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TEAM JAS

PROJECT UPDATE

We are currently in the active development phase of the 'AstraPark' project, focusing on both the electronic hardware components and the software application. On the 'electronic side', we are designing and testing the hardware systems that will integrate with the app to provide real-time parking availability and reservation capabilities. This includes sensors, communication modules, and other IoT devices that will ensure accurate and reliable data transmission.

On the software side, the AstraPark application is being developed simultaneously for web, Android, and iOS platforms to ensure broad accessibility for users. The development team is working on core features such as user authentication, parking space search, real-time availability updates, reservation management, and payment integration. The backend infrastructure, including the API gateway, microservices, and databases, is also being built to support seamless communication between the app and the electronic hardware.

At this stage, we are prioritizing user experience and system reliability, ensuring that the app is intuitive, responsive, and scalable. Regular testing and feedback loops are being conducted to identify and resolve any issues early in the development process. Our goal is to deliver a robust and user-friendly parking solution that meets the needs of our target audience.

AstraPark System Architecture Overview

1. User Layer:

- Comprises **mobile applications** (iOS and Android) and a **web application for admin side to system updates**.
- Enables users to search, reserve, and navigate to parking spaces seamlessly.

2. Application Layer:

- **API Gateway:** Manages and routes incoming requests.
- **Microservices:**
 - **User Management:** Handles registration, authentication, and profiles.
 - **Parking Search:** Provides real-time parking availability.
 - **Reservation:** Manages booking and reservation of parking spots.
 - **Payment Processing:** Integrates with payment gateways for transactions.
 - **Notifications:** Sends alerts and reminders via SMS/email.
 - **Navigation:** Integrates with maps for route guidance.

3. Data Layer:

- **Relational Database:** Stores structured data (e.g., user details, reservations).
- **NoSQL Database:** Manages unstructured data (e.g., logs, geolocation data).
- **Caching Layer:** Improves performance by caching frequently accessed data.

4. Integration Layer:

- **Third-Party Services:**

- Google Maps for location and navigation.
- Payment gateways for secure transactions.
- SMS/Email gateways for notifications.

5. Infrastructure Layer:

- **Cloud Hosting:** Scalable and reliable hosting (e.g., AWS, Azure, Google Cloud).
- **Containerization:** Uses Docker for consistent deployment.
- **Orchestration:** Managed by Kubernetes for scalability and fault tolerance.

6. Security Layer:

- **Authentication & Authorization:** Uses OAuth 2.0 or JWT for secure access.
- **Data Encryption:** Protects sensitive data in transit and at rest.
- **Firewall & DDoS Protection:** Safeguards against malicious attacks.

7. Monitoring & Logging:

- **Monitoring Tools:** Tracks system performance (e.g., Prometheus, Grafana).
- **Logging Tools:** Collects and analyzes logs for debugging (e.g., ELK Stack).

8. Key Benefits:

- **Scalability:** Designed to handle growing user demand.
- **Reliability:** Ensures consistent performance and uptime.
- **User-Friendly:** Intuitive interface and seamless functionality.
- **Comprehensive:** Integrates all necessary features for a complete parking solution.

The **AstraPark** project is progressing steadily, with significant strides made in both the **electronic hardware development** and the **software application** for web, Android, and iOS platforms. On the hardware front, we are actively designing and testing electronic components, such as sensors and communication modules, to ensure accurate real-time data transmission for parking availability and reservations. Simultaneously, the software team is developing core features like user authentication, parking search, reservation management, payment integration, and navigation, while building a robust backend infrastructure to support seamless functionality. Regular testing and feedback loops are being conducted to ensure a user-friendly and reliable experience. At this stage, our focus remains on delivering a scalable, secure, and intuitive parking solution that meets the needs of our users. With a strong foundation in place, we are confident in our ability to bring AstraPark to life as a comprehensive and innovative parking management system.

