EXAMTRACKER INDIA

Complete Architecture & Engineering Bible

Pre-Development Reference Document | February 2026 | Version 1.0

Never Miss a Government Exam Deadline Again

1. Product Philosophy & North Star

What We Are Building

ExamTracker is not a job notification website. It is a **personal eligibility intelligence system** for Indian government job aspirants. The distinction is everything:

- A notification website tells you **what vacancies exist**
- ExamTracker tells you **which of those vacancies you can actually apply to**, and when you will lose your chance forever

The Razorpay Onboarding Inspiration

Razorpay's onboarding achieves three things simultaneously:

- **Collects what it needs** — without feeling like a government form
- **Shows value as it collects** — each step reveals something useful to the user
- **Feels personal from step one** — it adapts to your answers in real time

We must achieve the same for an aspirant from Patna on a ₹8,000 Android phone on a slow 4G connection. Every screen must feel like a smart friend asking the right question.

Core Design Principles

Principle	Implementation
Maximum 5 taps to value	User reaches personalized exam list within 5 taps of landing
No government jargon	"Are you from SC/ST/OBC?" not "Select your reservation category"
Show, don't tell	When user selects OBC, instantly show: 'OBC gets +3 years age relaxation'
Progressive disclosure	Don't ask everything upfront; collect deeper data as trust builds
Mobile-first always	80%+ users on Android budget phones. No heavy animations, no large images
Hindi-ready architecture	Translation strings file from Day 1, even if Hindi UI ships in v2

2. The Eligibility Engine — Data We Need From Users

This is the most important section in this document. Before designing a single screen, we must understand every variable that determines whether a person can apply to a government job in India. Government exam eligibility is determined across **six pillars**.

Pillar 1: Age

Age eligibility is more complex than it appears. Age limits vary not just by exam, but by post within the same exam. Relaxations vary by category, state, and special quota.

What we store from the user: Date of Birth (exact date, not just year)

The system computes age dynamically against each exam's specific cutoff date — some notifications say 'age as on 01-Jan-2026'; others say 'as on closing date of application.'

Age Relaxation Rules (encoded in the Rules Engine, not per user)

Category	Upper Age Relaxation	Cumulative Rule
General (UR)	None — baseline	—
OBC (Non-Creamy Layer)	+3 years	Stacks with PwBD
SC / ST	+5 years	Stacks with PwBD
EWS	Usually none	Some exams give +5 — check notification
PwBD — General	+10 years	Horizontal; applies across all verticals
PwBD — OBC	+13 years (10+3)	Cumulative
PwBD — SC/ST	+15 years (10+5)	Cumulative
Ex-Servicemen	Military service years + 3 yrs	Subject to per-exam rules
State Govt Employees	+5 years	Varies by state
Widows/Divorced women	+5 to +9 years	For applicable exams only

Pillar 2: Category / Reservation Status

This is a multi-layered system. A single person may belong to multiple overlapping categories. Combinations create unique eligibility rules.

Vertical Reservation Categories (Central Government)

Category	Central Quota	Key Rule
General / UR (Unreserved)	No reservation	Competes on open merit
OBC-NCL (Non-Creamy Layer)	27% of seats	Must have current financial year NCL certificate
OBC-CL (Creamy Layer)	No reservation	Competes as General; income > ₹8 lakh/year
SC (Scheduled Caste)	15% of seats	Caste must be in Central Government's SC list for their state
ST (Scheduled Tribe)	7.5% of seats	Tribe must be in Central Government's ST list for their state
EWS (Economically Weaker Section)	10% of seats	Only for General category; family income < ₹8 lakh/year

Horizontal Categories (Cut Across All Vertical Categories)

Category	Quota	Requirements
PwBD — Locomotor Disability	1% of 4% PwBD total	Govt disability certificate; ≥40% disability
PwBD — Visual Impairment	1% of 4% PwBD total	Same certificate requirement
PwBD — Hearing Impairment	1% of 4% PwBD total	Same certificate requirement
Ex-Servicemen	3–10% depending on exam	Military discharge certificate + service book
Women (some state exams)	Horizontal; varies by state	State-specific; UP, Maharashtra, TN have sub-quotas
Sports Quota	Varies by exam	National/State-level sports representation proof
NCC Certificate	Some central exams	NCC C certificate holders get preference/relaxation
Freedom Fighter Descendants	Some exams only	Grandfather/grandmother who was a freedom fighter

CRITICAL DESIGN NOTE: The OBC Creamy Layer distinction is the most commonly misunderstood rule. An OBC candidate whose family income exceeds ₹8 lakh/year MUST apply as General category. Store OBC_NCL and OBC_CL as separate ENUM values to prevent accidental benefit application.

Pillar 3: Educational Qualification

Qualifications have multiple dimensions: level, stream/discipline, marks percentage, institution recognition, and 'appearing' (final year) status.

