Data Governance using Blockchain

Project Team 3

Abhijith Anugu
Anuja Bendre
Keegan Maguigan
Kritika Agarwal
Nathaniel Pines
Shun Ting Wang

About the Team

Abhijith Anugu

Anuja Bendre

Keegan Maguigan

Kritika Agarwal

Nathaniel Pines

Shun Ting Wang

Data Governance

- Framework and set of policies to regulate and control
  - Collection
  - Storage
  - Exchange

- People, Technology and Processes

https://www.imperva.com/learn/wp-content/uploads/sites/13/2019/01/Data-Governance.png

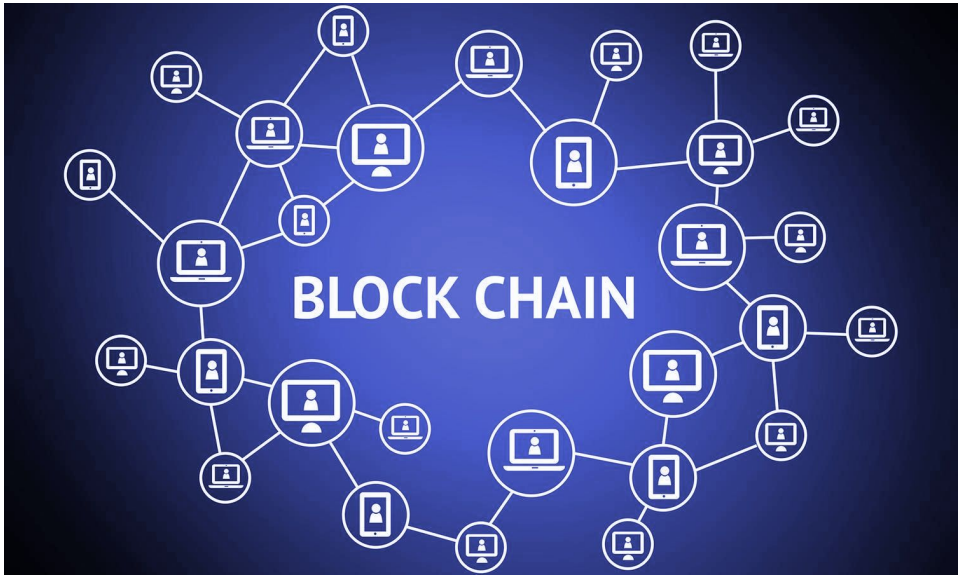
Elements of Data Governance

https://unite.un.org/sites/unite.un.org/files/styles/uw_full_width/public/news_articles/blog-oict-data-gov.png?itok=P_VAB1uI

What is Blockchain?

- Data structure that holds transactional records

- Ensuring security, transparency, and decentralization



https://geospatialmedia.s3.amazonaws.com/wp-content/uploads/2017/07/blockchain.jpg

Understanding Smart Contracts

https://assets-global.website-files.com/606f63778ec431ec1b930f1f/60785f4ecacc7f40fb9006fe_smart-contracts-in-block%D1%81hain-in-comparison-to-the-ordinary-contracts-image-2.png

Key Insights from Literature Review

Data Governance and Blockchain

- Blockchain governance interacts with traditional governance mechanisms in both substitutive and complementary ways (Lumineau, et al. 2021).
- Blockchains fit into the two categories of centralized and decentralized data governance models (Teperdjian 2020).
- Blockchain is a decentralized core architecture. Blockchain technology also has the characteristics of centralization, block data, no tampering and trust (Li, et al. 2019).
- Blockchains are data governance platforms by default (Smith 2019).
- Blockchain system should not be the first choice when:
  - Latency is paramount;
  - Storage is at a premium;
  - Sensitive data needs to be forgotten;
  - Network governance could break down; and
  - A single organization controls the data ecosystem (Smith 2019).

