



W3C Semantic Sensor Networks

Ontologies, Applications, and Future Directions

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So, again ...

How are **machines** supposed to **make sense** of this noisy, ambiguous, heterogeneous, deluge of **data**?



Semantic Sensor Networks (SSN)



**Semantic
Web**



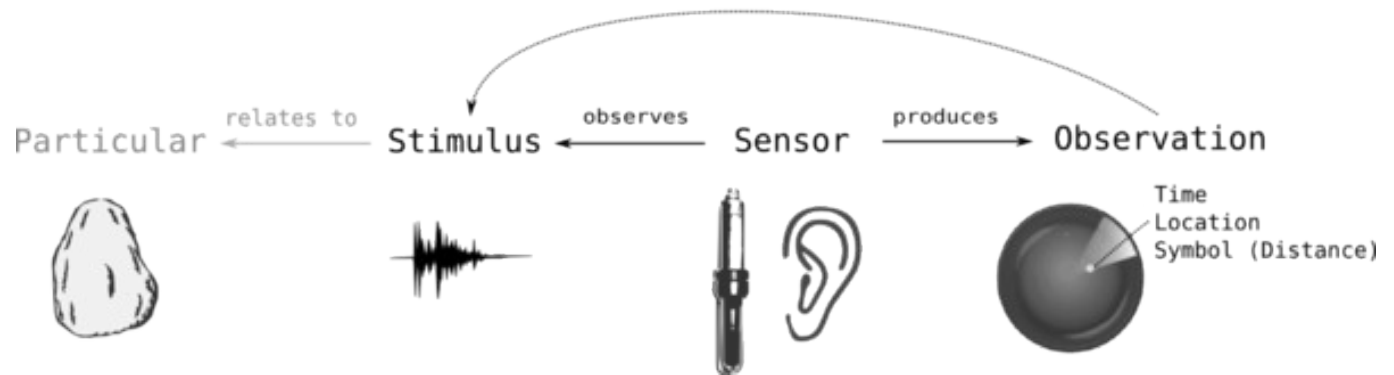
RDF



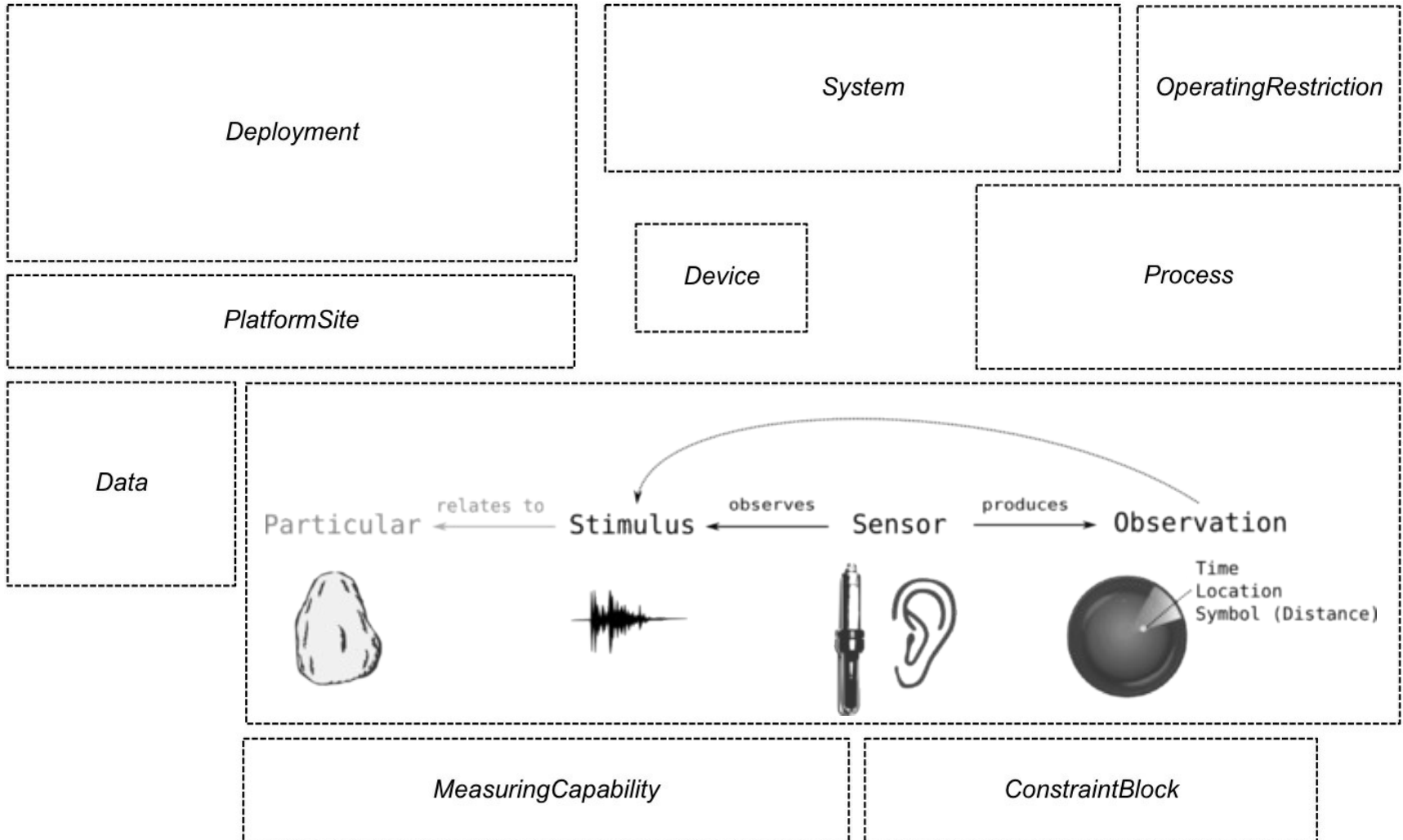
OWL

SSN Ontology

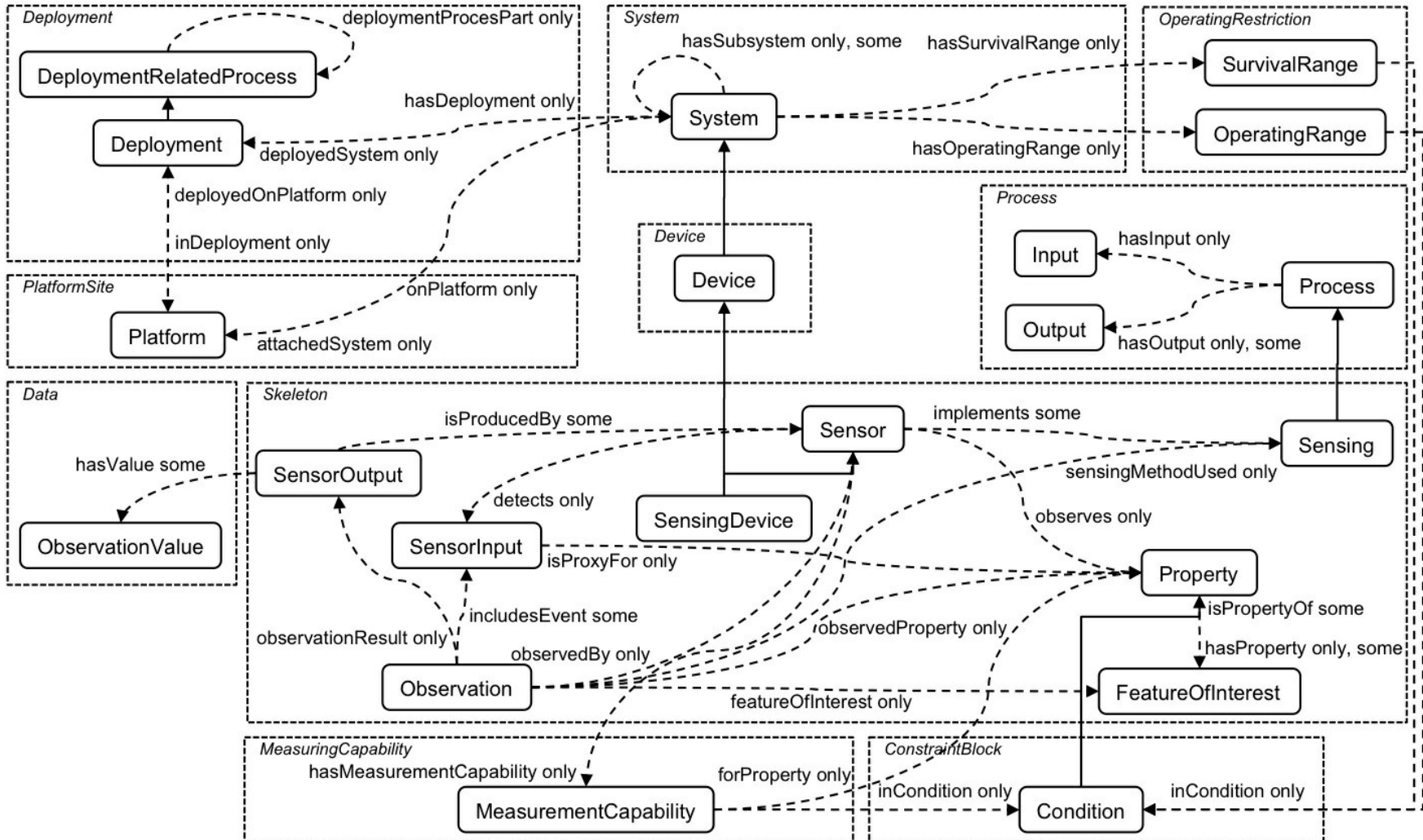
(i.e., General Sensor Knowledge)



