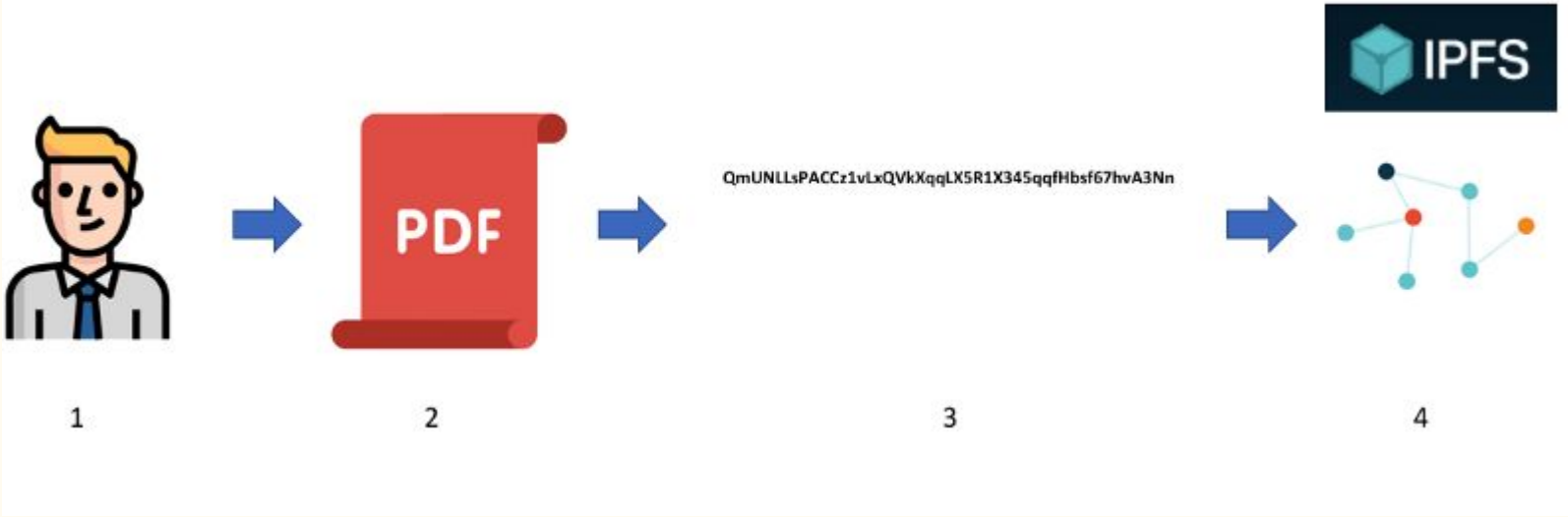
InterPlanetary File System

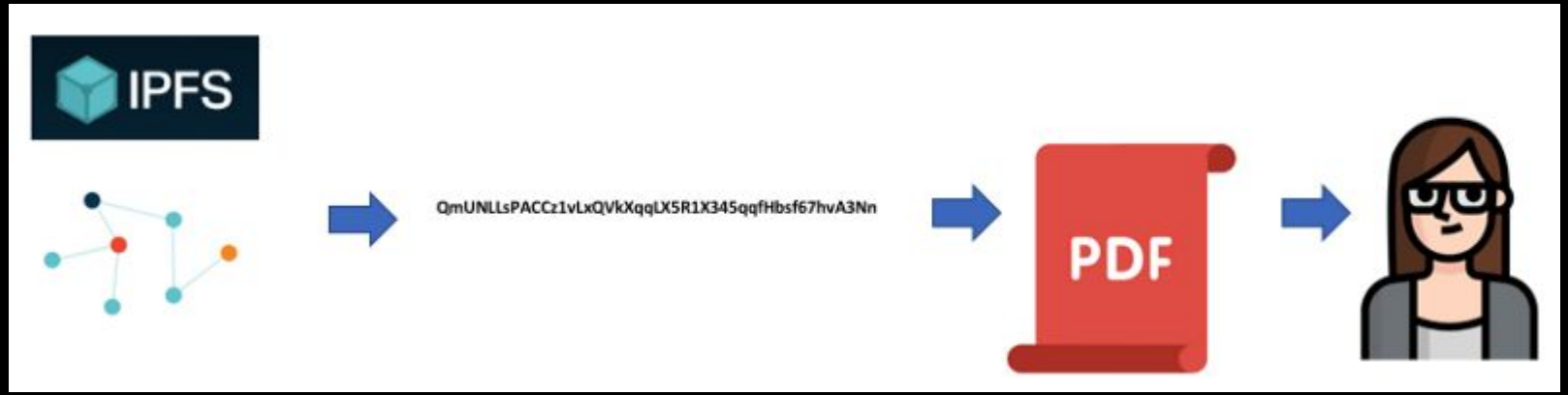
—

“IPFS is a distributed file system that seeks to connect all computing devices with the same system of files”

