PARKADE.IO

APP TECHNICAL FRAMEWORK

PURPOSE

To create parking lot infrastructure that leverages the Ethereum Blockchain for transparency, accountability, and automation. The use of Blockchain will allow PRKC Coin holders to take part in our profit-sharing program, as well as supporting per-minute, flexible-rate billing.

SYSTEM ARCHITECTURE

OVERVIEW

Each parking lot will have an associated Ethereum smart contract, which will maintain a list of customers currently inside the lot.

When customers enter the lot, they will indicate to this smart contract that they would like to park. The lot will store their account address, and a timestamp to be used for payment calculation.

When users exit the lot, they will pay the smart contract using Ether. The Parkade.IO app will leverage the timestamp and account address information stored within the contract to calculate balance owing and ensure all payments are collected accurately.

The resulting payments will be automatically distributed to PRKC token holders, Parkade.IO's wallet for future expansion, and a wallet for operational costs.
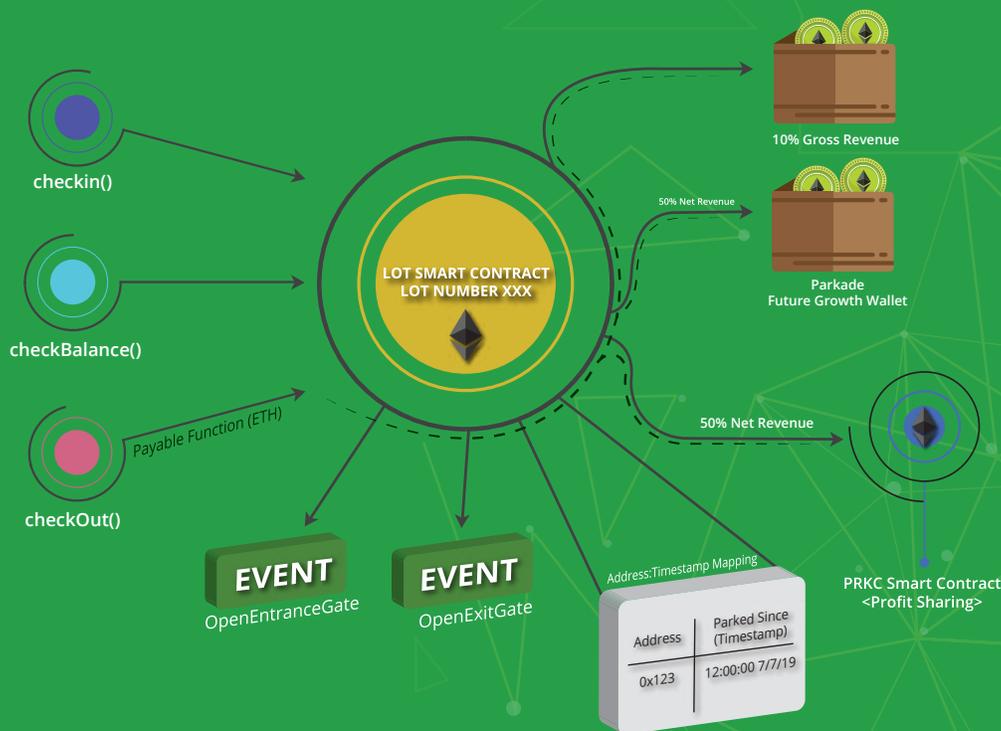
SMART CONTRACT

OVERVIEW

The design will require one smart contract to be deployed per parking lot. This smart contract will be developed in Solidity, and will run on the Ethereum Blockchain.

At the base level, the smart contract's purpose is outlined below:

- Allow drivers to check-in: store account and timestamp information in a mapping for future access.

- Calculate amounts owing by parkers prior to check-out time.

- Allow adjustments to be made to the minutely rate by the Parkade.IO team.

- Allow drivers to check-out: collect payment as drivers leave the lot.

- Automatically distribute Ether to wallets: PRKC (profit sharing) wallet, Parkade.IO future expansion wallet, Parkade.IO operational wallet.

- The smart contract will implement the following events:

    checkedIn: Triggered when a driver submits his license plate to the system. This event will be used to trigger the entrance gate opening.

    checkedOut: Triggered when a driver sends the correct payment as calculated by the smart contract, for the time spent parked in the lot. This event will be used to trigger the exit gate opening.

    rateUpdated: Triggered when the parking lot's rate (in Wei per Minute) has been updated by the Parkade.IO team.

