Open architecture for
Smart and
Interoperable networks in
Risk management based on
In-situ
Sensors

"The Integrated European Information Infrastructure for Effective Environment Management"

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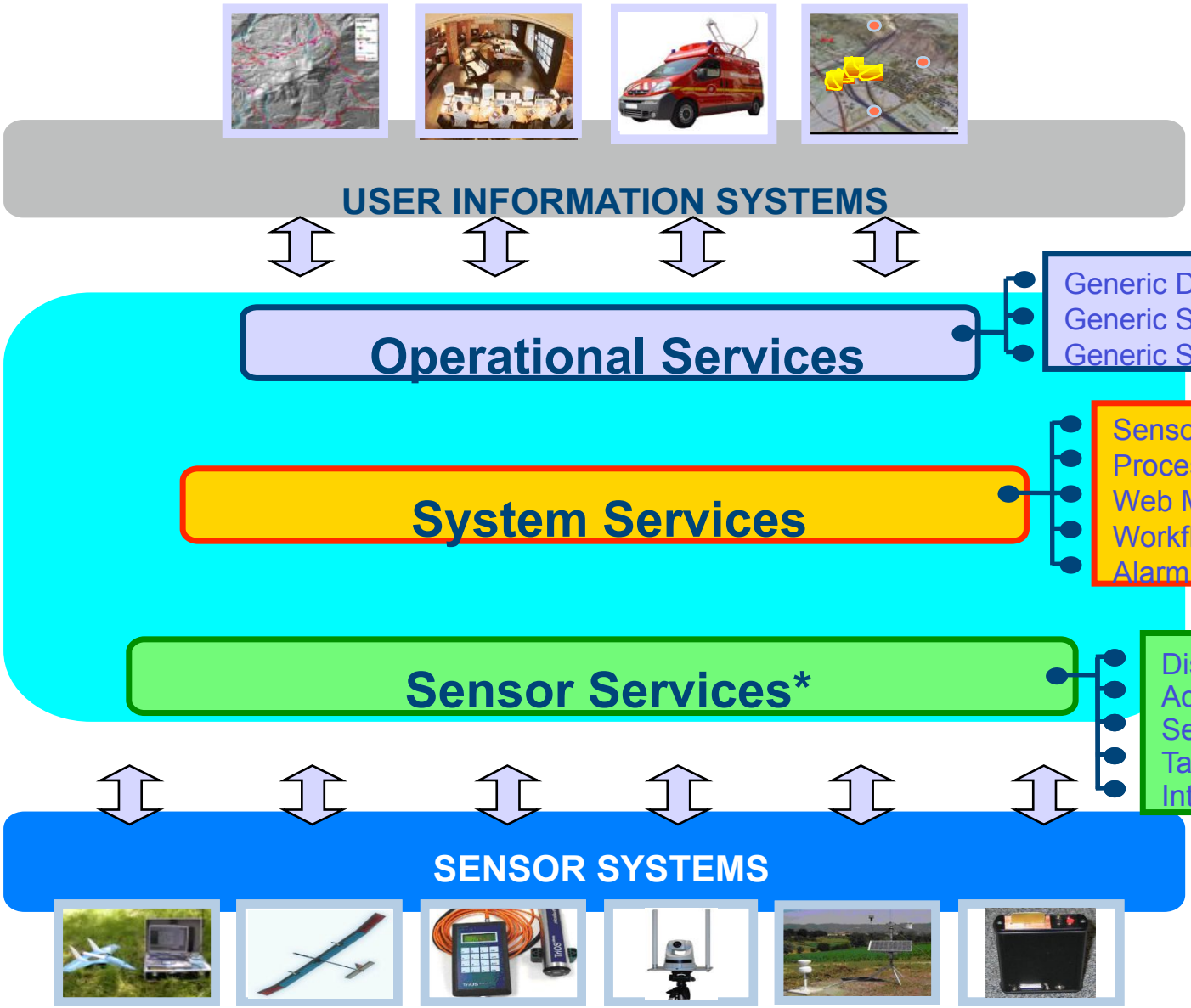
THALES aps GmbH Ayuntamiento de Valladolid ESYS CONSULTING Feuerwehr Aachen Menschen schützen Menschen gmv INNOVATING SOLUTIONS

HYDROGEOTECHNIKA Sp. z o.o. FCS La.M.M.A. REGIONE TOSCANA REMEDIA VITO Westfälische Wilhelms-Universität Münster

Dimensions of the OSIRIS architecture



*Standards from OGC (Open GeoSpatial Consortium)

OSIRIS

OSIRIS – multi level solution

Visualisation

IN-SITU Architecture

- Services Bus (ESB) and Data Flow Organiser
- Data Processing Infrastructure
- Data Persistency
- Notification of Alarms
- Registries of sensors and observables. Search engines using semantic.
- Supervision