Key Insights from Literature Review

Smart Contracts

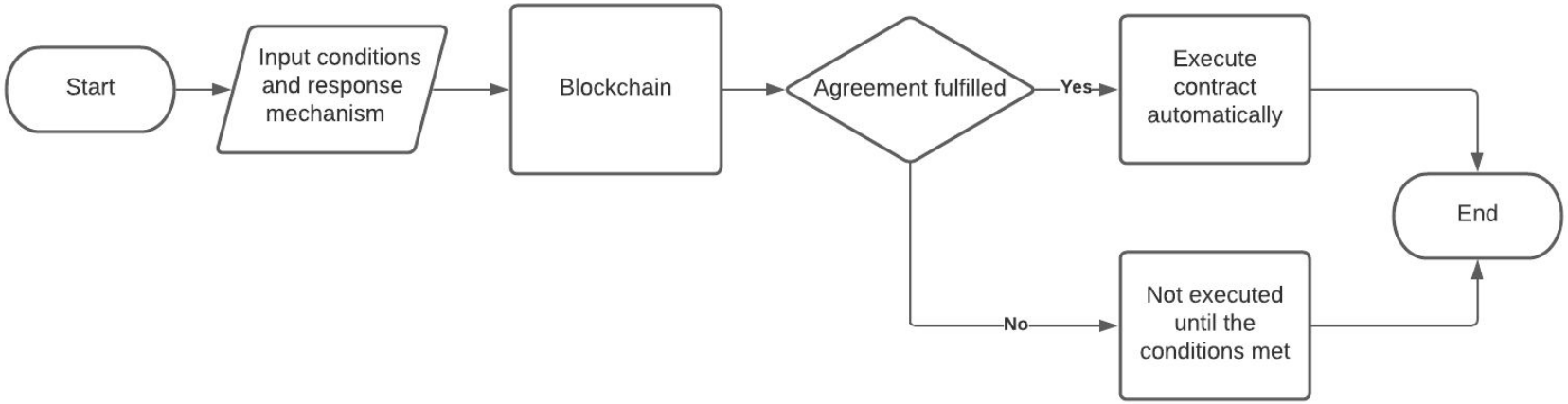
- Smart contracts are a revolutionary feature of blockchain technology. They provide flexibility, speed, security, and automation for real-world scenarios to create a trustworthy system with significant cost reductions (Bashir 2018).

- By creating smart contracts, parties no longer:
  - Have to trust others not to breach the terms of the contract; nor
  - Have to depend on an intermediary party, such as a bank, to enforce the rules of a contract (Gürkaynak, et. al 2018).

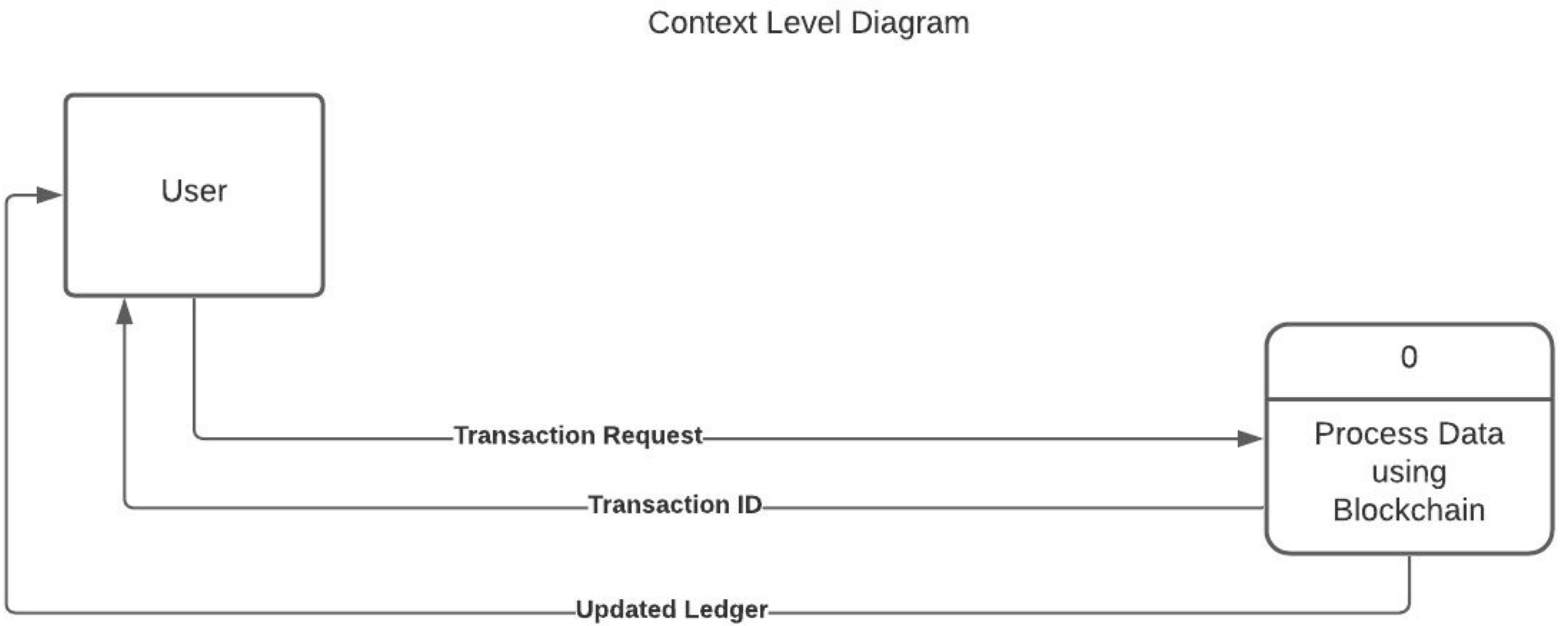
- Despite the early stages of the application of blockchain technology to copyright goods and services, there is booming deployment of applications, particularly in the online music sector (Bodó 2018).