Qualification Level	Examples	Key Exams Unlocked
10th Pass (Class X)	CBSE, ICSE, State Boards	SSC MTS, Railway Group D (some), Army Soldier GD
12th Pass (Higher Secondary)	Class XII from any recognized board	SSC CHSL, Railway NTPC UG, NDA, CISF Constable
ITI Certificate	NCVT-affiliated trade certificate	Railway ALP, RRB Technician (trade-specific)
Diploma	3-year polytechnic diploma	Railway JE, SSC JE (lower posts)
Graduation (General)	BA/B.Sc/B.Com/BBA from any recognized university	SSC CGL, IBPS PO/Clerk, SBI Clerk, RRB NTPC PG
Graduation (Engineering)	B.Tech/B.E. from AICTE-approved college	SSC JE, RRB JE, UPSC IES, PSU via GATE
Graduation (Law)	LLB from Bar Council recognized institution	Bank Law Officer, PSU legal posts
Graduation (B.Ed)	NCTE recognized B.Ed	CTET, KVS, NVS Teacher, State TET
Post-Graduation	MA, M.Sc, MBA, M.Tech	RBI Grade B (60%), NABARD, UGC NET
Professional: CA/ICWA/CS	Professional certifications	PSU finance posts, some specialized banking

Marks percentage matters for: RBI Grade B (60%), NABARD Grade A (60%), SBI PO (60% — 55% for SC/ST/PwBD). For most SSC, Railway, and state PSC exams, NO minimum percentage is required. Always check notification.

Pillar 4: Nationality & Domicile

Most central exams require Indian citizenship. State exams additionally require domicile of that specific state. An aspirant from Bihar studying in Delhi may have Bihar domicile but want to track Delhi Police notifications — these must be stored as **separate fields**.

Data Point	Why We Need It	Storage
Nationality	Most exams: Indian citizens only; some allow Nepal/Bhutan	`nationality` ENUM: INDIAN | NEPAL_BHUTAN | PIO | OCI
Home / Domicile State	For state PSC eligibility determination	`domicile_state` — single state code
Current Residence State	May differ for students/working professionals	`current_state` — optional
States of Exam Interest	User may apply across multiple states	`exam_states` — array of state codes
Language Proficiency	Some state exams require knowledge of state language	`languages_known` — array of language codes

Pillar 5: Physical Standards

Applies to: Police exams (Constable/SI/Inspector), Paramilitary (CRPF/BSF/CISF/ITBP/SSB), Indian Army/Navy/Air Force, Coast Guard, RPF/RPSF, Fire Service.

Parameter	Who It Affects	Storage
Height (cm)	All police/defence aspirants; standard differs by gender, category, state	`height_cm` (SMALLINT, nullable)
Chest measurement	Male police/paramilitary candidates	Not stored — flag to check notification
Visual acuity	Pilots, Air Traffic Controllers, some police posts	`has_vision_correction` (BOOLEAN)
Color blindness	Disqualifying for many posts	Flag — mentioned in document checklist
Gender	Affects height standards; some posts gender-restricted	`gender` ENUM — collected always

Pillar 6: Special Criteria

Criterion	Applies To	What We Store
Marital Status	NDA (unmarried required); some state exams give relaxation for widows	`marital_status` ENUM (optional)
Current Government Employment	PSU exams often require NOC; some exams have relaxations for govt employees	`is_government_employee` BOOLEAN
Sports Achievement	Sports quota in many central exams and police	`has_sports_achievement` + `sports_level` (NATIONAL/STATE/DISTRICT)
NCC Certificate	NCC quota in SSC, some police/defence exams	In `additional_qualifications` array
Number of Children	Some state exams bar candidates with 2+ children	NOT stored — flagged in document checklist instead

