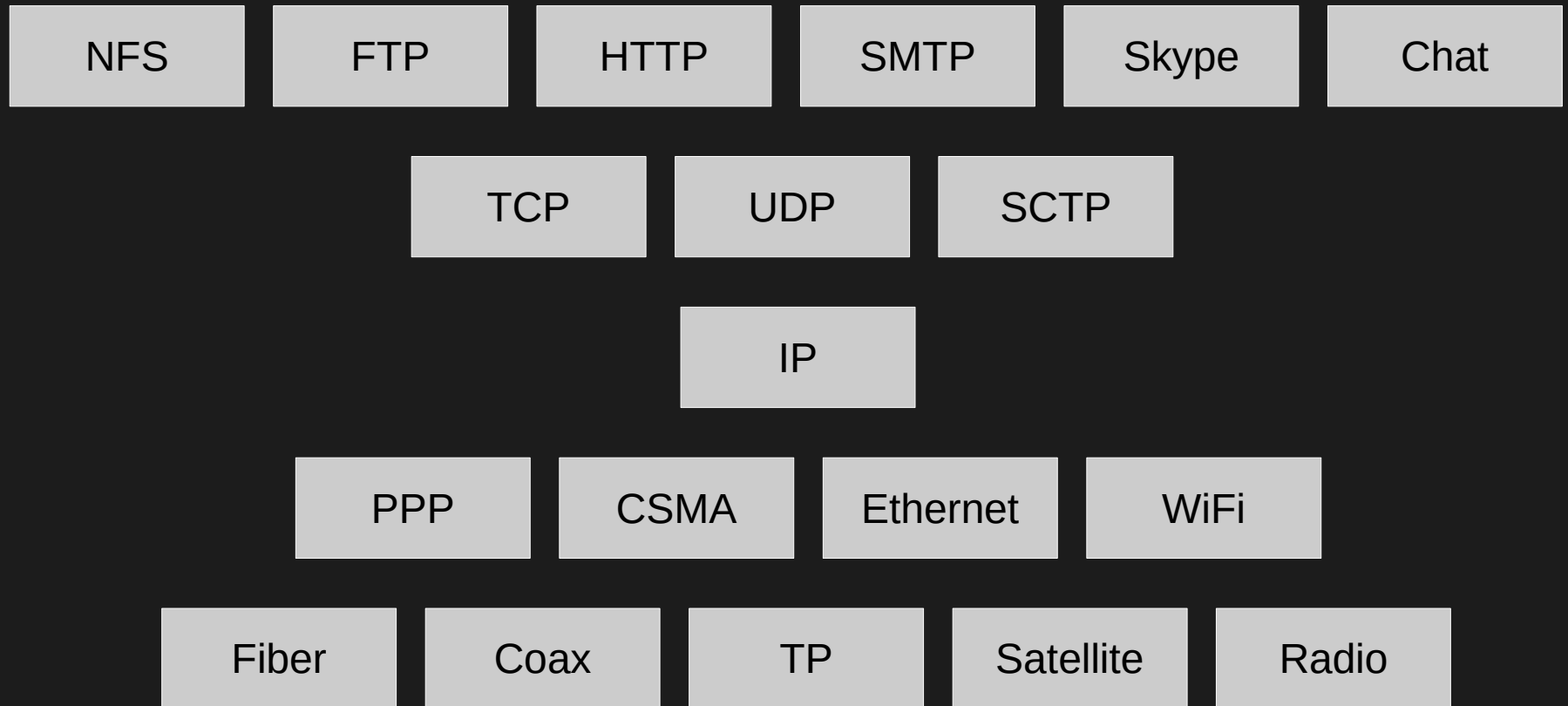# the InterPlanetary File System
"the Permanent Web"

IPFS

- Many names
  - The permanent web
  - The Merkle web
  - The distributed web
- Intent
  - Protocol upgrade to Internet and WWW
  - Decentralization, resilience, versioning, zero-duplication, speed

