Hyper Ecosystem

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Hyperdivison

Crypto(logy), Math
Dist. Sys.

Core Modules


dat
DATA

```
npm install hypercore
```

Problem:
p2p data feed

```
const hypercore = require('hypercore')

const feed = hypercore('./data')

feed.ready(function (err) {
  if (err) throw err

  console.log(feed.key.toString('hex'))
})
```

```
const hypercore = require('hypercore')

const feed = hypercore('./data')

feed.append(Buffer.from('hello world'))
```

```
const hypercore = require('hypercore')

const feed = hypercore('./data',
{valueEncoding: 'json'})

feed.append({
  symbol: 'BTCUSD',
  ask: 7000,
  bid: 6999
})
```

```
const hypercore = require('hypercore')

const feed = hypercore('./data',
{valueEncoding: 'json'})

feed.get(2, function (err, data) {
  if (err) throw err
  console.log(data)
})
```

```
const hypercore = require('hypercore')

const key = Buffer.from('...', 'hex')
const feed = hypercore('./copy', key,
{valueEncoding: 'json'})

var stream = feed.createReadStream({live: true})

stream.on('data', data => console.log(data))
```

```
const hypercore = require('hypercore')

const key = Buffer.from('...', 'hex')
const feed = hypercore('./copy', key, {valueEncoding:
'json'})

pump(
  transport,
  feed.replicate({live: true}),
  transport,
  function ondone (err) {
    if (err) throw err
  }
)
```

DEMO

```
const WebSocket = require('uws')
const hypercore = require('hypercore')
const swarm = require('hyperdiscovery')

const feed = hypercore('./ticker-data', {valueEncoding: 'json'})

feed.once('ready', () => console.log(feed.key.toString('hex')))
feed.once('ready', () => swarm(feed))

const sock = new WebSocket('wss://api.bitfinex.com/ws')

sock.onopen = function () {
  sock.send(JSON.stringify({
    event: 'subscribe',
    channel: 'ticker',
    pair: 'BTCUSD'
  }))
}

var dataChannel = null
sock.onmessage = function (raw) {
  var msg = JSON.parse(raw.data)

  console.log(msg)
  if (msg[0] === dataChannel && msg[1] !== 'hb') return feed.append([msg])
  if (msg.event && msg.event === 'subscribed') dataChannel = msg.chanId
}
```

