

# Git

## Links

### Overview

- Scott Chacon and Ben Straub: [Pro Git](#) book
- NDP Software: [Online Interactive Cheat Sheet](#)
- Linux Kernel: [Git User Manual](#)
- Git: [giteveryday - A useful minimum set of commands for Everyday Git](#)
- Atlassian: [Gitflow Workflow](#)

### Merge

- Ted Felix: [Git Conflict Resolution](#)
- Skybert: [Diffing and merging in Emacs](#)

### Rebase

- Bitbucket: [Merging vs. Rebasing](#)
- Sourcetree: [Merge or Rebase?](#)
- Stack Overflow: [What's the difference between 'git merge' and 'git rebase'?](#)
- Stack Overflow: [Difference between git pull and git pull --rebase](#)
- Stack Overflow: [Git branch diverged after rebase](#)

### Submodules

- Stack Overflow: [Git Submodule Workflow Advice](#)

### Hooks

- Stack Overflow: [Prevent commits in master branch](#)

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## Commands

### Cloning

- clone only a single branch/tag (*Linux* kernel example)

```
git clone --depth 1 --single-branch --branch v5.10.52 \
git://git.kernel.org/pub/scm/linux/kernel/git/stable/linux-stable.git
```

```
linux-5.10.52
```

## Status

- show status (long): `git status`
- show status (short): `git status -s`

## Commit

- cherry pick a commit to index: `git cherry-pick -n -Xpatience <commit>`
- revert all commits, not pushed so far, up to `<last_good_commit>`, and keep all changes in worktree/index: `git reset --soft <last_good_commit>`
- revert/delete all commits after `<last_good_commit>` up to HEAD: `git reset --hard <last_good_commit>`; if pushed in the past then do in addition: `git push -f origin <branch>`

## Merge/Rebase

- typical merge: `git merge --no-commit master`
- rebase a feature branch: `git checkout master;git pull;git checkout <branch>;git rebase master`

Some notes regarding *Rebase*:



1. In most cases rebasing does not produce any problem (it is best practice).
2. Interactive rebase (option `-i`) provides better control sometimes.
3. A rebase changes all commit hashes (Git rewrites the commit history) - so do not rebase commits that you've pushed!
4. Also regard the *Golden Rules* from [Bitbucket](#).

- rebase a branch, w/o flatten it's merge commits: `git rebase -p`
- interactive edit/re-arrange/squash the last 3 commits (example): `git rebase -i HEAD~3`

## Branches

- list remote branches: `git branch -r`
- show information about *origin*: `git remote show origin`
- create (and switch to) branch: `git checkout -b <branchname>`
- create branch and take over all working tree changes: `git stash branch <branchname>`
- push local branch to *origin* (create remote branch on demand): `git push origin <branchname>`
- push also the tags (this is not automatic!): `git push --tags`
- change remote tracking branch: `git branch --set-upstream-to=origin/<any> <branchname>`
- print name of current branch: `git rev-parse --abbrev-ref HEAD`; or with a *Bash* alias:

```
git_branch_name()
{
    local name="$(git rev-parse --abbrev-ref HEAD)"
    echo "$name"
}

alias gbn=git_branch_name
```

- print revision of branch base (gbb):<sup>1)</sup> `git merge-base --fork-point master`

## Log

- print summary of commits in branch: `git log --first-parent --pretty=oneline $(gbb)~..HEAD`; or: `git show-branch --current --sha1-name`
- show changed files in branch (local): `git diff --name-status $(gbb)~ HEAD --`
- show graphical history: `git log --graph --oneline --all`
- list last operations: `git reflog`

## Tags

- list all tags, incl. comments: `git tag -n`
- create (annotated) tag: `git tag -a v0.5 -m "release 0.5"`

## Diff

- create a (mbox) patchset, to be applied with `git am`:<sup>2)</sup> `git format-patch -s -M --stat --summary --cover-letter -o mboxdir origin/devel..`
- create a patch, to be applied with `patch`:<sup>3)</sup> `git diff [--cached] > patchfile`
- create a patch (using *Diff*, not *Git*), to be applied with `patch`: `diff -Naur file1 file2 > patchfile` (-N »treat absent files as empty, -r »recursive, -a »treat all files as text, -u »unified context)
- [Ediff](#) with *Emacs*: `git difftool --tool=ediff file`



Prefer `git format-patch`/`git am` against `git diff`/`git apply`, because of it's better conflict resolution capabilities.

