

ZK Compression

Zk compression

Rollup?

Zk compression

Not a rollup

Not a rollup

No sequencer

No transaction batching

Data on Solana Ledger

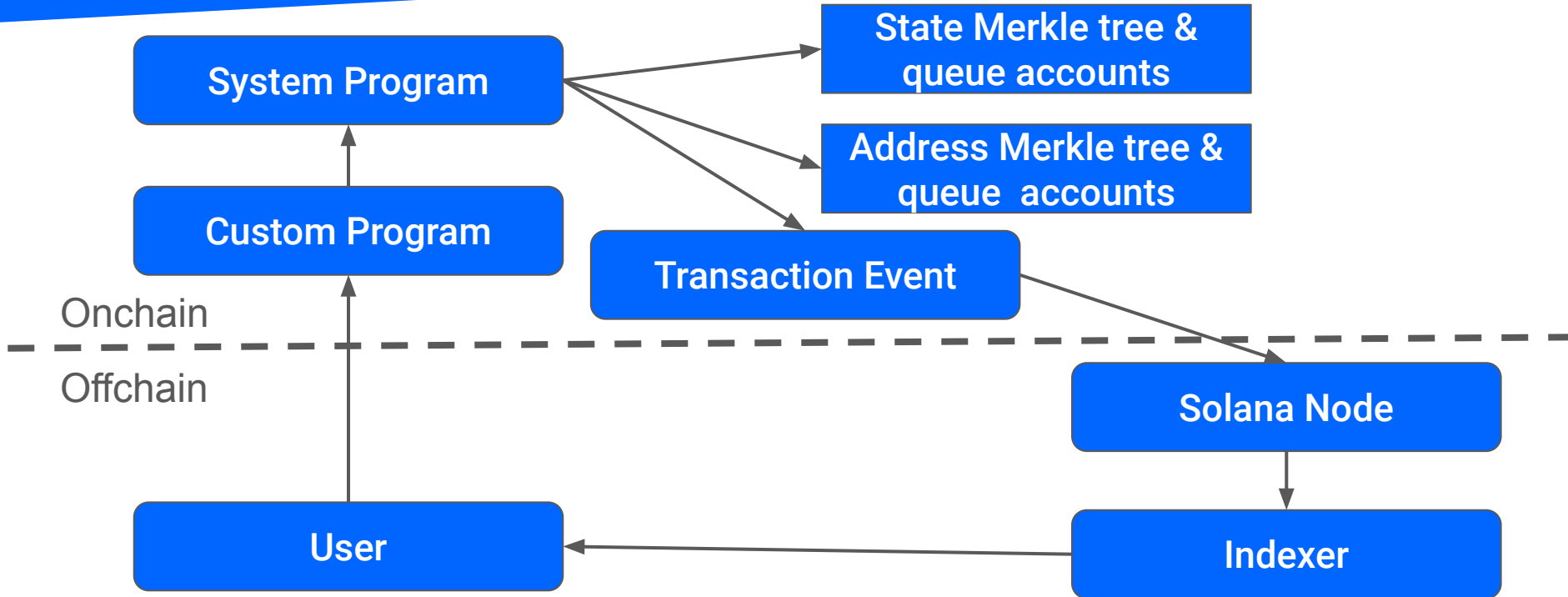
What is zk compression?

Solana account primitive without rent

In detail:

- Poseidon hashed data (offchain, Solana ledger)
- Optional unique persistent addresses
- Merkle trees on Solana
- State transitions over state (data) in Merkle trees on Solana

Architecture



Compressed Account - Hashed Data

```
pub struct CompressedAccount {  
    pub owner: Pubkey,  
    pub lamports: u64,  
    pub address: Option<[u8; 32]>,  
    pub data: Option<CompressedAccountData>,  
}
```

Compressed Account - Hashed Data

```
pub struct CompressedAccount {  
    pub owner: Pubkey,  
    pub lamports: u64,  
    pub address: Option<[u8; 32]>,  
    pub data: Option<CompressedAccountData>,  
}
```

```
pub struct CompressedAccountData {  
    pub discriminator: [u8; 8],  
    pub data: Vec<u8>,  
    pub data_hash: [u8; 32],  
}
```

Security

1. Hash compressed accounts onchain
2. Enable different output Merkle trees
3. Use cpi context account within the same transaction

What is it good for?

- Limit state growth
 - Zk friendly state
 - Orders of magnitude cheaper state
 - Example:
 - Spl Token account: ~2,000,000 Lamports
 - Compressed Token Account: 10,000 Lamports
- *(For compressed token account you pay 10,000 lamports with every use, you will break even at some point.)

Use Cases

- a. Suitable use cases:
 - i. Airdrops
 - ii. Reward distribution
 - iii. Multisig
 - iv. Games
 - v. Bridges
 - vi. Zk apps
- b. Traits of suitable use cases
 - i. State is accessed infrequently
 - ii. State is only accessed by one party

-> State on Solana should be compressed,
except high frequency pools or shared accounts.

Init new Program

```
$ npm install -g @lightprotocol/zk-compression-cli
```

```
$ light init <program-name>
```

Disclaimer

- Programs prod ready triple audited (Ottersec, Neodyme, Zellic)
- ts sdk unaudited
- rust sdk experimental (api will change)

Questions

Questions?

Links

Thank you, for your Attention!

- **Examples:**
<https://github.com/Lightprotocol/light-protocol/tree/main/examples>
- **Docs:**
<https://www.zkcompression.com/>
- **Twitter:**
@LightProtocol
@ananas_light

