OR

<https://research.paradigm.xyz/rollups>

<https://research.paradigm.xyz/optimism>

<https://medium.com/privacy-scaling-explorations/an-introduction-to-optimisms-optimistic-rollup-8450f22629e8>

<https://medium.com/plasma-group/ethereum-smart-contracts-in-l2-optimistic-rollup-2c1cef2ec537>

Oct 20 launch by optimism

<https://ethereum-magicians.org/t/a-rollup-centric-ethereum-roadmap/4698>

vs

<https://chaindebrief.com/optimistic-zero-knowledge-zk-rollups/>

<https://www.benzinga.com/money/what-is-arbitrum/#:~:text=Offchain%20Labs%2C%20the%20team%20behind,the%20president%20between%202015%2D2017>.

ZK

<https://ethereum.org/en/developers/docs/scaling/zk-rollups/>

<https://docs.ethhub.io/ethereum-roadmap/layer-2-scaling/zk-rollups/>

OR withdraw

Hop protocol connext

ZK

Computational heavy

Zk sync

Connext

<https://docs.connext.network/>

Polygon

<https://www.kraken.com/en-gb/learn/what-is-polygon-matic>

SideChain drawback

<https://ethresear.ch/t/understanding-sidechains/8045>

NXTP

Cross Chain integration in layer 2 applications

<https://docs.connext.network/Integration/SystemOverview/connextvsxyz>

Assumptions

Cost

Optimistic

https://community.optimism.io/docs/developers/bridge/messaging/#

## Optics

Protocol for passing data between chains

## atomic swaps

AMM vs orderBook

Nxtp June 20 – Connext: state channel

Cross chain transfer

Generic vs 1:1 asset

<https://chain.link/education/blockchain-oracles>

Oracle-

**Interoperability**

Side Chain

Polygon

Skale

xDai

xDai bridge

Omnibridge

Side chain

**Arbitrum**

**Optimism**

<https://l2beat.com/?view=risk>

Integration and interoperability of Layer 2 applications

Explanation of the problem

<https://ethereum.org/en/layer-2/>

<https://www.ledger.com/academy/what-is-the-blockchain-trilemma>

Layer 1 cost, seek for Layer 2 solution

Participants, increase traffic. Price (ref)

What is layer 2

Lots of practice since BTC, and prove that layer-2 is

However, Trilemma

Historical Survey

<https://ethereum.org/en/developers/docs/scaling/>

Roll up, Side chains, plasma, channels, validium to implement layer 2 chains, relay chain and parachain.

Different implementation and different assumptions.

Specific Bridge between L1 and L2, L2-L2

DAI-DAIx

Polygon bridge

Explanation

Basic

Consensus protocol

History, application, usage

In Depth Explanation (solution 1) (5 marks)

Side chain

Chain with the same functionalities (<https://ethereum.org/en/developers/docs/scaling/sidechains/#:~:text=A%20sidechain%20is%20a%20separate,by%20a%20two%2Dway%20bridge>.)

PoS

<https://consensys.net/blog/blockchain-explained/analyzing-polygons-proof-of-stake-network/>

In Depth Explanation (solution 2) (5 marks)

Roll up

<https://github.com/barryWhiteHat/roll_up>

Merged Consensus

<https://medium.com/@adlerjohn/the-why-s-of-optimistic-rollup-7c6a22cbb61a>

Communication Protocol

Critical Comparison (5 marks)

Side chain use separate consensus mechanism, Rollup base on layer 1

Centralise-fraud

General computation – the same or compromise

ZK rollup

<https://ethresear.ch/t/on-chain-scaling-to-potentially-500-tx-sec-through-mass-tx-validation/3477/2>

Criticism

<https://www.investopedia.com/terms/z/zksnark.asp>

OP rollup

<https://medium.com/plasma-group/ethereum-smart-contracts-in-l2-optimistic-rollup-2c1cef2ec537>

Comparison

<https://limechain.tech/blog/optimistic-rollups-vs-zk-rollups/>