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environmental services infrastructure with ontologies

# **Adaptable Environmental Service Chains: The Challenges of Distributed Execution and Information Collection**

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# Outline

- Introduction
- Goal of the Paper
- Data-Driven Process Adaptation
- Proposed Approach
  - Architecture
  - Semantic Context Space Engine
  - Service Orchestration Engine
- Conclusions

- Environmental Information Systems (EIS) are shifting towards the Service Oriented Computing (SOC) paradigm
  - Several initiatives and directives are spurring this transformation, e.g. INSPIRE, GMES or SEIS
- Service Process Adaptation is being pursued since the onset of SOC

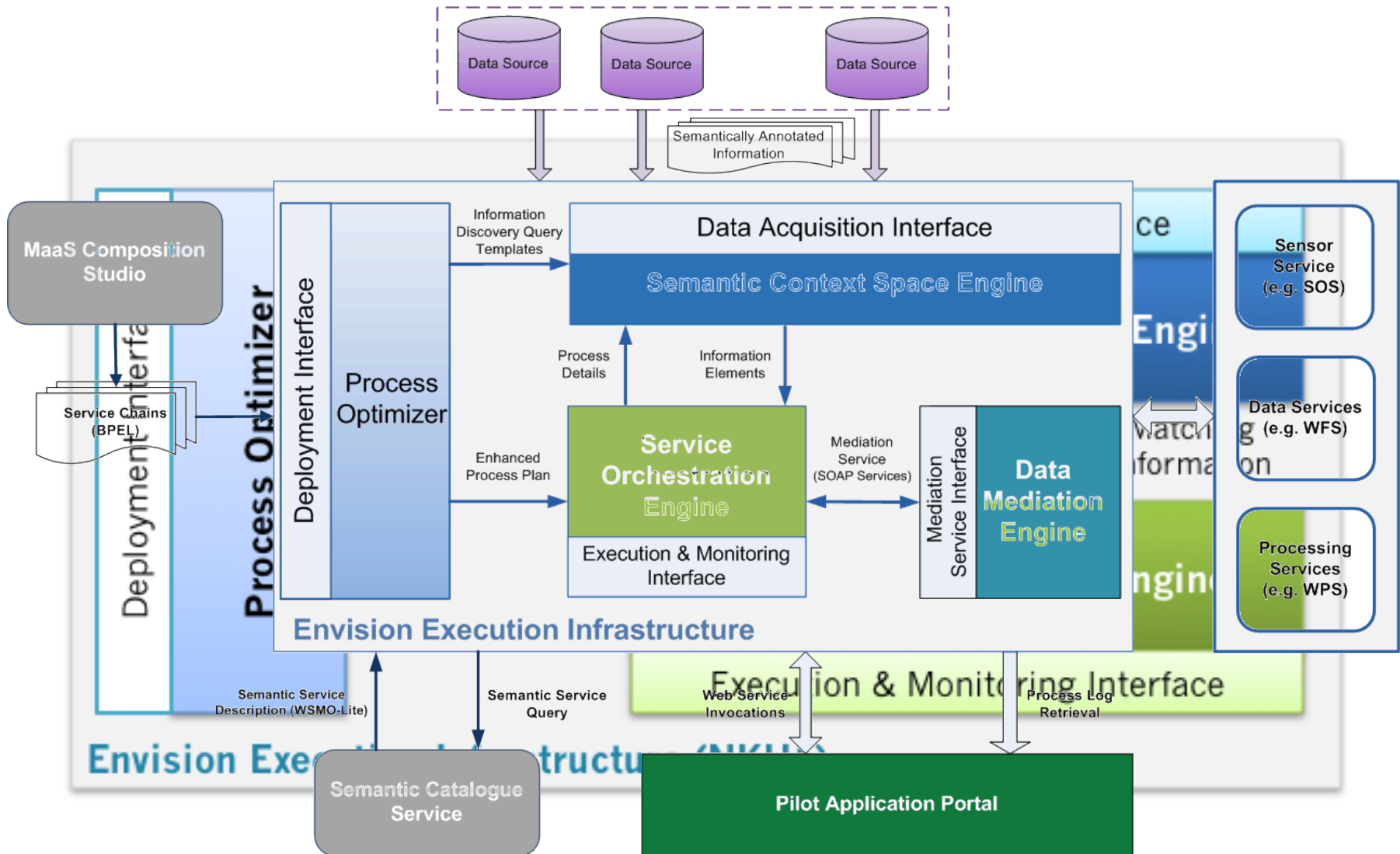
- EIS are inherently associated to:
  - The use of information elements provided by numerous information sources available in the web or privately managed networks
  - Tasks that necessitate either the use of
    - large volumes of computational resources or
    - the manipulation and exchange of large sets of information elements

## Goal of this Paper

- To outline an approach supporting the
  - Adaptation of environmental service chains, leveraged by the
  - Collection of information from several sources, and the
  - Distributed execution of service chains

