The Sensor Observation Service

Milan Antonovic
Software Engineer

Sensor Observation Service

1 – Introduction

2 – The Sensor Observation Service

3 – Institute of earth science's services

4 - Conclusions

1 - Introduction

Sensors Are Everywhere



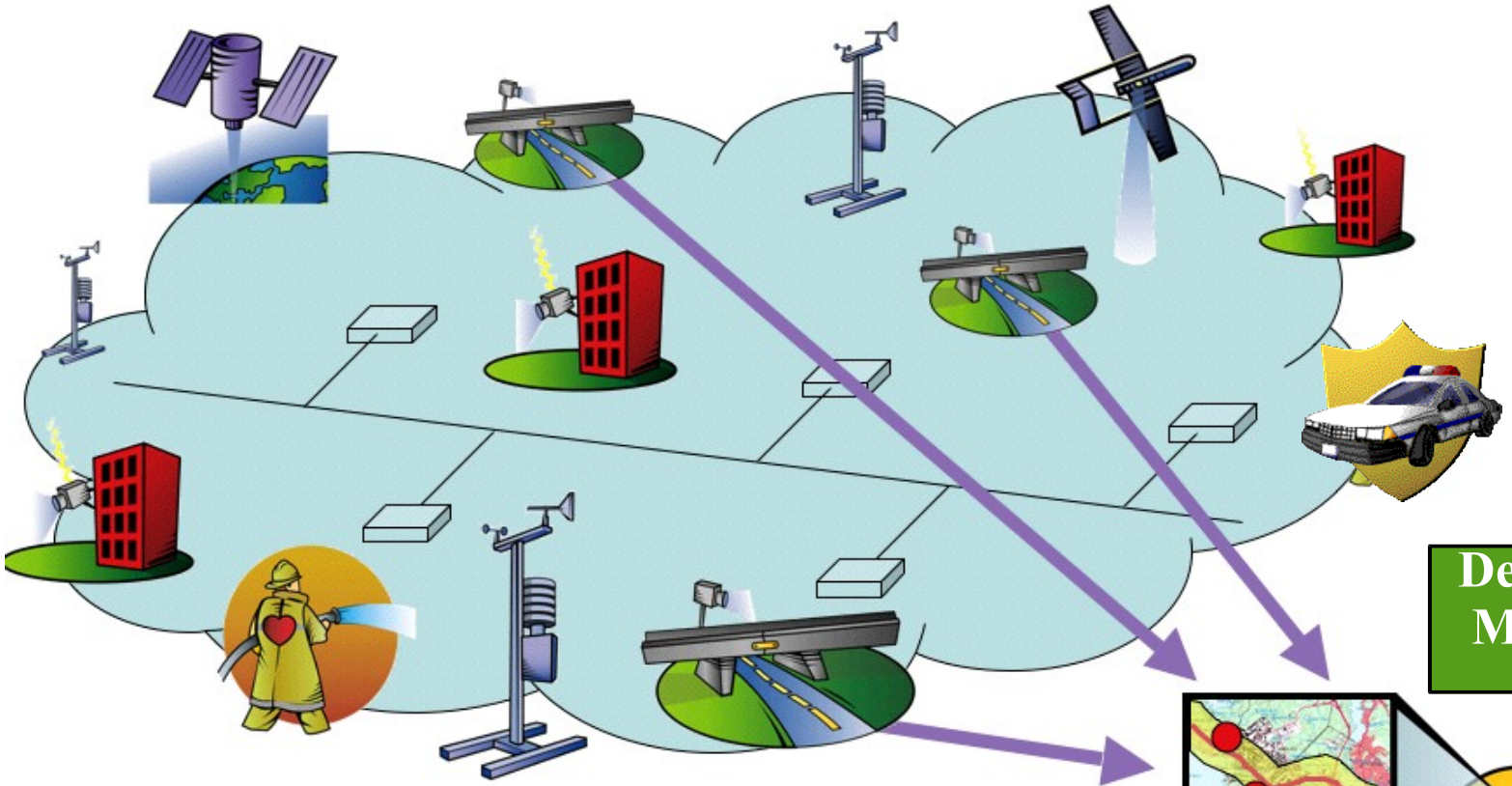












Decision Making

- All sensors reporting position
- All connected to the Web
- All with metadata registered
- All readable remotely
- Some controllable remotely

Who is in charge?

