A Registry of digital research objects

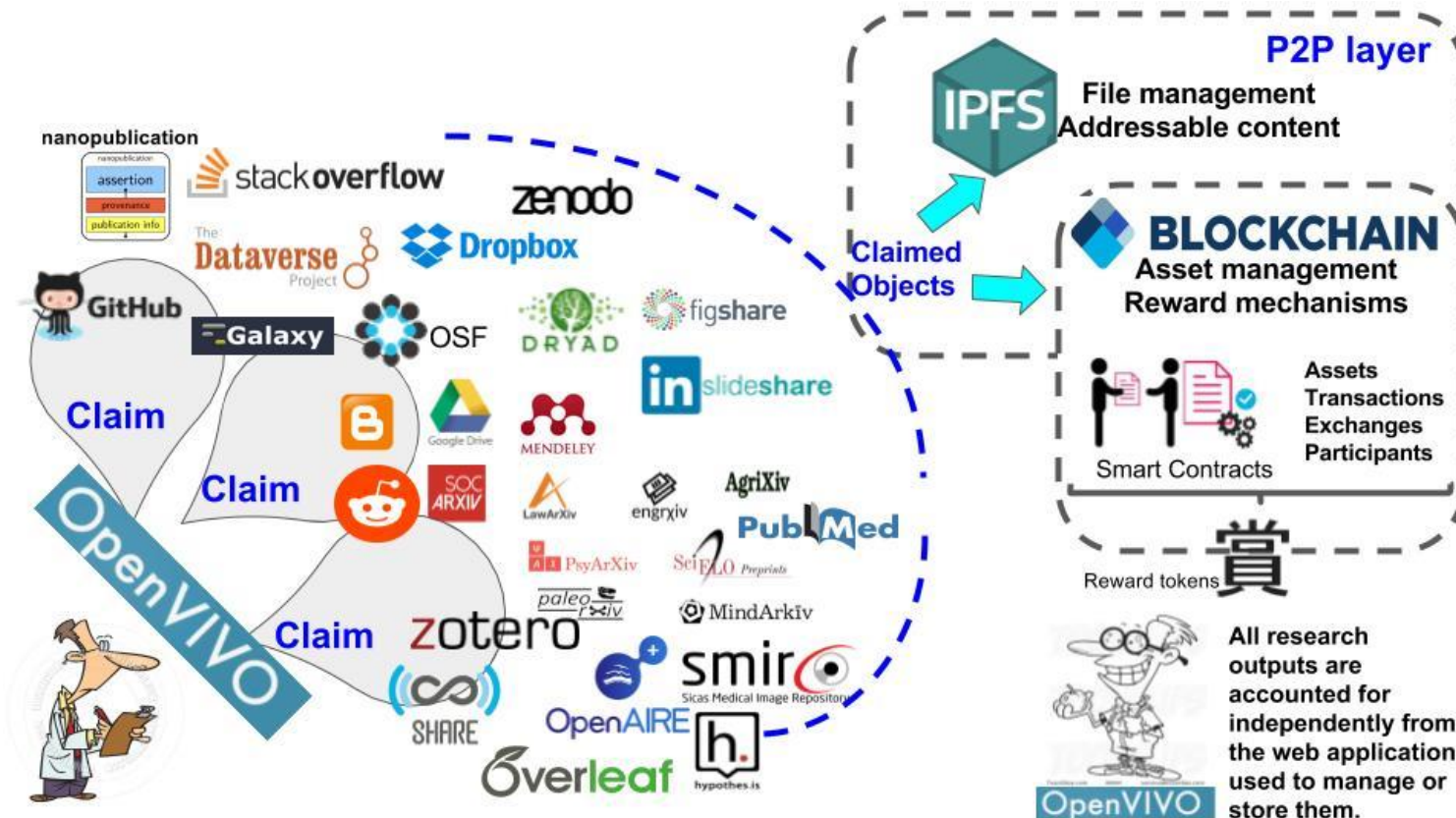Blockchain4openscience

Open science is a new movement in science that promotes principles of open access to research data, publications, and scientific collaboration. Open science promises to increase transparency and quality of research, provide reproducibility by reusing scientific datasets and increasing trust in the scientific collaboration.

