**Rollup Stages**

**Introduction:**

A Layer 2 (L2) chain’s maturity is evaluated based on specific properties and categorized into stages. The L2B team provides an opinionated assessment to encourage a progression towards a greater decentralization. **link:** <https://l2beat.com/scaling/summary>

**Rollup Stages:**

**Stage 0:** In this initial stage, the rollup’s governance is largely in the hands of the operators and a security council, ensuring that critical decisions and actions are overseen by a trusted group. The open-source software allows for the reconstruction of the state from L1 data, ensuring transparency and accessibility. Users in this stage have an exit mechanism that allows them to leave the rollup within seven days. However, this often requires actions from an entity/operator.

**Stage 1:** In this stage, governance evolves to be managed by \_smart contracts\_, although the \_security council\_ still plays an important role (e.g. solving bugs). At this stage, the proof system becomes fully functional, enabling decentralized submission of validity proofs. The exit mechanism is improved, allowing users to exit independently without needing operator coordination.

**Stage 2:** In this final stage, the rollup achieves full decentralization with governance entirely managed by smart contracts, removing the need for operators or council interventions in everyday operations. The proof system at this stage is permissionless and the exit mechanism is also fully decentralized. The security council’s role is now strictly limited to addressing any errors that occur on-chain, ensuring that the system remains fair without being overly reliant on centralized entities.

**ZKSync Risk Analysis:**

In the L2Beat summary it’s possible to see the actual stage of each rollup:

Currently, Zksync Era is operating as a `Stage 0` rollup. In the dedicated page on L2, we can find a risk analysis:

**Link:** <https://l2beat.com/scaling/projects/zksync-era>

**Data Availability:** refers to the ability to reconstruct the L2 state from L1 data, ensuring that anyone can verify and rebuild the L2 state if necessary.

**State Validation:** involves verifying the legitimacy of a set of bundled transactions. For ZK Sync, this is done using zero-knowledge proofs through an algorithm known as PLONK (Permutations over Lagrange-bases for Oecumenical Noninteractive arguments of Knowledge).

**Sequencer Failure:** describes the ability to process transactions even if the sequencer is down. In ZK Sync, transactions can still be submitted to L1, though not necessarily enforced immediately. **Note:** The sequencer is the operator responsible for ordering user transactions and often batching them before committing them to Layer 1.

**Proposer Failure:** describes the ability to process transactions even if the proposer is down. In this case, ZK Sync will halt all withdrawals and transactions executions.

**Exit Window:** In the current ZK Sync stage, there is no window for exit during unwanted upgrades.

**Conclusion:**

The stages of rollups provide a framework for assessing and encouraging the maturity and decentralization of L2 chains. Understanding these stages and their requirements is crucial for evaluating the progress and risks associated with different rollups.