Eclipse with (E)git Training

Agenda

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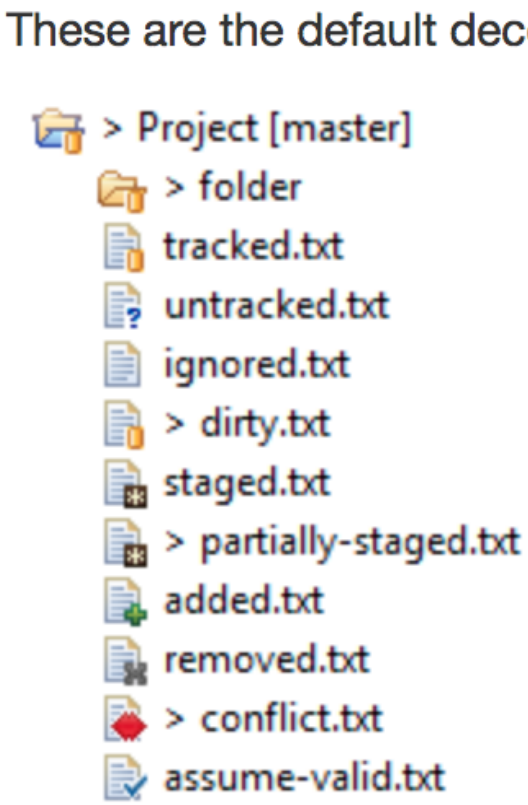
The starting point (I) : the git-repository

- ~~"git init" initializes a repository~~
- 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" (otherwice 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

Starting with a project : 1 and 2

- 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

Icons within EGit



git commands in Eclipse (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

The helper : git status

- Within egit implicitly in status of files (decorations)
- Git Staging View

The staging area / index :

- ~~Here you will decide, what gets shipped (for the next "git commit")~~
- ~~For doing so, we will use: git add~~
- In Eclipse you will see this information in the staging area:

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

The details : git add

- Done within the Git Staging Area in EGit / Eclipse

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

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
  - 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
```

Git - your identity (Why ?)

- Working in a team: Who has done what ?
- Makes it easier to organize work.
- You can easier search work based on Author (=Identity)

```
On newer versions your forced
to set your identity before you
you can publish your work to a remote server (=push)
```

Lab 5a: Set up your identity Git (git bash/commandline)

```
# within your project (folder training)
git config --global user.name "Jochen Metzger"
git config --global user.email "j.metzger@t3company.de"
# Checking your config:
git config --list
# Checking your config property:
git config user.email
```

Lab 5b: Set up your identity (Eclipse/EGit)

- 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
```

The journey: there we go to the (local) repository

- the next step: get the files/directory into the repo
- with "git commit" the work is transferred (after git add or git add .)

Git commit - in detail (command line)

- git commit (commit all files from staging)
- git commit -a (in addition all files that have been deleted or known (and have changed))
- git commit / git commit -a opens an editor where i can enter the commit message
- git commit -m "my commit-message" - makes committing a oneliner

Git commit (Eclipse/EGit)

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

Git log

- All commits are logged in to the log
- You can access the log with
  - git log

Git log - what in detail ? (commandline)

- Output the log: \ git log
- --
- a short version of logs: \ git log --oneline
- --
- all from a specific author: \ git log --author=Max

Git log (Eclipse/EGit)

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

Lab 6: Commit the changes and watch the log (commandline only)

```
# look into the status
git status

git commit
# editor opens - now add a commit message
# & save & close the editor

# everything shoud be clean now
git status

# you will notice the same commit-id as
# in the commit message
git log
```

Git aliases (commandline)

- With aliases you can create your own git commands ;o)
- Creation Syntax:
  - git config --global alias.name_of_alias " "
  - e.g. git config --global alias.cc "commit -a"
- Usage Syntax:
  - git cc
- You can still add params to the command on usage:
  - git cc -m "my commit"

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

Delete branch (commandline)

- You should cleanup unused branches as frequent as possible
- git branch -d feature-4711 (you should not be within the branch)

Lab 9: Merge branch (fast-forward) - from other feature (commandline)

```
# we did this before
# and worked on branch
git checkout feature-4711
git checkout master
git merge feature-4711
# you will notice, that both branches are at the same commit-id
git lg
git branch -d feature-4711
```

Merge - FastForward - How come ?

