

SARA

Smart Analysis and Research Assistant

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Reporter: Mrs. Amira BELHEDI

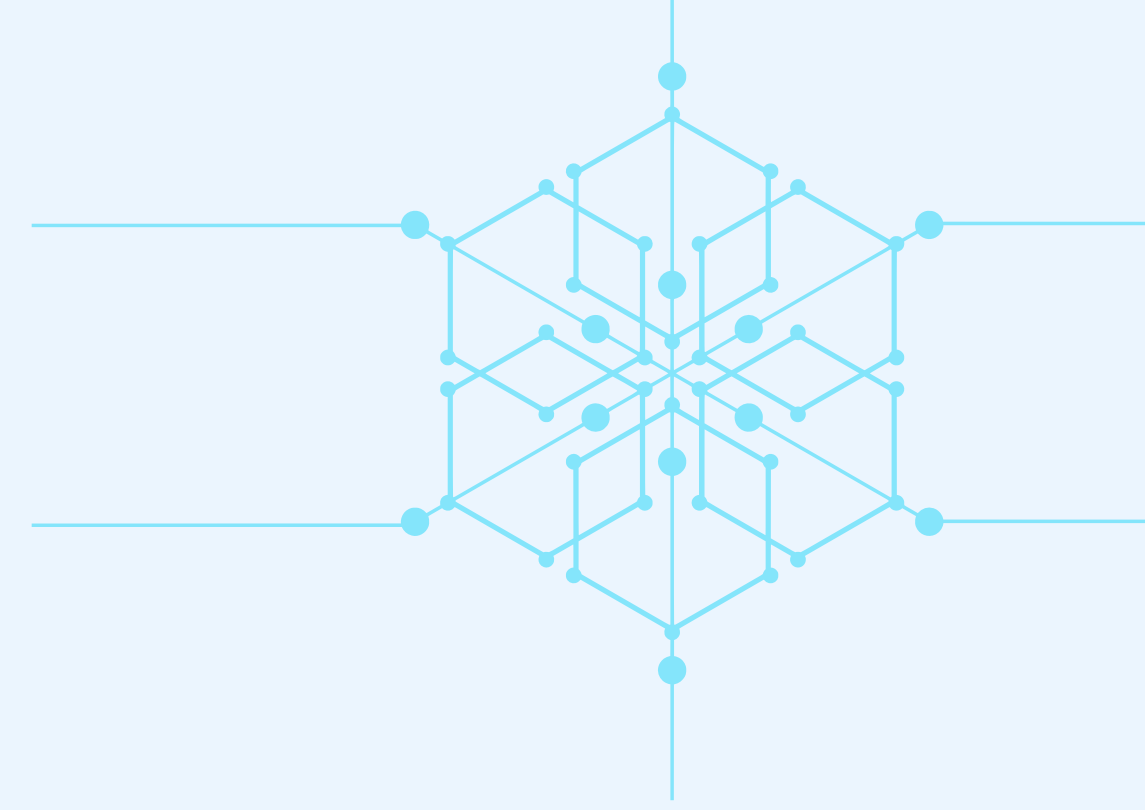
Professional Supervisor: Mr. Rentaro YOSHIOKA

Examiner: Mr. Moez ATTIA

Academic Supervisor: Mrs. Asma NAJJAR

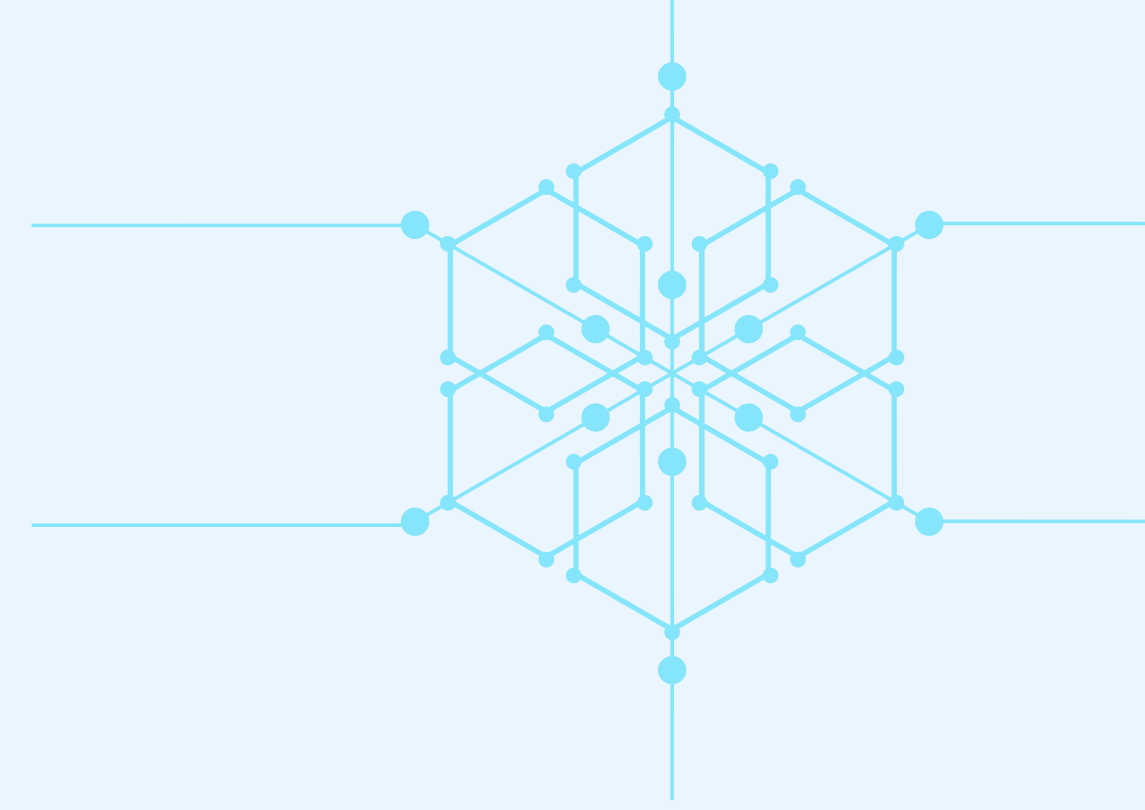
May 31, 2025 — Academic Year 2024-2025

Presentation Roadmap



- 1** *Context & Motivation*
- 2** *Problem Statement*
- 3** *Proposed Solution*
- 4** *Requirements*
- 5** *System Conceptual Design*
- 6** *Implementation*
- 7** *Conclusion & perspective*

