# Power EnJoy

## RASD

## Requirement Analysis and Specification Document

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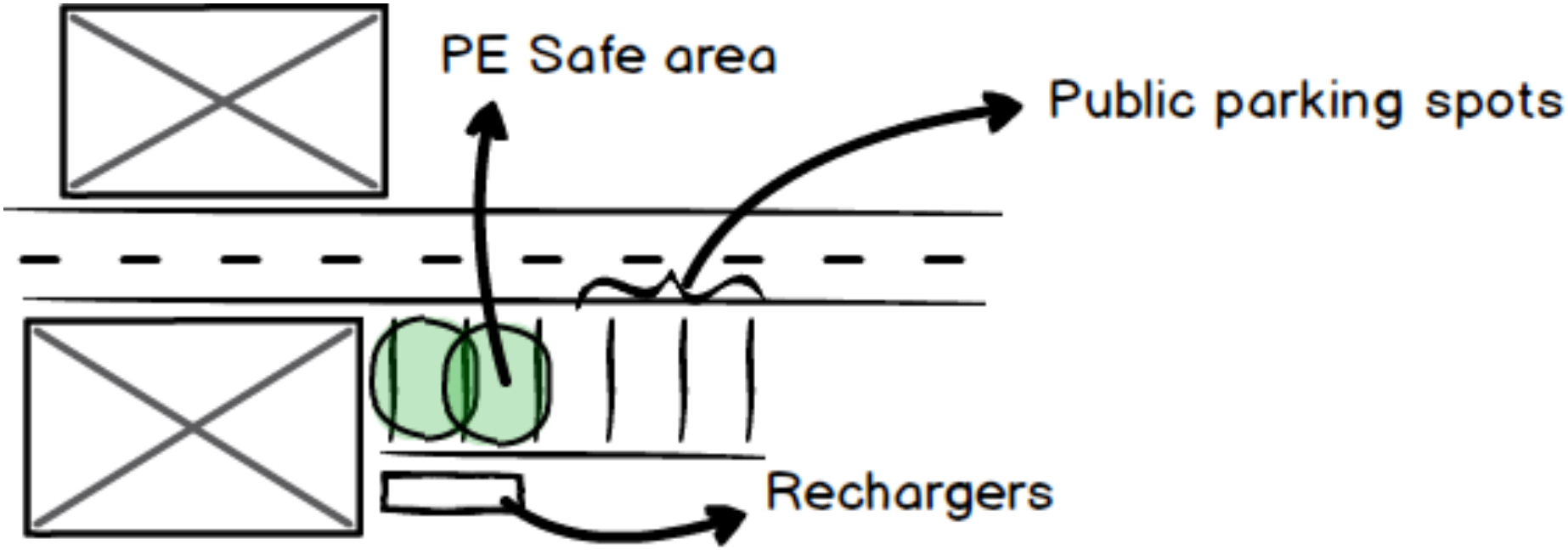
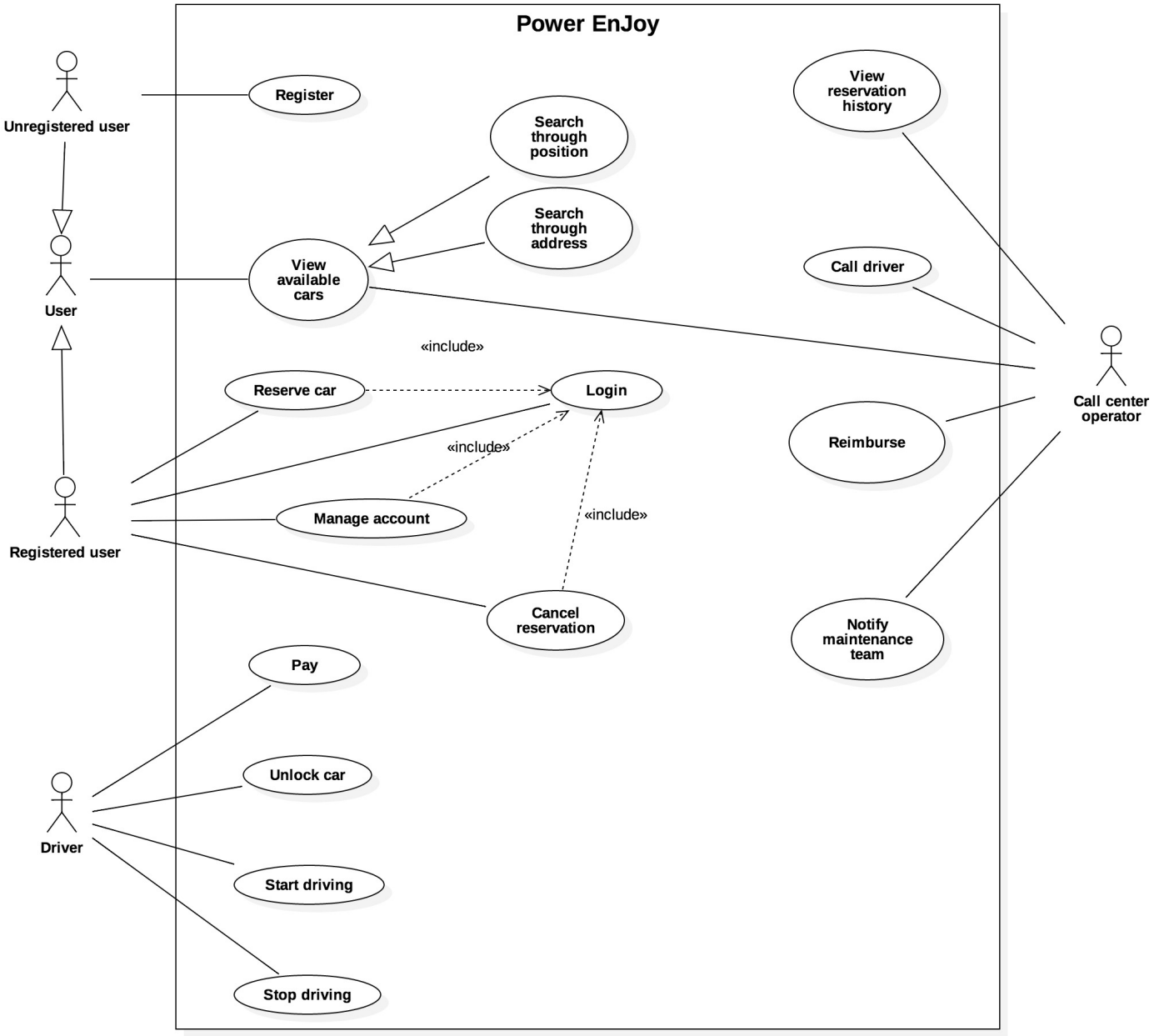
16/11/16

