Unified Reward System (URS)

Technical Implementation Report

1) Database Architecture and Applications

The **Unified Reward System (URS)** relies on a structured and efficient database architecture to manage vendor registrations, customer accounts, transactions, and purchase data. The system uses multiple interlinked databases to ensure secure, scalable, and seamless operations.

1.1 Vendors Database

- Stores details of all registered vendors participating in the URS ecosystem.
- Key attributes include:
  - **Vendor ID** – Unique identifier for each vendor.
  - **UPI ID** – The vendor's linked UPI account for transactions.
  - **Location** – Geographical data for analytics and vendor tracking.
  - **Vendor Type** – Categorization into Small, Medium, or Large, based on turnover.
  - **Subscription Details** – Information on the vendor's membership plan within the URS.

1.2 Customers Database

- Maintains records of all **non-vendor customers** using the URS app.
- Key attributes include:
  - **Customer ID** – Unique identifier for each customer.
  - **UPI ID** – Linked UPI account for transactions.
  - **Reward Points Balance** – Tracks earned and redeemed points.
  - **Bank Balance** – Monitors available funds in linked accounts.
  - **Transaction History** – Stores all past payments, including reward point allocations.

1.3 Transactions Database

- Records all transactions between customers and vendors within the URS system.
- Key attributes include:
  - **Transaction ID** – Unique identifier for each payment.
  - **Sender ID & Receiver ID** – Identifies both parties involved in the transaction.
  - **Amount** – Total transaction value.
  - **Reward Points Earned or Redeemed** – Tracks point allocation per transaction.
  - **Transaction Location** – Useful for demographic and spending pattern analysis.
  - **Timestamp** – Records transaction date and time for auditing and analysis.

1.4 Purchase Data Database

- Serves as the core analytical database, aggregating all **purchase records** from customers.
- The collected data is delivered to large vendors, helping them optimize inventory and marketing strategies.
- Key attributes include:
  - **Item Name** – Description of purchased goods or services.
  - **Quantity** – Number of units purchased per transaction.
  - **Price** – Cost per item.
  - **Total Bill Amount** – Sum of all items in the purchase.
  - **Transaction Location** – Enables regional sales analysis for large vendors.
  - **Timestamp** – Helps vendors analyze peak shopping hours and seasonal trends.

The combination of these databases ensures smooth transaction processing, secure reward allocation, and meaningful business insights for participating vendors. The URS database structure is designed to scale efficiently while maintaining high levels of security, consistency, and performance.

2) System Workflow

The URS workflow is structured to ensure seamless integration between customers, vendors, transactions, and reward management. The system follows a database-driven architecture, allowing real-time tracking and processing of transactions.

2.1 Registration Process

- When a customer registers via the mobile application, their profile is appended to the Customers Database.
- When a vendor registers via the web portal, their details are stored in the Vendors Database.
- Each profile is assigned a unique identifier (Customer ID or Vendor ID) to enable efficient data retrieval and mapping across transactions.

2.2 Transaction Processing

- When a customer initiates a transaction (either with a vendor (C-V) or another customer (C-C)), the system logs the transaction in the Transactions Database.
- A unique Transaction ID is generated for each transaction.
- The Transaction ID acts as the central attribute, linking the transaction with associated metadata such as:
  - Sender and Receiver IDs – Identifies both parties involved.
  - Transaction Amount – Tracks the total payment value.
  - Reward Points Earned/Redeemed – Updates customer balances accordingly.
  - Timestamp – Logs the exact date and time of the transaction.
  - Location – Captures geographical details to map consumer spending patterns.

2.3 Purchase Data Mapping

- The Transaction ID serves as a reference to map transactions to the Purchase Data Database.
- The timestamp and location attributes stored within the transaction entry are crucial for purchase analytics.
- Each transaction contributes to the Purchase Data Database, storing:
  - Items purchased
  - Quantities
  - Price details
  - Location of purchase
- This data is delivered to large vendors, helping them optimize inventory and promotional strategies.

The workflow architecture ensures structured transaction handling, real-time updates, and robust analytical capabilities, making URS a scalable and efficient system for managing digital transactions and reward programs.

3) Customer Interaction and Billing System

The URS mobile application follows a structured approach for recording purchases, ensuring accurate transaction mapping and reward allocation. This is particularly important for small vendors, where automated billing systems are often unavailable.

3.1 Bill Creation Process

- When a customer makes a transaction at a small vendor, they must create a bill manually by entering:
  - Item details – Name of the purchased items.
  - Amount per item – Price per unit of the item.
  - Total bill amount – Sum of all items in the transaction.
- This manual billing process is essential for updating the Purchase Data Database, which is later integrated into the global customer purchase data repository.
- The customer receives reward points only after successfully creating a bill for the transaction.

3.2 Local Databases: Bills and Drafts

- The URS app maintains two local databases for managing customer bills:
  - Bills Database – Stores all finalized bills that have been submitted by the customer.
  - Drafts Database – Allows users to save **incomplete bills** and modify them later before submission.
- If a customer does not complete a bill at the time of purchase, they can save it as a draft and update it later.

3.3 Ensuring Accurate Purchase Data

- The requirement to create a bill before earning reward points ensures that the system captures precise customer spending behavior.
- The Purchase Data Database, populated from these bills, provides insights into:
  - Consumer purchase patterns based on itemized transactions.
  - Category-wise spending trends for vendors and analytics.
  - Geographical insights for vendors based on purchase locations.

This structured approach guarantees that reward allocation remains fair while enabling large vendors to access real-time, verified purchase data.

Team Details

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