

# Comparative analysis of data stations in federated health data systems

Table 1 lists known examples of existing health data platform architectures along these two trade-offs.

Table 1: Broad categorization of health data platforms

	primary	secondary
<b>centralized</b>	openHIE [1], Digizorg, Nordics	kapseli, Mayo, ...
<b>decentralized</b>	RSO Zuid Limburg, Twiin portaal, ...	many federated analytics research networks such as x-omics programme and EUCAIM

## 1 EUCAIM

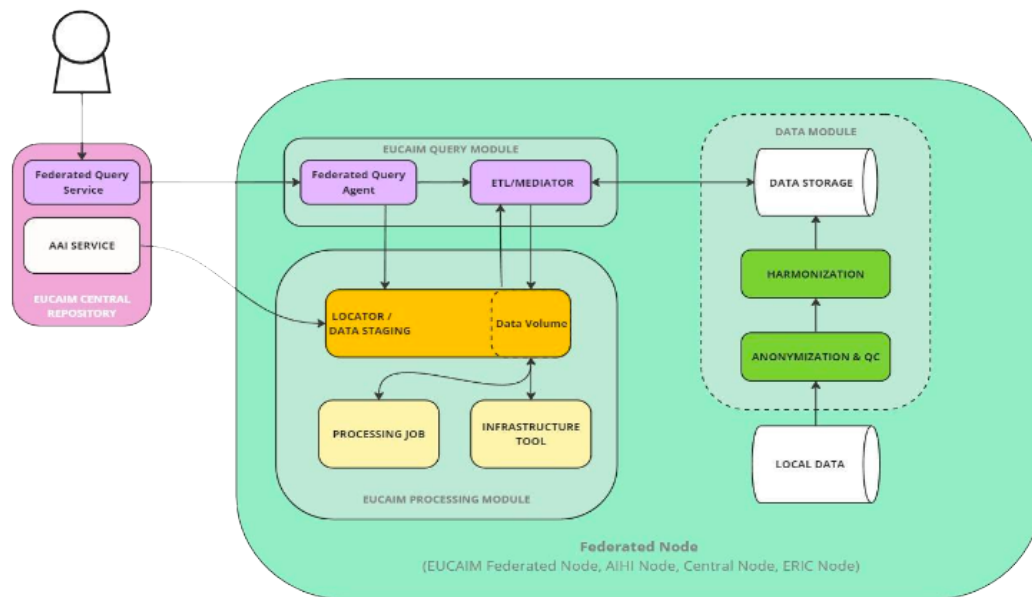


Figure 1: High-level architecture of EUCAIM node

## 2 PLUGIN

The PLUGIN federated learning network is an ongoing initiative initiated in 2022 by DHD, IKNL and Expertisecentrum Zorgalgoritmen (EZA) [2]. Its main objective is to realize a federated learning network that includes all 70 hospitals in the Netherlands. The PLUGIN network is intended to support a wide variety of use-cases including:

- AI-assisted coding (ICD10) based on supervised learning with language models

- Automated data submission for national registries such as the Dutch Cancer Registry managed by IKNL
- Descriptive analytics, for example, performance analysis across hospitals for benchmarking purpose

The architecture of

### **3 Fair Data Cube**

The Fair Data Cube [3] is a framework for the storage, analysis and integration of multi-omics data. Fair Data Cube reuses and extends existing open software components/modules and initiatives. This includes the FAIR Data Point [4] and vantage6 [5]. Further elements of the FDCube are the Investigation-Study-Assay (ISA) metadata framework[6, 7] for capturing general study metadata, sample (including basic sample characteristics), and assay metadata, and the Phenopackets [8] standards for capturing phenotypic description of a patient/sample. The concept of the FDCube is illustrated Figure 2.



by SPARQL, the researcher could further run follow-up analyses on the target dataset by raising a computation request to the Vantage6 server and retrieve the returning results from the data station via Vantage6.

## 4 Swiss Personal Health Network

The Swiss SPHN network [9] as an example of a data station that uses graph databases both for the data and metadata

## 5 Datastation-as-a-Service in KIK-V

The Datastation-as-a-Service as defined by the Zorginstituut for federated analytics using privacy-enhancing technologies [10]

## 6 Cumuluz data station

[TO DO]

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