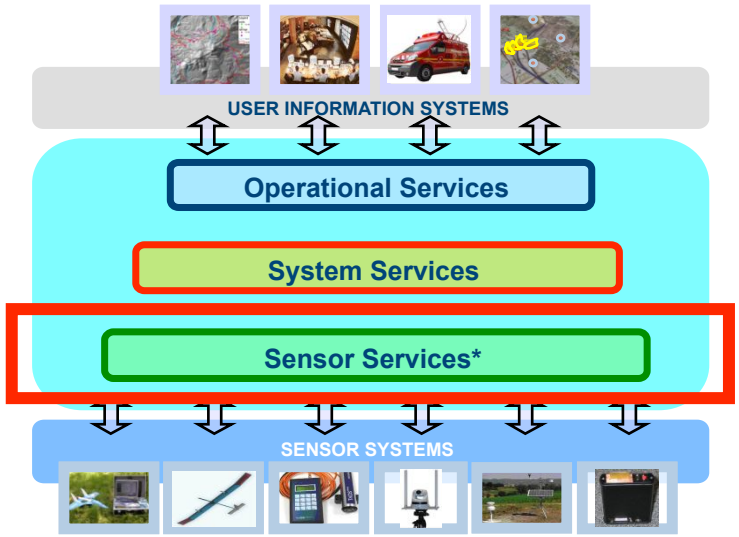
- Data Flow management
- Generic Displays
  - Sensor Data Displays and search engines
  - Cartographic layers
  - Sensor/Services Supervision
  - Sensor tasking
- (Specific displays
  - Mission planning for mobile sensors
  - Domain specific Displays)

Sensor Web Architecture (OGC SWE)

- Observations access
- Alerts
- Tasking

Sensors

Sensor Services



OSIRIS provides a ***SENSOR WEB*** architecture, offering:

- Access to sensor characteristics, liability and internal processing description
- Access to available data – delivery through different formats
- Command and control capacity for the sensors
- The capacity to manage a set of thresholds for notifying

⇒ Provides Open Source implementations of specifications from OGC (SWE)

⇒ Provides enhancements of existing OGC specifications as well as specifications of additional services

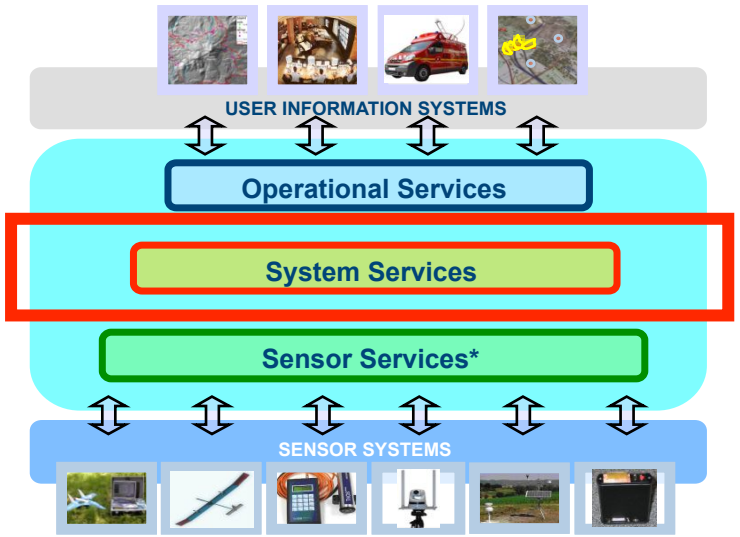
⇒ Implementation of Demonstrators to validate the OSIRIS results on the SWE

Architecture Sensor Web

OSIRIS activities regarding to SWE are:

- SOS (Sensor Obervation Service): access to the measurements and characteristics of sensors
  - OSIRIS improves the specifications to better manage the mobility of the sensors
  - Different SOS instantiated, regarding to the numerous sensors and domains covered by the experiments
- SAS (Sensor Alert Service): Delivery of measurements and notifications with threshold management (user defined alerting conditions)
  - OSIRIS contributes to the currently ongoing re-design of the OGC SAS specification and provides an according new SAS implementation which is deployed in the live experiments
- SPS (Sensor Planning Service): Command and control of the sensor and its acquisition process
  - OSIRIS provides a generic SPS protocol for mobile sensors (based on the practical example of a surveillance airplane)
  - Different SPS instantiated, due to the different capacities available at the sensor level.
- SIR and SOR as new services for sensor discovery

System Services



OSIRIS sets up an **"Enterprise Service Bus"** integrating different services:

