
1 Core identity & people

Table: mothers

- **mother_id** (PK, UUID)
- **hospital_mrn** (string, unique, nullable if not linked)
- **first_name** (string)
- **last_name** (string)
- **national_id** (string, nullable, indexed)
- **phone** (string, nullable)
- **date_of_birth** (date, nullable)
- **created_at** (timestamp)
- **updated_at** (timestamp)

Table: infants

- **infant_id** (PK, UUID)
- **hospital_infant_no** (string, unique)
- **first_name** (string, nullable)
- **gender** (enum: MALE, FEMALE, UNKNOWN)
- **date_of_birth** (timestamp)
- **birth_weight_grams** (integer, nullable)
- **status** (enum: ADMITTED, DISCHARGED, TRANSFERRED, DECEASED)
- **mother_id** (FK → mothers.mother_id, nullable for special cases)
- **created_at** (timestamp)
- **updated_at** (timestamp)

2 Tags & devices

Table: devices

- **device_id** (PK, UUID)

- **device_type** (enum: INFANT_TAG, MOTHER_TAG, READER, GATE_TERMINAL, ALARM_NODE, FOOTPRINT_SCANNER, OTHER)
- **serial_number** (string, unique)
- **firmware_version** (string)
- **hardware_version** (string, nullable)
- **status** (enum: ACTIVE, INACTIVE, MAINTENANCE, RETIRED)
- **zone_id** (FK → zones.zone_id, nullable)
- **last_seen_at** (timestamp, nullable)
- **created_at** (timestamp)
- **updated_at** (timestamp)

Table: infant_tags

- **infant_tag_id** (PK, UUID)
- **device_id** (FK → devices.device_id, unique)
- **tag_uid** (string, unique) // RF/BLE ID
- **assigned_infant_id** (FK → infants.infant_id, nullable)
- **assigned_at** (timestamp, nullable)
- **unassigned_at** (timestamp, nullable)
- **status** (enum: AVAILABLE, ASSIGNED, LOST, DAMAGED)
- **created_at** (timestamp)
- **updated_at** (timestamp)

Table: mother_tags

- **mother_tag_id** (PK, UUID)
- **device_id** (FK → devices.device_id, unique)
- **tag_uid** (string, unique)
- **assigned_mother_id** (FK → mothers.mother_id, nullable)
- **assigned_at** (timestamp, nullable)
- **unassigned_at** (timestamp, nullable)
- **status** (enum: AVAILABLE, ASSIGNED, LOST, DAMAGED)

- **created_at** (timestamp)
 - **updated_at** (timestamp)
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3 Hospital topology

Table: hospitals

- **hospital_id** (PK, UUID)
- **name** (string)
- **code** (string, unique)
- **address** (string, nullable)
- **created_at** (timestamp)
- **updated_at** (timestamp)

Table: wards

- **ward_id** (PK, UUID)
- **hospital_id** (FK → hospitals.hospital_id)
- **name** (string)
- **code** (string)
- **created_at** (timestamp)
- **updated_at** (timestamp)

Table: zones

- **zone_id** (PK, UUID)
- **ward_id** (FK → wards.ward_id)
- **name** (string)
- **code** (string)
- **zone_type** (enum: ROOM, CORRIDOR, EXIT, NURSERY, OTHER)
- **is_exit_zone** (boolean, default false)
- **created_at** (timestamp)
- **updated_at** (timestamp)

Table: gates

- **gate_id** (PK, UUID)
- **zone_from_id** (FK → zones.zone_id)
- **zone_to_id** (FK → zones.zone_id)
- **name** (string)
- **code** (string)
- **gate_terminal_device_id** (FK → devices.device_id, nullable)
- **created_at** (timestamp)
- **updated_at** (timestamp)

Table: readers

- **reader_id** (PK, UUID)
 - **device_id** (FK → devices.device_id, unique)
 - **zone_id** (FK → zones.zone_id)
 - **name** (string)
 - **location_description** (string, nullable)
 - **created_at** (timestamp)
 - **updated_at** (timestamp)
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4 Pairing & relationships

Table: infant_mother_pairings

- **pairing_id** (PK, UUID)
- **infant_id** (FK → infants.infant_id)
- **mother_id** (FK → mothers.mother_id)
- **infant_tag_id** (FK → infant_tags.infant_tag_id, nullable)
- **mother_tag_id** (FK → mother_tags.mother_tag_id, nullable)
- **paired_at** (timestamp)
- **unpaired_at** (timestamp, nullable)
- **status** (enum: ACTIVE, INACTIVE)
- **created_by_user_id** (FK → users.user_id, nullable)

- **created_at** (timestamp)
 - **updated_at** (timestamp)
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5 Location & RTLS

Table: tag_location_snapshots

- **snapshot_id** (PK, UUID)
- **tag_uid** (string, indexed)
- **device_id** (FK → devices.device_id) // reader
- **zone_id** (FK → zones.zone_id)
- **rssi** (numeric, nullable)
- **seen_at** (timestamp, indexed)

(Can be large; consider partitioning or moving to time-series DB.)