The Open Geospatial Consortium (OGC)
Not-for-profit, international standards development consortium
365+ members from industry, government, research and university

The mission

To advance the development and
market adoption of
open standards for **geospatial interoperability**.

OGC - Sensor Web Enablement Group?

Define, test, document and approve standards that:

- Define interfaces for sensor access and tasking
- Define metadata encodings

To enable real time integration of heterogeneous sensor webs into the information infrastructure.

Developers use these standards to

- Deploy applications, platforms, and products that integrate Web-connected devices such as flood gauges, air pollution monitors, stress gauges on bridges, mobile heart monitors, Webcams, and robots as well as space and airborne earth imaging devices.

Basic desires of SWE

Quickly **discover sensors and sensor data** (secure or public) that can meet my needs – location, observables, quality, ability to task

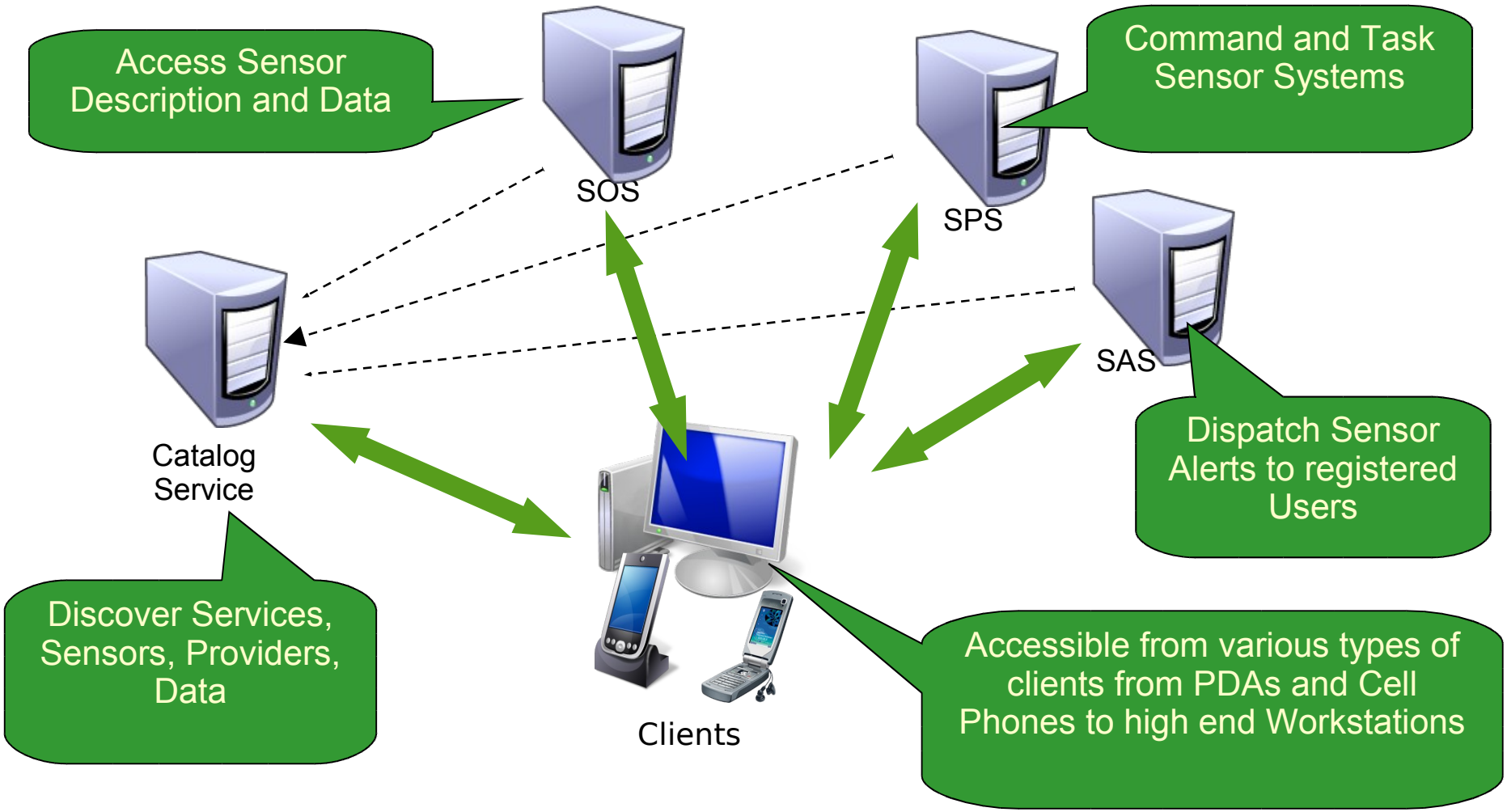
Obtain sensor information in a standard encoding that is understandable by me and my software

