Software Requirements Specification

MSC Home Rental & Real Estate Platform

Document ID: SRS_MSC_HOME_2026

Prepared By: CodeStorm Hub Development Team

Date: January 2026

Status: Review

CODESTORM HUB

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Executive Summary

MSC Home Rental & Real Estate Platform is a comprehensive digital solution designed to revolutionize Bangladesh's real estate market by providing a secure, verified, and transparent environment for property transactions. This Software Requirements Specification (SRS) document defines all functional and non-functional requirements necessary for successful development and deployment of the platform.

Key Platform Features

- **Verified Marketplace:** Identity verification, professional badges, and listing authentication
- **Complete Transaction Workflow:** From property search to deal closure with legal and financial support
- **Bangladesh-Specific Integration:** Support for Bayna, Dalil, Namjari, and government portal workflows
- **Secure Payments:** Multi-gateway integration with buyer protection mechanisms
- **Communication Suite:** In-platform chat, audio/video, and appointment scheduling
- **Professional Network:** Connect buyers, sellers, agents, legal advisors, and financial institutions

Target Users

- Property Buyers and Renters
- Property Sellers and Landlords
- URA-certified Real Estate Agents

- Legal Advisors and Law Firms
- Financial Institutions and Loan Providers
- Service Providers (Architects, Designers, etc.)

Technical Scope

- Web Application (Responsive Design)
- Mobile Applications (Android & iOS)
- Admin Dashboard and Moderation Tools
- Integration with Payment Gateways, Maps, eKYC providers, and Government Portals

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> **Note:** This document consolidates requirements based on market research, user studies, and Bangladesh real estate industry best practices. All requirements have been validated for technical feasibility and business value.

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1. Introduction

1.1 Purpose

Define comprehensive, implementable requirements for **MSC Home Rental & Real Estate**, a verified property marketplace for Bangladesh that includes **communication**, **legal & financial support**, **secure payments**, and **reputation-based trust**.

1.2 Scope

MSC Home supports (MVP-first):
- Account creation + professional mode switching
- Identity + professional verification (badges)
- Verified property listings + listing **Accuracy Score**
- Advanced search + map-based search + favorites
- In-platform chat + audio/video + appointment booking
- Offers/negotiation → order → payment → transaction tracking
- Legal support directory + booking/case tracking (MVP: manual workflow supported)
- Financial/loan support directory + requests (MVP: lead workflow supported)
- Post-transaction ratings/reviews

Deferred / optional (P2):
- Community features (groups/pages/posts)
- Blogs/videos publishing (moderated)

1.3 Definitions (BD-context)

- **Accuracy Score:** Completeness score shown on listings; computed from required/optional field completeness.
- **Verified Badge:** Profile indicator after successful verification approval.
- **Verified Listing:** A listing marked verified after ownership + information verification checks.

- **Bayna / Baina Nama:** Sale agreement / agreement to sell, commonly used in Bangladesh property transactions.
- **Dalil:** Registered deed at the Sub-Registrar office.
- **Namjari (Mutation):** Mutation process updating ownership records.
- **RBAC:** Role-based access control.
- **KYC/eKYC:** Identity verification.

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2. Product Overview

2.1 Problem Summary

Bangladesh's real estate market suffers from:
- Low trust, hidden property details, unfair pricing
- Difficulty verifying legal papers / seriousness of parties
- Loan affordability constraints
- Incomplete online information and poor advertising

2.2 Product Vision

MSC Home provides a secure, verified, transparent environment for buyers/sellers/agents/companies and integrates legal + financial partners for safer, faster transactions.

2.3 Research Signals (Cross-validated from Slides OCR)

From the case study survey/journey artifacts:
- **Advanced Search** demand: **97.6%**
- Importance of **trustworthiness**: **78.3%**
- Interest in **affordable loans**: **90.4%**
- Interest in **secure payments**: **69.9%**
- Desire to **rate buyers/sellers** after transaction: **95.2%**

Feature-preference breakdown:
- Secure payments: **69.9%**
- Affordable loans: **37.3%**
- Legal support: **27.7%**
- Virtual tours: **24.1%**

Implication: the MVP must strongly prioritize **search**, **verification/trust**, **payments**, and **post-transaction reviews**.

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3. Stakeholders & User Actors

3.1 Primary Actors

1. Buyer
2. Renter
3. Seller / Owner (flat owner, land owner)
4. Real Estate Agent / Broker (**including URA-certified agent where applicable**)
5. Legal Agent (Lawyer / Law firm)
6. Financial Agent / Financial Institute (banks/NBFIs/loan partners)
7. Service Provider (architect, interior/exterior designer, electrician, surveyor, etc.)
8. Social User (community-only)

3.2 Secondary Actors

1. Admin
2. Verifier / Moderator
3. Customer Support
4. Field Verifier (in-person property verification)
5. Credential Issuer / Institute (financial and non-financial)

3.3 Roles & Permissions (RBAC + Relationship-Based Access)

MSC Home uses:
- **RBAC** for coarse permissions (what a role *may* do)
- **ABAC / relationship checks** for fine permissions (what a user *may do to a specific resource*)

3.3.1 Role catalog

- **Guest:** not logged in.
- **User (Consumer):** logged in buyer/renter/seller (non-professional).
- **Professional:** verified or unverified professionals, sub-types:

    - **Real Estate Agent (URA-certified where applicable)**
    - **Developer/Company**
    - **Legal Agent**
    - **Financial Agent**
    - **Service Provider**
- **Verifier/Moderator:** reviews identity/listing verification and moderation cases.
- **Customer Support:** assists in disputes and user issues (limited admin powers).
- **Admin:** full platform management.

3.3.2 Relationship-based access checks (ABAC)

At minimum, access to sensitive resources must check:
- **Ownership:** user owns the listing/document/profile.
- **Participation:** user is a participant in the chat thread / appointment / offer / transaction / dispute.
- **Granted access:** explicit, time-bound access grant exists (e.g., document vault share).
- **Role constraints:** only verifier/admin can approve verification, only admins can ban users, etc.

3.3.3 Minimum permissions matrix (non-exhaustive)

Action	Guest	User	Professional	Verifier/Mod	Support	Admin
Browse public listings	✅	✅	✅	✅	✅	✅
View restricted listing docs (vault)	❌	✅*	✅*	✅	✅*	✅
Create listing	❌	✅	✅	❌	❌	✅

Action	Guest	User	Professional	Verifier/Mod	Support	Admin
Publish listing (after review)	❌	✅*	✅*	✅*	✅*	✅
Submit identity/pro verification request	❌	✅	✅	❌	❌	✅
Approve/reject verification	❌	❌	❌	✅	✅*	✅
Send chat message	❌	✅	✅	✅	✅	✅
Block/report user or listing	❌	✅	✅	✅	✅	✅
Create/accept/counter offers	❌	✅	✅	❌	❌	✅
View transaction timeline	❌	✅*	✅*	✅*	✅*	✅
Open dispute + upload evidence	❌	✅*	✅*	✅*	✅	✅
Resolve dispute	❌	❌	❌	✅*	✅*	✅

* Requires ABAC checks (ownership/participation/explicit access grant) and business-rule gating (e.g., only after offer accepted).

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4. Personas

4.1 Seller Persona (Rakib Hasan)

- Experienced seller/renter; wants faster transactions, legal & loan assistance, verification.

4.2 Buyer Persona (Sumaiya Akter)

- First-time buyer; concerned about fraud, complex legal steps, high prices, loan access.

4.3 Agent Persona (Inferred)

- Wants lead generation, fast chat response, appointment scheduling, high credibility badges.

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5. System Modules & Scope

1. Auth & Account (email/phone + OTP + social OAuth)
2. User Profile + Professional Mode
3. Verification & Trust (tiered badges, credential reports, optional e-KYC)
4. Marketplace (Buy/Sell/Rent)
5. Listings & Media (photos/videos/virtual tours) + Document Vault
6. Search (advanced filters + map) + saved searches
7. Offers/Negotiation + Transaction Tracking (Bayna/Dalil/Namjari-aware)
8. Payments (gateway + OTP/3DS) + payment records
9. Legal Support Services (directory + booking + case tracking)
10. Financial Support Services (directory + loan request workflow)
11. Communication (chat + optional audio/video) + Appointments
12. Reputation (ratings/reviews)
13. Notifications (in-app + email/SMS) **[Inferred but required]**

14. Admin/Moderation (users, verifications, listings, transactions, disputes)
15. Contacts & Networking (follow/connect/block + privacy controls) **[P2]**
16. Community (groups/pages/posts/feed) **[P2]**
17. Blogs & Videos (content hub + moderation) **[P2]**
18. Monetization & Billing (subscriptions, featured listings) **[Inferred]**
19. Government Land Portals (link-outs + tracking) **[BD-context]**

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6. Assumptions, Constraints, Dependencies

6.1 Assumptions

- Users consent to document upload and verification.
- Legal/financial partners exist.
- Payment gateway provides OTP/3DS or equivalent confirmation.
- For MVP, some legal/verification steps may be **manual but trackable**.

6.2 Constraints

- Personal info security is mandatory.
- Verified badge and verified listings must be supported.
- Offer/negotiation must exist.

Additional constraints (v3.0):
- Government land portals are treated as **external systems**: MSC Home provides link-outs and stores user-entered references/evidence only (no automated scraping/captcha solving).
- Sensitive identity and document data must be protected with least-privilege access, encryption, and full auditing.

6.3 Dependencies

- Maps provider (Google Maps or equivalent)
- OTP provider (SMS/Email)
- Payment gateway(s) (e.g., SSLCOMMERZ aggregator)
- Media storage/CDN
- Optional e-KYC provider (e.g., Porichoy for NID verification)

- Optional video SDK (Agora/Twilio/Jitsi)

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7. Functional Requirements (FR)

> Priority: **P0 (MVP must)**, **P1 (near-term)**, **P2 (later)**

7.1 Authentication & Account

- **FR-1 (P0): Register** via email/password and/or phone/password. Support a single user profile that can later switch to Professional Mode.
- **FR-1a (P0): Social OAuth Login (explicit providers)**
- **Google OAuth (P0)**
- **LinkedIn OAuth (P1)**
- **X/Twitter OAuth (P1)**
  System must store provider, provider_user_id, and verified email/phone claims when provided by the provider.
- **FR-1b (P0): Account Linking & Merge Rules**
- If a user signs in with OAuth and an existing account has the same verified email/phone, system must offer **link** (not duplicate).
- If the user already has an account and adds OAuth later, system must link providers to the same user.
- If duplicates exist (legacy), Admin can merge with audit logs.
- **FR-2 (P0): Login/Logout** + forgot password (email/SMS reset or OTP-based reset).
- **FR-3 (P0): Professional Mode Switch** (social user ↔ professional role flow).
  Switching to Professional Mode triggers: profile completion + professional verification submission (see FR-8..FR-11).
- **FR-4 (P0): OTP Login** via phone (required for Bangladesh market fit).
- OTP must be rate-limited, have TTL, and support resend rules.
- OTP verification can also be used for step-up security (e.g., payments, document access).

7.2 User Profile & Professional Data

- **FR-5 (P0): Profile Management** (name, contact, photo).
- **FR-6 (P0): Professional Profile** captures bank details, BIN/TIN, NID/licenses, financial statement; role-specific docs (BAR certificate, institute credential report).
- **FR-7 (P1): Reputation Summary** (rating averages, verified badges, response time metrics).

7.3 Verification & Trust (Tiered)

The PDF roadmap requires visible trust signals (verified badges), and multiple credential types (professional/company/ownership). This section formalizes **tiers** so UI can show consistent badges across listings and profiles.

- **FR-8 (P0): Submit Verification** request with one or more verification types and supporting documents.
- **FR-9 (P0): Review Workflow** approve/reject + reason (admin/verifier) with a full audit trail.
- **FR-10 (P0): Verified Badge Display** visible on profile and listings, with badge type and verification date.

7.3.1 Verification tiers (badge types)

- **Identity Verified (P0)**: NID/passport + selfie/face match (manual) and/or optional e-KYC provider.
- **Professional Verified (P0/P1)**:
- **URA-certified agent** (or other applicable regulator body) verification as a distinct professional credential.
- Other professional bodies (e.g., BAR Council for lawyers) supported as credential templates.
- **Company Verified (P0)**: BIN/TIN + trade license + bank details (for real estate companies, legal firms, financial institutions).
- **Property Ownership Verified (P0)**: deed/dalil + mutation/namjari + tax receipts (as applicable) attached to a listing or owner profile.
- **Listing Verified (P0)**: listing-level verification checks passed (ownership, address/location, completeness score threshold).
- **Reputation Verified (P1)**: post-transaction rating eligibility unlocked + “trusted seller/agent” thresholds (see FR-44/45).

7.3.2 Credential reports from financial/non-financial institutes (PDF gap closure)

- **FR-10a (P1): Credential Report Upload**: professionals/companies can attach a "credential report" issued by:
- **Financial Institute** (e.g., bank statement, solvency, loan eligibility confirmation)
- **Non-Financial Institute** (e.g., employer letter, membership/certification issuer, training institute)
- **FR-10b (P1): Credential Issuer Registry**: admin maintains allowed issuer types and verification rules (manual verification supported).

7.3.3 Optional e-KYC provider integration

- **FR-11 (P1): e-KYC Provider Check** (e.g., NID verification via an external provider) with fallback to manual verification.
  Government portals and identity systems are treated as external systems; no scraping or captcha bypass.

7.4 Listings & Media

- **FR-12 (P0): Create Listing** with location/area/price/terms/media/docs.
- **FR-13 (P0): Listing Verification** (ownership + info verification checks).
- **FR-14 (P1): Virtual Tours** (as media or external link).
- **FR-15 (P0): Favorites** (save listings).
- **FR-16 (P0): Document Vault** for sensitive docs (deeds/dalil, mutation/namjari, tax receipts, allotment letters) with strict access controls.
- **FR-17 (P1): Unit Converter** (SqFt ↔ Katha/Decimal/Shotok).
- **FR-18 (P1): Market Value Guidance** (manual inputs by agents + optional analytics later). Must show disclaimers and data source notes.

7.4.1 Property type matrix (PDF gap closure)

The PDF roadmap mixes apartment-first positioning with strong land workflows. The SRS therefore supports **multiple property types** with explicit required fields and required documents.

Property Type	Required Listing Fields (minimum)	Required Documents (minimum)	Step Tracking Template
Apartment/Flat (Buy/Sell)	address/area, floor/unit, size (sqft), bedrooms/baths, price, utilities, handover status, photos	ownership proof or allotment docs, HOA/utility bills if available	Offer → Booking/Bayana (optional) → Handover/Registration support
Apartment/Flat (Rent)	rent, deposit, lease duration, move-in date, rules, photos	landlord proof (NID + ownership proof where possible)	Inquiry → Viewing → Agreement → Move-in
Land (Buy/Sell)	mouza, dag/khatian, size (katha/decimal), location pin/map, asking price, land type, access road	dalil/deed, mutation/namjari, tax receipts, land development docs (if any)	Offer → Bayana → Deed transfer → Mutation follow-up
Commercial/Project	project/company profile, unit inventory, pricing model, handover timeline	project approvals/ownership, company docs (BIN/TIN)	Offer → Booking → Installment tracking (optional P2)

Notes:
- “Verified Land List” and land ownership verification are supported via **document vault + verification checks + government portal link-outs** (see Section 7.20).
- For each property type the system must validate presence of required fields and compute **Listing Accuracy Score** (see Section 7.4.2).

7.4.2 Listing Accuracy Score (Completeness + Evidence)

- Listing must display an **Accuracy Score** computed from completeness and evidence strength:
- Field completeness (required fields filled)
- Media quality (minimum photo count, resolution)
- Document evidence present (ownership/identity docs uploaded)

- Verification status (listing verified checks passed)
- Score impacts ranking (see Search) and creates an actionable checklist for sellers/agents.

7.5 Search & Discovery

- **FR-19 (P0): Advanced Search** filters: location/price/area + verified-only.
- **FR-20 (P1): Map-Based Search**.
- **FR-21 (P1): Saved Searches + Alerts** (notify when a matching listing is published).
- **FR-22 (P1): Compare Listings** up to N items side-by-side.

7.6 Communication & Appointments

- **FR-23 (P0): Live Chat** between buyer ↔ seller/agent and buyer ↔ legal/financial agent when related to a transaction.
- **FR-24 (P1): Audio/Video Call** (integrated SDK) with consent and abuse reporting.
- **FR-25 (P0): Appointment Booking** for agents/legal/financial with time slots and confirmation.
- **FR-26 (P0): Purpose Capture** for contact (message/appointment purpose).

7.6.1 Agent responsiveness (PDF gap closure)

The PDF recommends that agents respond quickly; this is formalized as measurable behavior + product mechanisms.

- **FR-26a (P1): Response SLA Timers**
- Chat: show “expected response time” and last active.
- Appointments: accept/decline within a configured window (default 2 hours).
- **FR-26b (P1): Reminders & Escalation**
- Auto-remind professionals if no response.
- Offer alternatives: suggest other verified professionals in the same area/category.
- **FR-26c (P1): Response Metrics**
- Maintain response rate (7/30 day), median response time, and show in professional profile.
- Admin can flag/penalize chronic non-responsive accounts (see moderation).

7.7 Offers, Orders, Transactions

- **FR-27 (P0): Submit Offer** securely.

- **FR-28 (P0): Negotiate** (counter/accept/reject/withdraw).
- **FR-29 (P0): Transaction Step Tracking** visible to both parties.
- **FR-30 (P0): Place Order** for property/service.
- **FR-31 (P0): Confirm/Cancel Order** with state transitions.
- **FR-32 (P0): Proof Uploads per Step** (e.g., Bayna copy, Dalil copy, Namjari/mutation docs) to keep the digital timeline verifiable.

