

The Sensor Observation Service

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Sensor Observation Service

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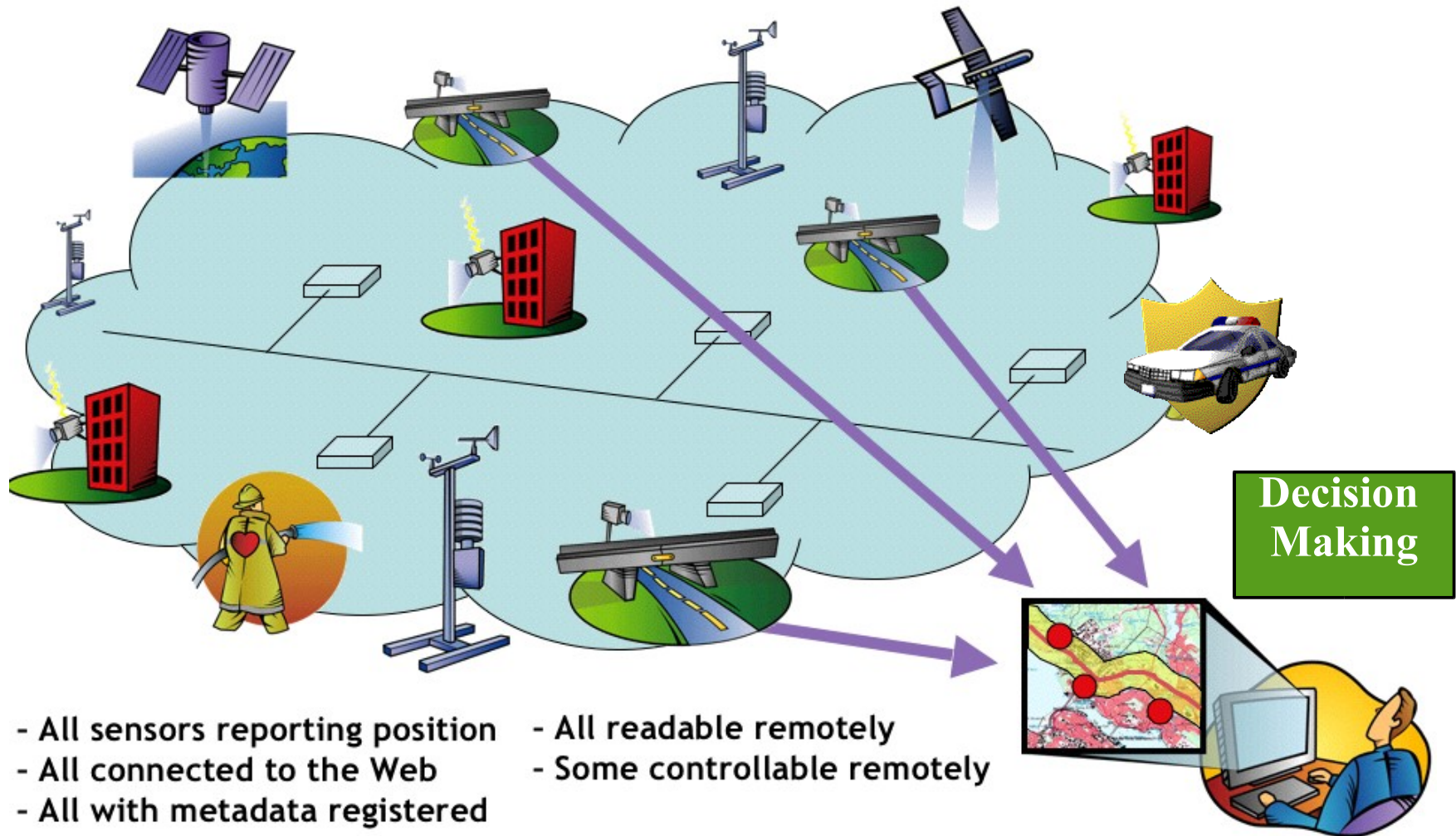
1 - Introduction





