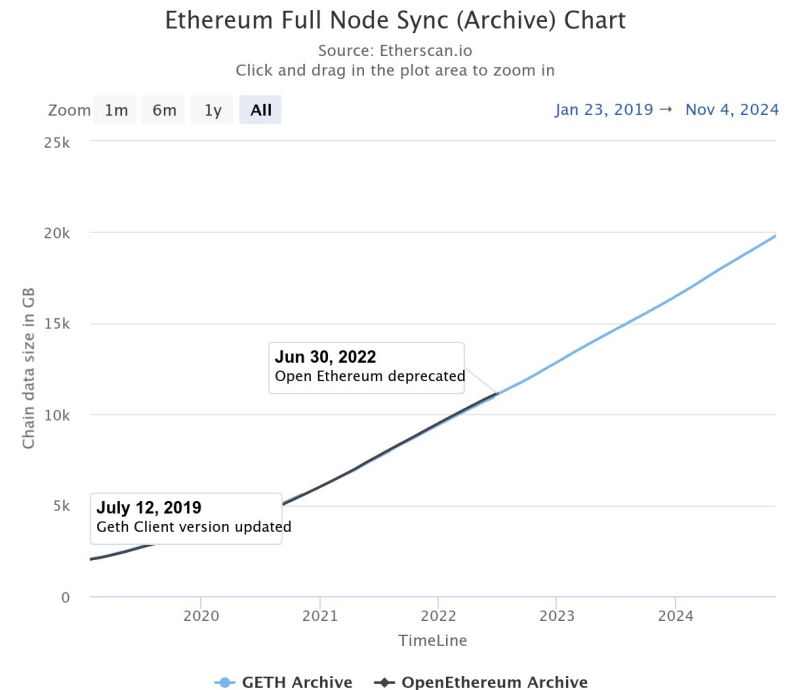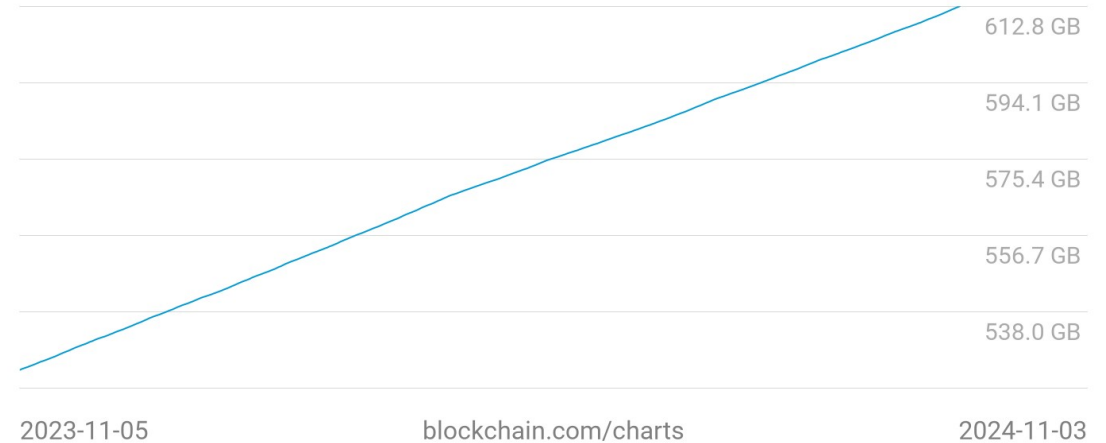# Blockchain (BlCh)

Payment Channels

Thomas Bocek

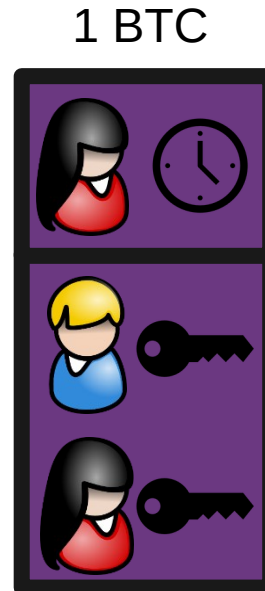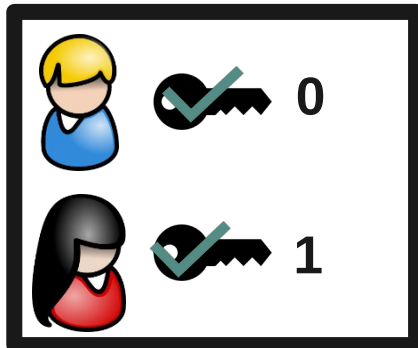04.11.2024

Scalability Solutions

- Blockchains grow linearly [ETH1, ETH2]

- Solutions

  - 1. First Layer Scalability Solutions (on-chain)

    - Sharding (distribute storage)

    - Improve protocol (SegWit, Taproot, Rollups)