COMPLETE ELIGIBILITY CHECKLIST — Every field we collect: Date of Birth, Category (with OBC sub-type), Highest Qualification + Stream + Marks%, Final Year Status, Gender, Nationality, Domicile State, Exam State Interests, PwBD Status + Type, Ex-Serviceman Status + Years, Additional Qualifications (B.Ed/LLB/CA etc.), Exam Category Interests, Physical Standards (if defence/police selected).
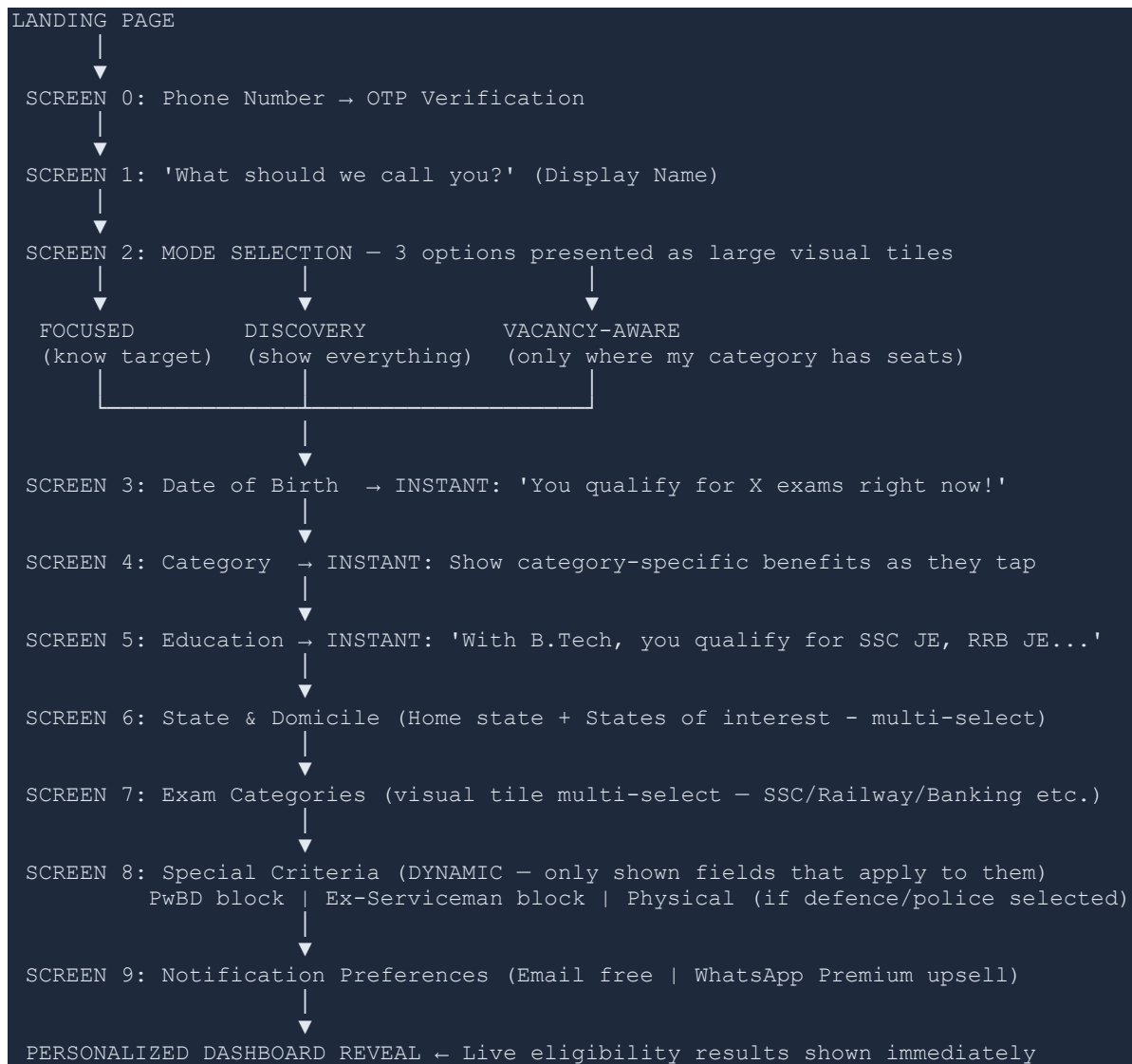
3. Onboarding Architecture — Strategic Philosophy

The 'Earn the Data' Principle

We do not dump a 20-field form on the user. We earn each piece of data by:

- **Explaining why we need it** as we ask — not after
- **Showing immediate value** the moment they give it — live eligibility preview updates
- **Asking only what's needed now** — defer optional data to post-onboarding profile completion

Complete Onboarding Flow Map

```
LANDING PAGE
     |
     ▼
  SCREEN 0: Phone Number → OTP Verification
     |
     ▼
  SCREEN 1: 'What should we call you?' (Display Name)
     |
     ▼
  SCREEN 2: MODE SELECTION — 3 options presented as large visual tiles
     |                |                    |
     ▼                ▼                    ▼
   FOCUSED        DISCOVERY          VACANCY-AWARE
  (know target)  (show everything)  (only where my category has seats)
     |_____|_____|
                      |
                      ▼
  SCREEN 3: Date of Birth  → INSTANT: 'You qualify for X exams right now!'
                      |
                      ▼
  SCREEN 4: Category  → INSTANT: Show category-specific benefits as they tap
                      |
                      ▼
  SCREEN 5: Education → INSTANT: 'With B.Tech, you qualify for SSC JE, RRB JE...'
                      |
                      ▼
  SCREEN 6: State & Domicile (Home state + States of interest - multi-select)
                      |
                      ▼
  SCREEN 7: Exam Categories (visual tile multi-select — SSC/Railway/Banking etc.)
                      |
                      ▼
  SCREEN 8: Special Criteria (DYNAMIC — only shown fields that apply to them)
          PwBD block | Ex-Serviceman block | Physical (if defence/police selected)
                      |
                      ▼
  SCREEN 9: Notification Preferences (Email free | WhatsApp Premium upsell)
                      |
                      ▼
  PERSONALIZED DASHBOARD REVEAL ← Live eligibility results shown immediately
```

Users see **7 to 9 screens** depending on their answers. The mode selection and special criteria screens adapt based on previous choices.

4. Onboarding Mode Selection — Customized Experience

The central insight: **different aspirants want fundamentally different things from this product.** We identify their mental model at the start and adapt accordingly.