Sensors Are Everywhere





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

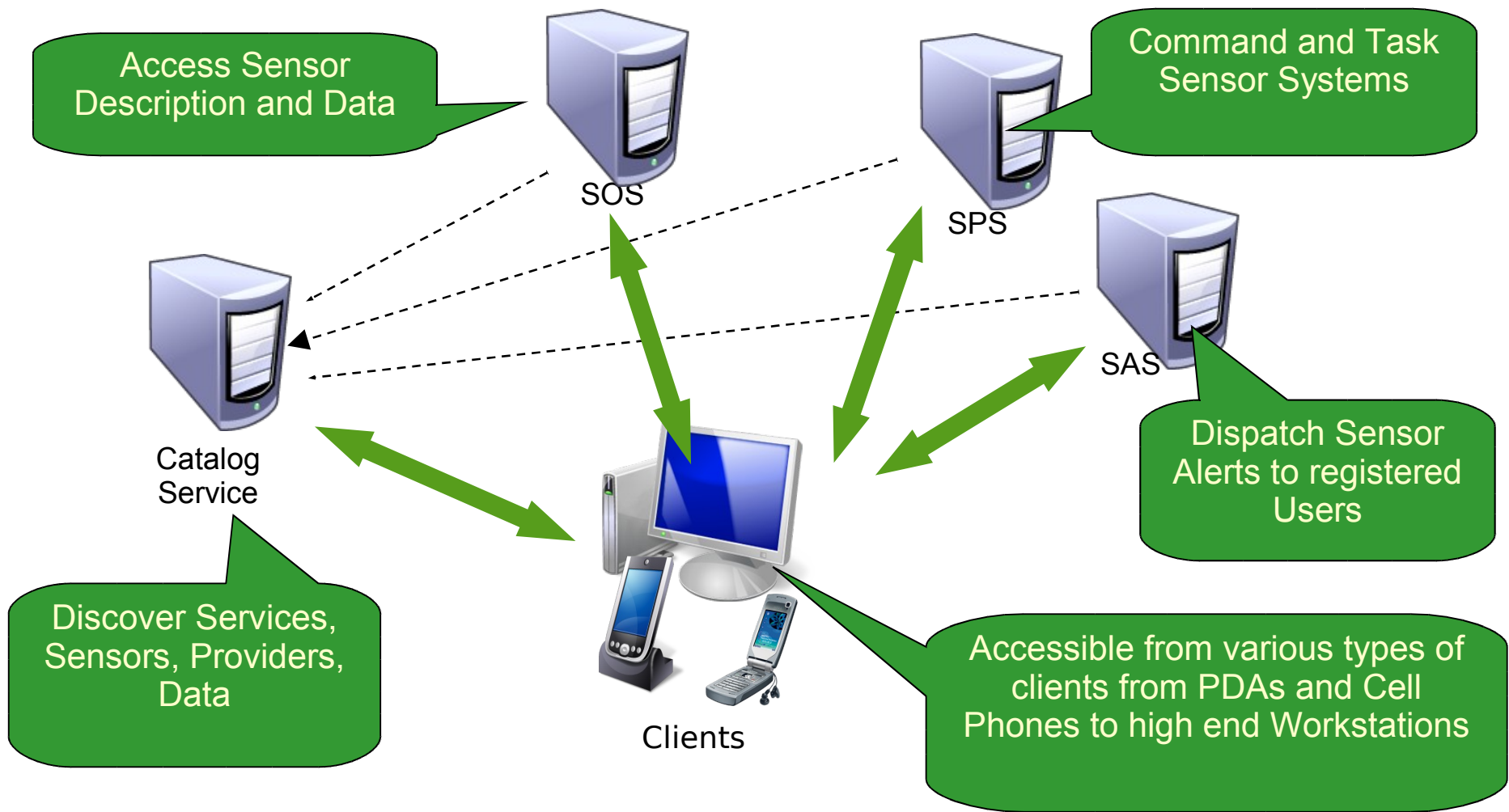
Readily **access sensor observations** in a common manner, and in a form specific to my needs

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.