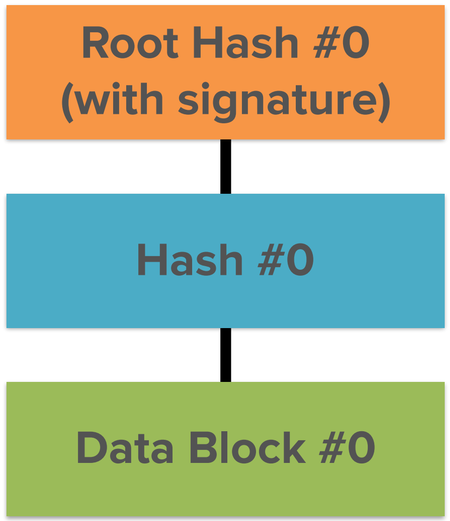
Public Key is read capability

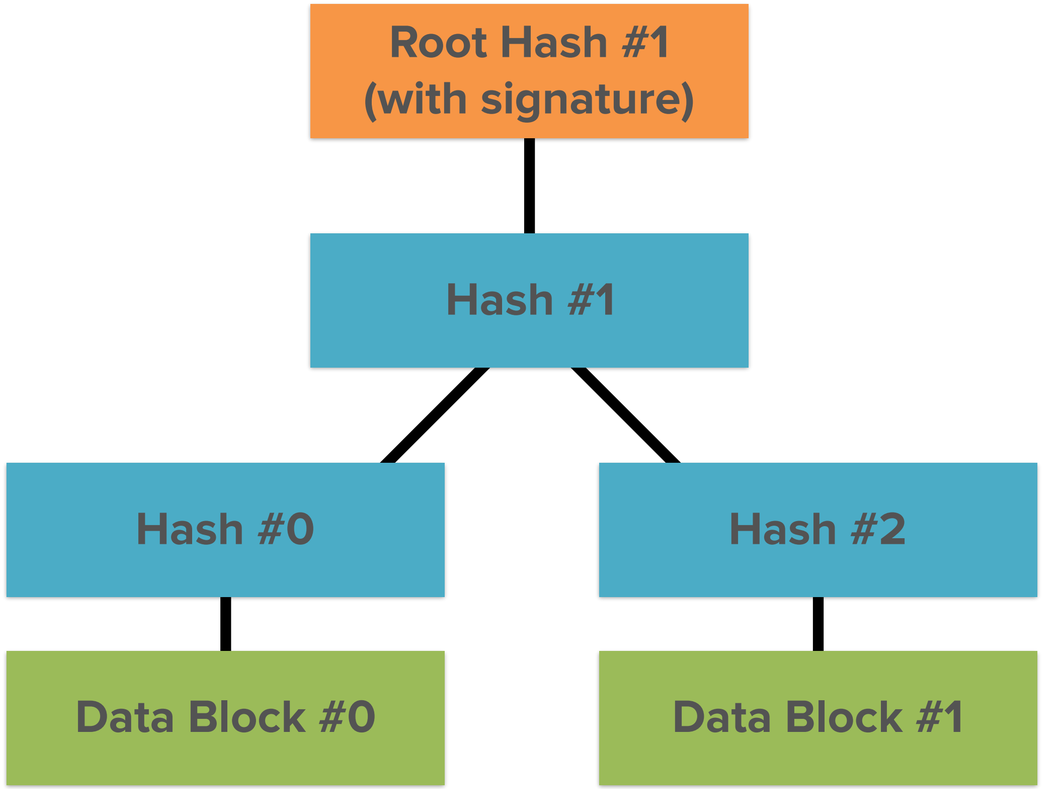
Secret Key is write capability

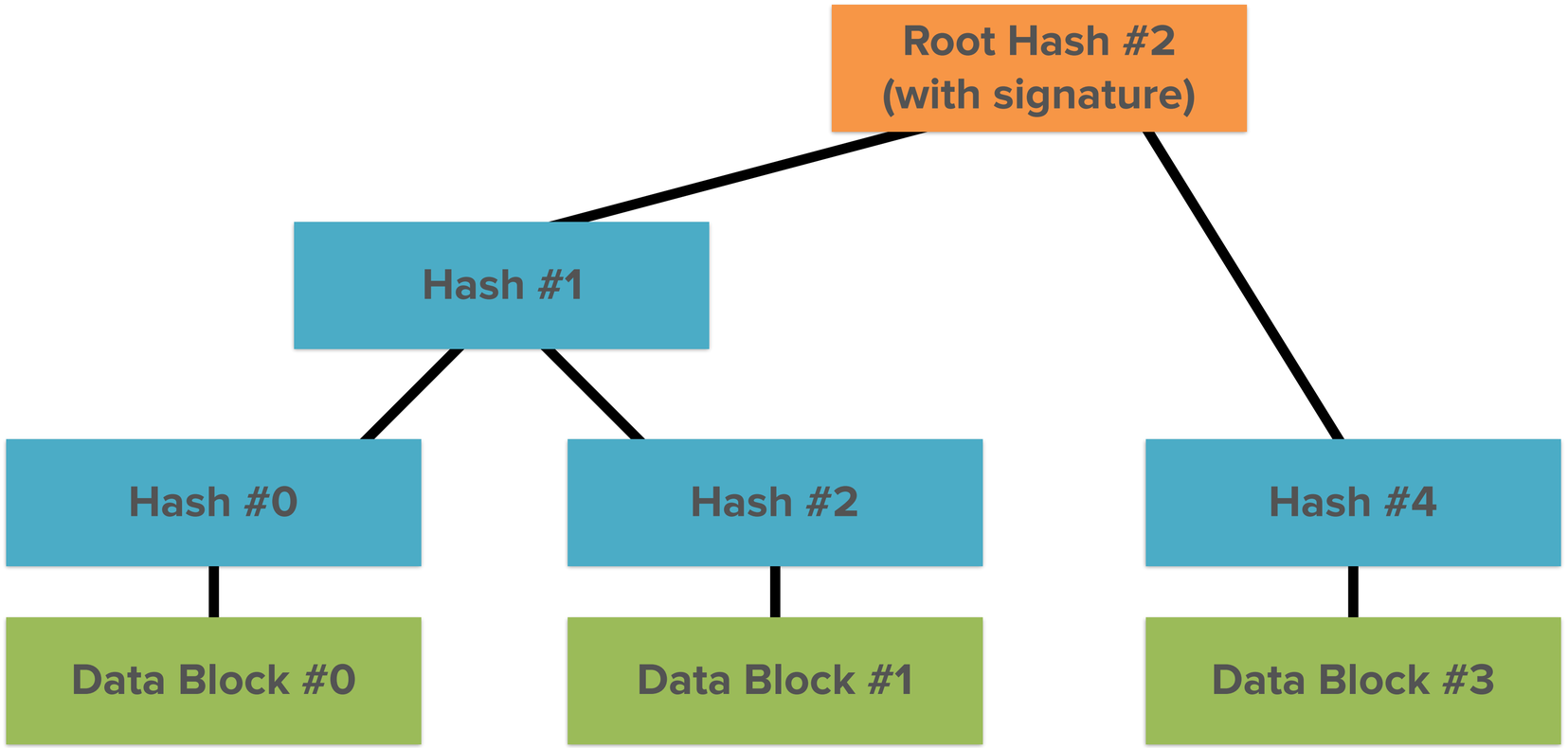
Still single-writer

