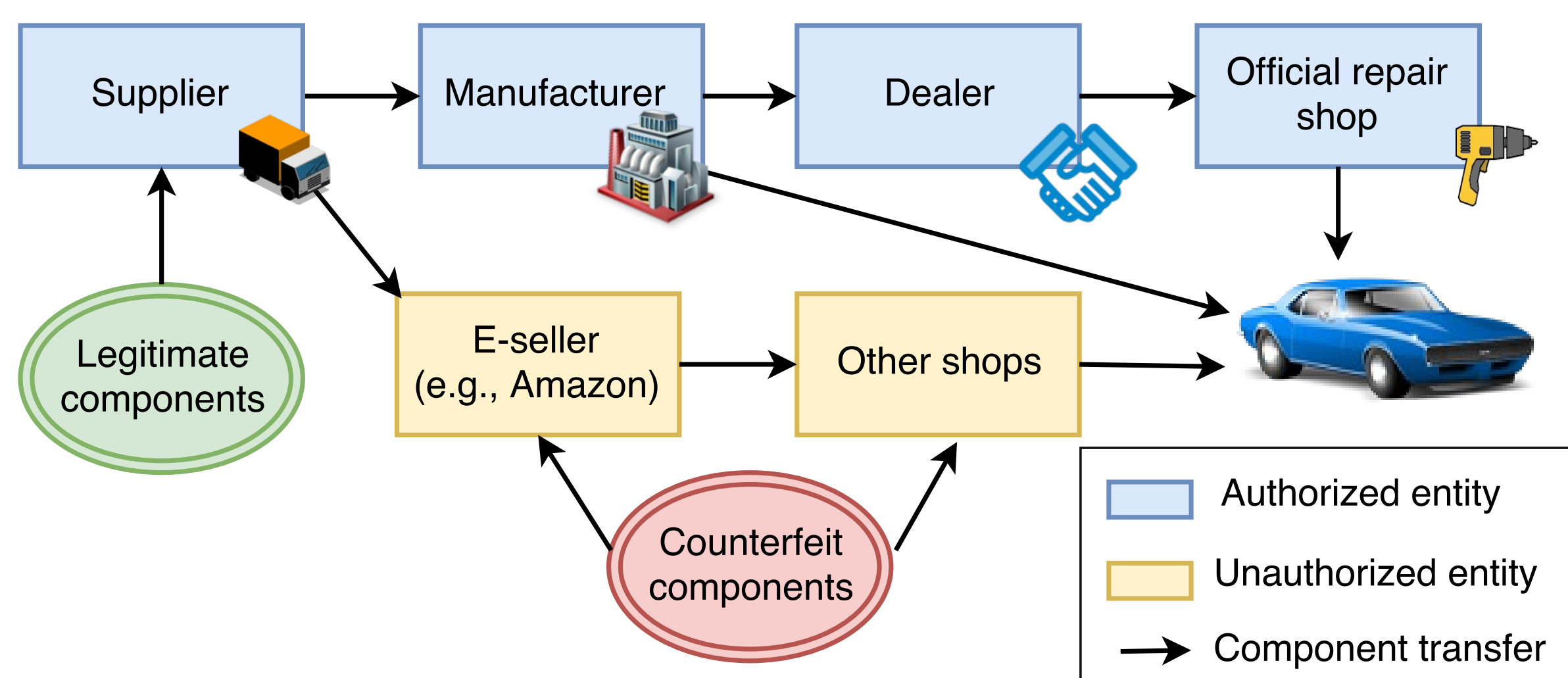


Counterfeit Mitigation using Blockchains

Aniket Kate, Mahimna Kelkar, Donghang Lu, Easwar Vivek Mangipudi, Pedro Moreno-Sanchez, Krutarth Rao
Purdue University

(1) Automotive Supply Chain

Global trade in fake goods is worth nearly half a trillion dollars a year!



How to distinguish between products with genuine components and counterfeit ones?