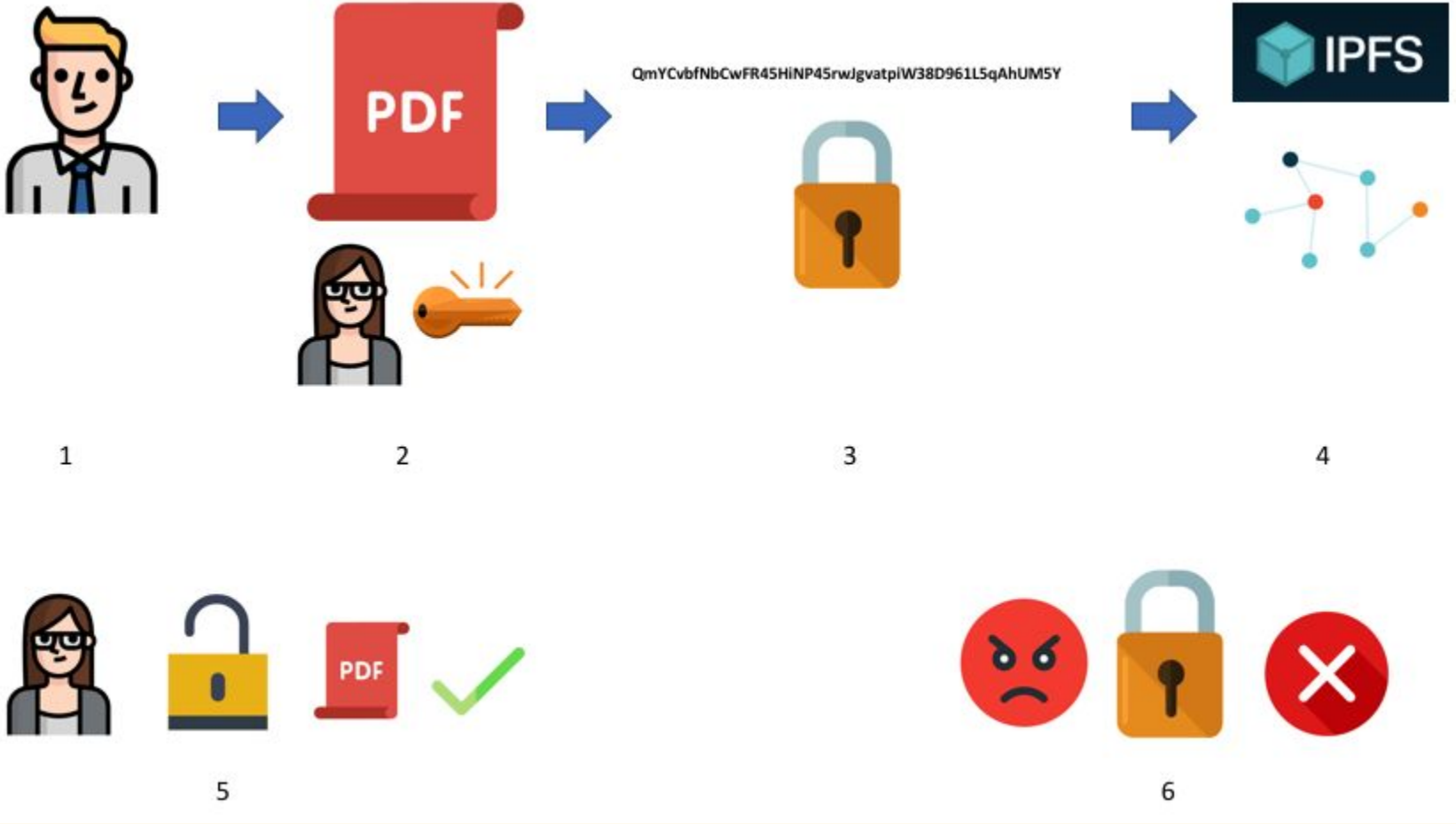
What's so interplanetary about this?

