

# Open Science Platform Artifact

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## 1 Open Science Platform

### 1.1 Overview

The Open Science platform aims to empower researchers and members of the scientific community by providing a secure, transparent, traceable and tamper-proof environment for sharing project artifacts and data. Building on this objective, the platform leverages decentralized technologies to ensure the integrity and reliability of shared information.

### 1.2 Technology Stack

The Open Science platform is built upon a robust technical foundation, comprising:

- Hyperledger Iroha v1 Blockchain: The core infrastructure for account management and transaction recording and business rules enforcement through Smart Contracts ensuring secure and transparent data exchange.
- IPFS (InterPlanetary File System): The decentralized storage for project artifacts and metadata, guaranteeing tamper-proof and persistent access to shared information.

Aside from the decentralized technologies above, the platform also relies on the following off-chain, centralized components:

- Jupyter Notebooks in Python: The front-end interface of the platform leverages Jupyter Notebooks in Python to automate and display the execution steps of the activities in the platform.
- Apache Tika: Utilized for extracting file metadata, enhancing the platform's ability to manage and describe artifact content.
- Woosh: For efficient indexing and search capabilities for artifacts stored on the platform.

### **1.3 Operations**

The Open Science platform is comprised of the following operations:

### **1.4 Benefits**

The Open Science platform offers numerous benefits for researchers and members of the scientific community, including:

- Secure data sharing: By utilizing blockchain technology and IPFS, the platform ensures tamper-proof data exchange.
- Transparent data management: The use of smart contracts and decentralized storage guarantees transparency in data access and modification history.
- Collaborative research environment: The platform enables researchers to collaborate on projects, share artifacts and results, and track progress.

### **1.5 Challenges**

The Open Science platform faces several challenges, including:

- Scalability: As the number of users increases, the platform needs to be able to handle a growing amount of data and transactions efficiently.
- Interoperability: Ensuring seamless integration with existing research platforms and tools is crucial for widespread adoption.
- User Adoption: Educating researchers about the benefits of decentralized technologies and the Open Science platform can be an uphill battle.

### **1.6 Future Work**

The Open Science platform has several areas for future development, including:

- Integration with existing research platforms: Collaborations with established research platforms to expand the platform's reach and user base.
- Enhanced security measures: Implementing additional security protocols to protect against potential threats and maintain the integrity of shared information.
- User interface improvements: Enhancing the web interface to make it more user-friendly and accessible for researchers from diverse backgrounds.

## 2 Conclusion

The Open Science platform is a comprehensive solution for secure, transparent, traceable, and tamper-proof data sharing and collaboration. By leveraging decentralized technologies, the platform empowers researchers to share project artifacts and data in a reliable and trustworthy manner.