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LifeBlock and semantic environment status and roadmap

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Junta de Andalucía
Andalucía se mueve con Europa
GOBIERNO DE ESPAÑA MINISTERIO DE CIENCIA E INNOVACIÓN
EUROPEAN UNION
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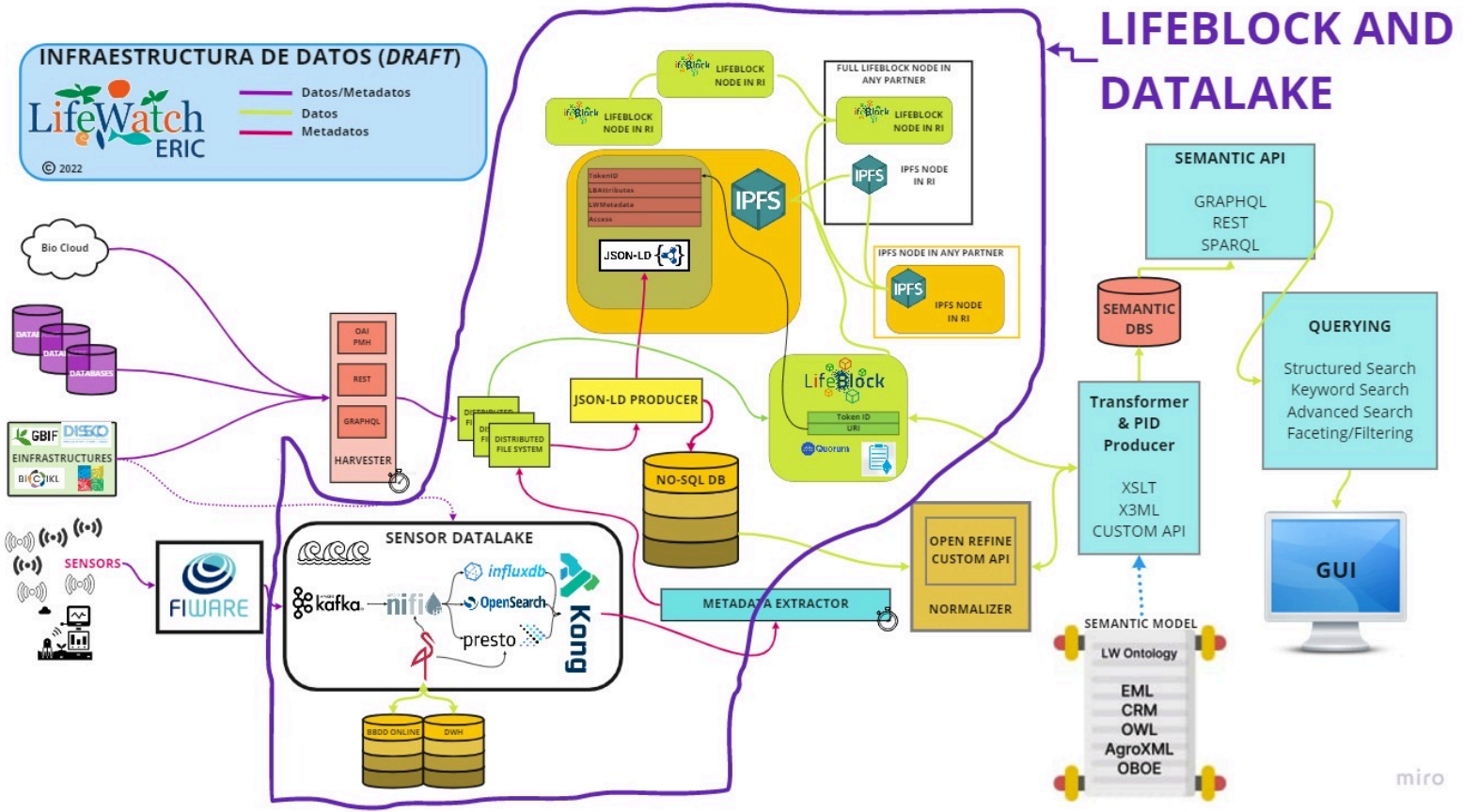
"A way to build Europe"

