

Git

Jaka Vute

Struktura

Struktura imenika

Podatkovne strukture

Delovanje
ukazov

Git init

Git add

Git commit

Git branch

Git push

Git fetch

Git merge

Viri

Sistemska programska oprema Git

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2. januar 2018

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- 2 Delovanje ukazov
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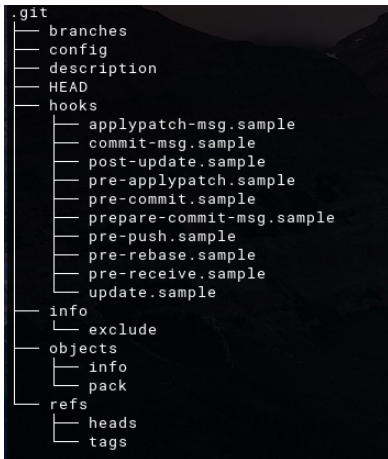
Git branch

Git push

Git fetch

Git merge

Viri



- **branches(direktori):** hrani krajšave za URL-je, ki se uporabljajo pri git fetch, git pull, git push, ... (zastarelo)
- **config(datoteka):** konfiguracijska datoteka za specifičen projekt
- **description(datoteka):** uporablja samo GitWeb za prikaz opisa projekta
- **HEAD(datoteka):** hrani referenco do trenutne *veje*, se uporabi kot starš naslednjega *commit-a*
- **hooks(direktori):** vsebuje primere skript, ki se lahko izvajajo pred ali po izvedbi določenega ukaza
- **info/exclude(datoteka):** podobno kot *.gitignore* vendar ni verzionirano
- **objects(direktori):** vsebuje podatke of git objektih (vsebina datotek, commit-i, tag-i)
- **refs(direktori):** hrani reference na commit-e, tag-e in veje

Podatkovne strukture

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Tipi podatkovnih struktur

- *index*: spremenljiv predpomnilnik, ki hrani informacije o trenutnem delovnem direktoriju in naslednji reviziji (`.git/index`)
- *podatkovna baza objektov*: datoteke, ki se lahko samo dodajajo ne pa brišejo (`.git/objects/`)

Tipi objektov

- *blob*: *binary large object* vsebuje vsebino datoteke
- *tree*: ekvivalentno direktoriju, vsebuje seznam imen datotek vsaka s tipom in referenco na *blob* ali drug *tree* objekt
- *commit*: poveže *tree* objekte v zgodovino, vsebuje ime *tree* objekta, časovni žig in nič ali več imen starševskih *commit* objektov
- *tag*: vsebuje referenco na nek drug objekt in lahko hrani meta-podatke povezane na drug objekt

Git init

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Git init (lokalno)

```
.git
├── branches
├── config
├── description
├── HEAD
├── hooks
│   ├── applypatch-msg.sample
│   ├── commit-msg.sample
│   ├── post-update.sample
│   ├── pre-applypatch.sample
│   ├── pre-commit.sample
│   ├── prepare-commit-msg.sample
│   ├── pre-push.sample
│   ├── pre-rebase.sample
│   ├── pre-receive.sample
│   └── update.sample
├── info
│   └── exclude
├── objects
│   ├── info
│   └── pack
└── refs
    ├── heads
    └── tags
```

Git init -bare (oddaljeno)

```
├── branches
├── config
├── description
├── HEAD
├── hooks
│   ├── applypatch-msg.sample
│   ├── commit-msg.sample
│   ├── post-update.sample
│   ├── pre-applypatch.sample
│   ├── pre-commit.sample
│   ├── prepare-commit-msg.sample
│   ├── pre-push.sample
│   ├── pre-rebase.sample
│   ├── pre-receive.sample
│   └── update.sample
├── info
│   └── exclude
├── objects
│   ├── info
│   └── pack
└── refs
    ├── heads
    └── tags
```

Git add

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```
$ touch test.txt
$ mkdir folder
$ touch folder/test2.txt
$ echo 'test line' > test.txt
$ echo 'test line 2' >
folder/test2.txt
$ git add .
```

Ustvari nova *blob* objekta:

```
.git/objects
├── 64
│   └── 8c95b97298c3749d30729614aaf345313d0ade
├── 8e
│   └── e70a22fc8315f60c26921e9d08f28298bf5b48
├── info
└── pack
```

Ki vsebujeta vsebino dodanih datotek:

```
Δ ~/projects/tmp/git git cat-file -p 648c
test line
Δ ~/projects/tmp/git git cat-file -p 8ee7
test line 2
```

V *.git/index* se zapišejo dovoljenja, ime blob objekta in pot do dodane datoteke:

```
Δ ~/projects/tmp/git git ls-files -s
100644 8ee70a22fc8315f60c26921e9d08f28298bf5b48 0 folder/test2.txt
100644 648c95b97298c3749d30729614aaf345313d0ade 0 test.txt
```

Git commit

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```
$ git commit -m 'Add test files'
```

- 1 Nova datoteka:
`.git/COMMIT_EDITMSG`
- 2 Novi objekti: `9353cde3`,
`cf3d1dc4`, `9c9f2d67`
- 3 Nova datoteka:
`.git/refs/heads/master`
- 4 Nova datoteka: `.git/logs/refs/heads/master`

Vsebinska

`.git/COMMIT_EDITMSG:`

```
Δ ~/projects/tmp/git cat .git/COMMIT_EDITMSG
Add test files
```

Vsebinska `.git/objects/`:

```
.git/objects
├── 64
│   └── 8c95b97298c3749d30729614aaf345313d0ade
├── 8e
│   └── e70a22fc8315f60c26921e9d08f28298bf5b48
├── 93
│   └── 53cde3f56bf8778fea1b7840da6799fb7257cc
├── 9c
│   └── 9f2d67c05424c687fb49cb9672cd506b02099a
├── cf
│   └── 3d1dc408759ec1d149802f557e1b9be77452d2
├── info
└── pack
```

Vsebinska

`.git/refs/heads/master:`

```
Δ ~/projects/tmp/git cat .git/refs/heads/master
9c9f2d67c05424c687fb49cb9672cd506b02099a
```

Vsebinska `.git/logs/refs/heads/master:`

```
Δ ~/projects/tmp/git cat .git/logs/refs/heads/master
9c9f2d67c05424c687fb49cb9672cd506b02099a Jaka Vute <jaka.vute@gmail.com> 1514832535 +0100 commit (initial): Add test files
```

Git commit (nadaljevanje)

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Vsebina *tree* objektov:

```
➤ ~/projects/tmp/git ➤ git cat-file -p 9353
100644 blob 8ee70a22fc8315f60c26921e9d08f28298bf5b48    test2.txt
➤ ~/projects/tmp/git ➤ git cat-file -p cf3d
040000 tree 9353cde3f56bf8778fea1b7840da6799fb7257cc    folder
100644 blob 648c95b97298c3749d30729614aaf345313d0ade    test.txt
```

Vsebina *commit* objektov:

```
➤ ~/projects/tmp/git ➤ git cat-file -p 9c9f
tree cf3d1dc408759ec1d149802f557e1b9be77452d2
author Jaka Vute <jaka.vute@gmail.com> 1514832535 +0100
committer Jaka Vute <jaka.vute@gmail.com> 1514832535 +0100

Add test files
```


Git branch

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```
$ git branch feature
```

Novi datoteki: `.git/refs/heads/feature` in

`.git/logs/refs/heads/feature`

```
Δ ~/projects/tmp/git cat .git/refs/heads/master
9c9f2d67c05424c687fb49cb9672cd506b02099a
Δ ~/projects/tmp/git cat .git/refs/heads/feature
9c9f2d67c05424c687fb49cb9672cd506b02099a
Δ ~/projects/tmp/git cat .git/logs/refs/heads/master
0000000000000000000000000000000000000000 9c9f2d67c05424c687fb49cb9672cd506b02099a Jaka Vute <jaka.vute@gmail.com> 1514832535 +0100 commit (initial): Add test files
Δ ~/projects/tmp/git cat .git/logs/refs/heads/feature
0000000000000000000000000000000000000000 9c9f2d67c05424c687fb49cb9672cd506b02099a Jaka Vute <jaka.vute@gmail.com> 1514835497 +0100 branch: Created from master
```

Git push (lokalno)

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```
$ git remote add origin ~/projects/tmp/git-remote  
$ git push -u origin master
```