- Several concerns continue to undermine adoption of smart contracts:
  - Security threats and vulnerabilities;
  - Legal issues;
  - Reliance on “off-chain” resources;
  - Immutability and scalability; and
  - A consensus mechanism (Khan, et. al 2021).

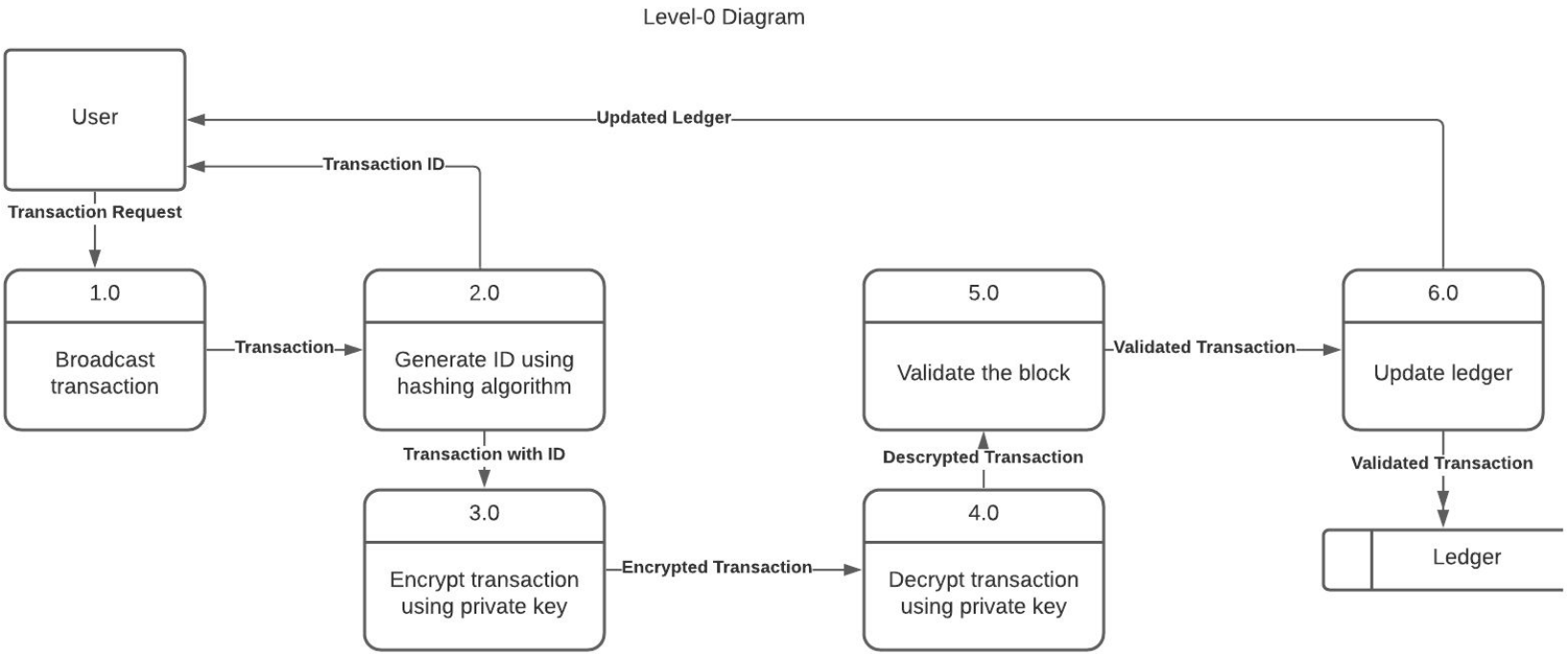
Flowchart - Smart Contracts using Blockchain



