Boston Transit Database Management System

Summary of changes made in ER diagram:

- **ROUTE_SCHEDULE_STATION:**
  A new entity named "ROUTE_SCHEDULE_STATION" has been introduced to manage and consolidate the relationships between the existing entities: "STATION," "ROUTES," and "SCHEDULE.". This entity serves as an associative entity connecting these three main entities, and it contains the following attributes:
  - *RSS_ID (*Primary Key): A unique identifier for each link between a route, schedule, and station.
  - *Route_ID (*Foreign Key): References the "ROUTES" entity, establishing a relationship between a specific route and the associated stations and schedules.
  - *Schedule_ID (*Foreign Key): References the "SCHEDULE" entity, indicating the schedule to which the station stops belong.
  - *Station_ID (*Foreign Key): References the "STATION" entity, identifying the station where the train stops.
  - *Arrival_Time:* The time at which the train arrives at the station.
  - *Departure_Time:* The time at which the train departs from the station.
  - *Station_Order:* An integer representing the position of the station in the route for that specific schedule.

  The relationships established with this new entity are as follows:
  - "STATION" to "ROUTE_SCHEDULE_STATION": This relationship represents that one station can be associated with multiple route schedules, resulting in a one-to-many (1:N) relationship. This allows the system to capture multiple schedules involving the same station.
  - "ROUTES" to "ROUTE_SCHEDULE_STATION": This relationship signifies that one route can have multiple scheduled stops at various stations, resulting in another one-to-many (1:N) relationship. This enables the system to manage the stops and schedules for a given route effectively.
  - "SCHEDULE" to "ROUTE_SCHEDULE_STATION": This relationship indicates that one schedule can encompass multiple stations and routes, forming a one-to-many (1:N) relationship. This design allows for the association of multiple stations and routes within a particular schedule.

- **RESOLVED_COMPLAINTS:**
  A new subtype entity "RESOLVED COMPLAINTS" has been introduced, with its parent entity being "COMPLAINTS." This new entity serves to categorize and track complaints that have been successfully resolved, providing valuable insights and data related to issue resolution.

- **DRIVER:**
  A new subtype entity named "DRIVER" has been introduced as a subtype of the existing "EMPLOYEE" entity. The "DRIVER" entity extends the attributes of an employee to include specific driver-related information, such as "Driver License ID" and "License Expiration Date." This allows for the management of data related to employees who also serve as drivers.

- **TRANSACTION:**
  The previous "PAYMENT" entity has been replaced with a more comprehensive "TRANSACTION" entity group, which includes a parent entity, "TRANSACTION," and two subtypes, "RECHARGE TRANSACTION" and "JOURNEY TRANSACTION." This change enhances the system's ability to manage and categorize different types of transactions more effectively.
  - **Parent Entity: TRANSACTION**
    - *Transaction_ID (Primary Key)*: Provides a unique identifier for each transaction.
    - *Transaction_Timestamp*: Records the timestamp when the transaction occurred, ensuring a chronological record of all activities.
    - *Transaction_Type*: Categorizes the transaction based on its purpose, such as recharge or journey for better organization.
    - *Card_ID (Foreign Key referencing TRANSIT CARD)*: Establishes a direct link between the recharge transaction and the specific transit card involved.
    - *Station_ID (Foreign Key referencing STATION)*: Records the id of the station where the transaction took place, allowing for tracking of transaction.
  - **Subtype 1: RECHARGE TRANSACTION (Subtype of TRANSACTION)**
    - *Recharge_Transaction_ID (Primary Key)*: Assigns a unique identifier to each recharge transaction.
    - *Recharge_Amount*: Captures the amount added to the transit card during the recharge.
    - *Payment_Method:* Indicates the payment method used for the recharge (e.g., credit card, cash, mobile payment).
  - **Subtype 2: JOURNEY TRANSACTION (Subtype of TRANSACTION)**
    - *Journey_Transaction_ID (Primary Key)*: Provides a unique identifier for each journey transaction, simplifying transaction retrieval and reference.
    - *Journey_Amount*: Captures the amount deducted from the transit card for a journey.

Data Management and Database Design
P3. Final ERD

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Updated ERD: