The next generation of tightly interconnected vehicles offers a variety of new technological as well as business opportunities. Vehicles form so called vehicular ad-hoc networks (VANETs) in order to enable vehicle-to-vehicle (V2V), vehicle-to-infrastructure (V2I), vehicle-to-human (V2H), or in general vehicle-to-everything (V2X) communication and interaction. In our previous research paper, we presented a blockchain-based system that enables a manufacturer agnostic platform solution that allows VANET participants to enact and transact any kind of services and goods. Usually, sophisticated systems of interconnected cars in the context of VANETs assume a full coverage of 5G networks to unfold their full potential. However, nowadays network infrastructure is neither 5G-ready, nor does it provide reliable and full coverage of all areas that might be relevant for VANET-based networks. Hence, the conventional mode of operations of all nodes being connected to one blockchain at all times is not feasible. In addition, traditional blockchains also require every node to process each transaction and smart contract commands which is highly inefficient. Therefore, we present a solution based on so called mobile ad hoc blockchains that enables groups of nodes involved in any kind of collaboration to effectively form temporary networks and coordinate themselves. They only connect to nodes they need to be connected to, depending on the context, for the duration of their interaction.

Another critical requirement of VANETs and interconnected vehicles is security. The safety of network participants does not only depend on the vehicles hardware, but also on the correctness of the software that controls the interaction and transaction within the network. Formal verification is a common way to address the issue proving the correctness of software with respect to a certain formal specification or property using formal methods of mathematics. The self-amending blockchain platform Tezos does not only support Turing complete smart contracts, it also offers built-in formal verification of their smart contract programming languages, thereby fostering the security of our solution.

This whitepaper fills the gap in the state of the art by introducing Vehicular Ad Hoc Tezos Blockchains based on mobile ad hoc blockchains that allows groups of nodes to be temporarily disconnected from the overall network but still being able to enact and transact on a local network level for the duration of their interaction. We present the advantages of the system, outline the requirements and goals, as well as the architecture of the system.