Team 4 Database Design Document

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Logistic Management System Objective:

The objective of this logistic system is to establish a dynamic database that empowers the Logistics Management Agency to effectively oversee logistics operations and simultaneously track orders and tasks. Its usage will be restricted to agency personnel.

Addressed Business Challenge:

This logistic system addresses the challenge of designing a comprehensive database for the Logistics Management Agency, aimed at optimizing and streamlining logistics operations. The system aims to centralize and manage data associated with transportation, warehouse management, packaging and order tracking. By consolidating this information, it empowers the agency to meet client requirements with customization and efficient delivery.

Additionally, the logistic system will govern internal data pertaining to the logistics management agency itself. This encompasses employee details, shipment details, tracking, mode of transportation details, transaction records and financial records. Through this integration, the system offers a holistic view of the agency's management system, effective means of transportation and facilitating informed decision-making.

Tracking of the delivery, delivery timeline, cost effectiveness and product security is crucial for the logistic system to adapt to evolving requirements. This versatility ensures the system's ability to remain agile and maintain accurate, up-to-date information for efficient logistics management.

Business Rules:

1. Each Logistic Management System can have more than one company.
2. Each Logistic Management System will have many employees.
3. Each department can have more than one employee
4. Each employee can be part of only a single department
5. Logistic Management System can have multiple shipments.
6. Logistic Management System can have multiple finances.
7. Each finance can have multiple transactions.
8. Each customer can have multiple transactions.
9. Customer may or may not have multiple reviews.
10. Customer may or may not have tracking ID.
11. Shipments may or may not have the transactions.
12. Shipments can have one or more tracking ID.
13. Shipments have multiple packaging.
14. Shipments can travel between multiple warehouses.
15. Shipments can have different modes of transportation.
16. Transportation may or may not have different types of packaging.
17. Each tracking id will be part of different types of transportation mode.
18. Shipmentwarehouse entity connects the link between shipments and multiple warehouses.

Design Decision:

Entity Name	Why Entity included	How entity is related to other entities
Logistics System	This entity accepts requests from companies, confirms the availability of shipments, confirms the expenses involved, and designates a unique department for each shipment.	The logistics management system is identified by its primary key, logisticsSystemID, which establishes a direct connection with the company entity. As the primary entity, it is linked to all other entities in the database, and the data stored pertains to the requirements of the company. Additionally, this entity has a one-to-many relationship with three other entities.
Company	This entity generates the order for the logistics management system. All the shipments will be delivered by logistics management system.	This entity has many to one relation with the core entity which is Logistics Management System.
Department	This entity contains various departments involved in the firm. This entity will be used to dissociate employees according to their department.	Department is associated with the logistics management system, and it has one too many relationships.
Shipments	This entity contains information about shipment tracking, packaging, transactions and warehouses.	Shipment entity is directly connected with tracking warehouses and transportation mode, to explain how they are tracked, stored and delivered. Shipment is not dependent on the transaction entity.

Employee	This entity contains information about the company's employees, including their first and last names, date of birth, phone numbers, addresses, age and departments.	Each employee's record is associated to department entity and explains how the structure is created. Each employee should be a part of one department.

Finances	This entity contains the details of the company’s finances to report on company’s metrics	This entity is directly associated with transactions to collate them
Transactions	This entity contains the details of the customer transactions and it does have details for the shipment associated with that.	This entity is directly associated to customer with customer id as foreign key to understand which customer made that transaction.
Tracking	Tracking details are present to track the shipment across various stages of transportation and report the updates to the customer if required.	This entity is connected to Shipments, Customers, Transportation Mode with trackingID being the primary key. The customer may or may not have a tracking Id but each shipment will have at least one associated tracking detail. A single tracking can be used to track shipment through various different modes of transportation.
Warehouse	Contains details about how many shipments are currently residing at a particular warehouse and other details like warehouse location and available capacity. It also contains the details of the volume occupied.	This entity has warehouseID as a primary key and is linked to shipments entity. Here one shipment can go through various warehouses

		depending on the origination and destination nodes.
ShipmentWarehouse	Contains the link between the different shipements and multiple warehouses.	This entity has the warehouseID and shipementID both acting as primary key/foreign key. Here we are linking the shipements with the multiple warehouses.
Customer	Entity containing details about the actual customer who may receive the package. Also, it does contain the tracking details.	This entity has the primary key customerID and is connected to transactions, tracking, and customer reviews. An order can only be placed by the customer if there is an accompanying transaction. Depending on the mode of transportation, customer may or may not receive a tracking id. The customer may or may not decide to leave a review.
Customer Reviews	This entity is responsible for storing and tracking various reviews left by the customers.	This entity is only connected to customer entity and has reviewID as a primary key. The customer may leave a review after the whole cycle is completed, and the reviews can be used to resolve pain points and improve the system.
Transportation Mode	This entity will contain details about the different transportation mode available.	This entity has primary Key as transportationModeID and it is connected to shipments, packaging and tracking. Here each shipments will have different transportation modes. Also each trackingID will have multiple transportation modes.

Packaging	This entity contains details about packaging type and its associated description.	This entity may or may not depend on transportation modes.