

Ihuzo HR System - Logical Model Design (Phase 3)

1. Entity-Relationship (ER) Model

This logical model focuses specifically on the **Recruitment Pipeline** module of the Ihuzo HR System, as identified in Phase 1. It supports the recruitment process workflow modeled in Phase 2.

1.1 Entities and Attributes

DEPARTMENT

- **department_id** NUMBER(6) PRIMARY KEY
- **department_name** VARCHAR2(100) NOT NULL
- **location** VARCHAR2(100)
- **description** VARCHAR2(500)
- **created_date** DATE DEFAULT SYSDATE
- **is_active** CHAR(1) DEFAULT 'Y' CHECK (is_active IN ('Y','N'))

JOB_POSITION

- **position_id** NUMBER(6) PRIMARY KEY
- **position_title** VARCHAR2(100) NOT NULL
- **department_id** NUMBER(6) NOT NULL
- **job_description** CLOB
- **min_salary** NUMBER(10,2)
- **max_salary** NUMBER(10,2)
- **created_date** DATE DEFAULT SYSDATE
- **is_active** CHAR(1) DEFAULT 'Y' CHECK (is_active IN ('Y','N'))

DEPARTMENT_MANAGER

- **manager_id** NUMBER(6) PRIMARY KEY
- **department_id** NUMBER(6) NOT NULL
- **employee_id** NUMBER(6) NOT NULL
- **start_date** DATE DEFAULT SYSDATE
- **end_date** DATE
- **is_current** CHAR(1) DEFAULT 'Y' CHECK (is_current IN ('Y','N'))

JOB_REQUISITION

- **requisition_id** NUMBER(6) PRIMARY KEY
- **position_id** NUMBER(6) NOT NULL
- **department_id** NUMBER(6) NOT NULL
- **manager_id** NUMBER(6) NOT NULL
- **requisition_date** DATE DEFAULT SYSDATE

- **status** VARCHAR2(20) NOT NULL CHECK (status IN ('DRAFT', 'PENDING', 'APPROVED', 'CLOSED', 'CANCELLED'))
- **headcount** NUMBER(3) DEFAULT 1
- **priority_level** VARCHAR2(10) CHECK (priority_level IN ('LOW', 'MEDIUM', 'HIGH', 'CRITICAL'))
- **job_requirements** CLOB
- **approval_date** DATE
- **target_start_date** DATE
- **is_internal_only** CHAR(1) DEFAULT 'N' CHECK (is_internal_only IN ('Y', 'N'))

JOB_POSTING

- **posting_id** NUMBER(6) PRIMARY KEY
- **requisition_id** NUMBER(6) NOT NULL
- **posting_title** VARCHAR2(200) NOT NULL
- **posting_description** CLOB
- **location** VARCHAR2(100)
- **publish_date** DATE
- **closing_date** DATE
- **status** VARCHAR2(20) NOT NULL CHECK (status IN ('DRAFT', 'PUBLISHED', 'CLOSED', 'CANCELLED'))
- **created_by** NUMBER(6) NOT NULL
- **display_salary_range** CHAR(1) DEFAULT 'N' CHECK (display_salary_range IN ('Y', 'N'))

APPLICANT

- **applicant_id** NUMBER(6) PRIMARY KEY
- **first_name** VARCHAR2(50) NOT NULL
- **last_name** VARCHAR2(50) NOT NULL
- **email** VARCHAR2(100) NOT NULL UNIQUE
- **phone** VARCHAR2(20)
- **registration_date** DATE DEFAULT SYSDATE
- **status** VARCHAR2(20) DEFAULT 'ACTIVE' CHECK (status IN ('ACTIVE', 'INACTIVE', 'BLOCKED'))

APPLICATION

- **application_id** NUMBER(10) PRIMARY KEY
- **applicant_id** NUMBER(6) NOT NULL
- **posting_id** NUMBER(6) NOT NULL
- **apply_date** DATE DEFAULT SYSDATE
- **status** VARCHAR2(20) NOT NULL CHECK (status IN ('SUBMITTED', 'SCREENING', 'SHORTLISTED', 'INTERVIEW', 'OFFERED', 'HIRED', 'REJECTED', 'WITHDRAWN'))
- **source** VARCHAR2(50)

- **matching_score** NUMBER(5,2)
- **last_update_date** DATE DEFAULT SYSDATE

APPLICATION_DOCUMENT

- **document_id** NUMBER(10) PRIMARY KEY
- **application_id** NUMBER(10) NOT NULL
- **document_type** VARCHAR2(20) NOT NULL CHECK (document_type IN ('RESUME', 'COVER_LETTER', 'CERTIFICATE', 'ID', 'REFERENCE', 'OTHER'))
- **file_name** VARCHAR2(255) NOT NULL
- **file_path** VARCHAR2(500) NOT NULL
- **upload_date** DATE DEFAULT SYSDATE
- **verified** CHAR(1) DEFAULT 'N' CHECK (verified IN ('Y','N'))

