

# MAN Logistic



## Report

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Mohammed Alsahli

Naif Albalawi

Abderrahmane Balah

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## I. Purpose

In this report, we are presenting the EER diagram and Relational Schema of a database system for a worldwide package delivery company that goes by the name MAN Logistic. The purpose of this database is to keep track of Customers (senders and receivers of packages), company employees, packages that are being sent, history of locations of the packages, transportation events which ship packages, and retail centers where packages are received.

## II. Constraints

### A. Technical Constraints

#### 1. Primary Keys:

- SSN (Person table)
- Customer\_SSN (Customer table)
- Employee\_SSN (Company\_Employee table)
- Sender\_SSN (Sender table)
- Receiver\_SSN (Receiver table)
- ID (Retail\_centre table)
- Package\_number (Package table)
- Package\_Number and Location\_ID (Located\_At table)
- VIN (Trucks table)
- Registration\_number (Planes table)
- ICAO (Airports Table)
- Country,City,Street\_address (composite primary key for Warehouses table)
- Location\_ID (Locations table)
- Vehicle\_ID (Vehicle table)
- Schedule\_number (Transportation\_event)
- Schedule\_number, Package\_number (Shipped\_By)

#### 2. Foreign Keys:

- Customer\_SSN (in Customer table reference to Person table)
- Employee\_SSN (in Company\_Employee table reference to Person table)
- Sender\_SSN (in Sender table reference to Customer table)
- Receiver\_SSN (in Receiver table reference to Customer table)
- Sender\_SSN (in Package table reference to sender table)
- Receiver\_SSN (in Package table reference to Receiver table)
- RC\_ID (in Package table reference to Retail\_centre table)
- Package\_number (in Located\_At table reference to Package table)
- Location\_ID (in Located\_At table reference to Location table)

- Location\_ID,Vehicle\_ID (in trucks,Planes,Airports, and Warehouses table reference to Location (Location\_ID) and Vehicle (Vehicle\_ID) Tables)
- Package\_number (in Shipped\_By table reference to Package table)
- Schedule\_number (in Shipped\_By table reference to Transportation\_event table)
- Vehicle (in Transportation\_event reference Vehicle table)

### **3. Check Constraints:**

- TRANSPORTATION\_EVENT(Type) must be one of the following values ("Flight", "Truck")
- PACKAGE(Status) must be one of the following values ("In Transit", "Delivered", "Lost", "Damaged")

### **4. Not Null Constraints:**

- All attributes are not null.

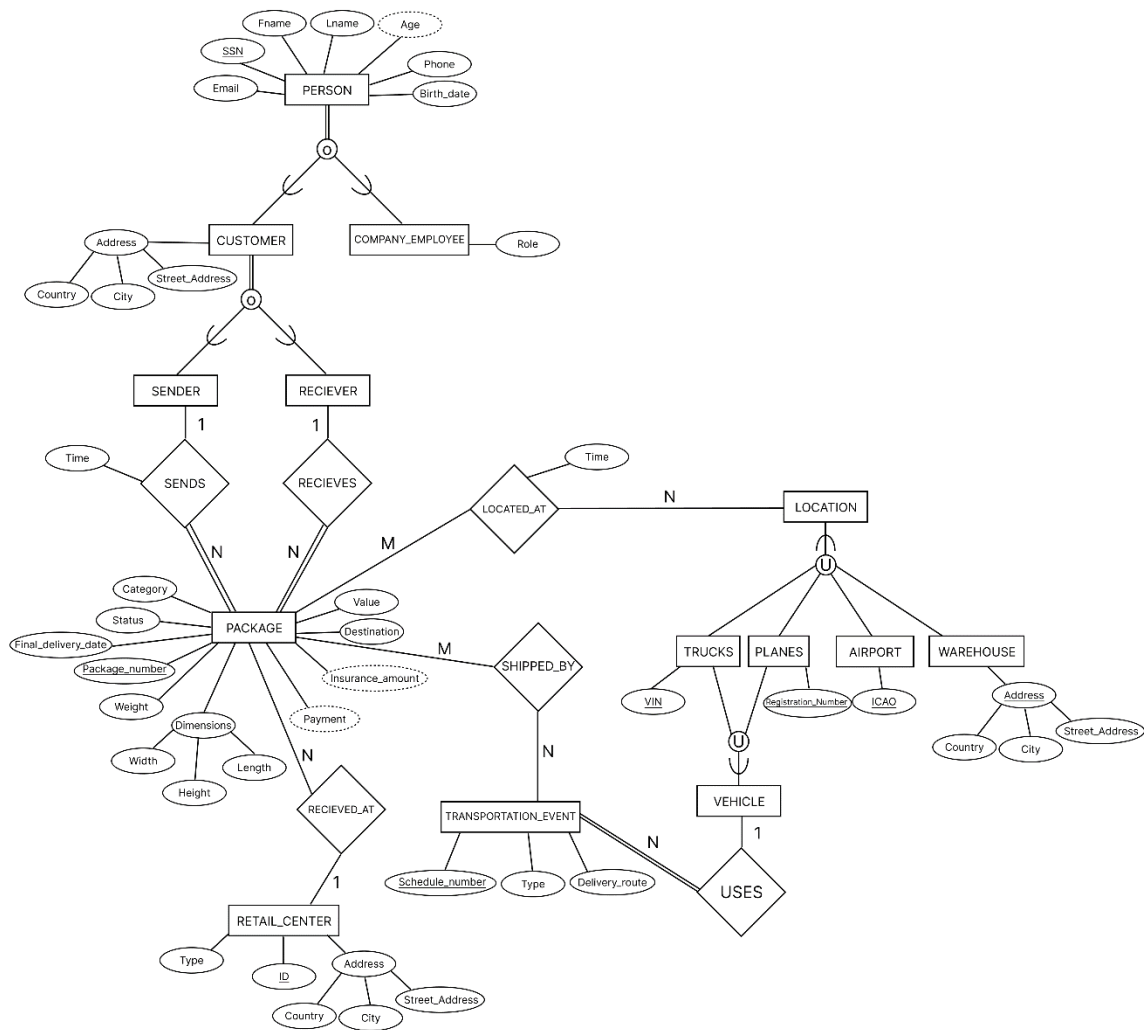
## **B. Business Rules**

- Each package must be categorized according to its content
- Each package must have either one of the four states at a time (in transit, delivered, lost, and damaged)
- The insurance amount is calculated based on the category of the package and its value
- The shipping cost is calculated based on the dimensional weight (DIM Weight) of the package and its destination
- The users should be able to search for a package by their SSN or the package ID, category, city, and delivery date
- The system should be able to generate the history of locations upon request
- The costumer should be able to update their information and pay online
- An employee should be able to modify the package's and the user's information
- An employee should be able to update movement information manually
- The system must keep track of all the packages that are not delivered, damaged, or lost
- The system should identify fines for any delay for more than the expected date by 72 working hours
- The insurance amount is delivered to the customer instead of the package for damaged or lost packages
- The system should notify the costumer when the package is ready to delivery or if it is delayed
- Each package has a unique barcode identifying its ID that the system will read (by camera) upon delivery

### **C. Assumptions**

- The sender must provide information about the receiver including (First Name, Last Name, SSN, Email, Phone and Birth Date).
- Addresses are broken down into Country, City, and Street\_Address.
- Each Warehouse has a unique Address.
- Airports are identified by a unique ICAO (International Civil Aviation Organization) code.
- Planes are uniquely identified by Registration number.
- Trucks are uniquely identified by their VIN (Vehicle Identification Number).
- A Vehicle is a Plane or a Truck. Each Transportation event only uses one vehicle. Each vehicle can be used by multiple Transportation events.
- A person has an SSN, a First Name, a Last Name, a Phone Number, a Birth\_date and an email.
- Company employees are Persons but also they have a role attribute.
- A Customer is a Person but also has an Address attribute.
- A Person can be a Company\_Employee and a Customer at the same time.

### III. EER



## IV. Relational Schema