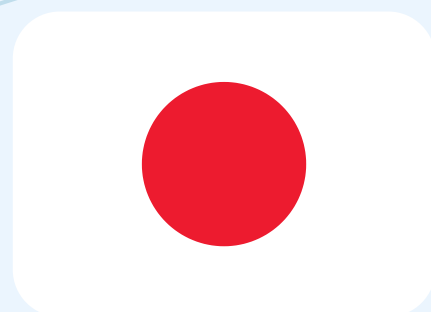
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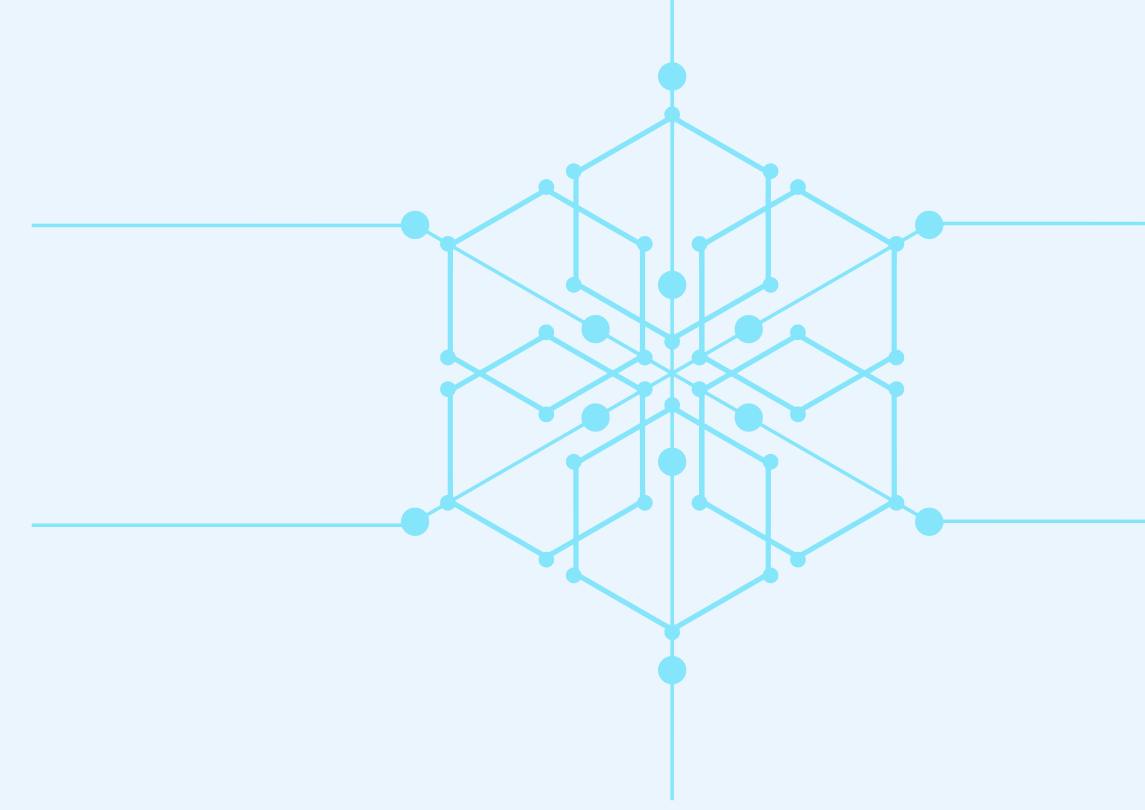
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Collaborative Partnership

“THAKIA DAIGAKU”



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Problem Statement



**Researchers juggle
disconnected tools**



**High-cost, vendor-locked
analytics solutions**



BI tools cater to business, not academia.

