ARTIFACTS
Platform for Scientific Research

A BLOCKCHAIN PLATFORM FOR SCIENTIFIC & ACADEMIC RESEARCH

ARTIFACTS is a unique web-based platform, which is purpose-built to enrich the scholarly record by enabling transactions and recording existence and attribution with linkages across all research artifacts.

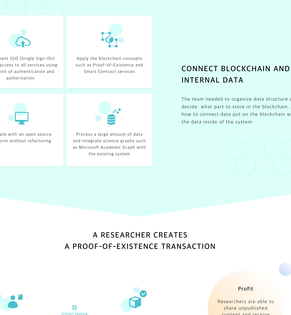
Business domain	Project type	Technologies
Scientific Research	Blockchain - Based Platform	Python, React/Redux

Business overview

THE ARTIFACTS PLATFORM - A SIGNIFICANT CONTRIBUTION TO THE ACCELERATION OF SCIENCE

Main functions are the management of research projects, securing the provenance of research evidence, and making hidden data accessible.

The aim was to create a platform for researchers that removes barriers which delay the communication of results and gives scientists formal recognition.



Challenge

Implement SSO (Single Sign-On) to give access to all services using one point of authentication and authorization

Apply the blockchain concepts such as Proof-of-Existence and Smart Contract services.

Operate with an open source platform without refactoring

Process a large amount of data and integrate science graphs such as Microsoft Academic Graph with the existing system

CONNECT BLOCKCHAIN AND INTERNAL DATA

The team needed to organize data structure and decide: what part to store in the blockchain, and how to connect data pot on the blockchain with the data inside of the system.

A RESEARCHER CREATES A PROOF-OF-EXISTENCE TRANSACTION

Artifact selection
Researcher chooses an artifact

Action loading

New transaction
System creates a new transaction with artifact hash and sends it to blockchain network

Validation
Blockchain network validates that no one has transacted that artifact earlier

Artifact has been already registered earlier

Join main ledger
System receives from blockchain that transaction has been confirmed

Profit

Researchers are able to share unpublished content and receive citation recognition for their contributions.

A RESEARCHER CREATES A CITATION TRANSACTION ON THE BLOCKCHAIN

Artifact selection
Scientist finds important discoveries other researchers have made accessible

Citation format and weight

Artifact set selection
Scientist selects artifact to be cited

New transaction
System creates and sends a Smart Contract transaction that describes Scientist A is citing Research B's artifact

Join main ledger
System receives from blockchain that transaction has been confirmed

Update research profile
System updates accounts of the citing and cited researchers on real-time basis according to transaction data

Profit

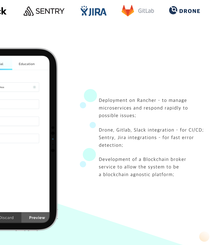
Researchers have an immutable proof of giving citation credit to the works of colleagues or receiving citations to their own contributions to the scholarly record.

Solution

PUBLIC PERMISSIONED BLOCKCHAIN IS THE BEST SOLUTION IN THE CURRENT CASE

The first version of the product was based on Ropsten (Ethereum trial network). However, after analyzing various framework options for building a private blockchain, we decided the use of Hyperledger Sawtooth will be a better solution in the current case.

In this regard, we developed a data transfer strategy to move the data from Ropsten to the new private blockchain Sawtooth. Our client's partners didn't have experience in using Sawtooth, which is why we created a technical manual and a set of recommendations for establishing this blockchain network. After signing up a cooperation agreement with Max Planck Digital Library, their Bloxberg blockchain network became the Public Permissioned Blockchain.


ARTIFACTS
Artifacts
Proposed
Smith John
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Unselect all
Elaboration of specific algorithms for data identification and validation;

Use of Grafana - an open platform for analytics and monitoring;

Continuous production update for business needs and optimization of internal processes;

RANCHER
Grafana
slack
SENTRY
JIRA
GitLab
DRONE

Deployment on Rancher - to manage microservices and respond rapidly to possible issues;

Drone, Gitlab, Slack integration - for CI/CD; Sentry, Jira integrations - for fast error detection;

Development of a Blockchain broker service to allow the system to be a blockchain agnostic platform;

Outcome

A UNIQUE SYSTEM THAT SPEEDS COMMUNICATION OF DISCOVERIES AND RECOGNIZES SCIENTISTS FOR THEIR CONTRIBUTIONS

Thanks to our efforts, the client got a unique system, which allows leading research projects and their researchers to secure the provenance of their materials by certifying them in the blockchain, and increasing the trust level by creating incontestable citation evidence of the (un)published papers, algorithms, data, protocols and all forms of relevant scientific outputs.

THE
Max Planck Digital Library
nature
scencepod
PRANAGE

Tech Stack and Team

Technologies
React/Redux, Python (3.6, 2.7), Django (2.0.5, Kubernetes, MongoDB, PostgreSQL, Elasticsearch, Nexus, Rancher, Grafana, Docker

Blockchain Part
Truffle, Ganache, MetaMask, Remix, Parity, Hyperledger Sawtooth, Hyperledger Fabric, Public Permissioned Blockchain Bloxberg

Team 10 experts
PM, Solution Architect, BA, Python Developers, JS Developer, DevOps + Designer and Front-End Web Developer by request!

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We are proud to be a part of a project that aims to improve science collaboration processes.