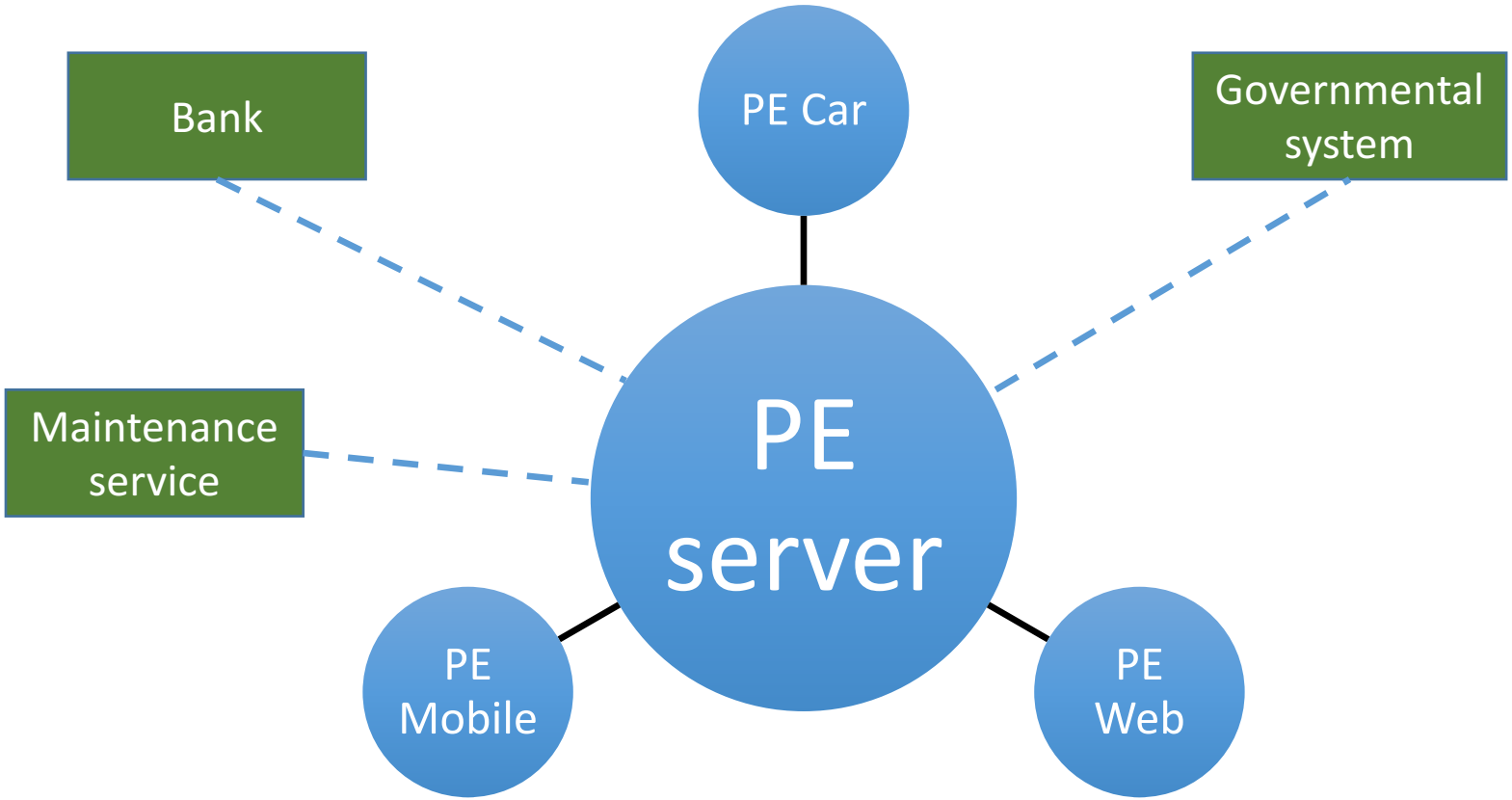
# Safe areas



# Use case diagram



# Power EnJoy components



# Goals

- **[G1] Build an effective and reliable electric car sharing system.**
  - [G1.1] Allow every user to view available cars near or in a given position.
  - [G1.2] Allow (activated) registered users to reserve available cars.
  - [G1.3] Allow users to drive their reserved car.
  - [G1.4] Allow users to cancel the reservation.
  - [G1.5] Allow users to access to PE and manage their account.
- **[G2] Encourage drivers to behave correctly and with respect to the law.**
- **[G3] Offer an easy-to-use system for call center operators to monitor cars and give assistance to drivers.**

# G1.1 View available cars nearby or in a given position

- PEM and PEW should be able to retrieve device position either with a GPS antenna or by using browser geolocalization after obtaining the user's permission.
- PE should be able to find the GPS coordinate given a specific address.
- Every car must respond with their GPS coordinate when it is asked by PE.
- The user should be able to specify the range of the area where to find available cars.
- The user should be able to visualize the battery level of available cars.

# G1.2 Reserve available cars

- Each user should have only one active reservation at a time.
- All reservations must be related to only one car and each car can be bound to at most one reservation at a time.
- When the user reserves a car, it automatically becomes reserved and won't be visible to other users until the reservation is cancelled or he/she stops driving.
- Each reservation should expire after a fixed amount of time (e.g. 1 hour). If the user forgets to cancel the reservation within that deadline, user should incur in a penalty fee.
- A car should be available only if it has at least 20% battery full.

# G1.3 Drive the reserved car

- Every car should be able to unlock every time they receive an unlock message by PE.
- The user should be able to unlock the car either via SMS (e.g. with an ‘UNLOCK’ message) or PEM.
- The car should lock the door after a fixed amount of time (e.g. 30 seconds) it have been unlocked. If the doors are still open after that time, the car will lock as soon as the doors closes.
- The user should be able to stop the ride either via SMS (e.g. with a ‘STOP’ message) or PEM

# G1.3 Drive the reserved car (2)

- The user should be able to pay for all his rides monthly.
- The car should be able to detect whether it is on a PE safe area or not.
- The car should be able to detect the number of passengers it is carrying.
- User should be aware of current charge when driving through a screen in the car.
- PE should start charging the user either when the car engine ignites or when a fixed amount of time (e.g. 10 minutes) is passed from the first unlock made by the user.

# G1.4 Cancel the reservation

- User should be able to cancel a pending reservation only before he/she unlocks the car for the first time
- User should be able to view his/her pending reservation.

