about me

- maintainer on github.com/nteract

- software engineer at microsoft

- wrote some tech blog posts you might have seen

- on the internet as @captainsafia

git from the ground up

a talk by @captainsafia

```
$ git clone https://github.com/nteract/nteract.git
Cloning into 'nteract'...
remote: Enumerating objects: 310, done.
remote: Counting objects: 100% (310/310), done.
remote: Compressing objects: 100% (98/98), done.
remote: Total 49241 (delta 218), reused 255 (delta 208), pack-reused 48931
Receiving objects: 100% (49241/49241), 16.00 MiB | 3.21 MiB/s, done.
Resolving deltas: 100% (34612/34612), done.
```

```
$ ls .git
HEAD            branches        config
description     hooks           index
info            logs            objects
packed-refs     refs
```

```
$ ls .git/objects/
info    pack
```

```
$ ls .git/objects/info
$ ls .git/objects/pack
pack-457ca7bffdeceb504dbf91cd58e3602f47a56ced.idx
pack-457ca7bffdeceb504dbf91cd58e3602f47a56ced.pack
```
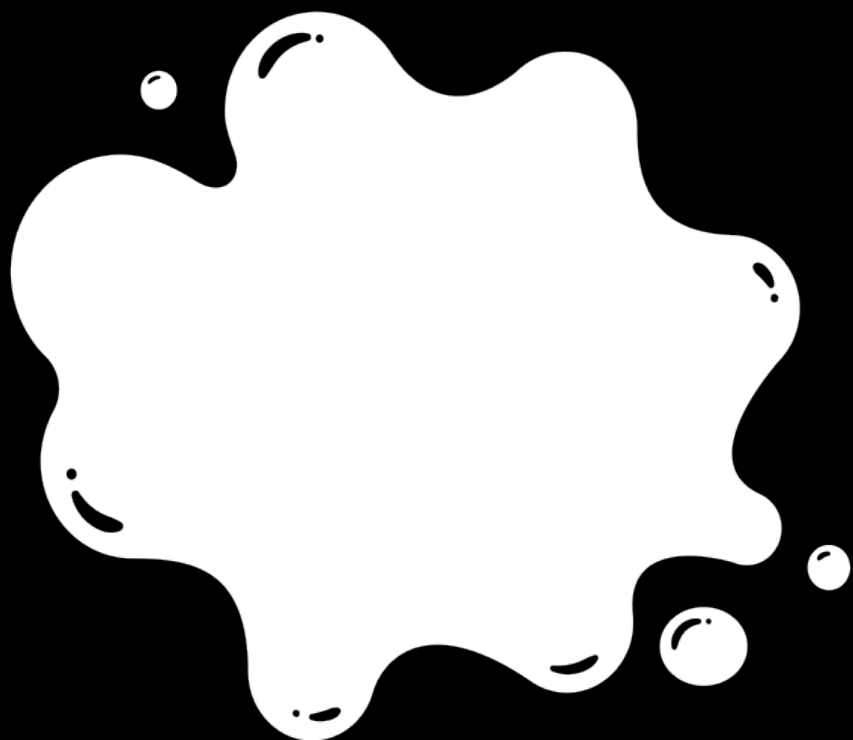
```
$ file .git/objects/pack/pack-457ca7bffdeceb504dbf91cd58e3602f47a56ced.idx
.git/objects/pack/pack-457ca7bffdeceb504dbf91cd58e3602f47a56ced.idx: Git pack index,
version 2
$ file .git/objects/pack/pack-457ca7bffdeceb504dbf91cd58e3602f47a56ced.pack
.git/objects/pack/pack-457ca7bffdeceb504dbf91cd58e3602f47a56ced.pack: Git pack, version 2,
49241 objects
```

```
$ du -sh .git/objects/pack/pack-457ca7bffdeceb504dbf91cd58e3602f47a56ced.pack
 17M     .git/objects/pack/pack-457ca7bffdeceb504dbf91cd58e3602f47a56ced.pack
```

```
$ git checkout -b safia/my-new-branch
Switched to a new branch 'safia/my-new-branch'
$ ls .git
HEAD              branches          config
description       hooks             index
info              logs              objects
packed-refs       refs
```

```
$ cat ./git/HEAD
ref: refs/heads/safia/my-new-branch
```

```
$ cat .git/refs/heads/safia/my-new-branch
e35102c15bd63698b6dcb721e161c4d630e2d6cc
```

```
$ git cat-file -p e35102c15bd63698b6dcb721e161c4d630e2d6cc
tree 6cf0113d017fc604de9481758fc6a578a4067dd2
parent aad3eac9629ee28c4d6030e1091e8089dee66cd9
parent b7d058a50b14ea9b45c128da2af2e260b0ef1ea1
author Kyle Kelley <rgbkrk@gmail.com> 1537647280 -0400
committer GitHub <noreply@github.com> 1537647280 -0400

