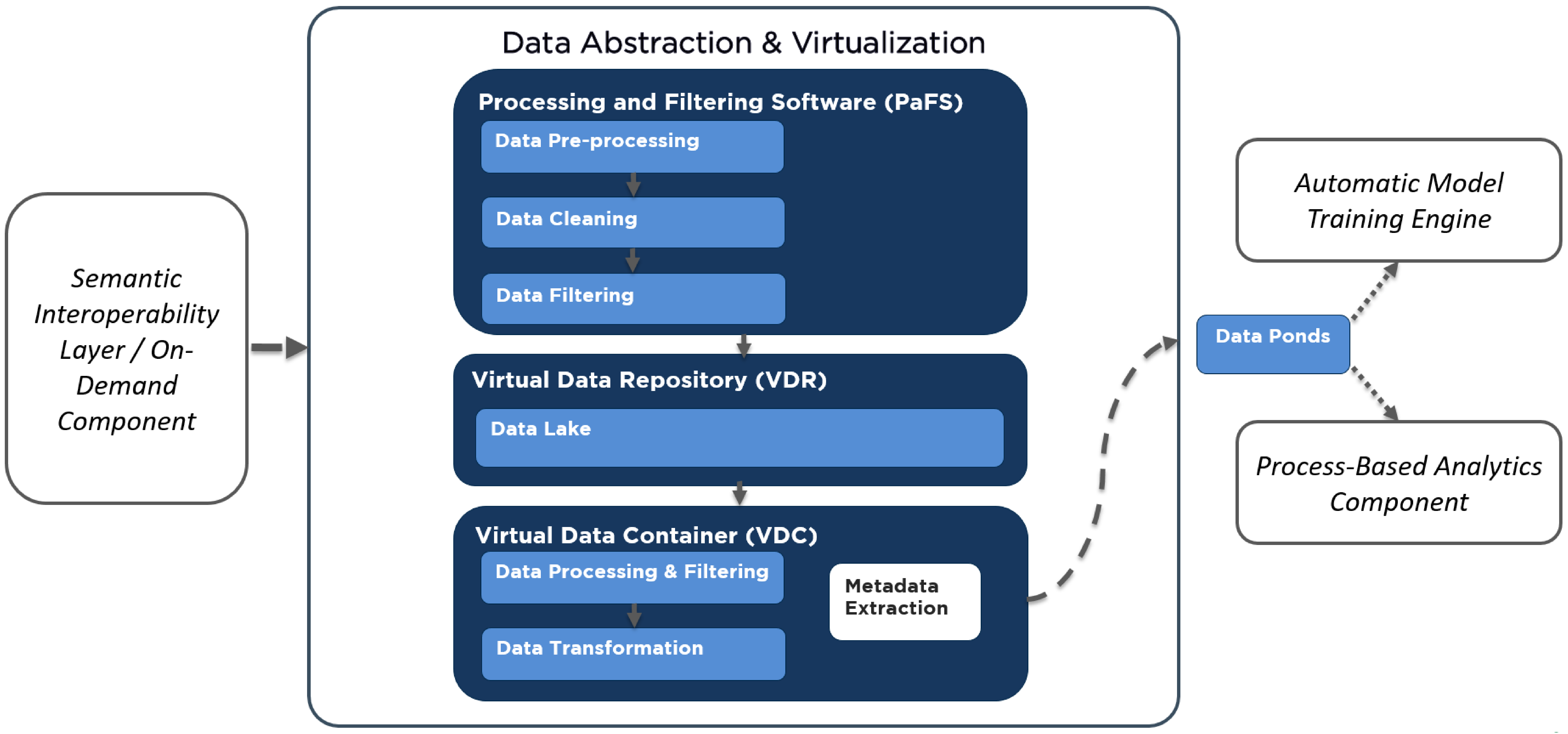
Data Abstraction and Virtualization

DataPorts
Data Platform for the Connection of Cognitive Ports

Overview

Data Abstraction and Virtualization component is responsible for correctly preparing data input from different sources inside the generic DataPorts architecture, maintaining metadata from all feeds, and finally making available the cleaned and processed datasets to any eventual client.