# G1.5 Allow users to access to PE and manage their account.

- PE should verify all the data changed by the user
- User should be able to:
  - Change password
  - Change/update driving license and ID card
  - Change phone number
  - View pending reservation (if any) and all past reservation
  - View the bills to pay and/or already paid
  - Change payment informations
- Users should be able to register and create an account.
- Users should be able to log in with a previously created account

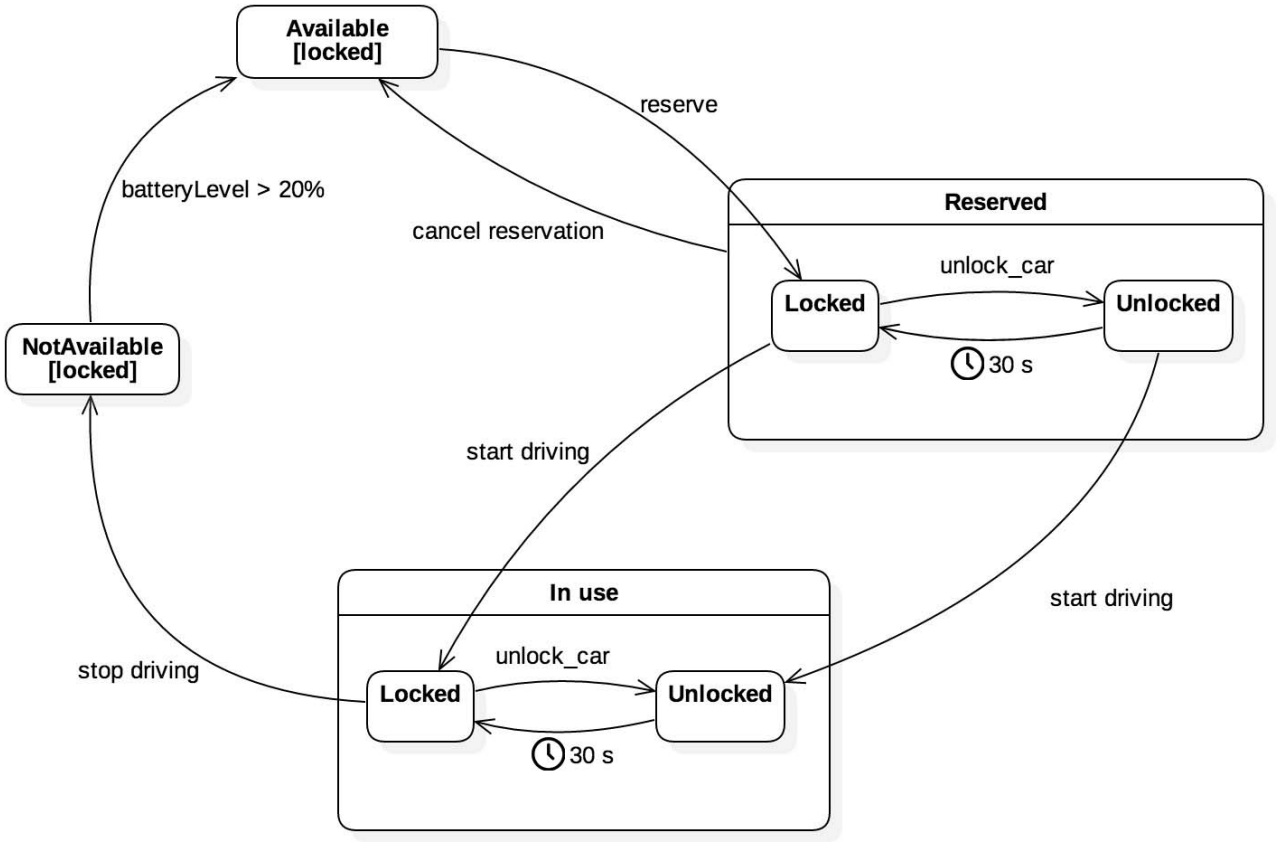
# G2 Encourage drivers to behave correctly and with respect to the law.

