

# A COMPARATIVE EVALUATION OF OGC SENSOR OBSERVATION SERVICE IMPLEMENTATIONS



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# Outline

- SOS Standard
- Experiment - SOS Implementations
- Evaluation
  - Completeness with regard to OGC standard
  - API and Features
  - Software architecture and configurations
  - User documentation and support
  - Deployment process
  - User interface
  - Available extensions
  - Performance
- Conclusions

# Sensor Observation Service (SOS)

- OGC Standard
- Query real-time sensor data
- Sensor Description: SensorML
- Measure Values: O&M encoding format
- SOS Implementations:
  - Java based implementation as **52°North SOS**
  - Python based implementation as **istSOS**
  - Java based implementation within degree framework by lat/lon
  - C based implementation in MapServer
  - Other Proprietary Implementations

# Experiment

- Benchmark Dataset: in-situ soil moisture observations acquired in different research projects
- Number of Observations: 381823
- Implementations
  - 52 °North SOS 4.4.3
  - istSOS 2.3.1

# Experimental Evaluation Parameters

- Completeness with regard to OGC standard
- API and Features
- Software architecture and configurations
- User documentation and support
- Deployment process
- User interface
- Available extensions
- Performance

# Evaluation: with regard to OGC standard

- Supported Operations
  - Core Operations
  - Transactional Operations
  - Enhanced Operations
  - Result Handling Operations

# Supported Operations: 52° North SOS 4.4.3

Operation Type	Operation Name (SOS V2.0.0)	52° North SOS 4.4.3
Core Operations	GetCapabilities	✓
	GetObservation	✓
	DescribeSensor	✓
Transactional Operations	InsertSensor	✓
	DeleteSensor	✓
	InsertObservation	✓
Enhanced Operations	GetFeatureOfInterest	✓
	GetObservationById	✓
Result Handling Operations	InsertResultTemplate	✓
	InsertResult	✓
	GetResultTemplate	✓
	GetResultOperation	✓

# Supported Operations: istSOS 2.3.1

Operation Type	Operation Name (SOS V1.0.0)	istSOS 2.3.1
Core operations	GetCapabilities	✓
	GetObservation	✓
	DescribeSensor	✓
Transactional Operations	RegisterSensor	✓
	InsertObservation	✓
Enhanced Operations	GetObservationById	✓
	GetResult	✗
	GetFeatureofInterest	✗
	GetFeatureofInterestTime	✗
	DescribeFeatureType	✗
	DescribeOservationType	✗
	DescribeResultModel	✗



# Overall Evaluation: API and Features

API component/Feature	52° North SOS 4.4.3	istSOS 2.3.1
Based on Language	Java	Python
Binding/Service	KVP, SOAP, POX, REST, JSON and EXI	REST, JSON
Platforms	Windows, Linux, mac	Windows, Linux, mac
Database Management System	PostgreSQL/PostGIS, Oracle, MySQL or MicrosoftSQL Server	PostgreSQL/PostGIS
Hosting Application Server	Tomcat, Jetty or Glassfish	Apache mod wsgi
Multilingual Support (Additional parameter: Language)	Yes English, German, Italian	No English
INSPIRE Compatible	Yes	Yes (mostly)
Automatic Notification	No	Yes via mail, twitter and other social media

