Explore Secure Travel Insurance Database Design Documentation

Milestone # 2

Akash Ghosh

Introduction: The explore secure Travel insurance database system is designed to handle the creation, management, processing of insurance policies, personalized quotes, claims and payments. The database system integrates with agents, travel platforms and partners offering various types of coverage and risk level to customer’s needs.

Entity Relationship Model:

The components of the ER Model include in the database system are:

1. **Customers** – Individuals purchasing insurance policies.
2. **Insurance Policies** – Different types of coverage options.
3. **Policy Types** – Categorization of policies (Health, Travel, Accident, etc.).
4. **Personalized Quotes** – Customized pricing for customers based on profile.
5. **Claims** – Insurance compensation requests by customers.
6. **Claim Processing** – Tracking claim status and assigned agents.
7. **Agents** – Representatives selling policies and managing claims.
8. **Agent Sales** – Tracks policies sold by agents and their commissions.
9. **Payments** – Tracks payments made by customers for policies.
10. **Travel Platforms** – External platforms partnering with the insurance company.
11. **Partnerships** – Agreements between insurance companies and travel platforms.
12. **High-Risk Coverage** – Additional coverage for customers traveling to high-risk areas.
13. **Country Offers** – Country-specific policy discounts and terms.

**Relational Model (Logical Schema):**

Each of the entity is transformed into a relational table with primary keys (PK), foreign keys (FK), and constraints.

* **Customer Table**

Customer (

customer\_id INT NOT NULL,

name VARCHAR(100) NOT NULL,

gender VARCHAR(20) NULL,

date\_of\_birth DATE NOT NULL,

occupation VARCHAR(100) NULL,

travel\_purpose VARCHAR(50) NOT NULL,

risk\_level VARCHAR(20) NOT NULL,

PRIMARY KEY (customer\_id),

CONSTRAINT chk\_risk\_level CHECK (risk\_level IN ('Low', 'Medium', 'High')),

CONSTRAINT chk\_travel\_purpose CHECK (travel\_purpose IN ('Business', 'Leisure', 'Medical', 'Education'))

)

