

Secure Free-Floating Car Sharing for Offline Cars

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Motivation

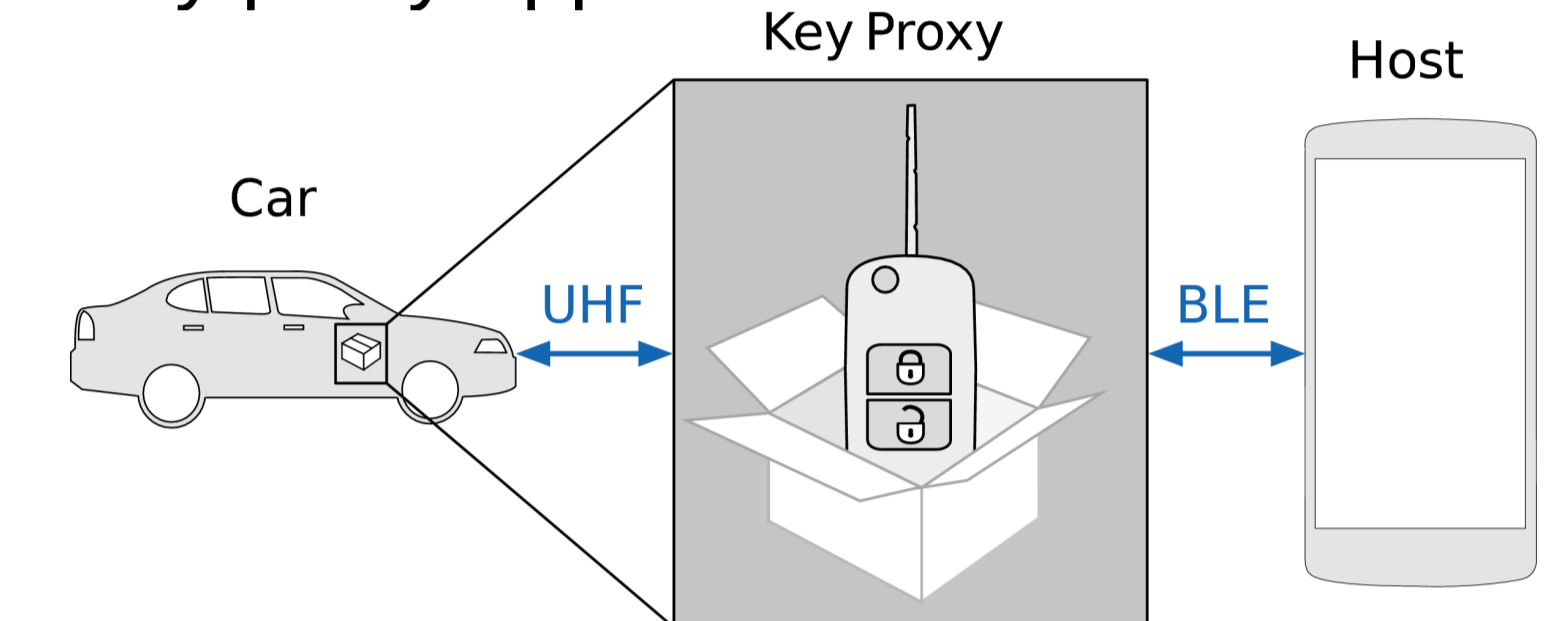
- General market-growth in car sharing
 - Urbanization, new mobility trends
- Omnipresent mobile devices enable comfortable user experience
 - Mobile device to book and access cars
- Avoiding costly stakeholder-owned Secure Element solutions

Requirements & Challenges

- Requirements
 - Offline Cars
 - Compatibility to legacy cars without intrusive modifications
 - Compatibility with DESFire EV1
- Challenging to achieve in one solution
 - No existing solution fulfills all requirements

