52north exploring horizons

Sensor Observation Service

52°North SOS v2-01-00

SOS: Introduction

- provide access to observations from sensors and sensor systems
- in a standard way that is consistent for all sensor systems
    - including remote, in-situ, fixed and mobile sensors.

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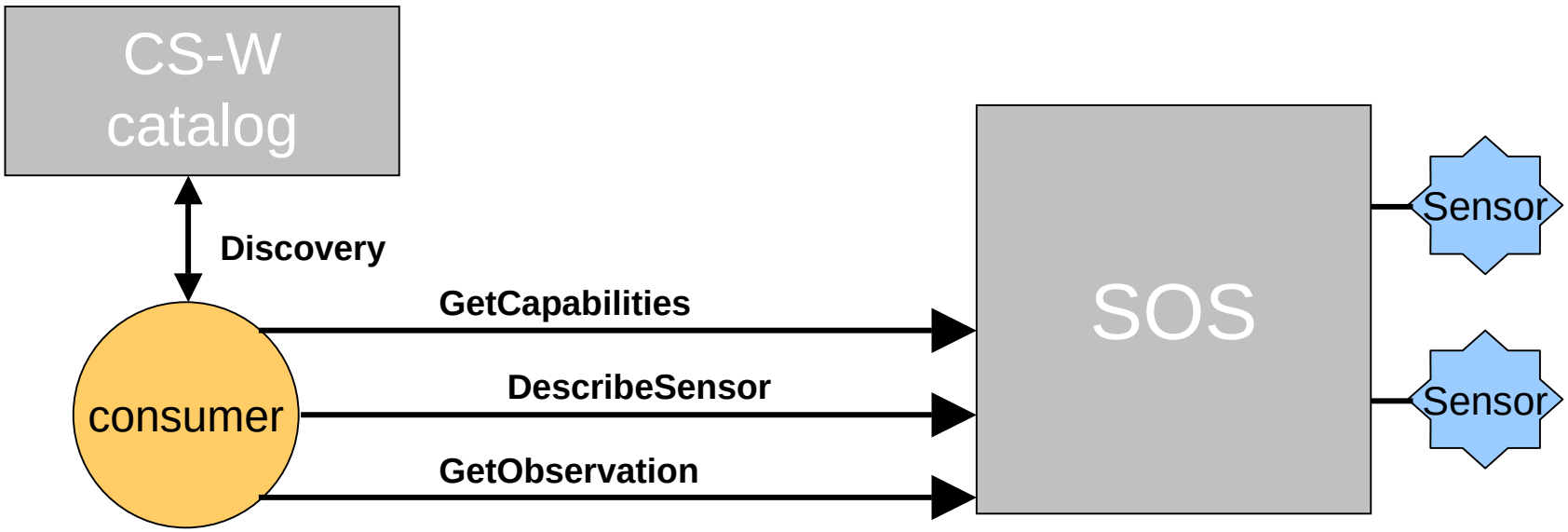
SOS: Introduction

- Access to observation from sensors
  - Pull-based
  - time-series
- Leverages
  - O&M for modeling sensor observations
  - SensorML for modeling sensor metadata

