AnchorFinal3 Smart Contract - Technical Documentation

1. Introduction

The AnchorFinal3.sol contract is the core of the DINIP (Digital Identity Network for Issuers and Passports) system. It implements decentralized digital passport issuance and verification using smart contract roles and secure audit logging.

Key Roles:

- Owner: Admin-level control for adding/removing issuers/verifiers.
- Issuer: Reviews KYC documents, approves applications, issues passports.
- Verifier: Validates passport authenticity.

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2. Workflow Overview

a) Passport Issuance Flow:

- Users submit applications with IPFS CID links.
- Issuers verify and process these applications.
- A hash is anchored to the blockchain as a digital passport.

b) Verification Flow:

- Verifiers call `verifyPassport` using a hash.
- The function checks if the hash is anchored and not revoked.
- Returns issuer, timestamp, status.

c) Revocation Flow:

- Issuers can revoke passport hashes.
- Revoked passports cannot be verified.

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3. Smart Contract Functions

Core Functions:

- addIssuer(address): Adds a new issuer (only owner).
- suspendIssuer(address): Temporarily disables an issuer.
- addVerifier(address): Authorizes an address to verify passports.
- applyForPassport(string[] docCids): Users submit their documents.
- processApplication(uint, bytes32, string): Issuers approve and issue passports.
- verifyPassport(bytes32): Returns verification details (onlyVerifer).
- revokeHash(bytes32): Revokes a hash previously anchored.
- rotateHash(bytes32, bytes32): Users can rotate their hash for security.

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4. Storage and Structure

Data Structures:

- Application: Stores user address, IPFS CIDs, timestamp, status.
- IssuanceLog: Tracks every issuance with issuer, hash, and timestamp.
- Mappings include:
  - authorizedIssuers
  - authorizedVerifiers
  - userHash
  - hashTypes

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5. Events

Events:

- ApplicationSubmitted: When a user applies.
- ApplicationProcessed: After approval.
- HashAnchored: When a passport hash is stored.
- HashRevoked / HashRotated: Security updates.