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Federated Information Systems

A Structured Literature Review and Taxonomy

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Type Bachelor's / Master's Thesis
Language German / English

Motivation

Federated information systems have recently gained prominence due to the rise of federated social networks, such as *Mastodon* or *PeerTube*. At their core, federated information systems consist of open networks of loosely coupled nodes, which are based on common open protocols, thus enabling interoperability between different instances. This setup allows for exchange and collaboration, while preserving local control and data sovereignty. The same principles underpin a wide range of technologies, from the mainstays of today's digital societies, such as email or the internet itself, to highly specific architectural setups for machine learning, such as federated learning. Despite their growing importance, federated information systems have received limited attention from an information systems research perspective, leaving gaps in theoretical understanding.

This thesis addresses the research gap by conducting a structured literature review to synthesise existing knowledge on federated information systems and develops a taxonomy for such systems. Through this work, the thesis aims to provide a foundational understanding of federated systems from an information systems perspective, laying the groundwork for future research and practical implementations alike.

Objectives

- Summarise the information systems literature on federated information systems with a structured literature review
- **Master's Thesis only:** Develop a taxonomy to structure the different types of federated information systems

Literature

- Heimbigner, D., & McLeod, D. (1985). A federated architecture for information management. *ACM Transactions on Information Systems*, 3(3), 253–278. <https://doi.org/10.1145/4229.4233>
- McMahan, B., Moore, E., Ramage, D., Hampson, S., & Arcas, B. A. y. (2017). Communication-efficient learning of deep networks from decentralized data. *Proceedings of the 20th International Conference on Artificial Intelligence and Statistics*, 20, 1273–1282. <https://proceedings.mlr.press/v54/mcmahan17a.html>