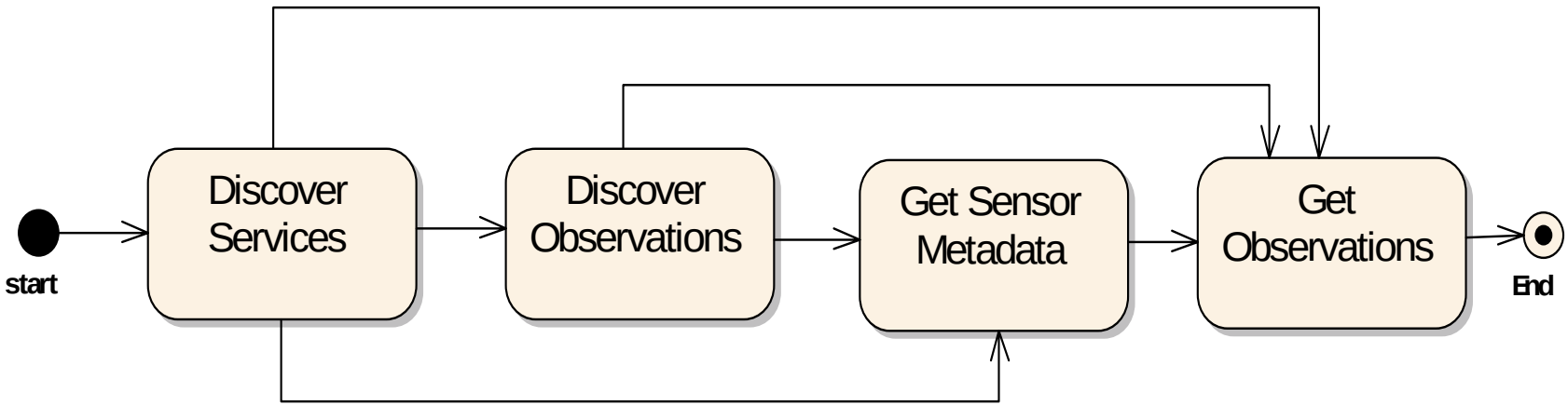
SOS: 4 Profiles

entire		
enhanced	**core**	**transactional**
GetResult GetFeatureOfInterest GetFeatureOfInterestTime DescribeFeatureOfInterest DescribeObservationType DescribeResultModel	GetCapabilities GetObservation DescribeSensor	RegisterSensor InsertObservation