7.8 Payments

- **FR-33 (P0): Payment Methods** card + e-banking + OTP/3DS (gateway-dependent).
- **FR-34 (P0): Secure Payment Records** linked to order/transaction with idempotency keys, reconciliation status, and audit logs.
- **FR-35 (P1): Buyer Protection / Dispute Hooks (Expanded)**
  The PDF recommends buyer protection and step tracking. MSC Home must support a minimal but well-defined buyer protection program that maps to disputes.

7.8.1 Payment protection modes (configurable)

- **Mode A - Direct Pay (P0):** payment is captured directly by the gateway to the seller/provider (platform only records).
- **Mode B - Platform Hold / Milestone Hold (P1):** payment is held (or partially held) until a transaction step is confirmed (e.g., Bayana received, document access granted). (Implementation depends on gateway capabilities and legal/compliance review; default to Mode A if hold is not allowed.)

7.8.2 Buyer protection policy (platform rules)

- **Eligibility:** only orders that pass identity verification and have recorded transaction steps/evidence.
- **Claim windows:** configurable time window (e.g., 7 days after payment OR within the active transaction step window).
- **Evidence required:** chat logs, uploaded documents, payment receipts, appointment logs, and step timeline.
- **Outcomes:** refund, partial refund, rework/redo (service), or dismissal.
- **Transparency:** show policy summary in checkout and in order detail.

7.9 Legal Support

- **FR-36 (P0): Legal Service Discovery**.

- **FR-37 (P0): Book Legal Agent**.
- **FR-38 (P1): Legal Case Tracking** (case created, docs uploaded, report delivered).

7.10 Financial Support

- **FR-39 (P0): Financial Service Discovery**.
- **FR-40 (P1): Loan Assistance Workflow** request → response → status tracking.

7.11 Reviews & Reputation

- **FR-41 (P0): Mutual Rating** buyer ↔ seller after completion.
- **FR-42 (P0): Listing/Agent Reviews**.
- **FR-43 (P1): Feedback Tools** respond to reviews + issue resolution.

7.12 Notifications

- **FR-44 (P0): In-app Notifications** for offers, chat, booking, verification, payment events.
- **FR-45 (P1): SMS/Email Notifications** for critical steps.

7.13 Contacts, Community + Content (P2)

This section mirrors the PDF IA that includes Contacts, Groups/Pages/Posts, and Blogs/Videos. These are P2 by default, but the data model and permissions are defined now to avoid rework.

- **FR-46 (P2): Search** groups/pages/posts/people/places and professional services.
- **FR-47 (P2): Groups/Pages/Posts** create + join + follow + like/comment/share. Includes moderation queue for reported content.
- **FR-48 (P2): View Blogs & Videos** (content hub).
- **FR-49 (P2): Post Blogs & Videos** (moderated).

7.13.1 Contacts & networking (PDF "Contacts / Connect with people")

- Connection model supports:
- **Follow** (one-way) for agents/companies/pages
- **Connect** (two-way) for person-to-person networking (optional)
- Privacy controls:
- profile visibility levels (public/registered/contacts-only)

- contact request approvals
- block/unblock
- Discovery:
- “People you may know” can be basic (shared area, shared group) without heavy ML.

7.14 Admin/Moderation

- **FR-50 (P0): Admin Console** manage users, verifications, listings, transactions, disputes.
- **FR-51 (P0): Audit Logs** for verification & payment events.

7.15 Transparency, Guides, and FAQs

- **FR-52 (P0): Ownership Verification Guide UI** provides step-by-step guidance for sellers on how to prove ownership and what documents are expected (linked to listing verification workflow).
- **FR-53 (P1): Legal & Loan Guides** provide checklists, explanations of steps (Bayna/Dalil/Namjari), and loan option explanations (CMS-backed).
- **FR-54 (P1): FAQ Templates** allow sellers/agents to attach common Q&A to a listing (e.g., service charge, utility status, facing, parking, handover date).
- **FR-55 (P1): Cost Transparency Fields** capture and display known costs (e.g., service charge, maintenance, booking money/deposit, additional fees) and explicitly label “unknown / not provided” fields.

7.16 Safety, Abuse Reporting, and Disputes

- **FR-56 (P0): Report Listing/User** (fraud, spam, harassment, inappropriate content) with category, free-text, attachments, and optional anonymity.
- **FR-57 (P1): Dispute Case Management (Expanded)**
- Open a dispute linked to an **order/transaction**.
- Upload evidence (documents, screenshots, payment ref, step proof).
- Admin review + resolution workflow with outcome and audit trail.
- Notify all parties and lock/unlock actions depending on dispute state.

7.16.1 Dispute lifecycle (recommended)

- **Open → Evidence Collection → Review → Resolution → Closed**
- **SLA targets (configurable):**

- Acknowledge dispute within 24 hours
- First review decision within 3 business days (or configurable)
- **Resolution types:**
- Refund (full/partial)
- Cancel order and archive transaction
- Continue transaction with corrective steps
- Account penalties (warning, suspend, ban)

7.16.2 Buyer protection alignment

- If payment protection Mode B is enabled, disputes can trigger **hold release** or **refund** decisions.
- If Mode A is used, platform records dispute decision and supports refund request initiation via gateway flow (gateway-dependent).

7.16.3 Abuse controls (minimum)

- Block user (chat/appointment restrictions)
- Rate-limit spam contacts/messages
- Automated flagging rules for repeated reports

7.17 Real Estate Company / Project Listings (from interview insights)

- **FR-58 (P1): Project Listing Type** supports developer/company projects with units, handover date, and construction progress.
- **FR-59 (P1): Project Progress Updates** allow verified developers to post progress updates (admin-moderated) to reduce “slow project completion” trust issues.

7.18 Monetization & Billing

- **FR-60 (P1): Subscription Plans** for agents/developers (limits, analytics, featured placements).
- **FR-61 (P1): Featured Listings** (pay-per-duration) with clear labeling.

7.19 Service Provider Marketplace (Gap closure from v1.1)

- **FR-62 (P1): Service Listings** service providers can create/edit listings with category, service area, price model, availability, and portfolio.
- **FR-63 (P1): Book/Order Services** users can request or book a service (with schedule, location, scope, and notes).
- **FR-64 (P1): Provider Payout Hooks** store provider payout account details and payout status per service order (implementation may be manual in MVP).
- **FR-65 (P1): Service Reviews** users can review service providers after a completed service order.

7.20 Government Land Portals (BD-context: link-out + tracking)

- **FR-66 (P0): Official Portal Deep Links** provide help-center links and contextual buttons to official portals for:
  - Land record/map services (DLRMS)
  - Online mutation (e-Namjari)
  - Land Development Tax (ভূমি উন্নয়ন কর)
- **FR-67 (P0): Portal Reference Capture** allow users to store portal references as part of a transaction timeline **without** requiring the platform to integrate directly with government systems. At minimum support:
  - Portal type: DLRMS / Mutation (e-Namjari) / LDTax
  - Application/holding/reference numbers (as applicable)
  - Mobile number used for tracking (as applicable)
  - Notes and attachment(s): screenshot/PDF receipt
  - Timestamp + actor (who captured)
- **FR-68 (P1): Status Tracking Assistance (Manual)** provide a guided “check status” UX that mirrors the portal’s required inputs and stores a **user-entered** status snapshot with timestamp.
  - Example (DLRMS tracking): application number + mobile number + **captcha math sum** input.
  - The platform must **not** attempt to automate portal submissions, scrape pages, or solve captchas. The workflow is **link-out + user manual entry + optional screenshot upload**.
  - Status snapshots store: portal type, reference identifiers, status text selected/entered by the user, captured_at, optional evidence attachment.

- **FR-69 (P1): Proof Attachments from Portals** support uploading QR-coded documents (e.g., khatian copy / DCR) as step proofs and link them to transaction steps.

* Notes (BD context):
- LDTax holding registration commonly requires user identity inputs such as mobile number, NID number, DOB, and land references (e.g., khatiyan/dakhila info). MSC Home should only **guide** users and store references/evidence they voluntarily provide.

7.21 Payment Gateway Integration (SSLCOMMERZ-style hardening)

- **FR-70 (P0): Hosted Checkout Support** support redirect-based hosted checkout in addition to (or instead of) embedded checkout for MVP reliability.
- **FR-71 (P0): IPN/Webhook Listener** implement a server-to-server notification endpoint to receive payment status updates independent of the user's browser session.
- **FR-72 (P0): Post-Payment Validation Call** validate successful payment notifications by calling the gateway validation endpoint and reconciling amount/currency/transaction IDs before marking orders as PAID.
- **FR-73 (P1): Refund Operations** support initiating and tracking refunds (gateway dependent) and store refund reference IDs/status.
- **FR-74 (P1): Risk Holds** if gateway flags a payment as risky, the system must place the order in a "HOLD" state for manual verification.

7.22 Operational & Safety Requirements (v3.0 Addendum)

7.22.1 Listing lifecycle & moderation

- **FR-75 (P0): Listing Lifecycle State Machine** implement listing statuses and allowed transitions (see diagram in Section 13):
  - DRAFT → SUBMITTED → UNDER_REVIEW → (PUBLISHED | CHANGES_REQUESTED | REJECTED)
  - PUBLISHED → (PAUSED | ARCHIVED)
  - CHANGES_REQUESTED → SUBMITTED
  - Any non-terminal → ARCHIVED (user-initiated) with retention policy
- **FR-76 (P0): Listing Moderation Queue** provide an admin/verifier queue for listing review decisions with:
  - decision: approve / reject / request_changes
  - reason codes + free-text notes
  - evidence links (photos/docs) and an audit trail

- **FR-77 (P1): Re-Verification Triggers** support automatic or manual re-review when:
  - listing price changes beyond threshold
  - location or ownership documents change
  - user receives fraud reports above threshold
  - listing has been inactive for N days and is re-published
- **FR-78 (P0): Status History + Auditability** store listing status history (who, what, when, why) and expose it to Admin.

7.22.2 Document vault access controls

- **FR-79 (P0): Document Access Requests** allow a user to request access to a listing's sensitive documents (e.g., Dalil/Mutation/Tax) with:
  - purpose (dropdown + free text)
  - requested documents (explicit selection)
  - expiry request (default configurable)
- **FR-80 (P0): Document Access Grants** allow owner/agent (and optionally admin) to approve/deny requests, generating a **time-bound access grant** with:
  - scope (which docs)
  - expiry timestamp
  - download/view permissions (default: view-only)
  - revocation support
- **FR-81 (P1): Document Watermarking / View-Only** for shared documents, render watermarked previews (e.g., userId + timestamp) and discourage raw downloads where feasible.
- **FR-82 (P0): Document Access Audit Log** record every view/download attempt with outcome (allowed/denied) for dispute and fraud investigation.

7.22.3 Messaging safety & abuse prevention

- **FR-83 (P0): Block & Report** users can block another user; blocked users cannot message/call each other.
- **FR-84 (P0): Anti-Spam Controls** enforce server-side rate limits and abuse detection for:
  - message frequency
  - repeated content
  - link/phone-number sharing limits (configurable)

- **FR-85 (P1): Moderation Cases** reported content creates a moderation case with triage, actions (warn/mute/suspend/ban), and evidence snapshots.

7.22.4 Notifications: preferences & delivery

- **FR-86 (P0): Notification Preferences** users can configure per-category notification preferences (in-app, email, SMS) and quiet hours.
- **FR-87 (P1): Reliable Notification Delivery** implement retries/backoff and a dead-letter queue for outbound email/SMS to avoid silent drops.

7.22.5 Disputes, cancellations, refunds

- **FR-88 (P1): Dispute Lifecycle** implement dispute creation, evidence uploads, admin workflow, and outcomes (see diagram in Section 13).
- **FR-89 (P1): Cancellation Policy Engine** define and enforce cancellation rules (time window, state-based eligibility) across orders and transactions.
- **FR-90 (P1): Refund Tracking** store refund attempts and statuses, and link them to disputes where applicable.

7.22.6 Payments: idempotency & signature verification

- **FR-91 (P0): Idempotent Payment Processing** process payment notifications and validations idempotently (dedupe by provider transaction identifiers + local idempotency keys).
- **FR-92 (P0): Verify Gateway Signatures** verify gateway callback/IPN authenticity where supported (e.g., signature fields) before trusting payloads.
- **FR-93 (P1): Reconciliation Report** provide a basic daily reconciliation export/report (orders vs payments vs gateway status) for operations.

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8. Business Rules (BR)

8.1 Verification

- **BR-1:** Verified badge only after successful verification approval.
- **BR-2:** Role-based document requirements (lawyer BAR certificate, institute credential report, etc.).
- **BR-3:** Listing “Verified” requires ownership verification completion.
- **BR-4 (P1):** If e-KYC provider check fails/unavailable, verification can proceed manually; the system stores provider attempts for audit.

8.2 Accuracy Score

- **BR-5:** Accuracy Score is computed from field completeness (required + optional weights).
- **BR-6:** Accuracy Score formula:
  $$\text{AccuracyScore} = \left(\frac{\sum w_i \cdot \mathbb{1}[field_i\ present]}{\sum w_i}\right) \times 100$$
  Weights are configurable by Admin.
- **BR-7 (optional):** Higher score boosts ranking.

8.3 Cost Transparency

- **BR-8:** A listing must not claim “no extra costs” unless the seller explicitly confirms all cost fields.
- **BR-9:** If a seller does not provide a cost field, UI must label it as “Not provided” (to avoid hidden costs).

8.4 Offers/Transactions

- **BR-10:** Only logged-in buyers can submit offers.
- **BR-11:** Offer states: SUBMITTED → COUNTERED → ACCEPTED/REJECTED/WITHDRAWN.
- **BR-12:** Accepted offer creates a transaction record.
- **BR-13:** Transaction steps are append-only and timestamped.
- **BR-14:** Step proof rules (MVP): step can be marked complete only if required proof type is attached (document or counterparty confirmation).

8.5 Payments

- **BR-15:** Payment must reference one order; order must reference one transaction (if property).
- **BR-16:** OTP/3DS is required for payment confirmation (gateway-dependent).
- **BR-17:** Cancel rules: if payment succeeded, refund flow is initiated.

8.6 Buyer Protection / Disputes

- **BR-18 (P1):** A dispute can be opened only for PAID orders within a configurable window.
- **BR-19 (P1):** Dispute status changes are admin-audited.

8.7 Reviews

- **BR-20:** Reviews allowed only after transaction completion.
- **BR-21:** One review per party per transaction.

8.8 Service Provider Marketplace

- **BR-22:** Service reviews are allowed only after a service order is completed.
- **BR-23:** Provider payout status must be auditable (who approved, when, and reference details).

8.9 Payment Gateway Validation & Risk

- **BR-24:** An order must be marked PAID only after back-end validation succeeds (IPN alone is not sufficient).
- **BR-25:** Back-end validation must reconcile at minimum: transaction ID, amount, currency type, and final status.
- **BR-26:** If the gateway returns a “risky” flag for an otherwise successful payment, the platform must place the order into a HOLD state and require additional verification before delivering buyer protection guarantees or releasing service confirmation.
- **BR-27:** The payment integration must require TLS 1.2+ on the merchant server and use server-to-server calls for sensitive API operations.

8.10 Listing Lifecycle & Moderation

- **BR-28:** Listings must not be publicly visible unless status is PUBLISHED.
- **BR-29:** Listings with CHANGES_REQUESTED cannot return to PUBLISHED without re-submission and a new review decision.
- **BR-30 (P1):** A listing should be auto-paused if it receives a configurable number of credible fraud reports pending review.
- **BR-31:** Re-verification triggers (FR-77) must result in either (a) review required before publish, or (b) status downgrade to UNDER_REVIEW/PAUSED until resolved.

8.11 Document Vault Access Policy

- **BR-32:** Vault documents are private by default; access requires explicit grant (FR-80) or verifier/admin role.
- **BR-33:** Access grants are time-bound and revocable; access must be denied after expiry.

- **BR-34 (P1):** When sharing is enabled, provide watermarked previews; raw downloads (if allowed) must be auditable.
- **BR-35:** Every access attempt must be logged (FR-82), including denied attempts.

8.12 Messaging Safety & Abuse Handling

- **BR-36:** Blocking is mutual: when either party blocks, messaging/calling is disabled both ways.
- **BR-37:** The platform must enforce rate limits server-side; clients cannot bypass.
- **BR-38 (P1):** Moderation actions (mute/suspend/ban) must be reversible by Admin and fully audited.

8.13 Notifications

- **BR-39:** Notifications must respect user preferences and quiet hours except for mandatory security alerts (e.g., suspicious login, password change).
- **BR-40 (P1):** Notification delivery failures must be retried and surfaced to operations (dead-letter queue monitoring).

8.14 Cancellations, Refunds, and Holds

- **BR-41 (P1):** Cancellation eligibility depends on order state; once PAID, cancellation triggers refund workflow (where supported).
- **BR-42 (P1):** Refund outcomes are final only after gateway confirmation; partial refunds (if supported) must reconcile amounts.
- **BR-43 (P1):** HOLD orders must not progress to service delivery or step completion requiring payment until released by Admin/Support.

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9. User Stories & Real-Life Scenarios

This section provides comprehensive user stories with detailed acceptance criteria and real-world scenarios based on Bangladesh real estate market dynamics.

9.1 Buyer Stories - Detailed Scenarios

US-B1: Property Discovery & Search

As a first-time property buyer in Dhaka,
I want to search for 3-bedroom apartments in Gulshan/Banani area with verified listings only,
So that I can find trustworthy options within my budget.

Real-Life Scenario:
Sumaiya Akter, a 28-year-old software engineer, is looking to buy her first apartment. She has a budget of BDT 80 Lakh and wants to live near her workplace in Gulshan. She is concerned about fraud and wants to see only verified properties.

