Connecting Bitcoin Payment Layers

What?

Lightning   Liquid   Rootstock

Mainchain

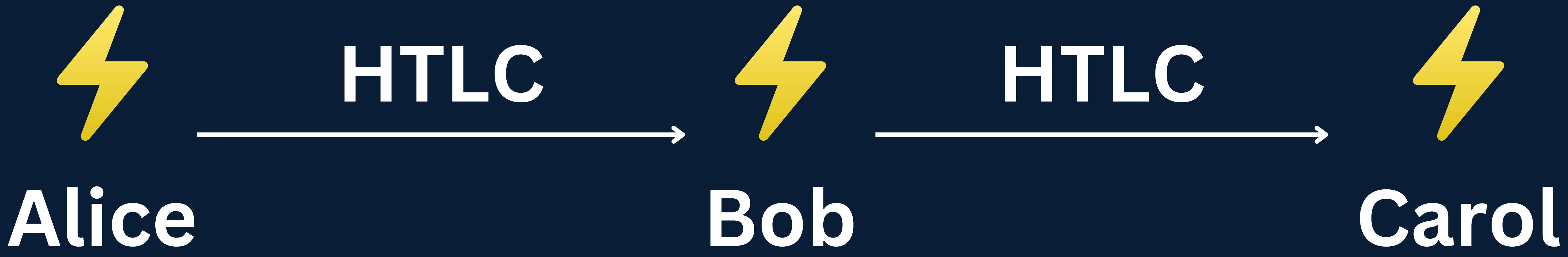
How?

HTLCs

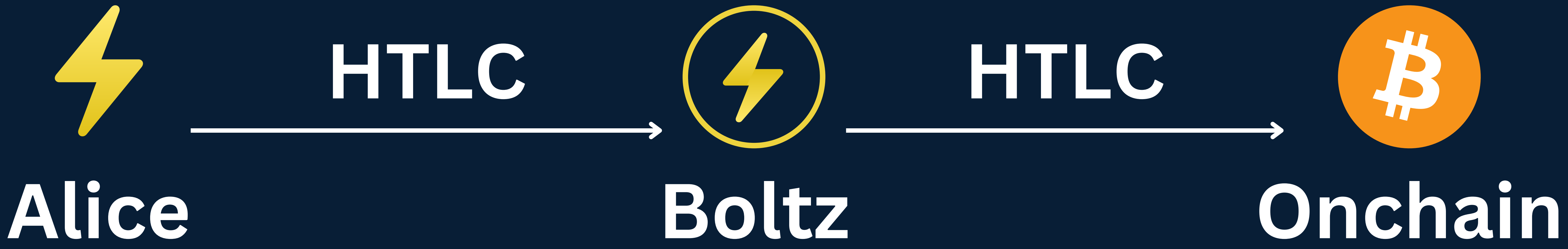
What do we need?

- Hash lock
- Time lock

Payments on Lightning



Swaps on Lightning



SegWit V0

```
OP_SIZE
OP_PUSHBYTES_1 20
OP_EQUAL
OP_IF
  OP_HASH160
  OP_PUSHBYTES_20 <preimage hash>
  OP_EQUALVERIFY
  OP_PUSHBYTES_33 <user public key>
OP_ELSE
  OP_DROP
  OP_PUSHBYTES_3 <timeout block height>
  OP_CLTV
  OP_DROP
  OP_PUSHBYTES_33 <Boltz public key>
OP_ENDIF
OP_CHECKSIG
```

SegWit V0

Hash lock

```
OP_SIZE
OP_PUSHBYTES_1 20
OP_EQUAL
OP_IF
  OP_HASH160
  OP_PUSHBYTES_20 <preimage hash>
  OP_EQUALVERIFY
  OP_PUSHBYTES_33 <user public key>
OP_ELSE
  OP_DROP
  OP_PUSHBYTES_3 <timeout block height>
  OP_CLTV
  OP_DROP
  OP_PUSHBYTES_33 <Boltz public key>
OP_ENDIF
OP_CHECKSIG
```

