Smart Flight Booking and Management Digital Tool

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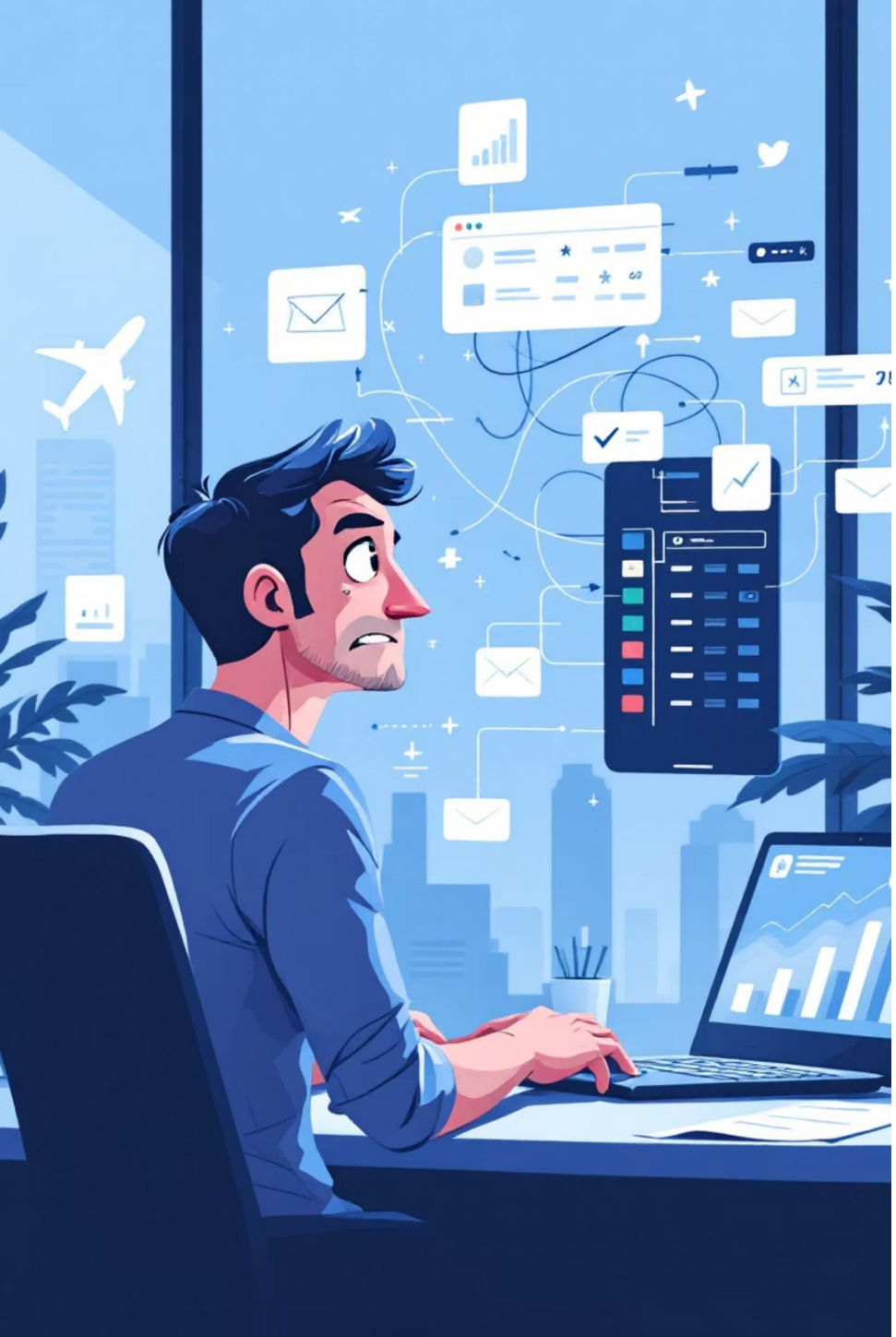


