Blockchain could offer a solution to the UK's transport ticketing systems

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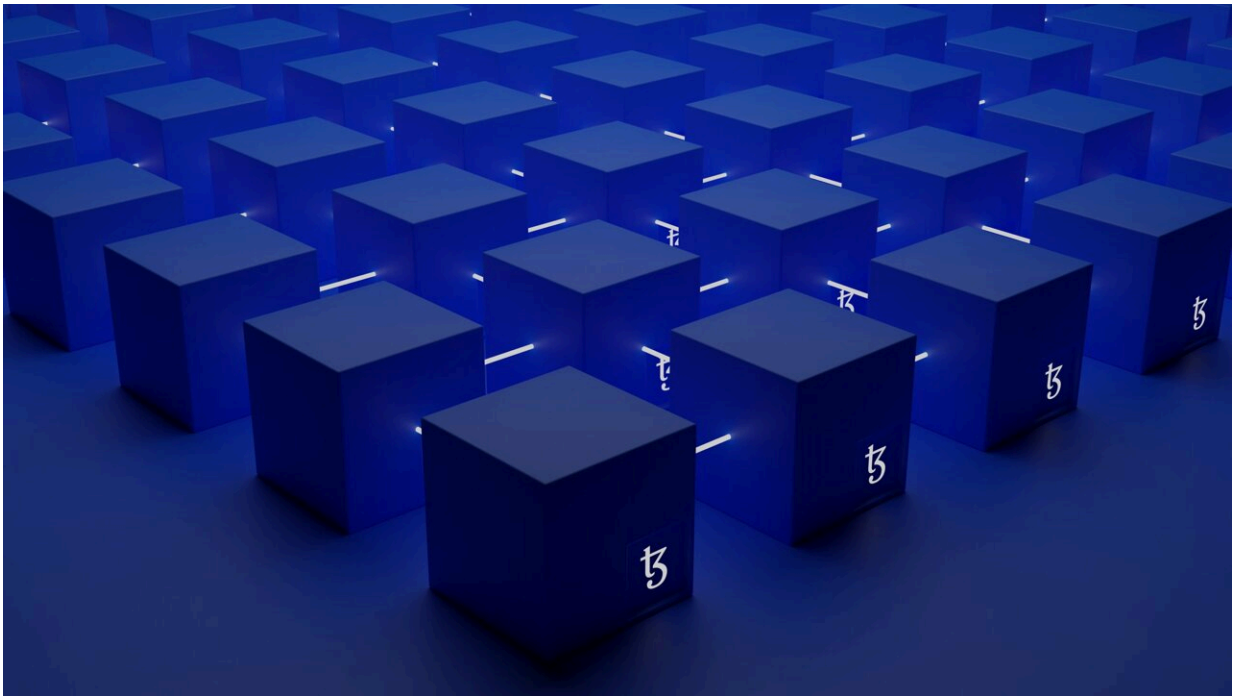

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A new approach to transport ticketing offers a step towards an integrated, transparent system that works efficiently for both ticket providers and passengers across all modes of transport.

Traditional ticketing systems are based on solutions that are vulnerable to issues, including a lack of transferability across multi-modal transport

networks and an inability to adapt to policy changes and new technologies.

Experts at the University of Birmingham have outlined a system that offers a new foundation for all ticketing providers. In a new paper published in *IET Blockchain*, STUB (System for Ticketing Ubiquity within Blockchains) brings together the capabilities of two versatile technologies—blockchain and ontology.

A blockchain is a distributed ledger that records transactions in a way that ensures security, transparency, and immutability. An ontology is a formal representation of knowledge within a domain and the relationships between those concepts used to model and manage complex information systems.

The researchers showed how both technologies could be combined to create a robust, transparent, and interconnected data framework that ensures consistent and reliable shared knowledge.

Utilizing these data structures, ticket providers can sell and validate tokenized tickets on the blockchain, ensuring universal accessibility across all providers. The integration of ontology allows providers to capture and share contextual information about the transport network, enabling providers to offer comprehensive data about routes, schedules, and availability, thereby streamlining the ticketing process.

Lead author Dr. Joe Preece said, "Transport systems around the world are becoming increasingly interconnected. Ticketing systems are key to this, and there is a growing interest in the use of smarter transport ticketing that harnesses emerging technologies to overcome the limitations of traditional systems. The system we have devised enables ticket providers to operate in a more transparent, flexible environment, that will ultimately offer passengers a more user-friendly experience.

"STUB's approach is not to be a single central data platform with transport policy baked-in, but instead to be a policy-agnostic approach that empowers existing ticket providers and technologies to share core ticketing data and to build new solutions on top of. In essence, this may provide a modernized approach to the Rail Settlement Plan that enables multi-modal ticketing, automated revenue and refund allocation, and dynamic fare pricing while retaining the technologies in the sector that already work well."

The next step for the team will be to set up a pilot scheme for the technology in a regional transport network to demonstrate its efficacy and to get feedback from ticket operators and passengers.

"A big challenge to implementation will be the integration with existing ticketing infrastructure to work alongside the current standardized approaches while we scale up the technology. Setting up a successful pilot will be key to breaking down these barriers," added Dr. Preece.

More information: Joseph D. Preece et al, Leveraging ontochains for distributed public transit ticketing: An investigation with the system for ticketing ubiquity with blockchains, *IET Blockchain* (2024). DOI: 10.1049/blc2.12071

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