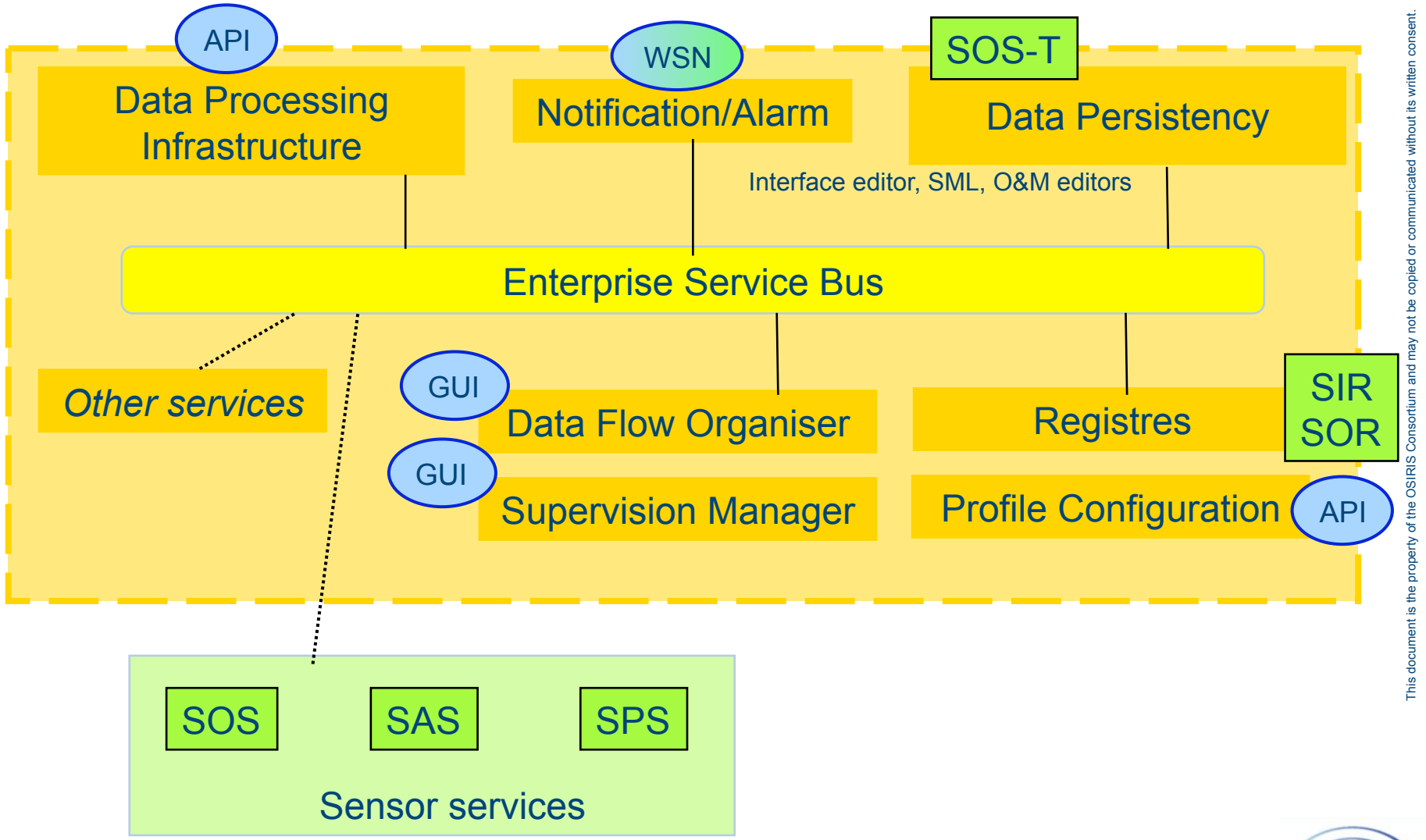
- Registration of sensors and search engines (sensors and observations) exploiting ontology
- Sensor supervision
- Data Processing Infrastructure, hosting different processing services and managing the workflows towards them
- User notification mechanisms, multi-protocol and multi standards enabled
- Services supervision
- Data storage service (Transactional) with management of automatic insertion of data from identified sources (through plug-ins, SOS plug in implemented)

⇒ Enterprise Service Bus, open and flexible

⇒ Workflow management

⇒ SWE and existing services are integrated and supervised in the Bus

Service Bus IN-SITU



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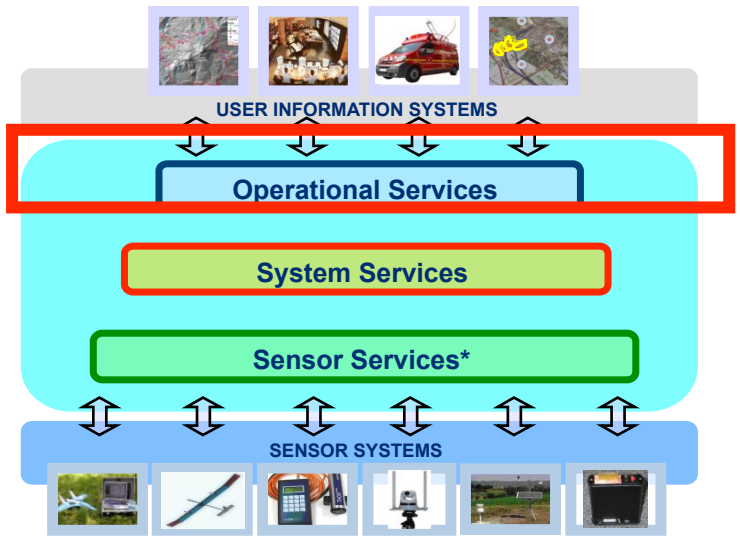
Operational Services