# Overall Evaluation: Software Architecture and Configuration

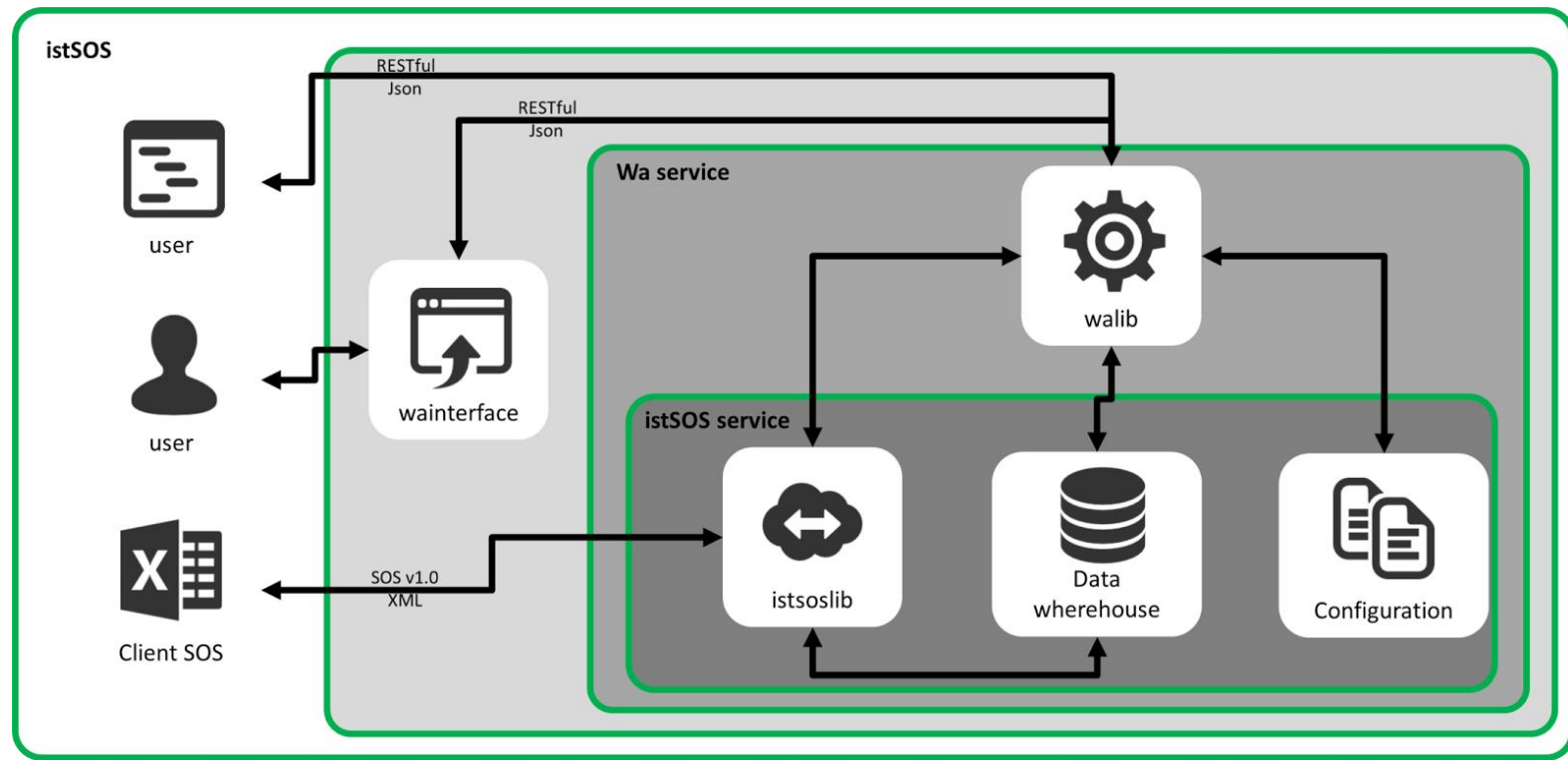


Fig.1: istSOS Architecture [1]

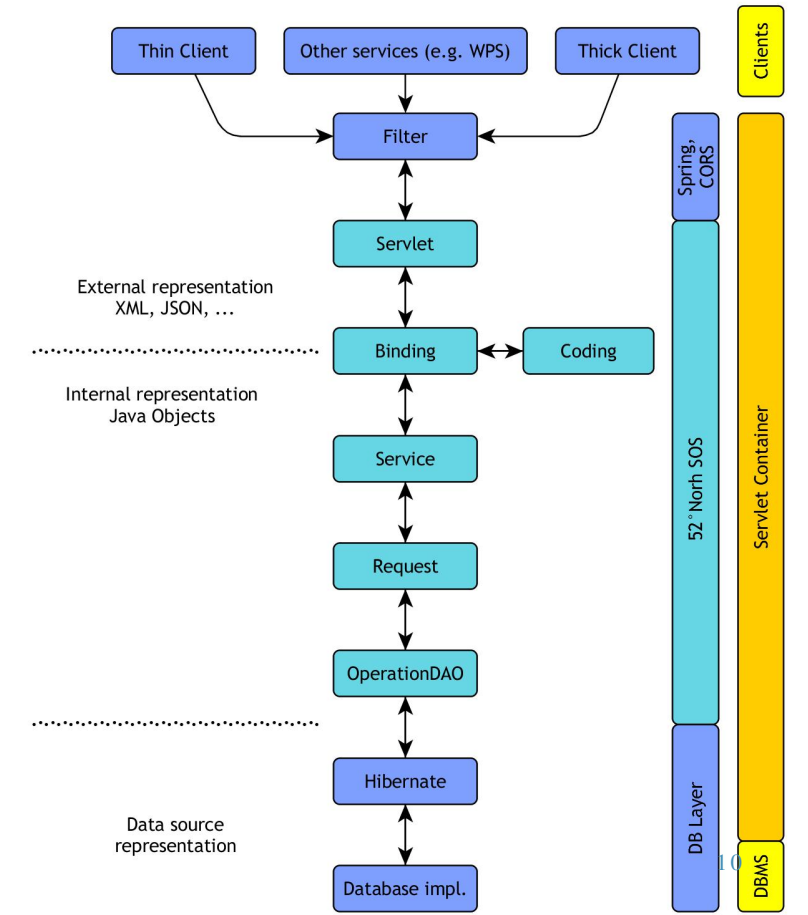


Fig.2: 52° North SOS Architecture [2]

[1] istsos-project documentation, <http://istsos.org/en/latest/doc/>

[2] Sos 4.x documentation, <https://wiki.52north.org/SensorWeb/SensorObservationServiceIVDocumentation>

# Overall Evaluation: Deployment Process, User interface, Extensions, Documentation and Support

Particulars	52° North SOS 4.4.3	istSOS 2.3.1
Deployment Process	Bit cumbersome not really difficult. Improvement in upcoming version 5.x <sup>[1]</sup>	Easy
User Interface	In built Helgoland client, data viewer	In built client, data manager, data viewer
Extensions	R and other extensions	-
Documentation	Good Documentation, Examples	Good Documentation, Examples
Support	Support group mailing list	Support group mailing list

[1] <https://52north.org/software/software-projects/sos/>

# Performance Evaluation

Particulars	52° North SOS 4.4.3	istSOS 2.3.1
Procedure data and meta-data generation/insertion	No data conversion required Data and meta-data wizard, feeder Time consumption	Data conversion required Separate procedure, properties scripts Comparatively less time consuming, reuse of certain data
Runtime - Data insertion 381823 in-situ soil moisture observations	525 minutes and 13 seconds	44 minutes and 53 seconds

# Points to Ponder

- Does it really support data interoperability ?
  - Technical
  - Syntactic
  - Pragmatic
  - **Semantic**
    - **SOS**
    - **O&M**
    - **W3C/SSN**

# Conclusions

- Detailed review of SOS implementations using a sample in-situ soil moisture data
  - review helps end users to choose a system based on their requirement
- Points out difficulties faced by users
  - gives an insight to developers to identify room for improvement
- Highlight concerns regarding standards
  - gives an insight to standardization community to identify room for improvement

# Thank You

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