Merge pull request #3341 from nteract/renovate/next-7.x

Update dependency next to v7.0.0
```

```
$ git commit -m "Update README"
$ tree .git
├── objects
│   ├── 26
│   │   └── 64cf0af38ae9428fca337c12868c4f5e41ca01
│   ├── dc
│   │   └── ce97ef3d92d70d1385952ba7a9988908f3f23e
│   ├── ec
│   │   └── 2122429f0a087825c4ae41a2d16777066e3f0a
│   ├── info
│   └── pack
│       ├── pack-457ca7bffdeceb504dbf91cd58e3602f47a56ced.idx
│       └── pack-457ca7bffdeceb504dbf91cd58e3602f47a56ced.pack
```

```
$ $ git cat-file -p ec2122429f0a087825c4ae41a2d16777066e3f0a
tree 2664cf0af38ae9428fca337c12868c4f5e41ca01
parent e35102c15bd63698b6dcb721e161c4d630e2d6cc
author Safia Abdalla <safia@safia.rocks> 1537835421 -0400
committer Safia Abdalla <safia@safia.rocks> 1537835421 -0400

Update README
```

```
$ git cat-file -p 2664cf0af38ae9428fca337c12868c4f5e41ca01
040000 tree 70616f745fe0f17582b0b608c92ae6b16ad86b5a    .circleci
100644 blob b3e97e8818845bcdf12b89f00449ef552ac58de6    .eslintignore
100644 blob c730a944e1d1c8079457c60abdce5bf053004809    .eslintrc
...
100644 blob dcce97ef3d92d70d1385952ba7a9988908f3f23e    README.md
...
100644 blob 6a1dbab2959bfd0981c3670b1018acde0a989043    styleguide.config.js
040000 tree 10dbc180a024fce8fdefb75e78ede8b833119af0    styleguide
100644 blob f90d9d5981d286dbd58411dc21b822f44451de7d    yarn.lock
```

```
$ git cat-file -p dcce97ef3d92d70d1385952ba7a9988908f3f23e
# nteract <img src="https://cloud.githubusercontent.com/assets/836375/15271096/98e4c102-
19fe-11e6-999a-a74ffe6e2000.gif" alt="nteract animated logo" height="80px" align="right"
/>

[![](https://img.shields.io/badge/version-latest-blue.svg)]
(https://github.com/nteract/nteract)
[![](https://img.shields.io/badge/version-stable-blue.svg)]
(https://github.com/nteract/nteract/releases)
[![codecov.io](https://codecov.io/github/nteract/nteract/coverage.svg?branch=master)]
(https://codecov.io/github/nteract/nteract?branch=master)[![slack in]
(https://slack.nteract.io/badge.svg)](https://slack.nteract.io)
[![lerna](https://img.shields.io/badge/maintained with-lerna-cc00ff.svg)]
(https://lernajs.io/) [![Circle CI Status Shield]
(https://circleci.com/gh/nteract/nteract/tree/master.svg?style=shield)]
(https://circleci.com/gh/nteract/nteract/tree/master)