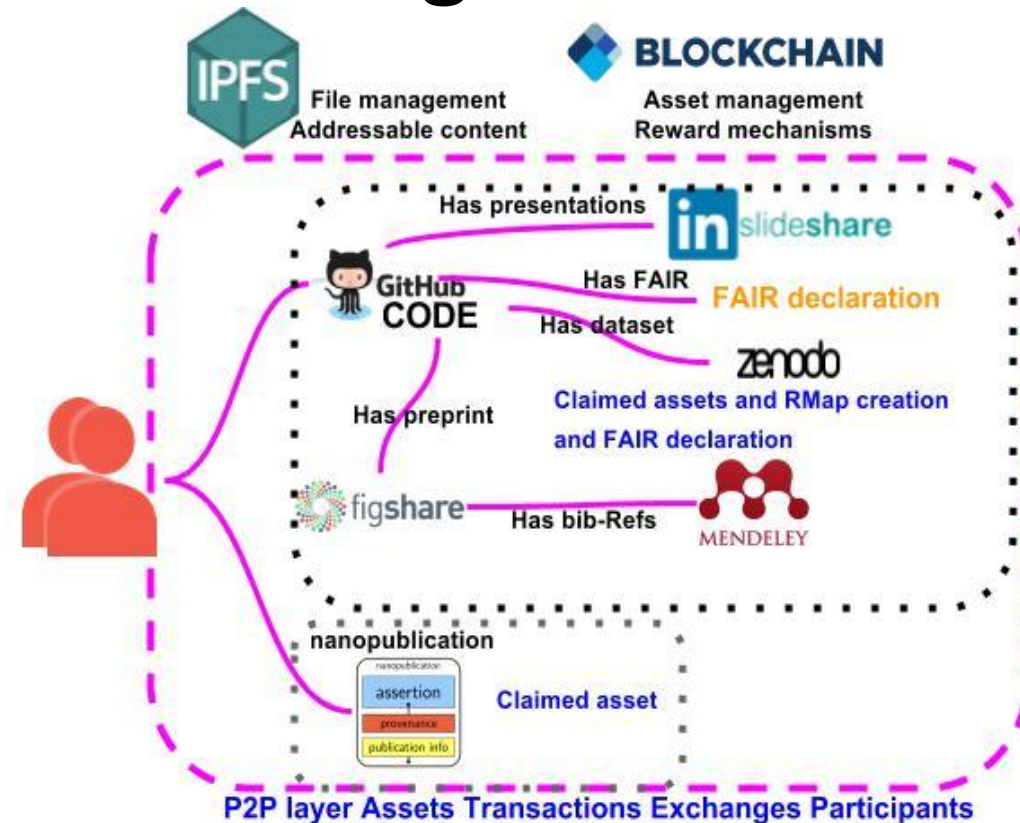# Blockchain4openscience

Blockchain fits the mindset of open science and can help to fulfill open science principles: transparency and availability of blockchain makes scientific outputs open & transparent; disintermediation removes subjectivity from scientific reviews; integrity and possibility to secure transactions in the competing environment increases trust in scientific results; smart contracts allows to manage access to scientific outputs; immutability represents precise relationships between the works with such features as richness, time-based relationships, and logical precursors: a digital continuum
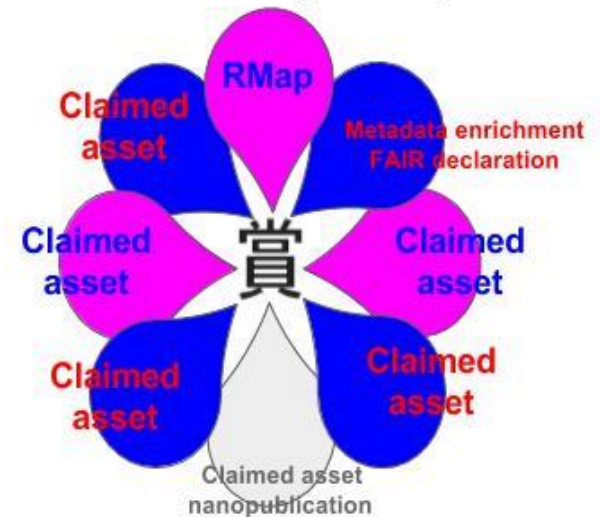
Blockchain4openscience

