Project Outline

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Contents

1 Research area and working title

1.1 Research Area

1.1.1 Blockchain

1.2 Working Title

1.2.1 Connecting Blockchain of Blockchains to centralised systems and decentralised ledger systems (also known as blockchain technology)

2 Abstract

(Belchior et al. 2021) state that ”blockchains of blockchains are frameworks that provide reusable data, network consensus, incentive, and contract layers for creating application-specific blockchains (customised blockchains) that interoperate between each other.” They further outline the current gap in the research regarding connecting existing centralised systems such as traditional banking systems and decentralised ledger systems such as blockchains to other blockchains. Interoperability between blockchains has been an emerging field of research for some time. It has gained significant traction since the whitepaper by Gavin Wood was released in 2016 that introduced Polkadot, a multi-chain development environment allowing for Interoperability between blockchains using a mechanism known as a parachain or bridge (Wood 2016). What currently requires further exploration

is how to connect centralised systems such as VisaNet Visa's electronic payments network to existing blockchain technologies (*VisaNet: The Technology behind Visa* 2022). Connecting centralised banking systems to blockchains could be possible using parachains along with substrate to leverage existing API's to create deep integrations into existing blockchain ecosystems (Polkadot 2021).
Visa in a recent research paper has outlined recent developments in their own attempt to achieve cross-chain Interoperability using a universal payment channel that provides off chain payment mechanisms supported by a blockchain ledger using haslocks and timelocks (Christodorescu et al. 2021).

3 Proposed Research Problem and Research Question

3.0.1 Research Problem

3.0.2 Research Questions

RQ1 Do the current cross-chain solutions provide mechanisms to connect to centralised and decentralised ledger systems?

RQ2 Does the proposed Visa universal payment channels solution support bridging solutions?

RQ3 Are off-chain solutions problematic for the paradigm under which blockchains operate?

4 Proposed Aims and Objectives

5 Proposed Research Design

Action research

I want to use action research.

6 Artefact/s that can be created

References

Belchior, Rafael et al. (Oct. 4, 2021). "A Survey on Blockchain Interoperability: Past, Present, and Future Trends". In: *ACM Computing Surveys* 54.8, 168:1–168:41. ISSN: 0360-0300. DOI: 10.1145/3471140. URL: http://doi.org/10.1145/3471140 (visited on 03/18/2022).

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Wood, Dr Gavin (2016). *POLKADOT: VISION FOR A HETEROGENEOUS MULTI-CHAIN FRAMEWORK*.