Advanced Research

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Project Title:
The Transformation of Transportation

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The Transformation of Transportation: The Potential of Distributed Ledger Technologies in Transportation Applications

To understand the potential, current, and future applications of Distributed Ledger Technology in improving transportation.

WHAT WAS THE NEED?

In this project, California State University, Long Beach (CSULB) worked on a comprehensive study of possible applications of Distributed Ledger Technology (DLT) in transportation.

CSULB planned to conduct a thorough review of the state-of-the-art DLT technology from other public agencies, academia, and industry. CSULB will conduct interviews with experts to depict a more complete picture of possibilities, benefits, challenges, and current limitations in this space. Finally, CSULB will provide California Department of Transportation (Caltrans) with a final white paper that summarizes their findings, as well as recommendation on next steps to leverage this technology.

WHAT WAS OUR GOAL?

The goal of this project was to understand the possible applications and key strategic use cases of DLT in California's transportation and public-sector transportation in general.

WHAT DID WE DO?

Despite the benefits of providing transportation and accessible public information, it raises new challenges and concerns about privacy and security of data. DLT offers potential of enhancing quality, integrity, and security of data using cryptography without sacrificing transparency. The need is to explore the potential of improving Caltrans' business processes using DLT, to transition to digital project delivery and one stop grants management system within Caltrans.

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Research Results

WHAT WAS THE OUTCOME?

The white paper documents a comprehensive study of possibilities to use DLT in transportation. DLT is behind cryptocurrencies like Bitcoin and smart contracts with potentials to be applied in a wide range of other applications, including mobility and transport. A thorough review of previous, current or any proposed work found online in use cases of DLT in transportation has been included in this white paper.

Based on the inputs gathered through interviews with 18 respondents who are staff and employees from public transit agencies in California, it was found that there was considerable interest among respondents in learning how DLT could be used to reduce friction in payments and fare collection. However, the extent to which transit riders would like DLT-based system of fare payment systems is still unknown. This can only be assessed with a full-scale data collection effort through interviews among riders carried out across key public transit systems of California.

Our future effort will be to evaluate the potential of DLT to promote contactless/cashless fare payments among the unbanked transit riders of California. Besides reducing transaction fees, this will also be useful in fostering the safe health and well-being of transit users and operators during and beyond the pandemic periods.

WHAT IS THE BENEFIT?

This project will help Caltrans to identify and leverage the use of new and promising DLT; to improve transparency, reduce friction, enhance security, integrity, and quality of data used in department's business process.