Readily **access sensor observations** in a common manner, and in a form specific to my needs

Task sensors, when possible, to meet my specific needs

Subscribe to and **receive alerts** when a sensor measures a particular phenomenon

SWE Standards



2 – The Sensor Observation Service

What is the Sensor Observation Service?

The Sensor Observation Service aggregates readings from live, in-situ and remote sensors. The service provides an interface to make sensors and sensor data archives accessible via an interoperable web based interface.

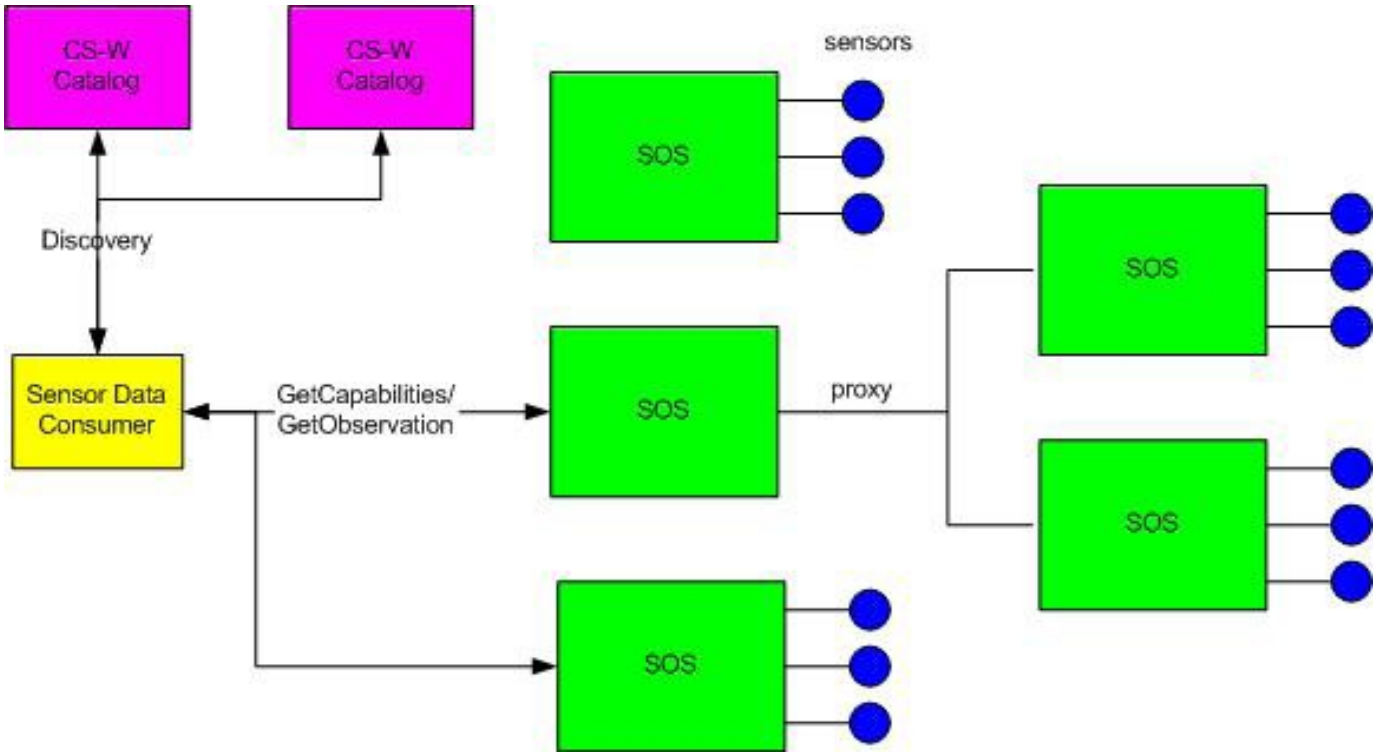
SOS Overview

- Provide **standardized query access** to sensor data that is applicable to multiple types of sensors