OSIRIS provides generic capacities for displaying data provided by the SWE and System services:

- A Web portal is set up, offering an access to the supervision of the services and the sensors, to the measurements and observations (for registered SOS and services), through a web client. Security access is managed.
- A rich client is provided, allowing rendering of measurements from SOS instances, command and control of sensors (SPS) and connection to SAS instances

In addition, OSIRIS sets up specific displays interfaced to legacy services and applications, addressing domain specific needs

⇒ Web portal

⇒ Rich client – Open Source

Major achievements:

- SWE: internal rev B delivered, contains:
  - SOS → compliant to OGC specification version 1.0.0 and basic support of the Transactional Profile
  - SOS implementation for video data
  - SAS → compliant to the latest OGC RFC
  - SPS → compliant to OGC specification version 1.0.0
- System services:
  - Enterprise Service Bus deployed, Data flow ready, first SWE integrated
  - DPI implementation ready
  - Service supervision ready, sensor supervision running
  - Data Storage, Alarms/notification : running
  - SIR/SOR: SIR implementation running, SOR ready to be coupled with SIR
- Client applications:
  - Web client: drafted, beta test ready. Implementation running
  - Rich client: Ox delivered (internal rev B): Support of the latest SWE specifications of SOS, SAS and SPS as well as support of WMS and WCS
- Test bed platform: Designed – deployed

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Next milestones are:

- July 2008:
  - SWE improvements
    - SOS: Further enhancements of the Transactional profile support and enhancements for mobile sensors
    - SAS: New implementation of the revised SAS specification
    - SIR: Stable version ready
  - System services delivery
  - Pre integration of some sensors SWE enabled for trials
- September 2009
  - Start of the Integration of the sensors (SWE enabled) for the experiments
  - Deployment of the system services on site
- November-December 2008
  - First experiments
  - Feedbacks – SWE improvements
  - Web client improvements
- March 2009
  - Last experiments

OSIRIS

WEB client: SIR display

Through the OSIRIS portal, a display for the Sensor Instance Registry service is enabled.
Search engines for sensors and observations is set up.
The extension of the search capacities with appropriate ontology is possible.

Home | Search for services | Access data | Supervise Services

SIR request window

Set your area of Interest :

Select | (XX,YY)

(Click the button and select an area on the map)