* **Policy Type Table**

**PolicyType (**

**policy\_type\_id INT NOT NULL,**

**type\_name VARCHAR(50) NOT NULL,**

**description TEXT NULL,**

**PRIMARY KEY (policy\_type\_id),**

**CONSTRAINT unq\_type\_name UNIQUE (type\_name)**

**)**

* **Insurance Policy Table**

**InsurancePolicy (**

**policy\_id INT NOT NULL,**

**policy\_name VARCHAR(100) NOT NULL,**

**description TEXT NULL,**

**coverage\_details TEXT NOT NULL,**

**premium DECIMAL(10,2) NOT NULL,**

**risk\_level VARCHAR(20) NOT NULL,**

**policy\_type\_id INT NOT NULL,**

**PRIMARY KEY (policy\_id),**

**FOREIGN KEY (policy\_type\_id) REFERENCES**

**PolicyType(policy\_type\_id),**

**CONSTRAINT chk\_premium CHECK (premium > 0)**

* **Insurance Policy Table**

**CREATE TABLE InsurancePolicy (**

**policy\_id INT PRIMARY KEY,**

**policy\_name VARCHAR(255) NOT NULL,**

**policy\_type\_id INT NOT NULL,**

**coverage\_details TEXT NOT NULL,**

**premium DECIMAL(10,2) NOT NULL,**

**FOREIGN KEY (policy\_type\_id) REFERENCES PolicyType(policy\_type\_id)**

**);**

* **Personalized Quote Table**

**PersonalizedQuote (**

**quote\_id INT NOT NULL,**

**customer\_id INT NOT NULL,**

**policy\_id INT NOT NULL,**

**custom\_premium DECIMAL(10,2) NOT NULL,**

**coverage\_adjustments TEXT NULL,**

**quote\_date DATE NOT NULL,**

**PRIMARY KEY (quote\_id),**

**FOREIGN KEY (customer\_id) REFERENCES Customer(customer\_id),**

**FOREIGN KEY (policy\_id) REFERENCES InsurancePolicy(policy\_id),**

**CONSTRAINT chk\_custom\_premium CHECK (custom\_premium > 0)**

**)**

* **Customer Policy Table**

**CustomerPolicy (**

**customer\_id INT NOT NULL,**

**policy\_id INT NOT NULL,**

**purchase\_date DATE NOT NULL,**

**expiry\_date DATE NOT NULL,**

**PRIMARY KEY (customer\_id, policy\_id),**

**FOREIGN KEY (customer\_id) REFERENCES Customer(customer\_id),**

**FOREIGN KEY (policy\_id) REFERENCES InsurancePolicy(policy\_id),**

**CONSTRAINT chk\_dates CHECK (expiry\_date > purchase\_date)**

**)**

* **Claim Table**

**CREATE TABLE Claim (**

**claim\_id INT PRIMARY KEY,**

**customer\_id INT NOT NULL,**

**policy\_id INT NOT NULL,**

**claim\_status VARCHAR(50) NOT NULL,**

**claim\_amount DECIMAL(10,2) NOT NULL,**

**submission\_date DATE NOT NULL,**

**FOREIGN KEY (customer\_id) REFERENCES Customer(customer\_id),**

**FOREIGN KEY (policy\_id) REFERENCES InsurancePolicy(policy\_id)**

**);**

* **Claim Processing Table**

**CREATE TABLE ClaimProcessing (**

**processing\_id INT PRIMARY KEY,**

**claim\_id INT NOT NULL,**

**assigned\_agent INT NOT NULL,**

**processing\_status VARCHAR(50) NOT NULL,**

**FOREIGN KEY (claim\_id) REFERENCES Claim(claim\_id),**

**FOREIGN KEY (assigned\_agent) REFERENCES Agent(agent\_id)**

**);**

* **Agent Table**

**CREATE TABLE Agent (**

**agent\_id INT PRIMARY KEY,**

**name VARCHAR(255) NOT NULL,**

**contact\_info VARCHAR(255) NOT NULL**

**);**

* **Agent Sales Table**

**CREATE TABLE AgentSales (**

**agent\_id INT NOT NULL,**

**customer\_id INT**

**policy\_id INT NOT NULL,**

**sale\_date DATE NOT NULL,**

**commission DECIMAL(10,2) NOT NULL,**

**PRIMARY KEY (agent\_id, policy\_id),**

**FOREIGN KEY (agent\_id) REFERENCES Agent(agent\_id),**

**FOREIGN KEY (policy\_id) REFERENCES InsurancePolicy(policy\_id)**

**);**

* **Payment Table**

**CREATE TABLE Payment (**

**payment\_id INT PRIMARY KEY,**

**customer\_id INT NOT NULL,**

**policy\_id INT NOT NULL,**

**amount DECIMAL(10,2) NOT NULL,**

**payment\_date DATE NOT NULL,**

**FOREIGN KEY (customer\_id) REFERENCES Customer(customer\_id),**

**FOREIGN KEY (policy\_id) REFERENCES InsurancePolicy(policy\_id)**

**);**

* **Travel Platform Table**

**CREATE TABLE TravelPlatform (**

**platform\_id INT PRIMARY KEY,**

**name VARCHAR(255) NOT NULL**

**);**

* **Partnership Table**

**CREATE TABLE Partnership (**

**platform\_id INT NOT NULL,(PK)**

**policy\_id INT NOT NULL,**

**commission DECIMAL(10,2) NOT NULL,**

**partnership\_date DATE NOT NULL,**

**PRIMARY KEY (platform\_id, policy\_id),**

**FOREIGN KEY (platform\_id) REFERENCES TravelPlatform(platform\_id),**

**FOREIGN KEY (policy\_id) REFERENCES InsurancePolicy(policy\_id)**

**);**

* **High Risk coverage Table**

**CREATE TABLE HighRiskCoverage (**

**coverage\_id INT PRIMARY KEY, (PK)**

**policy\_id INT**

**risk\_type VARCHAR(255) NOT NULL,**

**coverage\_amount DECIMAL(10,2) NOT NULL**

**);**

* **Country Offers Table**

**CREATE TABLE CountryOffers (**

**offer\_id INT**

**country\_name VARCHAR(255) PRIMARY KEY,**

**discount DECIMAL(5,2),**

**special\_terms TEXT**

**);**

**Normalization Analysis**:

1NF :

* All relations have been designed with atomic attributes
* No repeating groups exists in the Database
* All tables have primary keys defined.

2NF:

* All relations are in 1NF
* No partial dependencies exist in relations.
* Customer policy and agent sales table has been structured with composite keys.

3NF:

* All relations are in 2NF
* No transitive dependencies exist
* Policy type have been separated into their own relation
* Claim processing details have been separated.

**Constraints and Business Procedure:**

* Primary keys are defined as not null for the relations
* Unique constraints are applied when needed
* Foreign key relations are properly added
* Delete and update actions are restricted to maintain data integrity
* Date validations (expiry date > purchase date)
* Numeric validations (premium >0)

**Unsupported Constraints:**

* Complex premium calculations
* Time based policy status update
* Commissions calculations rules
* Risk level assessment rule