Current State of Internet

NFS	FTP	HTTP	SMTP	Skype	Chat

TCP	UDP	SCTP

IP

PPP	CSMA	Ethernet	WiFi

Fiber	Coax	TP	Satellite	Radio

IPFS
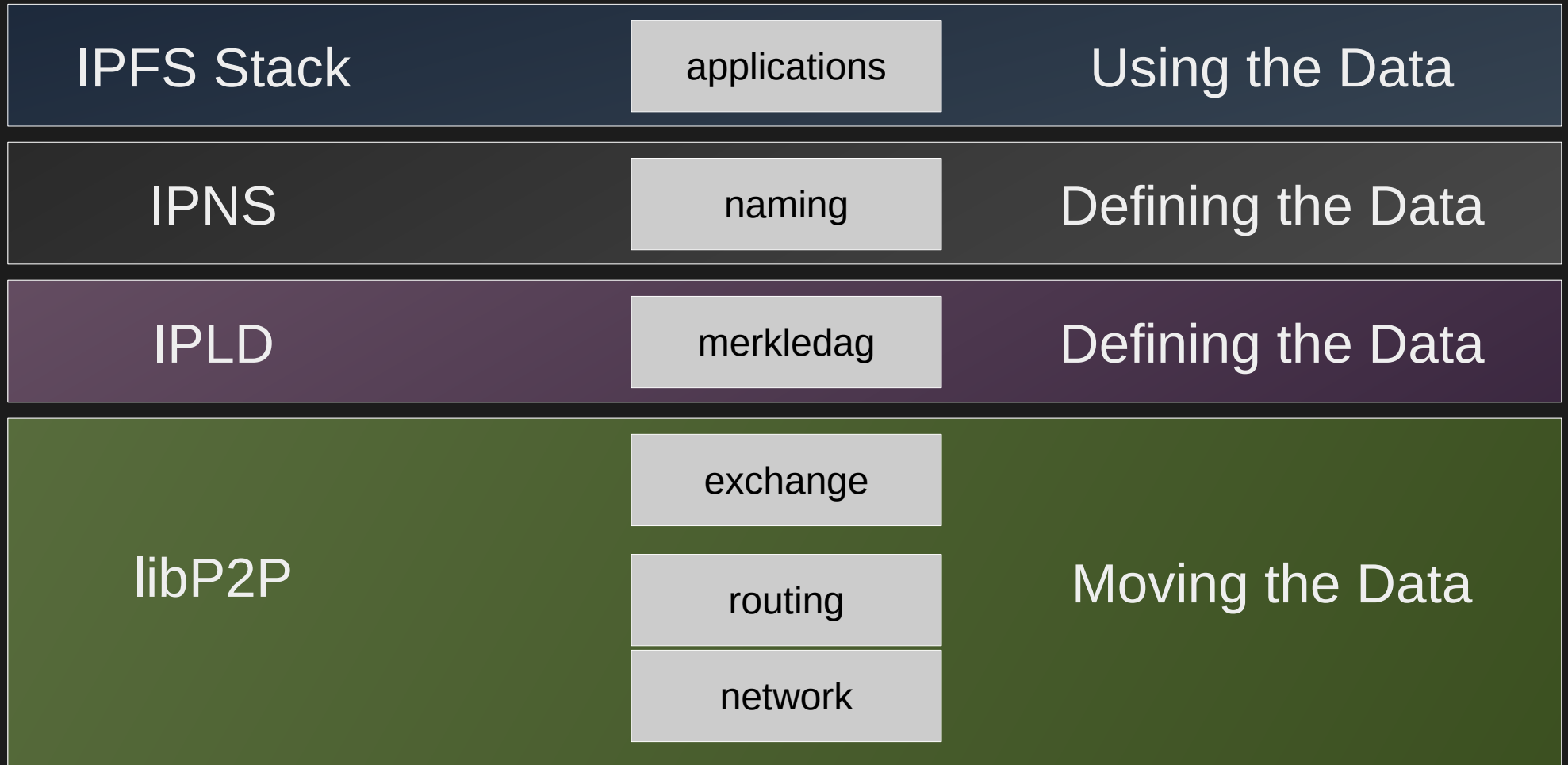
- Combines
  - www
  - SFS
  - Git
  - BitTorrent
  - DHT
  - Other protocols