- Provide query **results in standardized format**

- Observations defined by
  - **eventTime** – when was the measurement made
  - **featureOfInterest** – what entity is being measured
  - **observedProperty** - what characteristic was measured
  - **procedure** - how was it measured

Sensor Data Consumer



SOS core operations

GetCapabilities:
SOS service metadata for requesting a self-description of the service.

DescribeSensor:
information about the sensors, their processes and platforms in SensorML.

GetObservation:
access to sensor observations and measurement data via a spatio-temporal query that can be filtered by phenomena.

Discovering Capabilities

Observation discovery happens at the service level.

The service capabilities document includes detailed information about all of the offerings that are available from a service.

The request

```
http://www.mysrv.ch/sos?
    service=sos&
    version=1.0&
    request=GetCapabilities
```

Discovering Observations

Sensor observations are obtained using the **GetObservation** operation. This operation supports a selection mechanism that supports subsetting the observations that will be returned from a call to **GetObservation**. **GetObservation** allows the client to filter a large dataset to get only the specific observations that are of interest.

http://www.mysrv.ch/sos?
service=sos&version=1.0&request=GetObservation&
offering=MyOffering&observedProperty=Temperature

Discovering Observations

Query filtering:

- Time period
- Procedure (Sensor)
- ObservedProperty
- FeatureOfInterest

Discover Sensor Metadata

Sensor metadata can be retrieved for any sensor that is advertised in an observation offering using the **DescribeSensor** operation.

This will return a SensorML or TML document with detailed information about the sensor.

http://www.mysrv.ch/sos?
service=sos&version=1.0&request=DescribeSensor&
procedure=mySensor-001

SOS optional Operations

- GetResult
- GetFeatureOfInterest
- GetFeatureOfInterestTime
- DescribeFeatureofInterest
- DescribeObservationType
- DescribeResultModel
- **Register Sensor**
- **InsertObservation**

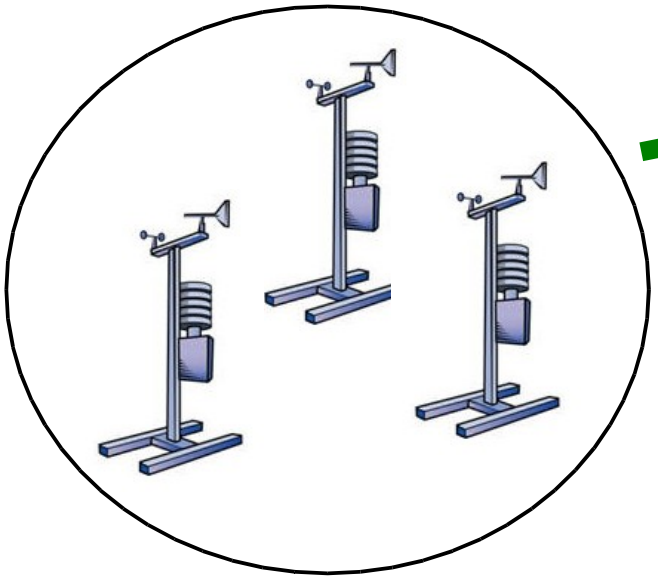
3 – Institute of earth science's use case

What we do

Data gathering:
- Rain
- River water–level
- Air temperature
- Solar radiation
- Ground water level
- Spring discharges
- Landslide geodetic monitoring

Goals:
- Sensors
  - Find
  - Query
  - Control
- Data analysis:
  - Monitoring
  - Risk management
  - Risk prevention