SSN Ontology (i.e., General Sensor Knowledge)



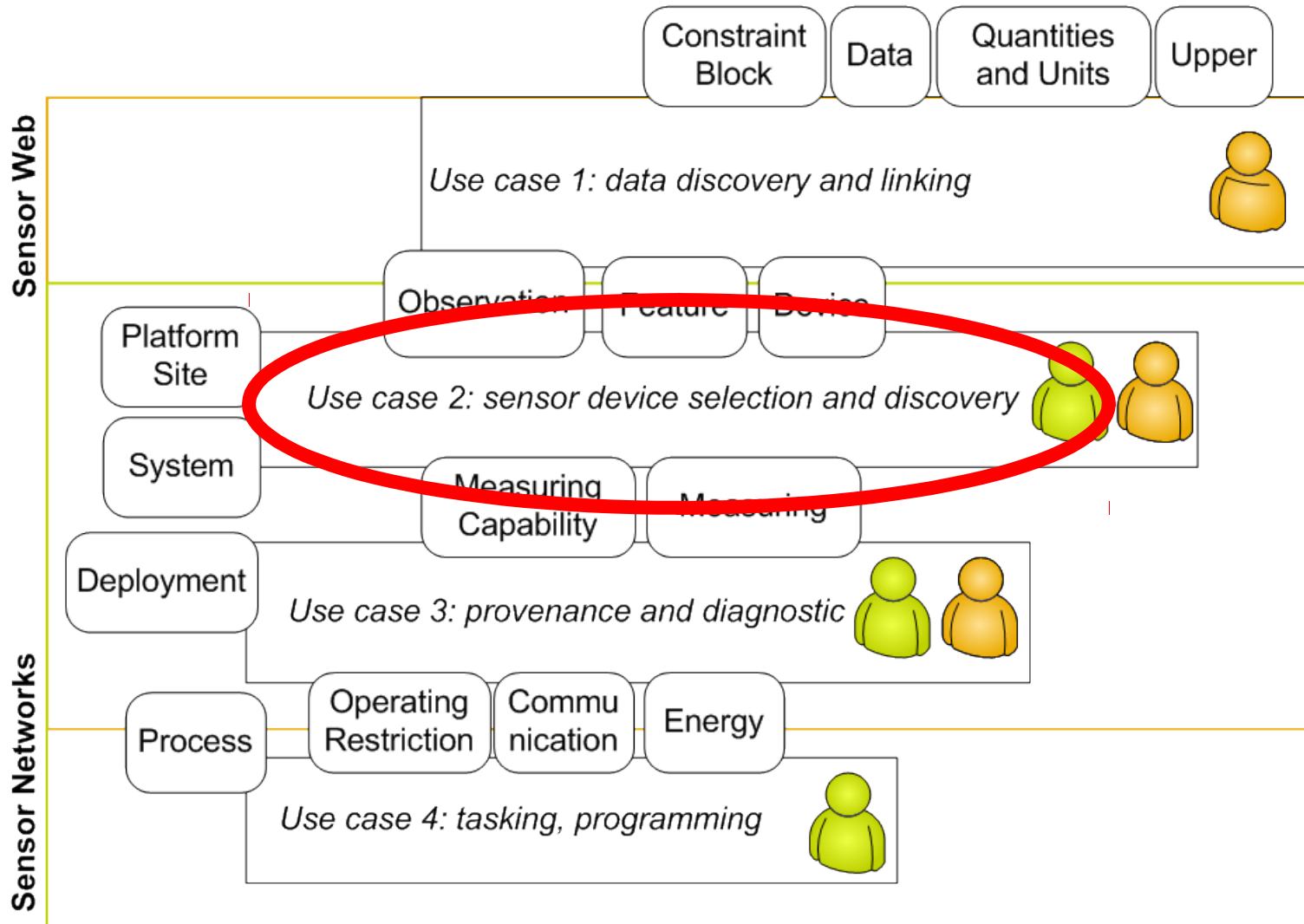
SSN Ontology (i.e., General Sensor Knowledge)



