iot.schema.org

Community Work

Current Layers of iot.schema.org

Core Model

Domain Model
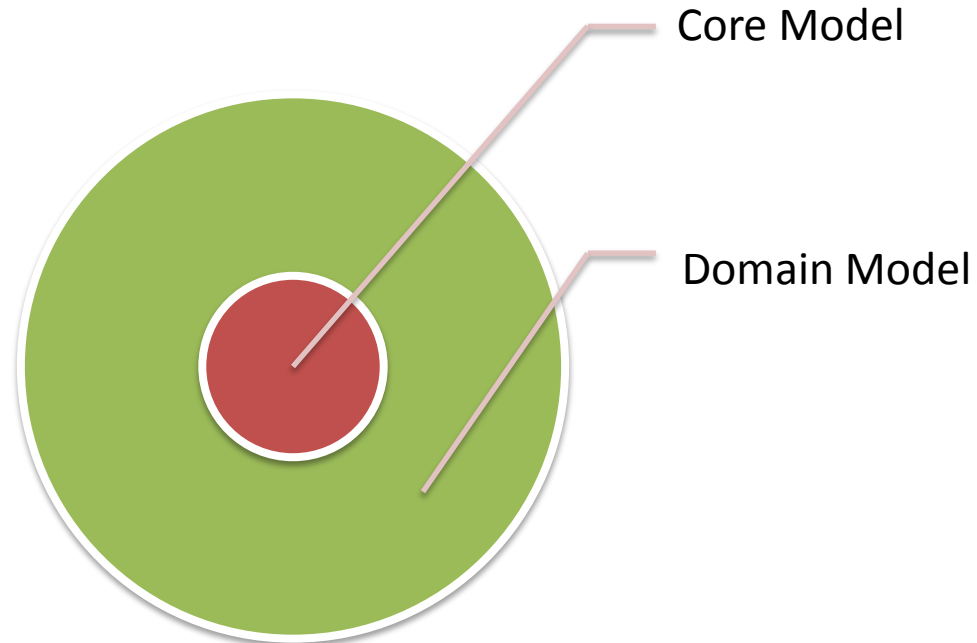
- Formats: Turtle and JSON-LD (following schema.org approach)
- Conversion can be automatically generated using:
  https://github.com/stain/owl2jsonld
- Namespaces: iot: http://iot.schema.org/core
  building: http://iot.schema.org/domain/building

Core Model

- **Core Model** follows a pattern-based approach. It describes **things** and their **environment**:
  - Common Pattern: a thing abstracted through its Capabilities, Properties, Actions, and Events;
  - Observation and Actuation Patterns: a W3C SOSA-based pattern extends Common Pattern with a horiz. vocabulary;
 - Location Pattern – work in progress

Domain Model

- Domain Model is a specialized vocabulary for a certain domain:
  - Smart Home/Building
    - MotionDetectionCapability
   - LightSwitchCapability

Motivation for SSN/SOSA Extension

- Binds Capability and Interaction patterns to real-world IoT devices:

  When a Capability is defined, this extension allows to specify the type of sensor/actuator that provides its interaction patterns.

- Allows to specify the Feature of Interest for the data provided by an interaction pattern. This provides information about the environment in which sensing/actuating is applied.

