GLOBAL LOGISTICS AND SUPPLY CHAIN MANAGEMENT SYSTEM

Project Overview

Highlights:

- ✨ Robust logistics database for global operations
- ✈️ Tracks shipments, carriers, clients, warehouses, and employees
- ⏱️ Supports international routing, customs, and delivery tracking
- 🔒 Ensures data integrity and real-time visibility

Key Features

System Capabilities:

- ✔️ End-to-end shipment monitoring and delivery tracking
- ✔️ Multi-warehouse routing with dynamic storage updates
- ✔️ Carrier transitions supported for multi-leg journeys
- ✔️ Clients can be both senders and receivers
- ✔️ Strict employee role enforcement

ER Diagram Overview

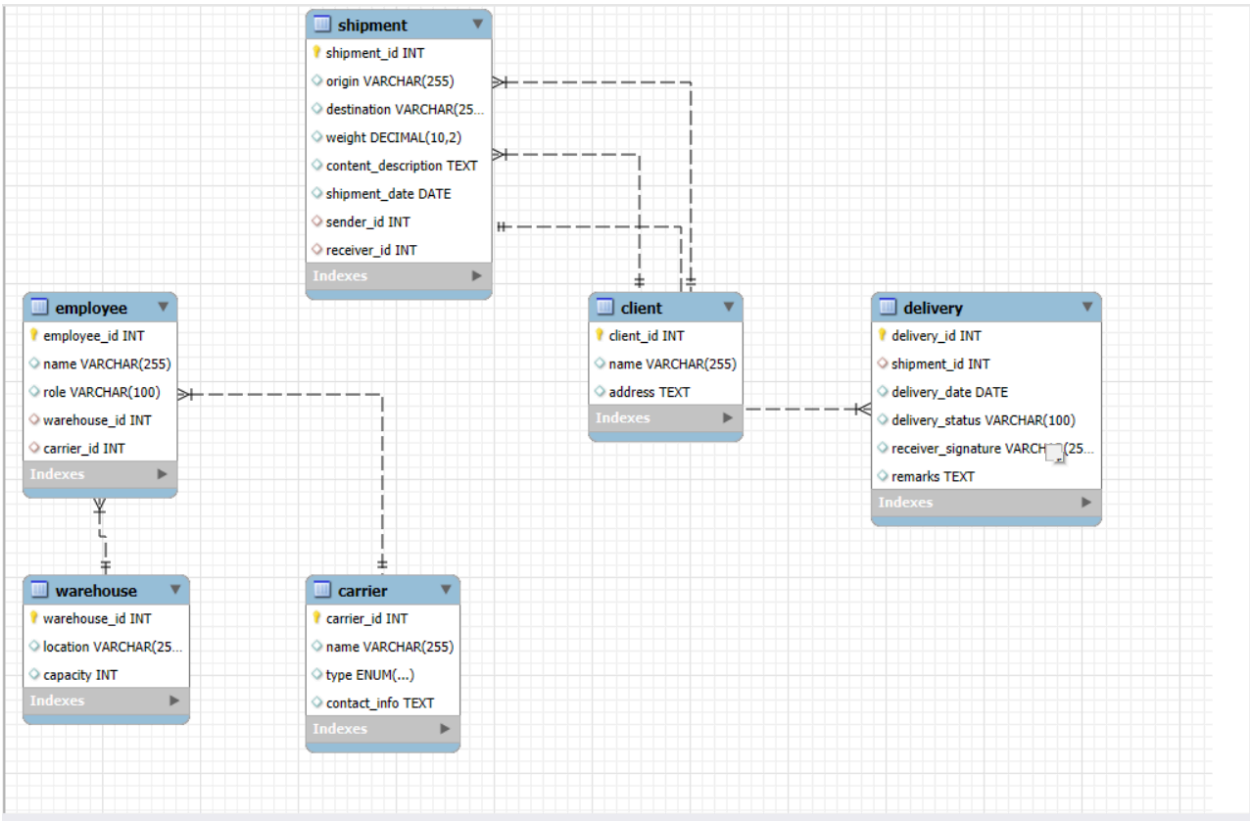

Diagram Details:

- ● Visualizes entity relationships and dependencies
- ● Highlights many-to-one and one-to-one connections

Major Entities

Client:

- • `client_id`, `name`, `address`
- • Can act as sender and/or receiver

Carrier:

- • `carrier_id`, `name`, `type` (ENUM: air, land, sea), `contact_info`
- • Manages shipment movements across various legs

Warehouse:

- • `warehouse_id`, `location`, `capacity`
- • Stores shipments during transition or customs clearance

Employee:

- • `employee_id`, `name`, `role`, `warehouse_id`, `carrier_id`
- • Assigned to either a warehouse or a carrier (not both)

Shipment:

- • `shipment_id`, `origin`, `destination`, `weight`, `content_description`, `shipment_date`
- • References sender and receiver clients

Delivery:

- • `delivery_id`, `shipment_id`, `delivery_date`, `delivery_status`, `receiver_signature`, `remarks`
- • Tracks final hand-off and delivery outcomes

Table Relationships

Entity Connections:

- ● Shipments → linked to sender and receiver clients
- ● Shipment → Delivery = One-to-One
- ● Employee → assigned to either warehouse or carrier (not both)
- ● Warehouse → manages multiple employees and shipments

Key Constraints

Design Integrity:

- ❌ Shipments stored in one warehouse at a time
- ➡️ Carriers change across route legs (use junction table)
- ❌ No dual role assignment for employees
- ✅ Deliveries uniquely linked to shipments

Sample Data Highlights

Inserted Records:

- • **Clients:** 5 entries across USA, UK, India, Germany, Japan
- • **Carriers:** FedEx, DHL, Maersk, Blue Dart, RoadRunner Logistics
- • **Warehouses:** Chicago, Rotterdam, Singapore, Dubai, Chennai
- • **Employees:** Assigned as warehouse staff or carrier crew only
- • **Shipments & Deliveries:** Actively tracked across stages

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Future Enhancements

Scalability Goals:

- ✈️ Add customs clearance & international compliance logs
- ➕ Introduce `Shipment_Leg` table for detailed route handling
- ⏱️ Real-time GPS tracking integration
- ♻️ Inventory and Cross-Docking modules for warehouse optimization

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Summary

System Overview:

- ✔️ Comprehensive global logistics management
- ✔️ Well-defined schema with data consistency
- ✔️ Modular and scalable for future logistics needs