Phenomenon: Weather

Keywords: Wind, vent, viento

Unit of Meas.: m/s

Service type: SOS SPS SAS

Time Period: FROM 07.11.2007 00:00 TILL 08.11.2007 00:00

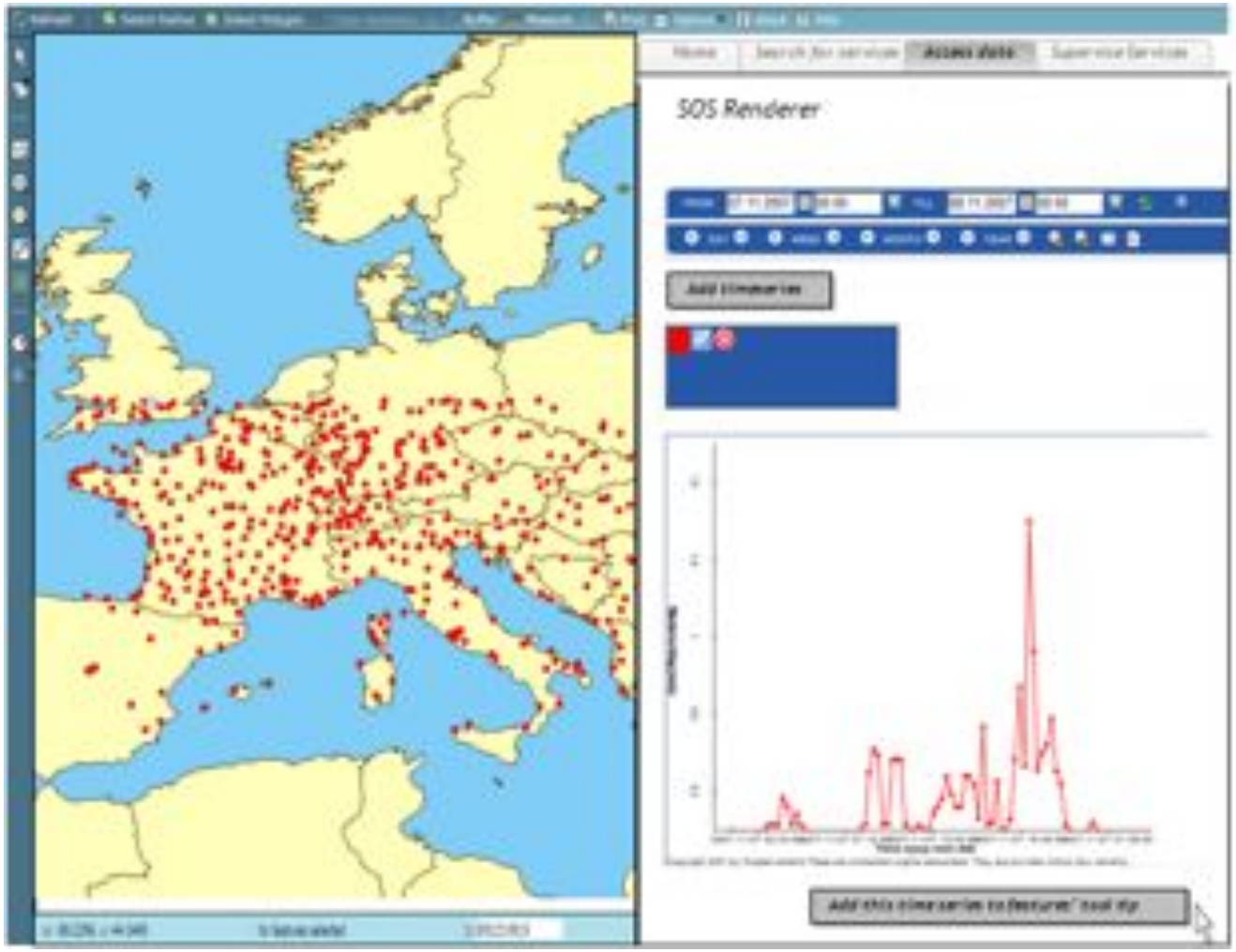
Extend the research with SOR

Search for sensors

Service	Address	Browse service	Add to map
SOS	Htt://....	→browse → search	+ Add
SOS	Htt://....	→browse → search	+ Add
SAS	Htt://....		
SPS	Htt://....		
SAS	Htt://....		
SOS	Htt://....	→browse → search	+ Add

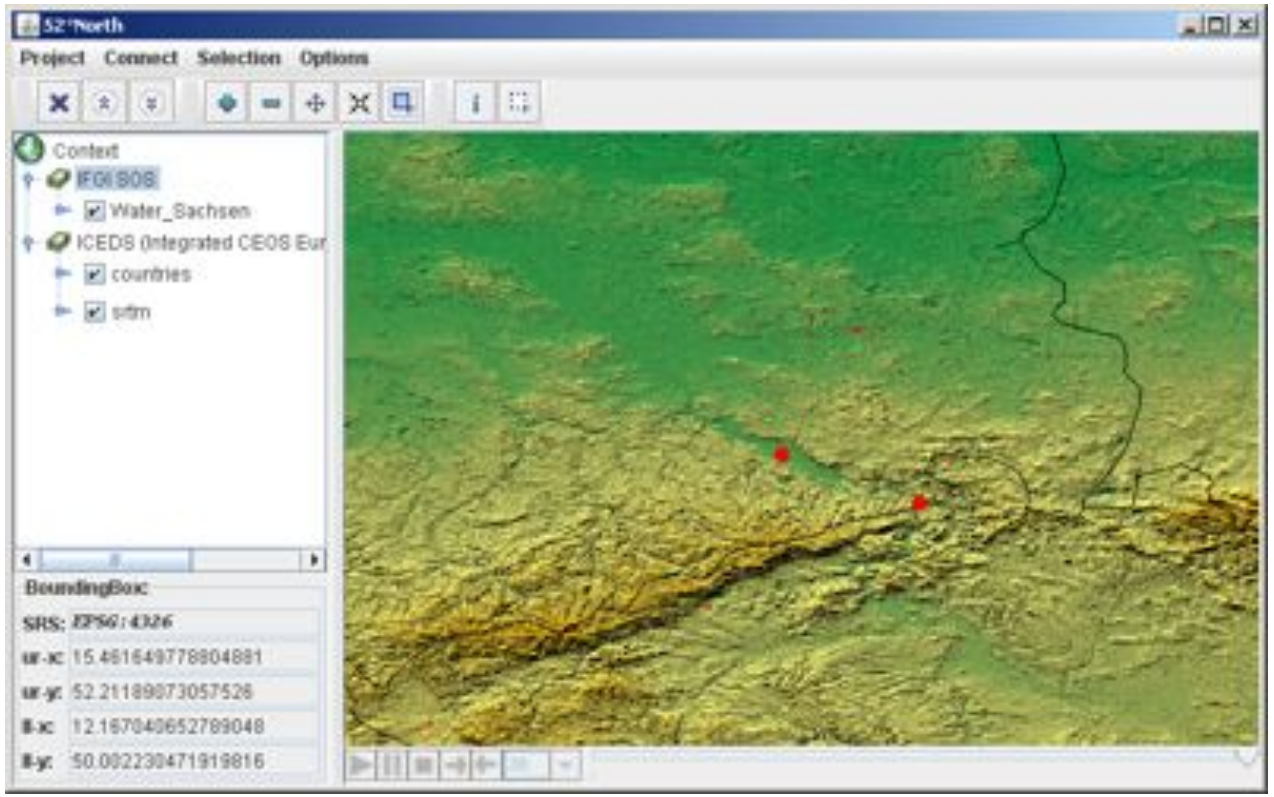
WEB Client: SOS display

The OSIRIS portal also provides a display for the Sensor Observation Service. SOS instances can be connected, then search for data is allowed, and displayed.