Yesterday @ IST - SUPSI



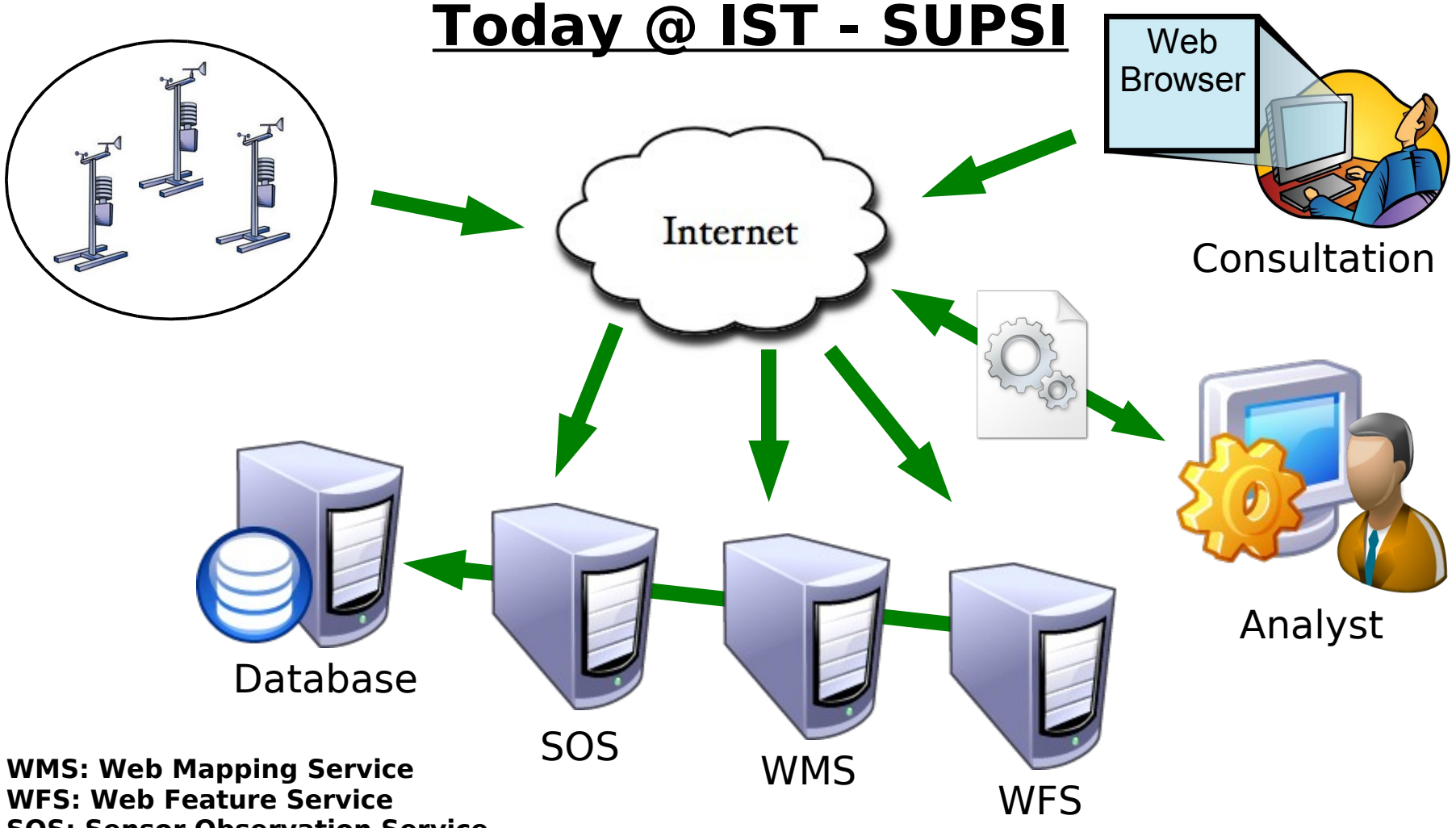
Data gathering

Database

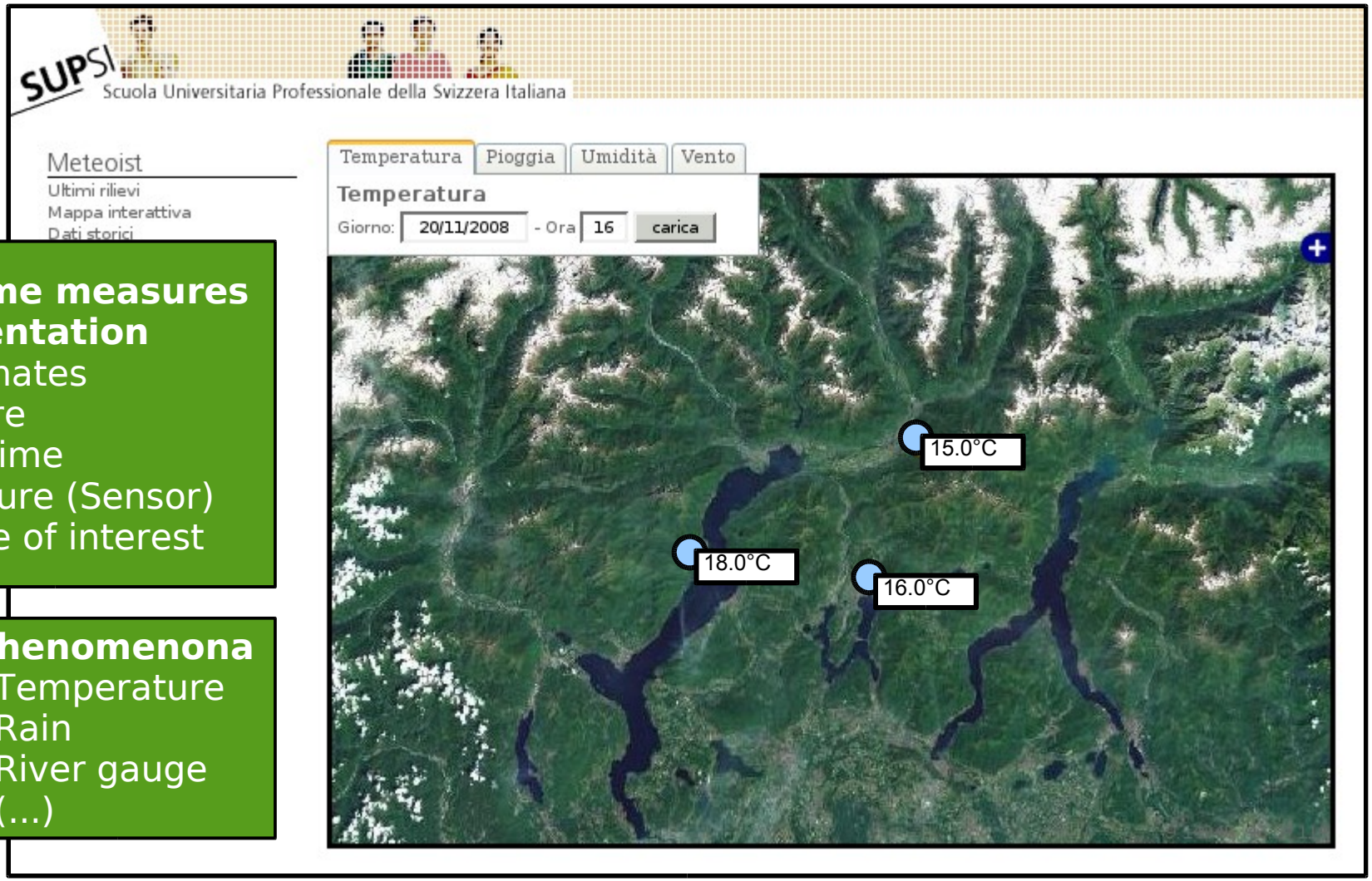
Analysis

Results

Today @ IST - SUPSI