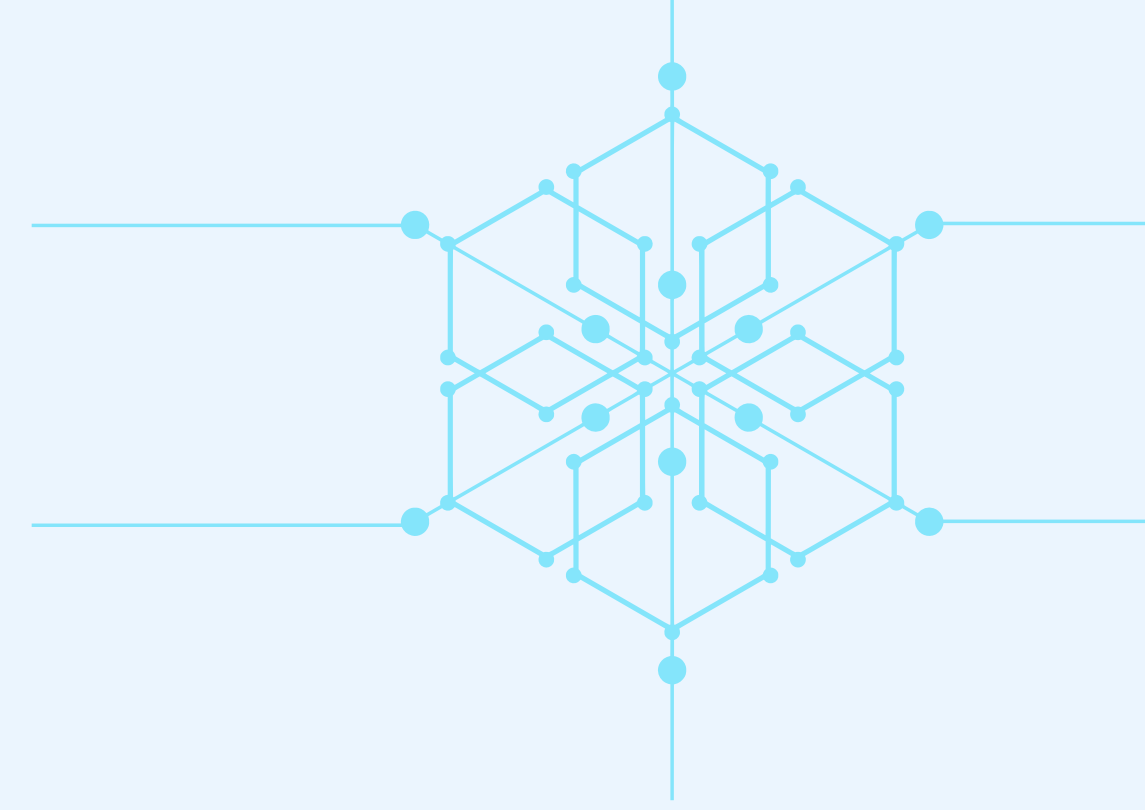


**No unified platform for live
and archived data**



**Limited configurability for
academic needs**

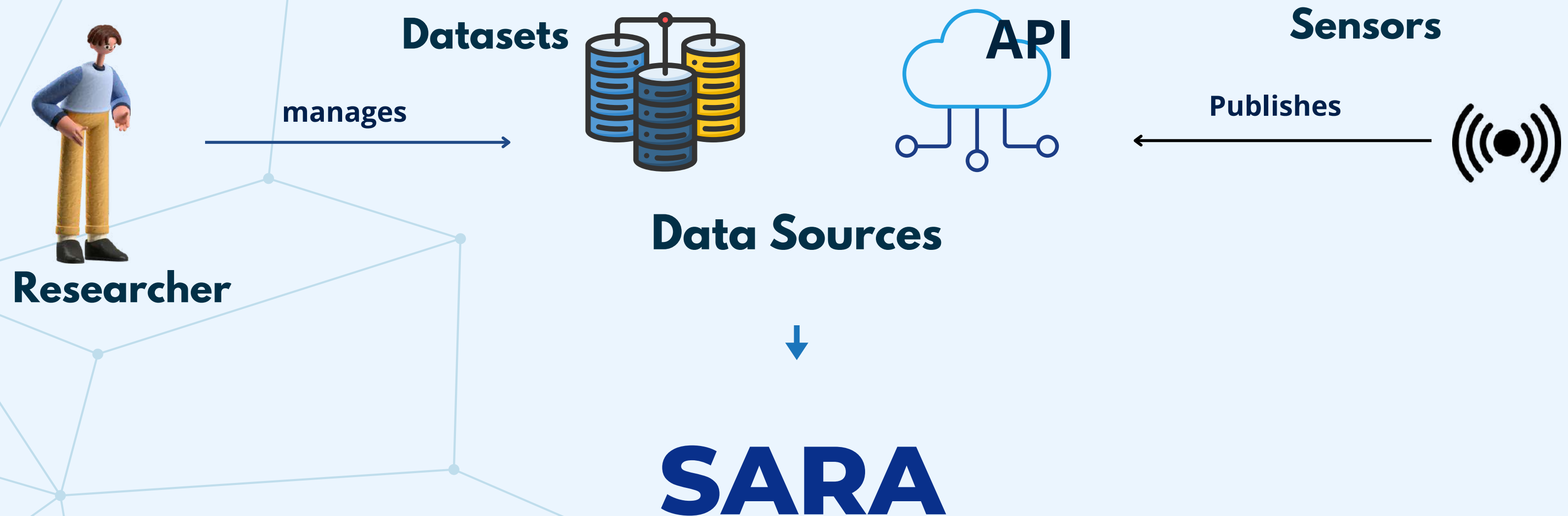
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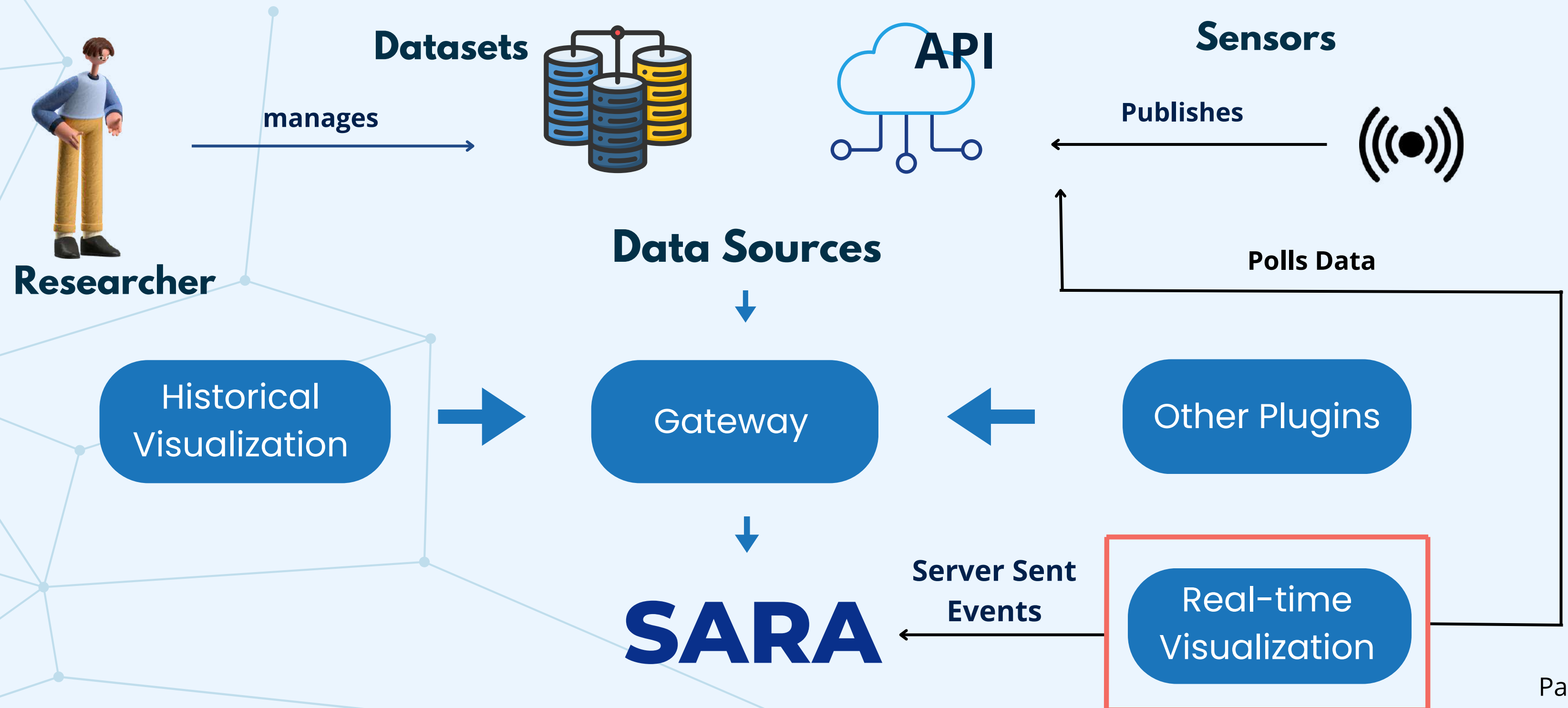
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1. Data Ingestion



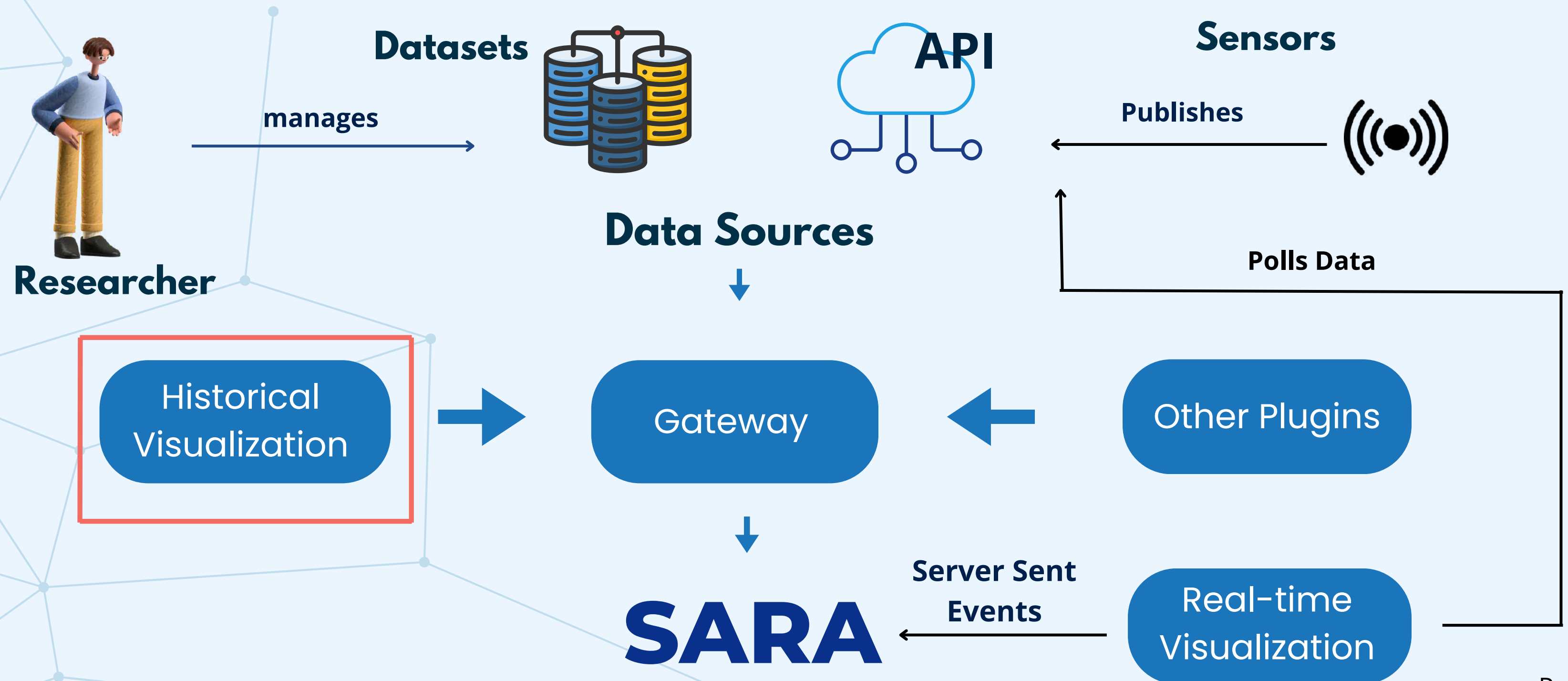
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2. Data Visualization