Mode	User Says	What Changes	Target User
🎯 FOCUSED	'I'm only preparing for SSC CGL / IBPS PO'	Shorter onboarding; dashboard defaults to tracked exams only; notifications are tightly targeted	Repeat aspirants, working professionals
🔍 DISCOVERY	'Show me all exams I'm eligible for'	Full questionnaire; dashboard defaults to 'Browse Eligible Exams' first; broader notifications	Fresh graduates, early-stage aspirants
☑ VACANCY-AWARE	'Only show where MY category actually has seats'	All DISCOVERY features + vacancy count filter; shows '43 OBC vacancies' per exam	OBC/SC/ST/EWS users who know basic eligibility ≠ practical opportunity
💎 COMPREHENSIVE (Premium)	'Track everything — every eligible exam, every vacancy'	DISCOVERY + VACANCY-AWARE + WhatsApp alerts combined	Power users; premium upsell after 1 week of usage

> *THE VACANCY-AWARE MODE IS OUR KILLER DIFFERENTIATOR. No other platform in India shows aspirants how many seats are allocated for THEIR specific category in a given exam. An OBC user who knows there are 0 OBC vacancies in an exam will NOT waste ₹500 in application fees. This is the feature that generates the most powerful word-of-mouth.*

5. Screen-by-Screen Onboarding Design

Screen 0: Registration — Phone OTP

Design principle: Phone number is the primary identity for Indian users, not email. WhatsApp lives on the same number — the connection is natural and implied.

- Input: 10-digit mobile number (auto-prefix +91)
- OTP: 6-digit, delivered via Twilio/MSG91 SMS
- Secondary option: 'Continue with Google' (for working professionals)
- Do NOT ask for email here — collect it optionally post-onboarding
- **Code instruction:** Use Supabase Auth with Twilio SMS provider. Phone is the primary identifier. `phone_verified = true` after OTP success.

Screen 1: Personal Welcome

Single input: 'What should we call you?' (first name only). No skip option — name personalizes every notification message. Razorpay does this for the same reason.

- Store as `display_name` (max 50 chars) — not legal name
- This becomes the greeting in every WhatsApp message: 'Hi Ravi, SSC CGL deadline is tomorrow!'

Screen 2: Mode Selection

Three large tappable cards with plain-language descriptions. This is the most important UX decision in the entire onboarding flow:

Card Text	Subtext	Mode Stored
🎯 I Know My Target	'I'm preparing for specific exams. Just track those.'	`FOCUSED`
🔍 Show Me Everything	'Show me all government exams I'm eligible for right now.'	`DISCOVERY`
☑ Only Where I Have Vacancy	'Show me exams where MY category actually has seats.'	`VACANCY_AWARE`

Screen 3: Date of Birth

Use a single scrollable date picker (not three separate dropdowns). The moment the user enters their DOB, immediately show:

> 'You are currently 24 years old. ☑ Still eligible for SSC CGL, IBPS PO, Railway NTPC, and 47 more central government exams.' — This is the FIRST WOW MOMENT.

- **Code instruction:** Store as `date_of_birth` (DATE type in PostgreSQL). NEVER store age as a number — always compute from DOB using the exam's specific cutoff date.
- Validate: DOB must place user between 16 and 55 years old

Screen 4: Category Selection

Six visual tiles. When user taps any category, immediately show a slide-up panel with the benefits for that category:

User Taps	Instant Feedback Shown
OBC	OBC candidates get 3 extra years for age limit + 27% of all central government seats reserved for you
SC	SC candidates get 5 extra years for age limit + 15% of all central government seats reserved for you
ST	ST candidates get 5 extra years for age limit + 7.5% of all central government seats reserved for you
EWS	EWS is for General category candidates with family income below ₹8 lakh/year. 10% seats reserved.
General	No age relaxation, but no upper cap on attempts for most exams. Compete on open merit.
Not Sure	Mini explainer quiz helps them identify their correct category

OBC Sub-question (shown only after OBC is selected): 'Is your OBC certificate Non-Creamy Layer (NCL)?' with explanation of the ₹8 lakh income threshold.

Screen 5: Educational Qualification

Visual tile grid (not a dropdown) for qualification level. Tapping 'Graduation' immediately branches to stream selection. Each selection updates a live eligibility preview.
- **Step 5A:** Highest completed qualification (tile grid)
- **Step 5B:** Marks percentage (shown only if exam interests include RBI/NABARD/SBI PO — otherwise optional)
- **Step 5C:** Final year student? If yes — expected completion date

Screen 6: State & Domicile

Two separate questions — this distinction is critical and must never be collapsed into one field:
- **Q1: Home/Domicile State** — 'Which state's government exams are you eligible for?' (single select, searchable dropdown)

- **Q2: Exam States of Interest** — 'Which states' exams do you want to track?' (multi-select — user can add more states beyond their domicile)

> *Why both? An aspirant from UP studying in Delhi has UP domicile but may want to track both UP State PSC AND Delhi Police exams. Many aspirants apply across 3–5 states. Collapsing these into one field would miss valid opportunities.*

Screen 7: Exam Interest Categories

Large icon-based multi-select tiles. Minimum 1 required. As each tile is selected, show: 'Based on your profile, we found [X] upcoming [Category] exams you qualify for.'

