Towards Implementing the FAIR4Fusion Open Data Blueprint

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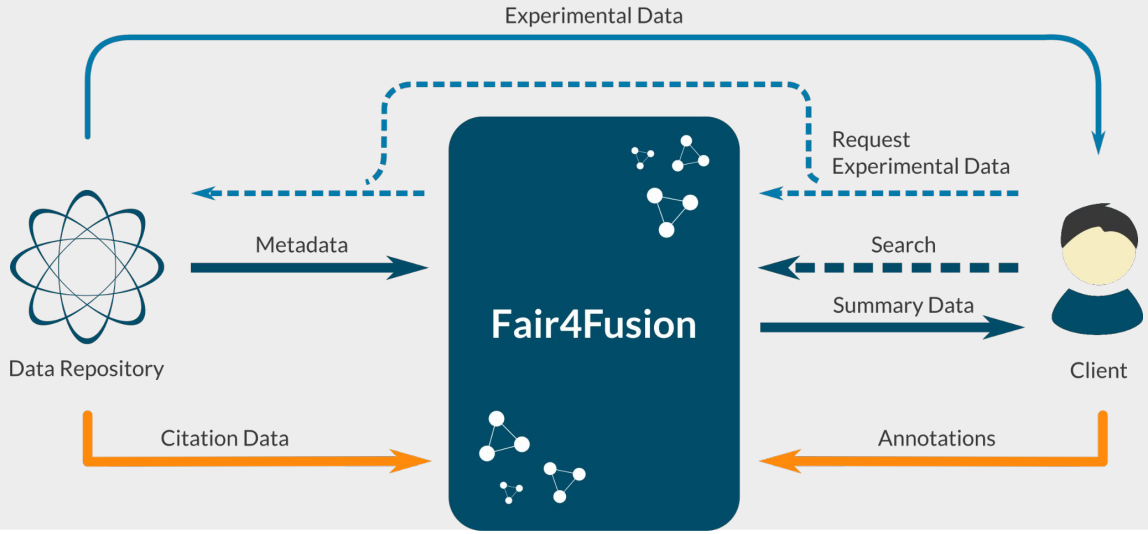
FAIR4Fusion - Blueprint architecture

- The objective of the **FAIR4Fusion** project was to provide **fair** access to experimental data
- The outcome of the **FAIR4Fusion** project is a **Blueprint** architecture for Fusion Open Data Framework which enforces fairness

Its development was triggered by a question

"How can we expose and make data available in a fair way and what technologies can we use to make it happen?"



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FAIR4Fusion - Blueprint architecture

As a result, a detailed architecture was created - Blueprint

In addition to the Blueprint, two reference implementations were provided -- both focusing on different aspects of the Blueprint

- **Demonstrator 1**
  - main focus was put on IMAS compatibility and ability to search, browse and access source data
- **Demonstrator 2**
  - main focus was put on various means of comparing data coming from various experiments

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Demonstrator 1 - focus on data ingestion

Demonstrator 1 uses already existing tools:

- IMAS - Integrated Modelling and Analysis Suit
- UDA - Universal Data Access (remote data access)
- Summary IDS - Summary IDS - Interface Data Structure

Currently we collect data from Summary IDS and Dataset Fair but we are not limited to only these IDSes