V `.git/config` se zapišejo podatki o oddaljeni veji:

```
[remote "origin"]  
  url = /home/jbyte/projects/tmp/git-remote  
  fetch = +refs/heads/*:refs/remotes/origin/*
```

```
[branch "master"]  
  remote = origin  
  merge = refs/heads/master
```

Novi datoteki:

```
.git/logs  
├── HEAD  
├── refs  
│   ├── heads  
│   │   ├── feature  
│   │   └── master  
│   └── remotes  
│       └── origin  
│           └── master
```

```
.git/refs  
├── heads  
│   ├── feature  
│   └── master  
├── remotes  
│   └── origin  
│       └── master  
└── tags
```

Git push (oddaljeno)

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```
.
├── branches
├── config
├── description
├── HEAD
├── hooks
│   ├── applypatch-msg.sample
│   ├── commit-msg.sample
│   ├── post-update.sample
│   ├── pre-applypatch.sample
│   ├── pre-commit.sample
│   ├── prepare-commit-msg.sample
│   ├── pre-push.sample
│   ├── pre-rebase.sample
│   ├── pre-receive.sample
│   └── update.sample
├── info
│   └── exclude
├── objects
│   ├── 64
│   │   └── 8c95b97298c3749d30729614aaf345313d0ade
│   ├── 8e
│   │   └── e70a22fc8315f60c26921e9d08f28298bf5b48
│   ├── 93
│   │   └── 53cde3f56bf8778fea1b7840da6799fb7257cc
│   ├── 9c
│   │   └── 9f2d67c05424c687fb49cb9672cd506b02099a
│   ├── cf
│   │   └── 3d1dc408759ec1d149802f557e1b9be77452d2
│   ├── info
│   └── pack
├── refs
│   ├── heads
│   │   └── master
│   └── tags
```

Git fetch (priprava)

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```
$ git clone ~/projects/tmp/git-remote ~/projects/tmp/git-clone
```

```
$ echo 'test fetch' >> test.txt
```

```
$ git add .
```

```
$ git commit -m 'Add new line to test.txt'
```

```
$ git push origin master
```

```
.git/objects
├── 4e
│   └── 1e58c6095400e80aec41fd5037b22a45d6536f
├── 64
│   └── 8c95b97298c3749d30729614aaf345313d0ade
├── 8e
│   └── e70a22fc8315f60c26921e9d08f28298bf5b48
├── 93
│   └── 53cde3f56bf8778fea1b7840da6799fb7257cc
├── 9c
│   └── 9f2d67c05424c687fb49cb9672cd506b02099a
├── b9
│   └── 2d2bf5f3c211762e29a276578a370ee3e62bb6
├── bb
│   └── d5f4509f6118e3123944ea240e1a36d224f354
├── cf
│   └── 3d1dc408759ec1d149802f557e1b9be77452d2
├── info
└── pack
```

```
Δ ~/projects/tmp/git-clone git cat-file -p 4e1e
test line
test fetch
Δ ~/projects/tmp/git-clone git cat-file -p b92d
040000 tree 9353cde3f56bf8778fea1b7840da6799fb7257cc folder
100644 blob 4e1e58c6095400e80aec41fd5037b22a45d6536f test.txt
Δ ~/projects/tmp/git-clone git cat-file -p bbd5
tree b92d2bf5f3c211762e29a276578a370ee3e62bb6
parent 9c9f2d67c05424c687fb49cb9672cd506b02099a
author Jaka Vute <jaka.vute@gmail.com> 1514842190 +0100
committer Jaka Vute <jaka.vute@gmail.com> 1514842190 +0100
Add new line to test.txt
```