Tile	Exam Examples	Flag If Selected
🏛 SSC	CGL, CHSL, MTS, CPO, JE, Stenographer	None
🚃 Railway	RRB NTPC, Group D, ALP, JE, RPF Constable	None
🏢 Banking	IBPS PO/Clerk, SBI PO/Clerk, RBI Grade B, NABARD	Ask marks% if not already
👮 Police/Paramilitary	CRPF, BSF, CISF, Delhi Police, SSB	Add physical standards screen
📚 Teaching	CTET, TET, KVS, NVS, DSSSB Teacher	Check B.Ed in additional quals
🏫 State PSC	UPSC, BPSC, MPPSC, RPSC, TNPSC...	None
⚔ Defence	Army, Navy, Air Force, Coast Guard, NDA, CDS	Add physical standards screen
💼 PSU	ONGC, NTPC, BHEL, HPCL via GATE	Check engineering stream
🏛 UPSC Civil Services	IAS, IPS, IFS, IRS	Note UPSC attempt limits

Screen 8: Special Criteria (Dynamically Assembled)

This screen is composed of 3–5 blocks based on previous answers. Users only see what's relevant to them.

- **Block A — PwBD:** Shown to everyone softly. If Yes → disability type + percentage
- **Block B — Ex-Serviceman:** Shown to everyone softly. If Yes → service type + years; also 'Child of Ex-Serviceman' option
- **Block C — Gender:** Shown to everyone (Male/Female/Third Gender/Prefer not to say)

- **Block D — Physical Standards:** ONLY if Police or Defence was selected in Screen 7. Asks height in cm + vision correction
- **Block E — Additional Qualifications:** Optional section. B.Ed, LLB, CA, CS, NCC certificate, Sports achievement

Screen 9: Notification Preferences

Notification Type	Free or Premium	Default
Email Digest (weekly)	Free	ON
Web Push Notifications	Free	ON
WhatsApp Utility Alerts	Premium — ₹49/month	OFF (opt-in only)
SMS Fallback	Premium only	OFF

WhatsApp opt-in must record timestamp and IP address for DPDPA 2023 compliance. This is a legal requirement in India, not optional.

The Payoff: Personalized Dashboard Reveal

After Screen 9, the user does NOT see a generic 'Welcome!' screen. The app immediately runs the eligibility matching query and shows:

```
✨ Ravi, we found 54 government exams you can apply to RIGHT NOW

📅 6 deadlines in the next 30 days
⚡ 2 exams closing in less than 7 days — act now

_____

🔥 CLOSING SOON
SSC CGL 2025          → Closing in 4 days
Your Category: OBC    | OBC Vacancies: 2,847

📌 NEWLY OPENED
Railway RRB NTPC      → Opened yesterday
Your Category: OBC    | OBC Vacancies: 1,203
_____
```

6. User Schema — Complete Database Design

users table

```sql
CREATE TABLE users (
    -- Identity
    id                   UUID PRIMARY KEY DEFAULT gen_random_uuid(),
    phone                VARCHAR(15) UNIQUE,         -- +91XXXXXXXXXX
    email                VARCHAR(255) UNIQUE,        -- Optional
    display_name         VARCHAR(50) NOT NULL,

    -- Auth
    phone_verified       BOOLEAN DEFAULT FALSE,
    email_verified       BOOLEAN DEFAULT FALSE,
    auth_provider        VARCHAR(20) DEFAULT 'phone', -- 'phone' | 'google'
    google_id            VARCHAR(100) UNIQUE,

    -- Onboarding state
    onboarding_mode      onboarding_mode_enum DEFAULT 'DISCOVERY',
    onboarding_completed BOOLEAN DEFAULT FALSE,
    onboarding_step      SMALLINT DEFAULT 0,  -- Resume partially completed flow

    -- Subscription
    subscription_tier    subscription_tier_enum DEFAULT 'FREE',
    subscription_start   TIMESTAMPTZ,
    subscription_end     TIMESTAMPTZ,
    razorpay_customer_id VARCHAR(100),
    razorpay_subscription_id VARCHAR(100),

    -- Metadata
    created_at           TIMESTAMPTZ DEFAULT NOW(),
    updated_at           TIMESTAMPTZ DEFAULT NOW(),
    last_active_at       TIMESTAMPTZ DEFAULT NOW(),
    is_deleted           BOOLEAN DEFAULT FALSE
);

CREATE TYPE onboarding_mode_enum AS ENUM
    ('FOCUSED', 'DISCOVERY', 'VACANCY_AWARE', 'COMPREHENSIVE');
CREATE TYPE subscription_tier_enum AS ENUM
    ('FREE', 'PREMIUM', 'PREMIUM_ANNUAL');
```

