Technical Design Notes

1. Trust Boundaries

Artisans, institutions, and the public do not fully trust each other's records. Blockchain serves as a neutral, auditable ledger for provenance and licensing events, reducing central authority and enforcing transparency through public attestations.

2. On-Chain vs Off-Chain Split

On-Chain (EVM Sepolia)	Off-Chain (IPFS or Equivalent)
ERC-721 token ID per artifact	Media files (images, scans, metadata JSON)
Creator & Validator roles	Detailed metadata and archival content
Content hash or URL reference	Long-term storage
Events: Register, Attest, Revoke, LicenseGrant, LicenseRevoke	–
Licensing terms & royalty splits	–

3. Threats & Mitigations

Threat	Mitigation
Fraudulent artifact claims	Require ≥ 2 validator attestations; revoke/dispute events
Single-validator abuse	Multi-attester model
Storage bloat	Keep media off-chain; store hashes only on-chain
Royalty manipulation / reentrancy	Use pull-payment pattern; cap royalties
Key loss / misuse	Role separation; simulated validator keys for demo

4. Alternatives Considered

- Centralized database: Simple, but single point of control and no shared trust.
- Single-oracle verification: Reduces friction but creates dependency on one validator.
- Multi-attester model on EVM with off-chain media: Balances decentralization, auditability, and feasibility for a Sadu pilot.

5. Success Criteria

- 3-5 tangible Sadu artifacts registered in Sepolia.
- ≥ 2 validator attestations per artifact.
- Register → Verify → License flows fully functional.
- Gas and latency metrics collected (3 runs).
- ≥ 3 usability testers successfully complete core flows.
- Revocation and dispute events are visible and functional on-chain.

6. Chain & Tech Stack

- Blockchain: EVM Sepolia Testnet
- Contracts: AtharRegistry (ERC-721) + AtharLicense (non-exclusive licensing)
- Storage: Off-chain (IPFS or equivalent), on-chain hashes
- Tools: Foundry or Hardhat, OpenZeppelin libraries, Next.js + wagmi + viem for frontend
- The frontend will allow users to connect their wallets, register/view artifacts, and trigger validator attestations or license grants through a simple UI