Acceptance Criteria:
- System displays advanced search filters with location (area/zone), price range, property type, bedrooms, and verified-only toggle
- Search results show verified badge prominently for verified listings
- Results include listing accuracy score (completeness percentage)
- Each listing shows key info: price, area (sqft), location, owner/agent name, and verification status
- System highlights "Recommended" properties based on search history
- Results load within 2 seconds for searches with < 100 matches
- Favorites can be saved for later viewing with one-click
- Search can be saved with email/SMS alerts for new matching listings

Test Data:
- Location: Gulshan, Banani, Baridhara
- Price: BDT 60-90 Lakh
- Type: Apartment/Flat
- Bedrooms: 3
- Verified Only: Yes
- Expected Results: 15-25 verified listings

US-B2: Detailed Listing Inspection

As a buyer,
I want to view comprehensive listing details including photos, virtual tour, document status, and ownership verification,
So that I can make an informed decision without visiting in person initially.

Real-Life Scenario:
Sumaiya finds an apartment in Banani that matches her criteria. Before scheduling a visit, she

wants to verify all details online - including checking if the seller has uploaded ownership documents (Dalil) and whether the listing has been field-verified.

Acceptance Criteria:
- Listing detail page shows:
- High-resolution photo gallery (minimum 10 photos for apartments)
- Virtual tour (if available) with 360° view
- Detailed specifications: floor plan, facing direction, utilities, parking, amenities
- Document vault status showing which documents are uploaded (Dalil, Tax Receipt, NOC, etc.)
- Ownership verification status and verification date
- Listing accuracy score with breakdown (required vs. optional fields filled)
- Seller/agent profile with verified badge and rating
- Response time metrics for the agent
- User can save listing to favorites
- User can request document access with reason
- User can initiate chat or book appointment directly from listing page
- System logs all document access requests for audit

Test Data:
- Listing ID: BAN-APT-2024-0045
- Location: Road 12, Block E, Banani
- Price: BDT 75 Lakh
- Size: 1,450 sqft, 3 bed, 3 bath
- Documents: Dalil (uploaded), Mutation (uploaded), Tax Receipt (uploaded)
- Verification: Ownership verified, Field verified
- Accuracy Score: 92%

US-B3: Communication & Appointment Booking

As a buyer,
I want to chat with the agent, book an appointment for property visit, and capture all communication history,
So that I can coordinate visit schedules and have a record of all discussions.

Real-Life Scenario:
After reviewing the listing, Sumaiya wants to visit the property. She messages the agent via the platform asking about possession date and utility bills. The agent responds within 2 hours confirming the visit for the upcoming Friday at 4 PM.

Acceptance Criteria:
- Chat interface shows real-time message status (sent/delivered/read)
- User can send text, images, and documents via chat
- User can book appointment by selecting date, time, and purpose
- Agent receives booking request notification (in-app, email, SMS)
- Agent can accept/reschedule/decline appointment with reason
- System sends confirmation notification to both parties
- All chat history is preserved and searchable
- User can report spam or block user if needed
- System tracks agent response time and displays on profile
- Appointment reminders sent 24 hours and 2 hours before scheduled time

Test Data:
- Chat initiated: 2024-01-15 10:30 AM
- Agent response time: 1 hour 45 minutes
- Appointment requested: 2024-01-19, 4:00 PM
- Purpose: Property visit and document review
- Agent confirmation: Accepted within 3 hours

US-B4: Offer Submission & Negotiation

As a buyer,
I want to submit a formal offer with my proposed price and terms, and negotiate if needed,
So that I can reach a mutually acceptable deal without informal discussions.

Real-Life Scenario:
Sumaiya likes the property after the visit. The asking price is BDT 75 Lakh but she wants to offer BDT 72 Lakh based on market comparison. She submits the offer through the platform. The agent counters at BDT 73.5 Lakh. After one more round, they agree at BDT 73 Lakh.

Acceptance Criteria:
- User can submit offer with:
- Proposed price
- Advance/booking money amount
- Possession timeline preference
- Loan/financing requirement (Yes/No)
- Additional terms/conditions (free text)
- Offer status tracked: SUBMITTED → COUNTERED → ACCEPTED/REJECTED/WITHDRAWN
- Seller/agent can:
- Accept offer (creates transaction)
- Counter with new price and terms

- Reject with reason
- Both parties see offer history with timestamps
- System limits counter offers to prevent infinite loops (max 5 rounds)
- Accepted offer automatically creates a transaction record and moves to next steps
- Email/SMS notifications sent on every offer action

Test Data:
- Listing Price: BDT 75,00,000
- Offer 1 (Buyer): BDT 72,00,000 + BDT 3,00,000 advance + Possession in 45 days
- Counter 1 (Seller): BDT 73,50,000 + BDT 3,50,000 advance + Possession in 60 days
- Counter 2 (Buyer): BDT 73,00,000 + BDT 3,50,000 advance + Possession in 60 days
- Status: ACCEPTED
- Transaction ID: TXN-BAN-2024-0045 created

US-B5: Transaction Tracking & Document Management

As a buyer,
I want to track all transaction steps (Bayna, Dalil, Namjari) and upload proof documents at each milestone,
So that I have a complete digital record of the property purchase process.

Real-Life Scenario:
After offer acceptance, Sumaiya and the seller proceed with the legal process. They prepare Bayna (agreement to sell), register the Dalil at the Sub-Registrar office, and apply for Namjari (mutation). Sumaiya uploads proof of each step into the platform's transaction timeline, and both parties can see the progress.

Acceptance Criteria:
- Transaction timeline shows all steps:
1. Offer Accepted
2. Document Collection Started
3. Ownership Verification Complete
4. Bayna Agreement Signed
5. Legal Review Complete
6. Payment/Token Money
7. Dalil Registration Complete
8. Namjari Application Submitted
9. Namjari Approved
10. Land Tax Payment Complete
11. Handover Complete
12. Transaction Closed

- Each step shows:
- Status: Pending / In Progress / Complete / Verified
- Required proof documents
- Upload date and uploader name
- Admin verification status (if applicable)
- Both buyer and seller can upload documents
- Admin/verifier can review and approve documents
- System sends reminders if a step is pending for > 7 days
- Government portal link-outs provided for Namjari and Land Tax steps
- User can add notes/comments at each step
- Complete audit trail with timestamps maintained

Test Data:
- Transaction ID: TXN-BAN-2024-0045
- Step 1: Offer Accepted (2024-01-20) - Auto-logged
- Step 4: Bayna signed (2024-01-27) - Buyer uploaded Bayna PDF
- Step 7: Dalil registered (2024-02-15) - Seller uploaded Dalil copy
- Step 8: Namjari submitted (2024-02-20) - Buyer added portal ref: MUT-DHK-2024-12345
- Step 9: Namjari approved (2024-03-10) - Buyer uploaded updated Khatian
- Step 11: Handover (2024-03-15) - Both parties confirmed
- Step 12: Closed (2024-03-16) - Reviews enabled

US-B6: Secure Payment with OTP/3DS

As a buyer,
I want to pay booking money or token money securely through the platform with OTP verification,
So that I have a verifiable payment record linked to the transaction.

Real-Life Scenario:
Sumaiya needs to pay BDT 3,50,000 as booking money after Bayna is signed. She selects bKash as payment method, enters the amount, and completes OTP verification. The payment is recorded in the transaction timeline and both parties receive confirmation.

Acceptance Criteria:
- User can select payment gateway: bKash / Nagad / SSLCommerz (card/e-banking)
- System creates payment intent with unique idempotency key
- User is redirected to gateway hosted checkout
- User completes OTP/3DS verification via gateway
- System receives IPN (Instant Payment Notification) from gateway
- System validates payment via gateway validation API

- On successful validation:
- Order status updated to PAID
- Transaction step updated
- Payment receipt generated with reference number
- Email/SMS confirmation sent to both parties
- On risky payment flag:
- Order placed in HOLD status
- Admin manual verification required
- All payment events logged for reconciliation
- Payment failures trigger automatic refund initiation
- Payment timeout (30 min) auto-cancels order

Test Data:
- Transaction ID: TXN-BAN-2024-0045
- Payment Amount: BDT 3,50,000
- Gateway: bKash
- Payment ID: PAY-BAN-2024-0045-001
- Gateway Transaction ID: BK-DHK-20240127-987654
- OTP Sent: +880-1712-XXXXXX
- Payment Status: SUCCESS
- Validation: Amount matched, Transaction ID matched
- Order Status: PAID
- Receipt ID: RCP-2024-0045-001

US-B7: Post-Transaction Rating & Review

As a buyer,
I want to rate and review the seller/agent after transaction completion,
So that I can share my experience and help future buyers make informed decisions.

Real-Life Scenario:
After successfully moving into the apartment, Sumaiya wants to leave a positive review for the agent who was responsive and professional throughout the process. She rates 5 stars and writes about the smooth transaction experience.

Acceptance Criteria:
- Review option enabled only after transaction status = COMPLETED
- User can provide:
- Overall rating (1-5 stars)
- Category ratings: Communication, Professionalism, Transparency, Timeliness
- Written review (min 50 characters)

- Option to recommend (Yes/No)
- User can upload photos (optional)
- System prevents duplicate reviews for same transaction
- Review visible on seller/agent profile after approval
- Seller/agent can respond to review (within 30 days)
- User can report fake/spam reviews
- Average rating auto-calculated and displayed on profile
- Reviews count toward seller/agent reputation score

Test Data:
- Transaction ID: TXN-BAN-2024-0045
- Reviewer: Sumaiya Akter (Buyer)
- Reviewed: Agent XYZ Real Estate
- Overall Rating: 5/5
- Communication: 5/5
- Professionalism: 5/5
- Transparency: 4/5
- Timeliness: 5/5
- Review Text: "Excellent service! The agent was very responsive and helped us complete all the legal formalities smoothly. Highly recommended!"
- Recommendation: Yes
- Review Date: 2024-03-18
- Agent Response: "Thank you for your kind words! It was a pleasure assisting you."

9.2 Seller / Agent Stories - Detailed Scenarios

US-S1: Listing Creation with Complete Details

As a real estate agent,
I want to create a comprehensive property listing with all required details, media, and documents,
So that I can attract serious buyers and achieve high accuracy score.

Real-Life Scenario:
Rafiq Ahmed, a URA-certified agent, has a new listing - a 2,000 sqft apartment in Dhanmondi. He wants to create a detailed listing with photos, floor plan, and ownership documents to establish trust and get quick responses.

Acceptance Criteria:
- Agent can create listing with:
- Property type: Apartment/Flat, Land, Commercial/Project

- Location: Area, road, block, landmarks, map pin
- Specifications: Size (sqft/katha), bedrooms, bathrooms, floor, facing
- Pricing: Asking price, negotiable (Yes/No), price per sqft
- Amenities: Parking, lift, generator, gas, water, security
- Possession: Ready/Under construction/Future, handover date
- Legal status: Ownership type, approval status
- Agent can upload:
- Photos (min 10, max 50) with auto-resize and compression
- Virtual tour link (optional)
- Floor plan PDF (optional)
- Documents to vault: Dalil, Mutation, Tax Receipt, NOC, Allotment Letter
- System calculates accuracy score in real-time as fields are filled
- Draft listing can be saved and resumed later
- Agent can submit for verification when ready
- System validates required fields before submission
- After submission, listing status = UNDER_REVIEW
- Agent receives confirmation and estimated review time

Test Data:
- Property Type: Apartment/Flat
- Location: Road 5, Dhanmondi R/A, Dhaka-1205
- Size: 2,000 sqft
- Bedrooms: 3, Bathrooms: 3
- Floor: 7th, Facing: South
- Price: BDT 95,00,000 (BDT 4,750/sqft)
- Amenities: Parking (1 car), Lift (Yes), Generator (Yes), Gas (Yes)
- Photos: 15 uploaded
- Documents: Dalil (uploaded), Mutation (uploaded), Tax Receipt (uploaded)
- Accuracy Score: 94%
- Status: SUBMITTED for review
- Listing ID: DHN-APT-2024-0078

US-S2: Professional Verification

As a URA-certified real estate agent,
I want to submit my professional verification documents and receive verified badge,
So that buyers trust my listings and I get priority in search results.

Real-Life Scenario:
Rafiq wants to establish credibility on the platform. He uploads his URA certificate, NID, trade

license, and bank account details for verification. After admin review, he receives the "URA Verified Agent" badge which is prominently displayed on his profile and all his listings.

Acceptance Criteria:
- Agent can access Professional Verification section from profile
- Agent uploads documents based on role:
- Real Estate Agent: URA certificate (if applicable), NID, Trade License, Bank Details
- Legal Agent: BAR Council certificate, NID, Firm Registration, Bank Details
- Financial Agent: Institute credential report, Authorization Letter, NID
- Agent provides business information:
- Company name, registration number, office address
- Contact numbers, email, website
- Service areas, specializations
- System validates file formats (PDF/JPG/PNG), size limits (max 5MB per file)
- Verification request status: PENDING → UNDER_REVIEW → APPROVED/REJECTED
- Admin/verifier can:
- View all uploaded documents
- Verify document authenticity
- Approve/reject with reason
- Request additional documents
- On approval:
- Verified badge enabled on profile
- Badge type shown: "URA Verified Agent", "Legal Expert", "Financial Advisor"
- Verification date displayed
- Agent listed in verified directory
- On rejection:
- Reason provided
- Agent can resubmit with corrections
- Email/SMS notifications sent at each status change

Test Data:
- Agent: Rafiq Ahmed
- Role: Real Estate Agent
- URA Certificate: URA-DHK-2022-5678 (uploaded)
- NID: 1234567890123 (uploaded)
- Trade License: TRAD-DHK-2020-9876 (uploaded)
- Company: Rafiq Properties Ltd.
- Office: House 45, Road 11, Dhanmondi, Dhaka
- Verification Status: APPROVED
- Badge: "URA Verified Agent"

- Verification Date: 2024-01-10
- Badge Expiry: 2025-01-10 (annual renewal required)

US-S3: Inquiry & Appointment Management

As a seller/agent,
I want to receive inquiries via chat, manage appointment requests, and respond quickly,
So that I can convert leads into transactions and maintain high response rate.

Real-Life Scenario:
Rafiq receives 5 inquiries on his Dhanmondi listing within the first week. He responds to each within 2 hours, books 3 property visits, and his response rate metric improves to 98% with average response time of 1.5 hours.

Acceptance Criteria:
- Agent receives real-time notifications for:
- New chat messages
- Appointment requests
- Offer submissions
- Document access requests
- Agent dashboard shows:
- Unread messages count
- Pending appointments
- Response time metrics (7-day, 30-day average)
- Response rate percentage
- Agent can:
- Respond to chat from web/mobile app
- Accept/reschedule/decline appointments with reason
- View appointment calendar with all bookings
- Set availability schedule and auto-block unavailable slots
- Enable/disable auto-responses for busy periods
- System tracks:
- Time to first response for each inquiry
- Appointment acceptance rate
- No-show rate
- Response SLA targets:
- Chat messages: Respond within 2 hours (recommended)
- Appointments: Accept/decline within 4 hours (recommended)
- System sends reminders if response pending > SLA target
- Poor response metrics trigger warning notification
- Excellent response metrics earn "Quick Responder" badge

Test Data:
- Agent: Rafiq Ahmed
- Listing: DHN-APT-2024-0078
- Week 1 Inquiries: 5 chat conversations, 3 appointment requests
- Response Metrics:
- Average response time: 1 hour 35 minutes (Target: < 2 hours) ✓
- Response rate: 100% (5/5 responded)
- Appointment acceptance: 100% (3/3 accepted)
- Badges Earned: "Quick Responder" (response time < 2 hours for 7 days)
- Calendar: 3 appointments scheduled (Jan 25, Jan 27, Jan 29)

US-S4: Offer Negotiation & Acceptance

As a seller/agent,
I want to receive offers, negotiate terms, and accept the best offer,
So that I can close the deal at optimal price with serious buyers.

Real-Life Scenario:
Rafiq receives 2 offers on the Dhanmondi listing: Offer A at BDT 92 Lakh (cash buyer, 30-day possession) and Offer B at BDT 93 Lakh (loan buyer, 60-day possession). He discusses with the owner and counters Offer A at BDT 93 Lakh with 45-day possession. Buyer A accepts and the deal is closed.

Acceptance Criteria:
- Agent receives notification for each new offer
- Agent can view offer details:
- Offered price vs. asking price
- Advance/booking money proposed
- Possession timeline
- Financing method (cash/loan)
- Buyer verification status
- Buyer rating/reputation (if available)
- Agent can:
- Accept offer immediately (creates transaction)
- Counter with new terms (price, advance, timeline)
- Reject with reason (e.g., "Price too low", "Prefer cash buyer")
- Request buyer to increase offer
- Agent can compare multiple offers side-by-side
- System tracks offer history and negotiation rounds
- After acceptance:
- Transaction automatically created

- Both parties notified
- Listing status changes to "Under Transaction" or "Sold Pending"
- Other pending offers auto-rejected with notification
- Seller/owner receives offer summary via email/SMS for approval

Test Data:
- Listing: DHN-APT-2024-0078
- Asking Price: BDT 95,00,000

Offer A:
- Buyer: Sumaiya Akter (Verified)
- Offered Price: BDT 92,00,000
- Advance: BDT 3,00,000
- Possession: 30 days
- Financing: Cash
- Agent Action: COUNTER at BDT 93,00,000, 45 days
- Buyer Response: ACCEPTED
- Status: DEAL CLOSED
- Transaction: TXN-DHN-2024-0078 created

Offer B:
- Buyer: Karim Hassan
- Offered Price: BDT 93,00,000
- Advance: BDT 2,50,000
- Possession: 60 days
- Financing: Bank Loan
- Agent Action: REJECTED (Deal closed with Offer A)

US-S5: Review Management & Reputation

As a seller/agent,
I want to receive reviews after transaction completion and respond to feedback,
So that I can build my reputation and address any concerns professionally.

Real-Life Scenario:
After the successful transaction, Rafiq receives a 5-star review from Sumaiya praising his professionalism. He responds with gratitude. Over 6 months, he accumulates 15 reviews with an average rating of 4.8/5, which boosts his profile visibility.