LifeBlock & DataLake Architecture



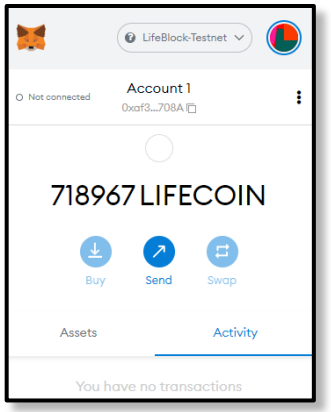
LifeBlock objectives

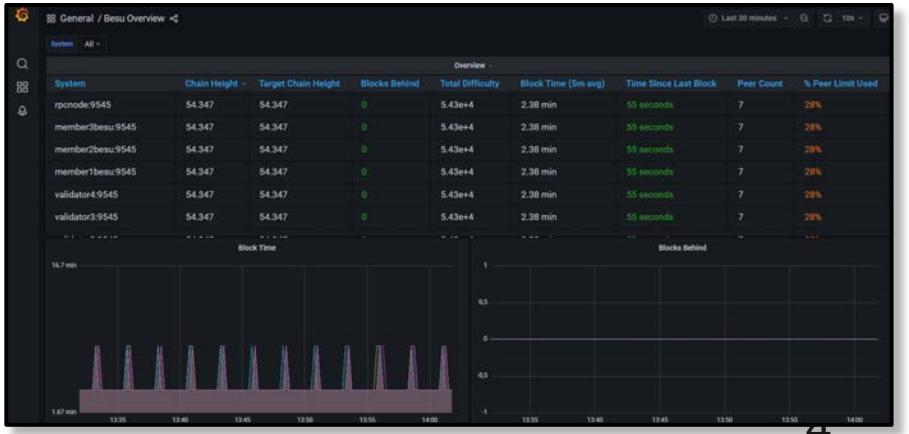
- Provide an environment for LifeWatch ERIC for the generation, storage and management of data of any type with a sufficiently generic metadata format to accommodate any type of information.
- Provide an environment with the capacity to act as a Hub for the rest of the research infrastructures (RIs) presented at European level so that their data can be managed and stored when deemed appropriate.
- Provide a link with the rest of the LifeWatch ERIC infrastructures from which data generated from any medium can be managed and used for VRE's, workflows, publications, research results, etc.
- Provide a tool that can provide ecosystem services valuation functions.
- Provide a tool that allows strict compliance with FAIR principles for data management of any kind.
- Provide a distributed, reliable and guaranteed data management environment for all members of the international scientific community.
- Provide an environment for the development and support of other initiatives related to ecosystem services worldwide under the support of blockchain technologies.

LifeBlock Proof of Concept (2021)

SUMMARY OF DEVELOPMENTS

- **LifeBlock Proof of Concept**.- A development using Hyperledger Blockchain technology. A full blockchain network with 7 nodes and 1 RPC-node connection.
- Deployed 2 smart contracts for tokenization (**ERC-20 and NFT**)
- Deployed test of offical LifeBlock coin (**LifeCoin**)
- Succesful connection with **Metamask** for managing balances and access to smart contracts
- A private IPFS network was developed to storage LifeBlock data (datasets).
- Deployed additional **support services** for LifeBlock:
  - Prometheus.- Blockchain network monitoring
  - Kibana.- Elastic search
  - Grafana.- Node monitorization
  - RPC.- Connection with external services
  - CakeShop (under development).- Network management tool
- **BiCiKL Hackathon**.- Participation with LifeBlock POC and agreement with main european RIs to start integration tests (September 2021).