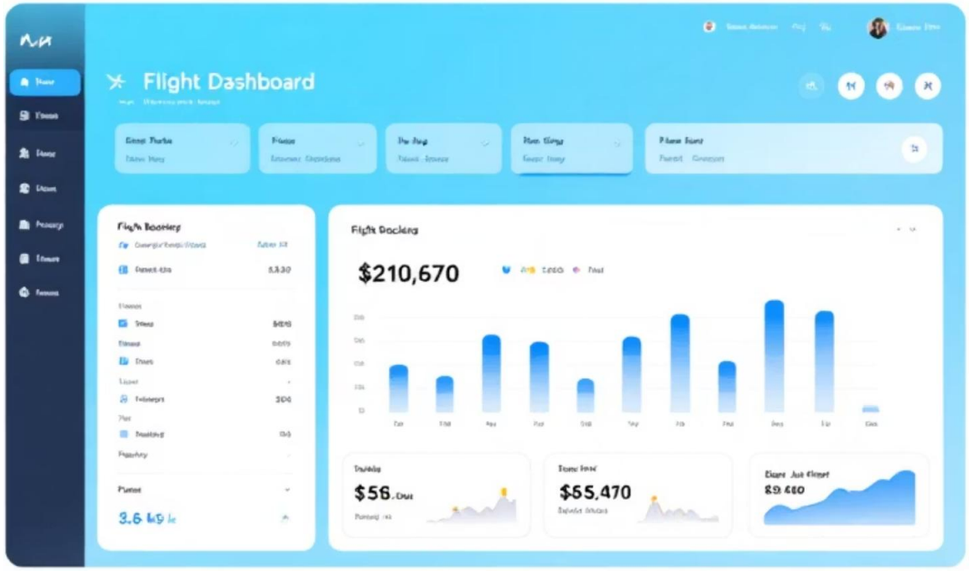
Problem Statement

- Manual flight booking processes are time-consuming and error-prone
- Lack of centralized system for managing flight reservations and passenger data
- Difficulty tracking flight schedules, seat availability, and booking status in real-time
- No integrated solution for managing cancellations, refunds, and customer communications
- Airlines struggle with data consistency and reporting across multiple booking channels