Rich Client

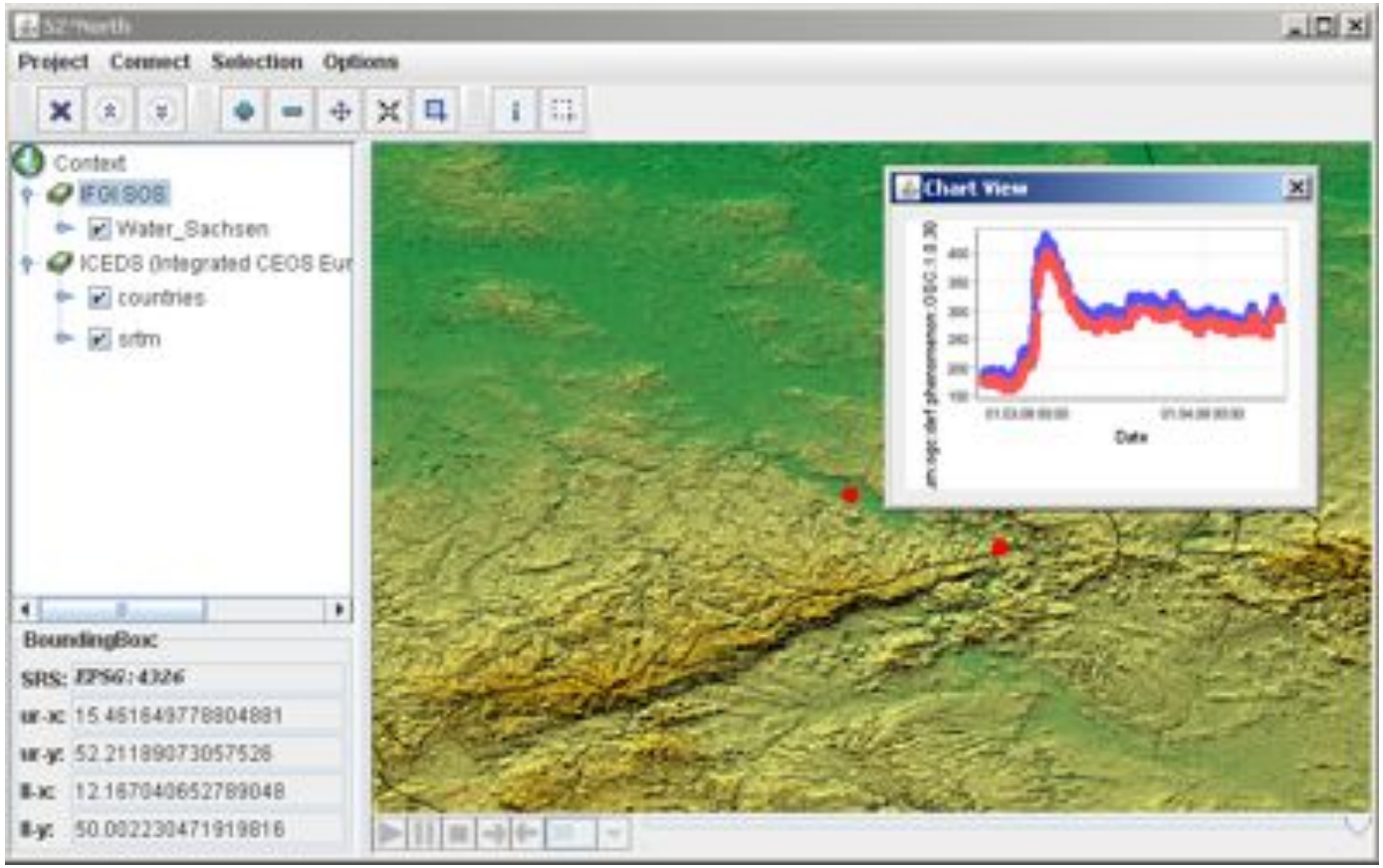
The OSIRIS rich client is a powerful tool behaving like a GIS, able to connect to SOS data sources, as well as other OGC services. Some SPS and SAS connectors are also provided. Different rendering capacities exist .