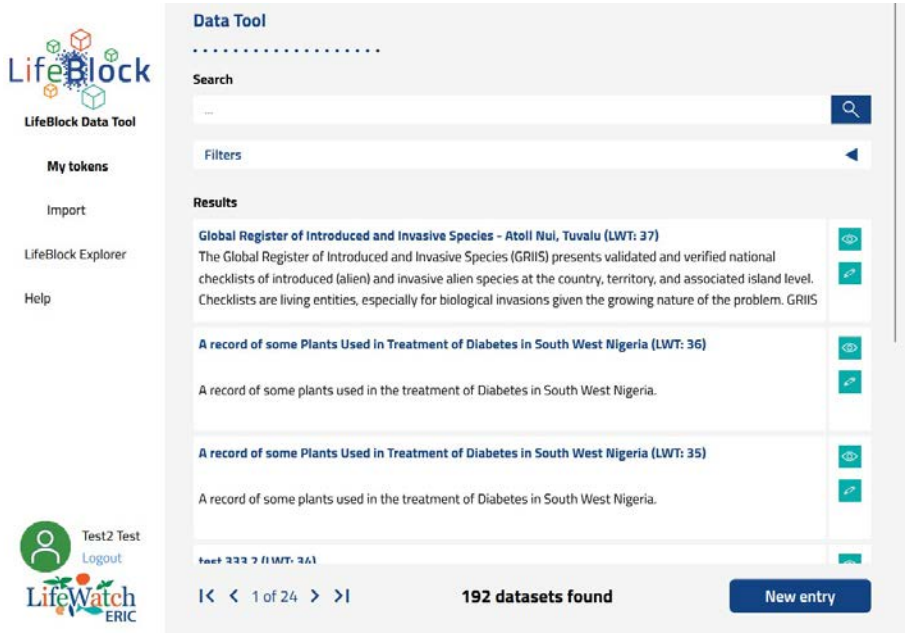




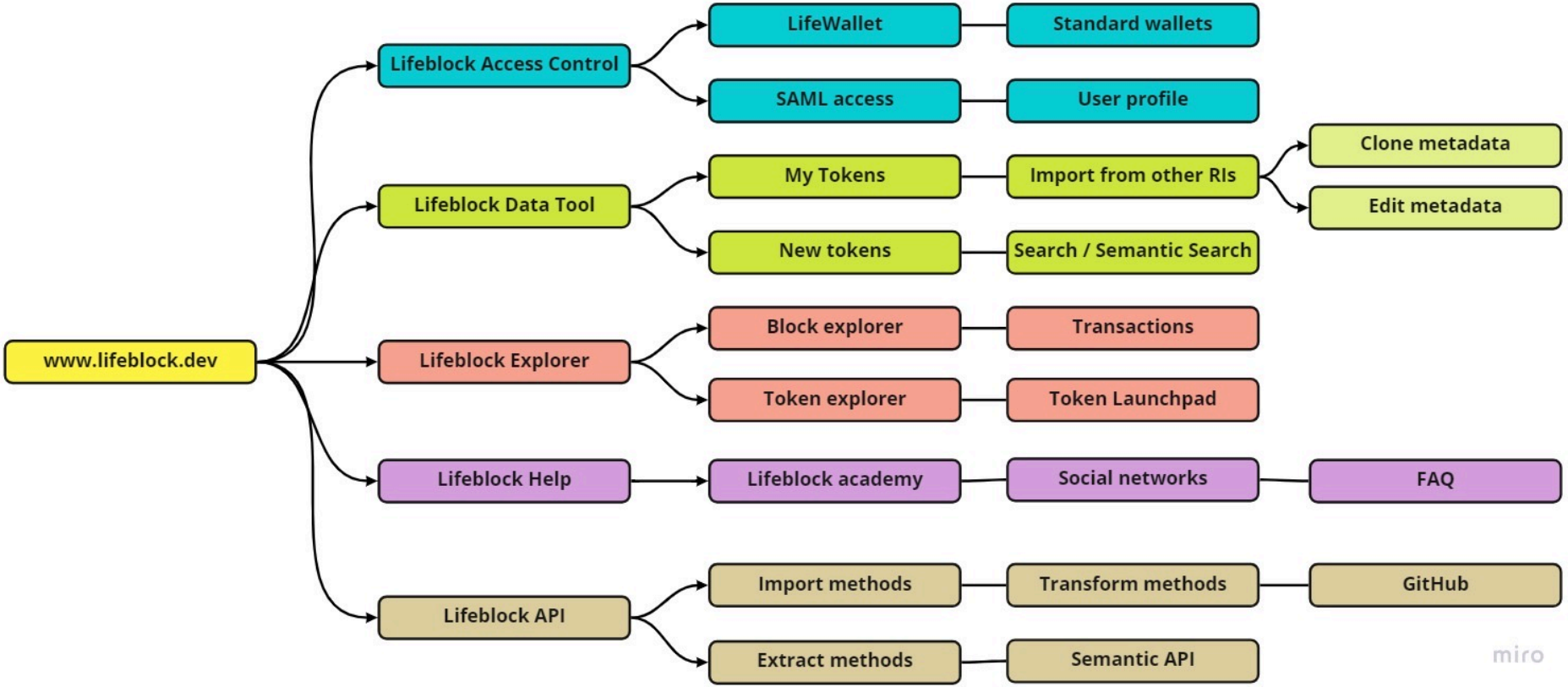
LifeBlock development status

SEPTEMBER 2022: TESTNET WORKING

- The LifeBlock test network is currently operational with the following elements in place:
  - LifeBlock Data Tool
  - LifeBlock Explorer
  - Semantic Search Engine
- Integration with GBIF, Zenodo and LTER RIs has been done and the LifeWatch ERIC metadata catalogue is currently being integrated.
- Metadata format - A provisional metadata format is currently being used which is sufficient for the current integrations.
- An ontology collection is being developed that includes LUPO and will be able to handle any type of metadata from any RI.
- API: The LifeBlock API will allow the interaction of the services with any other internal and external infrastructure. Version 0.1 has been released.