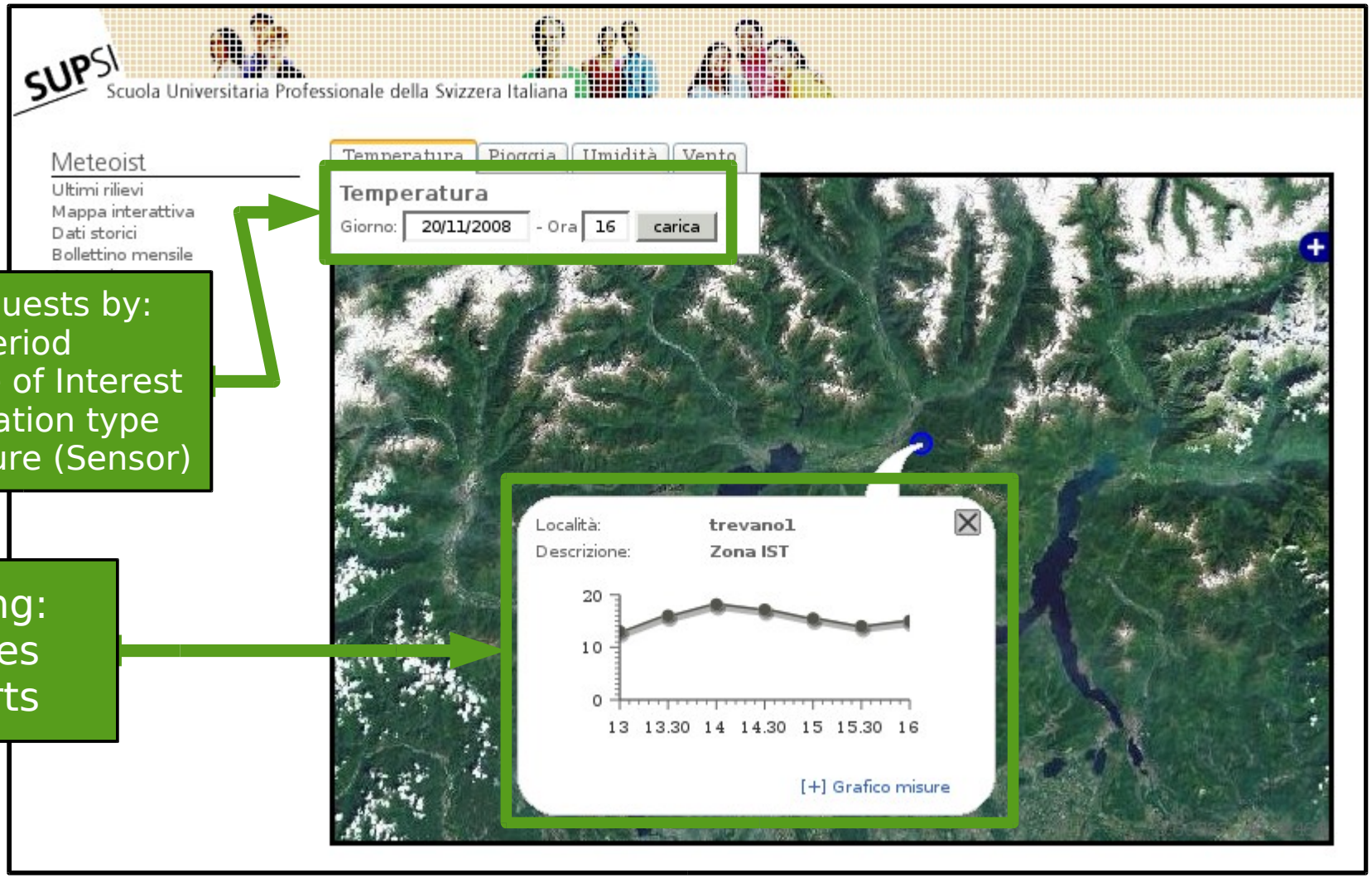


WMS: Web Mapping Service
WFS: Web Feature Service
SOS: Sensor Observation Service



Real-time measures rapresentation
- Coordinates
- Measure
- EventTime
- Procedure (Sensor)
- Feature of interest

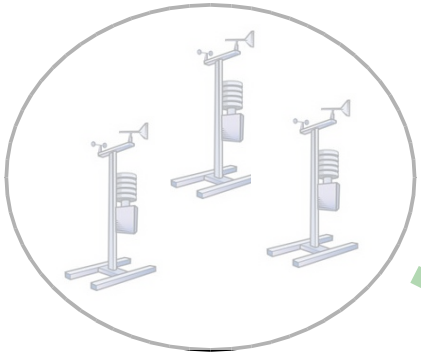
Phenomenona
- Temperature
- Rain
- River gauge
- (...)