Approach with Traditional Supply Chains:

- Track product components using RFID
- Local logs maintained at each supplier

Problem: Traditional supply chains can not mitigate counterfeiting when the supply chain entity itself is adversarial and fudges logs

(2) Blockchain

• Properties:

- *No Double-Spending*: Conflicting transactions can be easily detected
- *Append-Only*: Transactions added to the blockchain cannot be removed

• Deployed successfully in several financial applications today:

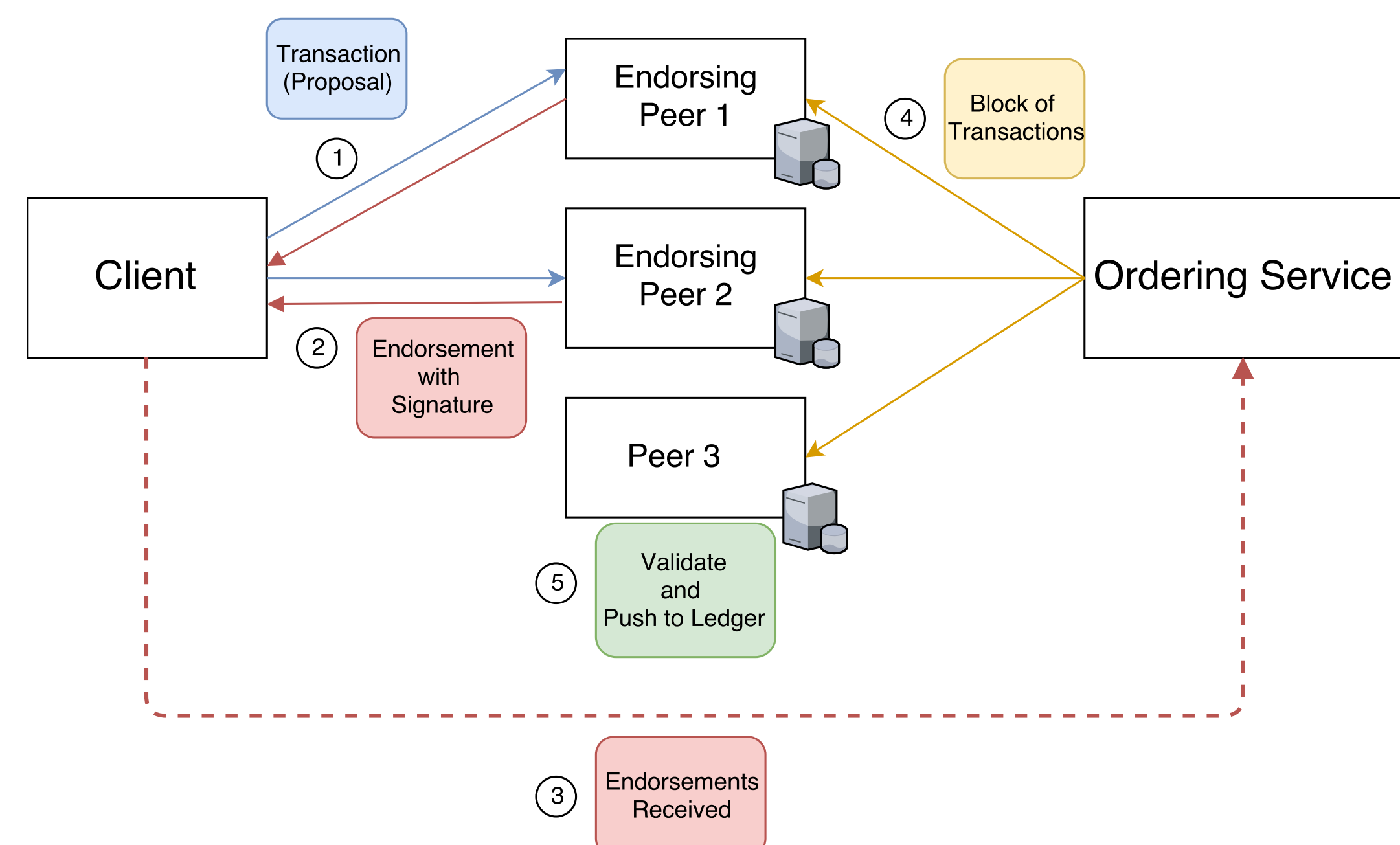
- Cryptocurrencies (Bitcoin, Ethereum)
- Credit networks (Ripple, Stellar)

Our Approach: Leveraging blockchain to avoid counterfeits in supply chains

Challenges:

1. Blockchain must maintain transactions tailored to the supply chain
2. Complex logic for product management

(3) Architecture



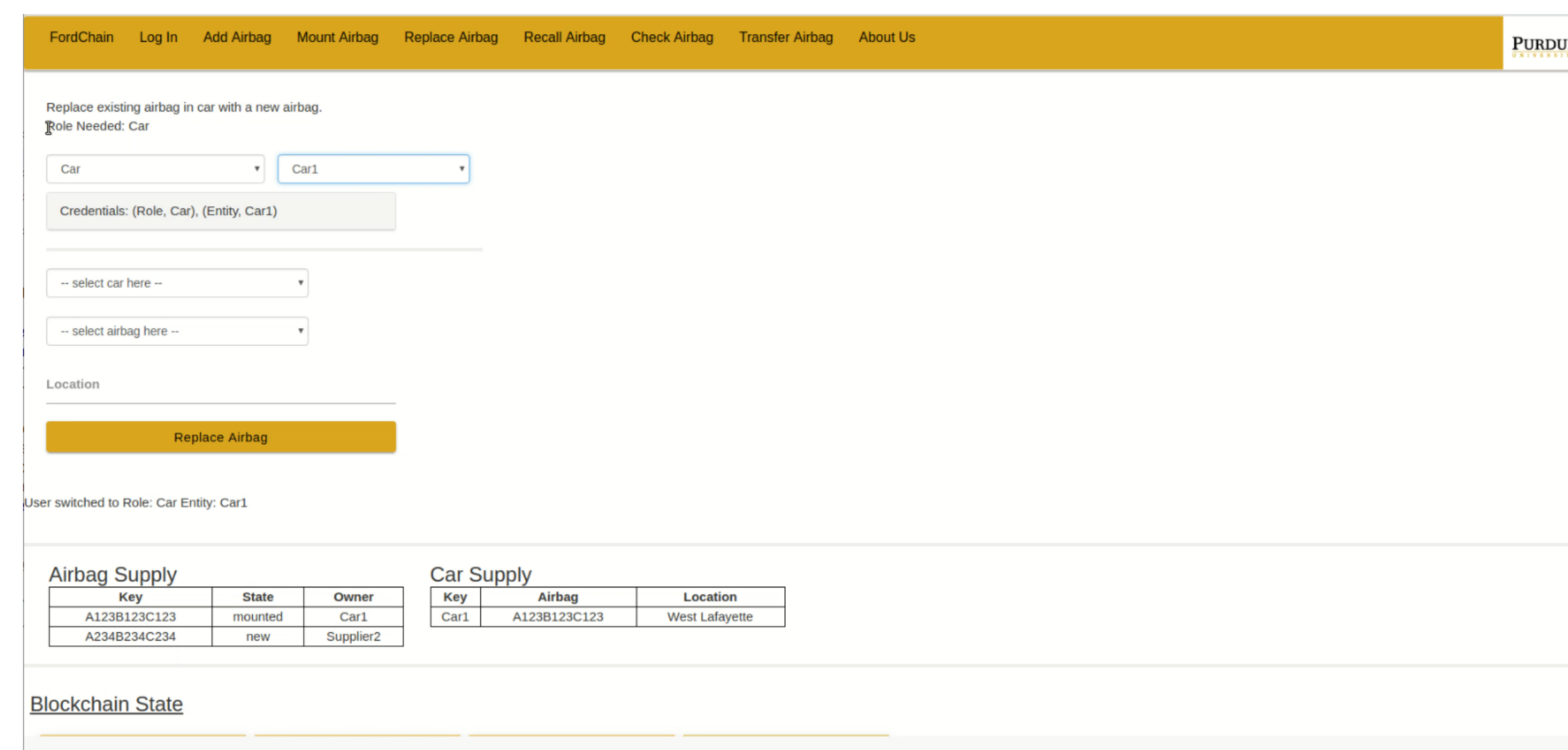
(4) Smart Contracts

- Convert agreed business logic into functions
- Automatic verification of supply chain correctness (i.e., agreed business logic is fulfilled)
- Interaction with **external signals**

(5) Implementation

Components:

- Hyperledger fabric architecture
 - Endorsement policy
- Smart contracts
- Graphical Interface



Data Structure:

- The data is stored in the form of Key - Value pairs
- Each item is identified with unique ID
- ID has a specific structure
 - ID is parsed to find the IDs of the components that form the ID
 - The validity of each sub component should be valid for the ID to be valid
 - Eg: A123B123C123 is parsed to obtain the IDs of components A123, B123, C123 where each of the three should be valid

(6) Policy

The infrastructure of the network and the placement of the network components can influence the policy.

Endorsement Policy:

- Different policies for different transactions
- Revokable Access Control
- Confidential transactions

(7) Conclusions

- Counterfeiting can be prevented by leveraging blockchain technology
- Our tool offers a flexible yet effective supply chain management system

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