Git fetch

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\$ git fetch

Prenesejo se novi objekti z oddaljenega skladišča:

```
.git/objects
├── 4e
│   └── 1e58c6095400e80aec41fd5037b22a45d6536f
├── 64
│   └── 8c95b97298c3749d30729614aaf345313d0ade
├── 8e
│   └── e70a22cf8315f60c26921e9d08f28298bf5b48
├── 93
│   └── 53cde3f56bf8778fea1b7840da6799fb7257cc
├── 9c
│   └── 9f2d67c05424c687fb49cb9672cd506b02099a
├── b9
│   └── 2d2bf5f3c211762e29a276578a370ee3e62bb6
├── bb
│   └── d5f4509f6118e3123944ea240e1a36d224f354
├── cf
│   └── 3d1dc408759ec1d149802f557e1b9be77452d2
├── info
└── pack
```

Datoteka

.git/refs/remotes/origin/master
vsebuje referenco na najnovejši
commit:

```
Δ ~/projects/tmp/git cat .git/refs/heads/master
9c9f2d67c05424c687fb49cb9672cd506b02099a
Δ ~/projects/tmp/git cat .git/refs/remotes/origin/master
bbd5f4509f6118e3123944ea240e1a36d224f354
```

Ustvari se tudi datoteka *.git/FETCH_HEAD*:

```
Δ ~/projects/tmp/git cat .git/FETCH_HEAD
bbd5f4509f6118e3123944ea240e1a36d224f354
branch 'master' of /home/jbyte/projects/tmp/git-remote
```

Git merge (fast-forward)

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```
$ git merge origin/master
```

Preprosto nastavi `.git/refs/heads/master` na isti *commit*, kot je v `.git/refs/remotes/origin/master`:

```
Δ ~/projects/tmp/git ➤ cat .git/refs/heads/master  
bbd5f4509f6118e3123944ea240e1a36d224f354  
Δ ~/projects/tmp/git ➤ cat .git/refs/remotes/origin/master  
bbd5f4509f6118e3123944ea240e1a36d224f354
```

Git merge (`-no-ff`)

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```
git-clone $ echo 'test merge -no-ff' >> test.txt
git-clone $ git add . && git commit -m 'Add line to test merge -no-ff'
git-clone $ git push origin master
git $ git fetch
git $ git merge --no-ff origin/master
```

```
.git/objects
├── 4e
│   └── 1e58c6095400e80aec41fd5037b22a45d6536f
├── 64
│   └── 8c95b97298c3749d30729614aaf345313d0ade
├── 8e
│   └── e70a22fc8315f60c26921e9d08f28298bf5b48
├── 93
│   ├── 53cde3f56bf8778fea1b7840da6799fb7257cc
│   └── fcea4701d1f905756fada13e2d803cb76a375
├── 9c
│   └── 9f2d67c05424c687fb49cb9672cd506b02099a
├── b4
│   └── 3e23b8610c9d718da9c0be853a41da0abd78f9
├── b9
│   └── 2d2bf5f3c211762e29a276578a370ee3e62bb6
├── bb
│   └── d5f4509f6118e3123944ea240e1a36d224f354
├── cf
│   └── 3d1dc408759ec1d149802f557e1b9be77452d2
├── dd
│   └── 7dff9a0dc6f8b908026016573838c99ccfa33c
├── f0
│   └── 4d3b43046b86eed8123f2e6ebe8b8a94dbc499
├── info
└── pack
```



SiteGround

SiteGround Git Directory Structure Tutorial

[https:](https://www.siteground.com/tutorials/git/directory-structure)

[//www.siteground.com/tutorials/git/directory-structure](https://www.siteground.com/tutorials/git/directory-structure)

[Dostopano: 30.12.2017]



git-scm

git-scm documentation

<https://git-scm.com/doc>

[Dostopano: 30.12.2017]



Wikipedia

Git

<https://en.wikipedia.org/wiki/Git>

[Dostopano: 30.12.2017]