INTERVIEW

- **interview_id** NUMBER(10) PRIMARY KEY
- **application_id** NUMBER(10) NOT NULL
- **interview_type** VARCHAR2(20) NOT NULL CHECK (interview_type IN ('PHONE', 'VIDEO', 'IN_PERSON', 'TECHNICAL', 'PANEL'))
- **scheduled_date** DATE NOT NULL
- **status** VARCHAR2(20) DEFAULT 'SCHEDULED' CHECK (status IN ('SCHEDULED', 'COMPLETED', 'CANCELLED', 'RESCHEDULED', 'NO_SHOW'))
- **location** VARCHAR2(200)
- **duration_minutes** NUMBER(3) DEFAULT 60
- **notes** CLOB

INTERVIEWER

- **interviewer_id** NUMBER(10) PRIMARY KEY
- **interview_id** NUMBER(10) NOT NULL
- **employee_id** NUMBER(6) NOT NULL
- **role** VARCHAR2(20) CHECK (role IN ('PRIMARY', 'PANEL_MEMBER', 'TECHNICAL', 'HR'))

INTERVIEW_FEEDBACK

- **feedback_id** NUMBER(10) PRIMARY KEY
- **interview_id** NUMBER(10) NOT NULL
- **interviewer_id** NUMBER(10) NOT NULL
- **rating** NUMBER(1) CHECK (rating BETWEEN 1 AND 5)
- **strengths** VARCHAR2(2000)
- **weaknesses** VARCHAR2(2000)
- **recommendation** VARCHAR2(20) CHECK (recommendation IN ('HIRE', 'REJECT', 'CONSIDER'))
- **feedback_date** DATE DEFAULT SYSDATE

JOB_OFFER

- **offer_id** NUMBER(6) PRIMARY KEY
- **application_id** NUMBER(10) NOT NULL
- **offered_salary** NUMBER(10,2) NOT NULL
- **start_date** DATE NOT NULL
- **expiration_date** DATE NOT NULL
- **status** VARCHAR2(20) DEFAULT 'PENDING' CHECK (status IN ('DRAFT', 'PENDING', 'ACCEPTED', 'DECLINED', 'WITHDRAWN'))
- **created_date** DATE DEFAULT SYSDATE
- **response_date** DATE
- **offer_details** CLOB
- **created_by** NUMBER(6) NOT NULL

RECRUITMENT_METRICS

- **metric_id** NUMBER(10) PRIMARY KEY
- **department_id** NUMBER(6)
- **position_id** NUMBER(6)
- **time_period** VARCHAR2(20)
- **year** NUMBER(4)
- **month** NUMBER(2)
- **applications_received** NUMBER(5)
- **interviews_conducted** NUMBER(5)
- **offers_made** NUMBER(5)
- **offers_accepted** NUMBER(5)
- **time_to_fill_days** NUMBER(5)
- **cost_per_hire** NUMBER(10,2)

1.2 Primary Keys (PKs) and Foreign Keys (FKs)

DEPARTMENT

- PK: department_id

JOB_POSITION

- PK: position_id
- FK: department_id REFERENCES DEPARTMENT(department_id)

DEPARTMENT_MANAGER

- PK: manager_id
- FK: department_id REFERENCES DEPARTMENT(department_id)
- FK: employee_id (References an EMPLOYEE table which would be in a separate HR module)

JOB_REQUISITION

- PK: requisition_id
- FK: position_id REFERENCES JOB_POSITION(position_id)
- FK: department_id REFERENCES DEPARTMENT(department_id)
- FK: manager_id REFERENCES DEPARTMENT_MANAGER(manager_id)

JOB_POSTING

- PK: posting_id
- FK: requisition_id REFERENCES JOB_REQUISITION(requisition_id)
- FK: created_by (References a USER table which would be in a separate Authentication module)

APPLICANT

- PK: applicant_id

APPLICATION

- PK: application_id
- FK: applicant_id REFERENCES APPLICANT(applicant_id)
- FK: posting_id REFERENCES JOB_POSTING(posting_id)

APPLICATION_DOCUMENT

- PK: document_id
- FK: application_id REFERENCES APPLICATION(application_id)

INTERVIEW

- PK: interview_id
- FK: application_id REFERENCES APPLICATION(application_id)

INTERVIEWER

- PK: interviewer_id
- FK: interview_id REFERENCES INTERVIEW(interview_id)
- FK: employee_id (References an EMPLOYEE table which would be in a separate HR module)