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## Basics

test

**nteract** is first and foremost a dynamic tool to give you flexibility when
writing code, [exploring data]
(https://github.com/nteract/nteract/tree/master/packages/transform-dataresource), and
authoring text to share insights about the
data.
```

```
$ git push origin HEAD
Counting objects: 100, done.
Delta compression using up to 4 threads.
Compressing objects: 100% (69/69), done.
Writing objects: 100% (100/100), 15.36 KiB | 1.02 MiB/s, done.
Total 100 (delta 61), reused 62 (delta 28)
remote: Resolving deltas: 100% (61/61), completed with 20 local objects.
To https://github.com/nteract/nteract.git
 * [new branch]       HEAD -> safia/my-new-branch
```

```
$ git merge safia/my-new-branch
Updating e35102c1..ec212242
Fast-forward
 README.md | 2 ++
 1 file changed, 2 insertions(+)
```

```
$ git checkout -b safia/branch-that-will-be-behind
$ git checkout master
$ echo "Test" > test.txt
$ git add test.txt && git commit -m "Added test file"
$ git checkout safia/branch-that-will-be-behind
$ echo "Test 2" > test-2.txt
$ git add test-2.txt && git commit -m "Added other test file"
$ git checkout master
$ git merge safia/branch-that-will-be-behind
Merge made by the 'recursive' strategy.
 test-2.txt | 1 +
 1 file changed, 1 insertion(+)
 create mode 100644 test-2.txt
```

```
$ git log
commit 5b347a036d5b27d5e11c13b0b88a34565db8dcc3 (HEAD -> master)
Merge: 00aa5891 e1bceaba
Author: Safia Abdalla <safia@safia.rocks>
Date:    Mon Sep 24 21:53:59 2018 -0400

    Merge branch 'safia/branch-that-will-be-behind'
```

```
$ git cat-file -p 5b347a036d5b27d5e11c13b0b88a34565db8dcc3
tree d94b7f867953d7a3335bcc23732ded883e0a24e7
parent 00aa5891eef1a21d384ca4eabca735f79c2c3bdf
parent e1bceaba273dec2db8970530553533f72f7d6447e
author Safia Abdalla <safia@safia.rocks> 1537840439 -0400
committer Safia Abdalla <safia@safia.rocks> 1537840439 -0400

Merge branch 'safia/branch-that-will-be-behind'
```

```
$ git cat-file -p 00aa5891eef1a21d384ca4eabca735f79c2c3bdf
tree d738ac3037823bf69abba275977592b87e430046
parent ec2122429f0a087825c4ae41a2d16777066e3f0a
author Safia Abdalla <safia@safia.rocks> 1537840379 -0400
committer Safia Abdalla <safia@safia.rocks> 1537840379 -0400