user_profiles table

```sql
CREATE TABLE user_profiles (
    id                   UUID PRIMARY KEY DEFAULT gen_random_uuid(),
    user_id              UUID NOT NULL REFERENCES users(id) ON DELETE CASCADE,

    -- PILLAR 1: Age
    date_of_birth        DATE NOT NULL,

    -- PILLAR 2: Category
    category             category_enum NOT NULL,
    -- GENERAL | OBC_NCL | OBC_CL | SC | ST | EWS

    -- PILLAR 3: Education
    highest_qualification qualification_level_enum NOT NULL,
    qualification_stream  VARCHAR(100),
    -- Engineering:
```

```sql
'Civil'|'Mechanical'|'Electrical'|'Electronics'|'Computer_Science'
    -- ITI: trade name (e.g., 'Electrician', 'Fitter')
    -- General: 'Science'|'Commerce'|'Arts'|'BBA'
    marks_percentage      NUMERIC(5,2),
    is_final_year         BOOLEAN DEFAULT FALSE,
    expected_completion   DATE,
    additional_qualifications TEXT[],
    -- ['BED','LLB','CA','CS','ICWA','MBBS','NCC_A','NCC_B','NCC_C','BTECH']

    -- PILLAR 4: Nationality & Domicile
    nationality           nationality_enum DEFAULT 'INDIAN',
    domicile_state        state_code_enum NOT NULL,  -- e.g., 'IN-UP'
    current_state         state_code_enum,
    exam_states           state_code_enum[],
    languages_known       VARCHAR(50)[],

    -- PILLAR 5: Physical Standards
    gender                gender_enum NOT NULL,
    height_cm             SMALLINT,  -- Only for Defence/Police exam aspirants
    has_vision_correction BOOLEAN,

    -- PILLAR 6: Special Criteria
    is_pwd                BOOLEAN DEFAULT FALSE,
    pwd_type              VARCHAR(50),  -- LOCOMOTOR|VISUAL|HEARING|SPEECH|OTHER
    pwd_percentage        SMALLINT,
    is_ex_serviceman      BOOLEAN DEFAULT FALSE,
    ex_service_type       VARCHAR(50),  --
ARMY|NAVY|AIR_FORCE|PARAMILITARY|CHILD_OF_ESM
    ex_service_years      SMALLINT,
    marital_status        marital_status_enum,
    is_government_employee BOOLEAN DEFAULT FALSE,
    has_sports_achievement BOOLEAN DEFAULT FALSE,
    sports_level          VARCHAR(20),  -- NATIONAL|STATE|DISTRICT

    -- Exam Preferences
    exam_categories       exam_category_enum[],
    -- SSC|RAILWAY|BANKING|UPSC_CIVIL|STATE_PSC|DEFENCE|POLICE|TEACHING|PSU|OTHER

    profile_completeness  SMALLINT DEFAULT 0,  -- 0-100, computed
    created_at            TIMESTAMPTZ DEFAULT NOW(),
    updated_at            TIMESTAMPTZ DEFAULT NOW(),
    UNIQUE (user_id)
);
```

7. Database Choice & Rationale

Primary Database: PostgreSQL via Supabase (Mumbai Region)

Requirement	Why PostgreSQL Wins
Complex eligibility queries	SQL WHERE clauses joining age + category + education + state in one query — unmatched by NoSQL
Multi-value fields	Native array columns (`exam_states state_code_enum[]`) — no junction table overhead for simple multi-selects
Flexible special criteria	JSONB for `physical_requirements`, `vacancies_by_category` — flexible structure with GIN indexing
Security	Supabase Row-Level Security — users can only read/write their own profile; zero application-level auth code needed
Full-text search	pg_trgm extension for exam catalog search — avoids adding Algolia at MVP stage
ACID guarantees	Critical for subscription state and payment webhooks
Indian latency	Supabase on AWS ap-south-1 (Mumbai) — sub-50ms for Indian users

Complete Storage Architecture

Data Type	Storage	Reason
User profiles, eligibility data	PostgreSQL (Supabase)	Relational, complex queries
Exam catalog, notifications	PostgreSQL (Supabase)	Structured, full-text searchable
WhatsApp consent audit logs	PostgreSQL (append-only table)	DPDPA 2023 compliance audit trail
Session rate limiting	Redis (Upstash)	Fast ephemeral; Upstash has free serverless tier
Official exam PDFs (cached)	Supabase Storage (S3)	Store source documents for notification verification
Email templates	PostgreSQL	Keep everything in one place for MVP

