Project Outline

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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). Some criticality is required regarding their solution to determine whether their off chain solution follows the paradigms outlined in the Staoshi Nakamoto white paper where trust of a third party is not required and the user is in control of their assets (Nakamoto n.d.).

In my research I want to evaluate the existing Interoperability solutions that are discussed in the available literature and establish the feasability of connecting blockchains to existing cenralised systems. Furthermore I want to explore Interoperability frameworks such a Polkadot along with Substrate to determine whether tools avialable are sufficient to achieve Interoperability with centralised systems.

3 Proposed Research Problem and Research Question

3.0.1 Research Problem

3.0.2 Research Questions

RQ1 What is the state of existing cross-chain interoperabiltity solutions and do they trully achieve invisioned outcome of an internet of blockchains?

RQ2 Do existing cross-chain frameworks such as Polkadot coupled with substrate provide a means to connect centralised systems to blockchains?

RQ3 Would the proposed Visa Universal Payment Channels support interoperabiltity with existing blockchain of blockchain networks?

4 Proposed Aims and Objectives

5 Proposed Research Design

Action research

For this dissertation I want to use a action research methodology (Dawson 2015). I find that the structure of action resarch would provide a less structure more experiemental approach to my research. Action research typically allows the researcher to actively attempt to solve a problem and document their findings thereafter.

6 Artefact/s that can be created

References

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