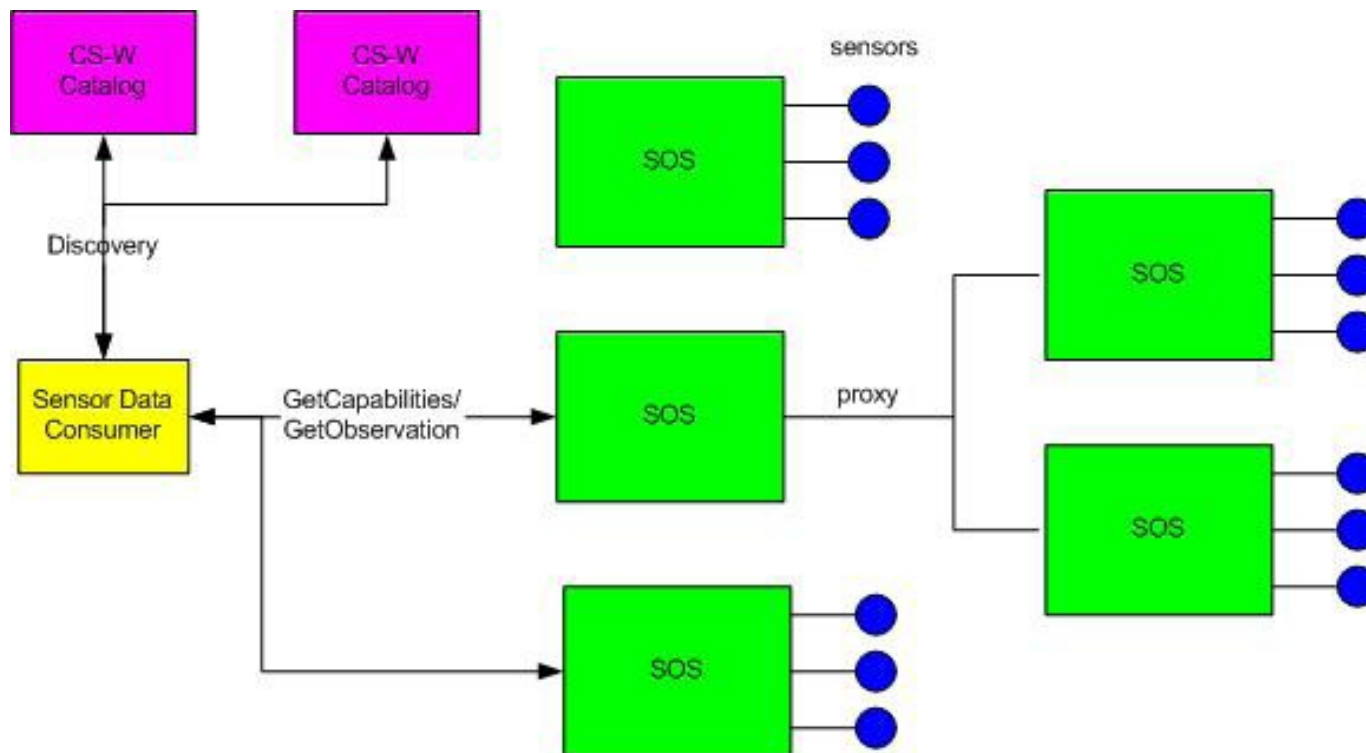


SOS Overview

- 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:

