do same for below

. License Vault User Story: As a compliance officer, I want to see all issued, pending, and expired licenses linked to products, partners, and shipments, so I can ensure full regulatory coverage. Acceptance Criteria: Every license record links to its relevant order, product, and rule source. Auto-tracks usage quotas, expiries, and renewal needs. Provides API for syncing with external authorities' license databases. Enables "drill-down" from compliance workflow to license details in UI. You can further expand each story into subtasks for UI, API, validation, and unit test coverage, setting the foundation for robust sprint planning and clear QA

Here is a comprehensive, detailed user story for your License Vault module, covering every area needed for robust implementation, integration, and audit—along with subtasks for UI, API, validation, and testing coverage.

License Vault – Detailed User Story

Title: End-to-End License Tracking and Orchestration

Description

As a compliance officer, I want a single point of truth to view, track, and manage all issued, pending, and expired licenses—linked to relevant products, partners, and shipments—so I can guarantee full regulatory coverage, real-time compliance, and readiness for audits or renewals. [1] [2] [3]

Functional Requirements (Expanded)

- **Comprehensive License Record Linkage**
  - Every license entry captures metadata: license number, status (issued, pending, expired, denied), issuing authority, effective and expiration date, permitted products (with details), covered partners, associated shipments/orders, applied rule reference.
  - Direct links in UI and APIs allow "drill-down" from any order, product, or partner to their license history and current state.
- **Quota and Expiry Management**
  - For each license, track quantity/usage consumption (e.g., by shipment or batch), remaining quota, customizable thresholds for warning and blocking.
  - System triggers alerts and workflow blocks as quota nears limit or expiration approaches.

    - Automated notifications and dashboard alerts for approaching renewal deadlines and expiring licenses.
- **API Integration with External Databases**
    - REST APIs provided for (a) ingesting new licenses from government or third-party systems; (b) pushing status or requests to authority/portal endpoints.
    - APIs are secured, rate-limited, and support full, incremental, and on-demand sync.
    - Error handling and reconciliation workflows for sync mismatches (e.g., mismatched license numbers, duplicates).
- **Powerful UI Views and Drill-Down**
    - Main dashboard shows license status breakdown (active, expiring soon, expired, over-quota), sortable and filterable by product, partner, or date range.
    - “Drill-down” views provide license details, related compliance workflow context, usage logs, and history of all associated entities.
    - Export functions for custom or full license reports (CSV, PDF) with embedded audit trail details.
- **Auditability and Traceability**
    - All changes to licenses (creation, update, renewal, expiry, quota usage, assignment) are version-controlled and audit-logged (user, timestamp, action, before/after).
    - Full retention per jurisdictional requirement (e.g., 5–7 years), tamper-evident.
    - Searchable event history for all compliance-relevant activity linked to licenses.

Subtasks (Implementation Focus)

- **UI**
    - Design and develop dashboard cards, tables, and detail/modals for license searching, review, and drill-down navigation.
    - Implement warning badges/alerts for expiring or low-quota licenses.
    - Test usability for minimum clicks to reach any license in a typical compliance scenario.
- **API**
    - Define OpenAPI/Swagger spec for license CRUD, sync, and lookup by product/order/partner/rule.
    - Implement validators for uniqueness, date logic, regulatory format, and usage/quota fields.
    - Write API unit and integration tests for error-handling, data limits, and sync reconciliation.
- **Validation and Logic**
    - Backend checks for quota exhaustion, auto-block on expiry, mandatory fields, and rule cross-linking.

    - Simulation/“what-if” mode for compliance team to preview the impact of shipment/order plan on license usage and expiry risk.
- **Unit Test Coverage**
    - Tests for every field/validation edge case (dates, linkage, duplicates).
    - Tests for notification triggers (expiring, quota low, renewal needed).
    - Scenario tests for API integration (missing data, API downtime, sync recovery).
    - Permission tests (role-based access) for view/edit/export.
- **QA/Acceptance**
    - Real-world scenario script: Add new license, associate to orders, monitor usage, simulate expiration, trigger renewal workflow, and validate downstream compliance workflow blocks.[2] [3]

This story structure ensures end-to-end traceability, integration flexibility, compliance coverage, and audit readiness for all license management activities—supporting robust business and regulatory needs.[3] [1] [2]

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