⇒ Numerous functionalities exploiting the SWE

⇒ Open Source implementation

Rich Client: SOS data rendering

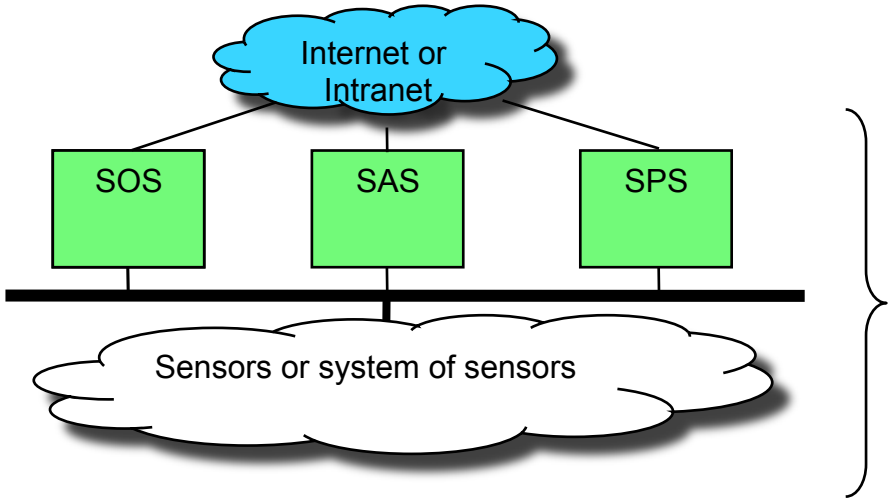


⇒Smart displays for time series are implemented

Deployments

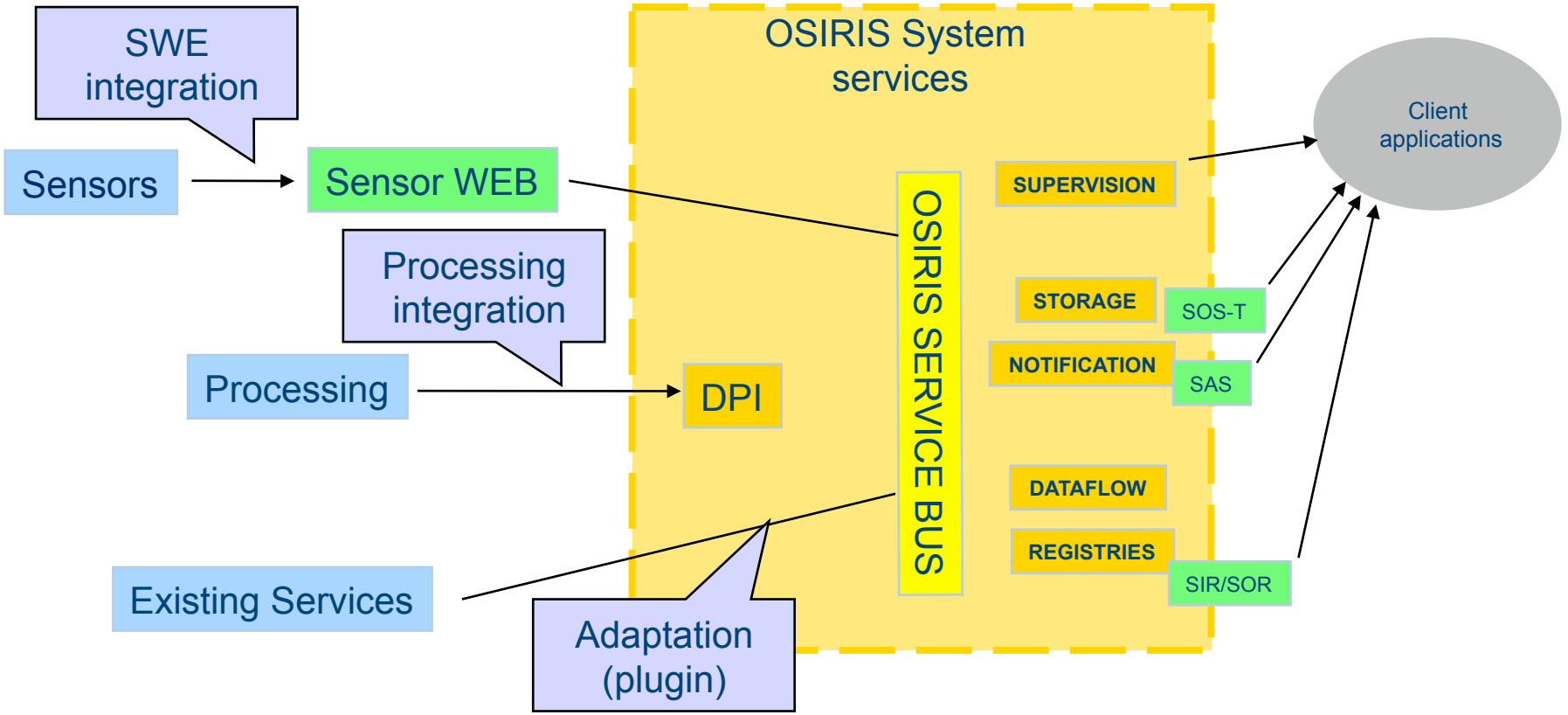
In 4 different experiments, the same generic OSIRIS architecture is deployed:

- SWE services are deployed at sensor level
- System services are deployed on different infrastructures
- Different processing is done to produce different information
- Generic displays are available (Web and rich clients)