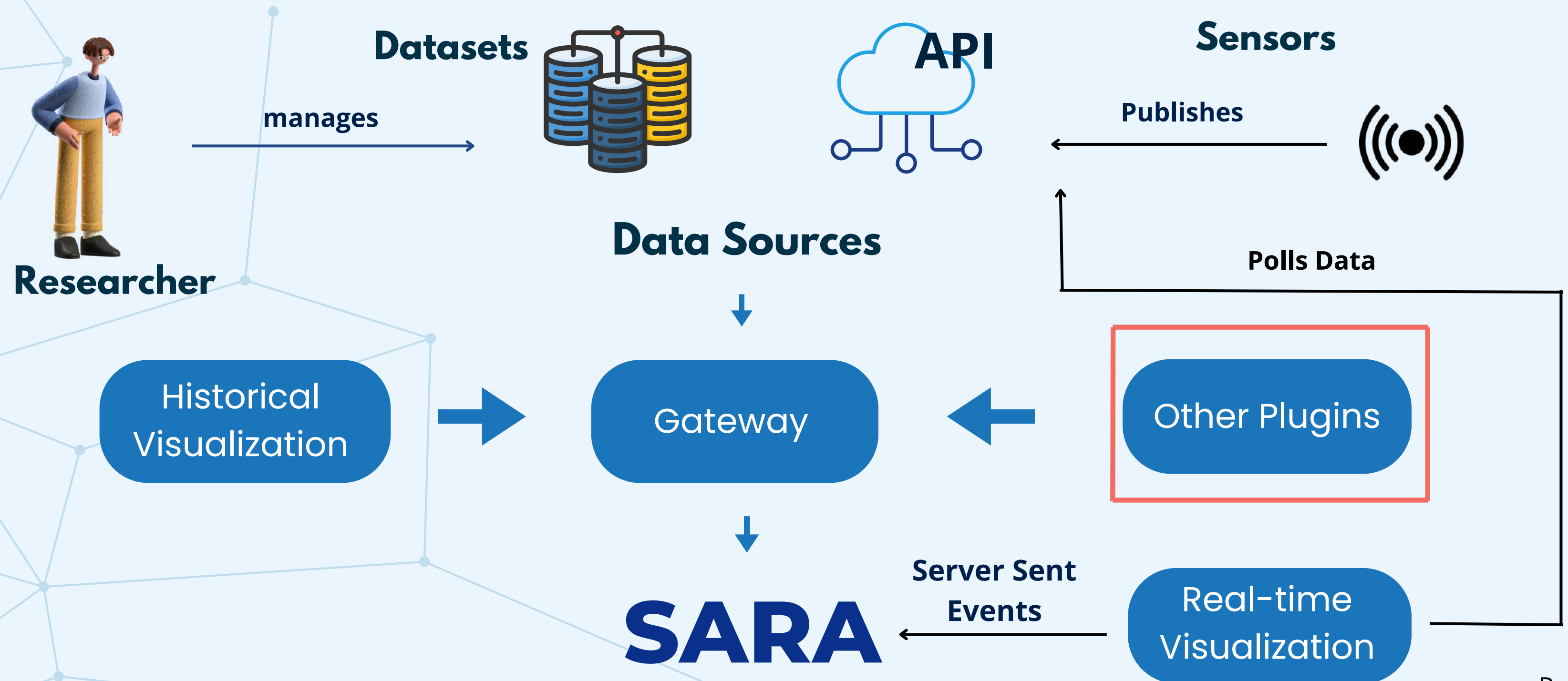
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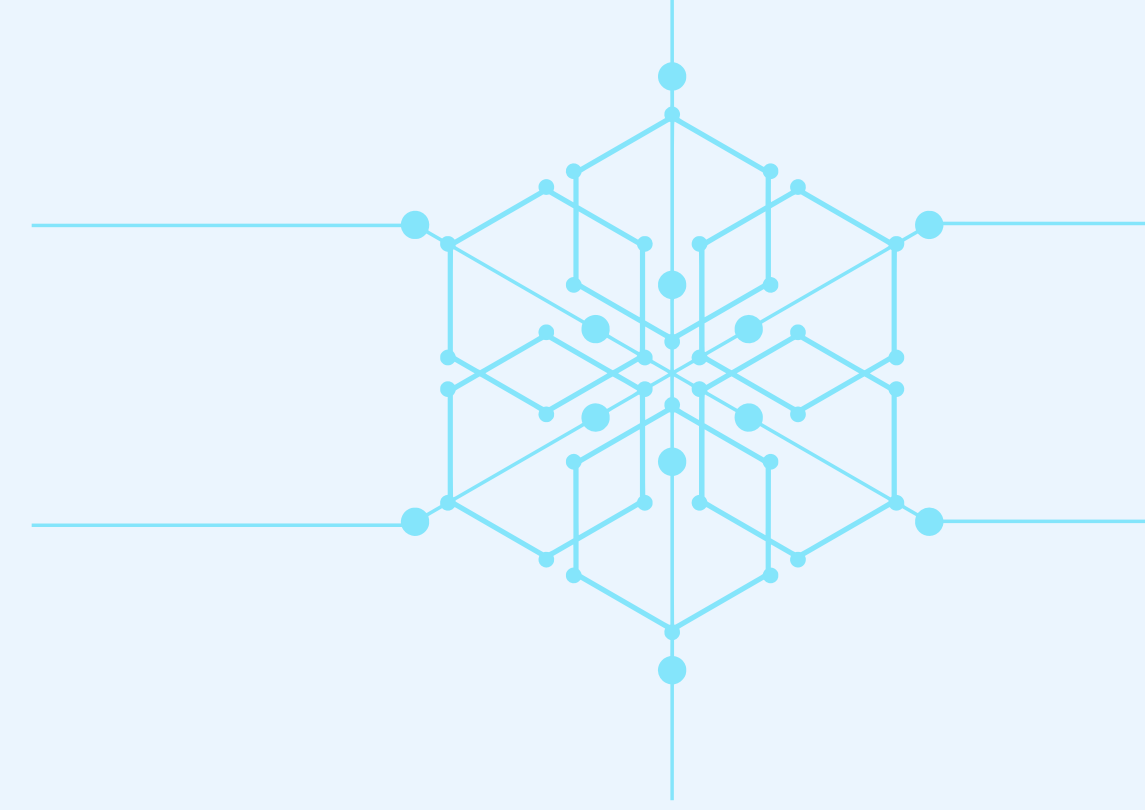