Component at a glance


Semantic Interoperability Layer / On-Demand Component
Data Abstraction & Virtualization
Processing and Filtering Software (PaFS)
Data Pre-processing
Data Cleaning
Data Filtering
Virtual Data Repository (VDR)
Data Lake
Virtual Data Container (VDC)
Data Processing & Filtering
Data Transformation
Metadata Extraction
Data Ponds
Automatic Model Training Engine
Process-Based Analytics Component

Goals of the component

- **Data Processing Mechanisms:** Process, clean and filter the incoming data in order to enable developers building cognitive data-driven applications on top of the DataPorts Platform
- **Data Management:** Store and deliver historical Data as a Service, putting emphasis on QoD and QoS
- **Metadata Extraction:** Calculate and provide useful metadata for all the available datasets
- **Data Transformation:** Transforms the data into the requested format, such as JSON, Parquet or CSV
- **Data Services and Analytics Integration:** The component will be integrated with the Semantic Interoperability layer, the Automatic Model Training Engine and the Process-Based Analytics component of the DataPorts Platform

This project has received funding from the European Union’s Horizon 2020 research and innovation programme under grant agreement No 871493

Data Abstraction and Virtualization

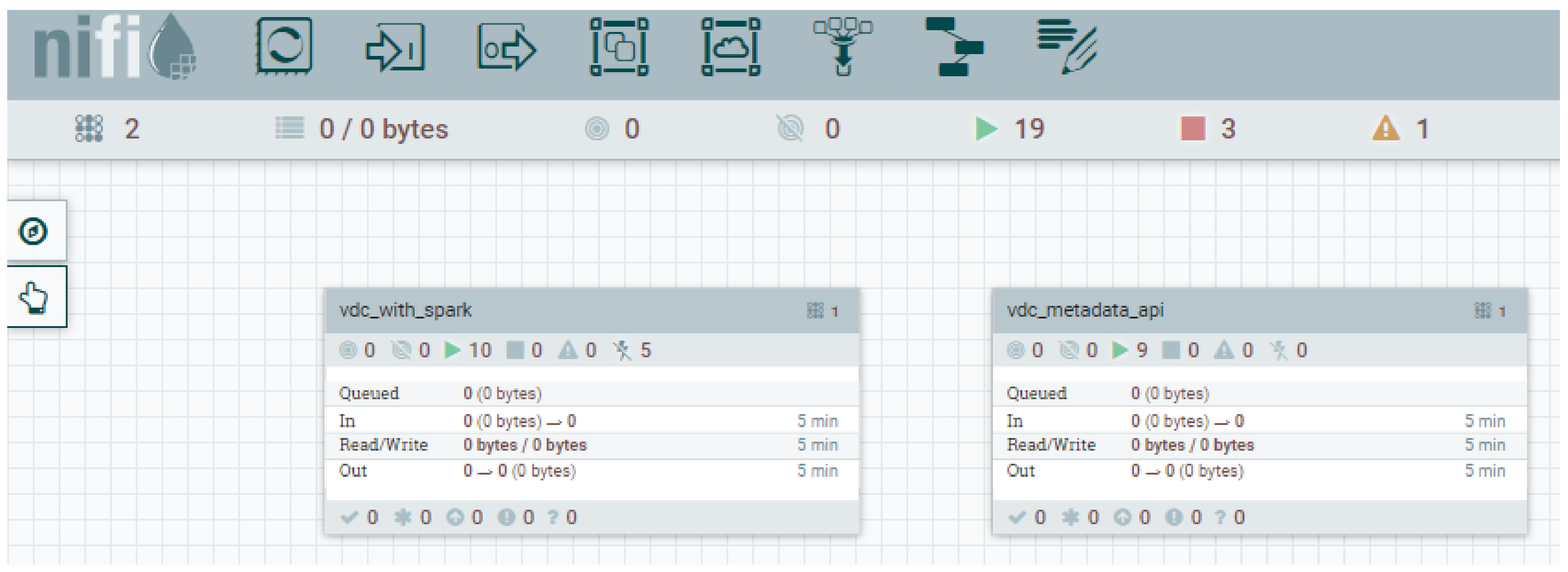
DataPorts
Data Platform for the Connection of Cognitive Ports

About the component

- **Pre-Processing and Filtering Software:** PaFS is responsible for the initial pre-processing, cleaning and filtering of the datasets
- **Virtual Data Repository:** VDR is the distributed infrastructure where all the pre-processed, cleaned, and filtered datasets, coming from PaFS, are saved
- **Virtual Data Container:** VDC is the interface through which communication with data recipients is achieved, for data stored in VDR to be made available