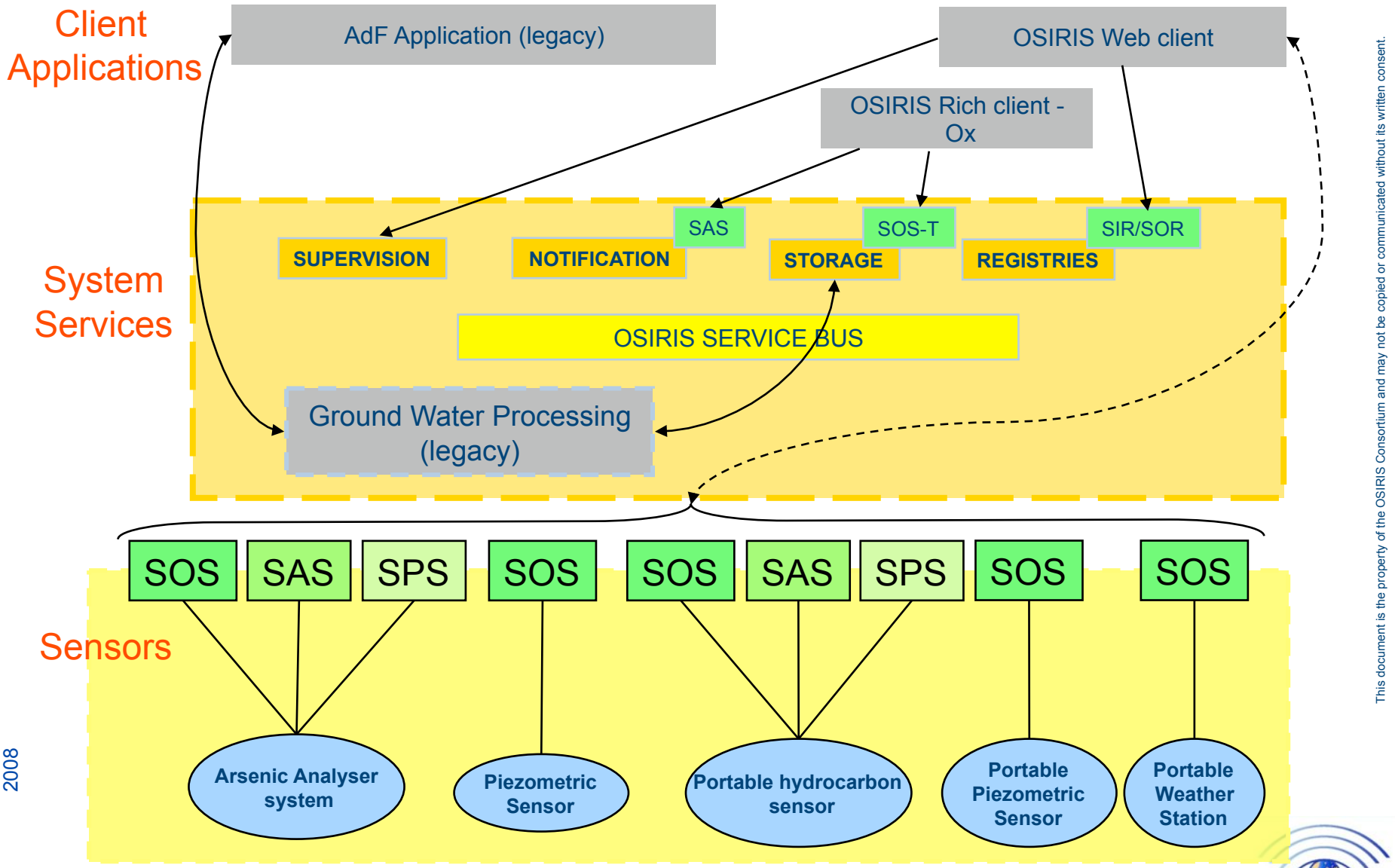


Sensors + SWE
⇒ Sensor Web

Deployments



Example for the Ground Water system



OSIRIS

Availability of the implementations

OSIRIS SWE implementations are regularly provided to the public thanks to the strong cooperation with 52°North. OSIRIS contributed to the development of the following SWE components:

- SOS
- SAS
- SPS
- SWE display (Ox framework)

Once stable, SIR and SOR will also be delivered in **Open Source**.

(Download via http://52north.org

In parallel to the contribution to the development of those services, OSIRIS participates to the SWE standardization process at the OGC.

Cooperation with the SANY project

SWE Standardization activities are done in conjunction with the SANY project:

- Both projects exchange information on their activities
- An OSIRIS twiki is set up to facilitate the exchanges related to the SWE activities
- Joint sessions are organized at OGC TC meetings (next : In June -Postdam)

This approach will allow a **consistent approach** of the standardization activities at the OGC level.

Conclusion

- Provides a set of homogeneous services integrated in an open and smart Bus of services
- Offers an open and smart architecture as a good model for In-situ systems
- Largely participates to open source initiatives
- Experiments the architecture in totally different domains
- Through THALES Communications and the University of Muenster OSIRIS is also participating to the OGC activities, in particular the SWE WG

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Thanks for your attention

www.osiris-fp6.eu