**Software Requirements Specification (SRS) for Locate a Socket**

**1. Introduction**

**1.1 Document Purpose**

This Software Requirements Specification (SRS) document defines the functional and non-functional requirements of the Locate a Socket web application. It is intended for software developers, testers, project managers, and stakeholders who will be involved in the design, development, and maintenance of the system.

**1.2 Product Scope**

Locate a Socket is a location-based web application designed to assist electric vehicle (EV) drivers in finding convenient charging stations along their routes. The platform provides real-time information about charging station availability, enables secure payment processing, and offers route planning functionality. The primary goal of Locate a Socket is to address the growing need for accessible EV charging infrastructure by providing an intuitive and reliable service for EV drivers worldwide.

**1.3 Document Overview**

This document outlines the software requirements for Locate a Socket, including an overview of the system, functional and non-functional requirements, and constraints. It is structured as follows:

* Section 2: Provides an overall description of Locate a Socket, including its perspective, functions, user characteristics, constraints, and assumptions.
* Section 3: Details the specific requirements, including external interfaces, functional, and non-functional requirements.
* Section 4: Provides supporting information.

**1.4 Definitions, Acronyms, and Abbreviations**

* **EV**: Electric Vehicle
* **GPS**: Global Positioning System
* **API**: Application Programming Interface
* **UI**: User Interface
* **UX**: User Experience
* **PCI-DSS**: Payment Card Industry Data Security Standard
* **kW**: Kilowatt (unit of power measurement for charging stations)

**2. Overall Description**

**2.1 Product Perspective**

Locate a Socket is a web-based application that integrates with various mapping services, payment gateways, and charging station networks. The system relies on real-time data from charging station providers and utilizes GPS technology for location-based services. It operates as a standalone web application accessible through major web browsers on desktop and mobile devices.

**2.2 Product Functions**

Locate a Socket provides the following core functionalities:

* User registration and profile management
* Real-time charging station location and availability tracking
* Route planning with charging station integration
* Charging station filtering and search capabilities
* Secure payment processing for charging services
* Charging session management and history
* User reviews and ratings for charging stations
* Push notifications for charging status updates
* Multi-language support

**2.3 User Characteristics**

**EV Drivers**: Primary users who own or operate electric vehicles and need to locate charging stations. They typically have basic to moderate technical proficiency and can navigate web applications with ease.

**Charging Station Operators**: Business entities that manage charging stations and need to update station information, pricing, and availability. They are expected to have moderate technical knowledge of content management systems.

**System Administrators**: Technical personnel responsible for system maintenance, user management, and data integrity. They should have advanced technical proficiency in web application management and database administration.

**2.4 Constraints**

* Must support major web browsers (Chrome, Firefox, Safari, Edge)
* Must be mobile-responsive for smartphone and tablet access
* Must comply with payment processing regulations (PCI-DSS)
* Must integrate with existing charging station network APIs
* Must handle real-time location data with minimal latency
* Application performance is subject to internet connectivity and GPS accuracy

**2.5 Assumptions and Dependencies**

* Users must have internet connectivity and GPS-enabled devices for location services
* Charging station operators will provide accurate and up-to-date information
* Third-party payment gateways will maintain reliable service availability
* Mapping services (Google Maps, OpenStreetMap) will remain accessible
* Charging station networks will maintain API compatibility

**3. Specific Requirements**

**3.1 External Interfaces**

* **User Interface**: Responsive web application compatible with desktop and mobile browsers
* **Hardware Interfaces**: Compatible with GPS-enabled devices, smartphones, tablets, and desktop computers
* **Software Interfaces**: Integration with mapping services (Google Maps API), payment processors (Stripe, PayPal), charging station network APIs, and email service providers
* **Communication Interfaces**: RESTful APIs for third-party integrations, push notification services, and SMS alerts

**3.2 Functional Requirements**

* **User Registration & Authentication**: Users must be able to create accounts using email or social media authentication (Google, Facebook). Authentication must implement OAuth 2.0 with secure password policies.
* **Location Services & Station Discovery**: The system must utilize GPS to identify user location and display nearby charging stations within a specified radius. Users must be able to filter results by charging speed, connector type, and availability.
* **Route Planning**: Users must be able to plan routes with integrated charging stops, considering vehicle range and charging requirements. The system should optimize routes based on charging station locations and traffic conditions.
* **Real-time Availability**: The system must display real-time charging station availability and estimated wait times. Status updates must be refreshed automatically at regular intervals.
* **Payment Processing**: Users must be able to make secure payments for charging services through integrated payment gateways. The system must support credit cards, digital wallets, and charging network membership cards.
* **Charging Session Management**: Users must be able to initiate, monitor, and terminate charging sessions through the application. The system must provide real-time charging progress and notifications.
* **Review and Rating System**: Users must be able to rate and review charging stations based on their experience. The system must calculate and display average ratings for each station.

**3.3 Non-Functional Requirements**

* **Performance**: The system should handle at least 50,000 concurrent users with response times under 3 seconds for location queries
* **Security**: User data and payment information must be encrypted using AES-256 encryption with secure data transmission via HTTPS
* **Availability**: The service should maintain an uptime of 99.5% with proper failover mechanisms
* **Usability**:
  + The interface should follow WCAG 2.1 accessibility standards
  + Key functions should be accessible within three clicks or taps
  + The application should provide clear visual indicators for charging station status and availability

**4. Supporting Information**

**References**

* W3C Web Content Accessibility Guidelines (WCAG) 2.1. Available at: <https://www.w3.org/TR/WCAG21/>
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