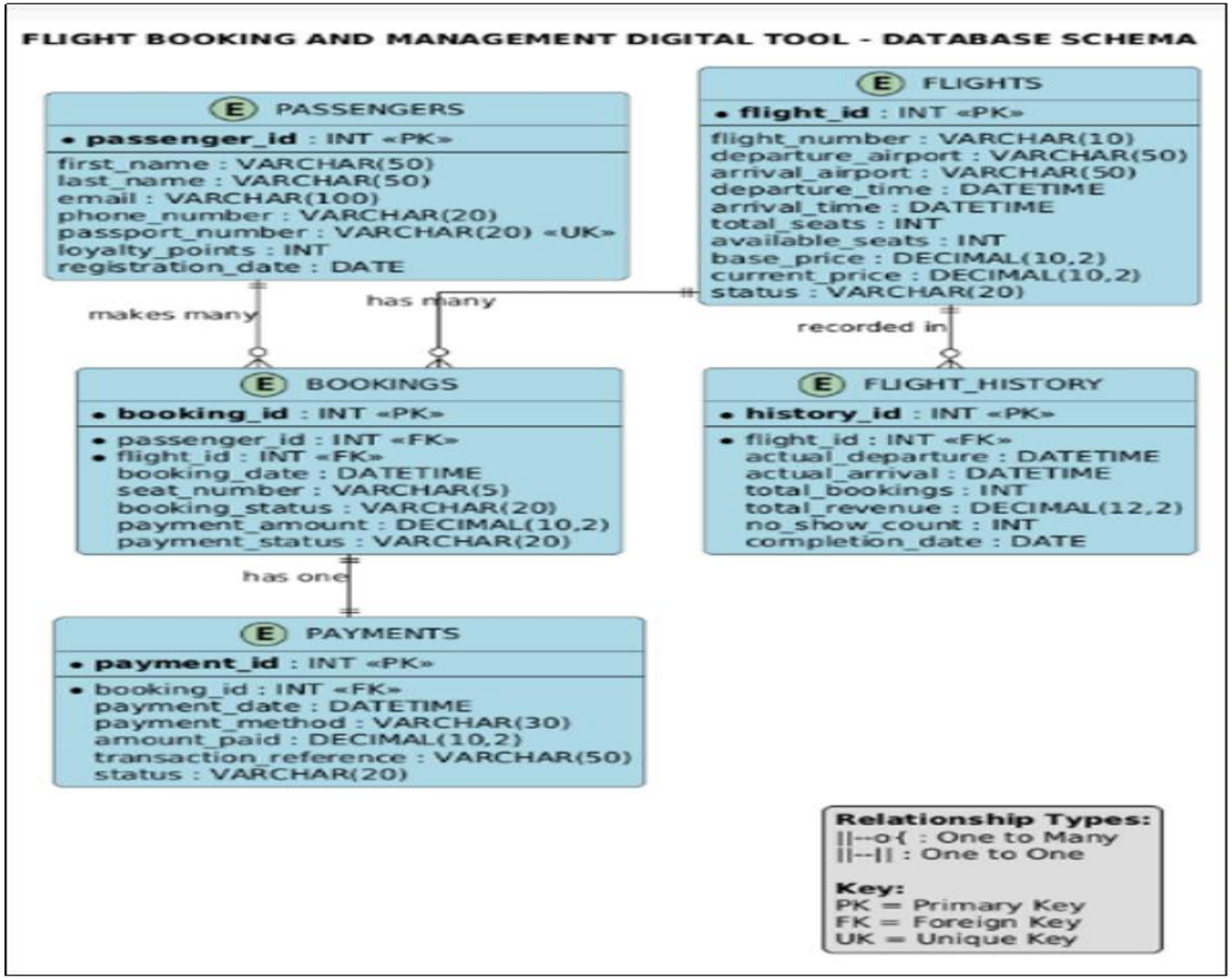
Solution & Project Objectives

- Develop a comprehensive Oracle database-driven flight booking and management system
- Centralize all flight, passenger, and booking data in a single, secure repository

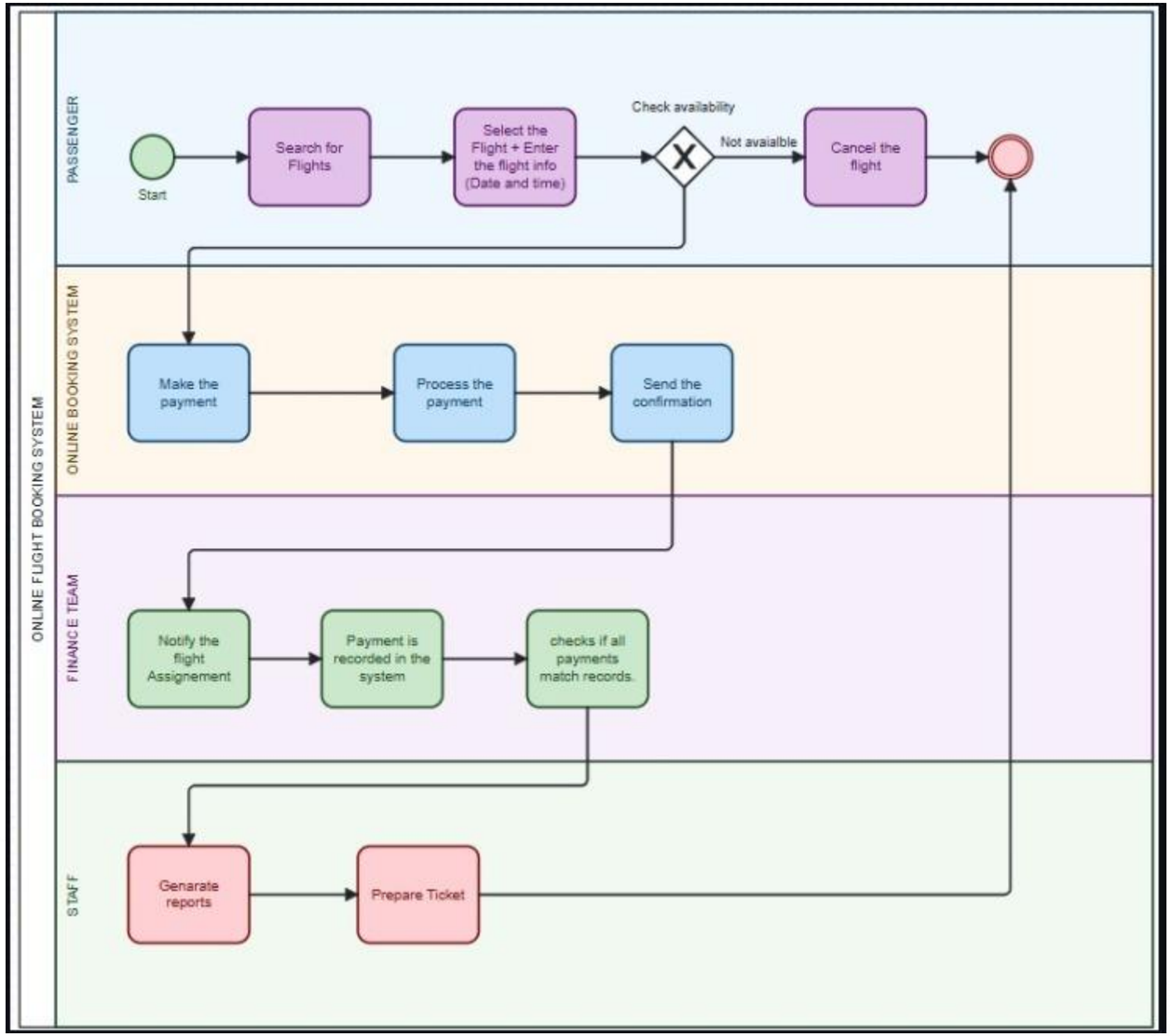
- Enable real-time tracking of flight schedules, seat availability, and booking status
- Implement automated workflows for cancellations, refunds, and customer notifications
- Provide analytics and reporting capabilities for business intelligence and decision-making
- Ensure data integrity, security, and compliance with industry standards



