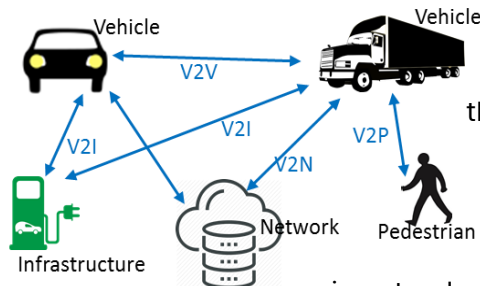


# AutoLink: Blockchain-Integrated Simulator for Autonomous Vehicle Networks

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**Project Overview:** Autonomous (self-driving) vehicles need a secure communication system between themselves, other vehicles, pedestrians, and surrounding infrastructure. Blockchain technology, with its decentralised and secure nature is well-suited for this task and is the subject of extensive efforts within the context of autonomous vehicle research. This project

aims to develop a blockchain simulator specifically designed for autonomous vehicles. **Novelty & Impact:** The simulator will integrate network, blockchain, and traffic components to enable researchers to evaluate performance and security of communication and coordination protocols specifically for autonomous vehicles in a realistic environment under a variety of traffic conditions and network configurations. **Methodology:** Literature review, interviews/workshops with traffic experts from Newcastle's Urban Observatory (NUO). NUO has over 8 billion records including real-time traffic. Develop simulator components: network component, blockchain component, and traffic component. Simulator components will enable modelling locations of vehicles, road networks, communication range of vehicles, and realistic traffic scenarios. Conduct simulations to evaluate performance of different blockchain-based communication and coordination protocols under a variety of network and traffic conditions. **Supervision Environment:** From an implementation perspective, the developed simulator will be an extension to our existing work [1,2,3,4]. The candidate will be trained and work with experts within the [NUSE research group](#) (with deep experience of building simulation environments for blockchain and IoT applications), the [Newcastle Urban Observatory \(NUO\)](#), and our extensive network of international partners.

**Applicant skills/background:** Strong background in computer science, with specific knowledge of distributed systems, blockchain technology, and simulation environments. The candidate should demonstrate excellent proficiency in programming languages such as Java, Python, and have a solid understanding of blockchain frameworks like Hyperledger Fabric or Ethereum. The candidate must exhibit excellent problem-solving abilities and a proactive enthusiastic approach to research. Strong communication skills, both written and verbal, are necessary to document the research findings and present them to various stakeholders, including academic peers and industry partners.

**References:** [1] A Albshri, A Alzubaidi, B Awaji, E Solaiman, *Blockchain Simulators: A Systematic Mapping Study*, International Conference on Services Computing (SCC), IEEE, 2022. [2] A Albshri, B Awaji, E Solaiman, *Investigating the Requirement of Building Blockchain Simulator for IoT Applications*, International Conference on Smart Internet of Things (SmartIoT), IEEE, 2022. [3] K Alwasel, Phil James, E Solaiman, R Ranjan, *IoTsim-Osmosis: A framework for modeling and simulating IoT applications over an edge-cloud continuum*, Journal of Systems Architecture, Elsevier, 2021. [4] A Albshri, A Alzubaidi, K Alwasel, K Mitra, Ellis Solaiman, *A conceptual architecture for simulating blockchain-based IoT ecosystems*, Journal of Cloud Computing: Advances, Systems and Applications, Springer Nature, 2023.