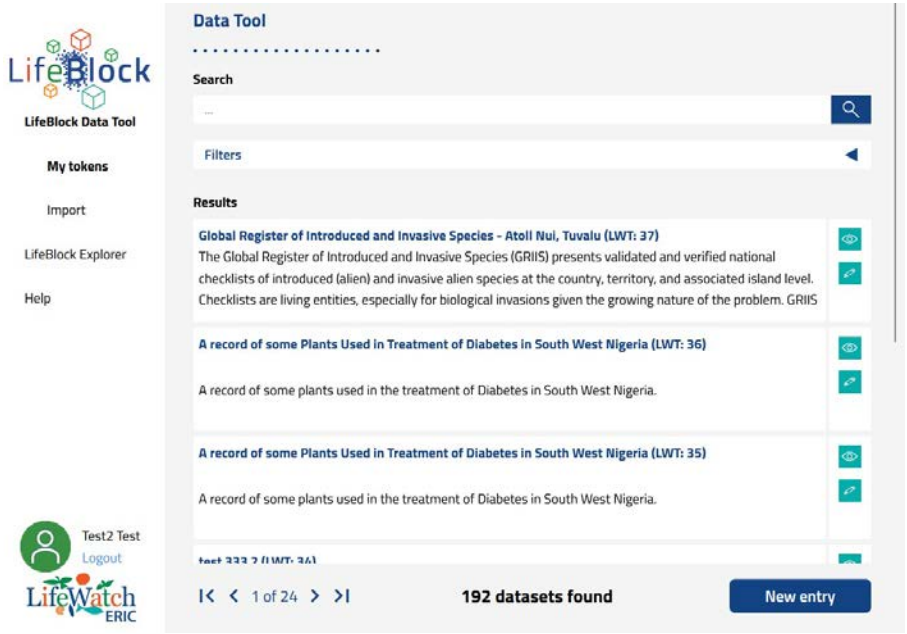
LifeBlock functional map (v 1.0)



LifeBlock Data Tool

SEPTEMBER 2022

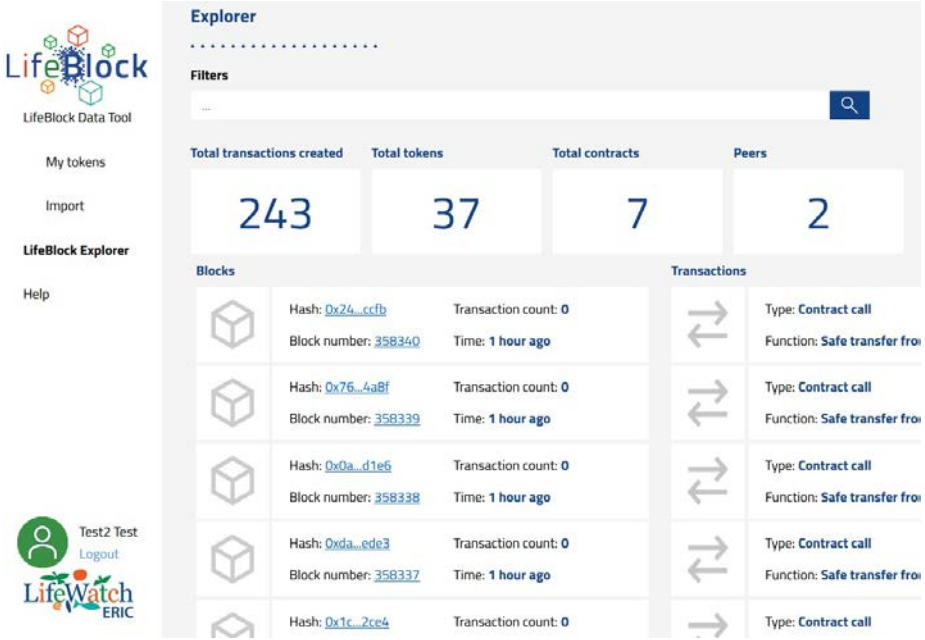
- LifeBlock Data Tool is LifeBlock's tool for data management.
- All data is managed according to the ERC-721 (NFT) blockchain standard.
- Users can search for data internally or in other IRs and:
  - Store it in their dashboard by generating a new NFT token that is owned by the User who has copied it and is linked to the original Data Source.
  - Modify some metadata and store it as a new dataset. This dataset will be linked to the dataset that originally created it.
- Users can generate their own metadata/data sets and store them in LifeBlock for later use.
- All generated data are registered in LifeBlock and IPFS (for stored datasets).
- The owners are the users who created them.