- Fast-Forward just move the pointer forward
- HEAD always points to tip of the checked out branch
- HEAD is simply the entry in a file
  - Content is itsef a reference
  - Reference holds Commit-Id.

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 !

Back in time -> reset (commandline)

- e.g. git reset --hard HEAD~1
- 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

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)

Remote repository - examples

- gitlab
- github
- gitosis
- --
- under the hood: git.

Login to gitlab / bitbucket

- Introduction of the gui

(Windows -> git bash) create private/public key pair ====

- desktop -> right click -> git bash
- ssh-keygen -t rsa # set password !
- cd ../.ssh
- cat id_rsa.pub # that's the public key
- Mark key with mouse -> then -> CTRL + C
- open gitlab in browser
- (gitlab) menü -> profile settings -> SSH keys -> paste key and click button "Add Key"
- Test the connection with ssh git@git.server.com

Create a repo under gitlab/bitbucket ====

- login
- create repo (schulung)
- introduce repo locally

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

Workflows -> gitflow workflow

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

Git Guis

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

Documentation

- 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

Technical Background

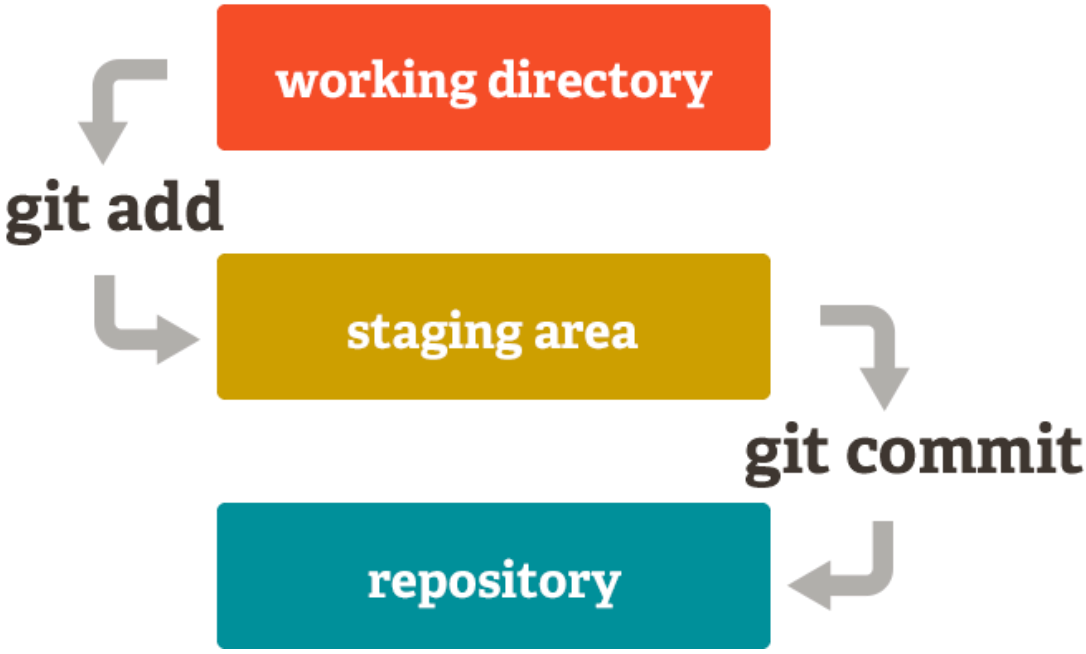
Projects with git

- 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



Installation

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
```

Commands (with tipps & 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

* nonsene commit-message becasue 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 resultion 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
```

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
```

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
```