Acceptance Criteria:
- Agent receives notification when a review is posted
- Agent can view review details:

- Overall rating and category ratings
- Written review text
- Reviewer name and transaction details
- Review date
- Agent can respond to review (within 30 days):
- Thank positive reviews
- Address concerns in negative reviews professionally
- Provide clarifications if needed
- Response character limit: 500 characters
- Agent cannot delete reviews (only admin can remove inappropriate reviews)
- Agent profile shows:
- Average overall rating
- Total number of reviews
- Rating distribution (5-star: X%, 4-star: Y%, ...)
- Recent reviews (latest 5)
- Response rate to reviews
- High ratings (4.5+ with 10+ reviews) earn "Top Rated" badge
- Agent can request dissatisfied clients to revise review after issue resolution
- Agent can report fake/spam reviews for admin investigation

Test Data:
- Agent: Rafiq Ahmed
- Total Reviews: 15
- Average Rating: 4.8/5
- Rating Distribution:
- 5-star: 12 reviews (80%)
- 4-star: 2 reviews (13%)
- 3-star: 1 review (7%)
- 2-star: 0
- 1-star: 0
- Response Rate: 100% (15/15 responses)
- Badges: "Top Rated Agent", "Quick Responder", "URA Verified"
- Latest Review:
- From: Sumaiya Akter
- Rating: 5/5
- Review: "Excellent service! Highly professional and responsive."
- Agent Response: "Thank you Sumaiya! It was a pleasure assisting you with your new home. Wishing you all the best!"
- Response Date: 2024-03-19

9.3 Legal Agent Stories - Detailed Scenarios

US-L1: Legal Service Discovery & Booking

As a verified legal agent (lawyer),
I want to list my legal services and receive booking requests from buyers/sellers,
So that I can provide property vetting and legal assistance services.

Real-Life Scenario:
Advocate Tahmina Sultana is a practicing lawyer specializing in property law. She creates her professional profile on MSC Home, lists her services (property vetting, title verification, document preparation), and sets her consultation fee. She receives a booking from Sumaiya who needs legal review before finalizing the Dhanmondi apartment purchase.

Acceptance Criteria:
- Legal agent can create professional profile with:
- BAR Council registration number and certificate
- Areas of specialization (property law, civil law, etc.)
- Service offerings: Property vetting, Title search, Document preparation, Court representation
- Consultation fee structure
- Office location and availability schedule
- Legal agent can list services with:
- Service name and description
- Pricing (fixed/hourly)
- Estimated turnaround time
- Required documents from client
- Buyer/seller can:
- Search legal agents by location, specialization, rating
- View agent profile, credentials, and reviews
- Book service by selecting service type and preferred date/time
- Upload case documents via secure document vault
- Legal agent receives booking notification with:
- Client details and transaction reference
- Service requested
- Uploaded documents
- Client contact information
- Legal agent can:
- Accept/decline booking
- Request additional documents
- Provide preliminary assessment
- Schedule consultation appointment
- System tracks:

- Case status: New / Document Review / In Progress / Completed
- Milestones and deliverables
- Payment status
- Legal agent delivers report via document vault
- Client can rate legal service after completion

Test Data:
- Legal Agent: Advocate Tahmina Sultana
- BAR Registration: BAR-DHK-2015-4567
- Specialization: Property Law, Title Verification
- Service: Property Vetting & Title Search
- Fee: BDT 15,000 (Fixed)
- Turnaround: 5-7 business days
- Client: Sumaiya Akter
- Transaction: TXN-DHN-2024-0078
- Documents Uploaded: Dalil copy, Mutation copy, Tax receipts
- Booking Date: 2024-02-01
- Service Status: COMPLETED
- Report Delivered: 2024-02-07 (Property Title Clear, No Legal Issues Found)
- Client Rating: 5/5

9.4 Admin / Verifier Stories - Detailed Scenarios

US-A1: Verification Queue Management

As an admin/verifier,
I want to review pending verification requests and approve/reject with proper audit trail,
So that only genuine verified users and listings appear on the platform.

Real-Life Scenario:
Admin Minhaz reviews the verification queue every morning. He has 12 pending identity verifications, 5 professional verifications, and 8 listing verifications. He processes each request by checking documents, verifying authenticity, and making decisions with reasons logged.

Acceptance Criteria:
- Admin dashboard shows verification queues:
- Identity Verification (Individual users)
- Professional Verification (Agents, Lawyers, Financial Advisors)
- Listing Verification (Property ownership and details)
- Document Verification (Transaction step proofs)

- Each queue shows:
- Pending count
- Average wait time
- Oldest pending request
- Priority flags (if any)
- Admin can filter/sort by:
- Submission date (oldest first)
- Request type
- User type
- Priority
- For each verification request, admin can:
- View all uploaded documents (with zoom/download)
- Check user/agent profile and history
- View related listings/transactions
- Add internal notes (visible to other admins only)
- Approve with verification date and badge type
- Reject with reason (dropdown + free text)
- Request more information/documents
- On approval:
- Verified badge enabled immediately
- User/agent notified via email/SMS
- Verification expiry date set (if applicable)
- Audit log entry created
- On rejection:
- Reason sent to user
- User can resubmit with corrections
- Rejection reason logged
- Admin performance metrics tracked:
- Verification processing time
- Approval/rejection rate
- Re-submission rate

Test Data:
- Admin: Minhaz Rahman
- Date: 2024-01-10
- Queue Status:
- Identity Verification: 12 pending
- Professional Verification: 5 pending
- Listing Verification: 8 pending
- Sample Review:
- Request ID: VER-PRO-2024-0089

- User: Rafiq Ahmed
- Type: Professional (Real Estate Agent)
- Documents: URA Certificate, NID, Trade License
- Submission Date: 2024-01-08
- Admin Decision: APPROVED
- Badge Granted: "URA Verified Agent"
- Processing Time: 2 days
- Audit Log: "Verified URA certificate DHK-2022-5678, NID matched, Trade License valid"

US-A2: Dispute Resolution Management

As an admin/support agent,
I want to review dispute cases, investigate evidence, and make fair resolution decisions,
So that buyer-seller conflicts are resolved transparently with proper documentation.

Real-Life Scenario:
A buyer files a dispute claiming the property handover was delayed by 30 days beyond the agreed timeline. Admin reviews the transaction timeline, chat history, and uploaded proofs. After investigation, admin determines the delay was due to seller's fault and approves a partial refund of booking money to compensate for the delay.

Acceptance Criteria:
- Admin can view all dispute cases with filters:
- Status: Open / Under Review / Mediation / Resolved / Closed
- Priority: Critical / High / Medium / Low
- Type: Payment dispute, Delivery dispute, Quality dispute, Fraud claim
- Transaction amount range
- Each dispute case shows:
- Transaction details and parties involved
- Dispute reason and description
- Evidence uploaded by both parties
- Chat history and communication logs
- Transaction timeline with all steps
- Payment records
- Admin can:
- Request additional evidence from either party
- Add investigation notes (internal)
- Escalate to senior admin
- Propose resolution with options:
- Full refund
- Partial refund (specify amount and reason)

- Cancel order with no refund
- Continue transaction with corrective steps
- Impose penalty on violating party
- Set resolution deadline
- Both parties are notified of proposed resolution
- Parties can accept or appeal resolution (within 7 days)
- On acceptance:
- Resolution executed (refund processed, order updated)
- Case status: RESOLVED
- Both parties notified
- Review eligibility updated
- On appeal:
- Case escalated to senior admin
- Additional review conducted
- Final decision is binding
- Complete audit trail maintained

Test Data:
- Dispute ID: DIS-2024-0023
- Transaction: TXN-DHN-2024-0078
- Opened By: Sumaiya Akter (Buyer)
- Dispute Type: Delivery Delay
- Reason: "Handover delayed by 30 days from agreed date"
- Evidence (Buyer):
- Transaction timeline showing agreed handover: 2024-03-15
- Chat messages with seller confirming date
- Actual handover: 2024-04-15
- Evidence (Seller):
- Claim: "Delay due to pending Namjari approval"
- No proof of communication about delay
- Admin Investigation:
- Reviewed transaction timeline
- Checked chat history
- Found: Seller did not inform buyer proactively about delay
- Found: Delay caused inconvenience (buyer paid rent for 30 extra days)
- Admin Decision:
- Partial refund: BDT 30,000 (compensation for rent paid during delay)
- Warning issued to seller for poor communication
- Case status: RESOLVED
- Refund processed: 2024-04-20

- Buyer Response: Accepted
- Case Closed: 2024-04-21

9.5 User Story Summary Matrix

Story ID	User Type	Feature	Priority	Complexity	Dependencies
US-B1	Buyer	Property Search	P0	Medium	FR-19, FR-20
US-B2	Buyer	Listing Details	P0	Medium	FR-12, FR-13, FR-16
US-B3	Buyer	Chat & Appointments	P0	High	FR-23, FR-25
US-B4	Buyer	Offer & Negotiation	P0	High	FR-27, FR-28
US-B5	Buyer	Transaction Tracking	P0	High	FR-29, FR-32, FR-66-69
US-B6	Buyer	Secure Payment	P0	High	FR-33, FR-34, FR-70-74
US-B7	Buyer	Reviews	P0	Low	FR-41, FR-42
US-S1	Seller/Agent	Listing Creation	P0	High	FR-12, FR-13
US-S2	Seller/Agent	Verification	P0	Medium	FR-8, FR-9, FR-10

Story ID	User Type	Feature	Priority	Complexity	Dependencies
US-S3	Seller/Agent	Inquiry Management	P0	Medium	FR-23, FR-25, FR-26a-c
US-S4	Seller/Agent	Offer Management	P0	High	FR-27, FR-28
US-S5	Seller/Agent	Review Management	P0	Low	FR-42, FR-43
US-L1	Legal Agent	Service Booking	P0	Medium	FR-36, FR-37, FR-38
US-A1	Admin	Verification Queue	P0	High	FR-9, FR-76, FR-78
US-A2	Admin	Dispute Resolution	P1	High	FR-57, FR-88, FR-89, FR-90

9.3 Legal / Financial

- **US-L1:** Verified legal agent receives bookings and provides vetting report.
- **US-F1:** Verified financial agent receives loan support requests.

9.4 Admin / Verifier

- **US-A1:** Review verification requests and approve/reject with reason.
- **US-A2:** Review disputes and resolve with auditable decisions.

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10. Data Requirements

10.1 Core Entities (MVP)

- User, Role, UserRole
- VerificationRequest, VerificationDecision, Document
- PropertyListing, ListingMedia, Favorite
- Offer
- Transaction, TransactionStep
- Order, Payment
- Review
- Appointment
- ChatThread, ChatParticipant, Message
- AuditLog

Additional (P1):
- ServiceListing, ServiceOrder, ServiceProviderProfile, PayoutAccount
- LandPortalReference (stores mutation/dlrms/ldtax reference metadata per transaction)

10.2 BD-specific Document Types (suggested)

- NID (front/back)
- Deed copy (Dalil)
- Bayna agreement copy
- Mutation/Namjari paper(s)
- Tax receipt / DCR (where applicable)

10.3 Additional Entities / Tables (v3.0 gaps closed)

Operational & compliance-oriented data that enables auditability and safe workflows:

- **ListingStatusHistory**: listing_id, from_status, to_status, reason_code, notes, actor_user_id, created_at.
- **ListingVerificationChecklist** (optional): listing_id, check_type, status, verifier_notes, evidence_document_id, created_at.

- **DocumentAccessRequest**: requester_user_id, listing_id (optional), transaction_id (optional), requested_doc_ids, purpose, status, created_at.
- **DocumentAccessGrant**: request_id, granter_user_id, allowed_doc_ids, can_download, expires_at, revoked_at.
- **Dispute**: order_id, opened_by_user_id, dispute_type, status, summary, opened_at, resolved_at.
- **DisputeEvidence**: dispute_id, uploader_user_id, document_id, note, created_at.
- **Refund**: payment_id, dispute_id (optional), provider_refund_id, amount, currency, status, initiated_by_user_id, created_at.
- **Notification**: user_id, type, channel, payload_json, status (queued/sent/failed), created_at.
- **NotificationPreference**: user_id, category, channel, enabled, quiet_hours.
- **ModerationCase**: target_type (listing/user/message), target_id, reporter_user_id, reason, status, action_taken, created_at.
- **DeviceSession** (optional): user_id, device_fingerprint, refresh_token_id, last_seen_at, revoked_at.
- **PaymentEvent**: payment_id, provider_event_type, raw_payload_hash, received_at, processed_at, processing_result.
- **LandPortalReference** (from v2.2): extend to include portal_type, reference_id(s), mobile_used, notes, attachments.
- **LandPortalStatusSnapshot** (new): portal_reference_id, captured_by_user_id, status_text, captured_at, evidence_document_id (optional).

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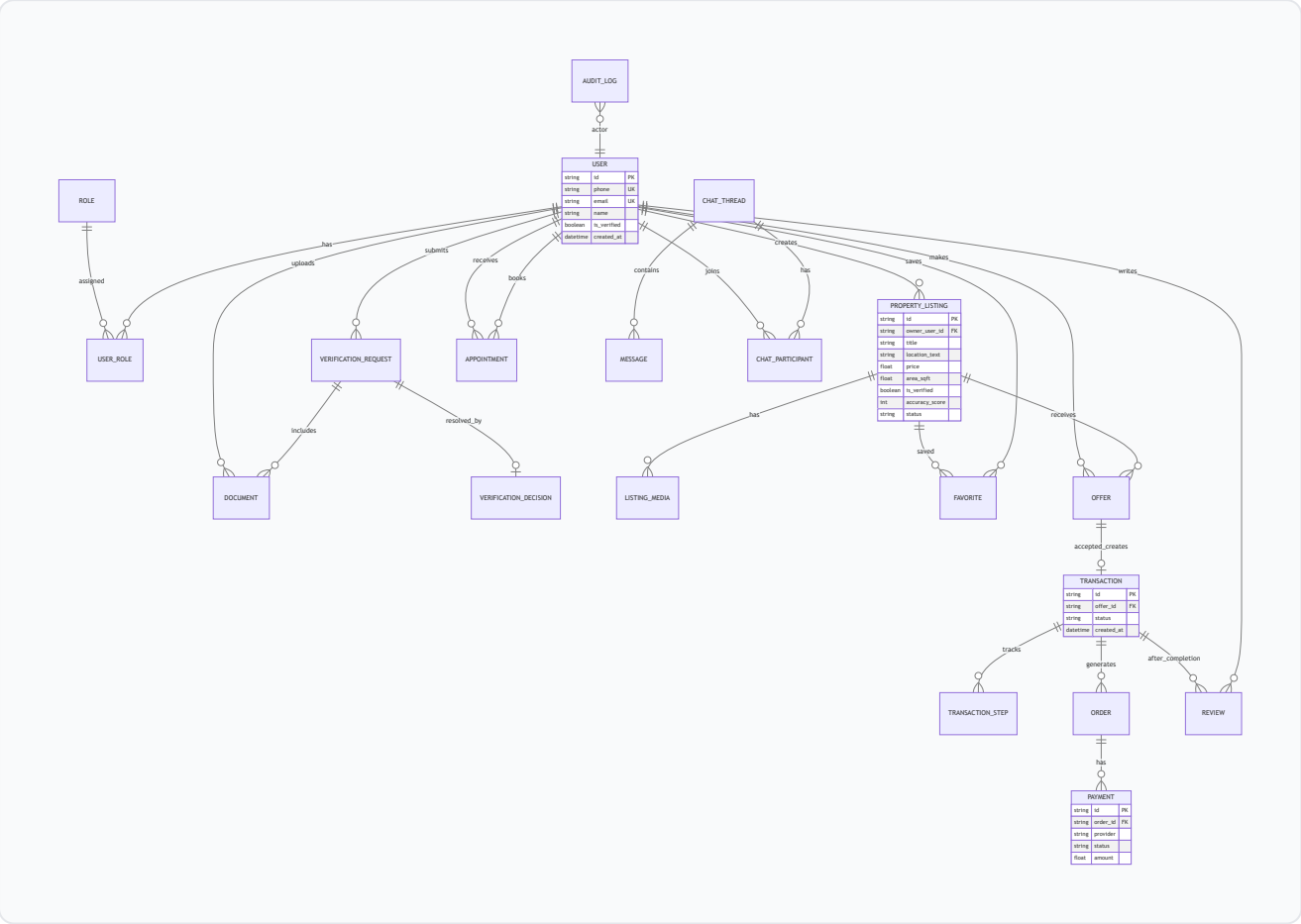
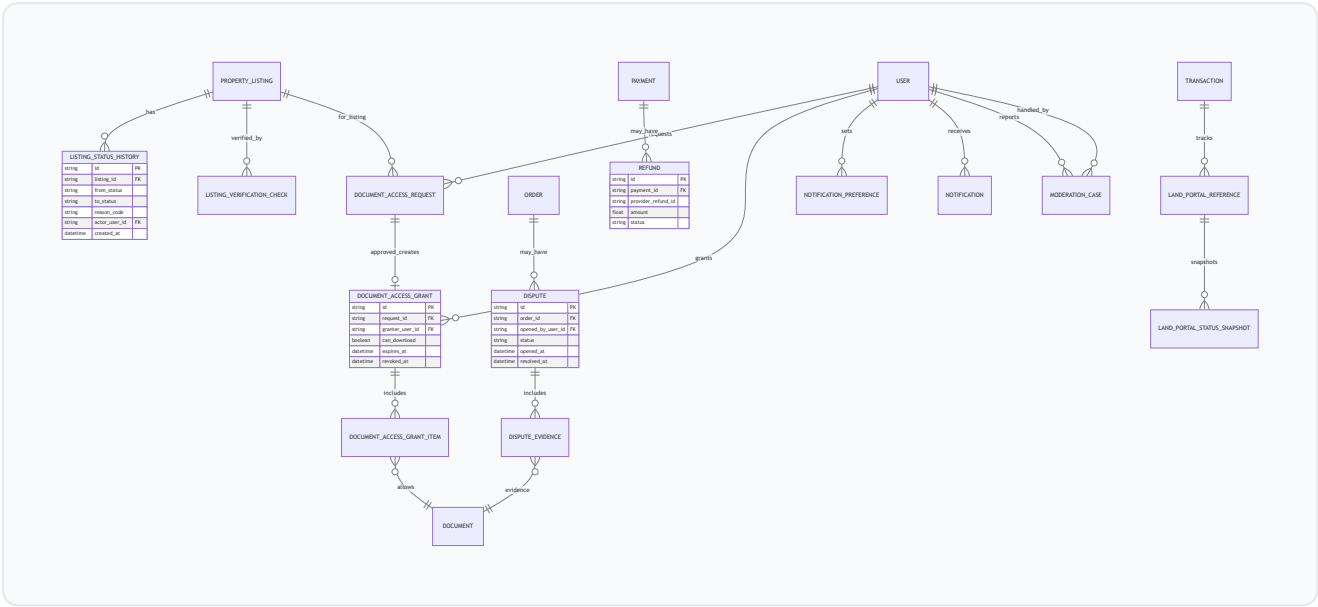
11. ERD (Mermaid)