Data Flow Diagram - Context Level Diagram

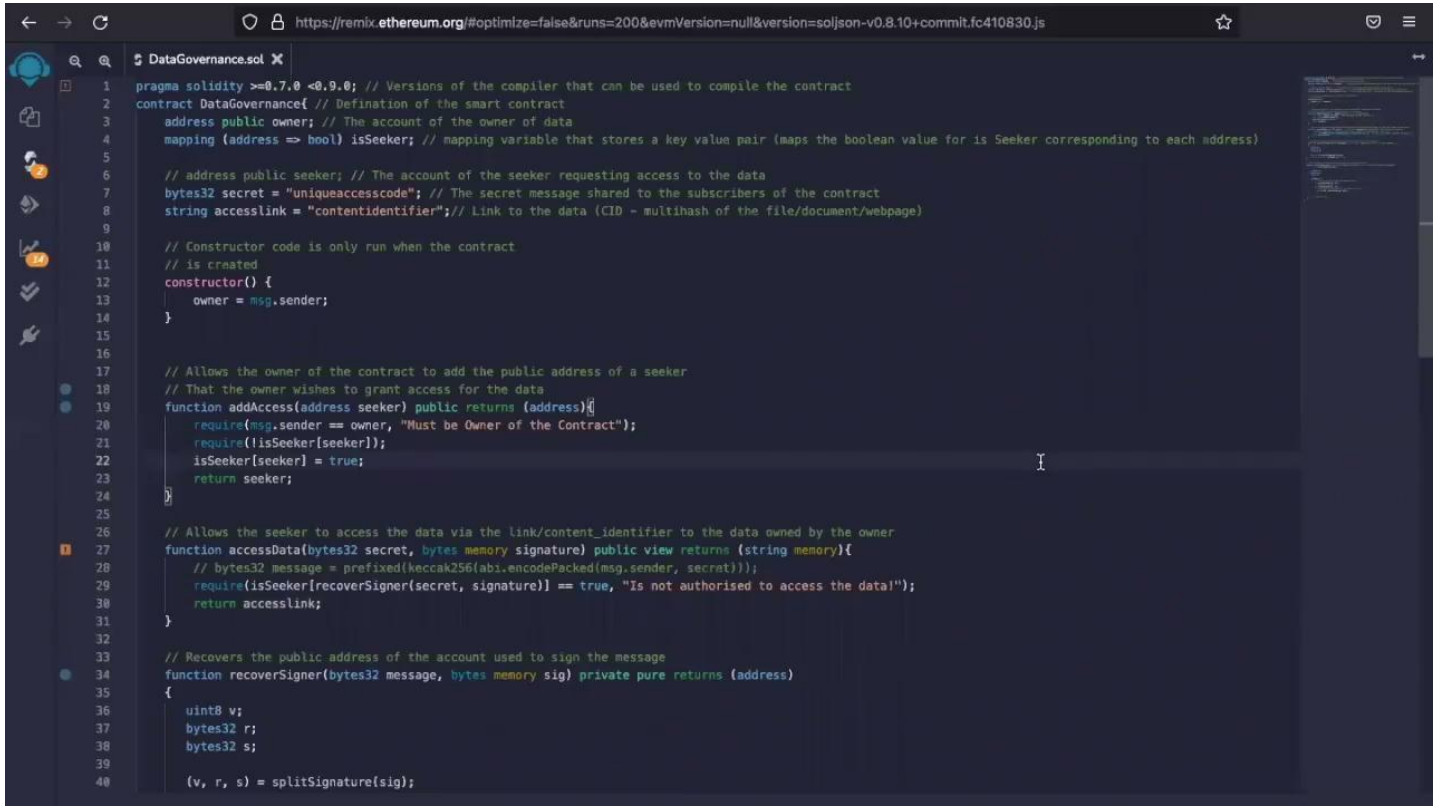


Data Flow Diagram - Level 0 Diagram

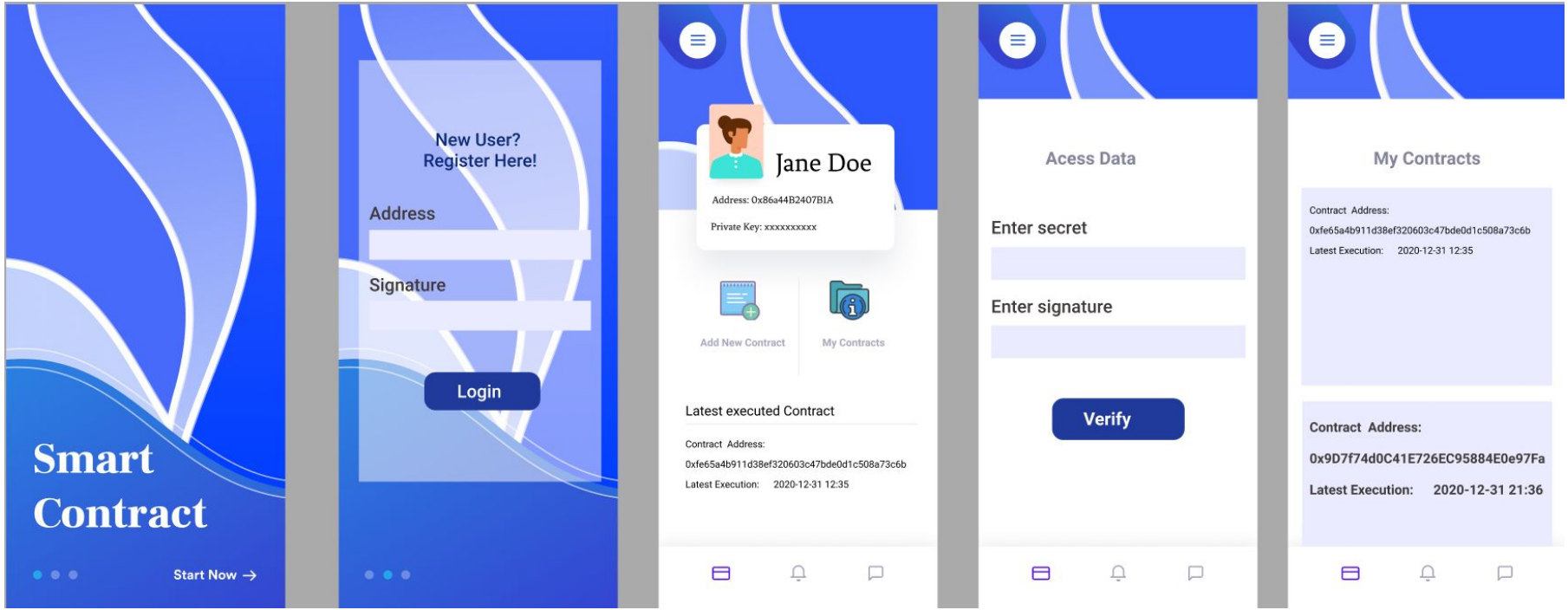


Implementation Video - Blockchain

Implementation Video - Smart Contract



Implementation Mockup



Other plausible Information Services using Blockchain

Image Sources

- Google Images
  - https://geospatialmedia.s3.amazonaws.com/wp-content/uploads/2017/07/blockchain.jpg
  - https://assets-global.website-files.com/606f63778ec431ec1b930f1f/60785f4ecacc7f40fb9006fe_smart-contracts-in-block%D1%81hain-in-comparison-to-the-ordinary-contracts-image-2.png
- Imperva
  - https://www.imperva.com/learn/wp-content/uploads/sites/13/2019/01/Data-Governance.png
- United Nations
  - https://unite.un.org/sites/unite.un.org/files/styles/uw_full_width/public/news_articles/blog-oict-data-gov.png?itok=P_VAB1uI