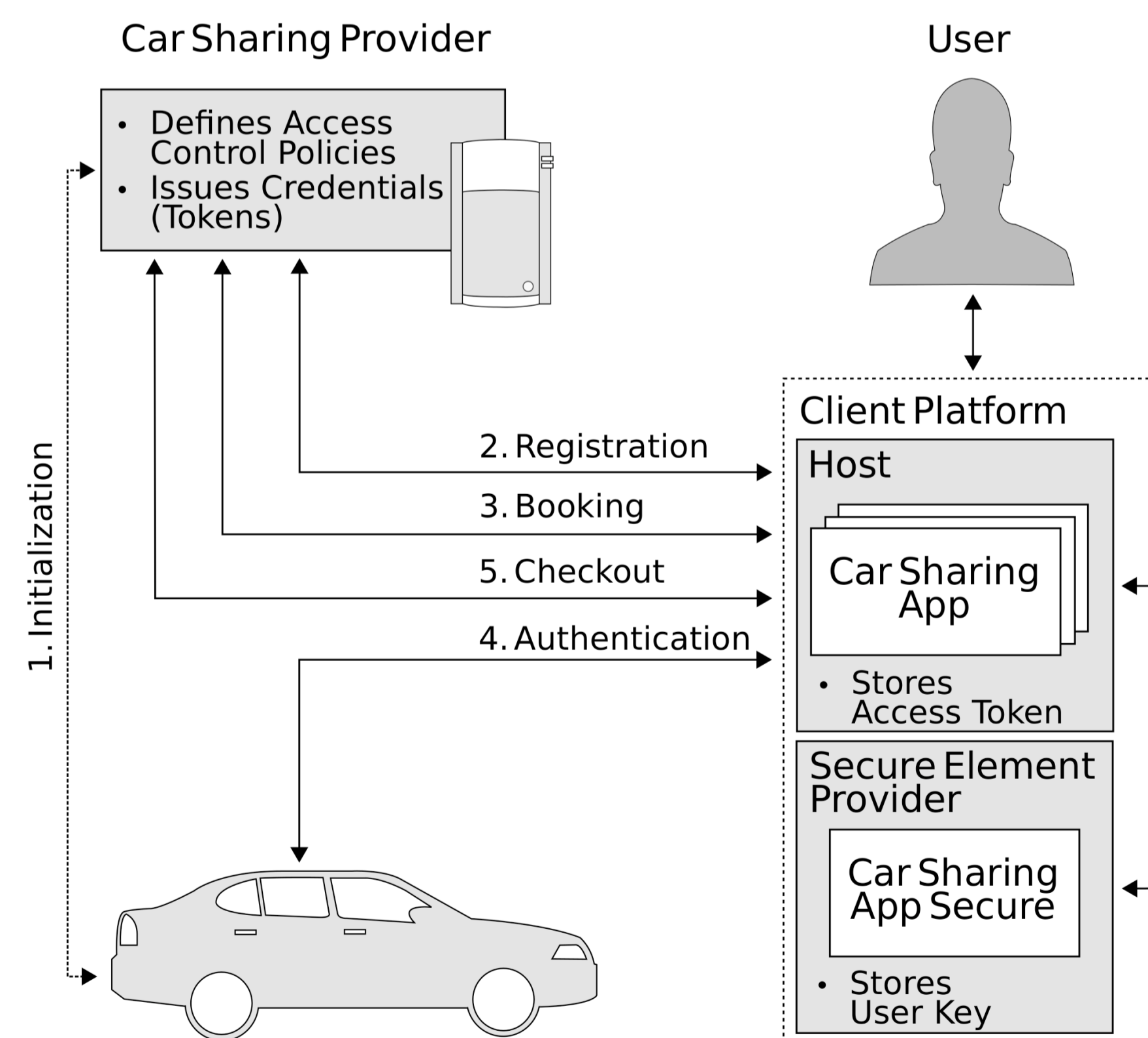
Compatibility with Legacy Cars

- Car key proxy approach



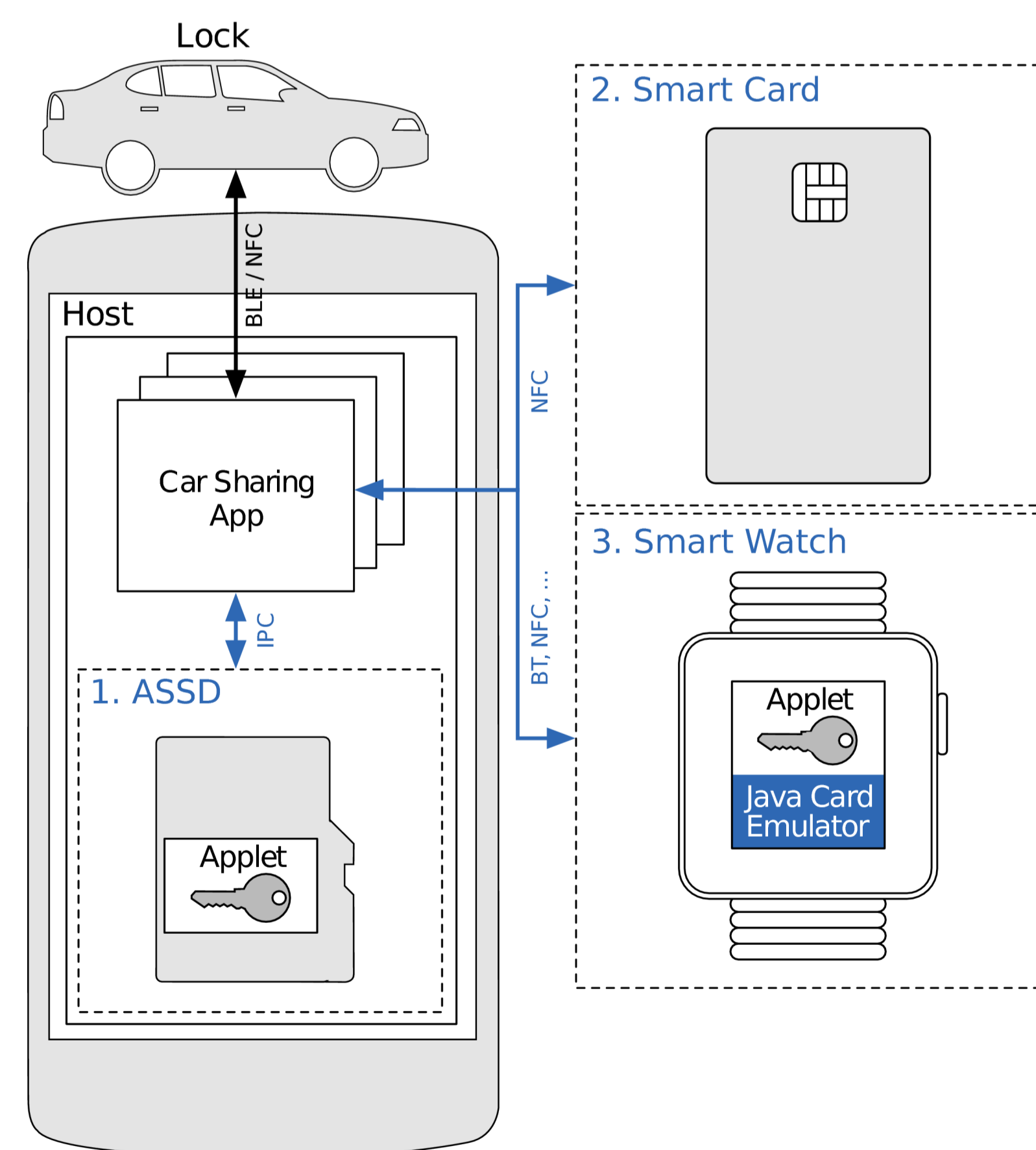
General Architecture

- 2-Factor authentication of users
 - (i) access token, (ii) user key
- Platform security architecture
 - Both authenticators are handled in isolation