INTERVIEW_FEEDBACK

- PK: feedback_id
- FK: interview_id REFERENCES INTERVIEW(interview_id)
- FK: interviewer_id REFERENCES INTERVIEWER(interviewer_id)

JOB_OFFER

- PK: offer_id
- FK: application_id REFERENCES APPLICATION(application_id)
- FK: created_by (References a USER table which would be in a separate Authentication module)

RECRUITMENT_METRICS

- PK: metric_id
- FK: department_id REFERENCES DEPARTMENT(department_id)
- FK: position_id REFERENCES JOB_POSITION(position_id)

2. Relationships & Constraints

2.1 One-to-One Relationships

- APPLICATION to JOB_OFFER (An application can have at most one job offer)

2.2 One-to-Many Relationships

- DEPARTMENT to JOB_POSITION (A department can have many positions)
- DEPARTMENT to DEPARTMENT_MANAGER (A department can have many managers over time)
- JOB_POSITION to JOB_REQUISITION (A position can have many requisitions)
- JOB_REQUISITION to JOB_POSTING (A requisition can have many job postings)
- APPLICANT to APPLICATION (An applicant can submit many applications)
- JOB_POSTING to APPLICATION (A job posting can receive many applications)
- APPLICATION to APPLICATION_DOCUMENT (An application can have many documents)
- APPLICATION to INTERVIEW (An application can have many interviews)
- INTERVIEW to INTERVIEWER (An interview can have many interviewers)
- INTERVIEW to INTERVIEW_FEEDBACK (An interview can have many feedback entries)

2.3 Additional Constraints

NOT NULL Constraints

- Applied to all primary keys and critical fields (names, essential dates, status fields)

UNIQUE Constraints

- APPLICANT.email must be unique

CHECK Constraints

- Status fields limited to predefined values in all tables
- Rating field in INTERVIEW_FEEDBACK must be between 1 and 5
- Boolean fields (is_active, is_internal_only, etc.) limited to 'Y' or 'N'

DEFAULT Constraints

- Creation dates default to SYSDATE
- Status fields have appropriate defaults
- Boolean fields default to appropriate values

Business Rule Constraints (Implemented through triggers or application logic)

- Job posting closing date must be after publish date

- Interview dates must be after application submission date
- Offer expiration date must be after creation date

3. Normalization Analysis

3.1 First Normal Form (1NF)

- All attributes contain atomic values
- All tables have primary keys
- No repeating groups (e.g., separate APPLICATION_DOCUMENT table for multiple documents)

3.2 Second Normal Form (2NF)

- All tables are in 1NF
- All non-key attributes are fully dependent on the primary key
- No partial dependencies exist

3.3 Third Normal Form (3NF)

- All tables are in 2NF
- No transitive dependencies exist
- Separate tables for entities like DEPARTMENT, JOB_POSITION, and APPLICANT
- Junction tables for many-to-many relationships (e.g., INTERVIEWER)

4. Data Scenario Handling

4.1 Recruitment Workflow Support

The logical model supports the complete recruitment workflow as modeled in the BPMN diagram from Phase 2:

- 1. Initiation Phase:**
 - Department Manager identifies staffing need → DEPARTMENT_MANAGER, JOB_REQUISITION
 - Job requisition creation and validation → JOB_REQUISITION (status tracking)
- 2. Sourcing Phase:**
 - Job posting creation and publication → JOB_POSTING
 - Applicant application submission → APPLICANT, APPLICATION, APPLICATION_DOCUMENT
- 3. Screening Phase:**
 - Application review and shortlisting → APPLICATION (status and matching_score)
 - Application statistics/analytics → RECRUITMENT_METRICS
- 4. Selection Phase:**
 - Interview scheduling and feedback → INTERVIEW, INTERVIEWER, INTERVIEW_FEEDBACK
 - Decision tracking → APPLICATION (status updates)