- PE should be able to retrieve driver information for a specified car in a given time.
- PE should be able to verify the correctness of the driving license and ID card of a driver (e.g. using a governmental system)
- PE should apply some discounts on the ride in this situations:
  - The driver is carrying at least 2 passengers
  - The driver leaves the car with at least 50% of battery full.
  - The driver parks in a PE safe area and plugs the car in the power grid
- PE should apply some penalty fees on the ride in this situations:
  - The driver parks the car far from the nearest PE safe area (e.g. the nearest PE safe area is at least 3 km far)
  - The driver leaves the car with less than 20% of battery full.
- PE should periodically check the validity of the documents presented by each user and forbid user to reserve cars with out-of-date documents.

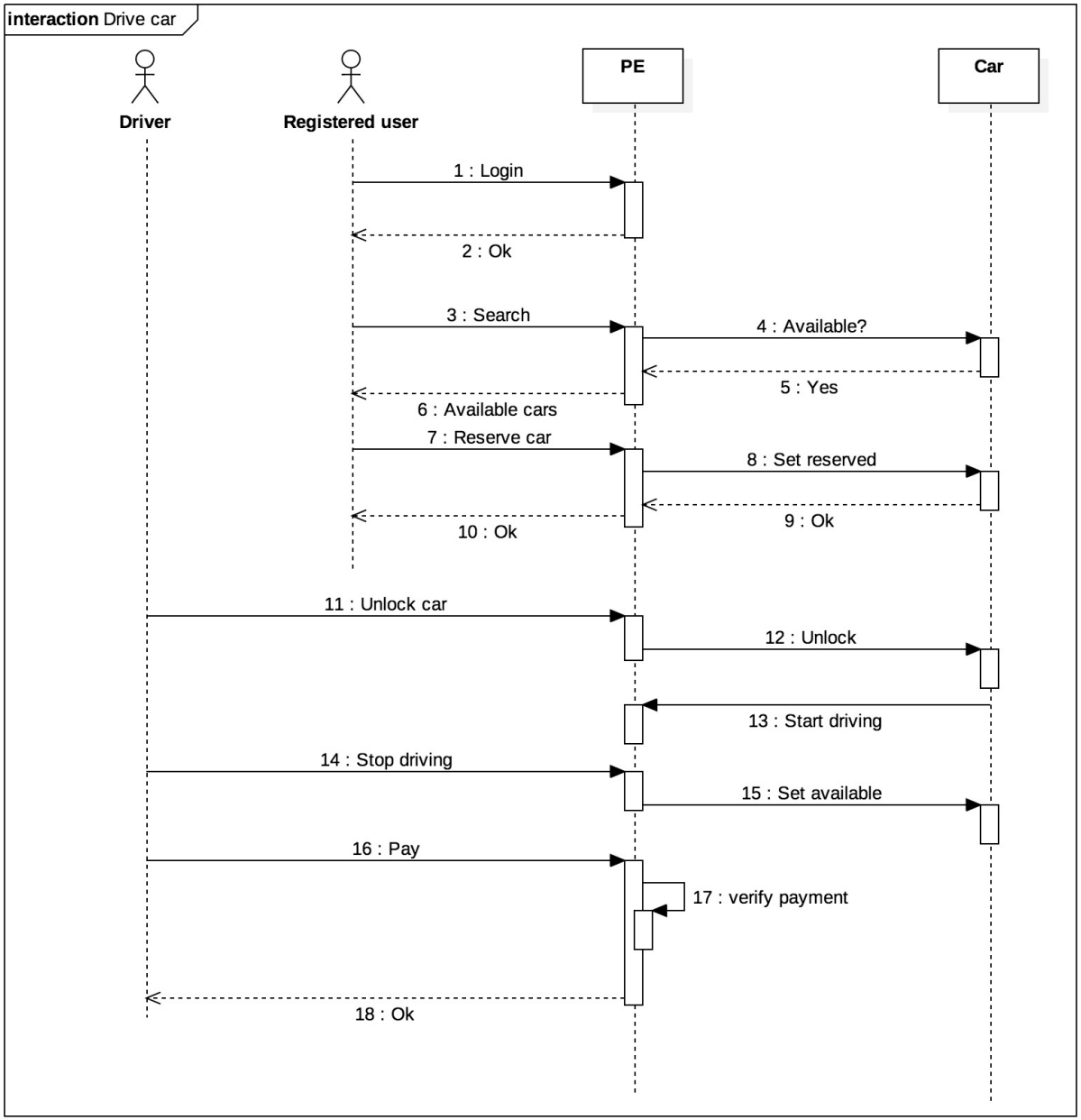
# G3 Monitor cars and give assistance to drivers

- Call center operators should be able to:
  - View the position of all the cars on road
  - Notify maintenance operators
  - Reimburse the driver
  - Call the driver
  - Notify police/ambulance of emergencies.
  - View the reservation history of each car.

