prd05 cloud sync api

PRD 05 — Cloud, Sync, and API Service

1. Product Vision
The Cloud/Sync/API service is an optional backend that provides collaboration, backup, diagnostics, and remote build capabilities. It is not required for local-only use but enables mobile editing, history, and centralized diagnostics.

2. Core Responsibilities
- User authentication and project accounts.
- Storage of JPE and JPE-XML documents and related metadata.
- Build queue for remote compilation and validation.
- History and diagnostics access.

3. Functional Requirements
3.1 Authentication
- R1.1: Support account-based access using a secure authentication mechanism.
- R1.2: Issue tokens for desktop and mobile clients.

3.2 Project Storage
- R2.1: Store project metadata and associated JPE/JPE-XML documents.
- R2.2: Optionally store IR snapshots and build metadata, but avoid storing large or proprietary binary assets.
- R2.3: Provide basic project-level backup and restore.

3.3 Build API
- R3.1: Expose an endpoint that accepts JPE, JPE-XML, or IR payloads and returns:
  Build status.
  Generated XML outputs (if requested and allowed).
  Error and warning diagnostics.
- R3.2: Allow asynchronous builds with job IDs and polling or push notifications.
- R3.3: Include structured EngineError arrays in build responses for integration with desktop and mobile.

3.4 Diagnostics and History
- R4.1: Store build reports and make them retrievable by project and build ID.
- R4.2: Provide endpoints for clients to fetch summarized and detailed diagnostics.
- R4.3: Keep a limited history per project, with configurable retention.

4. Non-Functional Requirements
- Security: All network communications should be encrypted.
- Reliability: Reasonable uptime, error handling, and retry strategies for clients.
- Scalability: Designed to support multiple concurrent users and projects without degrading performance.
- Observability: Log build jobs, diagnostics, and error rates for monitoring.