Transfer of file using IPFS
VS
Transfer of file using HTTP


IPFS
PDF
QmUNLLsPACCz1vLxQVkXqqLX5R1X345qqfHbsf67hvA3Nn
1
2
3
4


IPFS
QmUNLLsPACCz1vLxQVkXqqLX5R1X345qqfHbsf67hvA3Nn
PDF

Security HOLE!!!


PDF
QmYCvbfNbCwFR45HiNP45rwJgvatpiW38D961L5qAhUM5Y
IPFS
PDF
1
2
3
4
5
6

HTTP downloads a file from a single computer at a time, instead of getting pieces from multiple computers simultaneously. With video delivery, a P2P approach could save 60% in bandwidth costs.

IPFS makes it possible to distribute high volumes of data with high efficiency. And zero duplication means savings in storage.

IPFS STRUCTURE

IPFS Objects

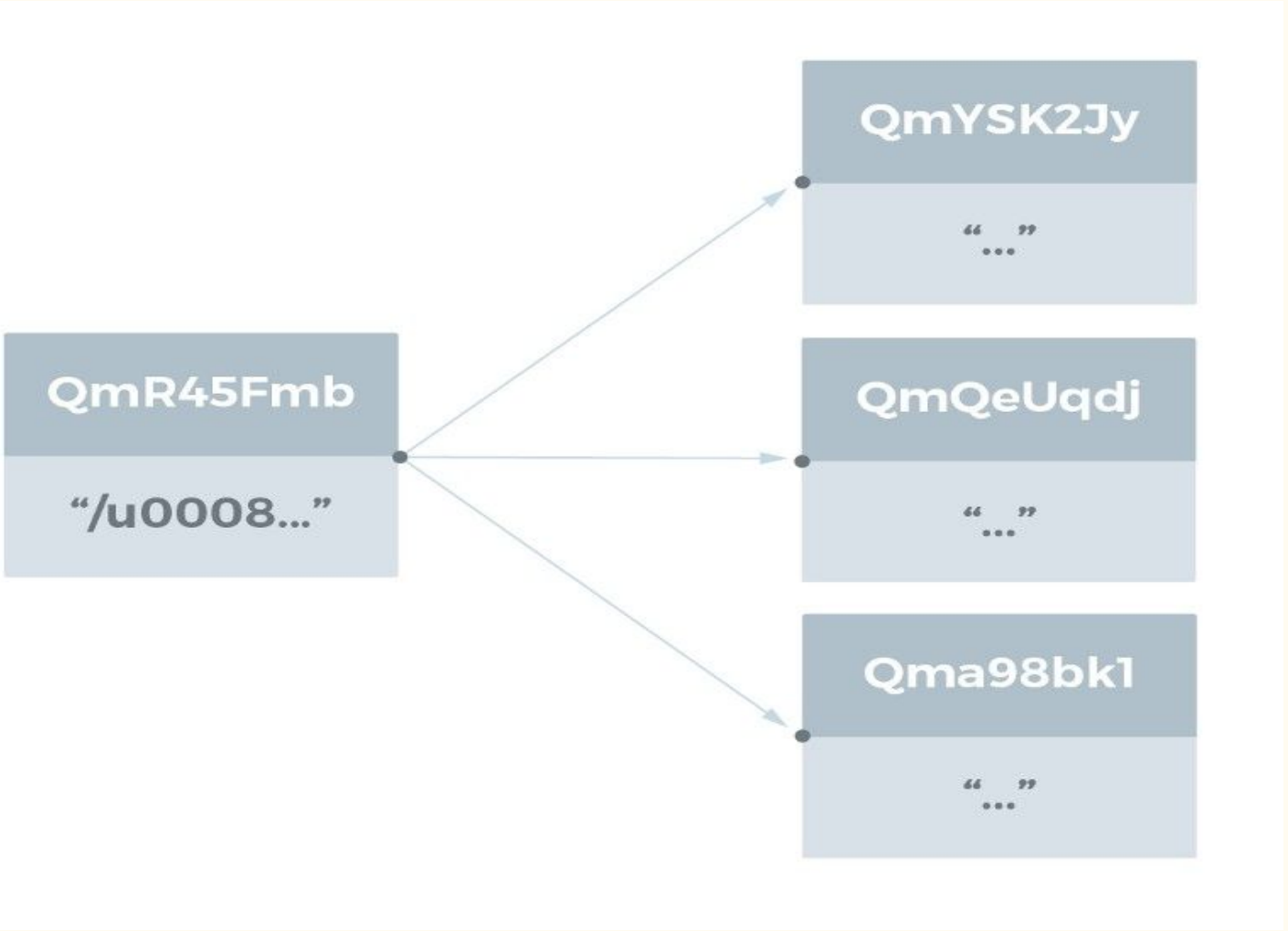
IPFS object is a data structure with two fields:

- *Data*—a blob of unstructured binary data of size < 256 kB.
- *Links*—an array of Link structures. These are links to other IPFS objects.