SOS: Core Profile



SOS: Data Consumer Flow Chart



CS-W

SOS

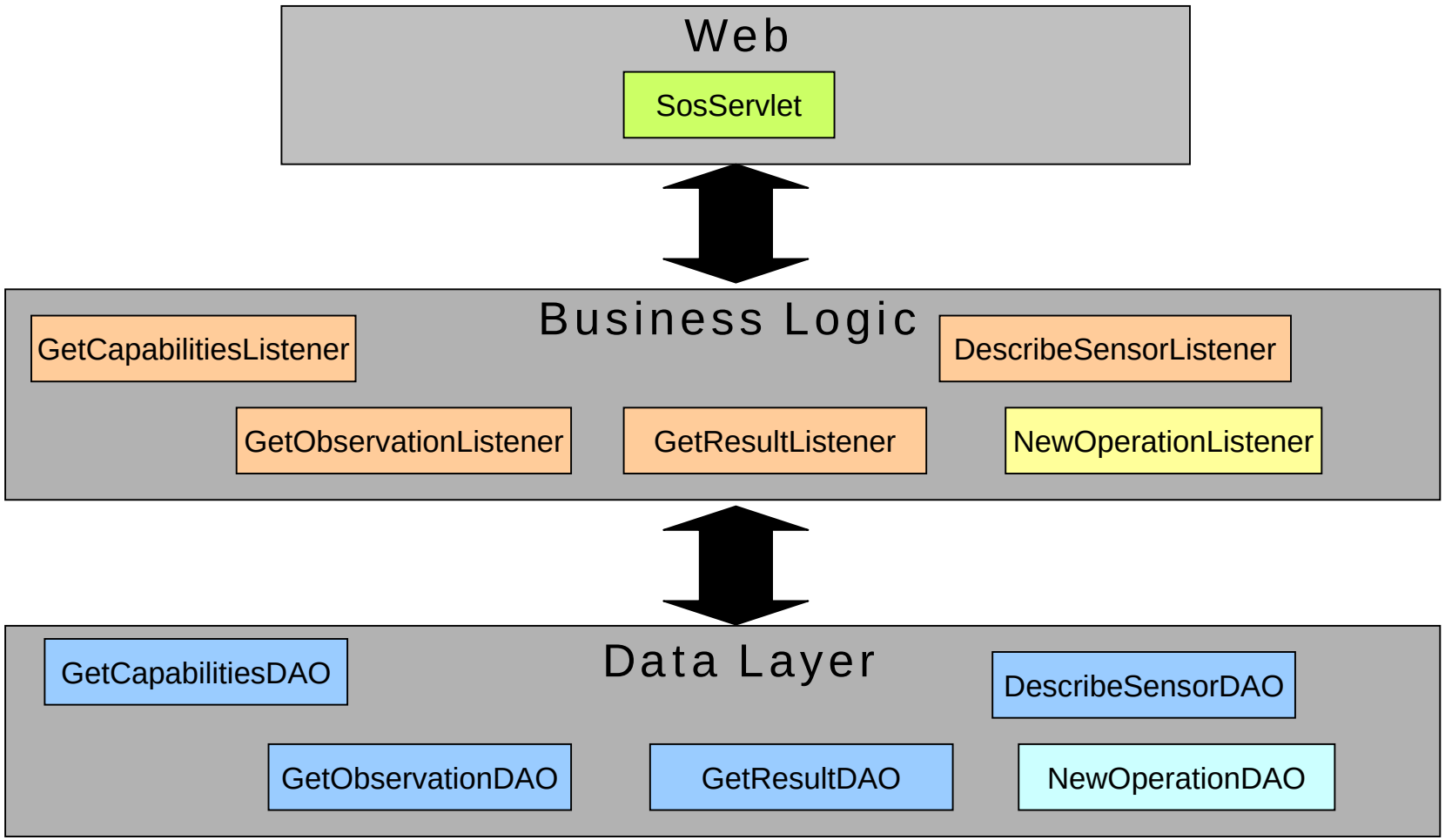
52N SOS: Implementation

- OGC specification 06-009r1
- 52N SOS: Core Profile + getResult operation
- DBMS: PostgreSQL + PostGIS
- XML databinding: XmlBeans