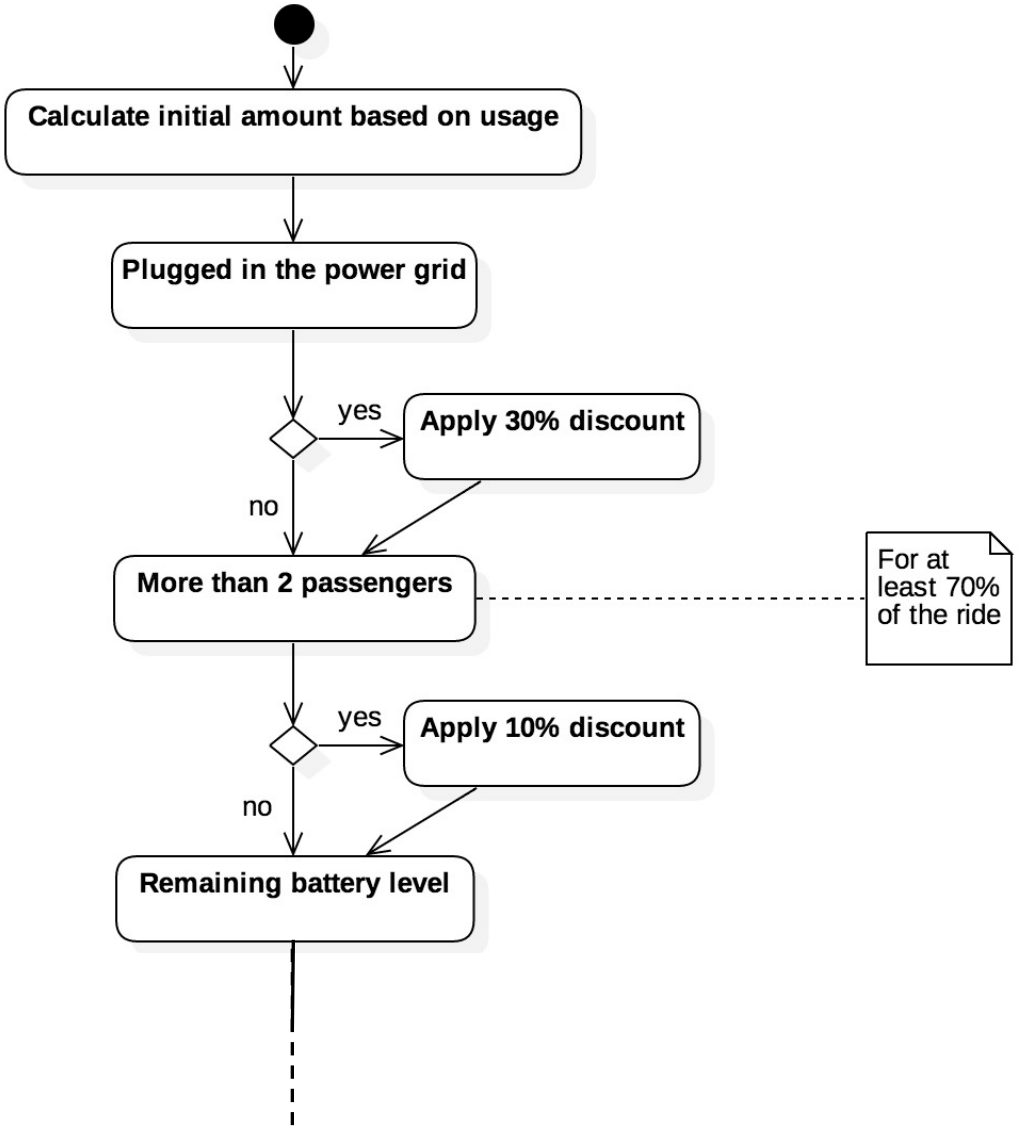
# Car state


Available
[locked]
reserve
batteryLevel > 20%
cancel reservation
Reserved
unlock_car
Locked
Unlocked
30 s
NotAvailable
[locked]
start driving
In use
start driving
stop driving
unlock_car
Locked
Unlocked
30 s