List of References

- Bashir, Imran. *Mastering Blockchain: Distributed Ledger Technology, Decentralization, and Smart Contracts Explained.* Birmingham: PACKT Publishing, 2018.
- Bodó, B, D Gervais, and J.P Quintais. 2018. “Blockchain and Smart Contracts: The Missing Link in Copyright Licensing?” *International Journal of Law and Information Technology* 26 (4): 311–36.
- Brett, Charles. “Blockchain Disadvantages: 10 Possible Reasons Not to Enthuse.” *Enterprise Times*, October 15, 2018, https://www.enterprisetimes.co.uk/2018/10/15/blockchain-disadvantages-10-possible-reasons-not-to-enthuse/.
- Chen, Yan. 2018. “Blockchain Tokens and the Potential Democratization of Entrepreneurship and Innovation.” *Business Horizons* 61 (4): 567–75. https://doi.org/10.1016/j.bushor.2018.03.006.
- Gürkaynak, Gönenç, İlay Yılmaz, Burak Yeşilaltay, and Berk Bengi. 2018. “Intellectual Property Law and Practice in the Blockchain Realm.” *Computer Law & Security Review: The International Journal of Technology Law and Practice* 34 (4): 847–62. https://doi.org/10.1016/j.clsr.2018.05.027.
- IBM. “What is Blockchain Technology?” https://www.ibm.com/topics/what-is-blockchain. Accessed November 29, 2021.
- IBM. “What are Smart Contracts on Blockchain?” https://www.ibm.com/topics/smart-contracts. Accessed November 29, 2021.
- “Introduction to Smart Contracts.” https://docs.soliditylang.org/en/v0.8.10/introduction-to-smart-contracts.html Accessed November 8, 2021.
- Khan, Shafaq Naheed, Faiza Loukil, Chirine Ghedira-Guegan, Elhadj Benkhelifa, and Anoud Bani-Hani. 2021. “Blockchain Smart Contracts: Applications, Challenges, and Future Trends.” *Peer-To-Peer Networking and Applications* 14 (5): 2901–25. https://doi.org/10.1007/s12083-021-01127-0.
- Li, Daming, Zhiming Cai, Lianbing Deng, Xiang Yao, and Harry Haoxiang Wang. 2019. “Information Security Model of BlockChain Based on Intrusion Sensing in the Iot Environment.” *Cluster Computing : The Journal of Networks, Software Tools and Applications* 22 (1): 451–68. https://doi.org/10.1007/s10586-018-2516-1.
- Lumineau, Fabrice, Wenqian Wang, and Oliver Schilke. 2021. “Blockchain Governance—a New Way of Organizing Collaborations?” *Organization Science* 32 (2): 500–521. https://doi.org/10.1287/orsc.2020.1379.

List of References

- Moralis Web3 Technology. “How to Create Smart Contracts.” https://moralis.io/how-to-create-smart-contracts/. Accessed November 29, 2021.
- Mukkamala, Raghava Rao, Ravi Vatrapu, Pradeep Kumar Ray, Gora Sengupta, and Sankar Halder. 2018. “Blockchain for Social Business: Principles and Applications.” *IEEE Engineering Management Review* 46 (4): 94–99. https://doi.org/10.1109/EMR.2018.2881149.
- Savelyev, Alexander. 2018. “Copyright in the Blockchain Era: Promises and Challenges.” *Computer Law & Security Review: The International Journal of Technology Law and Practice* 34 (3): 550–61. https://doi.org/10.1016/j.clsr.2017.11.008.
- Smith, Hampton. “Blockchain as a Platform for Data Governance 2.0.” https://dataschool.com/data-conversations/blockchain-as-a-platform-for-data-governance-2-0/. Accessed October 8, 2021.
- Talend. “What is Data Governance and Why Do You Need It?” https://www.talend.com/resources/what-is-data-governance/. Accessed November 29, 2021.
- Teperdjian, Raffi. 2020. “The Puzzle of Squaring Blockchain with the General Data Protection Regulation.” Jurimetrics 60 (3): 253–314.
- Varonis. “Data Governance Framework Best Practices, Definitions and Examples.” https://www.varonis.com/blog/data-governance/ Accessed November 29, 2021.

Thank You!

Project Team 3

Abhijith Anugu
Anuja Bendre
Keegan Maguigan
Kritika Agarwal
Nathaniel Pines
Shun Ting Wang