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3. Extensibility



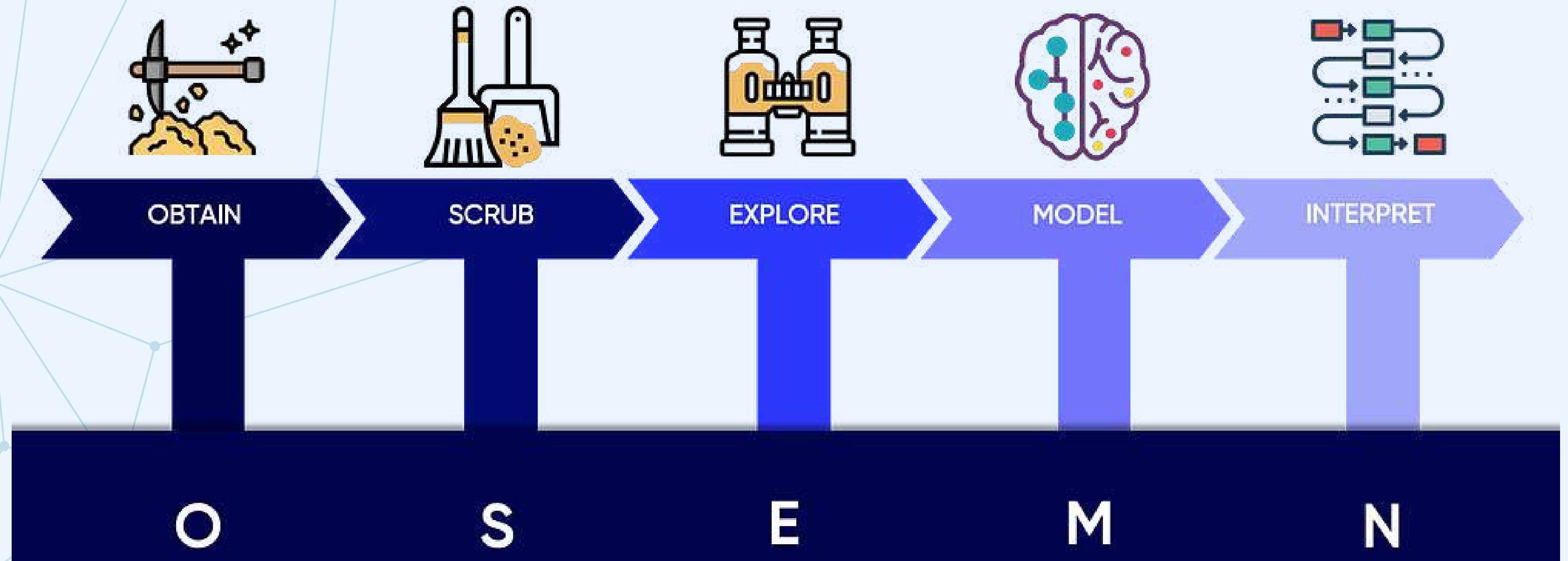
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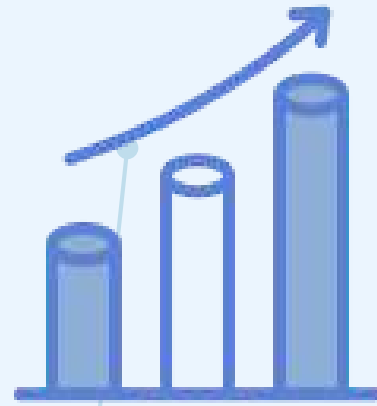
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Functional Requirements

- **OSEMN** : A framework for data science and analytics platforms, outlining five key stages:



Non Functional Requirements:



