Group : Finkonomics

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About Our Understanding of the Problem Statement

Reward systems strengthen customer loyalty but often limit flexibility by restricting points to specific sellers, resulting in unused rewards and reduced satisfaction. A Unified Reward System (URS) enables customers to combine and redeem points across vendors, enhancing value and satisfaction. However, seller resistance may arise due to loyalty dilution and revenue impact concerns.

For success, the URS must provide compelling seller incentives, drive customer engagement, ensure fair point exchange mechanisms, and seamlessly integrate with existing systems. By balancing customer convenience with seller benefits, the URS can establish a scalable, transparent ecosystem that benefits all stakeholders.

Solution Walkthrough:

Assumptions

1. Once a reward is assigned to a user, it becomes their exclusive property, granting them full ownership rights. However, the valuation of the reward remains subject to modification at the company's discretion.
2. Each participating company is required to define the equivalent monetary value of their reward points in INR. This valuation will serve as the basis for point exchanges facilitated by the Unified Reward System (URS) authority.
3. All sellers place their trust in the URS authority to ensure the integrity of transactional data and the equitable distribution of incentives across the system.

What Benefits Will Sellers Gain by Joining the URS System?

Increased Customer Interaction: Flexibility in converting loyalty points offers users greater value and personalization. This motivates customers to spend more with the seller, as they feel rewarded and empowered. Such flexibility enhances the customer experience, builds trust, and strengthens long-term loyalty, driving repeat purchases.

Reduced Branding Costs: Companies typically spend 5-10% of their revenue on branding. Flexible loyalty programs can reduce these costs by driving customer satisfaction and organic advocacy, lowering reliance on paid branding strategies.

Additional Incentives: Sellers can gain additional incentives from the point conversion system. URS authority charges a small fee or percentage during point exchanges, allowing sellers to recover some costs while offering value to the customer. This system balances profitability with customer satisfaction.

Strategic Insights: Tracking point exchanges and redemptions helps companies analyze customer behavior. Insights into exchange frequency and popular rewards enable sellers to tailor offers, optimize loyalty programs, and respond to customer needs more effectively.

Sellers will join URS because it provides access to competitors' customer bases, drives repeat business, and enhances brand loyalty. For instance, if a retailer joins the URS platform, their customers can earn and redeem points across various participating sellers. This encourages higher spending, increases foot traffic, and fosters cross-promotions with other brands, all while reducing marketing costs through a shared customer pool.

Example:

Company A and Company B sell the same product. Company A allows this exchange program, while Company B does not. As a user, I will prefer spending my money with Company A, as it allows me to earn points that can be used across multiple platforms. This increases customer retention and expansion for Company A. Consequently, Company B may be forced to adopt the system to retain its customers and remain competitive.

Technical Aspects

Database Schema

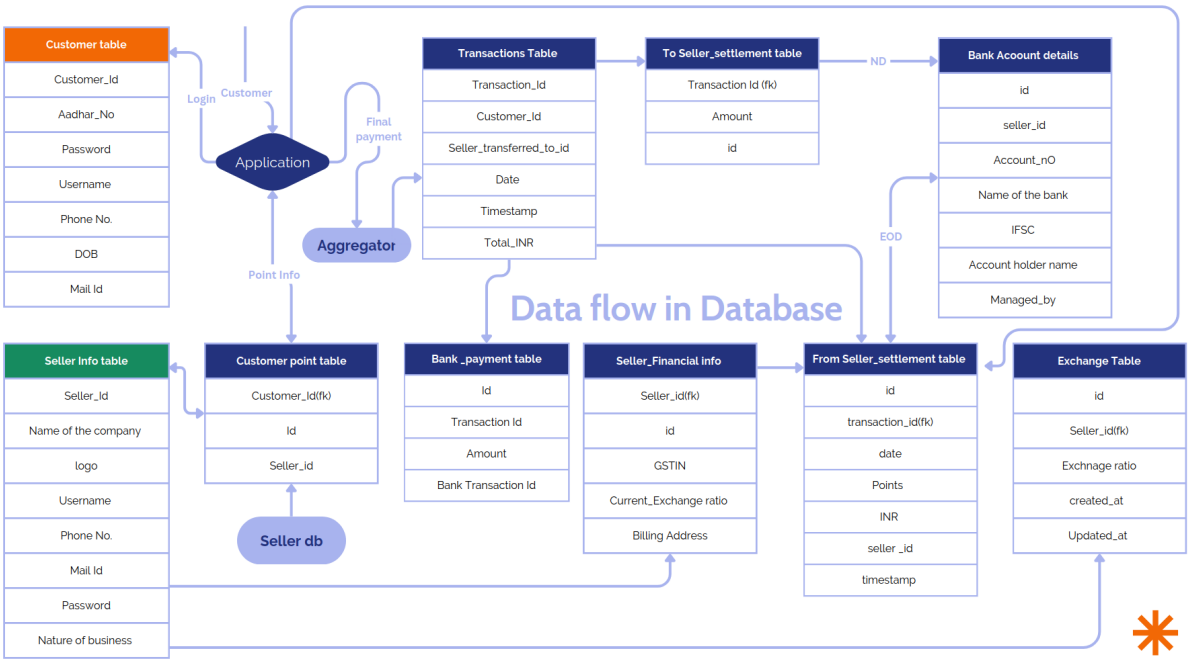
New User Registration

Upon registering in the URS system, users must provide personal information to uniquely identify themselves. Additionally, users will be required to link the accounts of companies where they have accrued reward points. This can be achieved using a search bar to locate the company name and associate it with their URS account.

