

1. This Relational ER diagram depicts a structured relational data model designed for a data warehouse, transforming unstructured JSON data into an organized schema. It adheres to normalization principles, ensuring data integrity, efficient querying, and minimal redundancy.
2. The users table (user\_id UUID, state VARCHAR, created DATETIME, last\_login DATETIME, role VARCHAR, active BOOLEAN) stores user details. It has a one-to-many (1:N) relationship with the receipts table (receipt\_id UUID, bonus\_points\_earned INT, ..., user\_id UUID) as each user can have multiple receipts. The receipts table captures transactional data, including purchase details, points earned, total spent, and more. It connects to the receipt\_items table (item\_id INT, receipt\_id VARCHAR, barcode VARCHAR, ...) in another 1:N relationship, where each receipt can have multiple items.
3. The receipt\_items table records individual products on a receipt, referencing the barcode\_data table (barcode VARCHAR, description TEXT) in a many-to-one (N:1) relationship, as multiple items can share the same barcode. The barcode\_data table stores information about the products associated with each barcode.
4. A junction table, brand\_barcode (barcode VARCHAR, brand\_id UUID), resolves the many-to-many (N:M) relationship between barcode\_data and brands (brand\_id UUID, brand\_code VARCHAR, ..., top\_brand BOOLEAN). This allows a product (barcode) to be associated with multiple brands and a brand to have multiple products.
5. This model is optimized for data retrieval and scalability, conforming to normalization principles to minimize redundancy and maintain data integrity. Indexes on key columns like user\_id, receipt\_id, barcode, and brand\_id enhance query performance for analytical purposes.