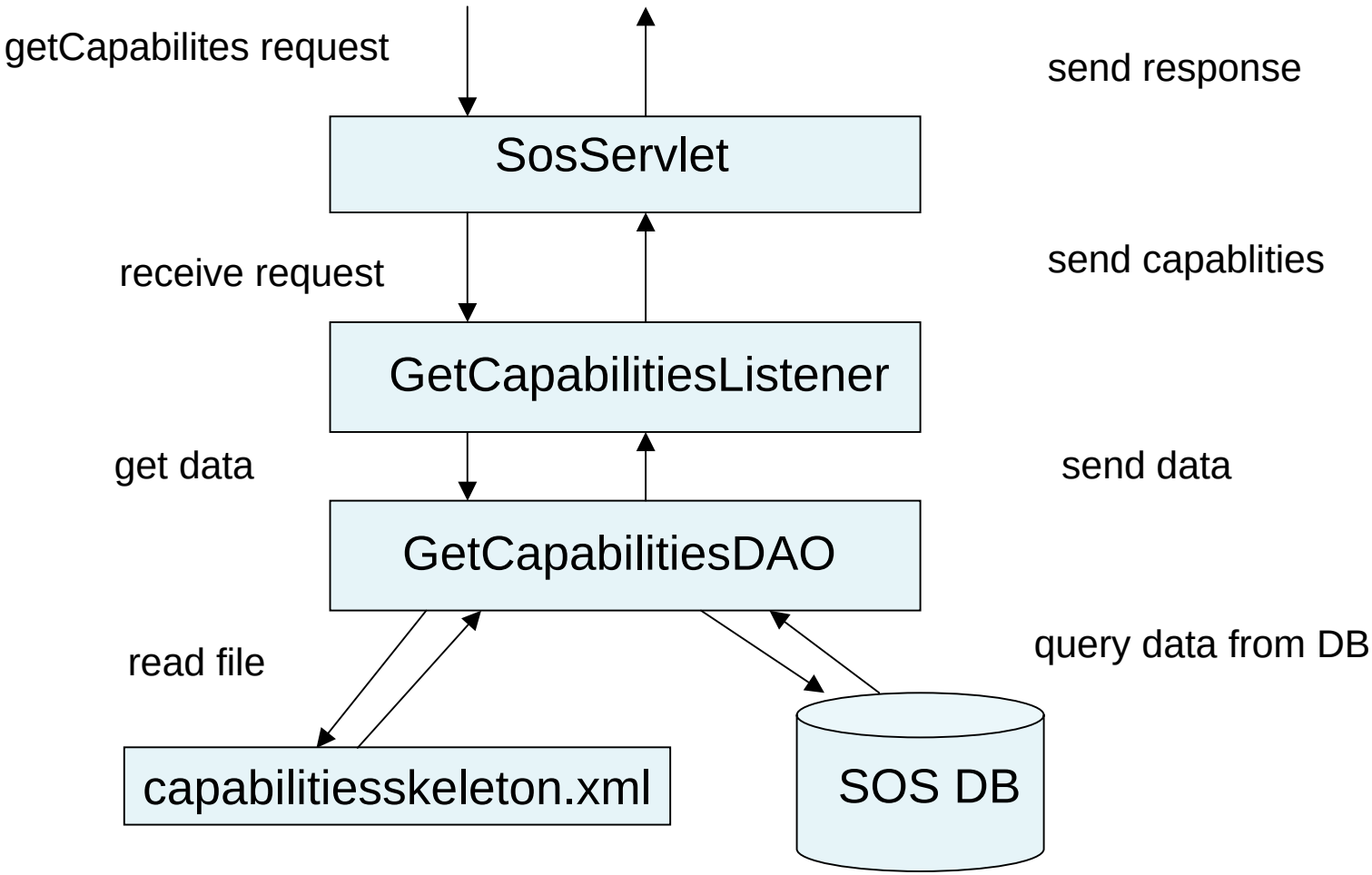
52N SOS: Features

- extensible architecture for easy implementation of additional operations
- easy integration of other data sources through Data Access Objects
- support for spatial and temporal filters in getObservation requests
- support for result filters in getObservation request
- different response types for different types of observations
- support for GZIP compression of responses
- 52N SOS Feeder Framework for easy inserting of data into the SOS database

52N SOS: 3-Tier Architecture



52N SOS: GetCapabilities flowchart



SOS: GetObservation

- offeringID
- eventTime
  - temporal filter
- procedure
  - SensorID
- observedProperty
  - phenomenon
- featureOfInterest
  - spatial filter
- Result
  - filter on the result value (=,>,<,…)
- resultFormat
  - O&M, CommonObservation
- responseMode
  - inline, template

52N SOS: Temporal Filter

- temporal filters:
  - After, Before, During, TEquals
- temporal operands:
  - timeInstant, timePeriod
- example:

```
<ogc:TEquals>
      <gml:TimeInstant>
<gml:timePosition>2006-06-30T10:00:00</gml:timePosition>
      </gml:TimeInstant>
</ogc:TEquals>
```

52N SOS: Spatial filter

- spatial filters:
  - BBOX, Contains, Overlaps, Intersects
- spatial operands:
  - Envelope, Polygon, LineString, Point
- example:

```
<ogc:Contains>
      <gml:Point srsName="EPSG:31467">
            <gml:pos>3425390 5735060</gml:pos>
      </gml:Point>
</ogc:Contains>
```

52N SOS: Result filter

- =, != for all values
- <,>,<=,>= for numeric values
- example:

```
<Result>
      <ogc:PropertyIsNotEqualTo>
            <ogc:Literal>
               <ogc:Measure uom="cm">50</ogc:Measure>
            </ogc:Literal>
      </ogc:PropertyIsNotEqualTo>
   </Result>
```