Semantic Annotation of SWE (backwards compatible)

```
<?xml version="1.0" encoding="UTF-8"?>
<swes:offering xlink:role="http://purl.oclc.org/NET/ssnx/ssn#Observation"
  xlink:arcrole="http://www.loa-cnr.it/ontologies/DUL.owl#hasSetting">
  <sos:ObservationOffering>
    <swes:procedureIdentifier
      xlink:role="http://purl.oclc.org/NET/ssnx/ssn#SensingDevice"
      xlink:href="http://purl.oclc.org/NET/ssnx/ssn-dev#rain gauge sth esk up esk rd bridge"
      xlink:arcrole="http://purl.oclc.org/NET/ssnx/ssn#observedBy">
      http://csiro.au/sw/rain gauge sth esk up esk rd bridge
    </swes:procedureIdentifier>
    <swes:observableProperty
      xlink:href="http://purl.oclc.org/NET/ssnx/cf/cf-property#thickness of rainfall amount"
      xlink:arcrole="http://purl.oclc.org/NET/ssnx/ssn#observedProperty"
      xlink:role="http://purl.oclc.org/NET/ssnx/qu/dim#Distance"/>
    <sos:phenomenonTime
      xlink:role="http://www.w3.org/2006/time-entry#Interval">
      xlink:arcrole="http://purl.oclc.org/NET/ssnx/ssn#observationTime"
      <gml:TimePeriod gml:id="phenomenonTime11">
        <gml:beginPosition
          xlink:role="http://www.w3.org/2006/time-entry#begins"
          xlink:arcrole="http://www.w3.org/2001/XMLSchema#time">
            2001-01-11T16:22:25.00
          </gml:beginPosition>
          <gml:endPosition
            xlink:role="http://www.w3.org/2006/time-entry#ends"
            xlink:arcrole="http://www.w3.org/2001/XMLSchema#time">
              2005-10-18T19:54:13.000Z
            </gml:endPosition>
          </gml:TimePeriod>
        </sos:phenomenonTime>
      </sos:ObservationOffering>
    </swes:offering>
```

SSN Use Cases



In the next century, planet earth will don an electronic skin. It will use the Internet as a scaffold to support and transmit its sensations. This skin is already being stitched together. It consists of millions of embedded electronic measuring devices.

Neil Gross, The Earth Will Don an Electronic Skin, BusinessWeek, Aug. 1999

Thanks.



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