Database Design & Entity-Relationship Model



Business Process & Workflow



Technical Implementation & PL/SQL Development

Our solution is built on a robust foundation, leveraging Oracle Database capabilities and custom PL/SQL development to ensure performance, reliability, and data integrity:

Database Platform: Oracle Database with PL/SQL

Architecture: Normalized relational database (3NF minimum)

Data Integrity: Primary keys, foreign keys, and constraints enforced

Procedures: Custom PL/SQL procedures for booking, cancellation, and refund processing

Functions: Validation functions for passenger data, seat availability, and payment verification

Transactions: ACID-compliant transactions ensuring data consistency

Error Handling: Comprehensive exception handling and logging mechanisms

Advanced Features: Triggers, Auditing & Security

Database Triggers: Automated enforcement of business rules and data validation

Audit Logging: Comprehensive tracking of all INSERT, UPDATE, DELETE operations

Restriction Rules: Employees cannot modify data on weekdays or public holidays

Security Measures: Role-based access control and user authentication

Data Validation: Triggers ensure seat availability, payment verification, and booking integrity

Audit Trail: Complete history of all transactions for compliance and dispute resolution

Error Recovery: Automatic rollback mechanisms for failed transactions

Business Intelligence & Analytics

Executive Dashboard: Real-time KPIs including booking volume, revenue, and occupancy rates

Flight Performance Analytics: On-time performance, cancellation rates, and route profitability