52N SOS: Types of responses

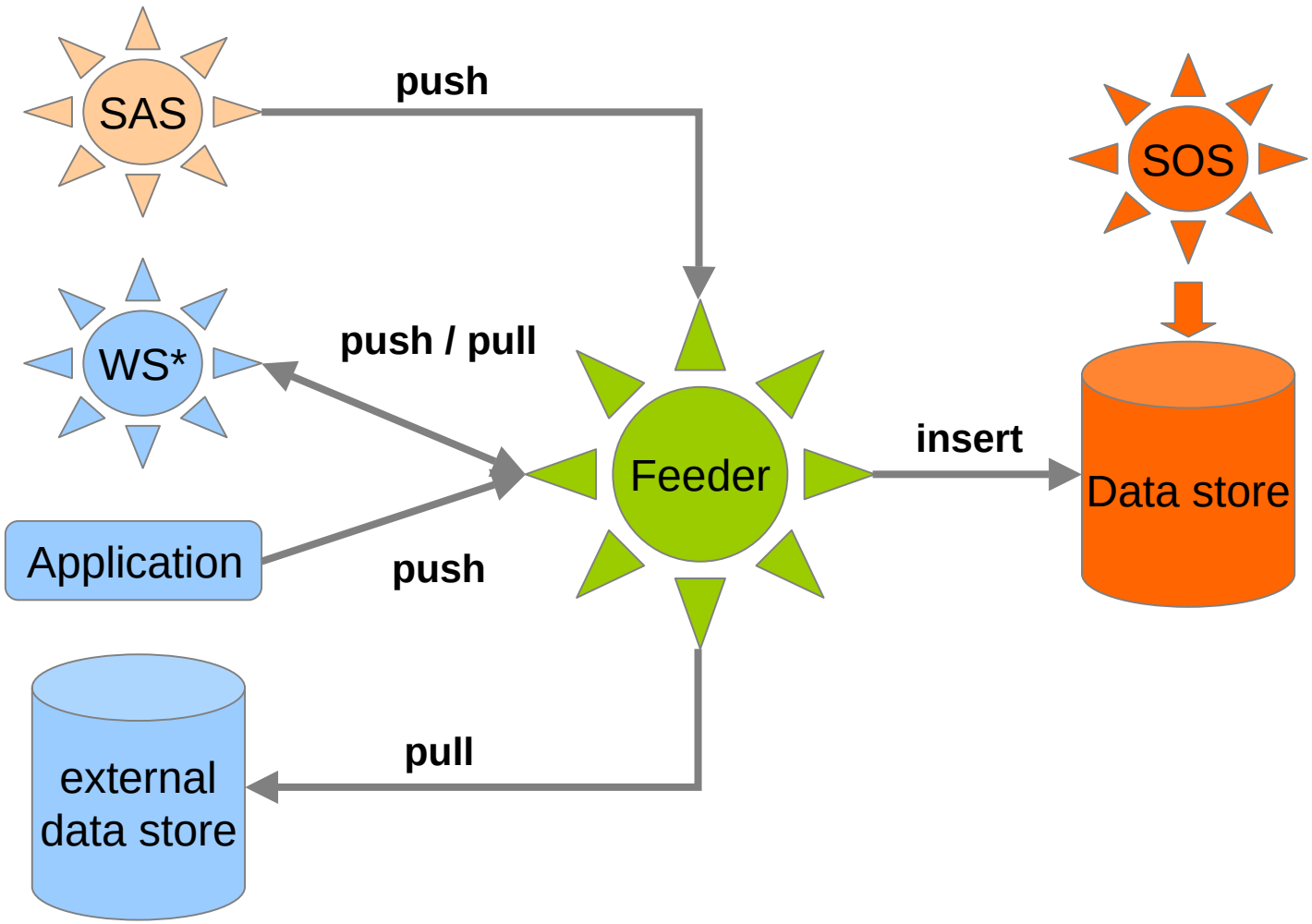
- Measurement:
  - numerical values
- CategoryObservation:
  - categorical values
- ExternalReferenceType:
  - references on files, which are located on another server (with MIME type annotation)
- CommonObservation:
  - time series for compositions of any types of observations
  - reduced amount of XML → smaller responses with same number of values

52N SOS Feeder Framework

- framework for inserting data into the SOS database
- PUSH and PULL mechanisms
- use of data access objects for inserting the data

→ flexibel use for different Sensor Observation Services with different DBMS (e.g. PostgreSQL, MySQL)

52N SOS Feeder Framework



52N SOS: next steps

- Transactional profile
- SOAP support
- MySQL support

52N SOS: users

- Spot Image
- CSIRO Australia
  - Commonwealth Scientific and Industrial Research Organisation
- CSIR South Africa
  - Council for Scientific and Industrial Research