- **Scalability**



- **Modularity**



- **Performance**

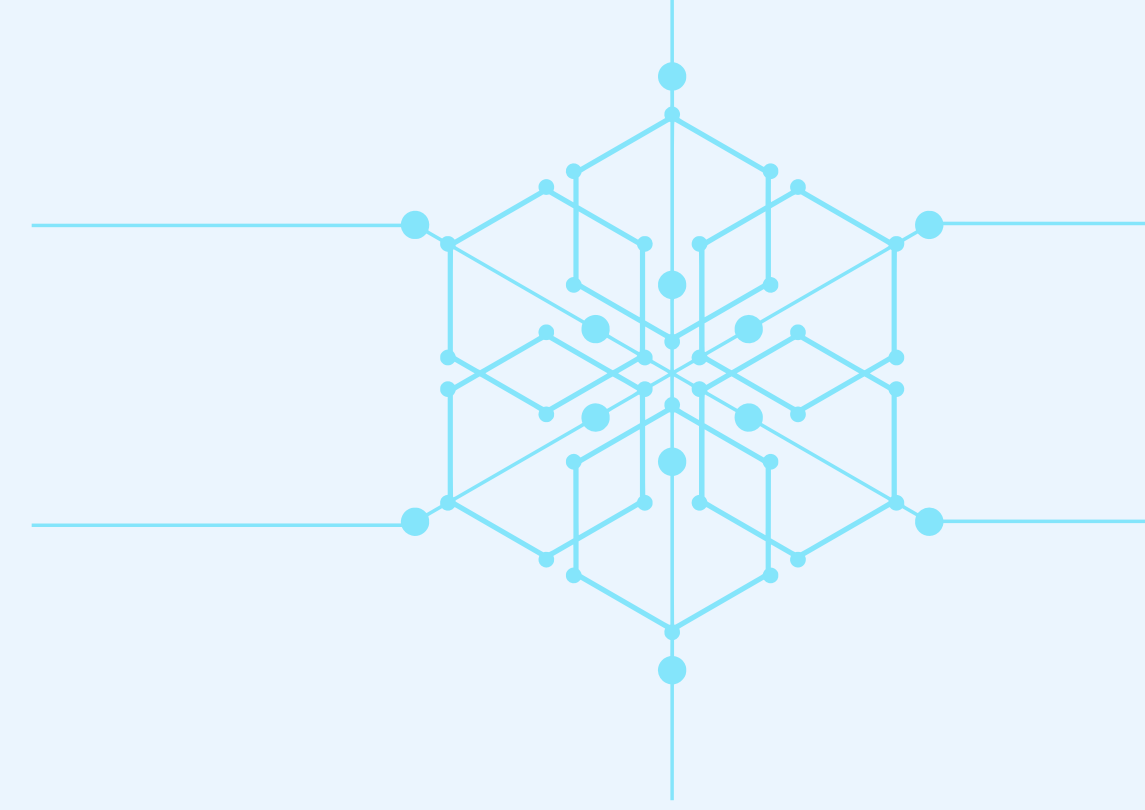


- **Security**



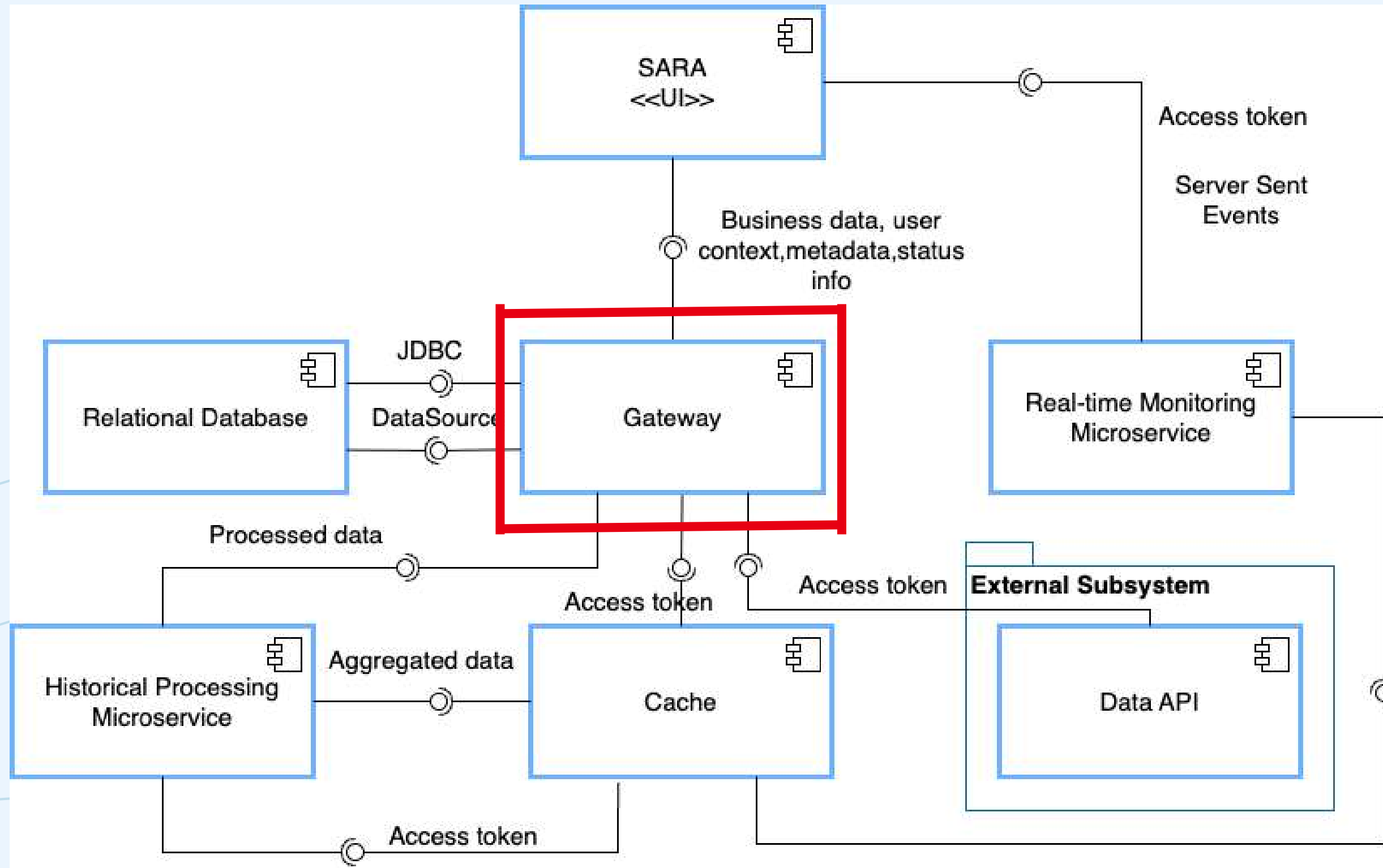
- **Usability**

Presentation Roadmap

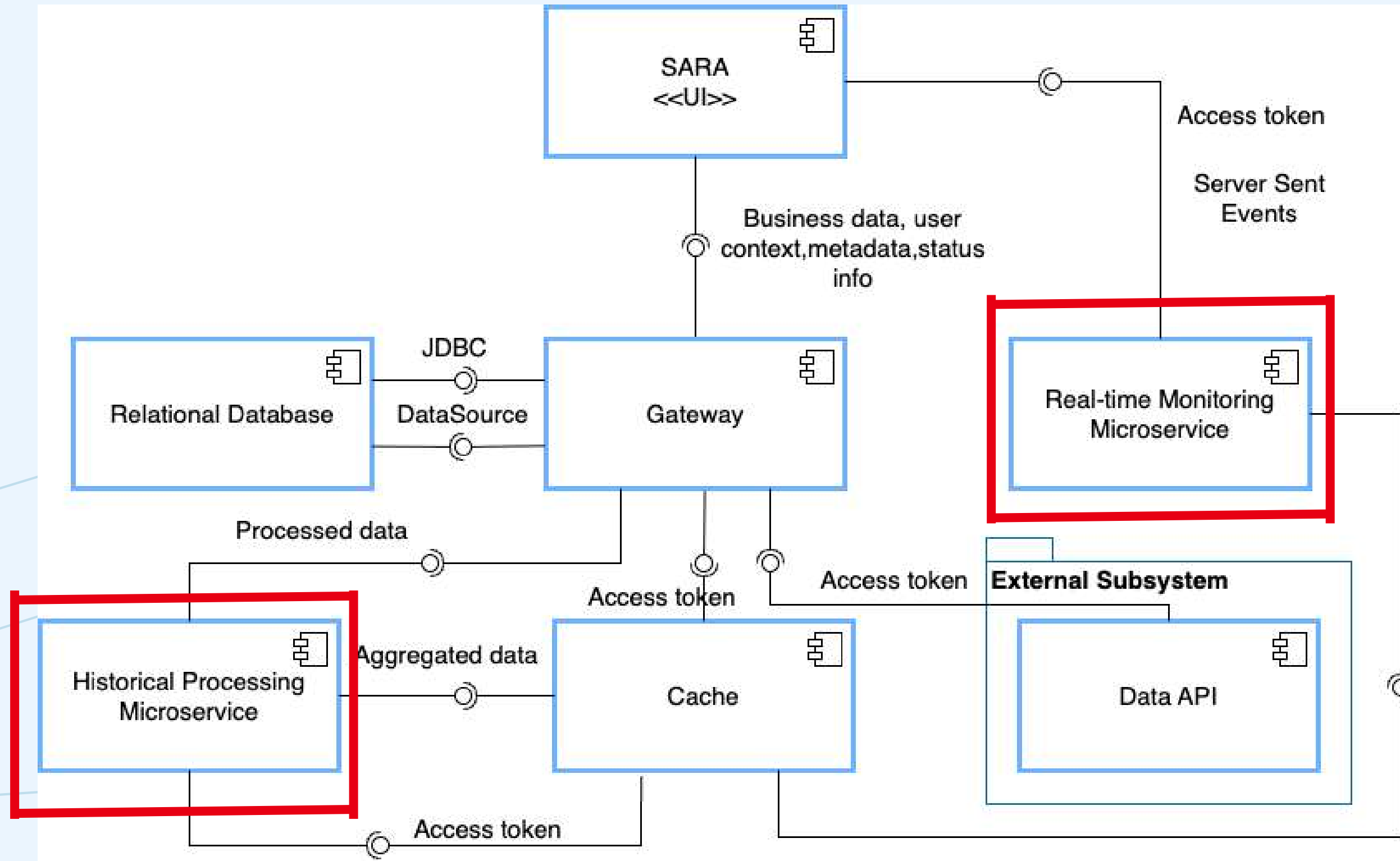