SOSA Observation Pattern
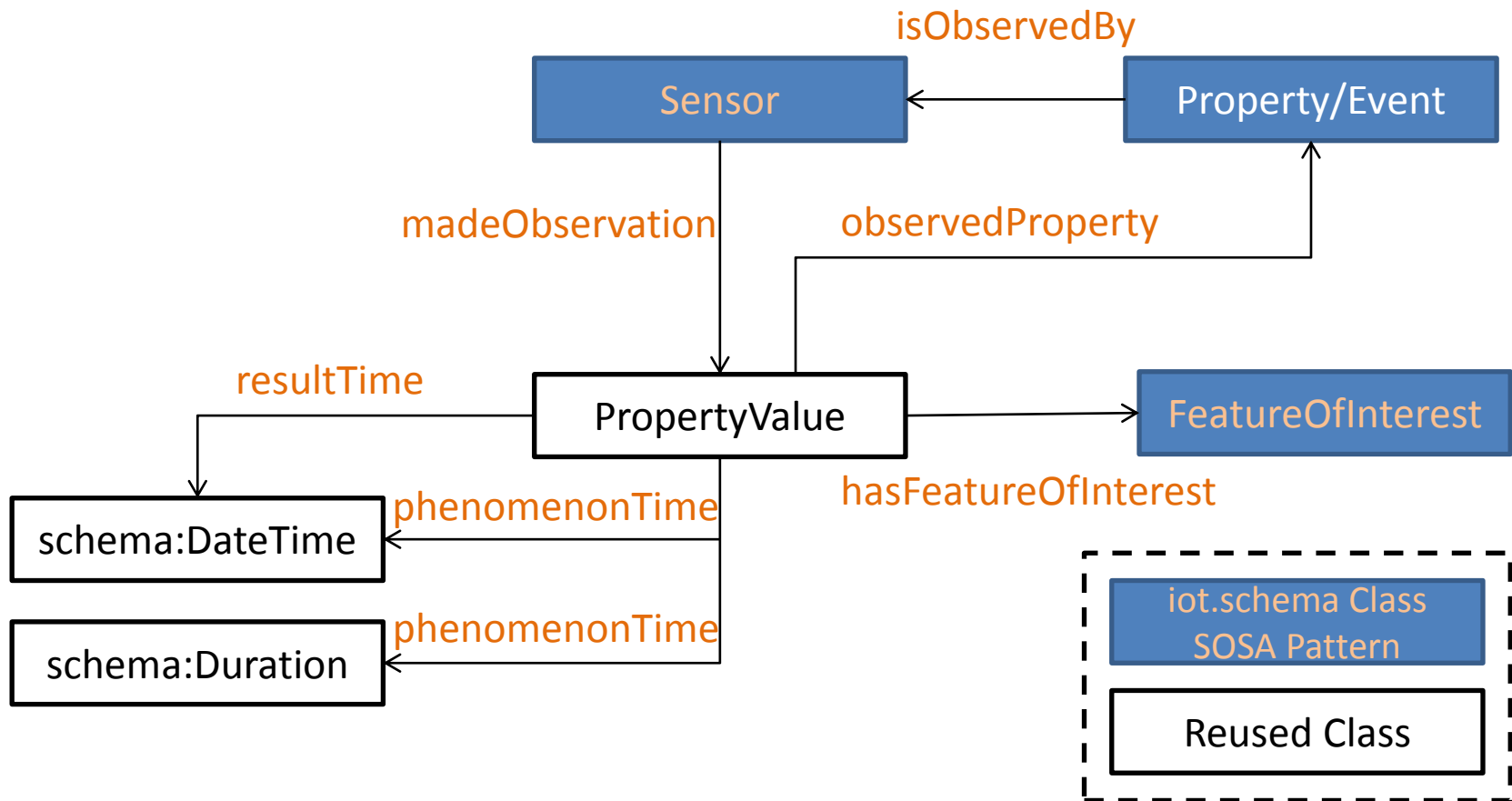
SOSA Actuation Pattern
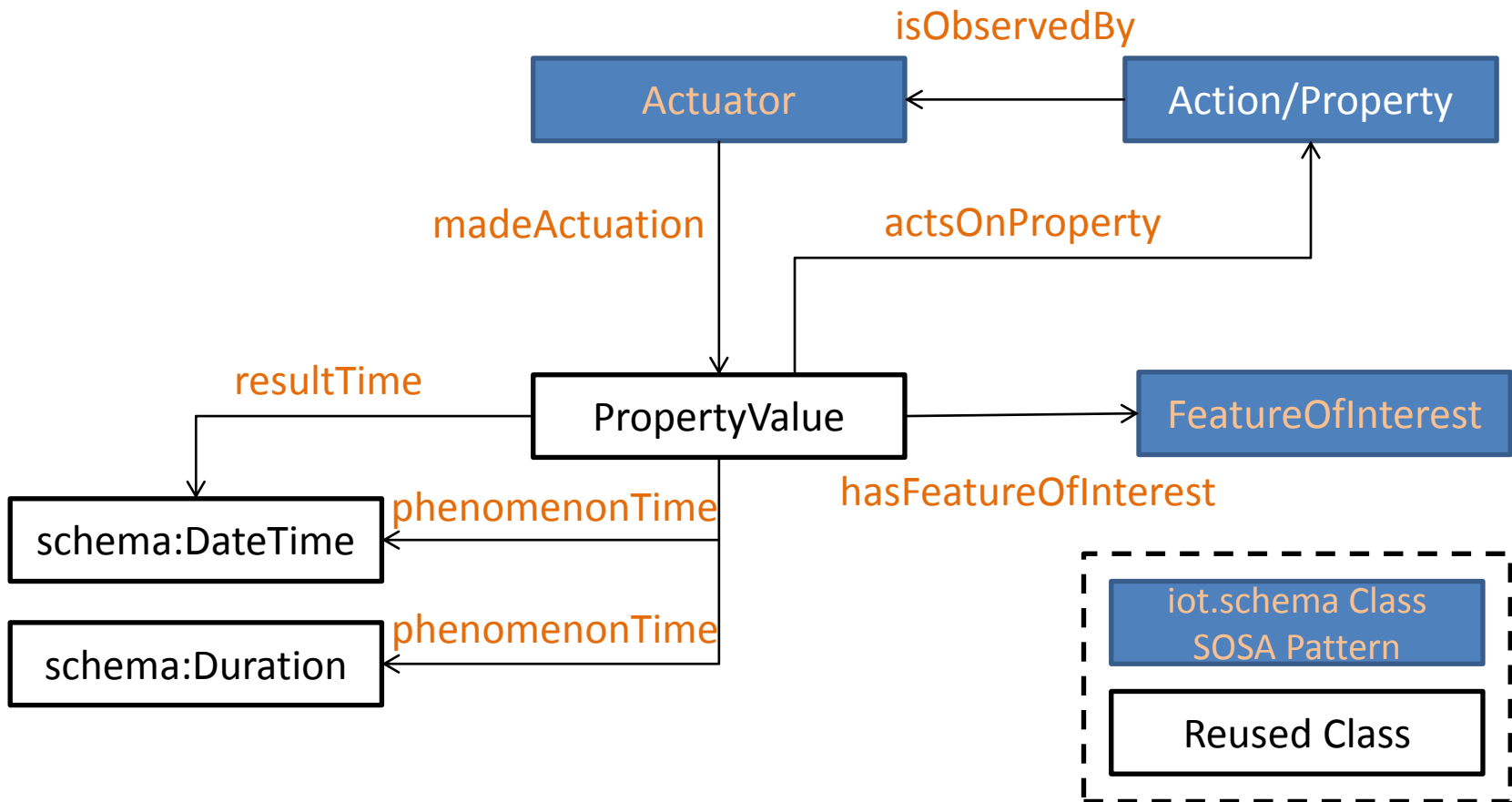
Example: Motion Detection Interaction Pattern

```
{
    "@id": "common:MotionDetected",
    "@type": "rdfs:Class",
    "rdfs:subClassOf": { "@id": "iot:Property" },
    "iot:domain": { "@id": "iot:Building" },
    "iot:providesOutputData": { "@id": "common:StateData" },
    "rdfs:comment": "Detects motion",
    "rdfs:label": "Motion Detected"},
{
    "@id": "common:StateData",
    "iot:domain": { "@id": "iot:Common" },
    "rdfs:comment": "State data",
    "rdfs:label": "State Data",
    "rdfs:subClassOf": { "@id": "schema:PropertyValue" },
    "schema:propertyType": { "@id": "schema:Boolean" }
}
```