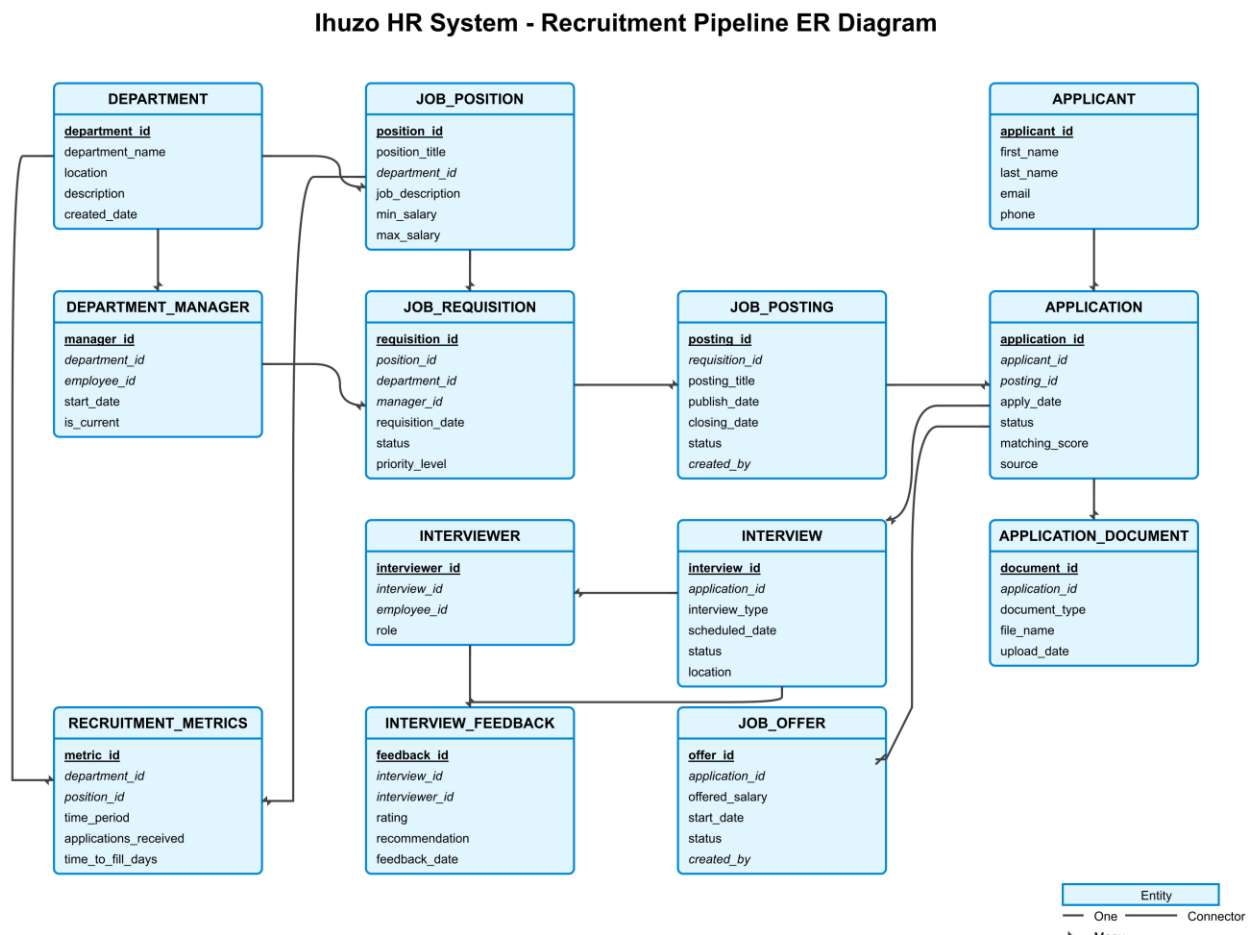
5. Finalization Phase:

- Job offer processing → JOB_OFFER
- Offer acceptance/rejection → JOB_OFFER (status tracking)

4.2 Specific Scenarios

- **Internal vs. External Recruitment:** Handled via JOB_REQUISITION.is_internal_only flag
- **Multi-stage Interviews:** Supported by creating multiple INTERVIEW records for a single APPLICATION
- **Panel Interviews:** Handled through the INTERVIEWER table (multiple interviewers per interview)
- **Candidate Withdrawal:** Tracked via APPLICATION.status and JOB_OFFER.status
- **Metrics and Reporting:** Supported by the RECRUITMENT_METRICS table

5. ER Diagram



Key: - ● Primary Key - ○ Foreign Key - ———▶ One-to-Many Relationship - ———|| One-to-One Relationship

6. Implementation Notes

6.1 Recommended Indexes

- APPLICANT(email)
- APPLICATION(posting_id, status)
- JOB_POSTING(requisition_id, status)
- INTERVIEW(application_id, scheduled_date)
- APPLICATION_DOCUMENT(application_id, document_type)

6.2 Oracle PL/SQL Specific Considerations

- Use of sequence generators for all primary keys
- Implementation of triggers for:
 - Automatic status updates based on workflow progression
 - Validation of dates (e.g., closing_date > publish_date)
 - Maintenance of audit trails for critical tables
- Implementation of stored procedures for:
 - Application screening and scoring
 - Interview scheduling
 - Offer generation
 - Metrics calculation

6.3 Security and Storage Considerations

- CLOB data types for text-heavy fields
- Secure storage of application documents with proper access controls
- Audit logging for sensitive operations (offer creation, application status changes)