  - 2. Second Layer Scalability Solutions (off-chain)

    - State Channels (payment channels)

      - Lightning Network

    - Sidechains / Blockchain Interoperability

Blockchain Size
612.9 GB

612.8 GB
594.1 GB
575.4 GB
556.7 GB
538.0 GB

2023-11-05   blockchain.com/charts   2024-11-03

Ethereum Full Node Sync (Archive) Chart
Source: Etherscan.io
Click and drag in the plot area to zoom in

Zoom 1m 6m 1y All   Jan 23, 2019 → Nov 4, 2024

Jun 30, 2022
Open Ethereum deprecated

July 12, 2019
Geth Client version updated

TimeLine

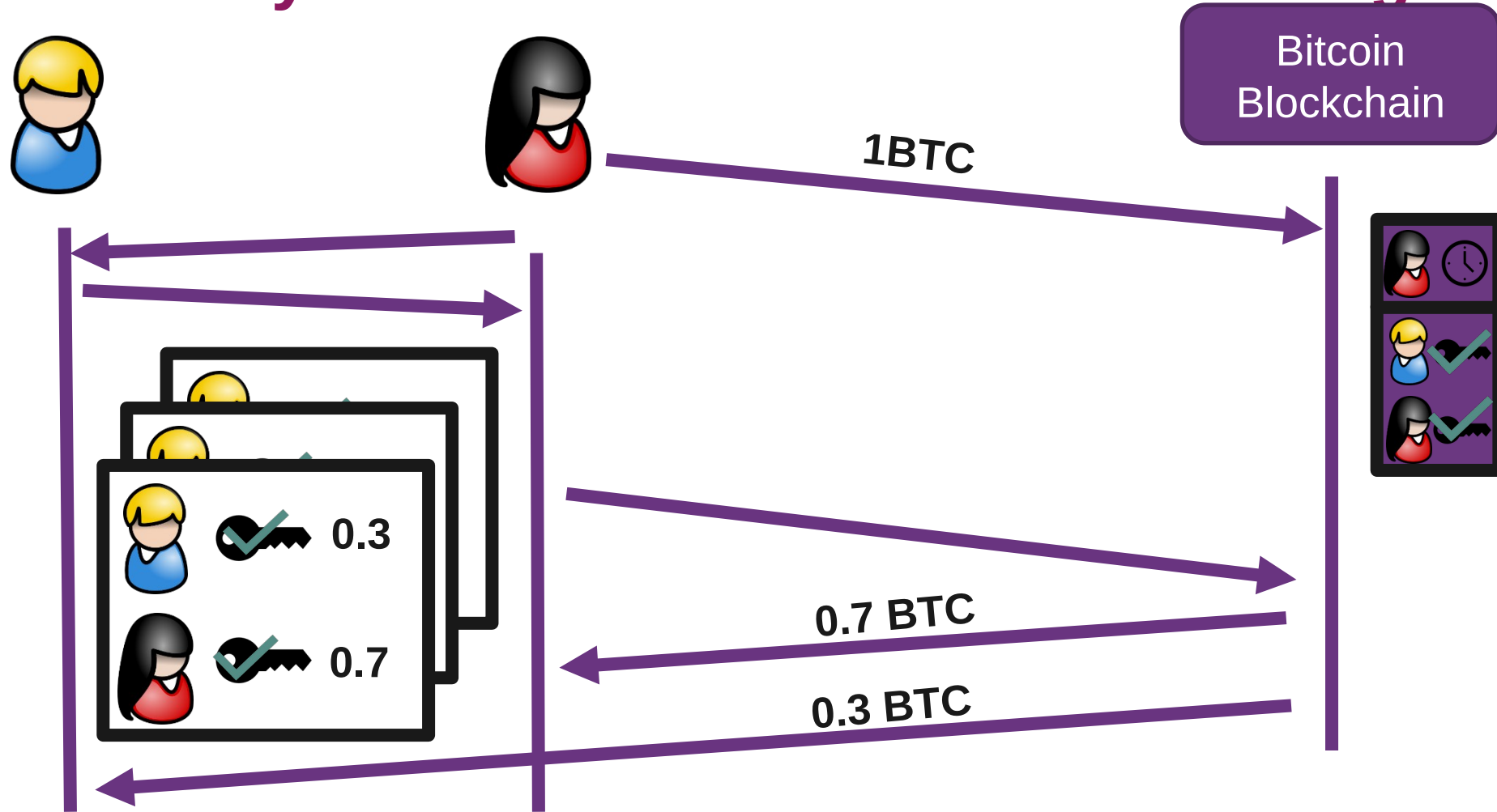GETH Archive   OpenEthereum Archive

Direct Payment Channel with 2-of-2 Multisig Contracts

- Open a payment channel between Alice and Bob

  - 1 BTC of Alice to Locked Multisig

  - 2-of-2 multisig

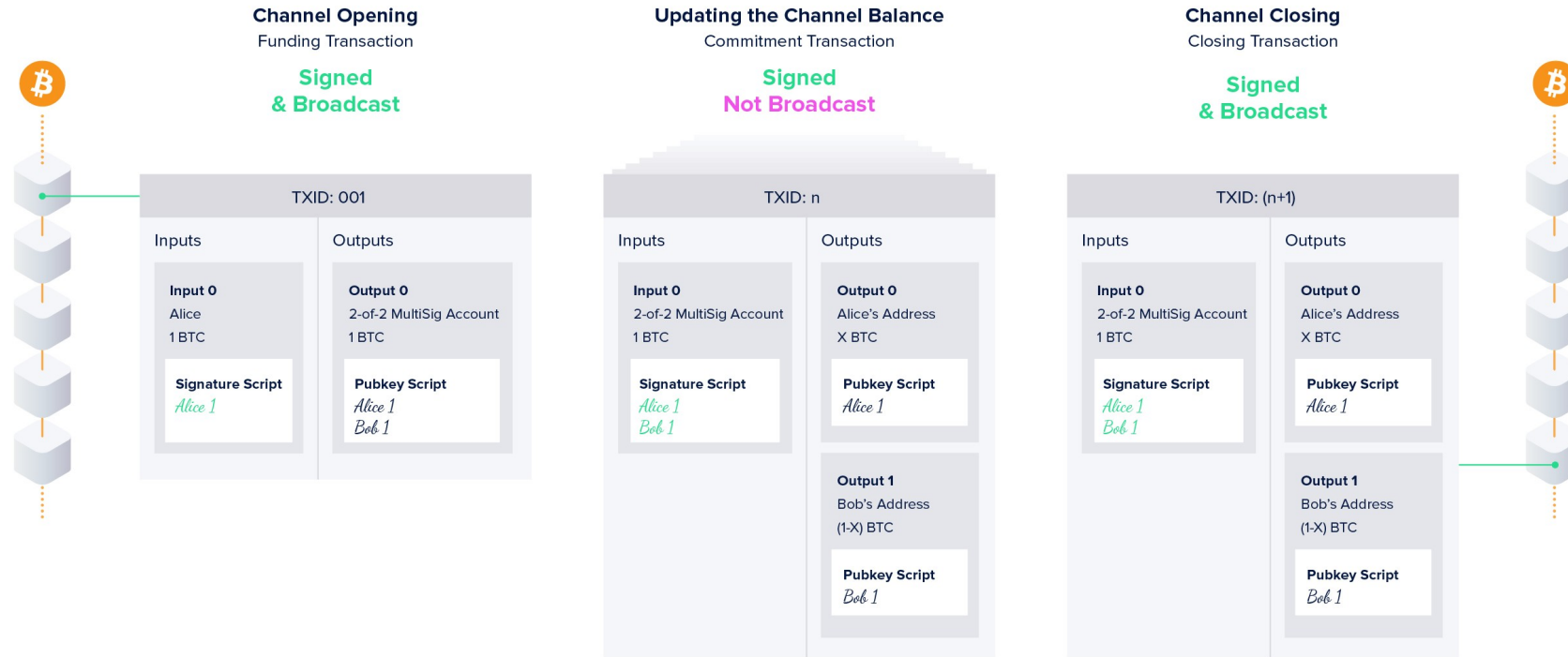   - Initial offchain TX

  - Bob does nothing

1 BTC

OST

Direct Payment Channel with 2-of-2 Multisig Contracts

Bitcoin
Blockchain

1BTC

0.3

0.7

0.7 BTC

0.3 BTC

OST

Other View on Direct Payment Channels
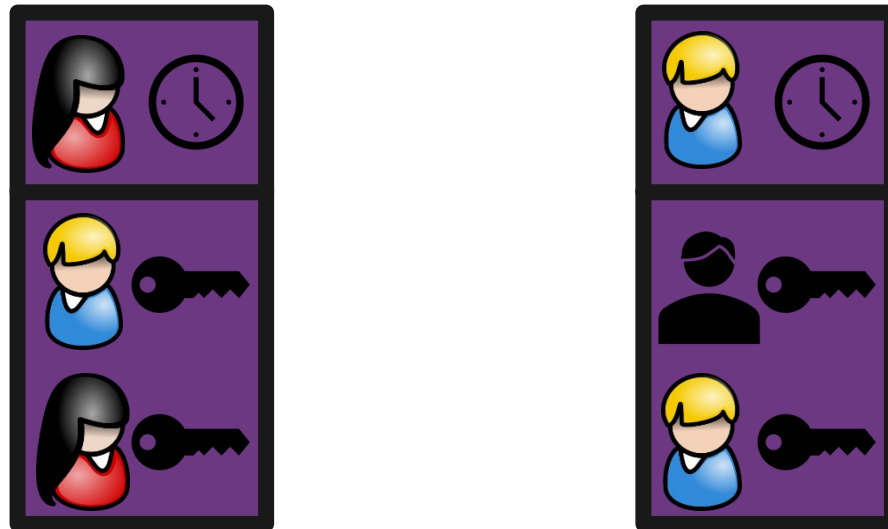