Sellers registering on the URS platform must provide the following details:

- Firm Name
- GSTIN (Goods and Services Tax Identification Number)
- Bank Account Details
- Other relevant details

Data Flow :



***This is developed as the view of URS authority**

Explanation :

At first the customer uses the application developed by URS authority . This will hit the Customer table and authenticate the user. As the information previously given for the seller for which this user has some points will be listed. Then the request will go to the Customer *point table* which will list down all the sellers attached to that user. API requests will be sent to all such sellers and requests will be served from the respective seller db which will be fully in control of the seller.

Q. Why are we not using our database to register ?
Solution : It will be in our (in view of URS authority) benefit as we don't have to store huge data that can reduce our storage cost. Also storing on our DB (Database) will lead to data inconsistency as there will be different points on actual seller DB and our DB because customers without using our platform directly spent some point which is not at all updated in our DB.

We are showing the company based on some priority. Then we will give the option to select the seller whose point is to be redeemed and after that a request is sent to all the chosen sellers by authority to return the cash evaluated for the respective points of that company.

Q. Will you decide the incentive based on the points & also will you give the same incentive to all the sellers ?
Solution : No, Incentives won't be given on the basis of points because some seller may evaluate their point to less value and want more benefit, to encounter this we will give on the basis of exchange INR.

Also , addressing the 2nd part keeping the same incentive for all the sellers will be injustice. It should depend on the basis if type of business as profit may vary on the type of business.

After that the total cash earned from these points will be merged and if extra money needed will be directly deducted from the customer bank account for this any aggregator will be used. It should be noted that when the redeem of point was happening then *from seller_settlement table* was being updated but without transaction id , and null will be stored there , this will ensure when payment fails then that row will be anyway invalid and can be removed at the end of day , but when transaction is complete we will update null with given id in that table.
Other flows are clearly explained in the data flow diagram .

Database control :
All the tables above will be stored in the URS system . It is the responsibility of the URS system to maintain the data integrity. It should be ensured that User data of one Seller won't be shared with the other.

Payment Process

When making a purchase on an online platform, users will have the option to select "Pay with Finko" at checkout. This will redirect them to the URS system, where they will interact with a user interface displaying a list of reward points from different stores, sorted in descending order of value (considering expiry in the future). Users can select which reward points they wish to redeem using checkboxes. If the redeemed points do not cover the full transaction amount, the remaining balance will need to be paid via the user's bank account. Once the payment is successfully processed, a unique transaction ID will be generated and stored in the transactions table. This ID will assist in reconciling settlement amounts with sellers on the following business day.

Settlement Process

When a user completes a transaction, the reward points redeemed from various stores will be logged in a `from_settlement` table, which uses the transaction ID from the transactions table as a foreign key. This allows the system to track and analyze reward point exchanges between different companies.

At the end of each business day, the system generates a summary for all registered sellers. Using the seller's unique seller_id, the system aggregates the total amount (in INR) from the `from_settlement` table for that day. After deducting an agreed-upon incentive percentage (mutually decided between URS and the seller), the seller will be required to transfer the remaining balance to URS. With the funds received from sellers, URS will settle payments with the companies whose reward points were redeemed, transferring the respective amounts to their designated bank accounts using the autopay functionality.

When a user selects the "Pay through Finko" option, their unique user_id in the URS system will be used to fetch live reward point data from the APIs of the respective seller companies. This data will be validated twice: once at the start of the process and again before finalizing the payment. This ensures data accuracy and maintains the integrity and security of transactions.

Validity of the solution

From the User's Perspective:
The user is happy because they can earn and redeem points across multiple sellers, enhancing the value of their purchases. The flexibility of converting points into rewards, discounts, or products adds convenience and personalization, making them feel appreciated. This seamless experience strengthens their loyalty to the brand, encouraging repeat visits and increased satisfaction.

From the Seller's Perspective:
The seller will generate a secondary source of income which the URS authority will give him as per the points that will be exchanged. Along With it, The seller benefits from increased foot traffic and repeat customers due to the URS system. Additionally, the data from point exchanges helps optimize product offerings, improving marketing strategies and product listing

From the URS Authority's Perspective:
The URS authority gains by fostering a collaborative ecosystem where multiple sellers participate, increasing the platform's reach and usage. They benefit from transaction fees or a small percentage of points exchanges, which generates consistent revenue. The authority's role in managing the system ensures smooth operations and provides valuable insights to sellers, helping them improve their loyalty programs and customer experiences.

Potential Security Issues

1. Data Breaches: Unauthorized access to sensitive customer and vendor data.
2. Fraudulent Transactions: Exploitation of the system to manipulate reward balances.
3. Point Inflation/Exploitation: Issuance or misuse of excessive rewards by sellers.
4. Point Conversion Loopholes: Exploiting unfair conversion mechanisms.
5. Account Takeovers: Gaining control of accounts through phishing or weak authentication.
6. Replay Attacks: Reusing intercepted transaction requests to redeem points multiple times.
7. Insider Threats: Misuse of privileges by employees or vendors.
8. Denial of Service (DoS) Attacks: Overloading the system to disrupt operations.
9. Weak API Security: Vulnerabilities in API endpoints exposing the system to exploitation.

Future Prospects

1. Priority Determination for Reward Points Exchange: The prioritization of reward points during exchanges can be optimized by considering key factors such as point validity, exchange value ratios, frequency of usage, and customer preferences. These parameters can enhance fairness and user satisfaction.
2. Database Scalability and System Optimization: To accommodate growth, scalability can be achieved by employing techniques like database normalization, horizontal sharding, and distributed systems. Additional measures such as server scaling, load balancing, rate limiting, and caching mechanisms can ensure system reliability and performance under increasing demand.
3. Maintaining proper concurrency controls by proper usage of mutex, semaphores ,etc.