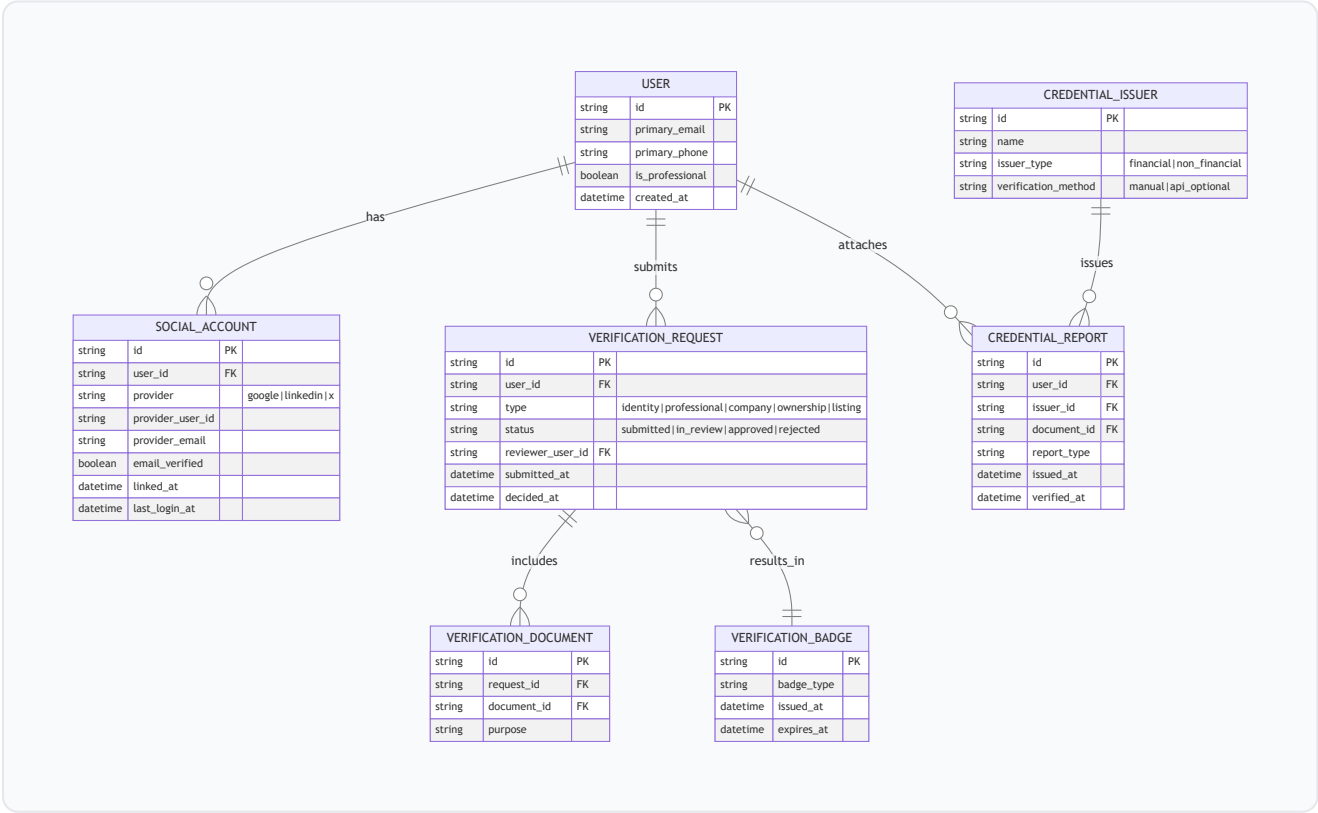
11.1 Core Marketplace ERD



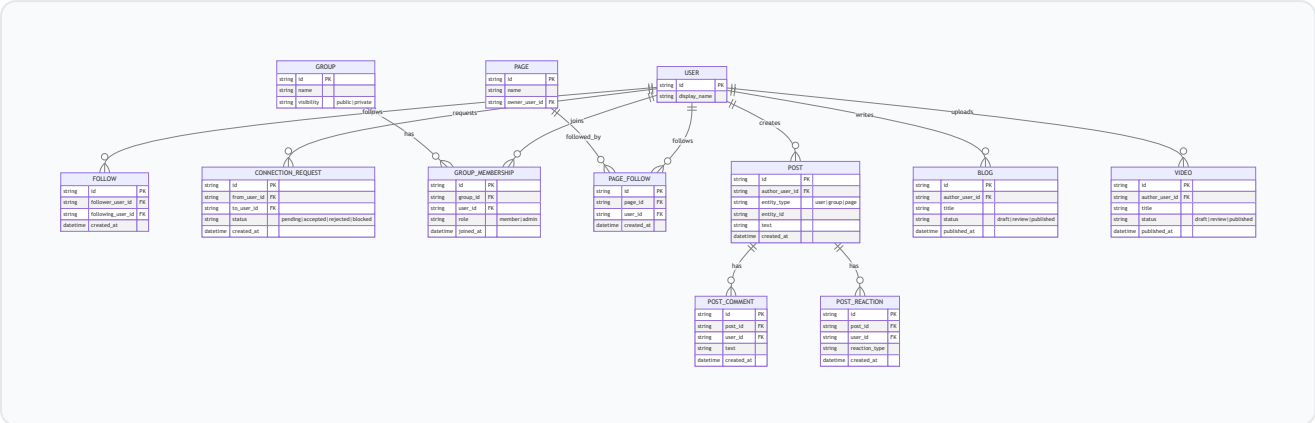
11.2 Extended Operational ERD (v3.0 Addendum)



11.3 Auth, Social Login & Credentials ERD (v3.1 Addendum)

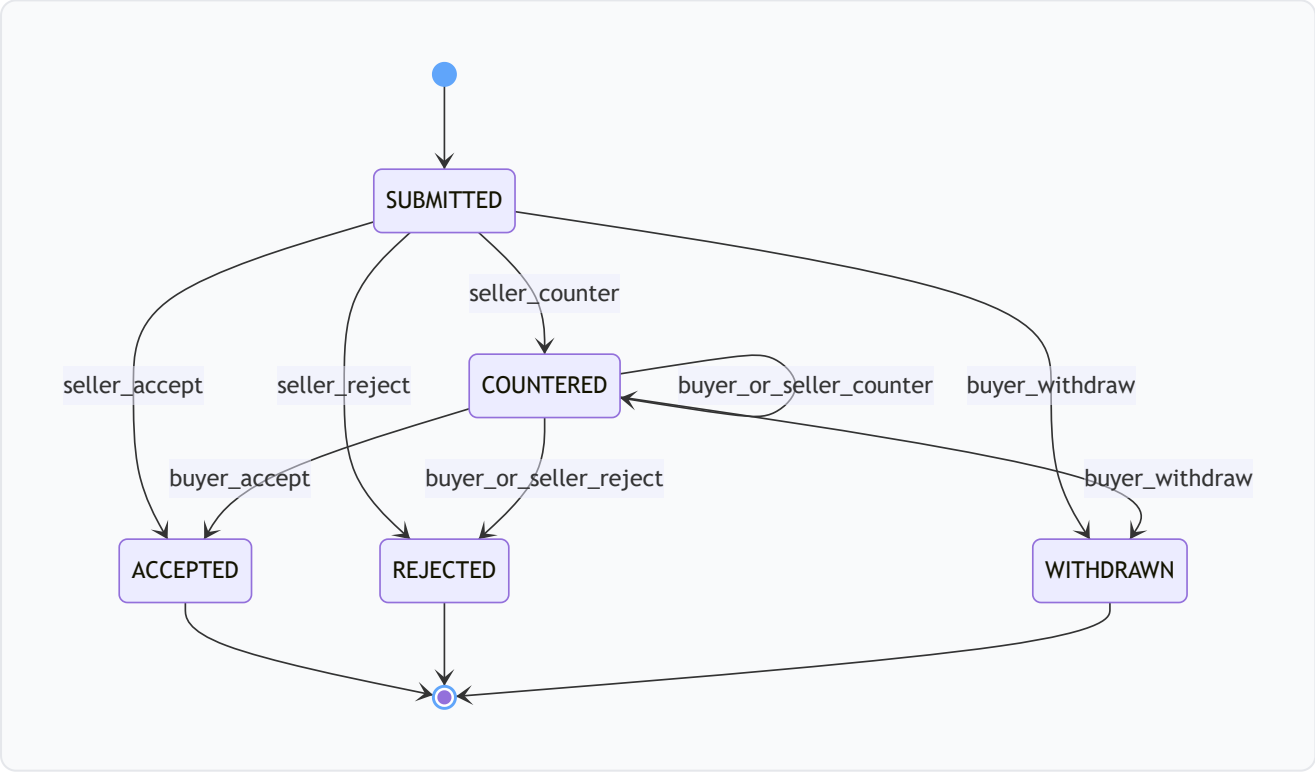


11.4 Community, Contacts & Content ERD (P2 Addendum)

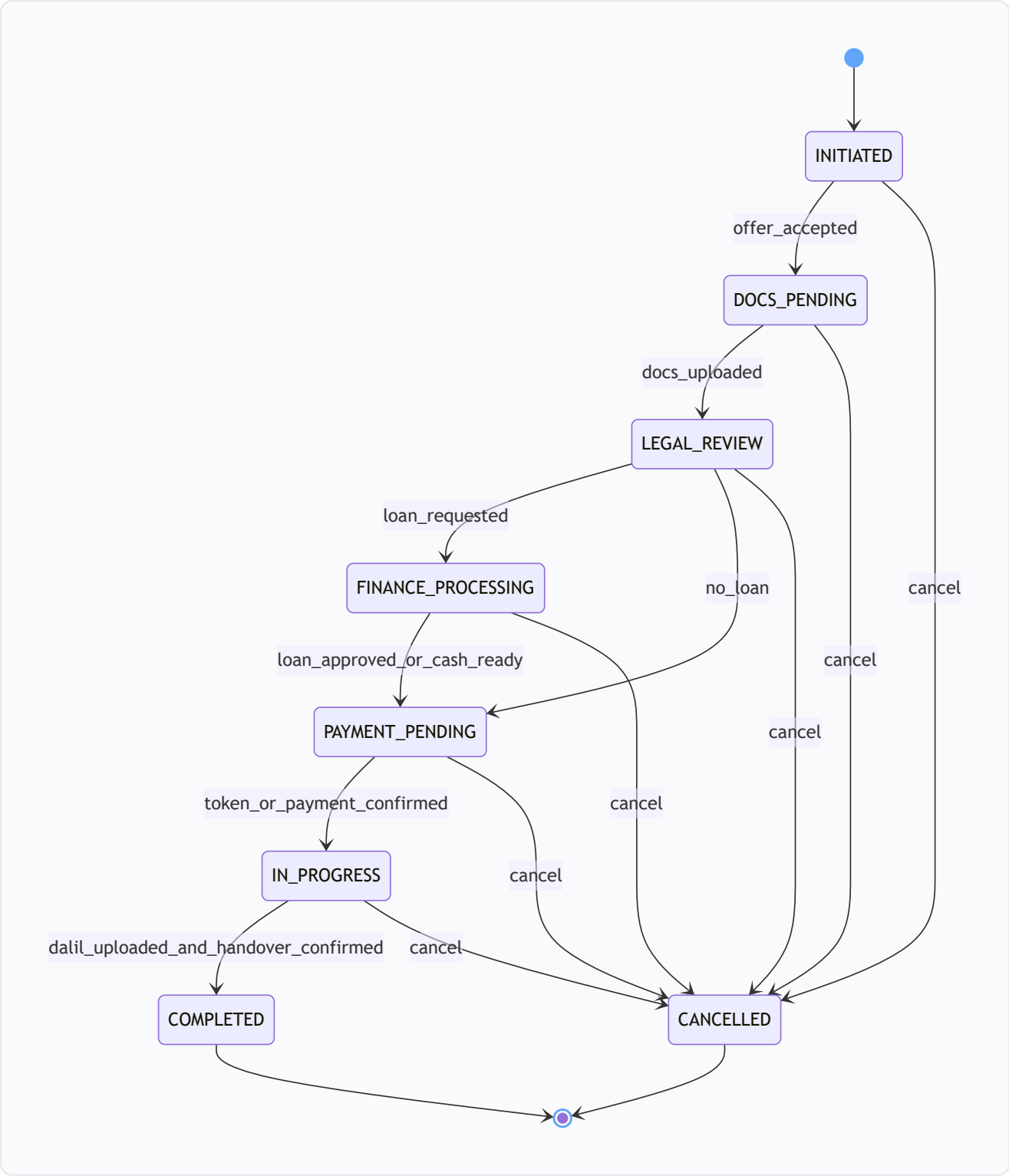


12. Transaction Step Tracking

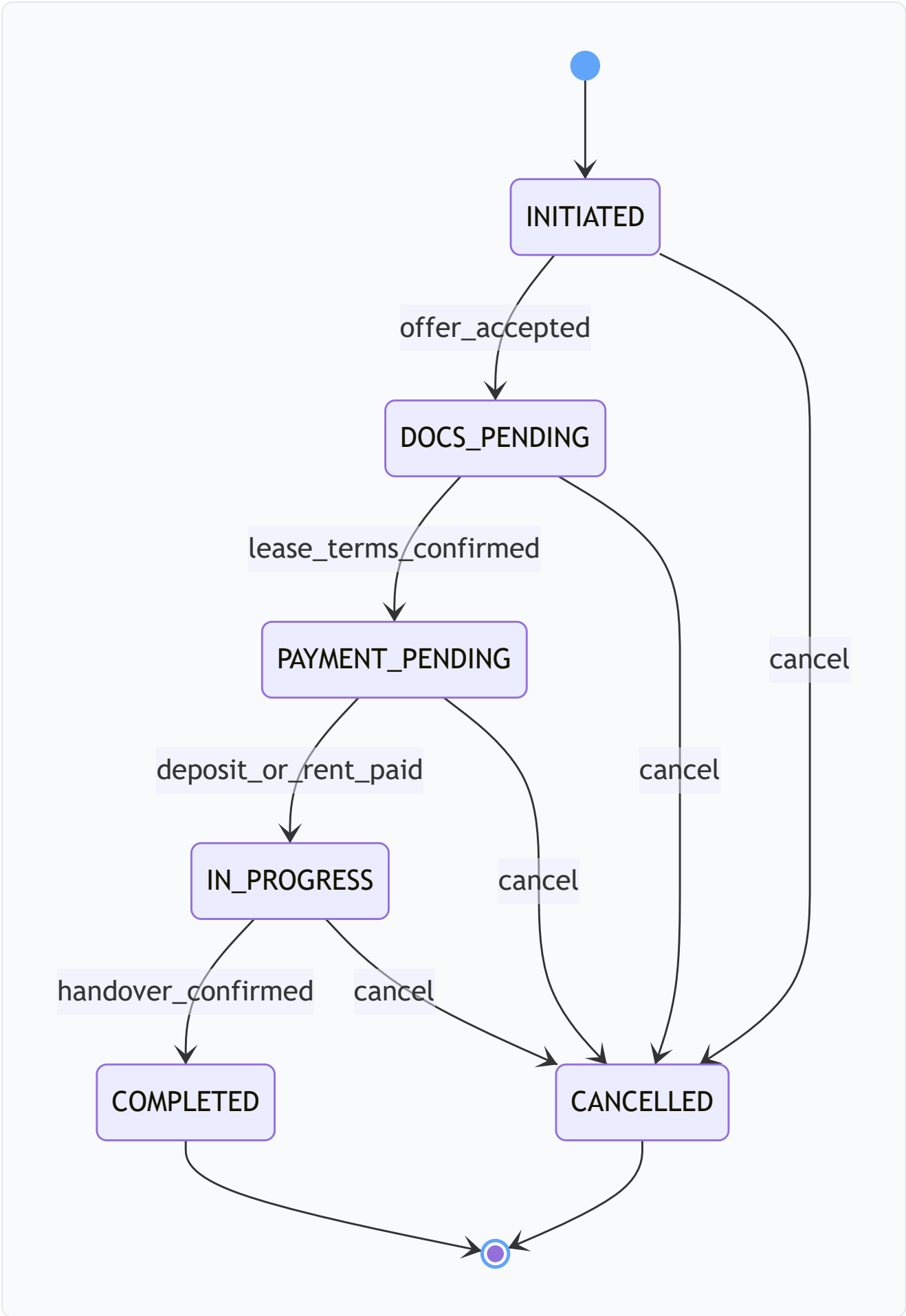
12.1 Offer State Machine



12.2 Transaction State Machine (Buy/Sell)



12.3 Transaction State Machine (Rent)


INITIATED
offer_accepted
DOCS_PENDING
lease_terms_confirmed
PAYMENT_PENDING
deposit_or_rent_paid
IN_PROGRESS
handover_confirmed
COMPLETED
cancel
cancel
cancel
cancel
CANCELLED

12.4 BD Transaction Step Checklist (Bayna → Dalil → Namjari → Tax)

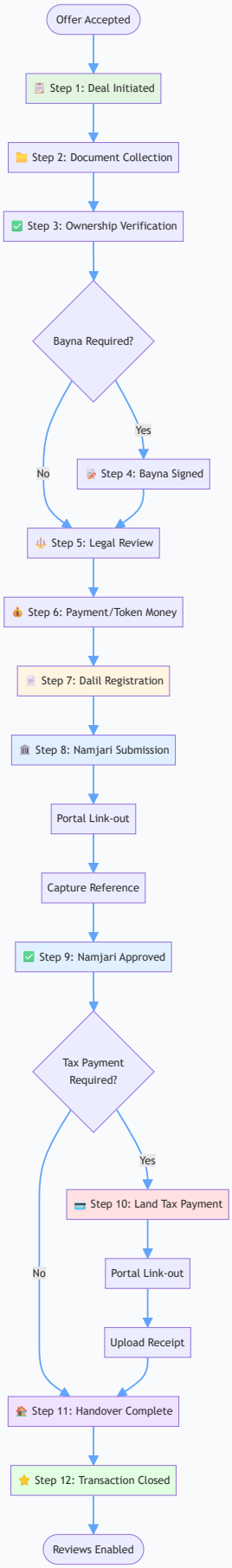
This checklist is an **explicit, user-visible step list** (timeline) for Bangladesh property transactions.
It complements the state machines above and operationalizes **proof uploads per step** (see FR-32) and **official portal reference capture** (see FR-66–69).