- Applications
- Naming
- Merkledag*
- Exchange
- Routing
- Network
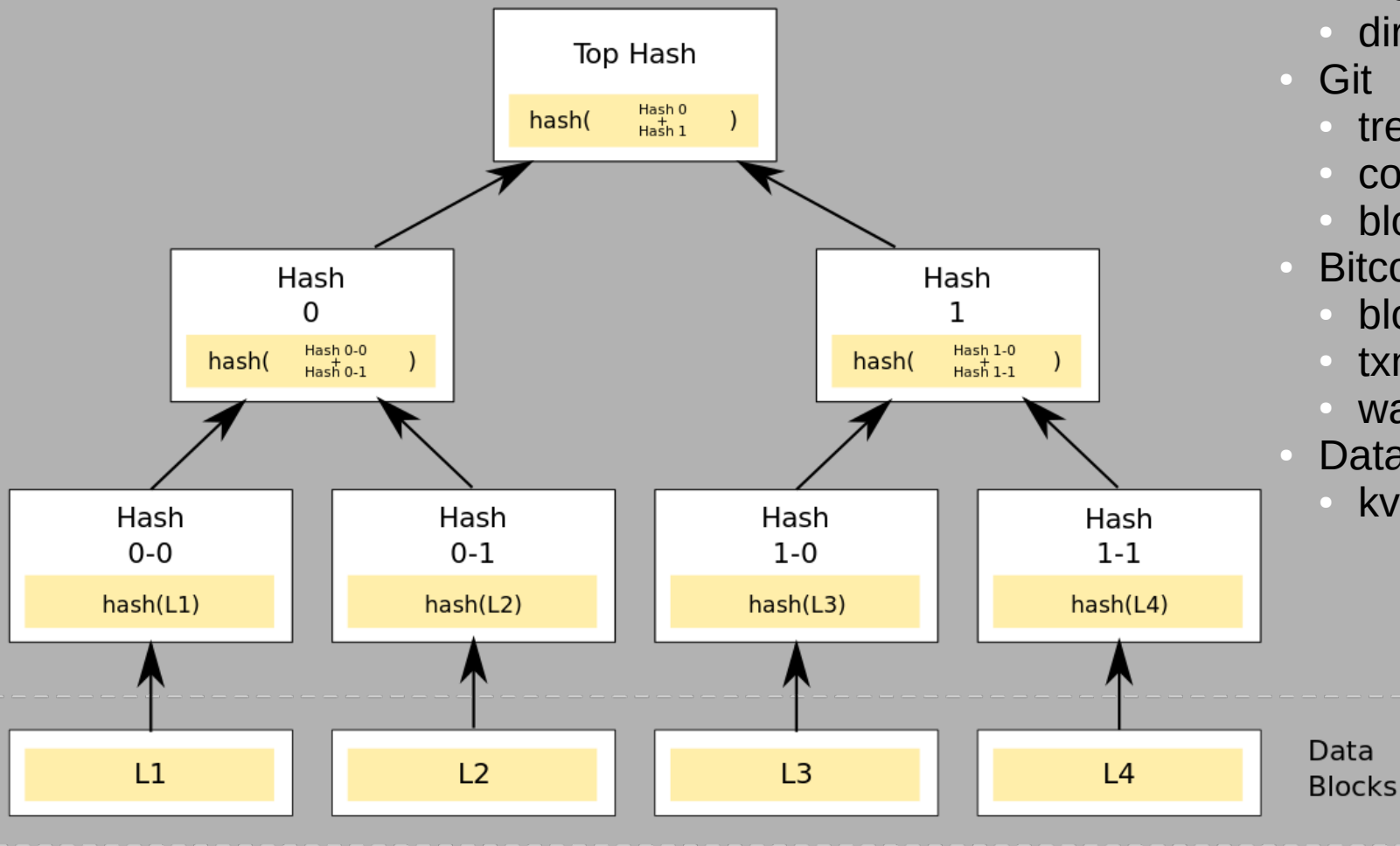
* dag (directed acyclic graph)

IPFS

IPFS Stack	applications	Using the Data
IPNS	naming	Defining the Data
IPLD	merkledag	Defining the Data
libP2P	exchange routing network	Moving the Data

IPFS

Framework designed to be modular

applications	Etherpad	VLC	Git	Bitcoin	Chat

naming	DNS	IPNS	Namecoin

	merkledag

exchange		BitTorrent	Bitswap	FTP	HTTP	
routing	Gossip	Chord	Kad DHT	mDNS	Delegated	I2P	TOR
network	CJDNS	UDT	uTP	WebRTC	QUIC	TCP	WebSockets	I2P	TOR

Source: ipfs.io; Juan Benet - *IPFS and the Permanent Web*

Merkle Tree

- Unix
  - files (dag nodes)
  - dirs (dag nodes)
- Git
  - tree
  - commit
  - blob
- Bitcoin
  - blocks
  - txns
  - wallets
- Data
  - kv-stores

Source: Wikimedia; Juan Benet - *IPFS and the Permanent Web*

IPFS

http://example.com/foo/bar/baz.png

http://10.20.30.40/foo/bar/baz.png

location   path

Using multi-hash to update pointers over time

Can also use external keys

Resolve paths via hash

Mount entire system

ipns/example.com/foo/bar/baz.png

key pair w/ pub as reference

ipns/QmYJPtosPTfoC/foo/bar/baz.png

pointer signed w/ private key

ipns/QmW98pJrc6FZ6/foo/bar/baz.png

content   path

Source: ipfs.io; Juan Benet - *IPFS and the Permanent Web*

IPFS

- HTML5 + CSS3 + JS
  - Go and JS installs available
  - Python under development
- Each file has unique hash
- Remove duplicates & versions every file
- Nodes only store the content it wants
- Find/Search files by their hash
- Human readable via IPNS
  - InterPlanetary Naming System

Source: ipfs.io; Juan Benet - *IPFS and the Permanent Web*

IPFS

- Uses
  - Archiving (versioning, persistence)
  - Services (e.g., DaaS)
  - Research (censorship-resistance)
  - Austere Utility (offline usage)
  - Blockchains compatible

IPFS

- Resources
  - ipfs.io
    - https://gateway.ipfs.io/ipfs/QmYwAPJzv5CZsnA625s3Xf2nemtYgPpHdWEz79ojWnPbdG/readme
    - https://gateway.ipfs.io/ipfs/QmYwAPJzv5CZsnA625s3Xf2nemtYgPpHdWEz79ojWnPbdG/quick-start
  - https://github.com/ipfs/ipfs
  - Build Raspberry Pi node (super simple and cheap)
    - http://www.siliconian.com/blog/16-bitcoin-blockchain/23-beginner-s-guide-to-installing-ipfs-on-a-raspberry-pi-2

IPFS

Please Contribute to / Use the Project!

Thanks!