LifeBlock Explorer

SEPTEMBER 2022

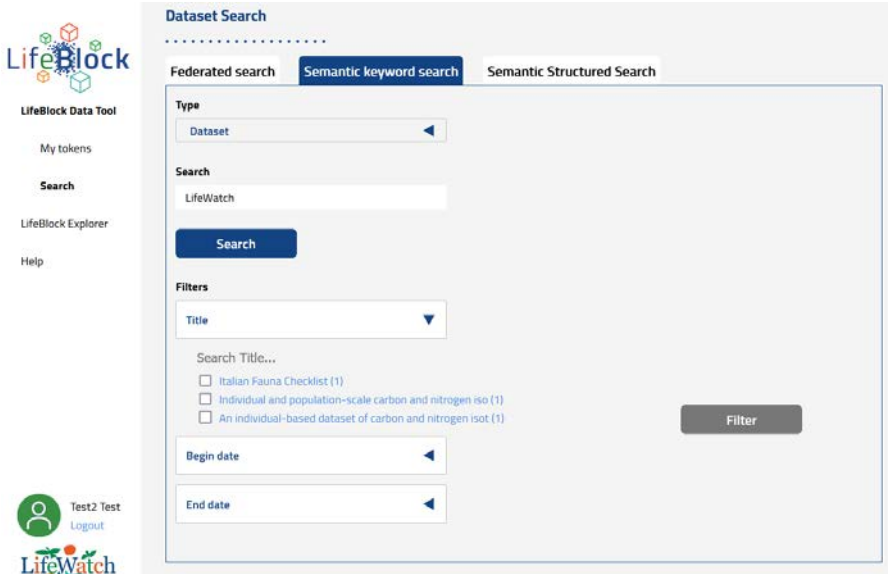
- LifeBlock Explorer is LifeBlock's tool for blockchain-level visualisation of LifeBlock.
- It currently allows the visualisation of the following elements within LifeBlock:
  - Blocks.- Functions to obtain information about any of the generated blocks and their associated transactions.
  - Transactions: Currently focused exclusively on the NFT data tokens that are generated from a smart contract enabled for this purpose.
  - Generated NFT tokens - These are data tokens generated by users from scratch or from imports from GBIF, LTER and/or Zenodo, with more Ris currently being added.