> Notes:
> - The platform does **not** need to integrate directly with government systems for MVP.
> - Instead, MSC Home supports link-outs + guided data capture + evidence uploads.

1. **Offer Accepted / Deal Initiated**
   - Output: Transaction record created; parties identified.
   - Evidence: Offer acceptance record (system).
2. **Document Collection Started**
   - Seller uploads initial documents into **Document Vault**.
   - Evidence: Deed copy (Dalil) (if available), prior mutation (Namjari) copy (if exists), tax receipts/DCR (if exists), photos, utility/service-charge info.
3. **Ownership & Listing Information Verification**
   - Verification may be: platform/manual review, field verification, and/or optional e-KYC for identity.
   - Evidence: Verified Listing badge status + verifier notes + uploaded proofs.
4. **Bayna / Baina Nama (Agreement to Sell) Prepared & Signed (if applicable)**
   - Output: Parties agree on price, terms, and schedule.
   - Evidence: Bayna agreement copy (uploaded) + counterparty confirmation.
5. **Legal Review / Due Diligence Completed**
   - Output: Lawyer/legal agent provides vetting report (title check, document consistency, risk flags).
   - Evidence: Legal report document + checklist completion log.

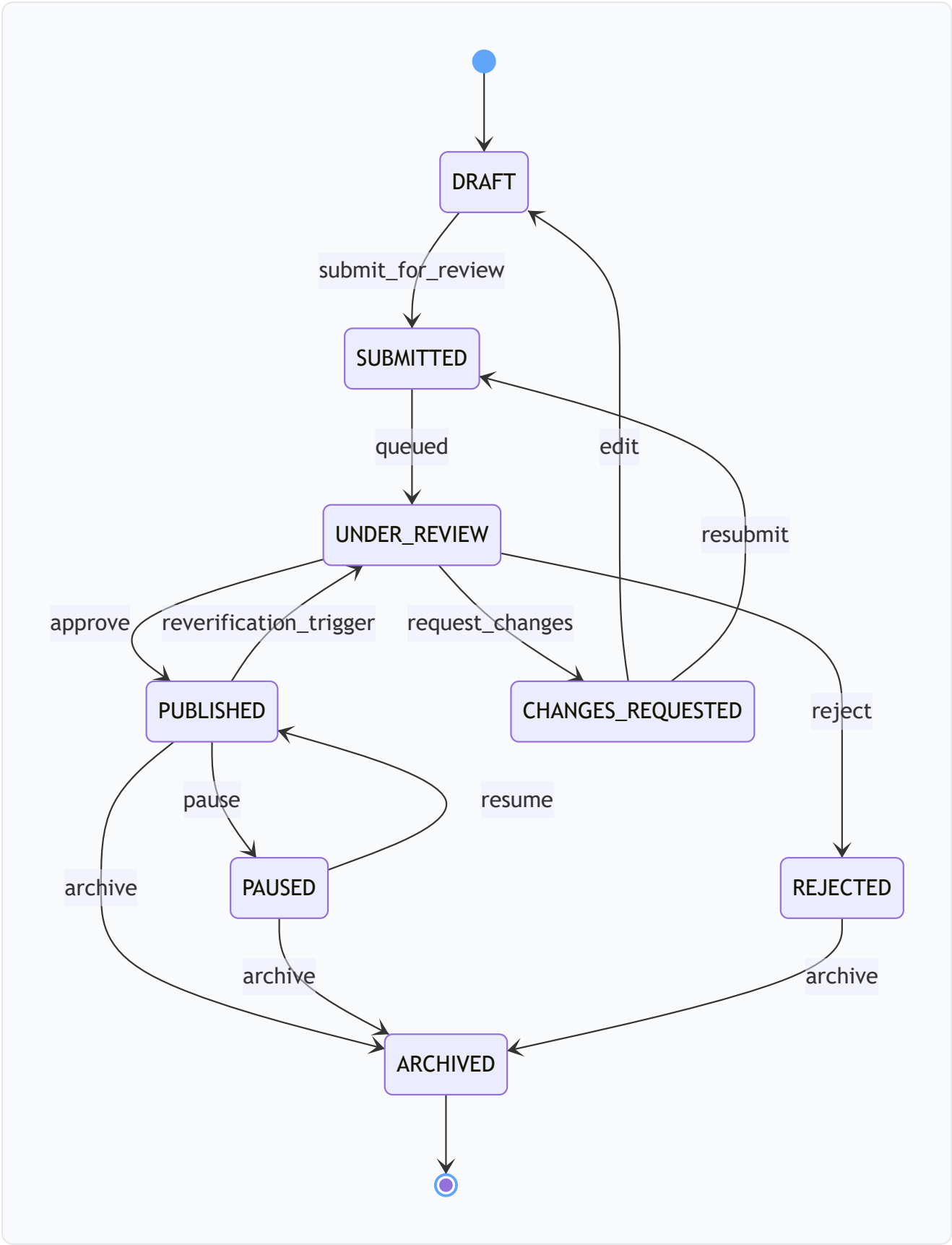
6. **Payment / Token / Booking Money (if applicable)**
    - Output: Payment intent created; gateway checkout completed.
    - Evidence: Gateway validation success + receipt; if risk flagged then HOLD per BR-26.
7. **Dalil (Registered Deed) Completed**
    - Output: Deed registration completed at Sub-Registrar.
    - Evidence: Registered Dalil copy (uploaded) + transaction step confirmation.
8. **Namjari (Mutation) Application Submitted (Portal-assisted)**
    - User action: Use official mutation portal link-out; submit application.
    - Platform action: Capture reference(s) (application number, mobile used) and store in timeline.
    - Evidence: Portal reference capture + screenshots/receipts + later status snapshot.
9. **Namjari (Mutation) Approved / Khatian Updated**
    - Output: Mutation/khatiyan result received.
    - Evidence: QR-coded khatian/related document upload + user-entered status snapshot (timestamped).
10. **Land Development Tax (ভূমি উন্নয়ন কর) Holding / Payment (as applicable)**
    - User action: Use official tax portal link-out to register holding/pay tax.
    - Platform action: Capture holding reference/DCR reference + upload receipt.
    - Evidence: Tax receipt/DCR uploaded + reference metadata stored.
11. **Handover Completed**
    - Output: Keys/possession transferred; handover checklist completed.
    - Evidence: Handover confirmation (both parties) + optional photos.
12. **Transaction Closed & Reviews Enabled**
    - Output: Parties can rate/review each other and (optionally) the listing/agent.
    - Evidence: Review gating enforced (BR-20/BR-21).

12.4.1 BD Transaction Step Workflow Diagram

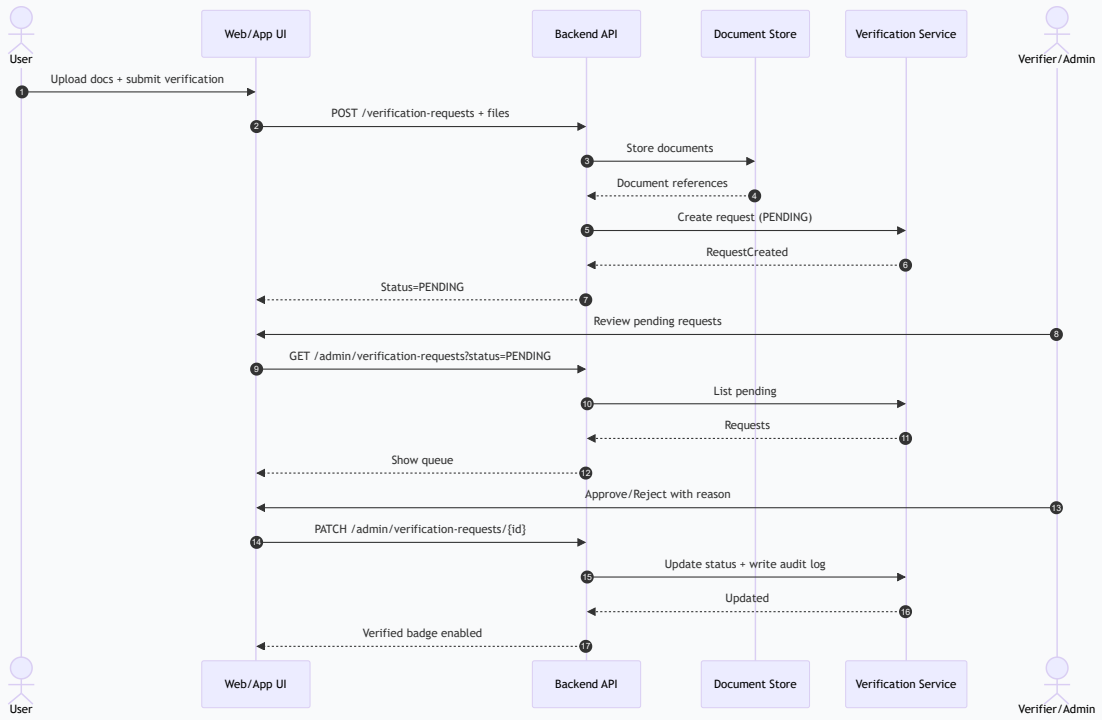

Offer Accepted
Step 1: Deal Initiated
Step 2: Document Collection
Step 3: Ownership Verification
Bayna Required?
Yes
No
Step 4: Bayna Signed
Step 5: Legal Review
Step 6: Payment/Token Money
Step 7: Dalil Registration
Step 8: Namjari Submission
Portal Link-out
Capture Reference
Step 9: Namjari Approved
Tax Payment Required?
Yes
No
Step 10: Land Tax Payment
Portal Link-out
Upload Receipt
Step 11: Handover Complete
Step 12: Transaction Closed
Reviews Enabled

13. Diagrams (ERD/State/Sequence/Flow)

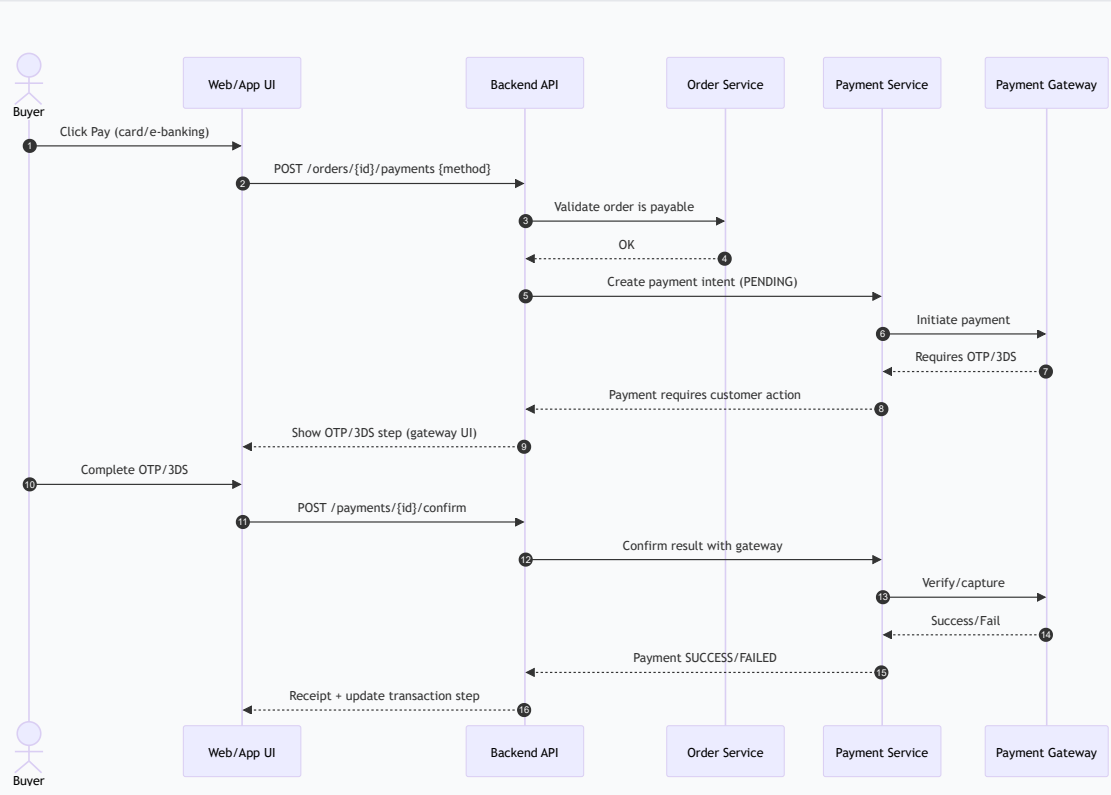
13.1 Listing Lifecycle (Draft → Review → Publish)


DRAFT
submit_for_review
SUBMITTED
queued
edit
UNDER_REVIEW
resubmit
approve
reverification_trigger
request_changes
PUBLISHED
CHANGES_REQUESTED
reject
pause
resume
archive
PAUSED
REJECTED
archive
archive
ARCHIVED

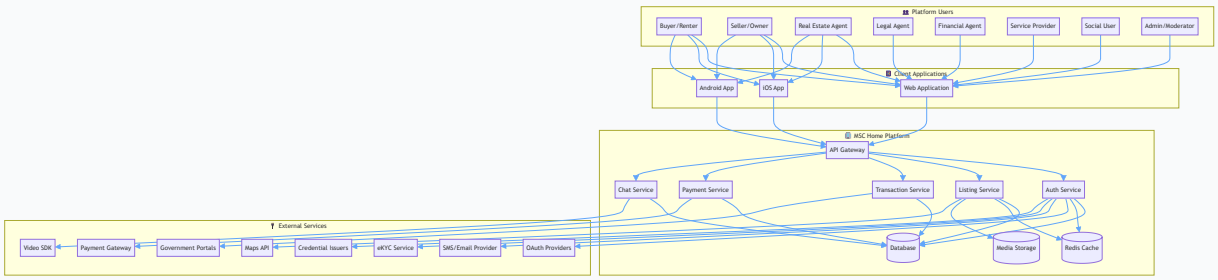
13.2 Verification Flow (User → Admin/Verifier → Badge)



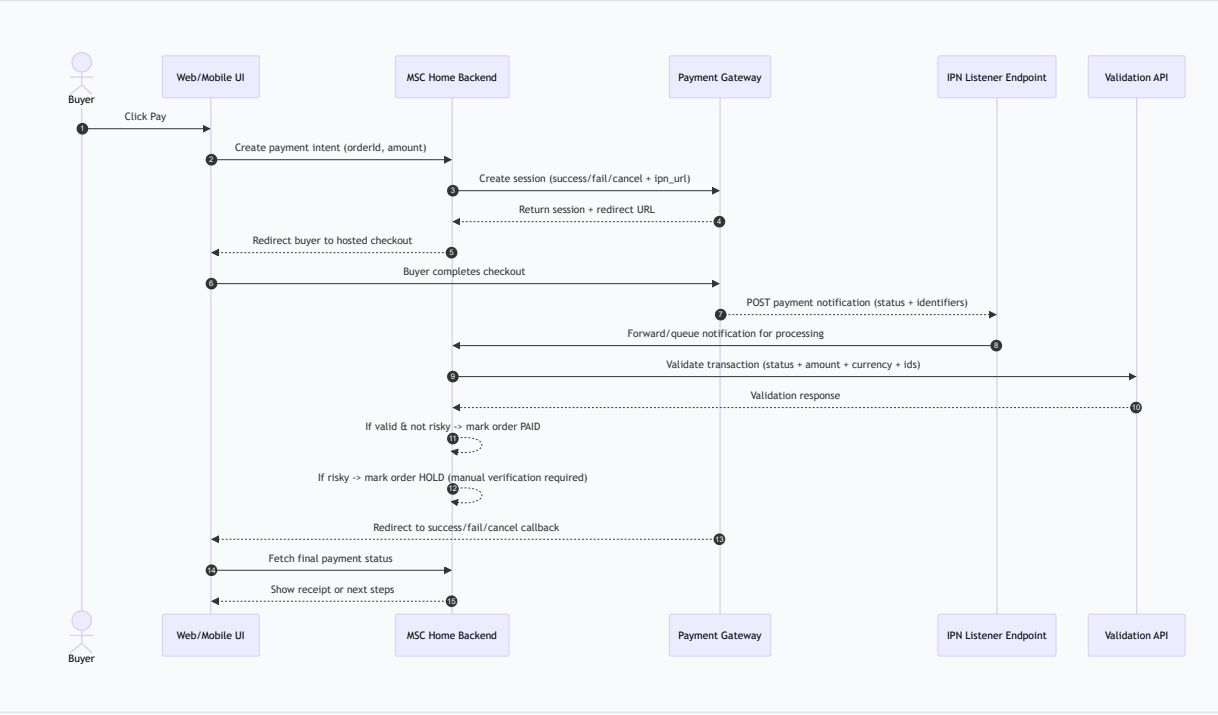
13.3 Payment Flow (Gateway + OTP/3DS)