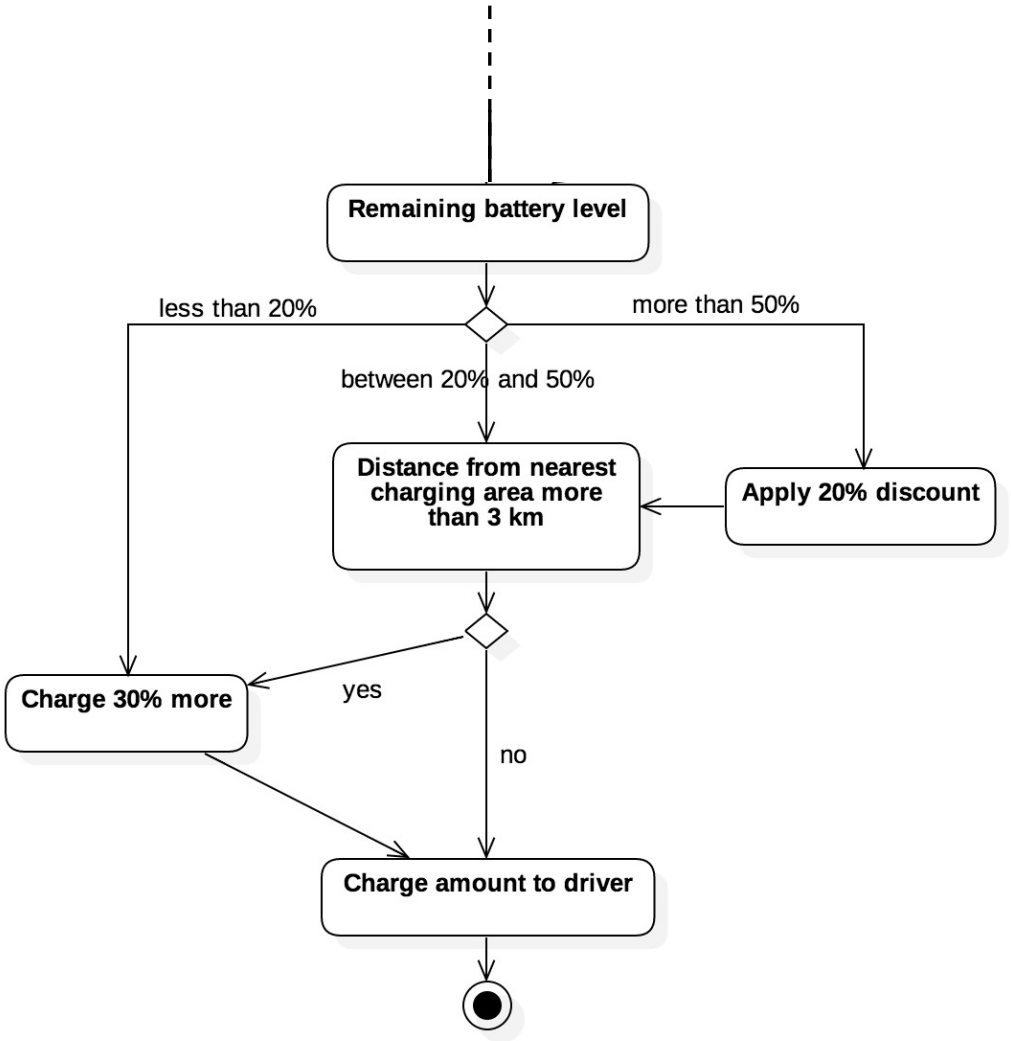
# Reserve car sequence diagram



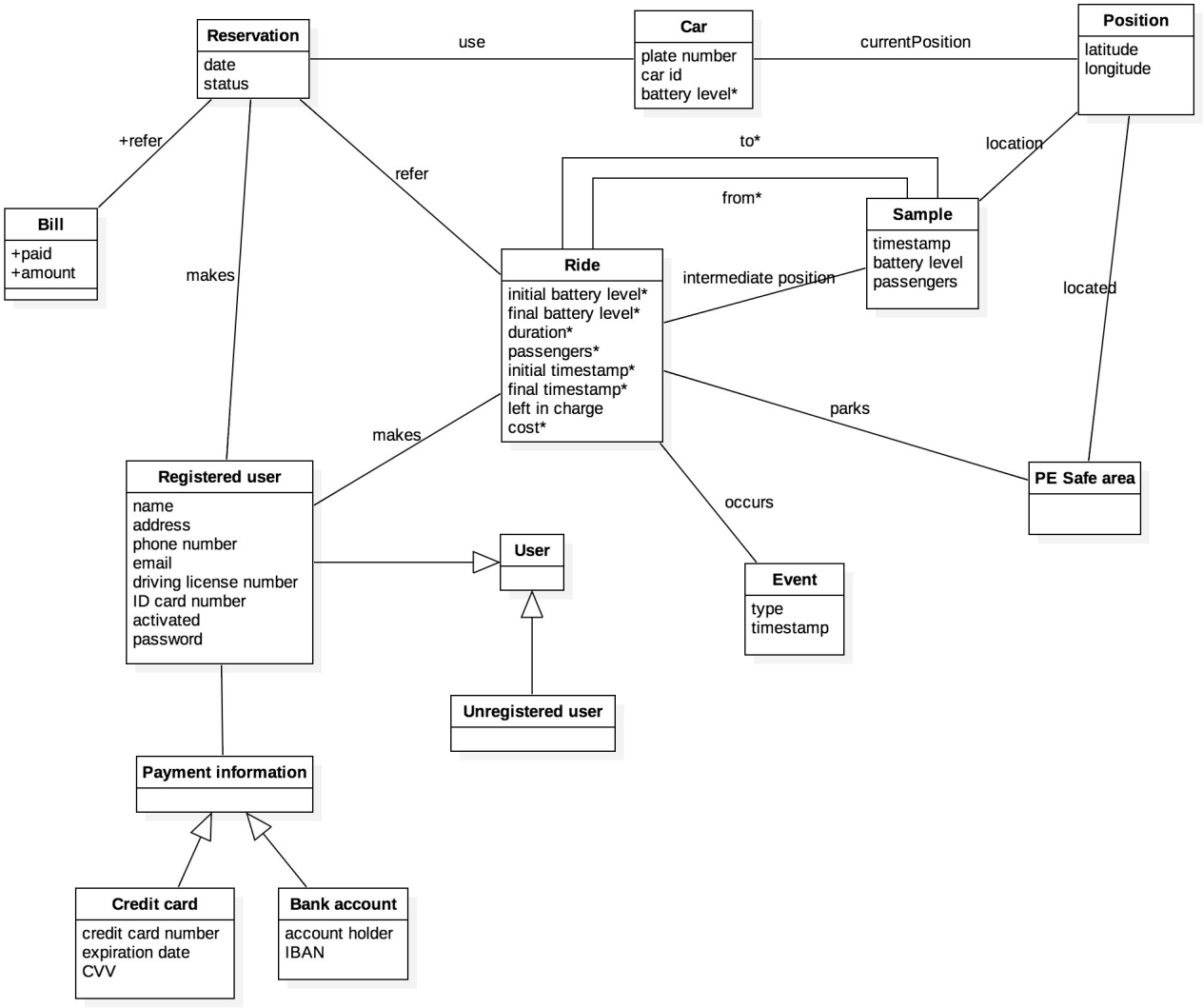