- Enables a service process to utilize the information available within its environment and adapt its execution accordingly
- Process state depends
  - on the values of its internal parameters,
  - on the outcomes from the invocation of constituent services and/or on its internal operations, and
  - on information pertaining to the process environment

# High Level Architecture

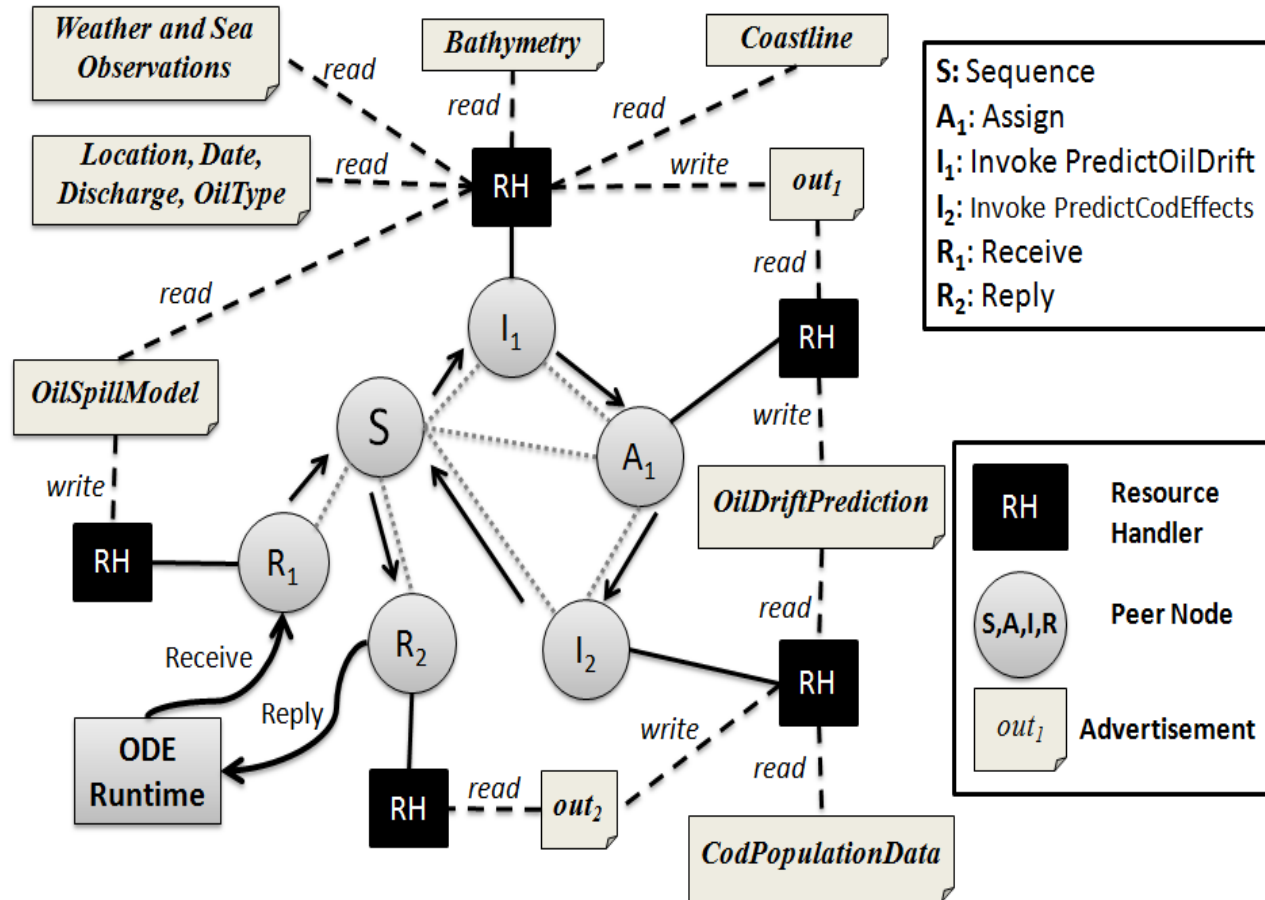




- Provides an open space where one may place relevant information. The SCS Engine leverages one to :
  - *Write and Retrieve* information within the process's environment and to
  - *Logically Group* information of interest to a specific domain and *Specify associations* among logical information groups
- Technically it :
  - Provides an implementation of the Tuplespace paradigm
  - Incorporates appropriate extensions to support semantic as well as spatiotemporal annotations

- Provides a BPEL-based engine that facilitates
  - The distributed execution of heterogeneous service processes (e.g. Web & OGC service processes)
  - The monitoring and reconfiguration of process execution according to preconfigured adaptation steps specified by the Process Optimizer
- Technically it (is):
  - Based on an existing BPEL engine, i.e. Apache ODE engine
  - Incorporates a P2P overlay to support the distribution of a service process

# Service Orchestration Engine (cont)



- The presented approach:
  - Accommodates the provision of data-driven adaptable heterogeneous service processes
  - Can support the requirements imposed by EIS, e.g. exchanged of large volumes of information, etc.
  - Promotes the decoupling among collaborating parties

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