💳 Problem Statement: "Credora Global — Building a Scalable Credit Card Intelligence Platform"

Credora is a leading **Indian credit card and digital payments company** that has rapidly grown to over **1 million active daily users** across major cities such as Mumbai, Delhi, and Bengaluru. The company began as a domestic card issuer and payments processor, but due to the rise in **cross-border e-commerce**, **travel spending**, and **digital wallet integration**, Credora is now planning a **global expansion** to markets like Singapore, the UAE, and the UK.

The leadership's goal is to transform Credora from a card-issuing platform into a **global credit ecosystem** — providing end-to-end financial services such as credit cards, BNPL (Buy Now Pay Later), foreign currency wallets, rewards management, merchant analytics, and risk scoring.

To achieve this, Credora's technology division must design a **centralized, scalable data architecture** and relational database that can support both operational and analytical workloads. The system must handle massive daily transaction volumes, maintain strict financial compliance, and provide deep analytical visibility into user behavior, fraud detection, and global operations.

As a **data analyst and database architect intern**, you are tasked with building the **entire ER model**, **PostgreSQL schema**, and **sample analytical queries** for the global platform's database layer.

The new system must begin by capturing all **user identity and KYC information**, including multi-country address formats, passport/visa details for international users, and compliance flags such as FATCA or AML checks. Every user can hold multiple cards (credit, corporate, travel, or co-branded cards) issued under different schemes like Visa, MasterCard, and RuPay.

Each card must be linked to a unique account profile containing **credit limits, billing cycles, statement generation rules, payment due dates, and reward multipliers**. The system must log both **financial transactions** (purchases, withdrawals, payments, chargebacks) and **non-financial events** (card activation, PIN reset, address change, or limit updates).

With Credora's global expansion, currency management becomes crucial. Every transaction must record **exchange rates**, **base currency**, and **settlement currency**, while adhering to ISO currency standards. For each international transaction, the system must store **merchant country, MCC (Merchant Category Code), FX fee applied**, and **time zone conversions** for analytics.

Credora is also launching **"SmartPay" — an integrated mobile wallet and bill payment hub**, allowing customers to pay for utilities, recharge mobile plans, and send peer-to-peer transfers. The database should handle **wallet balances, linked bank accounts, UPI handles**, and **real-time payment settlements**.

In addition, the platform must maintain a **rewards and loyalty subsystem**, where users earn points for specific categories (travel, groceries, dining) and redeem them for offers or cashback. Every reward event should be traceable to its originating transaction, along with expiry dates, redemption history, and partner details.

A major challenge for Credora is **fraud detection** and **risk scoring**. Therefore, every transaction record must be enriched with **geolocation**, **device fingerprint**, **IP address**, and **transaction velocity** metrics. Fraud analysts will later use this data to build rule-based and machine-learning-driven

detection systems. You must design the schema to efficiently support queries like *"detect users who made 3+ transactions above ₹50,000 within 5 minutes"* or *"flag device anomalies across multiple user accounts."*

Another key feature is **credit behavior analytics** — the database should store **spending patterns**, **credit utilization ratios**, **on-time payment streaks**, and **delinquency flags**. These metrics feed into Credora's proprietary **Credit Health Score**, which will be shared with partner banks and fintech platforms to enable personalized loan offers.

The database must also support **statement generation and billing**. For every card, monthly statements should aggregate all transactions, apply late fees or interest where applicable, and update outstanding balances. Payment records (NEFT, UPI, cheque, or auto-debit) should be reconciled against statements with proper audit trails.

Credora operates a large **merchant ecosystem**, including online stores, restaurants, airlines, and subscription platforms. Each merchant must be categorized by business type, region, and risk profile. The database should record **merchant onboarding details**, **KYC documents**, **chargeback disputes**, and **commission rates** for revenue analytics.

To support **global operations**, every transaction and merchant record should reference a **region entity** (India, SEA, Europe, MEA) and **time zone mapping**, enabling multi-region data partitioning. Currency conversion logs and compliance thresholds (like transaction reporting limits in USD or AED) should be built in as part of your schema.

On the customer side, the database must support **customer service tickets**, where users can raise disputes for double charges, card theft, or declined transactions. Each ticket must reference user, card, transaction, and assigned support agent IDs. Resolution metrics — such as average response time, refund amount, and CSAT (Customer Satisfaction Score) — will later feed into Tableau dashboards.

Marketing and analytics teams need access to data for **campaign performance**, **segment targeting**, and **offer redemption tracking**. The system must store campaign metadata, eligible customer segments, notification channels (email/SMS/app), and redemption counts. Campaign ROI will be calculated based on incremental transaction lift.

Credora's **operations control center** also wants to track **ATM usage patterns**, **cash withdrawal limits**, and **international spending corridors**. This will help identify high-risk countries and monitor compliance with RBI and FATF guidelines.

In terms of scalability, the new schema must be able to support **5 million transactions per day**, with each record containing audit timestamps and status codes. Historical data will be archived quarterly but should remain queryable for compliance audits.

The **IT infrastructure** will use PostgreSQL as the core transactional store, with replication to a read-only analytics node. You must design the schema to separate **fact tables** (transactions, payments, rewards, disputes) from **dimension tables** (users, cards, merchants, currencies, regions) for efficient BI querying.

You'll also define **constraints, indexes, triggers, and foreign keys** to maintain referential integrity and data consistency across millions of rows. For example, every transaction must reference an existing card, merchant, and region; every payment must tie back to a statement; and every reward redemption must reference a valid user and transaction.

The compliance team will require audit logs for every schema change, deletion, or data correction. You'll create a table like audit_log to store username, timestamp, table name, and old/new values to satisfy regulatory traceability.

Finally, the leadership expects the new data model to power **credit analytics dashboards** for KPIs such as *Net Interest Margin (NIM)*, *Average Spend per Customer*, *Delinquency Ratio*, *Reward Redemption Rate*, *Merchant Dispute Rate*, and *Revenue per Region*.

Your deliverables include:

1. A **Conceptual ER Diagram** with at least **25 entities** covering user, card, transaction, and merchant modules.

2. A **Logical & Physical Model** implemented in PostgreSQL (DDL + constraints).

3. **Sample data inserts** (≥10,000 transactions) for testing joins and aggregations.

4. **10+ analytical SQL queries** such as:

    o Top 10 merchants by revenue in each region.

    o Customers with >80% credit utilization.

    o Fraud detection by transaction velocity.

    o Total outstanding balances by currency and card type.

    o Region-wise NPA (Non-Performing Account) ratio.

5. A **Data Validation & Integrity Script** to check referential consistency and report orphaned records.

In summary, Credora's transformation into a **global credit intelligence platform** requires an enterprise-grade relational schema that integrates **financial transactions**, **user behavior**, **risk signals**, and **merchant analytics** — all while complying with multi-country regulations and enabling real-time insight generation.

Your SQL implementation will serve as the foundation of this ecosystem — powering every decision from credit limit updates to fraud alerts, loyalty management, and global financial reporting.