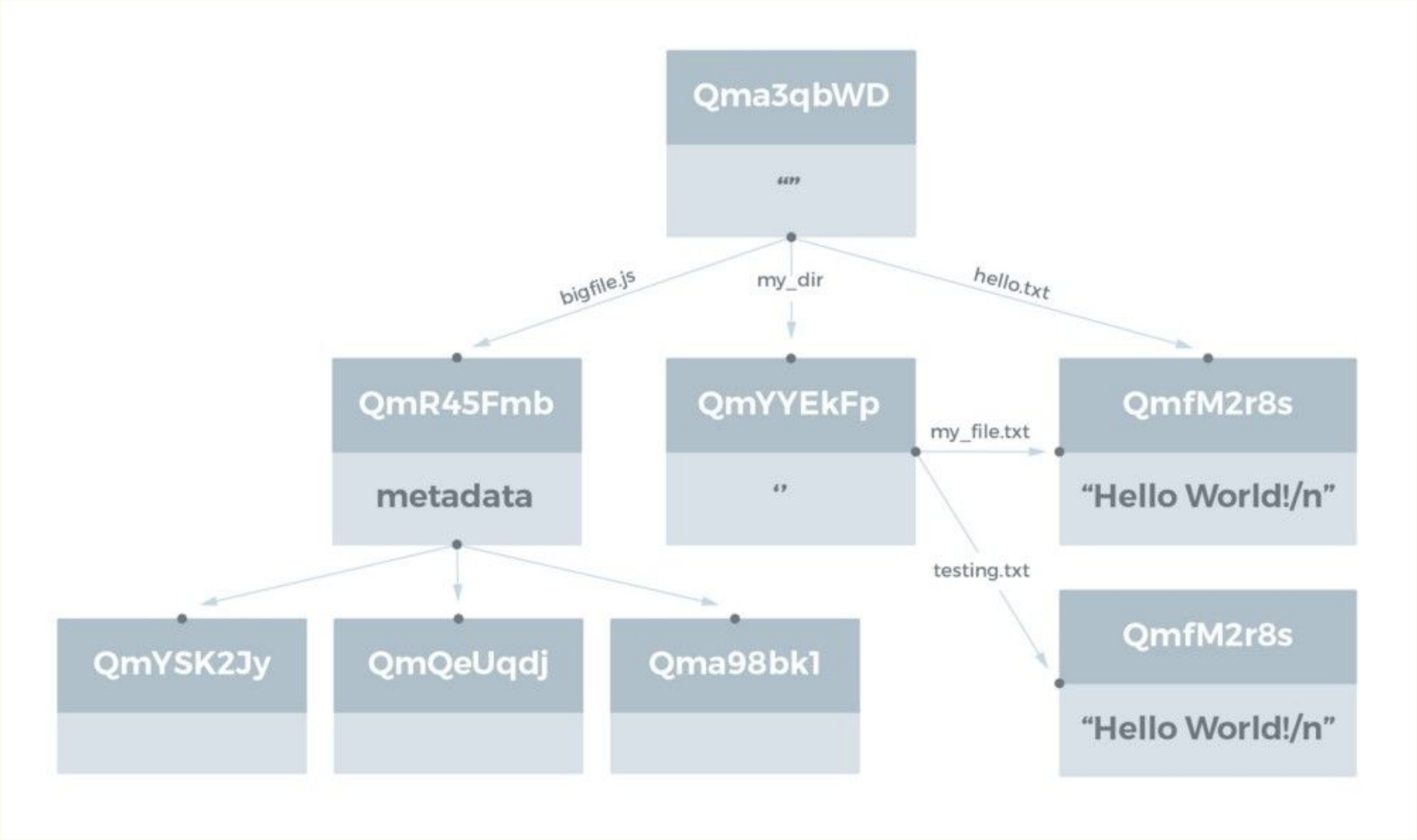
A Link structure has three data fields:

- *Name*—the name of the Link.
- *Hash*—the hash of the linked IPFS object.
- *Size*—the cumulative size of the linked IPFS object, including following its links.

```
chris@chris-VBox:~/tmp$ ipfs object get
QmR45FmbVVrixReBwJkhEKde2qwHYaQzGxu4ZoDeswuF9w
{“Links”: [{
“Name”: “”,
“Hash”: “QmYSK2JyM3RyDyB52caZCTKFR3HKniEcMnNJYdk8DQ6KKB”,
“Size”: 262158},
{“Name”: “”,
“Hash”: “QmQeUqdjFmaxuJewStqCLUoKrR9khqb4Edw9TfRQQdfWz3”,
“Size”: 262158},
{“Name”: “”,
“Hash”: “Qma98bk1hjiRZDTmYmfiUXDj8hXXt7uGA5roU5mfUb3sVG”,
“Size”: 178947}],
“Data”: “\u0008\u0002\u0018* \u0010 \u0010 \n”}
```


QmR45Fmb
"/u0008..."
QmYSK2Jy
"..."
QmQeUqdj
"..."
Qma98bk1
"..."

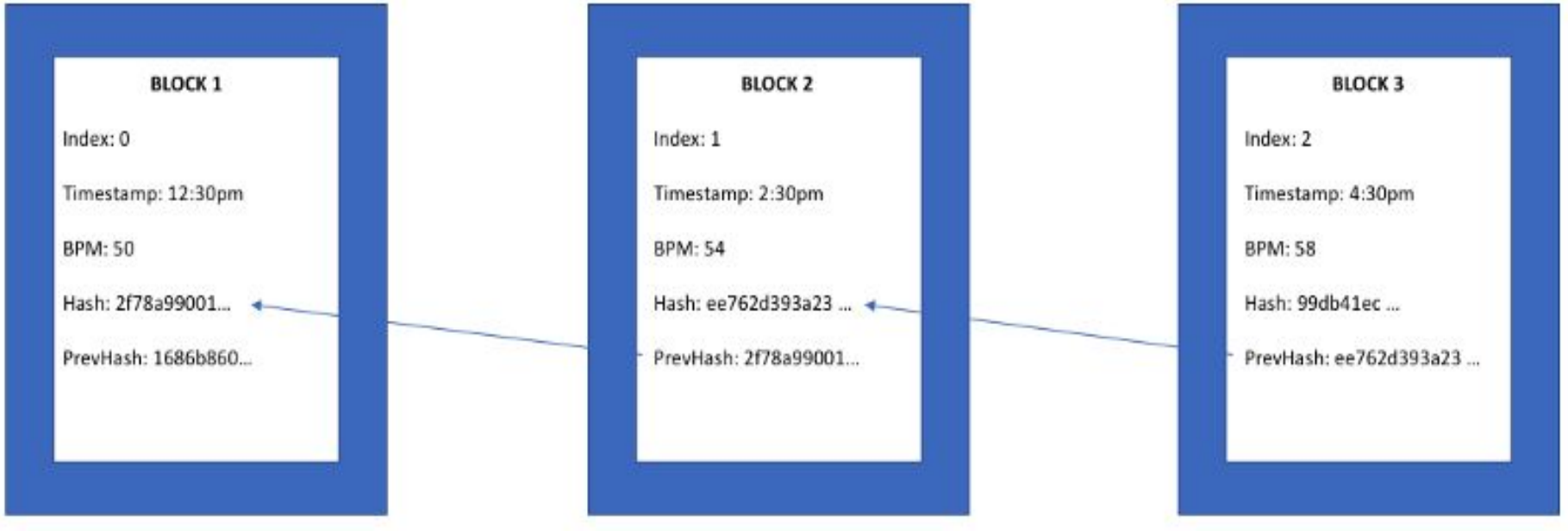
AVOIDING DUPLICATION

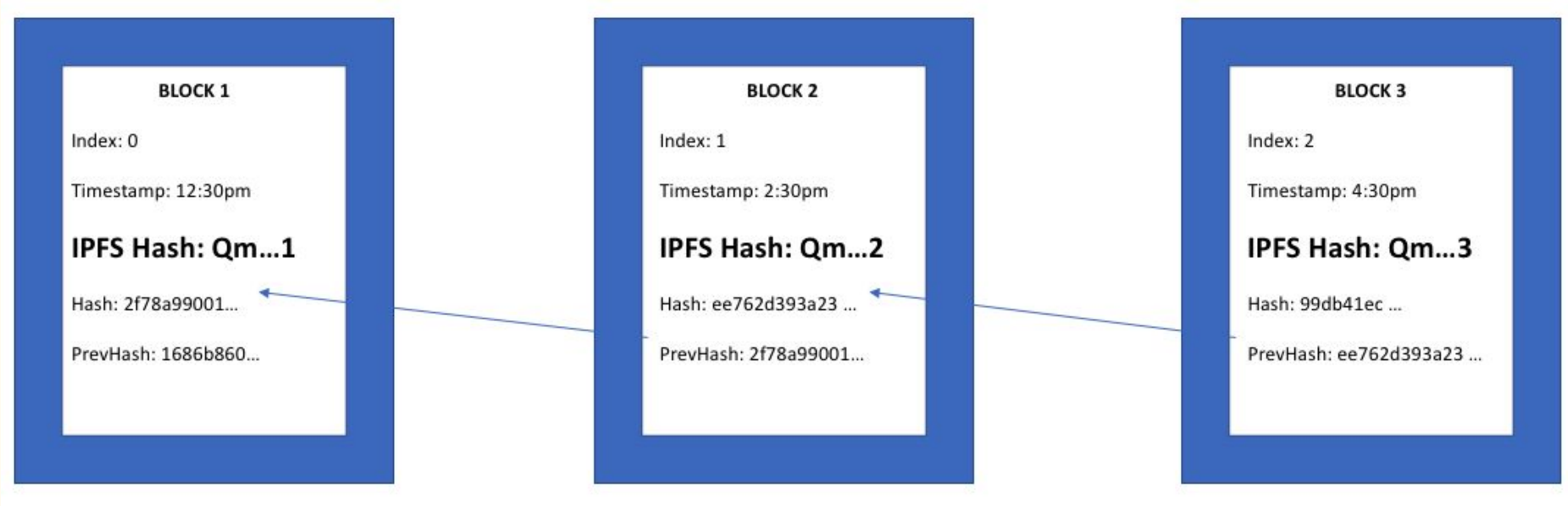

Qma3qbWD
“”
bigfile.js
my_dir
hello.txt
QmR45Fmb
metadata
QmYYEkFp
”
QmfM2r8s
“Hello World!/n”
my_file.txt
testing.txt
QmYSK2Jy
QmQeUqdj
Qma98bk1
QmfM2r8s
“Hello World!/n”

BLOCKCHAIN

We assume a simplistic model of a blockchain where each block contains the following data:

- A list of transaction objects
- A link to the previous block
- The hash of a state tree/database


BLOCK 1
Index: 0
Timestamp: 12:30pm
BPM: 50
Hash: 2f78a99001...
PrevHash: 1686b860...
BLOCK 2