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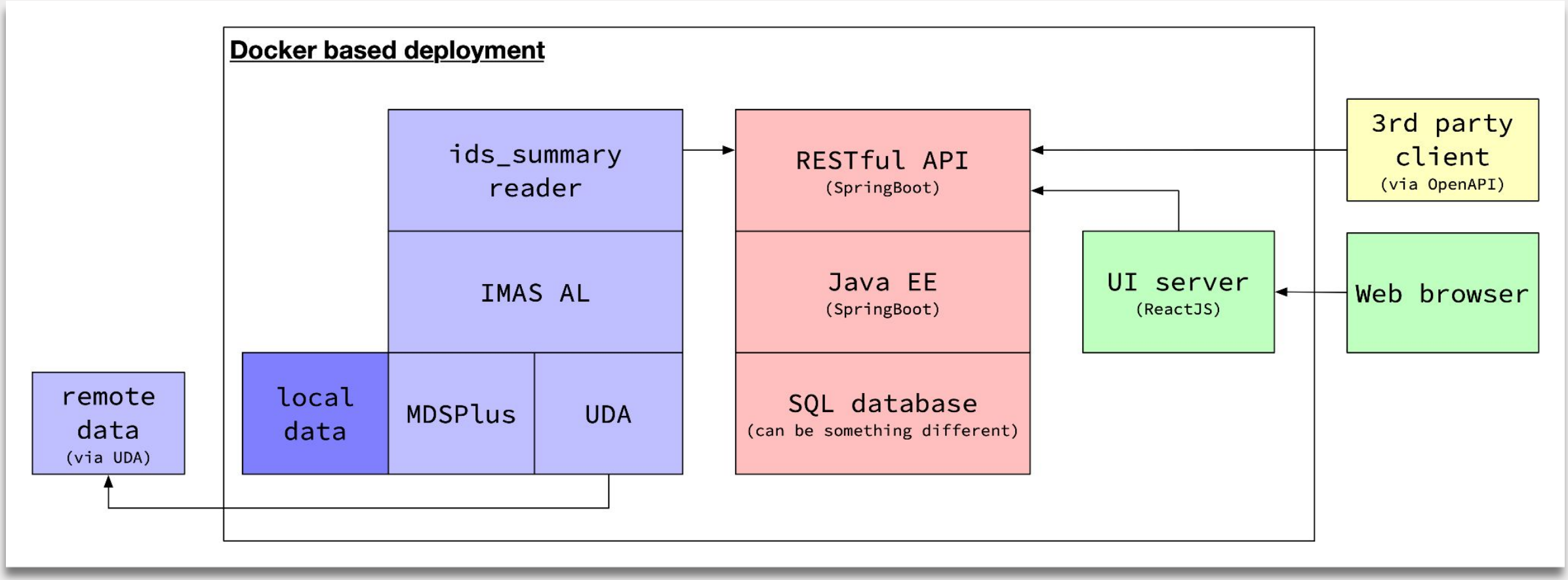
Demonstrator 1 - focus on data ingestion



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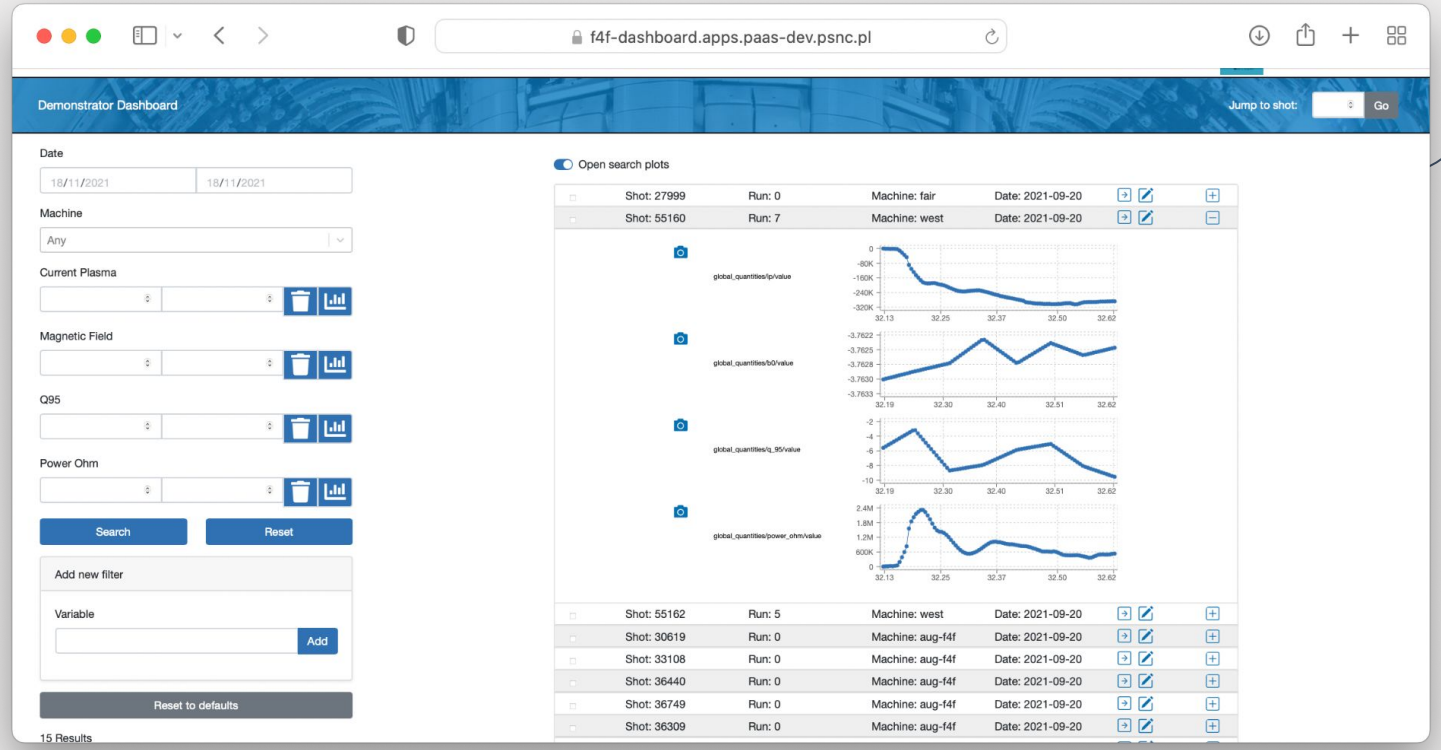
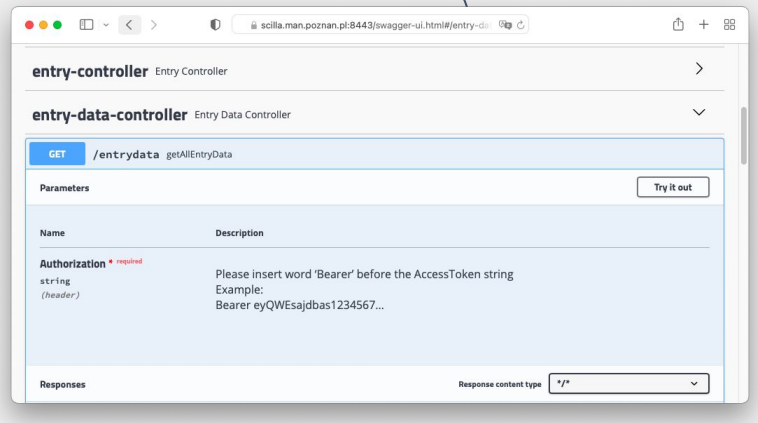
Demonstrator 1 - focus on data browsing