Target users

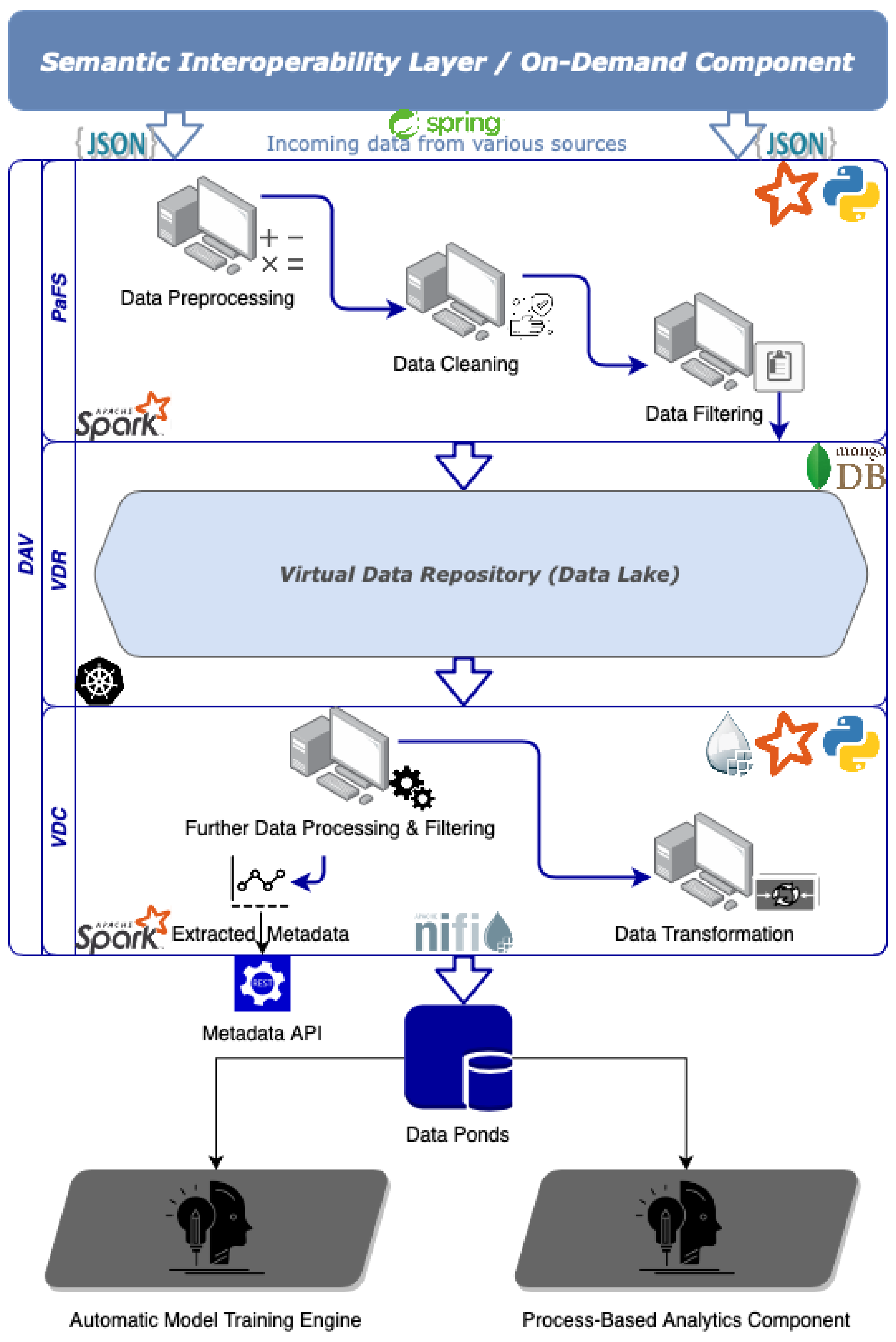
- Data Providers and Data Owners
- Data Consumers
- Application Developers
- Internal Platform Components



2 | 0 / 0 bytes | 0 | 0 | 19 | 3 | 1

vdc_with_spark 1
0 0 10 0 0 5
Queued 0 (0 bytes)
In 0 (0 bytes) → 0 5 min
Read/Write 0 bytes / 0 bytes 5 min
Out 0 → 0 (0 bytes) 5 min
0 0 0 0 ? 0

vdc_metadata_api 1
0 0 9 0 0 0
Queued 0 (0 bytes)
In 0 (0 bytes) → 0 5 min
Read/Write 0 bytes / 0 bytes 5 min
Out 0 → 0 (0 bytes) 5 min
0 0 0 0 ? 0



Semantic Interoperability Layer / On-Demand Component
JSON
spring
Incoming data from various sources
JSON
DAV
PaFS
Data Preprocessing
Data Cleaning
Data Filtering
Spark
VDR
mongoDB
Virtual Data Repository (Data Lake)
VDC
Further Data Processing & Filtering
Extracted Metadata
Spark
nifi
Data Transformation
Metadata API
Data Ponds
Automatic Model Training Engine
Process-Based Analytics Component

Use case scenarios

- Retrieve historical data
- Process, store and deliver cleaned data
- Export metadata
- Apply filtering rules to the data
- Internal components integration
- Use of the data by external apps
- Reuse of data by existing tools

Benefits

- **Interoperability:** Provide an abstraction layer between data providers and consumers
- **Less development effort:** Let the application developers just define the content and the format of the needed data and rely on the component to deliver them properly and timely
- **Scalability:** Ability to scale in a fully automated way based on the workload, aiming at optimizing resource utilization and decreasing response times
- **Ease of use and deploy:** Provide a common access layer, where the data consumers simply define queries as filtering rules in a unified format, regardless of the underlying storage technology

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 871493