https://academy.horizen.io/technology/expert/state-and-payment-channels/
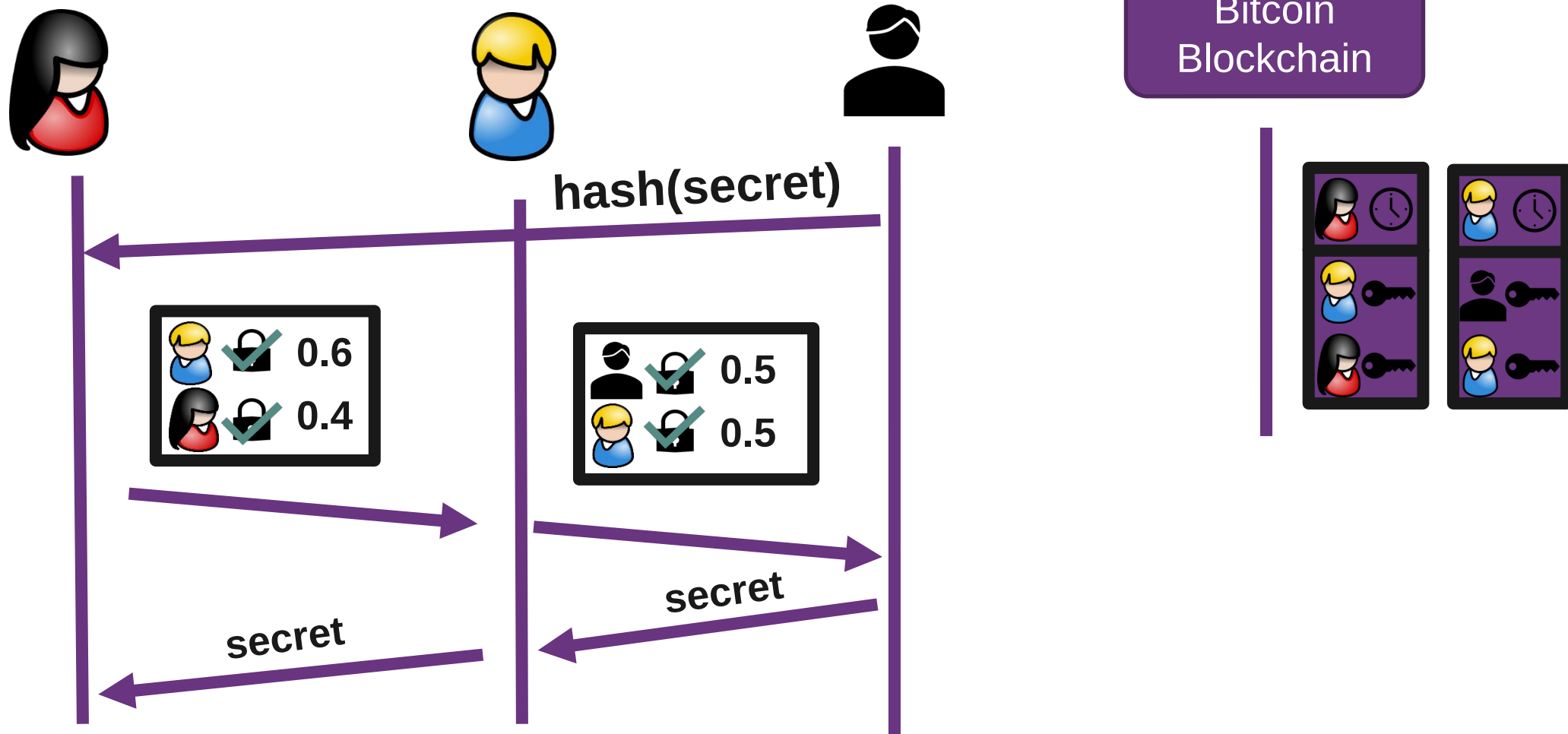
Indirect Payment Channel with HTLC

- Now we are ready to open a payment channel between Alice and Bob and Charlie

  - 1 BTC lockup, Alice – Bob, Bob – Charlie

  - Alice wants to send 0.5 BTC to Charlie (no direct channel)

OST

Atomic Swaps – 2 Payment Channels with 1 BTC

Other View on Indirect Payment Channels

https://medium.com/softblocks/lightning-network-in-depth-part-2-htlc-and-payment-routing-db46aea445a8