8. Exam Data Schema

This is the most complex table in the system. The `vacancies_by_category` JSONB field is the key enabler for VACANCY_AWARE mode.

```sql
CREATE TABLE exams (
    id                    UUID PRIMARY KEY DEFAULT gen_random_uuid(),
    slug                  VARCHAR(200) UNIQUE NOT NULL,  -- 'ssc-cgl-2025'
    name                  VARCHAR(300) NOT NULL,
    short_name            VARCHAR(100),

    -- Classification
    category              exam_category_enum NOT NULL,
    conducting_body       VARCHAR(200) NOT NULL,
    level                 exam_level_enum NOT NULL,  --
CENTRAL|STATE|PSU|DEFENCE|BANKING
    state_code            state_code_enum,  -- NULL for national exams

    -- Vacancy data (CRITICAL for VACANCY_AWARE mode)
    total_vacancies       INTEGER,
    vacancies_by_category JSONB,
    -- Example: {
    --    'general': 1200, 'obc': 847, 'sc': 423,
    --    'st': 212, 'ews': 282,
    --    'pwd_locomotor': 45, 'ex_servicemen': 85
    -- }

    -- Dates
    notification_date     DATE,
    application_start     DATE,
    application_end       DATE NOT NULL,    -- PRIMARY ALERT TRIGGER
    exam_date             DATE,
    admit_card_date       DATE,
    result_date           DATE,

    -- Age Eligibility (all category-specific limits stored EXPLICITLY)
    min_age               SMALLINT,
    max_age_general       SMALLINT,
    max_age_obc           SMALLINT,
    max_age_sc_st         SMALLINT,
    max_age_ews           SMALLINT,
    max_age_pwd_general   SMALLINT,
    max_age_ex_serviceman SMALLINT,
    age_cutoff_date       DATE,

    -- Education Eligibility
    required_qualification qualification_level_enum NOT NULL,
    required_streams      TEXT[],   -- NULL = any; ['Civil','Mechanical'] =
engineering only
    min_marks_percentage  NUMERIC(5,2),
    allows_final_year     BOOLEAN DEFAULT FALSE,

    -- Other Eligibility
    nationality_requirement nationality_enum DEFAULT 'INDIAN',
    gender_restriction    gender_enum,   -- NULL = no restriction
    physical_requirements JSONB,  -- height, vision standards
    marital_status_requirement marital_status_enum,

    -- Application Fees
    application_fee_general  NUMERIC(8,2),
    application_fee_sc_st    NUMERIC(8,2),
    application_fee_pwd      NUMERIC(8,2),
```

```sql
    application_fee_women    NUMERIC(8,2),
    fee_payment_mode         TEXT[],

    -- Trust & Verification
    official_notification_url TEXT NOT NULL,  -- Direct link to official PDF
    notification_verified BOOLEAN DEFAULT FALSE,
    data_source              VARCHAR(50) DEFAULT 'MANUAL',
    is_active                BOOLEAN DEFAULT TRUE,
    is_cancelled             BOOLEAN DEFAULT FALSE,

    created_at               TIMESTAMPTZ DEFAULT NOW(),
    updated_at               TIMESTAMPTZ DEFAULT NOW(),
    last_verified_at         TIMESTAMPTZ
);

-- Performance indexes
CREATE INDEX idx_exams_deadline ON exams(application_end) WHERE is_active = TRUE;
CREATE INDEX idx_exams_category ON exams(category);
CREATE INDEX idx_exams_state ON exams(state_code);
CREATE INDEX idx_exams_vacancies ON exams USING GIN(vacancies_by_category);
```

9. Eligibility Matching Logic

Four-Level Result Flags

Flag	Meaning	UI Treatment
☑ ELIGIBLE	All criteria definitively met	Green badge — shown prominently on dashboard
⚡ LIKELY_ELIGIBLE	Core criteria met; some optional fields not yet verified	Amber badge — shown with 'Complete profile to confirm'
⚠ CHECK_REQUIRED	One or more criteria couldn't be determined from current profile	Orange — shown with specific missing field prompt
⊘ INELIGIBLE	One or more hard criteria definitely not met	Hidden from main dashboard view (available in 'All Exams' tab)

> *We never show a binary eligible/ineligible. 'LIKELY_ELIGIBLE' is honest about uncertainty while still showing the user a potentially useful exam. This transparency builds trust.*

Core Eligibility Checks (in order of strictness)

1. Application window is still open (application_end >= TODAY)
2. User's age on the exam's cutoff_date is within min_age to max_age for their category
3. User's educational qualification level >= required_qualification
4. Stream/discipline matches required_streams (if any)
5. Marks percentage >= min_marks_percentage (if exam requires it)
6. Nationality matches exam requirement
7. Gender restriction matches (if exam is gender-specific)
8. State restriction matches (domicile_state or exam_states for state-level exams)
9. VACANCY_AWARE mode: vacancies_by_category for user's category > 0