Table: current_tag_locations

- **tag_uid** (PK, string)
 - **device_id** (FK → devices.device_id)
 - **zone_id** (FK → zones.zone_id)
 - **last_seen_at** (timestamp)
 - **last_rssi** (numeric, nullable)
 - **tag_type** (enum: INFANT_TAG, MOTHER_TAG, OTHER)
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6 Movements & gates

Table: movement_logs

- **movement_id** (PK, UUID)
- **infant_id** (FK → infants.infant_id)
- **infant_tag_id** (FK → infant_tags.infant_tag_id, nullable)
- **mother_id** (FK → mothers.mother_id, nullable)
- **mother_tag_id** (FK → mother_tags.mother_tag_id, nullable)
- **staff_user_id** (FK → users.user_id, nullable)

- **gate_id** (FK → gates.gate_id)
 - **from_zone_id** (FK → zones.zone_id, nullable)
 - **to_zone_id** (FK → zones.zone_id, nullable)
 - **movement_reason** (string or enum: ROUTINE_TRANSFER, TEST, EMERGENCY, OTHER)
 - **authorized** (boolean)
 - **authorization_result_code** (string, nullable)
 - **authorized_at** (timestamp)
 - **created_at** (timestamp)
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7 Events, tamper, alarms

Table: security_events

- **event_id** (PK, UUID)
- **event_type** (enum: TAMPER, UNAUTHORIZED_EXIT, UNAUTHORIZED_MOVEMENT, TAG_MISSING, DEVICE_FAULT, OTHER)
- **severity** (enum: INFO, WARNING, CRITICAL)
- **infant_id** (FK → infants.infant_id, nullable)
- **infant_tag_id** (FK → infant_tags.infant_tag_id, nullable)
- **mother_id** (FK → mothers.mother_id, nullable)
- **device_id** (FK → devices.device_id, nullable)
- **zone_id** (FK → zones.zone_id, nullable)
- **details** (JSONB, nullable)
- **raised_at** (timestamp)
- **resolved_at** (timestamp, nullable)
- **resolved_by_user_id** (FK → users.user_id, nullable)
- **created_at** (timestamp)

Table: alarms

- **alarm_id** (PK, UUID)

- **security_event_id** (FK → security_events.event_id, nullable)
 - **zone_id** (FK → zones.zone_id, nullable)
 - **alarm_state** (enum: ACTIVE, SILENCED, RESET)
 - **raised_at** (timestamp)
 - **silenced_at** (timestamp, nullable)
 - **reset_at** (timestamp, nullable)
 - **raised_by_user_id** (FK → users.user_id, nullable)
 - **silenced_by_user_id** (FK → users.user_id, nullable)
 - **reset_by_user_id** (FK → users.user_id, nullable)
 - **created_at** (timestamp)
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8 Biometrics

Table: **biometric_templates**

- **template_id** (PK, UUID)
- **infant_id** (FK → infants.infant_id)
- **template_type** (enum: FOOTPRINT, OTHER)
- **template_format** (string) // e.g., vendor/algorithm ID
- **template_data** (BYTEA or TEXT) // encrypted
- **quality_score** (numeric, nullable)
- **enrolled_at** (timestamp)
- **enrolled_by_user_id** (FK → users.user_id, nullable)
- **created_at** (timestamp)
- **updated_at** (timestamp)

Table: **biometric_match_logs**

- **match_id** (PK, UUID)
- **infant_id** (FK → infants.infant_id, nullable)
- **template_id** (FK → biometric_templates.template_id, nullable)
- **match_type** (enum: ENROLLMENT_CHECK, VERIFICATION, DEDUPLICATION)

- **match_score** (numeric)
 - **match_result** (enum: MATCH, NO_MATCH, POSSIBLE_DUPLICATE)
 - **details** (JSONB, nullable)
 - **created_at** (timestamp)
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9 Users, roles, audit

Table: users

- **user_id** (PK, UUID)
- **username** (string, unique)
- **full_name** (string)
- **role_id** (FK → roles.role_id)
- **email** (string, nullable)
- **phone** (string, nullable)
- **status** (enum: ACTIVE, DISABLED)
- **password_hash** (string, nullable if using SSO)
- **created_at** (timestamp)
- **updated_at** (timestamp)

Table: roles

- **role_id** (PK, UUID)
- **name** (string, unique) // ADMIN, NURSE, SECURITY, BIOMED, IT
- **description** (string, nullable)
- **created_at** (timestamp)
- **updated_at** (timestamp)

Table: audit_logs

- **audit_id** (PK, UUID)
- **timestamp** (timestamp, indexed)
- **user_id** (FK → users.user_id, nullable)

- **action_type** (string or enum: LOGIN, LOGOUT, CREATE, UPDATE, DELETE, CONFIG_CHANGE, MANUAL_ALARM, etc.)
 - **entity_type** (string: INFANT, MOTHER, DEVICE, CONFIG, etc.)
 - **entity_id** (string, nullable)
 - **details** (JSONB, nullable)
 - **ip_address** (string, nullable)
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