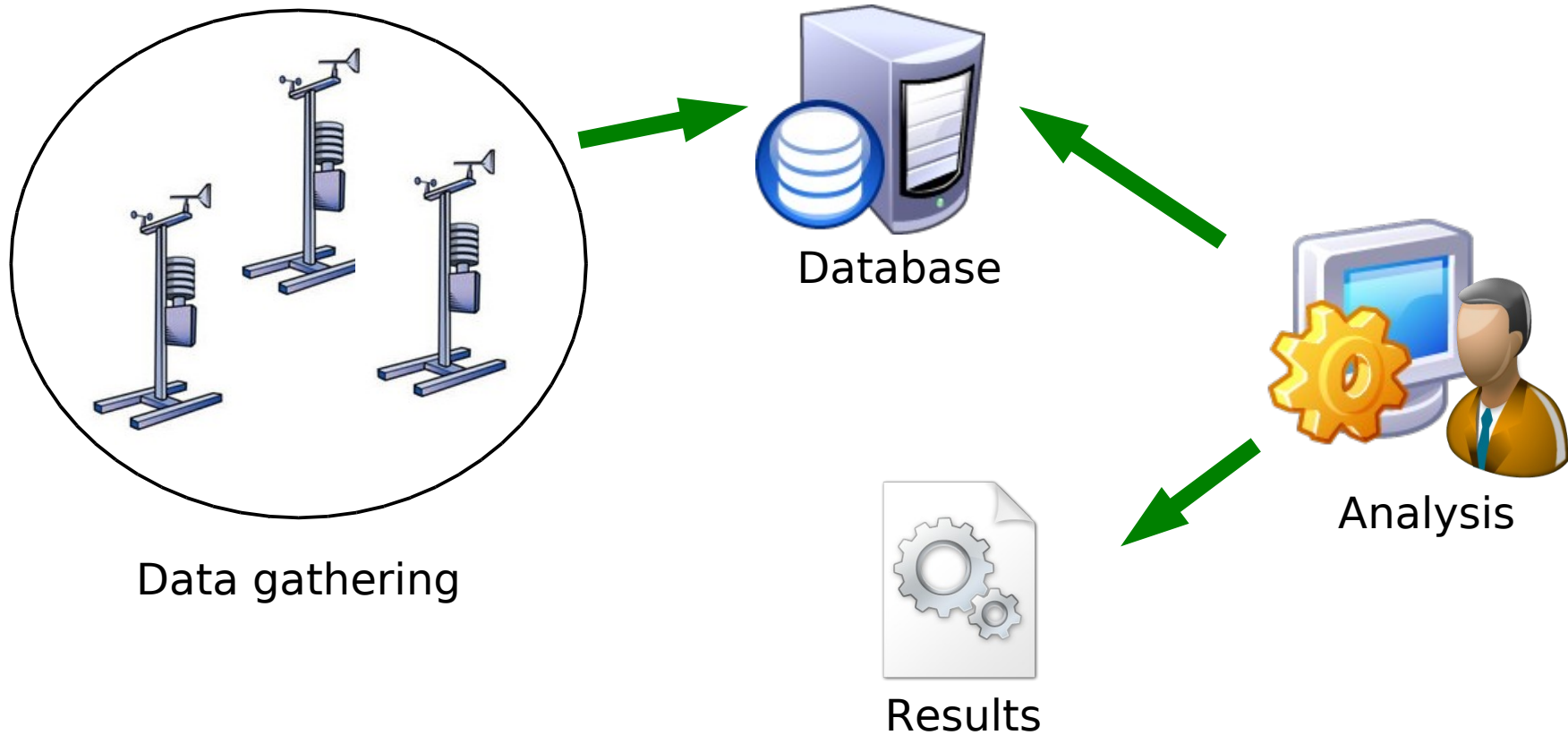
- Rain
- River water–level
- Air temperature
- Solar radiation
- Ground water level
- Spring discharges
- Landslide geodetic monitoring

Goals:

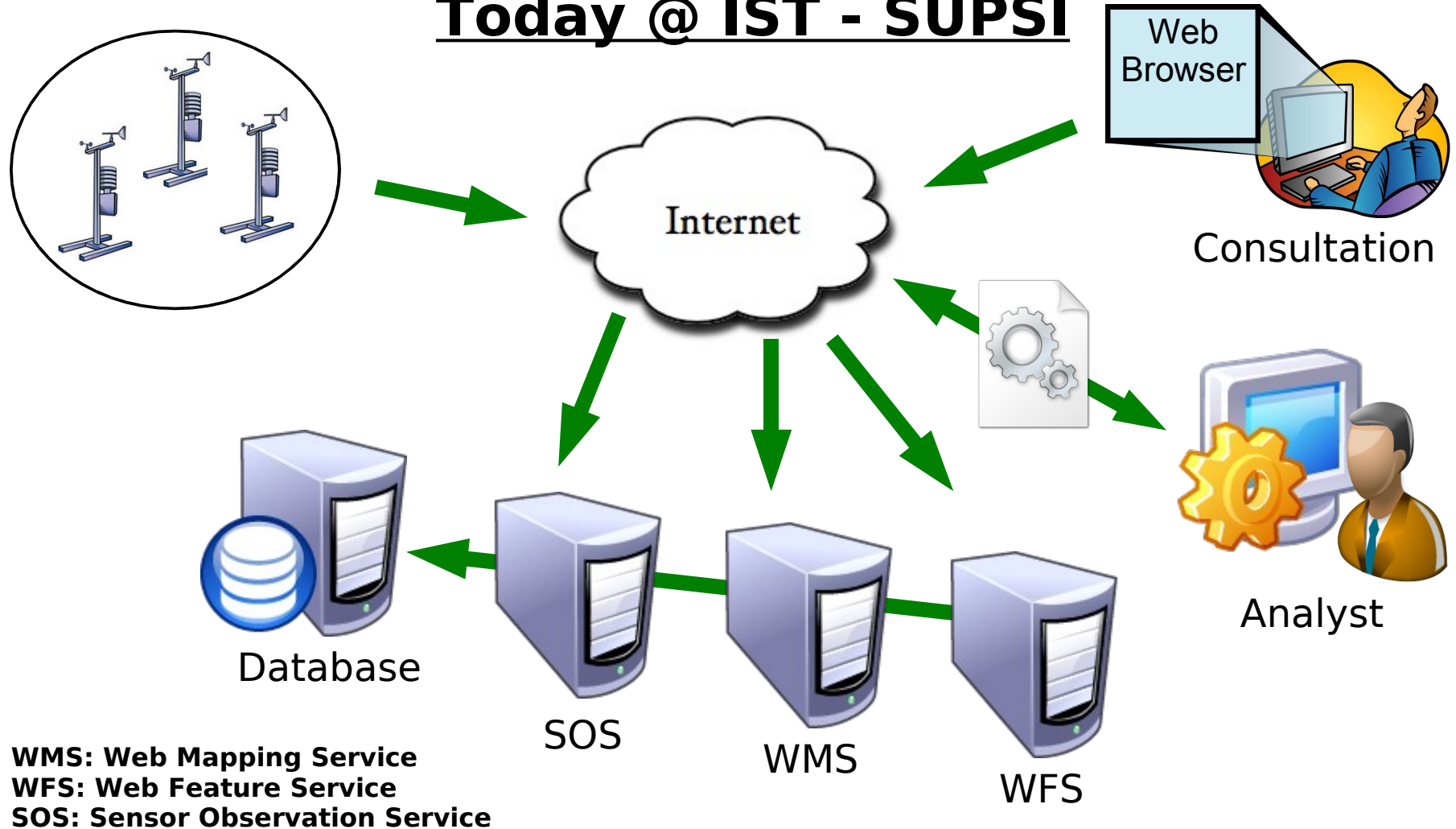
- Sensors
 - Find
 - Query
 - Control
- Data analysis:
 - Monitoring
 - Risk management
 - Risk prevention



Yesterday @ IST - SUPSI



Today @ IST - SUPSI



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

The screenshot shows the SUPSI website interface. At the top, there is a navigation bar with the SUPSI logo and the text 'Scuola Universitaria Professionale della Svizzera Italiana'. Below this, there are several tabs: 'Temperatura', 'Pioggia', 'Umidità', and 'Vento'. The 'Temperatura' tab is selected, and the page title is 'Temperatura'. Below the title, there is a search bar with 'Giorno: 20/11/2008' and 'Ora: 16', and a 'carica' button. The main content is a satellite-style map of a river network with three temperature markers: 18.0°C, 16.0°C, and 15.0°C. On the left side, there is a sidebar with the text 'Meteoist' and links for 'Ultimi rilievi', 'Mappa interattiva', and 'Dati storici'.

Real-time measures representation

- Coordinates
- Measure
- EventTime
- Procedure (Sensor)
- Feature of interest

Phenomena

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

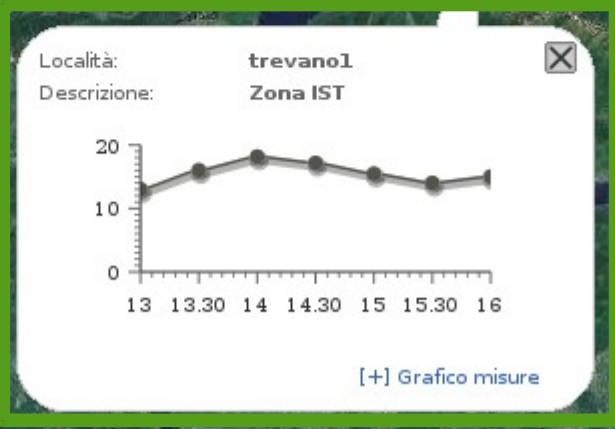


The screenshot shows the SUPSI Meteost website interface. At the top left is the SUPSI logo and navigation menu with options: Ultimi rilievi, Mappa interattiva, Dati storici, and Bollettino mensile. A filter box on the left lists: Filter requests by: - Time period, - Feature of Interest, - Observation type, - Procedure (Sensor). The main content area has tabs for Temperatura, Pioggia, Umidità, and Vento. The 'Temperatura' tab is active, showing a date selector for '20/11/2008' and a time selector for '16' with a 'carica' button. Below this is a satellite map of a mountainous region. A data plot window is open over the map, showing a line graph for 'Località: trevano1' and 'Descrizione: Zona IST'. The graph plots temperature over time from 13:00 to 16:00. A blue arrow points from the plot window back to the map. A green box highlights the 'Temperatura' tab and the date/time selector. Another green box highlights the filter requests list. A third green box highlights the plotting options (Tables and Charts) and points to the data plot window.