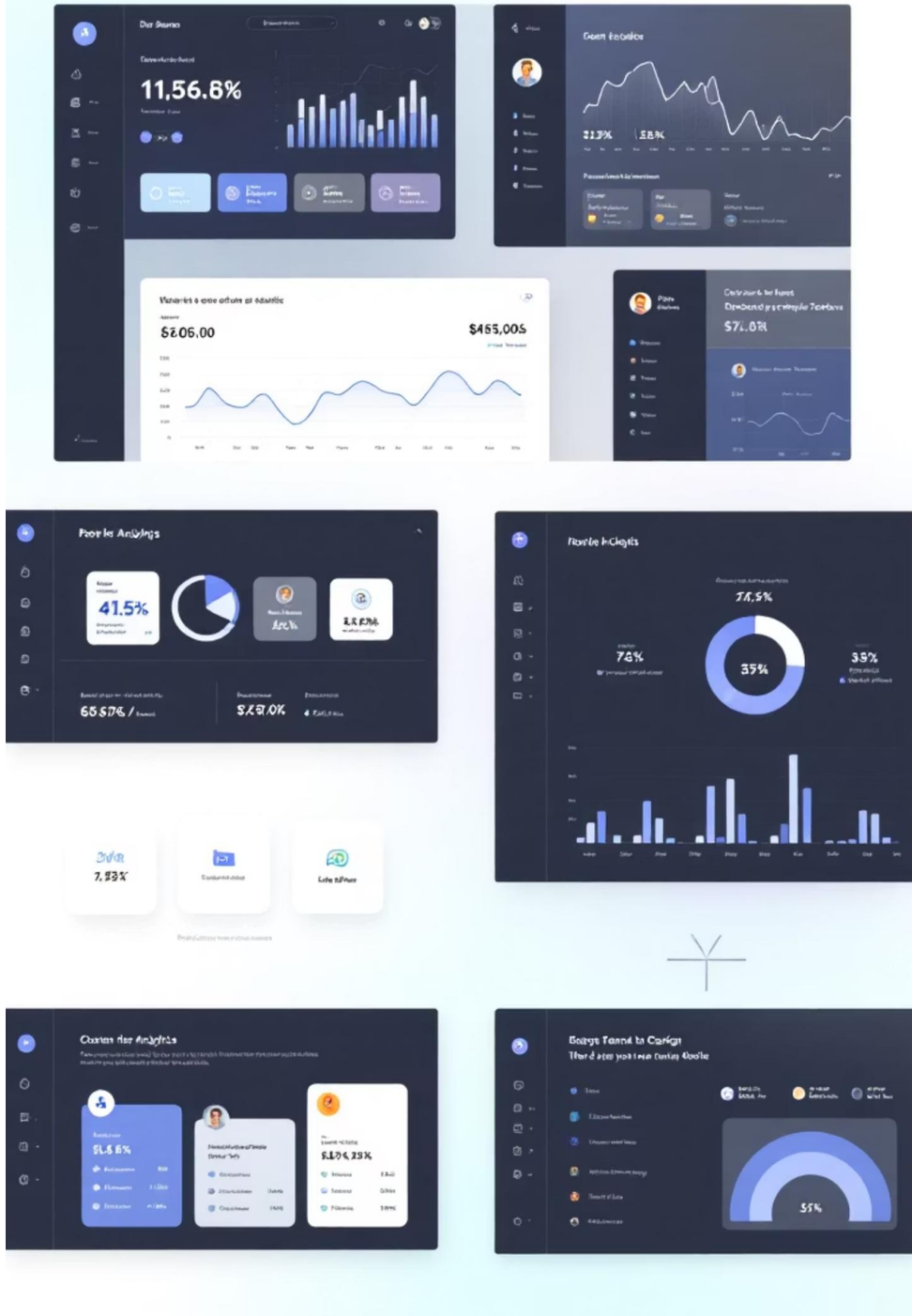
Passenger Analytics: Booking patterns, customer demographics, and repeat customer analysis

Revenue Reporting: Detailed revenue breakdown by route, airline, and time period

Audit Dashboard: Monitoring of system access, data modifications, and compliance violations

Predictive Analytics: Forecasting demand and optimizing pricing strategies

Custom Reports: Ad-hoc reporting capabilities for business decision-making



Results & Implementation Testing

Database Size: 7 tables with 500+ records per main table

Data Integrity: 100% constraint compliance and referential integrity validation

PL/SQL Components: 5+ procedures, 5+ functions, 3+ packages, and 6+ triggers implemented

Test Coverage: Comprehensive testing of all CRUD operations and business logic

Performance: Query optimization with indexes achieving sub-second response times

Audit Logging: 1000+ audit trail entries demonstrating complete transaction tracking

Error Handling: All edge cases tested and documented with clear error messages

Trigger Testing: Verified restriction rules blocking weekday/holiday modifications

Conclusion & Key Achievements

- Successfully developed a production-ready flight booking and management system
- Implemented comprehensive database design with 3NF normalization and data integrity
- Created robust PL/SQL components for automated business process management
- Established advanced security and auditing mechanisms for compliance and accountability
- Delivered business intelligence capabilities for data-driven decision-making
- Demonstrated mastery of Oracle database development and PL/SQL programming
- Lessons Learned: Importance of data normalization, comprehensive testing, and security
- Future Enhancements: Mobile app integration, real-time notifications, and predictive analytics