#### DESCRIPTION OF PRODUCT REQUIREMENTS

Group: 3

Project: Airline Reservation System

Date: 5-Apr-2025

**I. Short description of product ideas (less than 7 statements)**

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| Our proposed Airline Reservation System is a scalable, user-friendly Airline Reservation System (ARS) designed to revolutionize flight bookings. The system will feature real-time flight search with intuitive filters (price, duration, airline), powered by a dynamic pricing engine that uses AI to optimize fares based on demand and seasonality. Passengers can enjoy interactive seat selection with instant upgrades, while multiple payment options (credit cards, e-wallets, even cryptocurrency) ensure seamless transactions. Automated SMS/email notifications keep travelers informed about bookings, flight changes, and check-in reminders. A self-service portal allows users to easily modify or cancel reservations, while airlines benefit from a comprehensive admin dashboard with real-time analytics on sales, occupancy rates, and customer behavior. For broader distribution, the system includes API integration for travel agencies to connect and sell flights effortlessly. Built with scalability in mind, this cloud-based solution combines cutting-edge technology with user-friendly design to deliver speed, transparency, and control for both travelers and airlines. Use cloud-native architecture (AWS/Azure) for high scalability and 99.9% uptime. |

**II. Requirements**

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| High-level Functional Requirements | 1. Flight Search & Booking: Enable users to search for flights by date, price, destination, and airline, with real-time seat availability. |
| 2. Multi-Payment Integration: Support credit cards, e-wallets, and for seamless transactions. |
| 3. Automated Notifications: Email/SMS for bookings, check-in reminders, and flight updates. |
| 4. Admin Dashboard: Provide airlines with tools to manage flights, pricing, occupancy analytics, and generate reports. |
| 5. Self-Service Portal: User-friendly modifications/cancellations and seat selection. |
| 6 Travel Agency API: Enable third-party integrations for bulk bookings and commission tracking. |
| 7 Dynamic Pricing Engine: Use AI to adjust fares based on demand, seasonality, and user behavior. |
| 8 Mobile Compatibility: Ensure responsive design for seamless access across devices. |

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| Quality Attributes Requirements  (example related to issues: Ease  Use, Easy to Like, Easy to Learn, Easy to Understand, Easy to Buy / Yes, ...) | 1. Ease of Use: 3-click reservation process (UI/UX optimized with React/Bootstrap). |
| 2. Accessibility: WCAG 2.1 compliance. |
| 3. Personalization: Handle 10,000+ concurrent users with <5s response time. |
| 4. Security: JWT authentication, encrypted data (AES-256), and role-based access. |
| 5. Scalability: Microservices architecture (Node.js/Express.js) deployed on Google Cloud. |

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| Operation Requirements  (related to issues: Speed, Accuracy, Performance, Stability, Load Resistance, Scalability, Safety, ...) |  |
| 1. Data Accuracy: Real-time sync between inventory and bookings (MySQL/PostgreSQL).. |
| 1. Uptime: 99.9% availability with load balancing. |
| 1. Compliance: GDPR for data privacy, PCI-DSS for payments. |
| 1. Low Latency: CDN (Firebase Hosting) for global content delivery. |

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| Environment & Operation Requirements  (related to issues: physical impacts on the environment, interact with relevant or existing systems, conditions for product commercialization, ...) | 1. Cloud Deployment: Host on Google Cloud (App Engine, Cloud SQL) for global reach. |
| 2. Third-Party Integrations: Compatibility with GDS (Sabre/Amadeus) and payment gateways. |
| 3. Compliance: Adhere to PCI-DSS for payments and GDPR for data privacy. |
| 4. Low Latency: CDN (Firebase Hosting) for fast content delivery worldwide. |
| 5. Eco-Friendly: Optimize server usage to reduce carbon footprint. |

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| Requirements for Maintenance & Support | 1. Eco-Friendly: Optimize server usage to reduce carbon footprint. |
| 2. Automated Testing: CI/CD pipelines (Jenkins/GitHub Actions) for regression testing. |
| 3. Documentation: Detailed API docs (Swagger) and admin manuals. |
| 4. Monitoring: Real-time alerts via Prometheus/Grafana for system health. |
| 5. Patch Management: Monthly security updates and bug fixes. |

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| Security/ Safety Requirements  (related to issues: conditions of use / access to products, personal freedom, inspection, ...) | 1. Data Encryption: AES-256 for sensitive data (PII, payment details). |
| 1. Audit Logs: Track all system changes and access attempts. |
| 1. Role-Based Access: Granular permissions for admins, agents, and customers. |
| 1. DDoS Protection: Cloudflare/WAF to mitigate attacks. |
| 1. Data Protection: CORS policies, SQL injection prevention. |

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| Culture Requirements | 1. Localization: Support for regional payment methods (e.g., MoMo in Vietnam). |
| 2. Cultural Sensitivity: Avoid conflicting imagery/text in global markets. |
| 3. Holiday Awareness: Adjust pricing/notifications for local festivals. |
| 4. Currency Flexibility: Dynamic conversion with real-time exchange rates. |
| 5. Customer Support: 24/7 multilingual chat/call centers. |

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| Evaluate the complexity of engineering problems | 1. Balancing real-time updates with database consistency. |
| 1. Custom ETL → OLAP → RDF conversion for analytics. |
| 1. Aligning needs of airlines, travelers, and agencies. |
| 1. Combines AI (pricing), security (PCI-DSS), and cloud engineering. |
| 1. System failures could disrupt thousands of bookings globally. |
| 1. 20+ microservices for flight search, payments, and notifications. |

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| Standard requirements |  | 1. Code standard. (Oracle Java Code Conventions, React best practices., ..,) |
|  | 2. Design standard. (MVC architecture, SOLID principles, and domain-driven design,…). |
|  | 3. IEEE (830 (SRS), 1016 (Design Docs), 829 (Test Cases).) |
|  | 4. ISO/IEC/IEEE 12207:2017 (TCVN 10539:2014)). |
|  | 5. Other standards. (related to specific topics) |