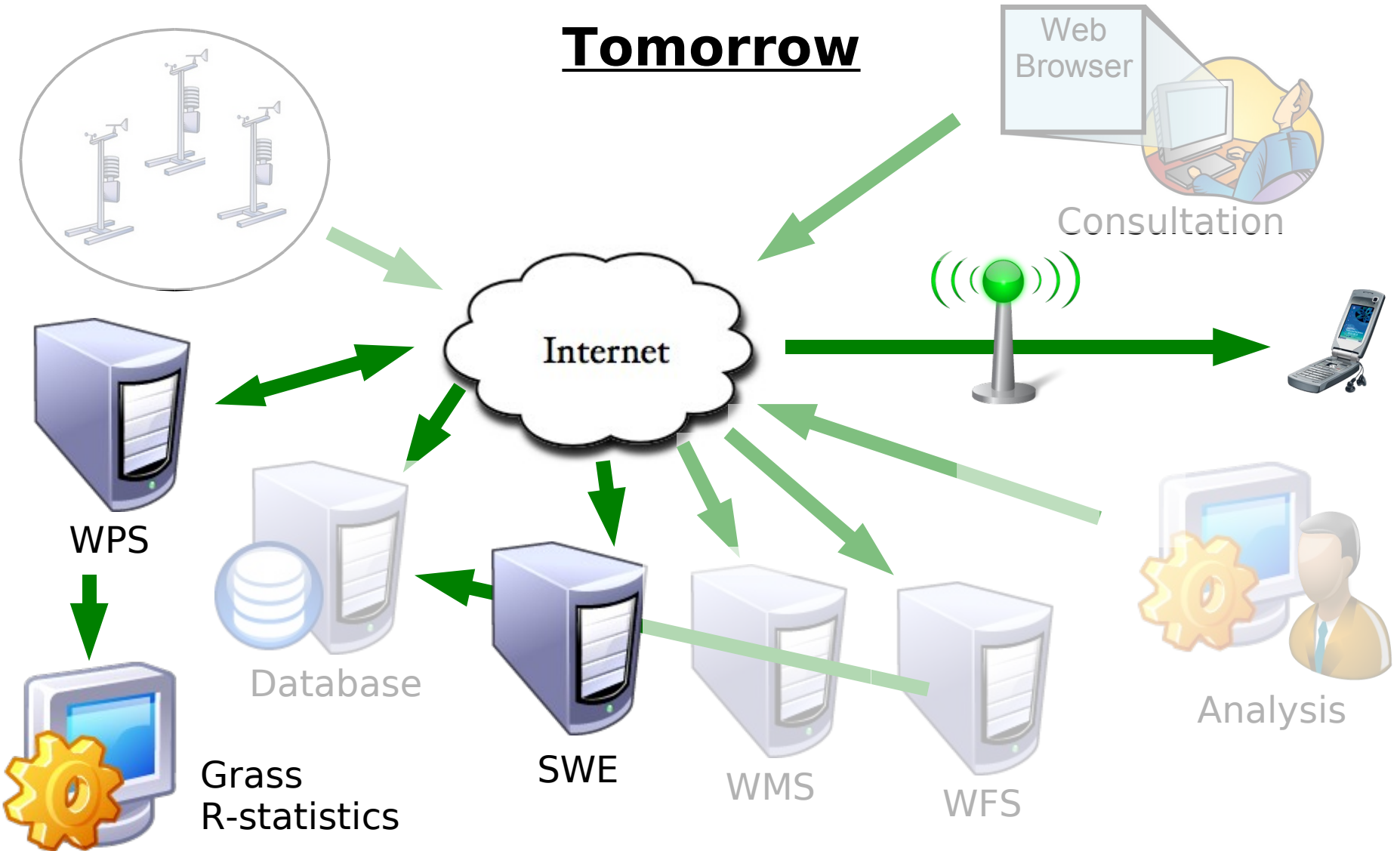
Filter requests by:
 - Time period
 - Feature of Interest
 - Observation type
 - Procedure (Sensor)