10. Complete Tech Stack

Layer	Technology	Version	Reason
Frontend Framework	Next.js (App Router)	14+	SSR for SEO + CSR for dashboard interactions
UI Components	shadcn/ui + Tailwind CSS	Latest	Fast, unstyled, accessible; production-ready
Onboarding State	Zustand	4+	Lightweight; persists onboarding progress to localStorage for resume
Animations	Framer Motion	10+	Step transitions in onboarding; performant on mobile
Database	PostgreSQL via Supabase	PG 15	Managed Postgres + Auth + RLS + Storage in one service
Auth	Supabase Auth	—	Phone OTP (Twilio) + Google OAuth out of the box
OTP SMS	Twilio (+ MSG91 fallback)	—	Reliable; dual-provider prevents SMS delivery failures
Cache / Rate Limiting	Upstash Redis	—	Serverless Redis; free tier; 100 req/min per user
WhatsApp	Meta WABA via AiSensy	—	Indian reseller; cheaper setup than direct Meta API
Email	AWS SES	—	₹0.007/email; 99.9% deliverability; Indian region
Push Notifications	OneSignal	—	Free up to 10K subscribers; web + Android push
Payments	Razorpay	—	Indian payment gateway; UPI, cards, net banking, subscriptions
File Storage	Supabase Storage	—	Exam notification PDFs; verification source documents
Search	PostgreSQL pg_trgm	—	Avoid adding Algolia at MVP; PostgreSQL full-text is sufficient
Frontend Hosting	Vercel	—	Auto-scaling; optimal Next.js deployment; CDN globally
Backend Jobs	BullMQ on Railway.app	—	Scraping queue, notification delivery, digest generation
Analytics	PostHog (self-hosted)	—	Full onboarding funnel visibility; self-hosted = free

Layer	Technology	Version	Reason
Error Tracking	Sentry	—	Free tier; catches runtime errors in onboarding flow
Payments Monitoring	Razorpay Dashboard	—	Built-in subscription management; webhook reliability

11. Development Phases

Phase	Timeline	Key Deliverables	Milestone
0: Setup	Week 0	Supabase project (Mumbai), Vercel, Razorpay test, OneSignal, all DB migrations, ENUMs	Development environment fully configured
1: Auth + Onboarding	Weeks 1–3	Phone OTP auth, all 9 onboarding screens, profile save API (incremental), basic eligibility query, dashboard reveal	User can register, complete onboarding, see personalized exam list
2: Exam DB + Dashboard	Weeks 4–6	50 central exams curated manually, full eligibility matching, deadline calendar, track/untrack, email digest, web push	Core product loop complete — user can track exams and get alerts
3: Payments + Premium	Weeks 7–8	Razorpay subscription, WhatsApp opt-in with DPDPA consent logging, WhatsApp utility messages for premium users	First paying user
4: Growth Features	Weeks 9–12	SEO exam pages, referral program, Hindi interface, State PSC coverage (top 5 states), admin dashboard for exam data	SEO traffic begins; referral loop established

12. Key Engineering Decisions Log

Every decision documented here was made deliberately. Future developers should not revisit these without reading this rationale.

Decision 1: Explicit Age Limit Columns Per Category

Store `max_age_general`, `max_age_obc`, `max_age_sc_st` as separate explicit columns — NOT computed as (general_limit + standard_relaxation).

> *Reason: Government notifications sometimes have non-standard relaxations (e.g., OBC from J&K gets different relaxation than OBC from other states for the same exam). Storing explicit values prevents bugs from applying the formula when the notification is non-standard. The manual curation team enters the ACTUAL limit from the PDF.*

Decision 2: JSONB for vacancies_by_category

Vacancy counts are stored as JSONB rather than a junction table.

> *Reason: Vacancy data is always queried as a whole unit. A junction table would require a join every time. JSONB allows GIN indexing for fast lookups. The structure is stable (always 8-10 keys: general, obc, sc, st, ews, pwd categories, ex-servicemen).*

Decision 3: Separate domicile_state and exam_states Fields

> *Reason: A student from Bihar studying in Delhi has Bihar domicile but wants Delhi Police notifications. Conflating these fields would miss valid exams OR show ineligible state exams. The separation models reality accurately.*

Decision 4: OBC_NCL and OBC_CL as Separate ENUM Values

> *Reason: Creamy Layer OBC candidates compete as General category. If we store them as 'OBC' with a boolean flag, we risk applying OBC age relaxation to someone who should not get it. Separate ENUM values make the eligibility rule unambiguous and bug-proof.*

Decision 5: No Mobile App in MVP

> *Reason: PWA on Android covers 80%+ of users adequately. Building React Native doubles development effort and adds Play Store approval timelines (2-4 weeks). PWA supports push notifications on Android Chrome. Re-evaluate after 10,000 MAU.*

Decision 6: application_end as the Primary Alert Trigger

Reason: The exam date is months away; aspirants don't need alerts that far ahead. The application window closing is the IRREVERSIBLE event — missing it means the aspirant cannot apply regardless of preparation level. All deadline logic centers on application_end.

Decision 7: WhatsApp Consent Recorded with Timestamp and IP

Reason: DPDPA 2023 (India's Digital Personal Data Protection Act) requires that consent be specific, informed, freely given, and verifiable. Recording the timestamp and IP of opt-in creates an audit trail. This is a legal requirement — not optional.

Decision 8: Four-Level Eligibility Flag, Not Binary

Reason: Binary eligible/ineligible is misleading when the user's profile is incomplete. 'LIKELY_ELIGIBLE — complete your profile to confirm' is honest AND incentivizes profile completion. It also prevents users from dismissing genuinely eligible exams due to incomplete profile data.