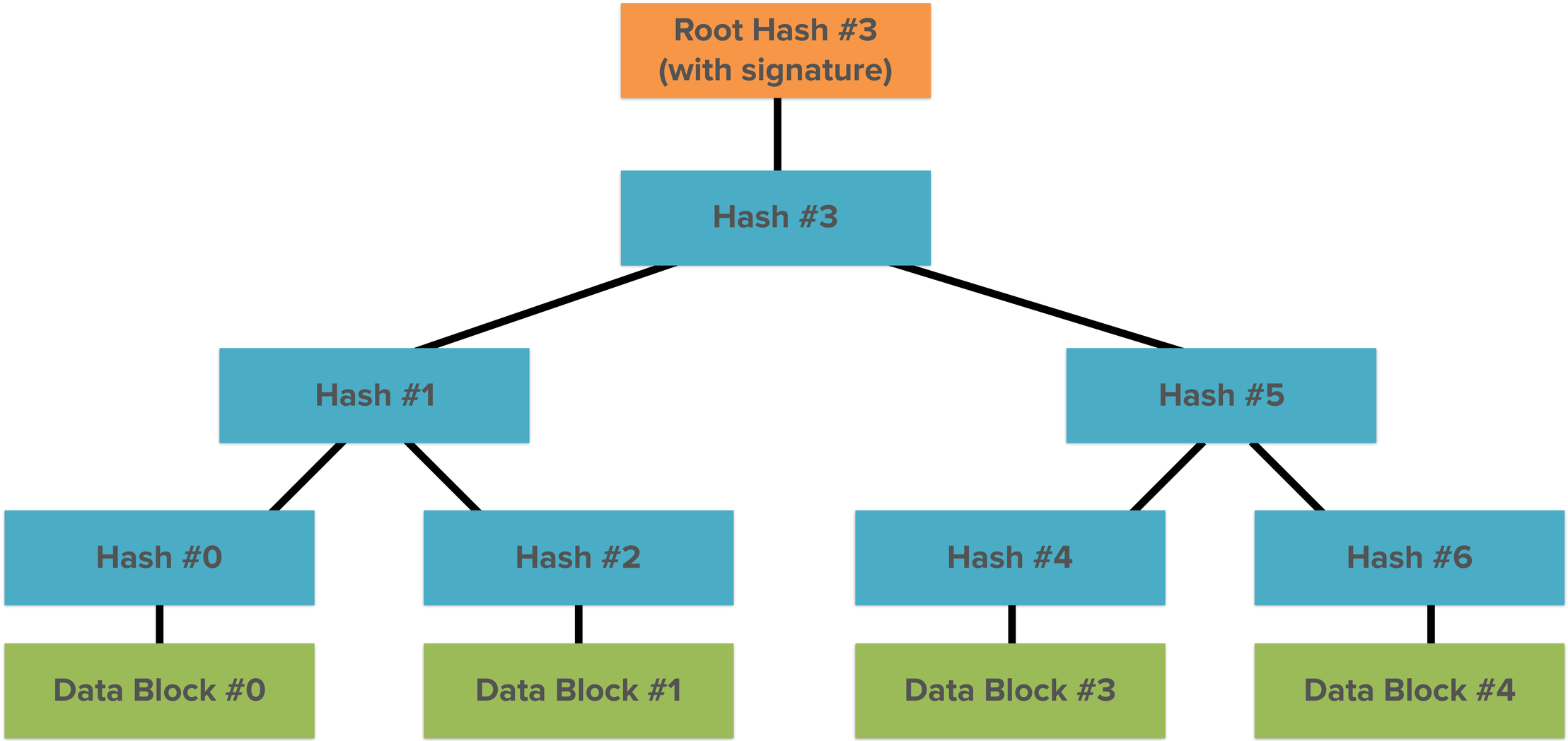
Authentication with Merkle Tree

Data Block #0


Root Hash #0
(with signature)
Hash #0
Data Block #0


Root Hash #1
(with signature)
Hash #1
Hash #0
Hash #2
Data Block #0
Data Block #1