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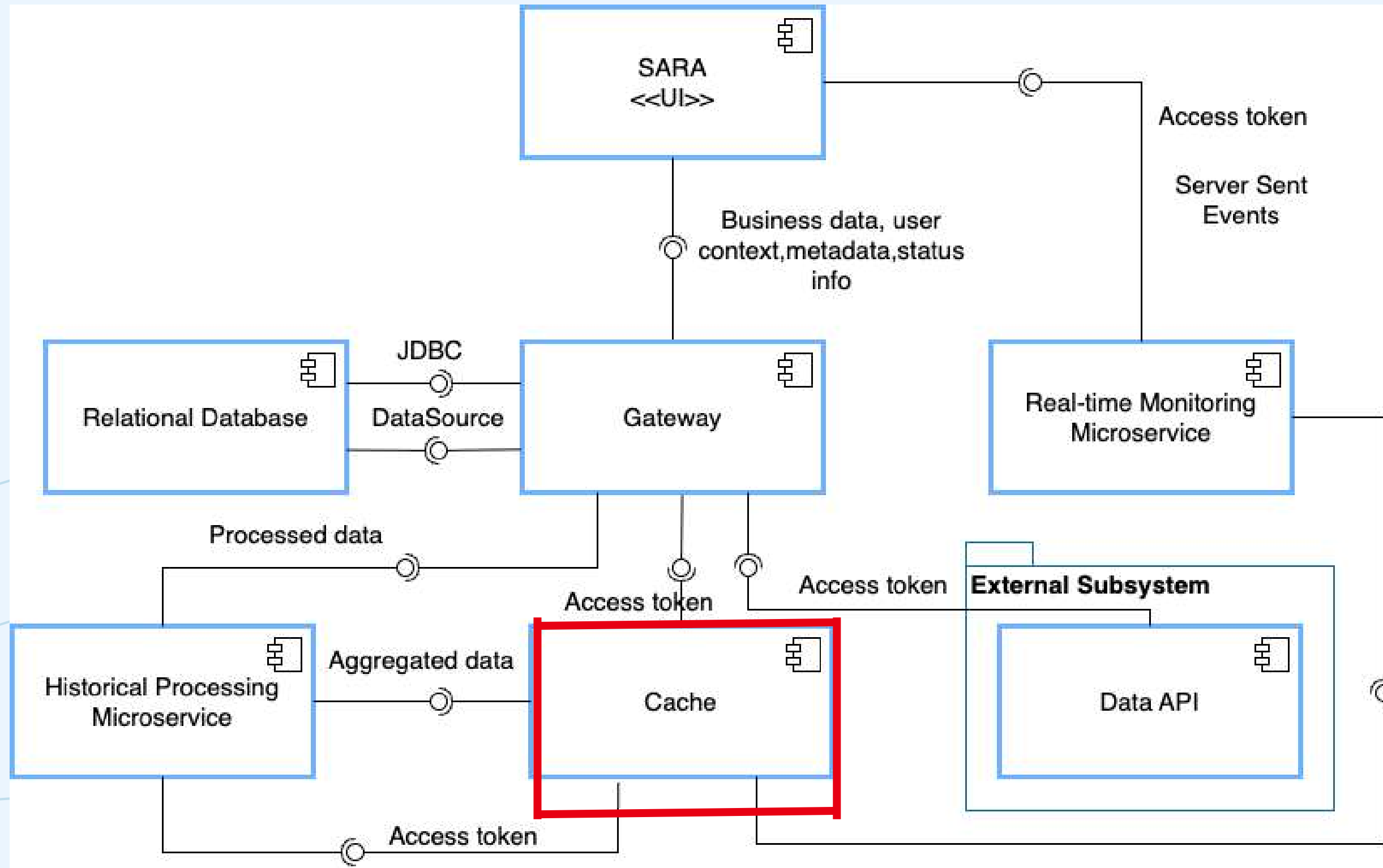
Component Diagram



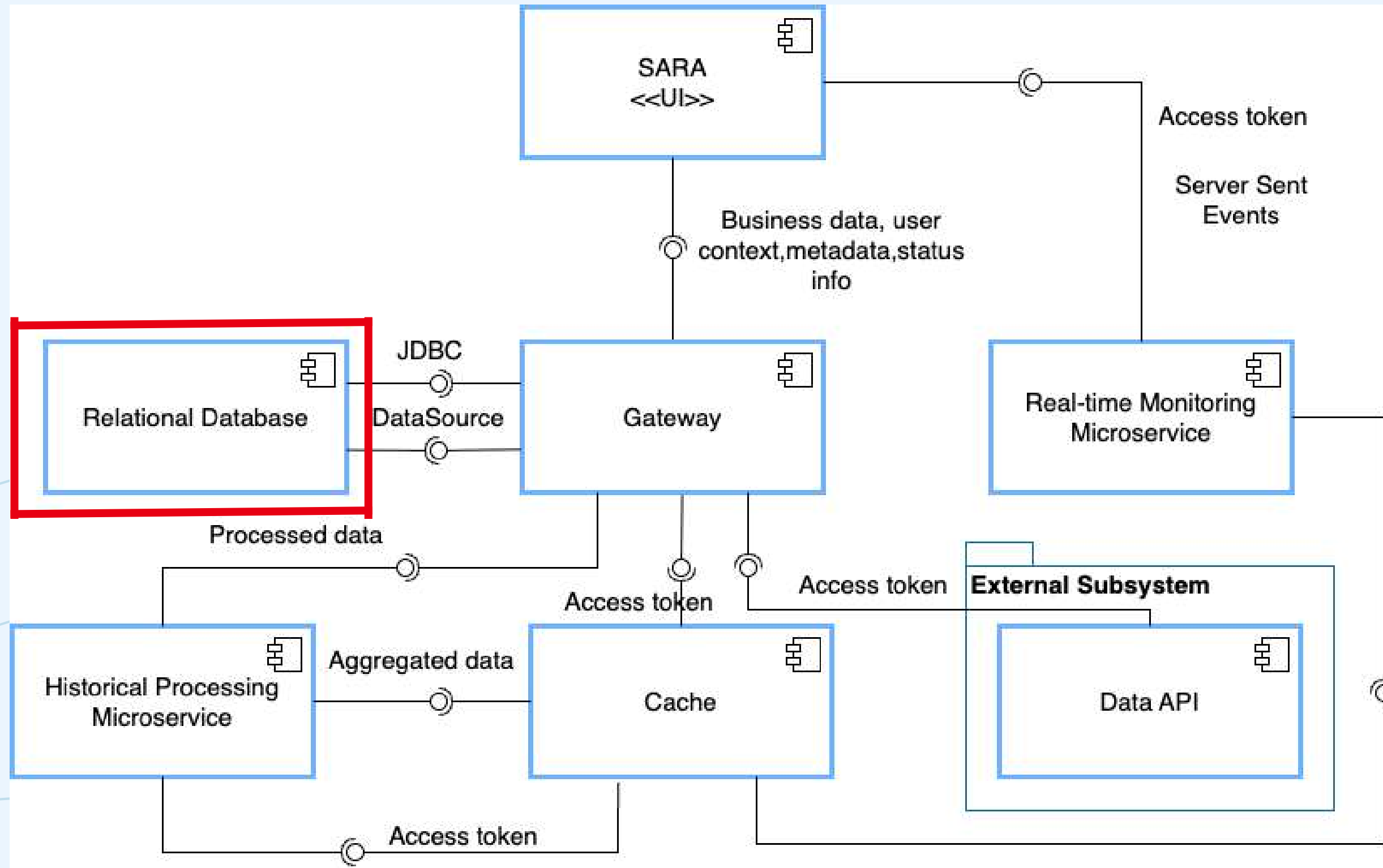
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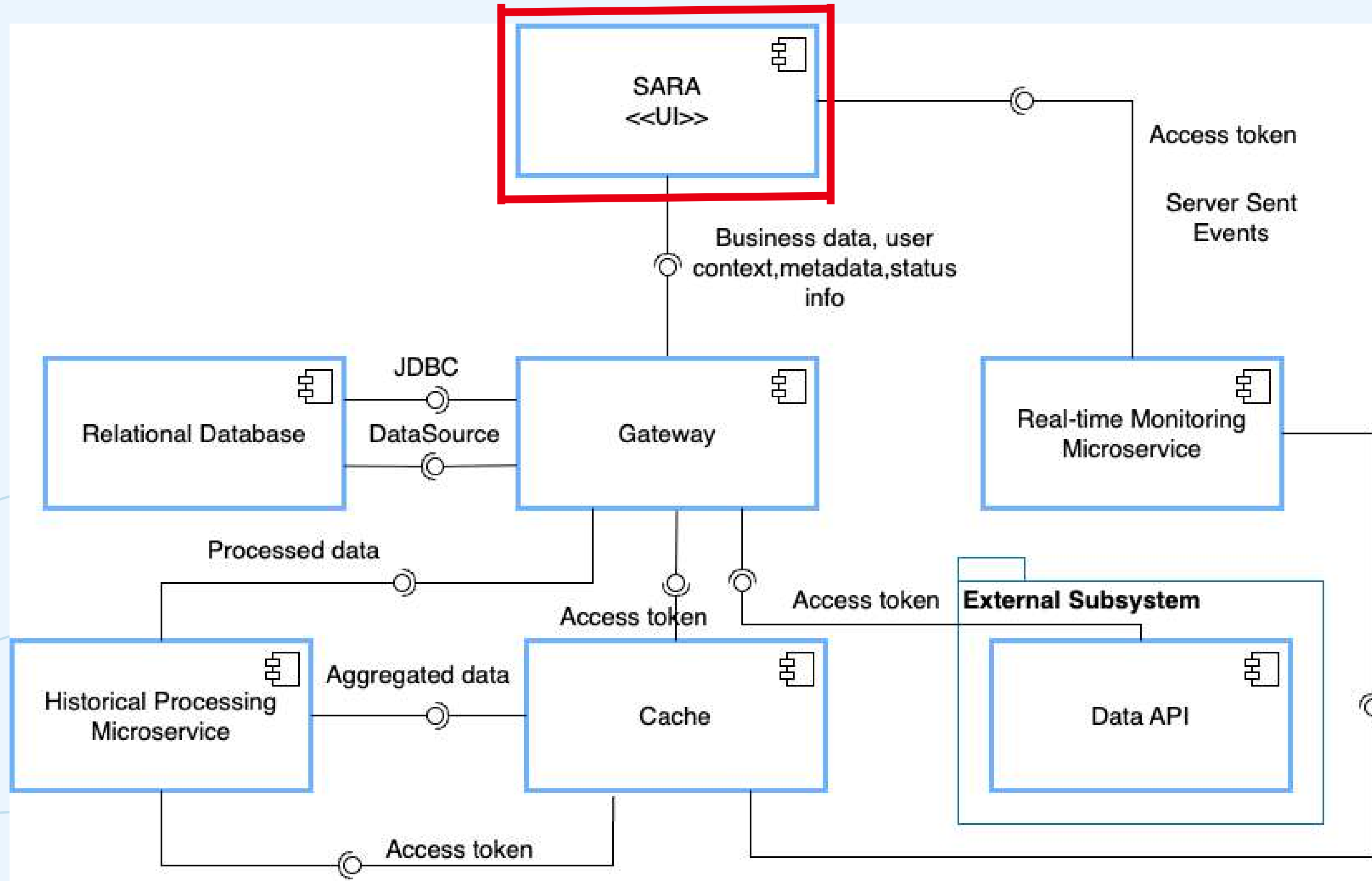
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Component Diagram



