Abstract

The sharing economy has drastically changed the current economic landscape. It has led to lower costs, increased utilization, and a better user experience in many cases. Building devices that can be shared has many challenges, but one that is ubiquitous is access control for the devices. AXIS is a decentralized authorization service for shareable IOT devices that will allow owners to lease device access and data with others by storing authorization information on the Ethereum blockchain. This provides three main benefits - device makers can make their devices “shareable” easily, users can manage the devices that they own and access in one place, and users can own and have fine-grained control of the data generated from their devices.

Impact

IOT Device Manufacturers

IOT device makers leverage AXIS to securely transfer ownership of their device to purchasers, and allow these purchasers to “share” their device with others, offsetting the costs associated with the development effort and server maintenance inherent to implementing a custom authorization service of their own, and increasing the overall utilization and applicability of their device with substantially less work on their end.

Consumers

Consumers benefit from AXIS through the fine grained control it provides to any number of devices a user may own, either in terms of access control or the data generated by the device. All of this functionality is presented to the user through a singular, streamlined, and user friendly mobile app, effectively avoiding the fragmented experience of IOT device management prevalent today.

Promoting the Future of the “Shareable Economy”

If a service does not currently exist for a given IOT device for use in a given context it is by nature not a “shareable technology” at that time. AXIS attempts to transcend this barrier to entry into this lucrative marketplace through its unparalleled degree of control and management capabilities of a user’s devices.

Project Metrics

The success of this project was primarily defined in terms of the feedback provided by our mentors and the ability of the team to adapt our product to meet their expectations and concerns. Every facet of our product from the algorithm behind it to the user experience that drives it was carefully reviewed by our mentors, and modified in accordance to their feedback, at frequent points throughout the semester before arriving at our end product. By this definition the AXIS app is successful in that it balances the vision of our sponsor and the vision of our team and converges to a unique solution that satisfies the IOT capabilities research ambitions that governed this project.

Results

First Decentralized Access Control Protocol - Driven by the Innovative “Proof of Access”

- Leverages Blockchain Technology.
- BlockApps Private Ethereum Compliant Blockchain.
- Strato REST API
- Bloc REST API
- Cirrus Query Engine
- Smart Contracts (Solidity)
- Deeds, Leases, Authorization, “Proof of Access”.

Fine-Grained Control Over the Services and Data of a User’s IOT Devices with the AXIS App

Summary

Currently, companies building shareable technology products have to individually build a custom authorization service. This creates a significant amount of overhead for the creators, a fragmented experience for the consumer, and a dependency on device makers to initiate a market. For example, a shareable bike company has to build a service to lease access to their bikes, and the consumer has to use the bike companies app to use the service. Imagine in the future when the average consumer uses hundreds of these smart devices a day. In order to gain or lease access, they may have to use several different applications, and each device company may have to each create their own authorization flow to implement a given service. AXIS gives fine-grained control to the user to lease access of device services and data to others, whenever, and however they see fit.