## Patch

- apply a (mbox) patchset, created with `git format-patch`: `git am --reject mboxdir/mboxfile`
- send a (mbox) patchset as e-mail:<sup>4)</sup> `git send-email --no-signed-off-cc --to="user1 <user1@dummy.com>" --cc="user2 <user2@dummy.com>" mboxdir/mboxfile/`
- apply a patchfile with `patch`: `patch -p1 < patchfile`

## Repo

- show tracked remote repos: `git remote -v`
- change *origin* URL: `git config remote.origin.url ssh://<user>@<server>:<port>/<repo>`

### NOTES:



1. Proper working of some commands can be ensured only in conjunction with my *Git* configuration (see section [Files](#) below).
2. In particular i use [Emacs](#) for most development tasks, also in *VC* or *Magit* mode (see also the *Git* `diff`tool script for [Ediff](#)).

## Troubleshooting

- [Have I lost my changes after rebasing?](#)<sup>5)</sup>
- Especially on *MinGW* the following error message is very common (with transport protocol `HTTPS`): `SSL certificate problem: unable to get local issuer certificate`. This problem can be solved by suppressing the issuer certificate validation with:

```
git config --global http.sslVerify false
```



This contradicts the idea of certificates and might be a security issue.

## Files

- `/etc/gitconfig`: system-wide *Git* configuration file
- `~/.gitignore`: ignored files (see `core.excludesfile` in file `~/.gitconfig` below)
- `~/.gitmessage.txt`: commit template (see `commit.template` in file `~/.gitconfig` below)
- `~/.gitconfig`: users global *Git* configuration:

```
# -*- mode: conf -*-
#
# Copyright (C) 2018 Ralf Hoppe <ralf@dfcgen.de>
#
[user]
  name = Ralf Hoppe
  email = ralf.hoppe@ieee.org

[core]
  editor = emacs
  excludesfile = ~/.gitignore
```

```
[pager]
  branch = false

[color]
  diff = auto
  status = auto
  branch = auto
  interactive = auto
  status = auto
  diff = auto

[credential]
  helper = cache

[commit]
  template = ~/.gitmessage.txt

[log]
  abbrevCommit = true

[sendemail]
#  smtpserver = ???
  from = Ralf Hoppe <ralf.hoppe@ieee.org>
  envelopesender = ralf.hoppe@ieee.org
  suppressfrom = true # do not add From: address to the cc: list
  confirm = auto # confirm before sending on automatic adding of
addresses
  thread = false # no threading by git-send-email (see git-format-
patch)
[diff]
  tool = ediff
  guitool = ediff

[difftool]
  prompt = false # do not prompt before launch

[difftool.ediff]
  cmd = ediff.sh $LOCAL $REMOTE

[merge]
  tool = ediff

[mergetool]
  keepBackup = false

[mergetool.ediff]
  cmd = ediff.sh $LOCAL $REMOTE $MERGED $BASE
  keepBackup = false
  trustExitCode = true
[pull]
```

```
    rebase = merges
[push]
    # "git push" without any refspec will push the current branch out
to
    # the same name at the remote repository only when it is set to
track
    # the branch with the same name over there
    default = simple

[format]
    signoff = true # add Signed-off-by: line to the commit message
    thread = shallow # do threading in git-format-patch
```

1)

After a rebase this command prints the rebase point, not the original fork point.

2)

Conforming to *Linux* kernel [submit guideline](#).

3)

There is no need for option `--no-prefix` if applied with `git apply`.

4)

Send as shallow thread according to configuration option `format.thread` in file `~/.gitconfig`.

5)

If after a rebase (or twiddling with `refs`) it seems that all commits were lost then use `git reflog show` in conjunction with `git reset`.

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