Added test file
$ git cat-file -p e1bceaba273dec2db8970053053533f72f7d6447e
tree 58f0c5c85c6c93e8f8943c7212ec3c6f0ba9fa43
parent ec2122429f0a087825c4ae41a2d16777066e3f0a
author Safia Abdalla <safia@safia.rocks> 1537840430 -0400
committer Safia Abdalla <safia@safia.rocks> 1537840430 -0400

Added other test file
```

```
$ git checkout -b safia/branch-to-rebase-with
$ git checkout master
$ echo "Another test" > test-3.txt
$ git add test-3.txt && git commit -m "Added test-3.txt"
$ git checkout safia/branch-to-rebase-with
$ echo "Another test in another branch" > test-4.txt
$ git add test-4.txt && git commit -m "Added test-4.txt"
$ git checkout master
$ git rebase safia/branch-to-rebase-with
First, rewinding head to replay your work on top of it...
Applying: Added test-3.txt
```

```
$ git log
commit badeaff4c25c768d2b296f65952ff9ae14413577 (HEAD -> master)
Author: Safia Abdalla <safia@safia.rocks>
Date:    Mon Sep 24 22:08:04 2018 -0400

    Added test-3.txt

commit f864bfbc841f5056fac081da39b97fd9944863cf (safia/branch-to-rebase-with)
Author: Safia Abdalla <safia@safia.rocks>
Date:    Mon Sep 24 22:08:18 2018 -0400

    Added test-4.txt
```
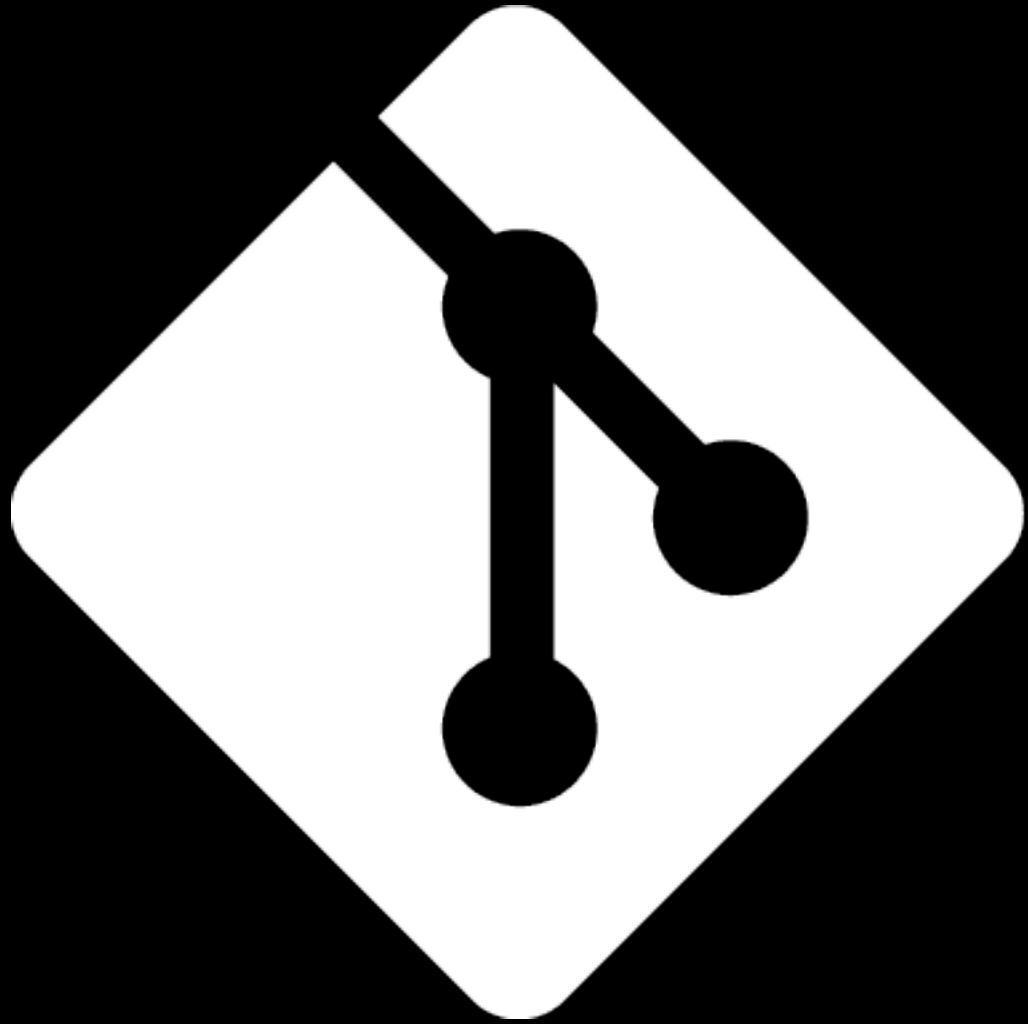
```
$ git cat-file -p f864bfbc841f5056fac081da39b97fd9944863cf
tree a9012c9d01aadc083ac095885c4340954f49b0bf
parent 5b347a036d5b27d5e11c13b0b88a34565db8dcc3
author Safia Abdalla <safia@safia.rocks> 1537841298 -0400
committer Safia Abdalla <safia@safia.rocks> 1537841298 -0400

Added test-4.txt
$ git cat-file -p badeaff4c25c768d2b296f65952ff9ae14413577
tree a6c43fe433c254b30fdc46315107025d19bd1951
parent f864bfbc841f5056fac081da39b97fd9944863cf
author Safia Abdalla <safia@safia.rocks> 1537841284 -0400
committer Safia Abdalla <safia@safia.rocks> 1537841304 -0400

Added test-3.txt
```

git status

- git represents key information as objects stored in the file system

- git compresses loose objects into packfiles to increase space efficiency

- rebases and merges differ in whether they give preference to maintaining a linear history or explicit branches

resources

- pro git book (https://git-scm.com/book/en/v2)

- git packfiles by william shepherd (bit.ly/git-packfiles)

- my blog posts on git (blog.safia.rocks/search/git)

thank you!