Example: Motion Sensing Capability

```
{
    "@id": "building:MotionCapatility",
    "@type": "rdfs:Class",
     "rdfs:subClassOf": {
      "@id": "iot:Capability"
    },
"iot:providesInterctionPattern": {
     "@id": "common:MotionDetected"
    },
    "iot:domain": {
    "@id": "iot:Building"
    },
 "rdfs:comment": "Motion Sensing Capability",
 "rdfs:label": "Motion Sensing Capability",
}
```

Example: Interaction Pattern Extended with SSN/SOSA pattern

```
{
    "@id": "common:MotionDetectedExt",
    "@type": "rdfs:Class",
    "rdfs:subClassOf": { "@id": "iot:Property"},
    "iot:domain": { "@id": "iot:Building" },
    "iot:isObservedBy": { "@id": "iot:Sensor"},
    "iot:providesOutputData": {"@id": "common:StateDataExt"},
    "rdfs:comment": "Motion detection property extended with SSN/SOSA observation and actuation pattern",
    "rdfs:label": "Motion Detected" },
{
    "@id": "common:StateDataExt",
    "iot:domain": {  "@id": "iot:Common" },
    "iot:hasFeatureOfInterest": { "@id": "schema:Room"},
    "iot:observedProperty": { "@id": "common:MotionDetectedExt"},
    "rdfs:comment": "State data Extended with SSN/SOSA observation and actuation pattern",
    "rdfs:label": "State Data",
    "rdfs:subClassOf": { "@id": "schema:PropertyValue" },
    "schema:propertyType": { "@id": "schema:Boolean" }}
```

Thing Description Example

```
{
  "@type": ["ssn:Sensor"],
  "name": "MotionDetectionSensor",
  "interactions": [ {
      "@type": ["Property", "common:MotionDetected"],
      "name": "motionDetection",
      "outputData": { "@type": "common:StateData",
        "valueType": { "type": "boolean" } },
      "writable": true,
      "links": [{
        "href" : "example/motionsensor/motionDetection",
        "mediaType": "application/json"
}]
 }] }
```

Additional Concept Requirements

```
{
    "@id": "common:MotionDetectedExt",
    "@type": "rdfs:Class",
    "rdfs:subClassOf": { "@id": "iot:Property"},
    "iot:domain": { "@id": "iot:Building" },
    "iot:isObservedBy": { "@id": "iot:Sensor"},
    "iot:providesOutputData": {"@id": "common:StateDataExt"},
    "rdfs:comment": "Motion detection property extended with SSN/SOSA observation and actuation pattern",
    "rdfs:label": "Motion Detected" },
{
    "@id": "common:StateDataExt",
    "iot:domain": {  "@id": "iot:Common" },
    "iot:hasFeatureOfInterest": { "@id": "schema:Room"},
    "iot:observedProperty": { "@id": "common:MotionDetectedExt"},
    "rdfs:comment": "State data Extended with SSN/SOSA observation and actuation pattern",
    "rdfs:label": "State Data",
    "rdfs:subClassOf": { "@id": "schema:PropertyValue" },
    "schema:propertyType": { "@id": "schema:Boolean" }}
```