"
tag:	"Team -> Advanced -> Tag..." , annotated tags only toolbar of Commit views, ditto

Setup Identity

- http://wiki.eclipse.org/EGit/User_Guide#Identifying_yourself

```
Click Preferences > Team > Git > Configuration
Click New Entry and enter the key value pairs:
Key: user.name
Value: YourUsernameHere
```

```
And
Key: user.email
Value: YourEmailHere
```

Staging Area

- In Eclipse you will see this information in the staging area:
 - New / Modified files (git status)

```
Right Click (Mouse) -> Team -> Commit
or:
Windows -> Show View -> Other -> Git -> Git Staging
```

Log

```
Right Click -> Show In -> History
or:
Right Click -> Team -> Show In -> History
```

Alternative: (Recommended)

-> Simply do it from the staging area

Commit

```
1) Right Click on Project
2) Team -> Commit

## Alternative
## Do it directly in the staging area
```

Add

- Done within the Git Staging Area in EGit / Eclipse

```
Right Click (Mouse) -> Team -> Commit
or:
Windows -> Show View -> Other -> Git -> Git Staging
```

Edit markdown in eclipse with plugin

- <https://marketplace.eclipse.org/content/markdown-text-editor>

Features

Partial Clone

Prerequisites

at least git 2.22.0

Command

```
git clone --filter=blob:none

## blobs werden erst beim Checkout runtergeladen
git checkout master
```

Hooks

- <https://git-scm.com/book/en/v2/Customizing-Git-Git-Hooks>

GIT-Server

GIT Server

Fully Fledged (können ziemlich viel) - Proprietär

```
github
bitbucket
gitlab
```

Cloud and on premise

Installation im Netz oder in der Cloud
Aber: bitbucket (atlassian) verkaufen keine Lizenzen für on-premise (lokales Netz - selber installiert)

gitlab

Es gibt eine Community Version (kostenlos) Anzahl Nutzer ?

github

Enterprise for own installation

https://github.com/organizations/enterprise_plan?ref_cta=Start+a+free+trial&ref_loc=hero&ref_page=%2Fenterprise

bitbucket

```
bitbucket cloud - damit arbeiten wir
bitbucket server - lokale Installation (wird es nach 2021 nicht geben, bis ma 2024)
bitbucket data center
```

Kleinere Server (können fast nix)

```
git-server (direkt)
https://git-scm.com/book/de/v2/Git-auf-dem-Server-Einrichten-des-Servers

gitosis
https://www.admin-magazin.de/Das-Heft/2012/02/Git-Server-selbst-
installieren/(offset)/2#:~:text=Gitosis,die%20entsprechenden%20Skripte%20aufgerufen%20werden.&text=Analog%20zu%20Gitolite%20legt%20i

web-git
```

Freie Alternativen (online - cloud)

```
codeberg.org
```

Freie Alternativen (offline ;o) - on premise)

```
https://gitea.io/en-us/ (codeberg basiert darauf)
```

Welchen nehme ich (Vergleich bitbucket / gitlab)

- <https://www.atlassian.com/de/software/bitbucket/comparison/bitbucket-vs-gitlab>

Welchen nehme ich (Vergleich bitbucket / github)

- <https://gist.github.com/juderosen/8410710>

Golden

5-goldene-Regeln

```
1. Kein git commit --amend auf bereits veröffentlicht (gepushed) commit.

2. Kein git reset vor bereits veröffentlichte (gepushed) commits
(1234 (HEAD~1 -vorletzter Commit) < 5412 (vö - HEAD - letzter Commit ) -> kein reset auf 1234)

3. Mach niemals ein git push --force (JM sagt)

4. Kein Rebase auf bereits veröffentlichte commits (nach vö von Feature-branchen)
- ausser Feature-Branch kann online gelöscht und nochmal erstellt werden

Ausnahme (Brechen der Regeln): ich veröffentliche einen branch auf dem NUR ICH arbeite.
```

Tipps & Tricks (git / git bash)

Konfigurationseinstellung löschen

```
git config --global --unset alias.lg
```

Anderen Editor verwenden

```
git config --global core.editor "'C:/Program Files/Notepad++/notepad++.exe' -multiInst -notabbar -nosession -noPlugin"
```

Platz sparen mit dem shallow clone + neu pushen

Walkthrough (nicht pushbar)

```
## ohne Einschränkung 1428 objekte aktuell (stand 09.09.2021)
git clone https://github.com/jmetzger/mariadb-fuer-entwickler.git

### Clone only last 501 commits
git clone --depth=501 https://github.com/jmetzger/mariadb-fuer-entwickler.git mfe
cd mfe

### Es steht der Hinweis grafts im letzten Logeintrag.
### Der letzte Logeintrag (also das erste commit hat ein parent),
### dadurch kann es nicht in ein neues Repo gepushed werden.
```

Walkthrough (pushbar)

```
### Nur 201 commits abholen damit das handling einfacher ist.
git clone --depth=501 https://github.com/jmetzger/training-git.git gt

### Jetzt Historie neu aufbauen
cd gt
### sha - id des ersten commits (letzter log eintrag finden)
### z.B. cc43
### tree rausfiltern und auf dieser Basis einen neuen Initial-Commit ohne eltern erstellen.
echo "Start of truncated history" | git commit-tree cc43^{tree}
### es erscheint die neue commit-id z.B. 56c3....

### Diese nehmen wir um darauf die restliche Historie draufzuflanschen
git rebase --onto 56c3 cc43

### historie ist fertig

### Jetzt remote umbiegen
git remote set-url origin https://url_zum/neuen_repo.git

### bzw. master
git push origin main
```

Branch aus bestehendem Branch neu erstellen (alles auf Anfang!)

```
git checkout --orphan new_branch
git status
git add .
git commit -am "New Initial release"
git checkout main
```

Arbeiten mit git replace

- <https://git-scm.com/book/en/v2/Git-Tools-Replace>

ssl Verifizierung ausschalten (quick & dirty)

```
## Wenn eine Fehler auftritt, wie z.B. beim Pushen
fatal: unable to access 'https://bitbucket.org/xy/xyz.git/': SSL certificate problem: unable to get local issuer certificate

git config http.sslVerify false

oder: für alle repos
git config --global http.sslVerify false
```

generic no-ff

Workaround

```
git config --global --add merge.ff false
```

GIT-Guis

Exercises

Create simple conflict on commandline

```
## if todo.txt does not exist, create it after creating new branch
1. neuen branch: feature/4920 - todo.txt Zeile 1 und Zeile4
2. add + commit
3. git checkout master
4. in master -> todo.txt zeile 1 und zeile 4 ändern
5. add + commit
6. git merge feature/4920
```

Conflict merge-request

```
Schritt 1:
Online die Datei src/README.txt im master
-> ändern Zeile 1, Zeile 4, Zeile 8 (wenn nicht vorhanden anlegen) -> im master

Schritt2:
```



```
1. lokal neuen Branch feature/7001 erstellen und checkout
2. im branch src/README.txt anlegen (wenn nicht vorhanden)
und Zeile 1 , Zeile4, Zeile 8 etwas reinschreiben
3. add + commit
4. git push -u origin feature/7001
5.. merge-request
-> feature/7001 -> master
6.. ihr versucht zu mergen
```

Documentation

GIT pdf

- <https://schulung.t3isp.de/documents/pdfs/git/git-training.pdf>

Off-Topic

Alternatives jira/confluence

Jira

```
Trac
Roundup
OTRS
Taiga
Redmine (speziell für Software)
Open Project

-> Redmine
```

GIT-Server

```
gitea
```

Wikis

```
dokuwiki
-> Migration
```