

Prediction Market Loyalty Program

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Executive Summary

Loyalty Program Outline: Capturing 2025 Consumer Priorities & Gamification

The revised outline integrates core 2025 consumer priorities: **convenience**, **personalized value**, and **simplicity**, now enhanced with immediate, gamified, and personalized push notifications to ensure the program feels like a seamless part of a member's daily routine.

1. Program Architecture Overview

A unified loyalty platform blending local commerce rewards with prediction market engagement, driven by AI analytics to provide sponsors with superior decision-making intelligence while maintaining member privacy. The architecture focuses on **ease of use** and a **seamless mobile experience**.

System Components (Python-based application framing)

Member Mobile App

- User interface for shopping, betting (points only), recommendations, and effortless reward tracking
- Now includes immediate push notification functionality for point-earning events and relevant prediction market suggestions

Integration Points

- **APIs for POS/QR code systems:** Transaction capture for instant gratification
- **Kalshi API:** Market odds, order execution
- **ML Engine:** Predictions which triggers personalized push notifications

Data Processing

- Utilizes a real-time stream (e.g., Apache Kafka or Event Hub)
- Capable of handling 10,000+ events/sec
- Allows for real-time point tracking and immediate feedback

Backend Systems

Data Warehouse (PostgreSQL/Snowflake)

- Used for analytics with fact and dimension tables

ML Models & Inference

- Runs predictive models for churn, LTV, and next-best-action (hyper-personalization)

- Specifically for in-the-moment recommendations

Compliance System

- Manages privacy controls and responsible gaming safeguards
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2. Member Experience & Program Mechanics

The program design emphasizes **engaging members** through a unified currency and a clear, **simple value proposition** that feels convenient and flexible, integrating point earning with immediate gamified opportunities.

2.1. Point System (Unified Currency, Points Only)

Points are the sole currency for all activities (no cash wagering), simplifying the user experience and offering **"points as currency" flexibility**.

Earning & Immediate Gamification

- Members earn points effortlessly from:
 - Local shopping
 - Daily logins
 - Referrals
 - Social shares
- Upon a transaction (point earned), the user immediately receives a personalized push notification
 - Example: "You earned 50 points at (Merchant Name)! 🎱 Bet them now on tonight's game."
 - Suggests relevant, same-day "Predictions you might win" based on AI insights

Redemption Value & Flexibility

- Program structure encourages local spending
- Provides flexible options allowing members to spend small point balances

Point Expiration

- Points never expire, allowing unlimited holding

2.2. Prediction Market Betting & Gamification

Members can stake points on various outcomes within the app, leveraging **gamification** and **mobile-first interactions** tied directly to real-time events.

Categories

- Sports
- Events
- Weather
- Local events via Kalshi API integration
- Focus on same-day events to facilitate immediate action from push notifications

Mechanism

- Uses the Kalshi API for real-time odds sync, order execution, and automatic settlement (within 60 seconds)
- Provides **instant gratification** for bets placed from the new feature

Limits & Compliance

- Enforces age (18+)
- Geolocation restrictions
- Daily/weekly betting limits
- Responsible gaming features

2.3. AI-Powered Personalization & Engagement

An AI engine analyzes member behavior to provide targeted recommendations and insights, meeting the demand for **hyper-personalization** in real time.

Recommendations

- "Predictions you might win"
- "Local offers nearby"
- "Friends' insights"
- Tailored to the user's specific shopping behaviors and lifestyles
- Now includes immediate, post-purchase/action push notifications

Social Features & Community

- Friend leagues and weekly challenges
- Drive **community engagement**
- Offer non-transactional rewards

3. Sponsor Benefits & Feedback Loop Narrative

The program aims to drive sponsor revenue gain and improve efficiency through intelligent data use, while ensuring member data privacy.

Responsible Data Collection and Usage

- Data is processed through a tokenization layer that immediately removes PII
- Replaces PII with an anonymous **member_token**

Driving Daily Member Engagement (AI Features)

Next-Best-Action Engine

- Scores potential actions to determine the single best, personalized offer to show a member at any given time
- Includes the new immediate push notifications

Demand Forecasting

- Predicts daily/hourly redemption volume
- Helps sponsors optimize staffing and inventory

Churn Prediction

- Identifies at-risk members
 - Triggers automated re-engagement offers
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4. Technical Implementation Outline (Python Focus)

This section frames key components for a development team, with updates for the new immediate engagement features.

