Research Proposal Draft

# **Research Summary**

## **Research Area**

Blockchain technology and organisational data interoperability.

## **Working Title**

A permissioned (Hybrid) blockchain prototype facilitating banking record interoperability.

## **Abstract**

Baking organisations deal with massive amounts of customer records used throughout the organisation by various departments such as insurance, personal lending and marketing departments (‘Blockchain in Banking - 15 Possible Use Cases’, 2022). The organisations use customer information to fulfil multiple processes, such as processing insurance claims or communicating with customers through various marketing campaigns (IBM, 2022).

To fulfil such functions, banking organisations may require a series of fragmented technologies that require data stored in separate databases to function correctly. (Shahaab *et al.*, 2021) implemented a prototype system providing data immutability and interoperability for public service organisations within the UK government to share a singular view of data. That data may be used within various contexts in each organisation. Their implementation clearly outlines the value of using a blockchain as a shared singular state of known information about a customer.

In this research project, I will explore organisational data interoperability by creating a substrate permissioned network that will facilitate decentralised data collaboration between the departments within a banking organisation (Substrate, no date).

The (‘IEEE Standard Computer Dictionary: A Compilation of IEEE Standard Computer Glossaries’, 1991) outlines that interoperability is “The ability of two or more systems or components to exchange information and to use the information that has been exchanged.” Furthermore, the (European Commission. Directorate General for Informatics., 2017) outlines an interoperability framework for defining the various layers of interoperability where we will specifically focus on organisational and semantic interoperability.

## **Research Questions**

TBC

# **Methodology**

I will use the research design and methodology Design Science Research (DSR). DSR is traditionally used in the information systems field, where an artefact is created throughout the research process; however, there are examples where DSR is used within the computer science field (Kappen, 2019). (Hevner *et al.*, 2004) outlines seven design science research guidelines that assist researchers to “understand the requirements for design-science research.

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| **Guideline** | Description |
| Guideline 1: Design as an Artifact | Design-science research must produce a viable artefact in the form of a construct, a model, a method, or an instantiation. |
| Guideline 2: Problem Relevance | The object of design-science research is to develop technology-based solutions to important and relevant business problems. |
| Guideline 3: Design Evaluation | The utility, and efficacy of a design artefact must be rigorously demonstrated via well-executed evaluation methods. |
| Guideline 4: Research Contributions | Effective design-science research must provide clear and verifiable contributions in the areas of the design artefact, design foundations, and design methodologies. |
| Guideline 5: Research Rigor | Design-science research relies on the application of rigorous methods in both the construction and evaluation of the design artefact. |
| Guideline 6: Design as a Search Process | The search for an effective artefact requires utilising available means to reach desired ends while satisfying laws in the problem environment. |
| Guideline 7: Communication of Research | Design-science research must be presented effectively both to technology-oriented and management-oriented audiences. |

(Hevner *et al.*, 2004)

Regarding design guideline 3, “Design Evaluation.” I will make use of an experimental method where two unnamed representatives engage with the artefact in a controlled setting to establish whether the developed system is usable and meets the requirements outline in the design phase of the project.

# **Key Literature**

Abebe, E. *et al.* (2019) ‘Enabling Enterprise Blockchain Interoperability with Trusted Data Transfer (Industry Track)’, in *Proceedings of the 20th International Middleware Conference Industrial Track*. New York, NY, USA: Association for Computing Machinery (Middleware ’19), pp. 29–35. doi:[10.1145/3366626.3368129](https://doi.org/10.1145/3366626.3368129).

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Jabbar, R. *et al.* (2020) ‘Blockchain technology for healthcare: Enhancing shared electronic health record interoperability and integrity’, in *2020 IEEE International Conference on Informatics, IoT, and Enabling Technologies (ICIoT)*. *2020 IEEE International Conference on Informatics, IoT, and Enabling Technologies (ICIoT)*, pp. 310–317. doi:[10.1109/ICIoT48696.2020.9089570](https://doi.org/10.1109/ICIoT48696.2020.9089570).

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Substrate (no date) *Start a Permissioned Network*, *Substrate*. Available at: <https://docs.substrate.io> (Accessed: 11 May 2022).

Zhang, P. *et al.* (2018) ‘FHIRChain: Applying Blockchain to Securely and Scalably Share Clinical Data’, *Computational and Structural Biotechnology Journal*, 16, pp. 267–278. doi:[10.1016/j.csbj.2018.07.004](https://doi.org/10.1016/j.csbj.2018.07.004).

# **Human Participants**

In this research project, I will use human participants to determine whether the system is usable and has met the requirements outlined in the system design.

# **Timeline**

TBC

# **References**

‘Blockchain in Banking - 15 Possible Use Cases’ (2022) *The Blockchain Forum*. Available at: https://www.linkedin.com/posts/theblockchainforum\_blockchain-in-banking-activity-6928541204632477696-Qf1p/?utm\_source=linkedin\_share&utm\_medium=member\_desktop\_web (Accessed: 11 May 2022).

European Commission. Directorate General for Informatics. (2017) *New European interoperability framework: promoting seamless services and data flows for European public administrations.* LU: Publications Office. Available at: https://data.europa.eu/doi/10.2799/78681 (Accessed: 11 May 2022).

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