SegWit V0

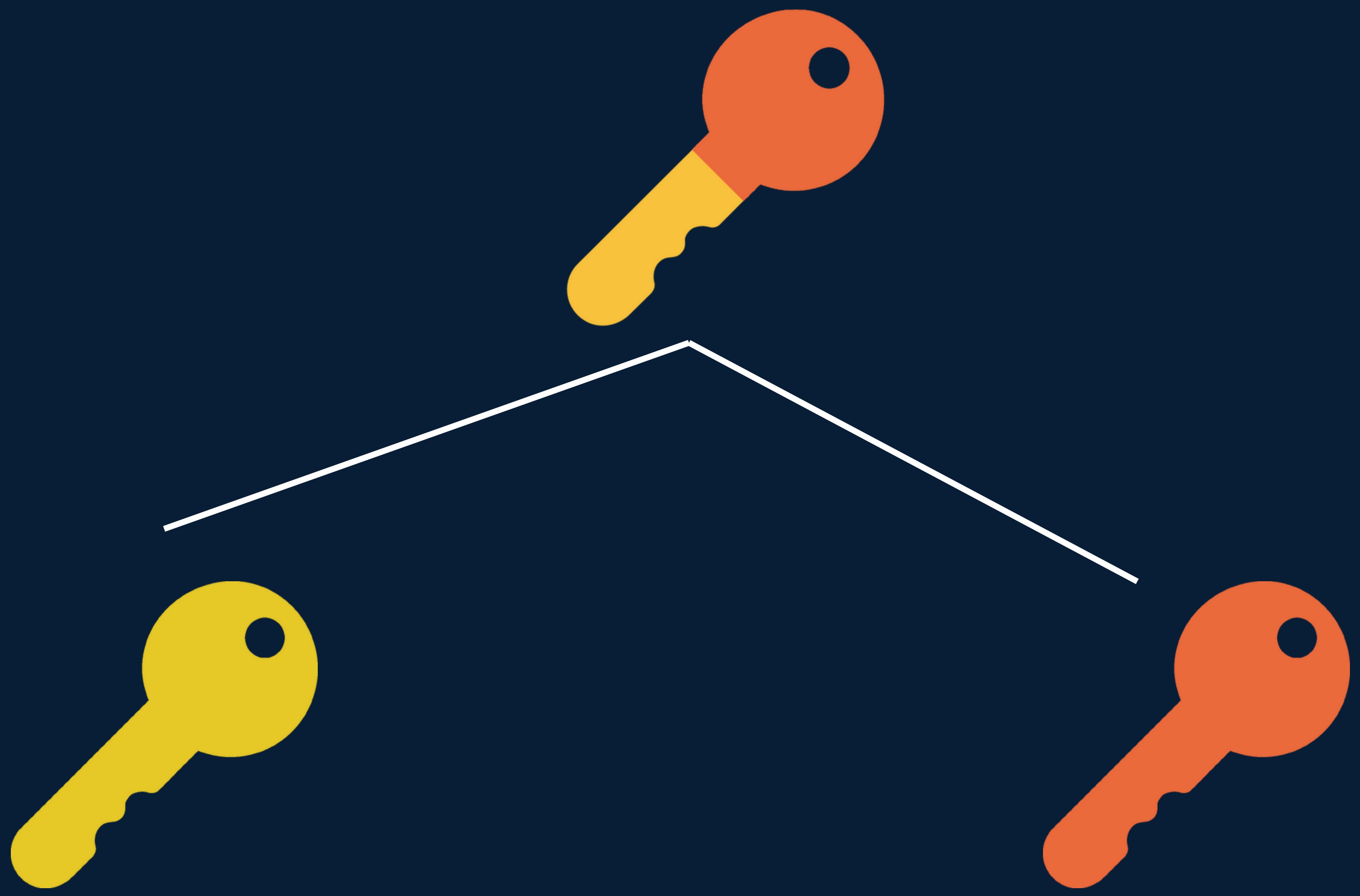
Hash lock

Time lock

```
OP_SIZE
OP_PUSHBYTES_1 20
OP_EQUAL
OP_IF
  OP_HASH160
  OP_PUSHBYTES_20 <preimage hash>
  OP_EQUALVERIFY
  OP_PUSHBYTES_33 <user public key>
OP_ELSE
  OP_DROP
  OP_PUSHBYTES_3 <timeout block height>
  OP_CLTV
  OP_DROP
  OP_PUSHBYTES_33 <Boltz public key>
OP_ENDIF
OP_CHECKSIG
```