4.1. Data Infrastructure & Schemas

The application uses Python libraries:

- **Pandas** - Data manipulation
- **Scikit-learn** - Machine learning
- **Kafka-Python** - Streaming
- **SQLAlchemy** - Database interaction

Fact Tables

fct_transactions

- `transaction_id`
- `member_token_id`
- `merchant_id`
- `amount_cents`

fct_predictions

- `prediction_id`
- `member_token_id`
- `market_id`
- `stake_cents`
- `outcome_result`

Dimension Tables

dim_members

- `member_token_id`
- `age_bracket`
- `location_zip`
- `data_sharing_status`

Stream Processing

- Python scripts using Spark Streaming or Flink for real-time feature engineering
- Anomaly detection
- Identifies immediate push notification triggers post-transaction

4.2. Kalshi API Integration Framework

The Kalshi platform is a core component for the prediction market mechanics, functioning as the staking, executor, anonymized accounts administrator (for bets), payor, and manager of the predictions component.

Core Endpoints & Functionality (Python API Client)

GET /markets

- Browse available contracts by category (sports, events, etc.)
- Filter by status (open)

POST /orders

- Place a bet (order execution)
- Platform converts points to dollars internally before sending to Kalshi

GET /positions

- Check a member's current open holdings
- View unrealized P&L

POST /webhooks/settlement

- Kalshi sends a webhook to the application when a market closes
- Details the winning outcome and payouts

Order Flow & Execution (Platform's Role)

1. **Validate:** Check member age (18+), balance, jurisdiction, and responsible gaming limits locally
2. **Reserve Points:** Lock points in escrow within the platform's database
3. **Submit to Kalshi:** Python function converts the point stake into a dollar amount (\$) and calls the Kalshi `POST /orders` endpoint
4. **Trigger Notification (New):** Concurrently, the Next-Best-Action Engine is alerted to the completed transaction event via the data stream and triggers an immediate, personalized push notification with a relevant, open prediction market suggestion
5. **Settlement (Payor/Executor Role):** Upon receiving the settlement webhook from Kalshi, the application credits the member's point balance (payout) and updates their historical record

4.3. Kalshi Webhook Data Schemas (JSON/Python Dictionary)

The following schemas represent the expected data structures for seamless integration, consistent with the Kalshi API documentation structure.

A. Incoming Settlement Webhook (from Kalshi to Platform)

Kalshi sends a POST request with details like:

- `market_id`
- `winning_outcome`
- `payout`
- Uses the platform's internal `member_id` token

B. Outgoing Acknowledgment Response (from Platform back to Kalshi)

The platform responds with a simple JSON object confirming receipt and the amount to credit.

4.4. AI Insights Translation to Sponsor Portal Features

The AI Analytics Engine models are consumed by the Sponsor Intelligence Portal (Dashboard) and translated into actionable features that drive business outcomes.

Member LTV Prediction Model

- **Portal Feature:** "High-Value Members" Dashboard Segment

Churn Prediction Model

- **Portal Feature:** "At-Risk Members" Alerts and Intervention Plans

Next-Best-Action Engine

- **Portal Feature:** "AI Recommendations" Card on Home Screen
- Now also driving real-time push notifications

Demand Forecasting Model

- **Portal Feature:** "Forecasted Demand" in Metrics and Staffing Suggestions

Key Takeaways

- ☑ **Unified Points Currency** - Simplified user experience
 - ☑ **Real-Time Push Notifications** - Immediate engagement post-transaction
 - ☑ **AI-Powered Personalization** - Hyper-personalized recommendations
 - ☑ **Kalshi Integration** - Seamless prediction market mechanics
 - ☑ **Privacy-First Design** - Tokenized data with PII removal
 - ☑ **Sponsor Intelligence** - Actionable insights for business growth
 - ☑ **Mobile-First Approach** - Effortless daily engagement
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