Temperatura
 Giorno: 20/11/2008 - Ora 16 carica

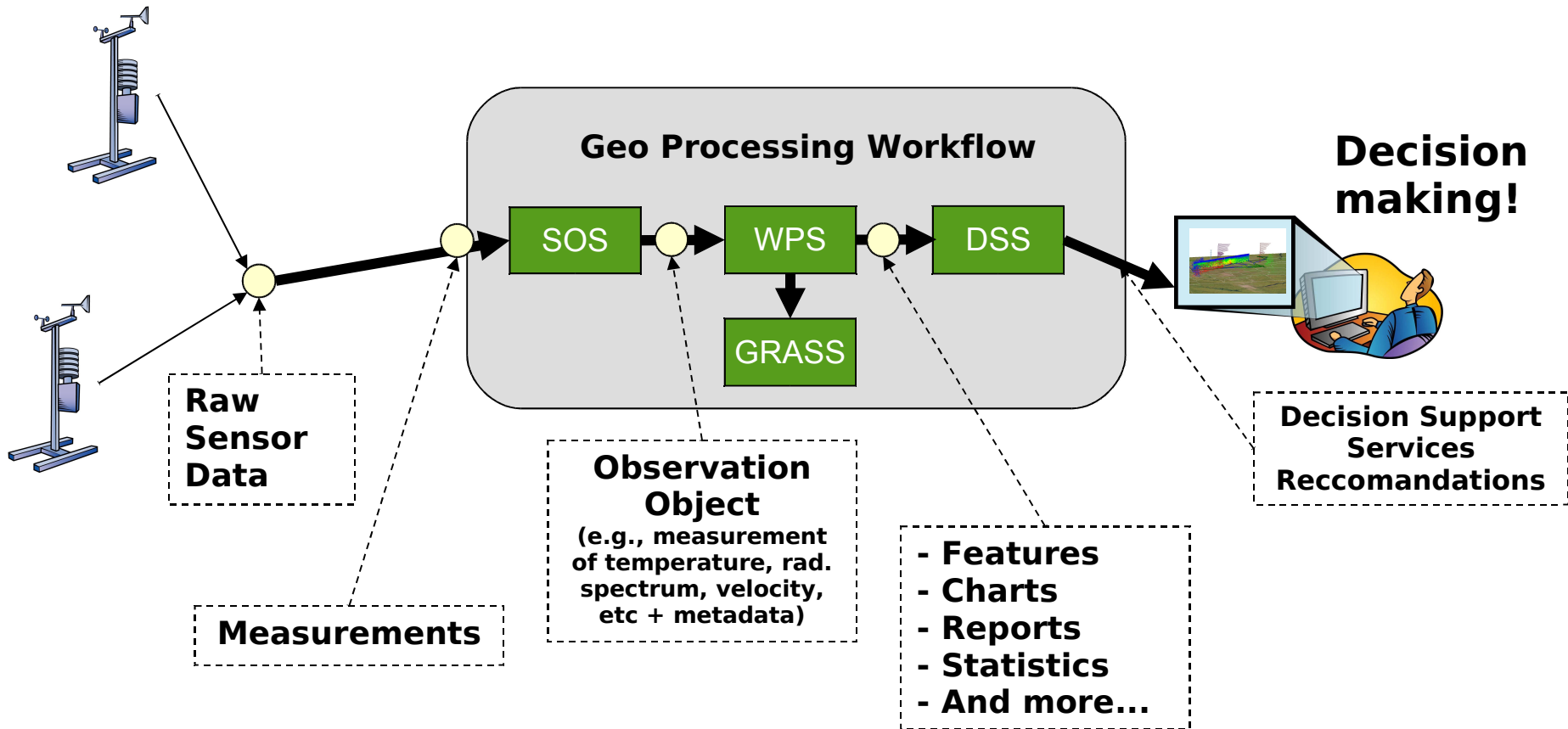
Plotting:
 - Tables
 - Charts



Tomorrow



Tomorrow's WPS @ IST - SUPSI



Any questions?