Successful integration of a registry, the storage of the asset and a reward system (tokens), using existing frameworks:

Claim, enrich and get rewards from digital research objects

IPFS
File management
Addressable content

BLOCKCHAIN
Asset management
Reward mechanisms

The token is built upon the definitions for assets, transactions, participants and smart contracts. This means that communities can define their own features and still interact with all other nodes in the ledger/IPFS space.

Has presentations — in slideshare

GitHub CODE
Has FAIR — **FAIR declaration**
Has dataset — zenodo

Claimed assets and RMap creation and FAIR declaration

Has preprint

figshare
Has bib-Refs — **MENDELEY**

nanopublication
assertion
provenance
publication info
Claimed asset

P2P layer Assets Transactions Exchanges Participants

RMap
Claimed asset — Metadata enrichment FAIR declaration
Claimed asset — 賞 — **Claimed asset**
Claimed asset — **Claimed asset**
Claimed asset nanopublication

Claiming | Assets into P2P layer | Metadata enrichment, e.g. creating RMaps FAIR declarations | RMap Asset | RMap Smart Contract | Token Reward
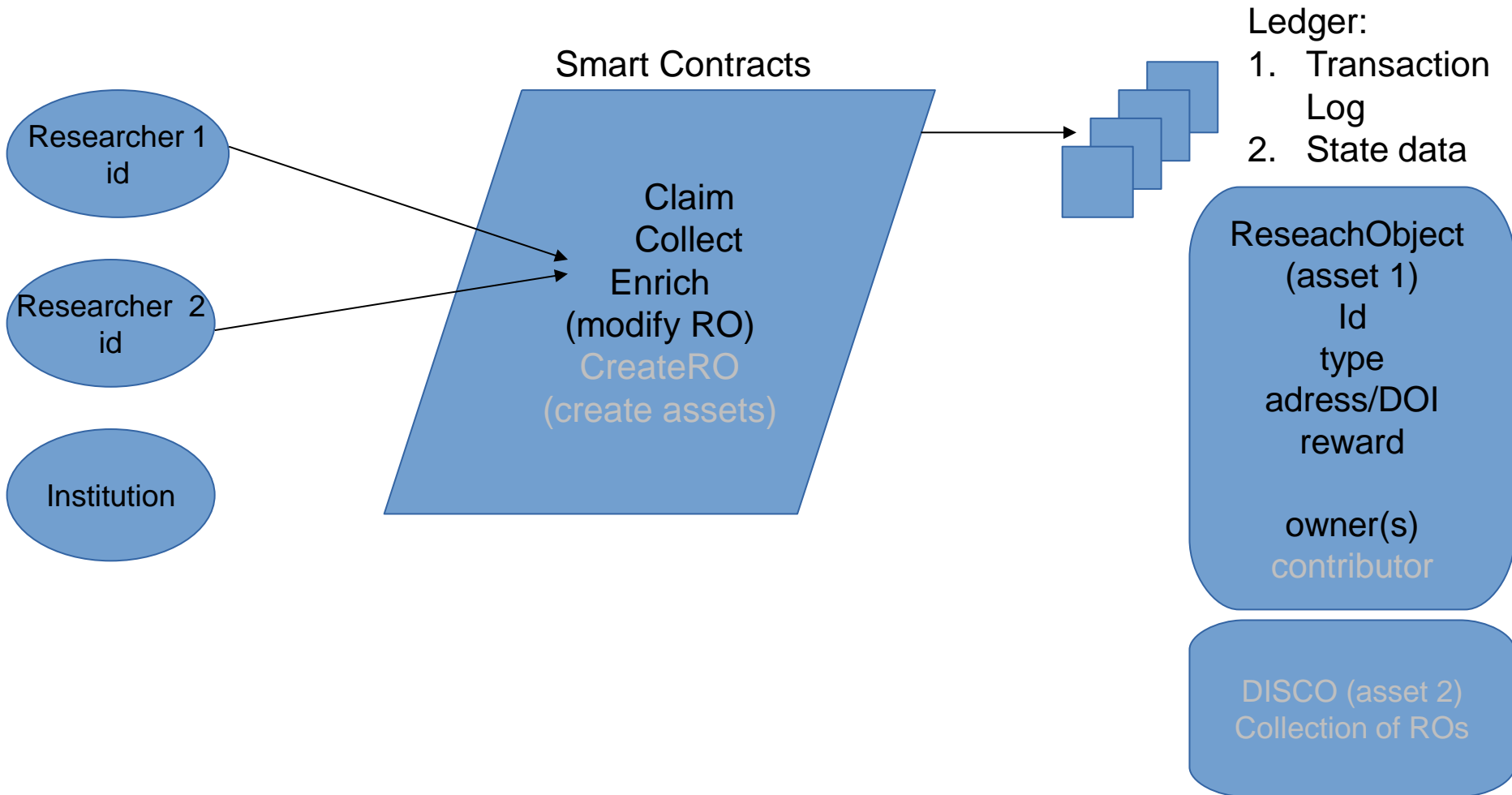
Blockchain4openscience