Filter requests by:
- Time period
- Feature of Interest
- Observation type
- Procedure (Sensor)

Plotting:
- Tables
- Charts

Tomorrow



Consultation

Internet

WPS

Database

SWE

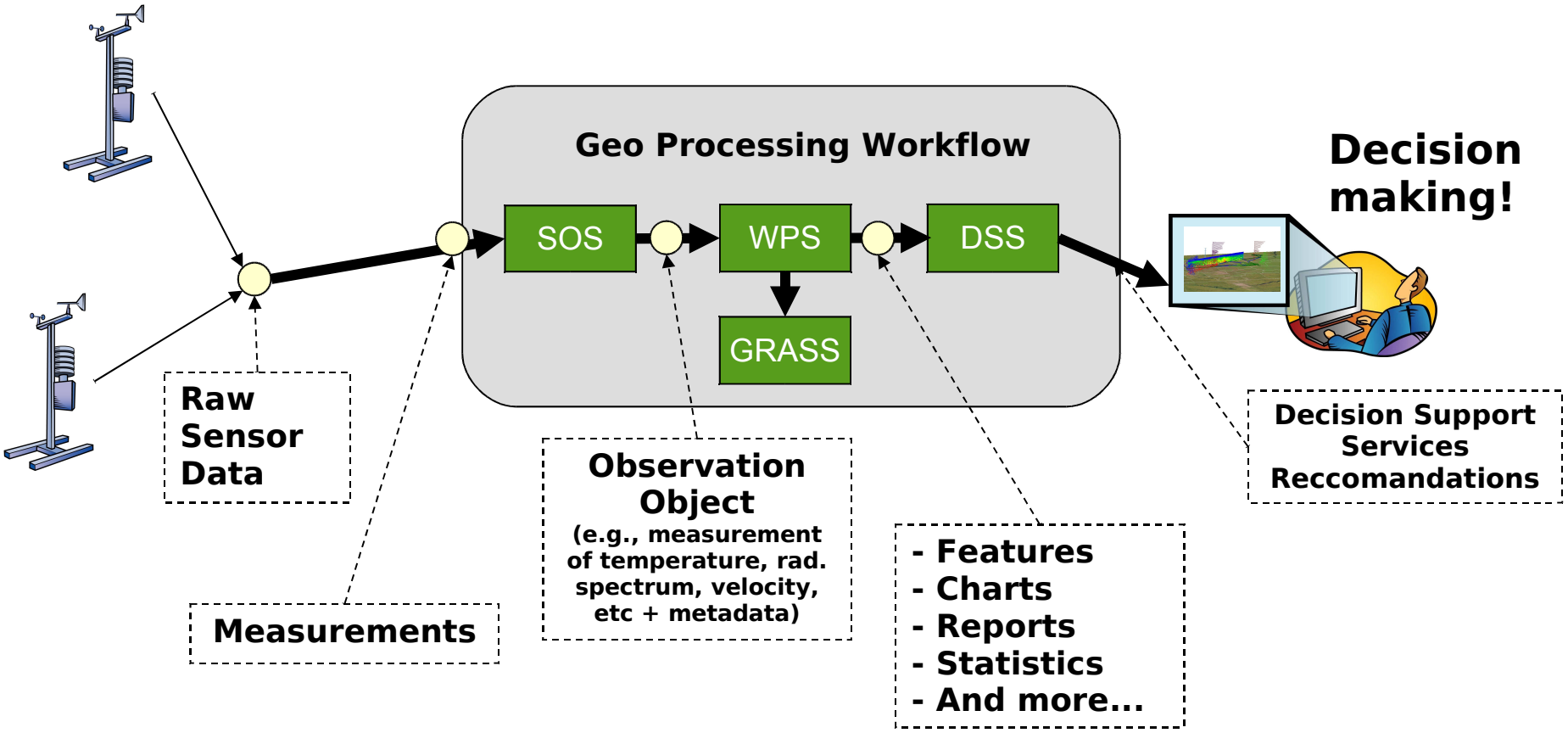
WMS

WFS

Analysis

Grass
R-statistics

Tomorrow's WPS @ IST - SUPSI



Any questions?