Root Hash #2
(with signature)
Hash #1
Hash #0
Hash #2
Hash #4
Data Block #0
Data Block #1
Data Block #3


Root Hash #3
(with signature)
Hash #3
Hash #1
Hash #5
Hash #0
Hash #2
Hash #4
Hash #6
Data Block #0
Data Block #1
Data Block #3
Data Block #4

Means any peer can copy for any other peer

```
npm install hyperdiscovery
```

```
const hypercore = require('hypercore')
const hyperdiscovery = require('hyperdiscovery')

const key = Buffer.from('...', 'hex')
const feed = hypercore('./copy', key,
{valueEncoding: 'json'})

feed.ready(function () {
  hyperdiscovery(feed)
})
```

Announce
`blake2b(pk,'hypercore')`
on Mainline DHT

Broadcast on mDNS

(locally and predefined DNS servers)

```
npm install hyperdb
```

```
const hyperdb = require('hyperdb')
const hyperdiscovery = require('hyperdiscovery')

const db = hyperdb('./my.db', {
  valueEncoding: 'utf8',
  reduce: (a, b) => a // conflict resolution
})

hyperdiscovery(db)

db.put('/hello', 'world', function (err) {
  if (err) throw err
  db.get('/hello', function (err, node) {
    if (err) throw err
    console.log('/hello --> ' + node.value)
  })
})
```

```
var hyperdb = require('hyperdb')

var db = hyperdb('./my.db', {valueEncoding: 'utf-8'})

db.ready(function () {
  var aliceKey = db.key
})

db.authorize(bobKey, function (err) {
  if (err) throw err

  // Bob can now also an admin to the database
  // This trust is propagated to peers
})
```

```
var hyperdb = require('hyperdb')

var db = hyperdb('./my.db', {valueEncoding:
'utf-8'})

db.list('/tokens', function (err, tokens) {
  console.log(tokens)
})
```

Path like keys

`/token/btc/ticker`

HAMT makes random-access on keys efficient

Multiwriter!

Applications

Hyperpipe

```
# Pipe logs into a hypercore
$ ./server | hyperpipe /var/logs/server
KEY

# Pipe into a local log file
$ hyperpipe /tmp/hyperpipe KEY > logs.txt
```

```
var hypercore = require('hypercore')
var hyperdiscovery = require('hyperdiscovery')
var dataDir = process.argv[2]
var key = process.argv[3]
var feed = hypercore(dataDir, key)

feed.on('ready', function () {
  var swarm = hyperdiscovery(feed)

  if (!feed.writable) {
    pump(feed.createReadStream({live: true}), process.stdout, ondone)
  } else {
    console.error(feed.key.toString('hex'))
    pump(process.stdin, feed.createWriteStream(), ondone)
  }

  ondone (err) {
    swarm.close()

    if (err) {
      console.error(err)
      process.exit(1)
    }
  }
})
```

Hyperclock

```
var hypercore = require('hypercore')
var sodium = require('sodium-native')
var feed = hypercore('./hyperclock', {valueEncoding: 'json'})

var nonce = Buffer.alloc(32)
var interval = 5 * 60 * 1000 // 5 min
setInterval(function () {
  sodium.randombytes_buf(nonce)
  feed.append({
    ts: Date.now(),
    nonce: nonce.toString('hex')
  })
}, interval)
```

Hypervision

```
const hypercore = require('hypercore')
const recorder = require('media-recorder-stream')
const cluster = require('webm-cluster-stream')
const pump = require('pump')

const feed = hypercore('./hypervision')

// media instanceof MediaStream
const mediaRecorder = recorder(media, {
  interval: 1000,
  videoBitsPerSecond: 800000,
  audioBitsPerSecond: 128000
})

pump(
  mediaRecorder,
  cluster(),
  feed.createWriteStream(),
  function ondone () {}
)
```

Cabal

Hyperdrive

Hypercore-dag

Hypertrie

Append-tree

Multifeed