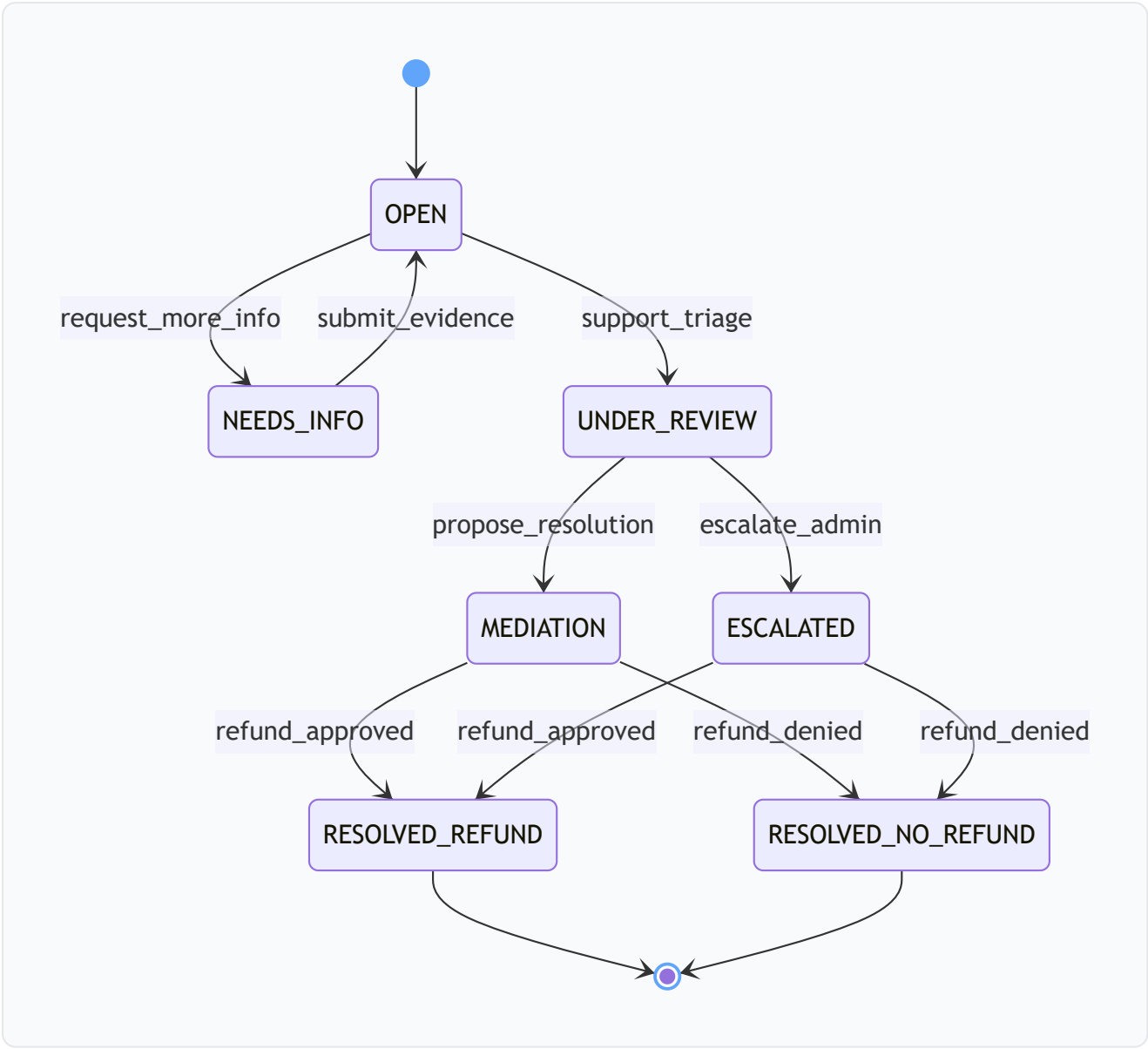
13.4 System Context (External Integrations)



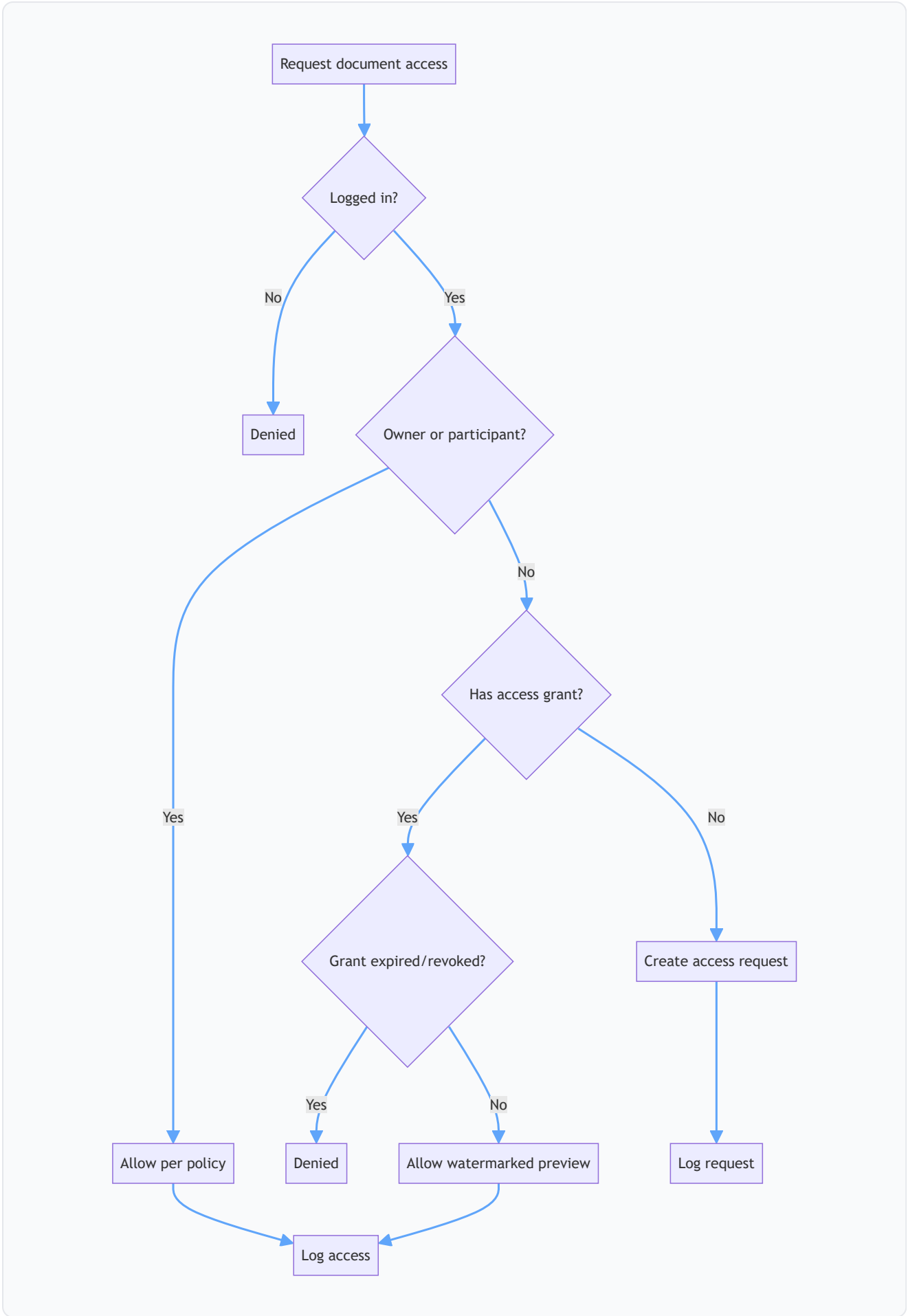
13.5 Hosted Checkout + IPN + Validation (SSLCOMMERZ-style)



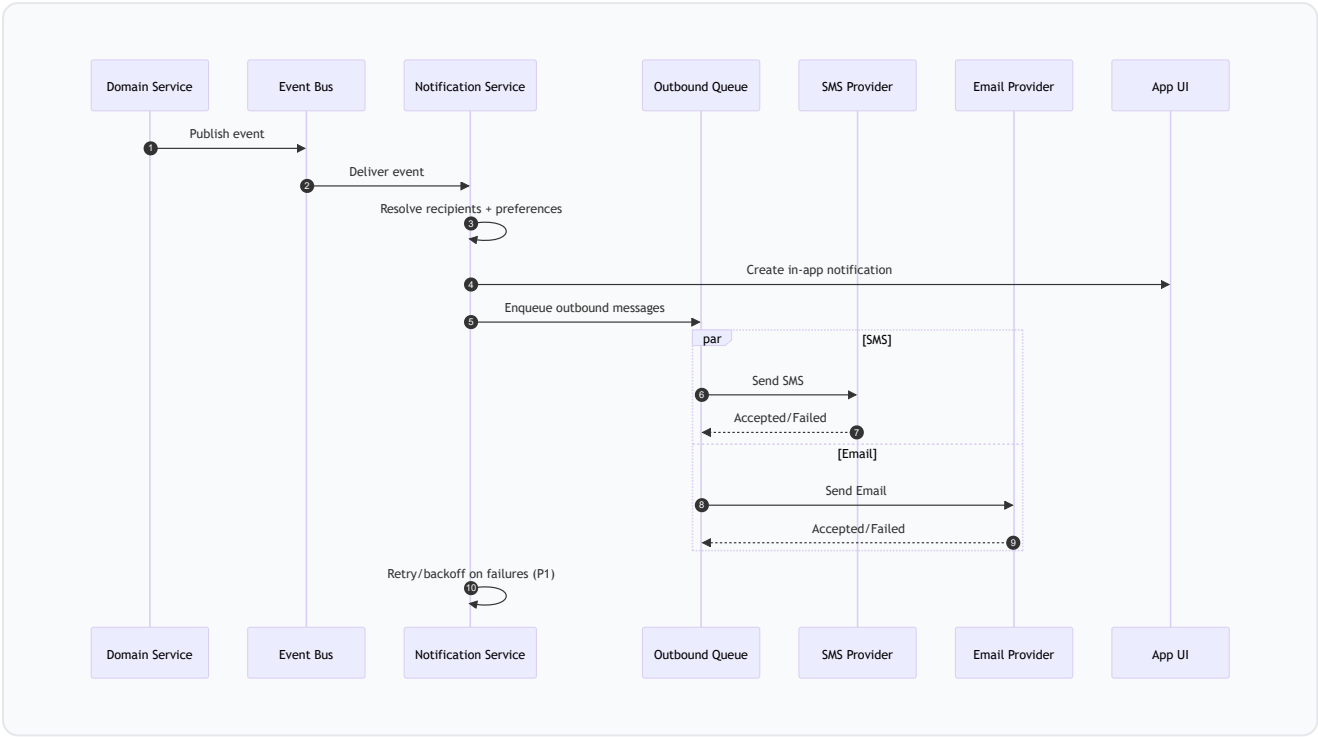
13.6 Dispute Lifecycle (State Diagram)



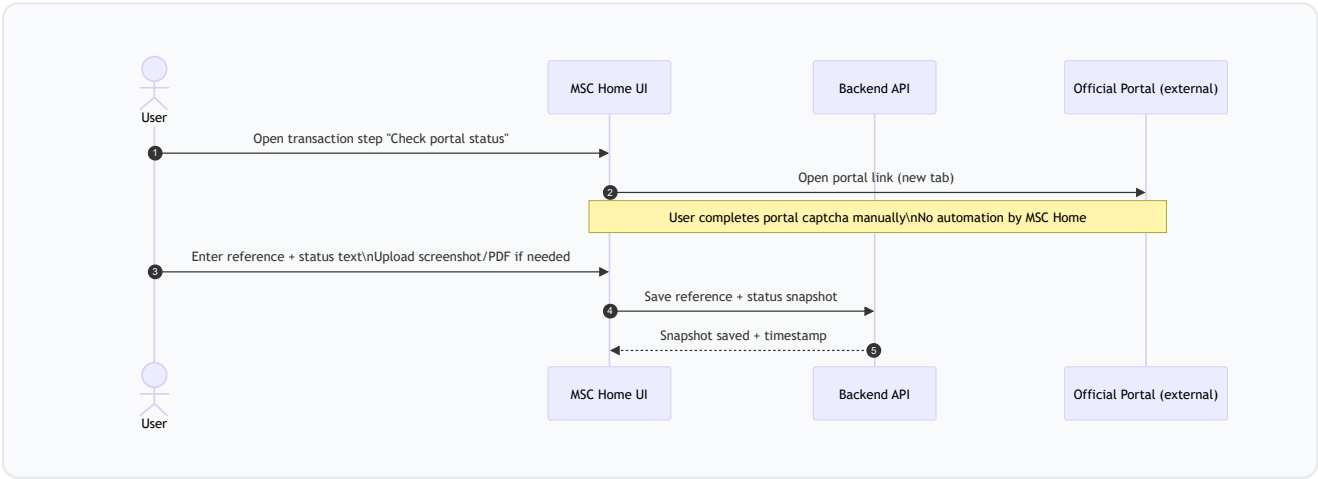
13.7 Document Vault Access Decision (Flow)


Request document access
Logged in?
No
Yes
Denied
Owner or participant?
Yes
No
Has access grant?
Yes
Yes
No
Grant expired/revoked?
Create access request
Yes
No
Allow per policy
Denied
Allow watermarked preview
Log request
Log access

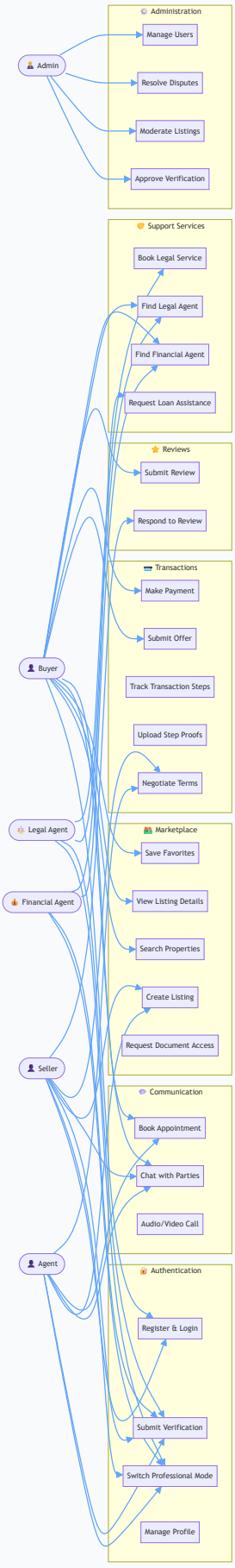
13.8 Notification Delivery (Sequence)



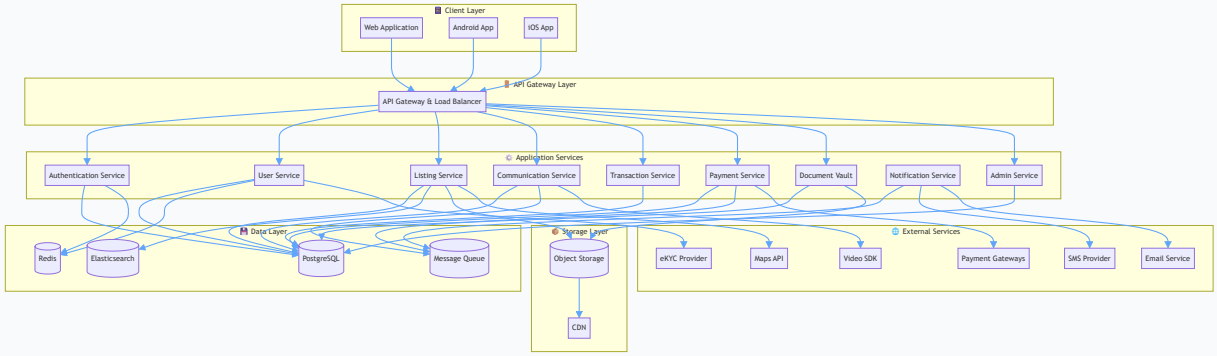
13.9 Portal Tracking Assistance (Manual Link-Out)



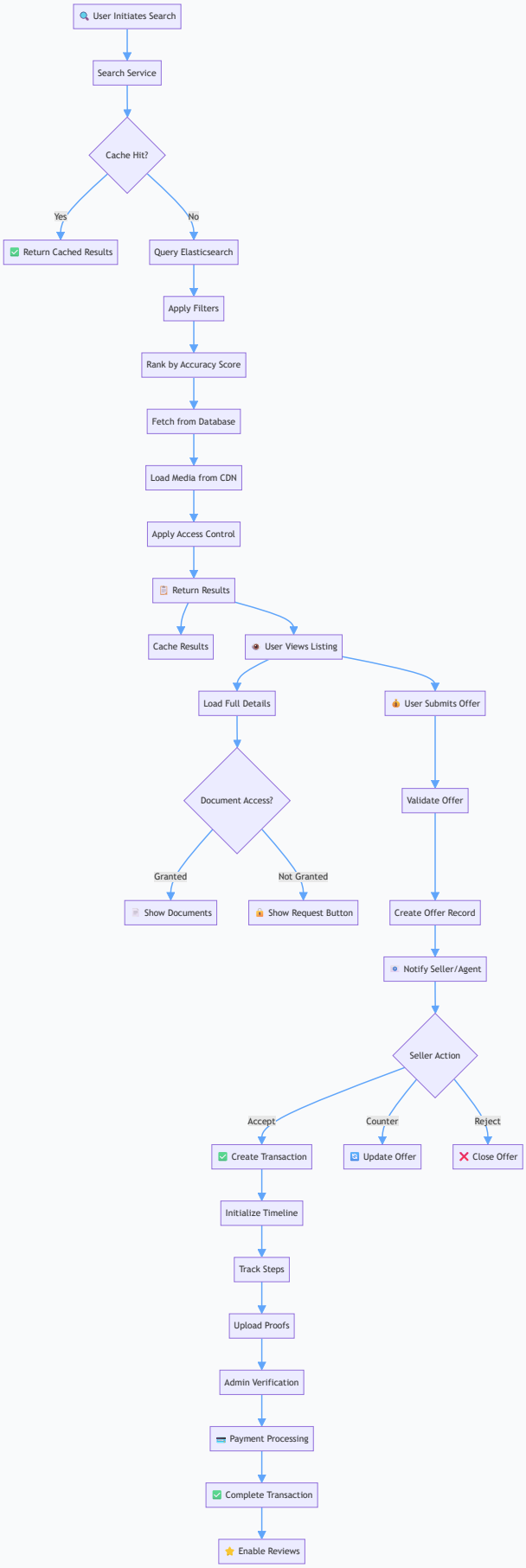
13.10 Use Case Diagram - Core Platform Features