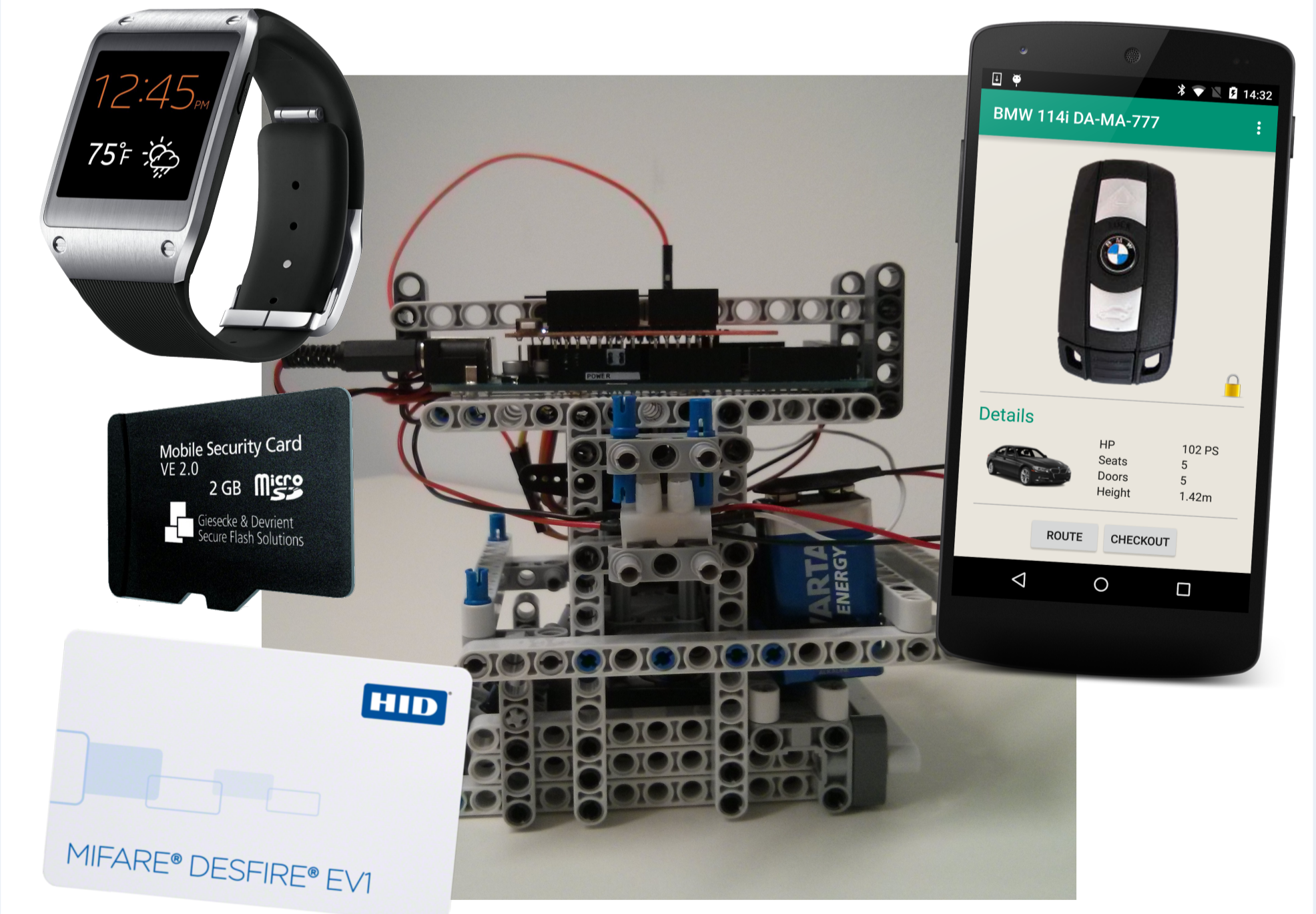
Deployment Options

- 3 deployment options
 - ASSD, Smart Card, Smart Watch



Implementation

- Google Nexus 5, Samsung Galaxy S4
- Car key proxy prototyped using Lego, Arduino Mega, BLE shield and Servo
- Secure Element instantiated by
 - Mobile Security Card, Smart Card, Galaxy Gear



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