LifeBlock development status

OCTOBER 2022: SEMANTIC SEARCH AND RI´S

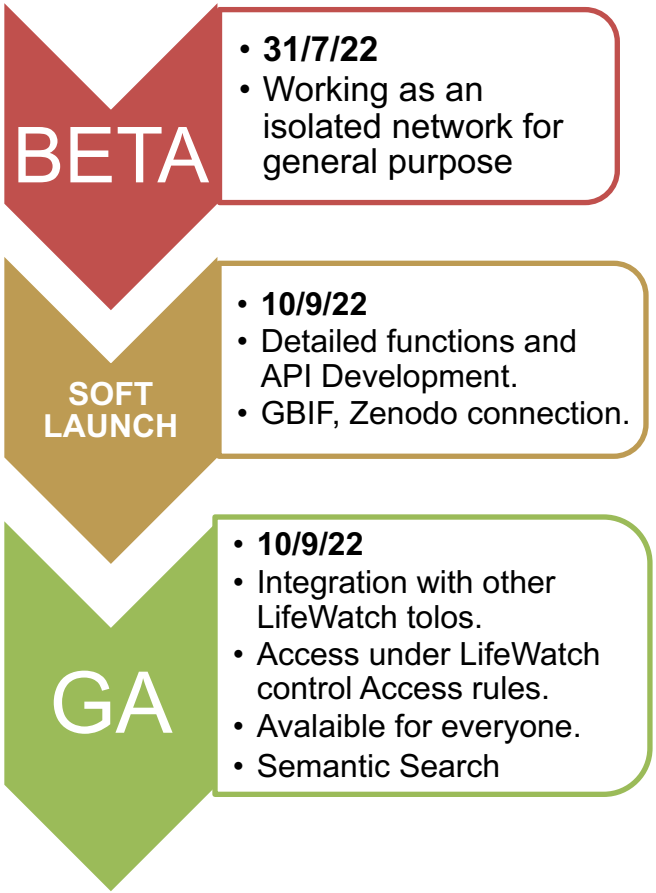
- The first **semantic search-oriented** developments in biodiversity databases have been incorporated.
- It is the first European infrastructure that is using this type of search that is capable of structuring any type of query and making sense of the results.
- The basis of the developments, carried out from scratch, lies in the transformation of all the information obtained into RDF format, preserving the metadata format used by LifeWatch ERIC.
- The development of the structured semantic search to be carried out in the next month will allow the design of search workflows in a few seconds.
- Infrastructures already included: **GBIF, LTER, Zenodo and LIfeWatch Metadata Catalogue**.



LifeBlock MVP and GA

CURRENT STATUS

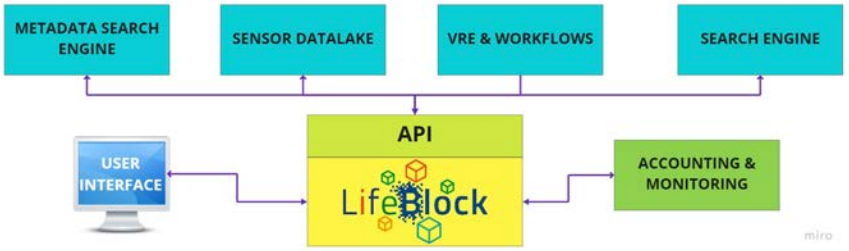
- The pre-commercial version of LifeBlock is **currently under development** with the following features:
  - Full network in operation with 6 nodes.
  - IPFS storage network in operation with 4 nodes.
  - Front-end node for access to basic functionalities.
  - Back-end node for basic functions and API with other LifeWatch services and RIs.
- **Beta launch: 31/7/2022 (done!)**
- **Soft launch: 10/9/2022 (done!)**
- **GA: October 2022 (in progress)**