Index: 1
Timestamp: 2:30pm
BPM: 54
Hash: ee762d393a23 ...
PrevHash: 2f78a99001...
BLOCK 3
Index: 2
Timestamp: 4:30pm
BPM: 58
Hash: 99db41ec ...
PrevHash: ee762d393a23 ...


BLOCK 1
Index: 0
Timestamp: 12:30pm
IPFS Hash: Qm...1
Hash: 2f78a99001...
PrevHash: 1686b860...
BLOCK 2
Index: 1
Timestamp: 2:30pm
IPFS Hash: Qm...2
Hash: ee762d393a23 ...
PrevHash: 2f78a99001...
BLOCK 3
Index: 2
Timestamp: 4:30pm
IPFS Hash: Qm...3
Hash: 99db41ec ...
PrevHash: ee762d393a23 ...

FAQS:-

1. Are the blocks stored locally on my system too?
2. Where else is the data stored? On other peers that I am connected to? Because I'm still able to access the file if I close my ipfs daemon.
3. If this is true, and data is stored at several places, possibility of losing my data is still there, if all the peers disconnect from the network?
4. Does every peer on the network store the entire file or just a part of the file?
5. If copy of data is being distributed across the p2p network, it means the data is being duplicated multiple times? How is this efficient in terms of storage?
6. We store data uploaded by other peers too?
7. Minimum System requirements for running IPFS? We just need abundant storage, not necessarily a powerful system?

Thank You