



## **Tracing of Messages in the UNICORE Workflow System**

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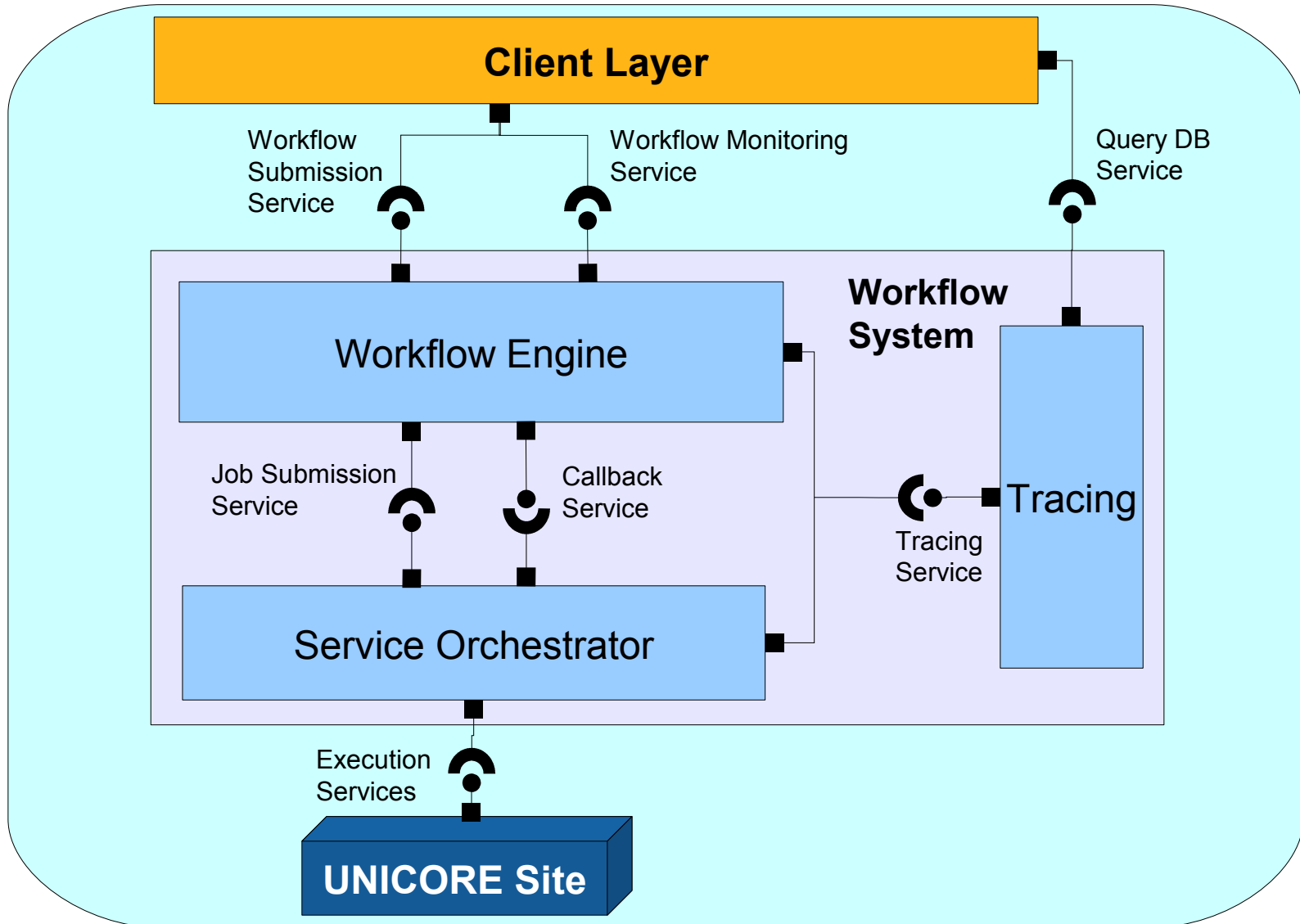
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# Introduction

- ▶ Part of the UNICORE workflow system
- ▶ First developed in the Chemomentum project
- ▶ Collects all messages sent by the service orchestrator and workflow engine
- ▶ Stores them in a relational database
- ▶ Additional attributes
  - ▶ Type of message
  - ▶ Source and target of the message
  - ▶ Timestamp
- ▶ Used to have a simple querying mechanism
  - ▶ Free text search in message content or a single attribute

# Overview



# Scope of this Work (1)

- ▶ Extension of the tracing service
- ▶ New queries
  - ▶ Time based queries
  - ▶ Nested Boolean combinations
- ▶ Restriction of returned number of results (memory!)
- ▶ Definition of result format
  - ▶ Set of attributes
  - ▶ Message count
- ▶ New attribute: User id (distinguished name)

# Scope of this Work (2)

- ▶ New plugin for the UNICORE Rich Client
- ▶ Two different views
  - ▶ Smooth view switching
  - ▶ Hierarchical graphs
    - ▶ Similar messages are merged, bird's eye view
  - ▶ Sequence diagrams
    - ▶ Each message shown, timing is visible
  - ▶ Extensible with new views
- ▶ GUI for defining nested Boolean queries
- ▶ Message traces stored on client side, can be viewed offline
- ▶ Challenge: lots of messages

# Application Scenarios

- ▶ Developers
  - ▶ Do the services send the expected messages at all?
  - ▶ Performance tweaks
    - ▶ Comparison of different service implementations, strategies
    - ▶ Identification of bottlenecks
- ▶ Administrators
  - ▶ Monitoring of services and resources
  - ▶ Usage statistics
- ▶ End users
  - ▶ Better insight into temporal and spatial aspects of workflow execution
  - ▶ Helps in optimizing workflow structure
  - ▶ Search for similar/related jobs or workflows

# Demo

# Future Work

- ▶ Further improve performance
- ▶ Improved handling of overlaps
- ▶ Non-linear time scales for sequence diagram view
- ▶ Usage reports
  - ▶ Different chart types: pie charts, bar charts, etc.
- ▶ Investigate: workflow replay, reproducibility of results