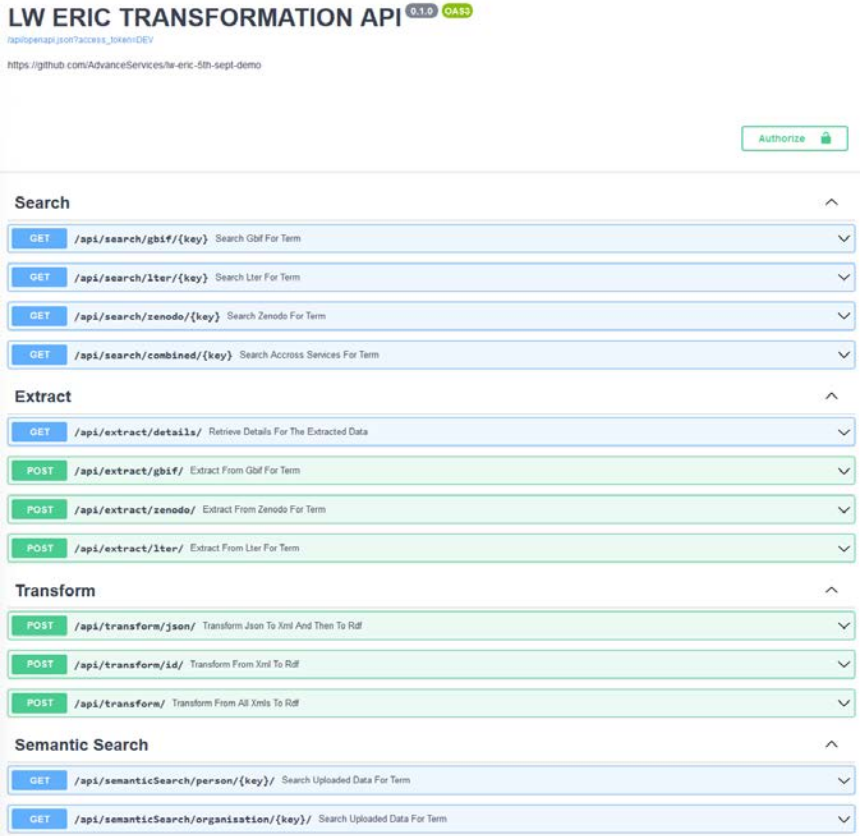


LifeBlock API

CONNECTION WITH OTHER SERVICES (API REST, GRAPHQL AND SPARQL)

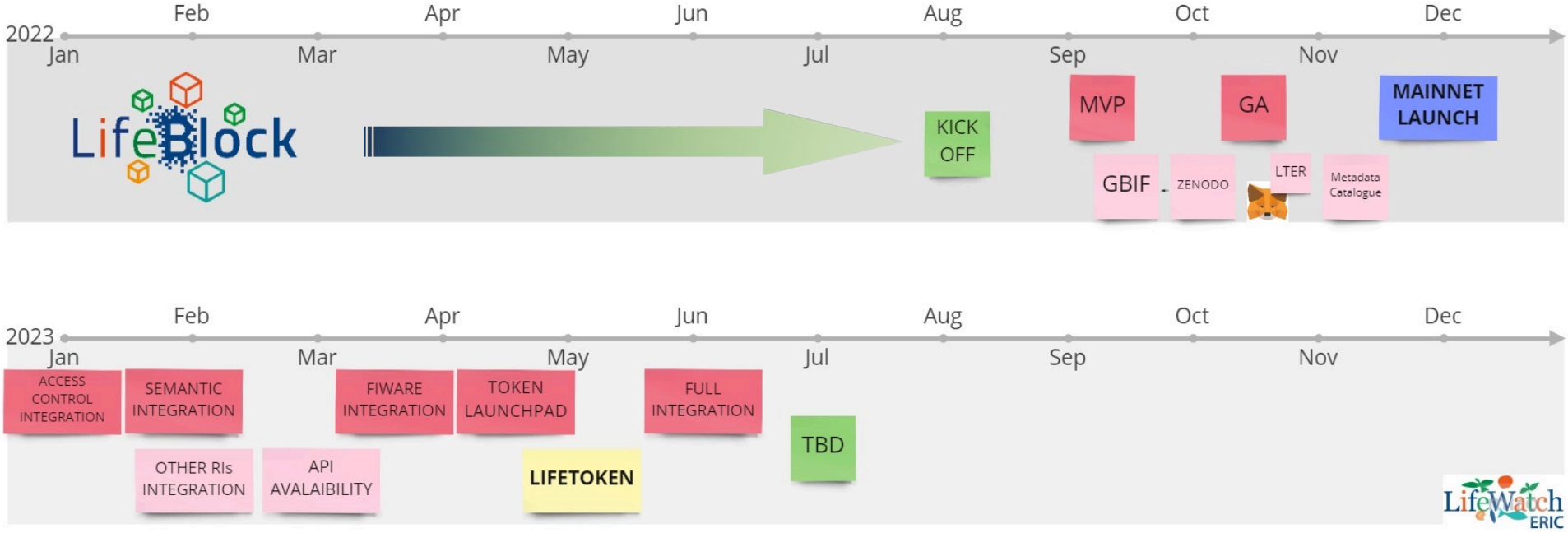
- Sensor Datalake
- Metadata Search Engine
- Relational Search Engine
- VRE & Workflows