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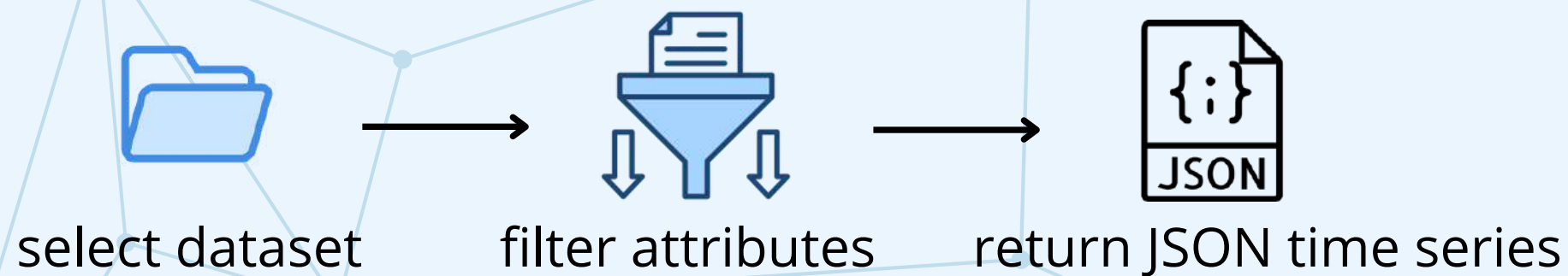


Visualize Historical Data

- The workflow **diverges** based on the **data source** choice.

1. **Custom Dataset** as Data Source

Simple flow



2. **Sensor Network** as Data Source

Complex flow

Invoke Historical-Processing
Microservice

Design Solutions: Temporal Aggregation & Caching

1 .Adaptive **Caching** Strategy

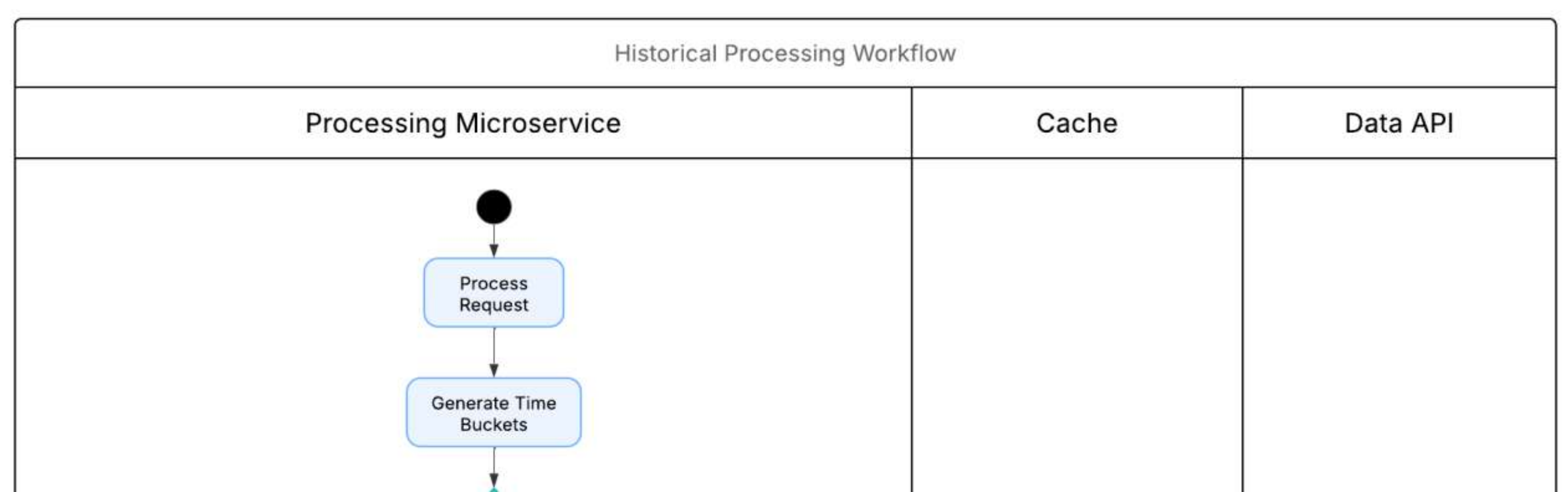
- Faster Roll-up from cache



2 . Hierarchical Temporal **Aggregation**

- Minute → Hourly → Daily → Monthly → Yearly
- Aggregation **metrics** include: **Min, Max, Sum, Median, Mean, Skewness.**

Historical Processing Workflow (1/3)



1. Request **initiation**

Time range $[t1, t2]$, Aggregation level L ,
Metric m

2. **Time-buckets** generation

Buckets $B = \{Bk\}_{K=1}^N$

Visualize Real-Time Data

1. Challenges

- Minute-by-minute sensor feeds → continual updates

2. Goal

- Low-latency, scalable streaming + per-sensor configurability

3. Approach

- **Design pattern:** Event Driven Architecture