Admin
Buyer
Legal Agent
Financial Agent
Seller
Agent
Administration
Manage Users
Resolve Disputes
Moderate Listings
Approve Verification
Support Services
Book Legal Service
Find Legal Agent
Find Financial Agent
Request Loan Assistance
Reviews
Submit Review
Respond to Review
Transactions
Make Payment
Submit Offer
Track Transaction Steps
Upload Step Proofs
Negotiate Terms
Marketplace
Save Favorites
View Listing Details
Search Properties
Create Listing
Request Document Access
Communication
Book Appointment
Chat with Parties
Audio/Video Call
Authentication
Register & Login
Submit Verification
Switch Professional Mode
Manage Profile

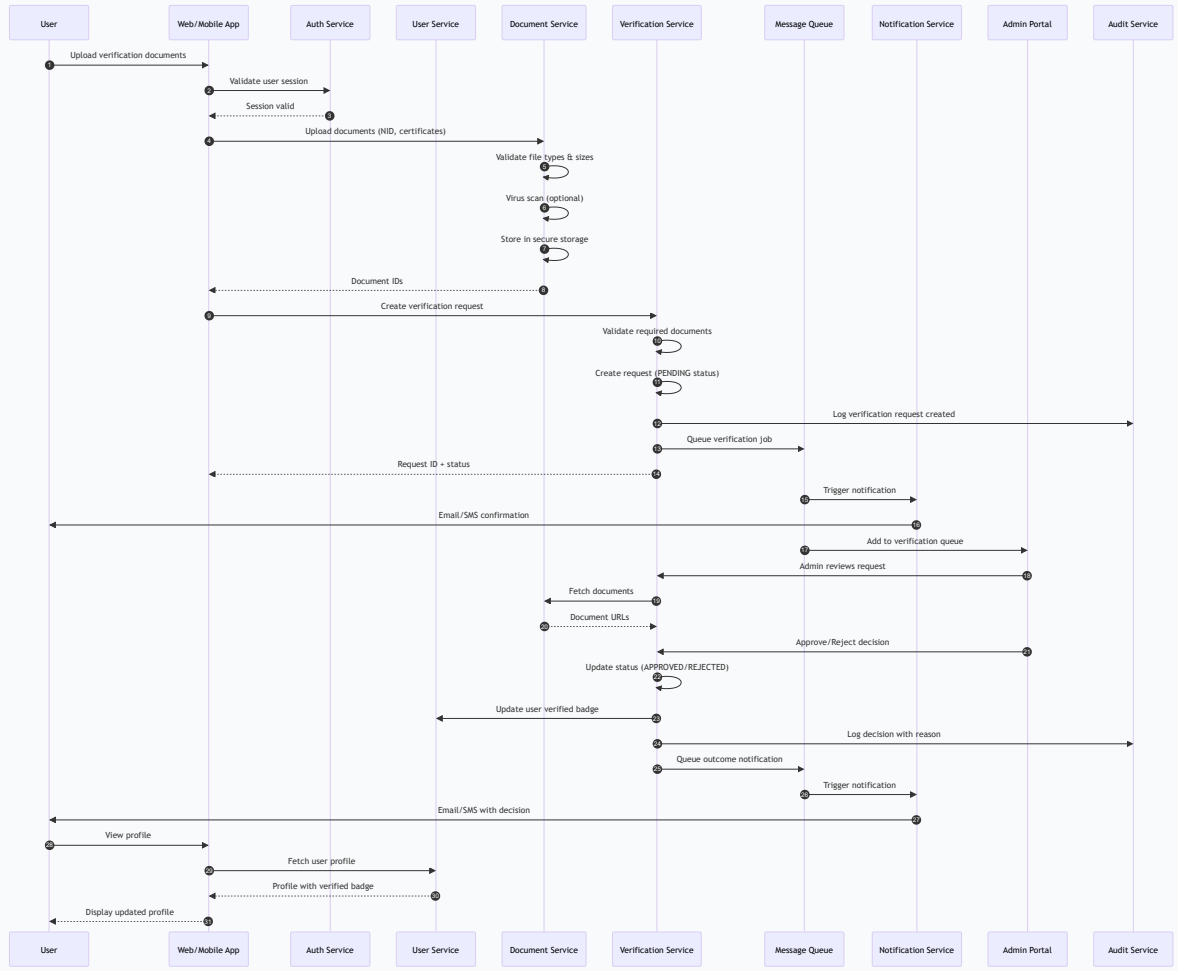
13.11 High-Level Architecture Diagram



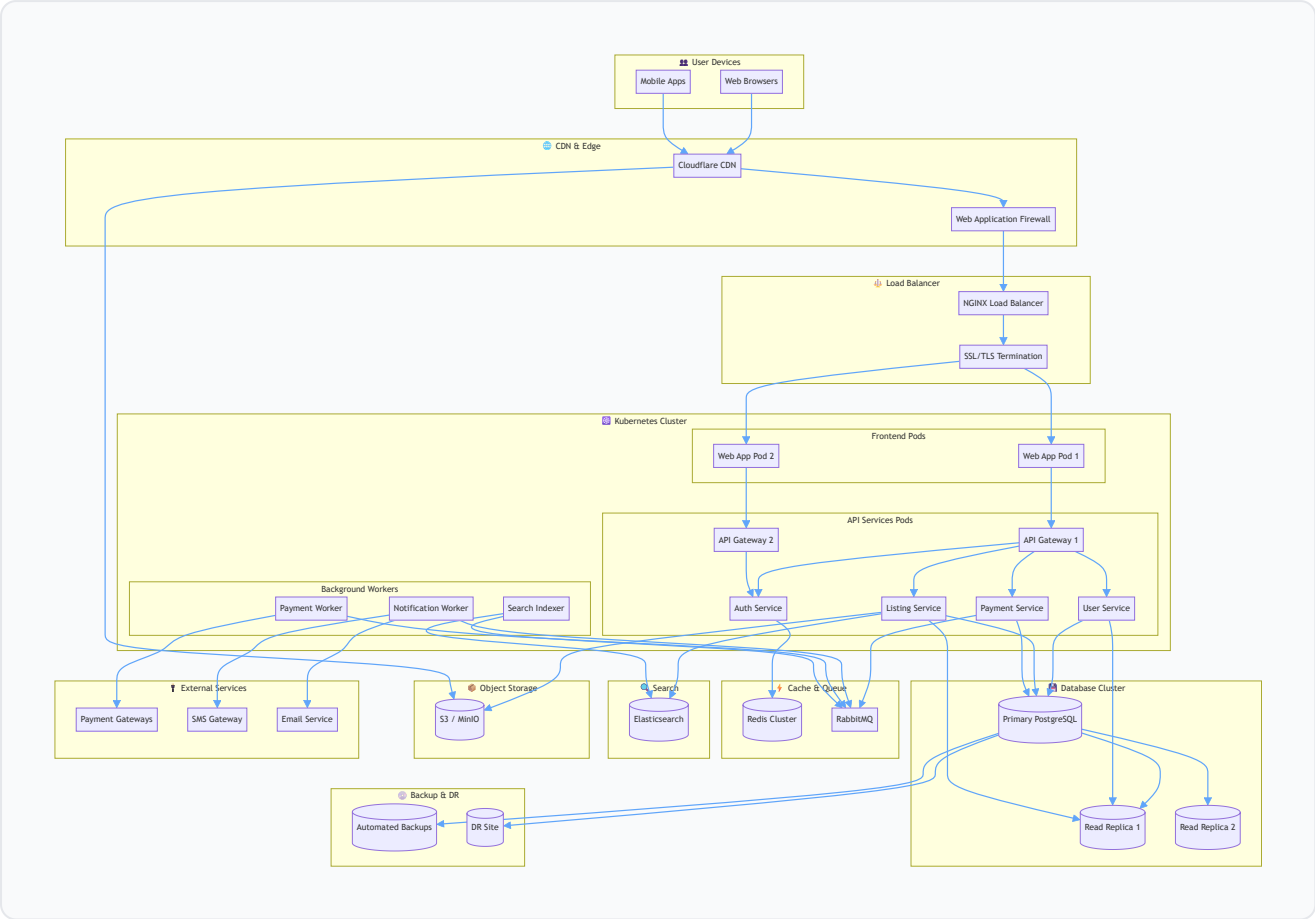
13.12 Data Flow Diagram - Property Search & Transaction


🔍 User Initiates Search
Search Service
Cache Hit?
Yes
No
✅ Return Cached Results
Query Elasticsearch
Apply Filters
Rank by Accuracy Score
Fetch from Database
Load Media from CDN
Apply Access Control
📋 Return Results
Cache Results
👁️ User Views Listing
Load Full Details
🔥 User Submits Offer
Document Access?
Validate Offer
Granted
Not Granted
📄 Show Documents
🔒 Show Request Button
Create Offer Record
🔔 Notify Seller/Agent
Seller Action
Accept
Counter
Reject
✅ Create Transaction
🔄 Update Offer
❌ Close Offer
Initialize Timeline
Track Steps
Upload Proofs
Admin Verification
💳 Payment Processing
✅ Complete Transaction
⭐ Enable Reviews

13.13 Component Interaction Diagram - Verification Flow



13.14 Deployment Architecture Diagram



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14. Non-Functional Requirements (NFR)

14.1 Security

- TLS everywhere; encryption at rest for sensitive documents.
- RBAC on all endpoints.
- Audit logs for verification, admin actions, and payments.
- Signed URL access for document downloads.

Additional security requirements (implementation-oriented):
- Strong authentication defaults: password policy, OTP rate limits, brute-force protection.
- Session security: refresh token rotation, device/session revocation (FR-75), and suspicious login alerts.
- File security: virus/malware scanning for uploads (P1), content-type validation, size limits.

- Secrets management: no credentials in clients; rotate API keys; environment-based configs.
- Data minimization: collect only required NID/identity data; avoid storing captcha solutions.

14.2 Performance

- Search response target < 2s for typical filters.
- Media served via CDN.

14.2.1 Scalability

- System must support burst traffic during marketing campaigns and peak hours.
- Background jobs (notifications, payment webhooks, media processing) must not block user requests.

14.3 Reliability

- Payment flow must be retry-safe (idempotency keys).

14.3.1 Availability & Recovery

- Define RPO/RTO targets (to be finalized). Suggested baseline: RPO ≤ 24h, RTO ≤ 4h.
- Automated backups for primary database and document metadata.
- Graceful degradation: if optional providers fail (video SDK, e-KYC), core marketplace remains usable.

14.3.2 Observability

- Centralized logging with correlation IDs.
- Metrics for: search latency, payment success rate, webhook processing lag, notification delivery failures.
- Alerting for: payment validation failures, webhook spikes, dead-letter queue growth.

14.4 Privacy

- Strict access to documents (only owner + verifier + permitted parties).

Privacy requirements:
- Explicit user consent for document uploads and sharing.
- Support user data export/delete requests where legally appropriate.
- Redact sensitive information in logs (NID, bank details, document URLs).

14.5 Accessibility & Localization

- Support Bangla and English UI text (P1); store user locale preference.
- Ensure WCAG-friendly UI for core flows (search, listing view, chat, checkout).

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15. Appendices (Traceability & Glossary)

15.1 Technical Standards & Compliance

SRS Documentation Standards:
- ✅ IEEE 830-1998 Software Requirements Specification template
- ✅ ISO/IEC/IEEE 29148:2018 Systems and software engineering requirements
- ✅ Clear separation of functional and non-functional requirements
- ✅ Traceability matrix for requirements validation
- ✅ Use of industry-standard diagram notation (Mermaid.js)

Security & Privacy Standards:
- ✅ OWASP Top 10 security considerations
- ✅ Payment Card Industry Data Security Standard (PCI DSS) awareness
- ✅ Secure document handling with encryption at rest and in transit
- ✅ TLS 1.2+ requirement for all communications
- ✅ Audit logging for all sensitive operations

Accessibility Standards:
- ✅ WCAG 2.1 Level AA compliance (recommendation for core flows)
- ✅ Mobile-first responsive design
- ✅ Support for Bangla and English interfaces
- ✅ Clear navigation and user guidance

Performance Standards:
- ✅ Search response time target: < 2 seconds (P95)
- ✅ Payment webhook processing: < 30 seconds
- ✅ API response time: < 500ms (P95) for reads, < 1s for writes
- ✅ System availability: 99.5% uptime for core services
- ✅ Scalability: Support 5,000 concurrent users

15.2 External References & Resources

Bangladesh Government Services:
- Mutation / e-Namjari portal: https://mutation.land.gov.bd/ (status tracking, contact hotline 16122)
- Land record & map services (DLRMS): https://dlrms.land.gov.bd/ (guideline + application tracking)
- DLRMS application tracking: https://dlrms.land.gov.bd/application/search
- Land Development Tax portal: https://portal.ldtax.gov.bd/ (holding registration prerequisites and manuals)

Payment Gateway Integration:
- SSLCOMMERZ Developer Documentation: https://developer.sslcommerz.com/
- SSLCOMMERZ API v4: https://developer.sslcommerz.com/doc/v4/
- bKash Merchant Integration: https://developer.bkash.com/
- Nagad Merchant API: https://developer.nagad.com.bd/

Verification & eKYC Services:
- Porichoy (National ID Verification): https://porichoy.gov.bd/
- Urban Development Directorate (URA Certificate Verification): https://rajuk.gov.bd/

Technical References:
- Bangladesh National Portal: https://bangladesh.gov.bd/
- ICT Division, Bangladesh: https://ictd.gov.bd/
- Bangladesh Bank (Payment System Guidelines): https://www.bb.org.bd/

Industry Best Practices:
- Real Estate Information System (REIS) Guidelines
- Property Technology (PropTech) Standards
- Digital Transaction Security Best Practices

15.3 Glossary of Terms

General Real Estate Terms:
- **Listing:** A property advertised for sale or rent on the platform
- **Verified Listing:** A listing that has passed ownership and information verification checks
- **Accuracy Score:** Completeness percentage of listing information (required + optional fields)
- **Transaction:** The complete process from offer acceptance to property handover
- **Step Tracking:** Monitoring progress of transaction milestones with proof documentation

Bangladesh-Specific Terms:
- **Bayna / Baina Nama:** Sale agreement or agreement to sell, legally binding document in BD

property transactions
- **Dalil:** Registered deed document obtained from Sub-Registrar office, proves property ownership
- **Namjari (Mutation):** Legal process of updating ownership records in government land records after property transfer
- **Khatian:** Land record document showing ownership details, plot number, and boundaries
- **Mouza:** Administrative land unit in Bangladesh, used in property identification
- **Dag:** Plot number within a Mouza, part of property identification system
- **DCR (Dhaka City Corporation Receipt):** Tax receipt from city corporation for urban properties
- **URA (Urban Development Authority):** Regulatory body for real estate agents in Bangladesh (e.g., RAJUK in Dhaka)
- **TIN (Taxpayer Identification Number):** Tax identification for businesses
- **BIN (Business Identification Number):** Business registration identifier
- **Katha:** Traditional land measurement unit (1 Katha = 720 sqft in Bangladesh)
- **Decimal:** Land measurement unit (1 Decimal = 435.6 sqft)
- **Shotok:** Smallest land measurement unit (1 Shotok = 7.26 sqft)

Technical Terms:
- **RBAC (Role-Based Access Control):** Permission system based on user roles
- **ABAC (Attribute-Based Access Control):** Permission system based on user attributes and relationships
- **KYC (Know Your Customer):** Identity verification process
- **eKYC (Electronic KYC):** Digital identity verification using government databases
- **OTP (One-Time Password):** Temporary password sent via SMS/Email for verification
- **3DS (3-Domain Secure):** Additional security layer for card payments
- **IPN (Instant Payment Notification):** Real-time payment status update from payment gateway
- **Idempotency:** Ensuring duplicate requests don't cause multiple operations
- **CDN (Content Delivery Network):** Distributed server network for fast content delivery

Platform-Specific Terms:
- **Verified Badge:** Visual indicator on user profile showing successful verification
- **Professional Mode:** Account type for business users (agents, lawyers, financial advisors)
- **Document Vault:** Secure storage for sensitive property and identity documents
- **Access Grant:** Time-bound permission to view specific documents
- **Watermark:** Visible identifier on documents showing viewer information and timestamp
- **Accuracy Score:** Calculated completeness percentage for property listings
- **Response SLA:** Expected timeframe for agent/professional to respond to inquiries
- **Transaction Timeline:** Chronological record of all transaction steps and actions
- **Step Proof:** Evidence document uploaded to verify completion of transaction milestone
- **Moderation Queue:** Admin interface for reviewing pending verification/listing requests

15.4 Approval & Sign-Off

Document Approval:

Role	Name	Signature	Date

Document Status: PENDING APPROVAL (To be updated upon client sign-off)

End of Software Requirements Specification

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