Demonstrator 1 provides also means of accessing data



ReactJS based UI

OpenAPI
(documentation provided by Swagger)



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Demonstrator 2 - reproducible, sharable

Demonstrator 2 was developed to validate usage of YAML files as a definition of computational experiments

- Perceives computational experiments as a composition of steps
- Each step applies a signal processing tool to the previous step's outputs
  - Some steps are distributed, some need to bring results together
- Experiment execution is triggered by a YAML file
  - The YAML file fully specifies what tools/versions to compose and how, a fully reproducible computational experiment
- Final outputs are visualized

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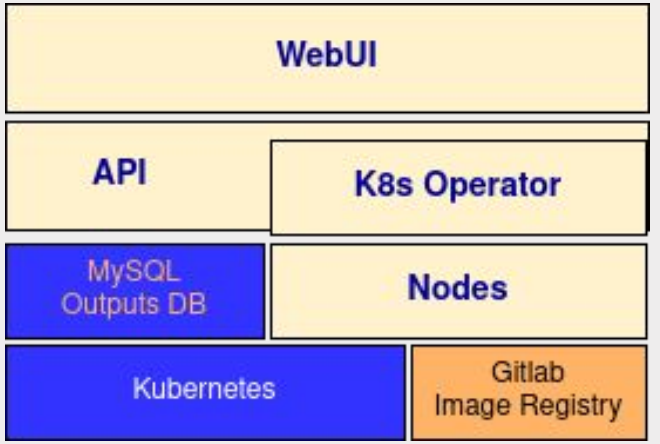
Demonstrator 2 - Distributed computation

Demonstrator 2 was designed with Cloud deployment in mind - distributed processing

- **k8s** application orchestrating Docker containers - each implementing a single step
- Custom **k8s** operator that parses YAML in order to design the final structure of the processing pipeline
- Docker pulls images from CI/CD
- CI/CD based builds - to avoid manual actions
- User interacts via **REST API** and a **WebUI**



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Summary

- **Demonstrator 1**
  - Tries to mimic Blueprint Architecture in as many details as possible
  - Maximizes value of existing infrastructure - without breaking backward compatibility
- **Demonstrator 2**
  - More radical approach - "breaks" the current architecture
  - Tests concepts and technologies for eventual transfer into the Blueprint Architecture

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Questions?

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