

Eclipse with (E)git Training

Agenda

1. Technical Background

- [Projects with git](#)
- [How does it work?](#)
- [The flow of git](#)

2. Commands - Commandline (with tips & tricks)

- [git add + Tipps & Tricks](#)
- [git commit](#)
- [git log](#)
- [git config](#)
- [git show](#)
- [Needed commands for starters](#)
- [git branch](#)
- [git checkout](#)
- [git merge](#)
- [git tag](#)

3. Eclipse/STS(Spring Tool Suite)

- [Installation of Eclipse](#)
- [Installation of STS \(Spring Tool Suite\)](#)
- [Create/Initialize Repository/Project](#)
- [Eclipse Icons](#)
- [Git-Commands in eGit](#)
- [Setup Identity](#)
- [Staging Area](#)
- [Log](#)
- [Commit](#)
- [Add](#)

4. Advanced Commands

- [git reflog](#)
- [git reset - Back in Time](#)

5. Features

- [Partial Clone](#)

6. GIT-Server

- [GIT Server](#)

7. Golden

- [5-goldene-Regeln](#)

8. Tipps & Tricks

- [Increasing Icon Size](#)
- [Prepare Perspective](#)
- [Konfigurationseinstellung löschen](#)

- [Anderen Editor verwenden](#)
- [Platz sparen mit dem shallow clone](#)

9. GIT-Guis

- <https://github.com/DmitryZhelnin/git-extensions-intellij>
- <https://github.com/gitextensions/gitextensions/>
- <https://git-fork.com/>

10. Documentation

- [GIT pdf](#)
- http://wiki.eclipse.org/EGit/User_Guide
- <https://schulung.t3isp.de/documents/pdfs/git/git-training.pdf>
- <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>

11. Off-Topic

- [Alternatives jira/confluence](#)

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

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
 - blobs
 - 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
```

Git log - beautified (commandline)

- Why ?
 - For later usage, it will be easier to have a beautified log

```
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' --abbrev-commit"
```

Lab 7: Setup beautified log (commandline)

```
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' --abbrev-commit"
```

```
# use beautified log
git lg
```

Branches -> why ?

- important concept of git
- work on features easily
- independent from remote repository

Create branches -> 1-step-version

- git checkout -b feature-4711

Branch - which one is active ?

- git branch (star means active)

change to another branch (commandline)

- git checkout feature-4711

Lab 8: Create a new branch + work there (commandline)

```

git checkout -b feature-4711
# check which branch is active
git branch

# create a file feature-4711.txt
touch feature-4711.txt
# create a line of text into it
# with your favourite editor
# .e.g
# Line of code in 4711

# now commit the changes
git status
git add .
git commit -am "New feature-4711.txt"
git status
# do you notice, that the branch is ahead ?
git lg

```

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 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

Workflows -> gitflow workflow

```
{{ :gitflow-workflow-4.png }}
```

Technical Background

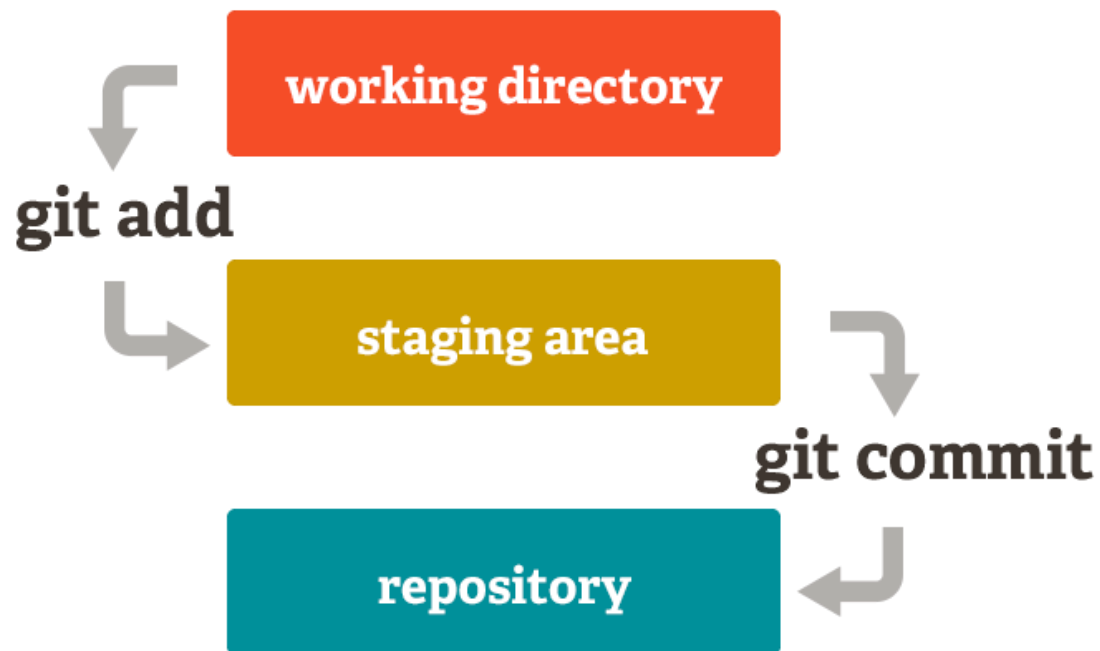
Projects with git

- 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



Commands - Commandline (with tips & tricks)

git add + Tipps & 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-mesage (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'
```

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

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
```

Eclipse/STS(Spring Tool Suite)

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
```

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:

-  > Project [master]
-  > folder
-  tracked.txt
-  untracked.txt
-  ignored.txt
-  > dirty.txt
-  staged.txt
-  > partially-staged.txt
-  added.txt
-  removed.txt
-  > conflict.txt
-  assume-valid.txt

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 reflog 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"
reflog:	"Git Reflog" 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

Advanced Commands

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
```


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
```

GIT-Server

GIT Server

Fully Fledged (können ziemlich viel) - Properitär

```
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 server
```

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%20we

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://github.com/jmetzger/mariadb-fuer-entwickler.git>

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 < 5412 (vö) -> kein reset auf 1234)
- (3. Nie Struktur in 2 Branches (z.B. Master / Feature-Branch) vor Merge gleichzeitig ändern)
4. Mach niemals ein git push --force (JM sagt)
5. Kein Rebase auf bereits veröffentlichte commits (nach vö von Feature branchen)
- ausser Feature-Branch kann online gelöscht und nochmal erstellt werden

Tipps & Tricks

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
```

Prepare Perspective

- 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 -> 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

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

Walkthrough

```
## 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
```

GIT-Guis

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
```