IPFS CRASH COURSE

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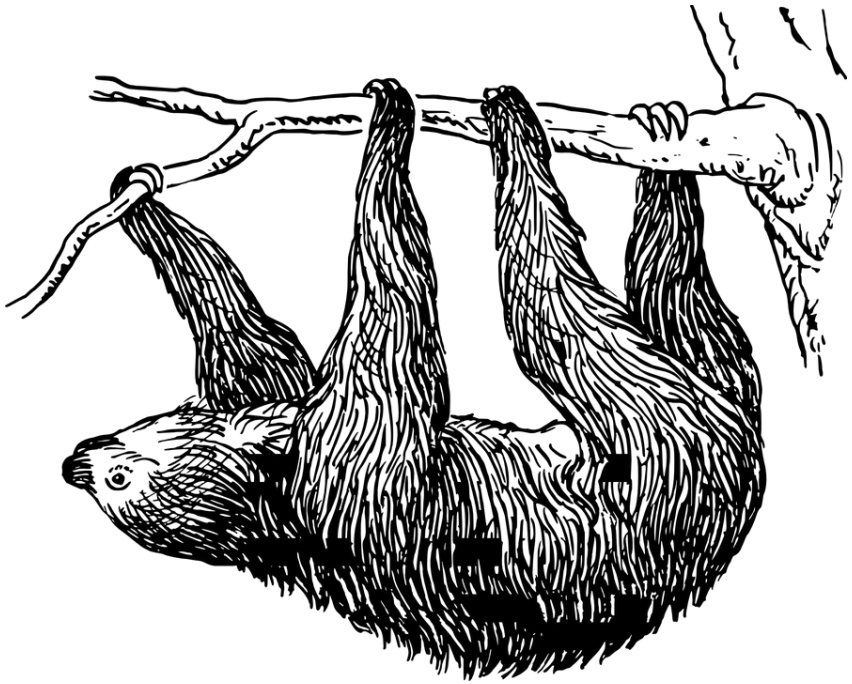
WHAT IS IPFS?

- IPFS stands for Interplanetary File System
- IPFS is a distributed system for storing and accessing files, websites, applications, and data. - IPFS.io

IPFS IN ACTION

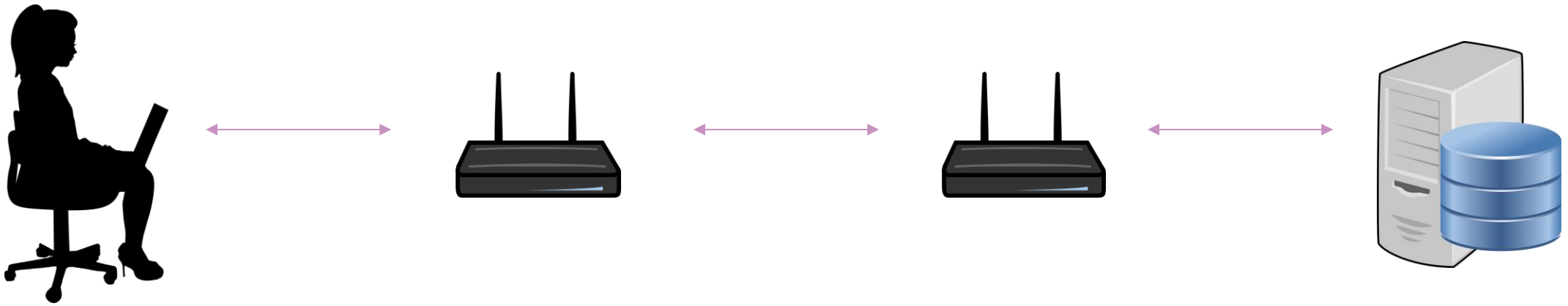
Let's say you're doing some research on sloths. You might start by visiting the Wikipedia page on sloths at:

https://en.wikipedia.org/wiki/Sloth



IPFS IN ACTION

When you request that URL in your browser, your computer requests the Sloth page from Wikipedia's servers, which could be on the other side of the country, or even across the globe.



IPFS IN ACTION

There's a mirror of Wikipedia stored on IPFS, and you could use that instead. If you use IPFS, your computer asks to get the Sloth page like this:

ipfs://bafybeiemxf5abjwjbikoz4mc3a3dla6ual3jsgpdr4cjr3oz3evfyavhwq/wiki/Sloth.html

WHY IPFS?

Decentralization, Permanence, Built-In CDN

DECENTRALIZATION

Decentralization is a cornerstone of the IPFS architecture.

Supports a resilient internet.

- If someone attacks Wikipedia's web servers or an engineer at Wikipedia makes a big mistake that causes their servers to catch fire, you can still get the same webpages from somewhere else.

PERMANENCE

Makes it harder to censor content.

- Files on IPFS can come from many places, it's harder for anyone (whether they're states, corporations, or someone else) to block things.
- Information can be preserved, no more 404's!

BUILT-IN CDN

Can speed up the web when you're far away or disconnected.

- Did your neighbor already visit the Sloth page yesterday?
- Fetch it from them instead of all the way from Wikipedia's servers.
- Enables anyone to run and contribute to a global CDN. No complex infrastructure necessary.

ADDRESSING

Location-based vs. Content-based addressing

LOCATION ADDRESSING

The traditional model of addressing content on the web uses DNS and HTTP to deliver content.

- Clients ask a DNS server for which IP addresses belong to a domain
- Clients request the content by location from these IP addresses
- Server replies with the requested content, or some other response (hopefully not an error)

LOCATION ADDRESSING

Traditional URLs look like:

- https://news.ycombinator.com
- https://en.wikipedia.org/wiki/Sloth

These URLs are mapping content to a specific *location.*

Here, we are asking *where* a file is.

CONTENT ADDRESSING

Instead of being location-based, IPFS addresses a file by *what's in it*, or by its *content*.

- IPFS URLs look like ipfs://QmXoypizjW3Wkn…DDP1mXWo6uco
- The content identifier above is a *cryptographic hash* of the content at that address.
- This allows you to verify that you got what you asked for — bad actors can't just hand you content that doesn't match.

CONTENT ADDRESSING

Because the address of a file in IPFS is created from the content itself, links in IPFS can't be changed.

- If the text on a web page is changed, the new version gets a new, different address.
- Content can't be moved to a different address. On today's internet, a company could reorganize content on their website and move a page at http://mycompany.com/what_we_do to http://mycompany.com/services.
- In IPFS, the old link you have would still point to the same old content.

INSTALLING AN IPFS CLIENT

IPFS Desktop, Browser, JavaScript and GO Clients

IPFS IN GO AND JAVASCRIPT

The go-ipfs project is the main full-node solution for running an IPFS node - https://github.com/ipfs/go-ipfs

IPFS can also be built into any web application using the js-ipfs library - https://js.ipfs.io/

IPFS DESKTOP

You can find desktop GUI clients of IPFS for every platform at https://ipfs.io/#install

IPFS BROWSER

https://addons.mozilla.org/en-US/firefox/addon/ipfs-companion/

DEMO TIME!

Enough talk – show me the code!

RESOURCES

What is IPFS? (2020, September 14). Retrieved October 15, 2020, from https://docs.ipfs.io/concepts/what-is-ipfs/