# Calculate discounts



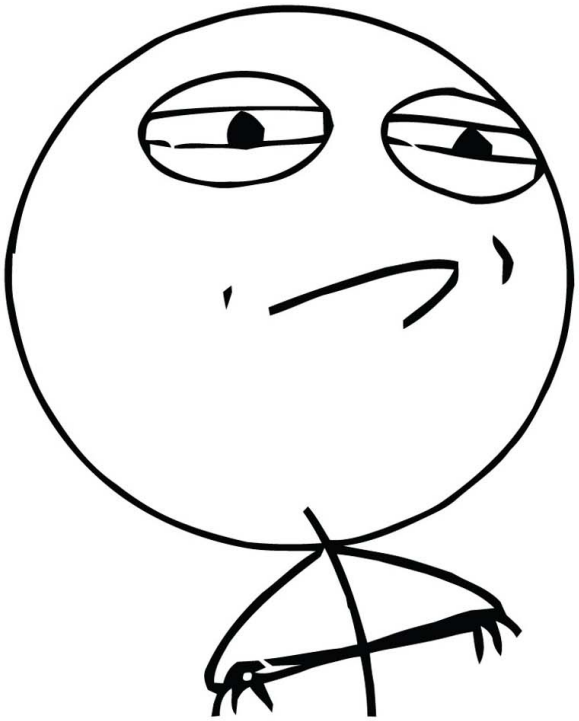
# Calculate discounts (2)



# Class diagram



# We're done.



# Any questions?