PUBLIC USER FACING FUNCTIONS

```
function checkIn() public returns (uint256)
```

This function will be used by parkers at the entrance to the parking lot, to submit their information to the smart contract.

FUNCTIONALITY: Calculate current timestamp. Store the user's Ethereum address along with this timestamp in a mapping (mapped to their Ethereum account address). Emit "OPEN GATE" event. Returns reference number for future usage.

```
function checkBalance() public view returns (uint256)
```

This function will be used by drivers at the exit of the parking lot, to submit payment for the balance owed to the smart contract.

FUNCTIONALITY: Calculate amount owed by user's address, by using current timestamp and comparing to the timestamp at check-in time (stored in mapping). Returns the amount owed by user (in Ether).

```
function checkOut() public payable
```

This function will be used by drivers at the exit of the parking lot, to submit payment for the balance owed to the smart contract.

FUNCTIONALITY: Verify that amount paid is greater than, or equal to the amount owed by the user (based on timestamp in the Address mapping). Remove user's Ethereum address from the mapping. Emit "OPEN GATE" event. Send back any excess payment (ie. change) to the user's wallet.
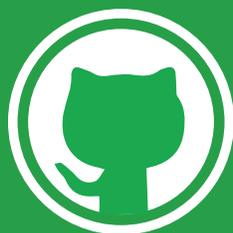
For further implementation details, please consult the Parkade.IO GitHub Page.

A draft smart contract framework has been written, and is available on our GitHub repository. You can view it **HERE.**
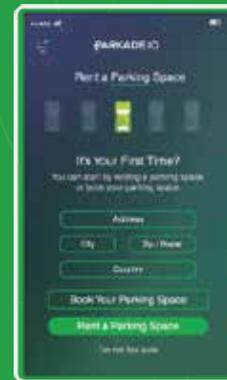
USER FLOW DIAGRAM

Driver pulls up to Entrance gate

Using the Parkade.IO app, driver scans Entrance QR Code which will link to Parkade's associated smart contract on the Ethereum Blockchain.

Using Parkade.IO app, the driver indicates that they would like to park by sending a **checkIn** transaction to the smart contract.

After some checks, the parking lot's smart contract stores the Ethereum wallet and timestamp information. Triggers opening of entrance gate. Driver enters and parks their car.

USER FLOW DIAGRAM

Driver pulls up to Exit gate

Using the Parkade.IO app, driver sends a **checkBalance** query to the smart contract. Smart contract will calculate amount owed and send it back to the user.

Using the Parkade.IO app, driver sends a **checkOut** transaction to the smart contract. This is a payable transaction where the user will send the amount owed in ETHER. The mobile application will automatically construct this transaction using the result of the **checkBalance** query.

**Note - If the user does not have Ether, options will be available to easily convert USD or other currencies to Ether by using a credit card. This will be accomplished through integration with exchange services, such as Changelly in the U.S.

Smart contract checks that correct payment has been received. Triggers opening of exit gate. Driver leaves the parking lot.

BENEFITS

INVESTOR BENEFITS

TRANSPARENCY OF FUNDS: As smart contract keeps track of payments, investors can be sure of Parkade.IO earnings at any time. This is due to the fact that all payments are processed through the public smart contract.

LESS OVERHEAD, FEWER ACCOUNTANTS, LESS REPORT FILINGS: The PRKC smart contract automatically disburses 50% net profits as part of the profit sharing reward program to investors. The Parkade.IO app smart contract will automatically send Ether to the PRKC contract. This obviates the need for manual accounting or income reporting, as the smart contract logic ensures that investors will be paid.

DRIVER (USER) BENEFITS

PER-MINUTE BILLING: Parkers can be billed based on the exact time they spent at the lot, as the Parkade.IO system is fully automated, the smart contract can calculate amount owed down to the minute.

FLEXIBLE RATES: The Parkade.IO team can adjust the parking rate at any time, and this will be immediately reflected in the parking lots. Parkers could get a better deal when the lot is underutilized. These rate changes can be publicly visible due to the transparency of the smart contract, so users and investors can be aware of past rate changes and reasons for them.

PRIVACY/ANONYMITY: In many traditional automated parking solutions, the user's license plate must be captured to allow parking. In contrast, the Parkade.IO app works solely based on the driver's Ethereum wallet address, as access is only controlled at the entrance/exit gate. Thus, drivers do not have to share any personal information with Parkade.IO.

MODERN, SMARTPHONE-BASED EXPERIENCE: No need to keep ticket stubs, or remember to display a parking pass on the dashboard. With the Parkade.IO mobile app, the user experience is much more modernized, secure, and fool-proof.