- Bna onto Fabric
  - Researcher/funding institution: client
    - Create, Claim, Enrich assets, Endow wallet?
  - Institution(s): Organization
    - Endorsing peer (holds chaincode for clients actions on the ledger)
    - Commiting peer (holds and transmits ledger: Log and state)
  - Orderer (for the momento Solo)

bforos v1

Business Network, bforos.bna (playground)

Researcher 1 id

Researcher 2 id

Institution

Smart Contracts

Claim
Collect
Enrich
(modify RO)
CreateRO
(create assets)

Ledger:
1. Transaction Log
2. State data

ReseachObject
(asset 1)
Id
type
adress/DOI
reward

owner(s)
contributor

DISCO (asset 2)
Collection of ROs

bforos v2

Pluggable registry for science

Scientific contributions are kept in many decentralized repositories (GitHub) and tagged on different sites (RO2share) that provide a historical record of individual or group contributions. This record requires additional steps to keep it up to data, lacks proper security regarding who contributed what and how this contribution relates to other scientific contributions.
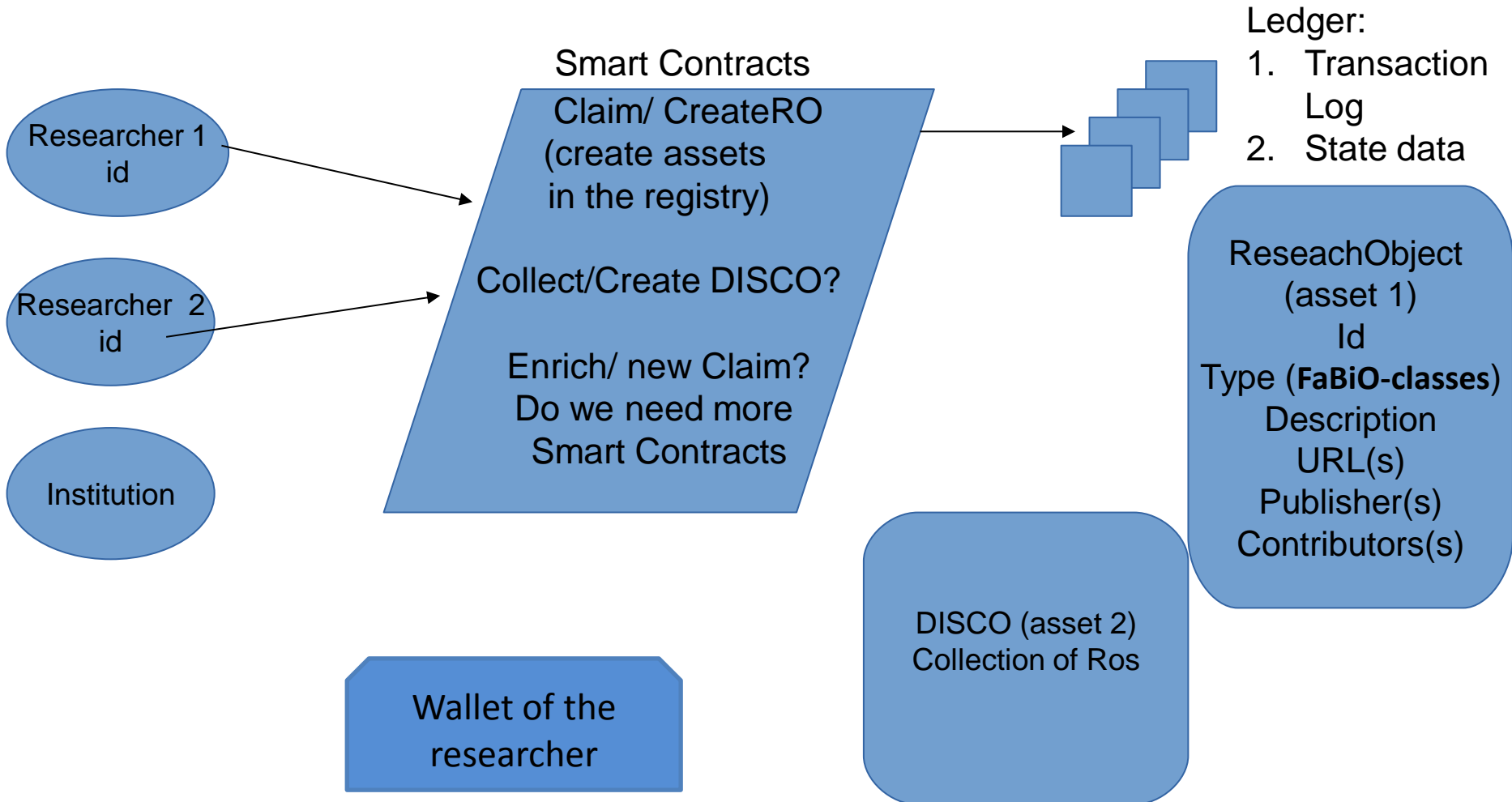
Pluggable registry for science

exiting archive | Blockchain Business Network

exiting archive

1. **User log-in.**
2. Queries and displays www DB's for RO under user name.
3. Claim RO

Blockchain Business Network

1. **Create participant (if 1st time).** Instantiate wallet.
2. Create an asset (Capture metadata).
3. Claim asset
   a) Assign ownership (with and without approval)
   b) Update wallet (event)

Business Network, bforosv2.bna (playground)

Researcher 1 id

Researcher 2 id

Institution

Wallet of the researcher

Smart Contracts

Claim/ CreateRO
(create assets
in the registry)

Collect/Create DISCO?

Enrich/ new Claim?
Do we need more
Smart Contracts

DISCO (asset 2)
Collection of Ros

Ledger:
1. Transaction Log
2. State data

ReseachObject
(asset 1)
Id
Type (**FaBiO-classes**)
Description
URL(s)
Publisher(s)
Contributors(s)

Pluggable registry for science

A collection of research objects (creation of a DISCO) has two objectives:
1. To aggregate related RO of a researcher of a group of researchers related to a common theme (code, DB, paper..)
2. To stablish (and register) relationships and reusability of RO across researchers.