Taproot

Musig2



Taptree

Hash lock

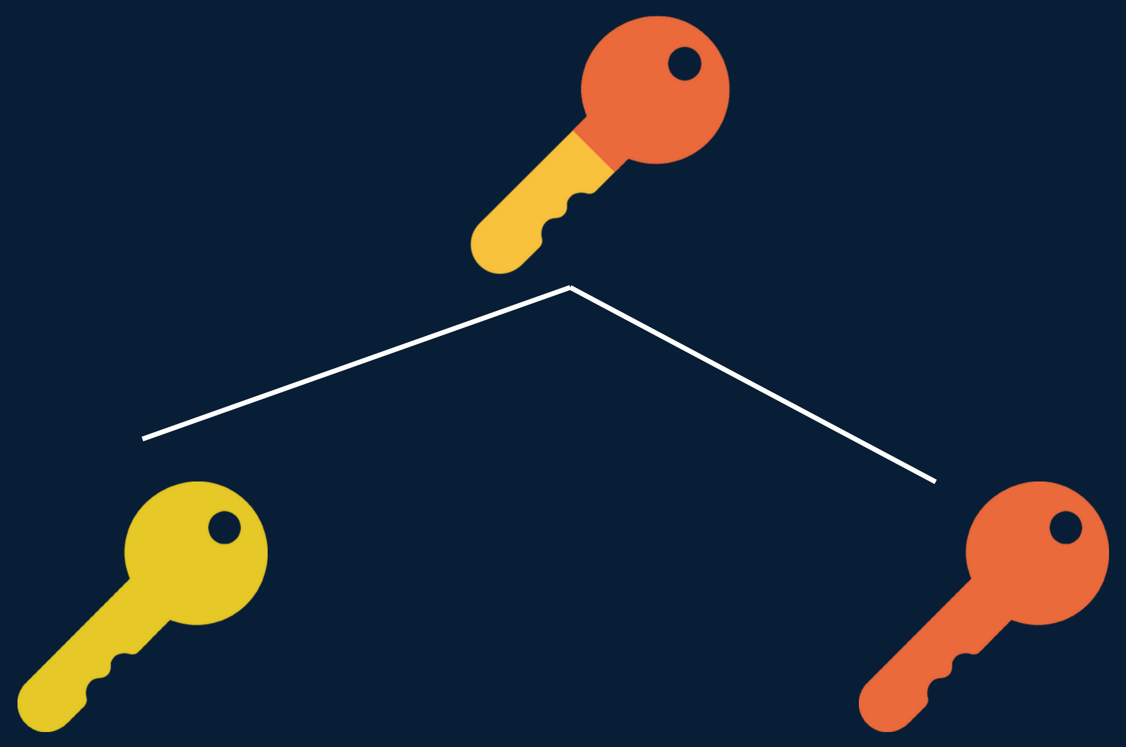
```
OP_SIZE
OP_PUSHBYTES_1 20
OP_EQUALVERIFY
OP_HASH160
OP_PUSHBYTES_20 <preimage hash>
OP_EQUALVERIFY
OP_PUSHBYTES_33 <user public key>
OP_CHECKSIG
```

Time lock

```
OP_PUSHBYTES_33 <Boltz public key>
OP_CHECKSIGVERIFY
OP_PUSHBYTES_3 <timeout block height>
OP_CLTV
```

Ways to spend

Key path



Script path

Hash lock

```
OP_SIZE
OP_PUSHBYTES_1 20
OP_EQUALVERIFY
OP_HASH160
OP_PUSHBYTES_20 <preimage hash>
OP_EQUALVERIFY
OP_PUSHBYTES_33 <user public key>
OP_CHECKSIG
```

Time lock

```
OP_PUSHBYTES_33 <Boltz public key>
OP_CHECKSIGVERIFY
OP_PUSHBYTES_3 <timeout block height>
OP_CLTV
```