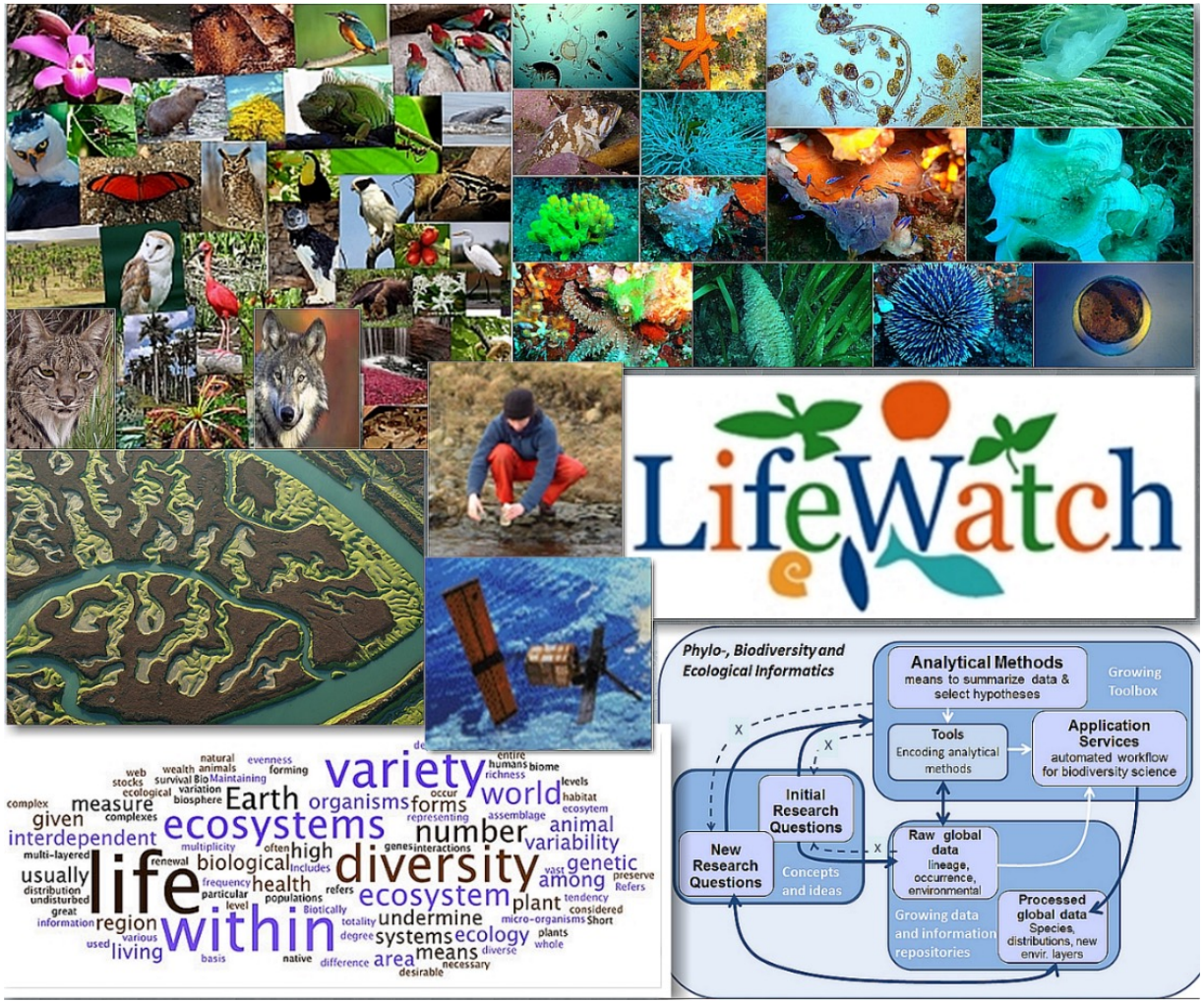




Version 0.1 of LifeBlock API

LifeBlock roadmap




LifeWatch
Phylo-, Biodiversity and Ecological Informatics
Analytical Methods
means to summarize data & select hypotheses
Growing Toolbox
Tools
Encoding analytical methods
Application Services
automated workflow for biodiversity science
Initial Research Questions
New Research Questions
Concepts and ideas
Raw global data
lineage, occurrence, environmental
Growing data and information repositories
Processed global data
Species, distributions, new envir. layers
variety
world
Earth
organisms
forms
ecosystems
number
animal
variability
biological
diversity
genetic
among
life
health
ecosystem
plant
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undermine
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Thanks!