Web of Things
Linked Data & Semantic Processing

Preparation for the next F2F Meeting

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ACTIVITY 1

THE LINKED DATA FOR WOT APPLICATIONS

The Linked Data for WoT Applications
(Dave, McCool, Victor, Maria, Danh , Darko)

- Problem Statement - Example
  - Interop client can discover Things from two or more different device ecosystems (e.g., W3C WoT and OCF) in order to dynamically adapt applications to changes, e.g., to replace malfunctioning sensor with an equivalent one.
- Tasks
  - Provide a semantic model
    - Aligned model: W3C WoT TD, OCF, horizontal voc., e.g., W3C SSN/SOSA, SAREF (oneM2M), Haystack, ECHONET etc.
    - iot.schema.org based on the notion of Capabilities
  - Make the model accessible for Plug Fest participants
  - Provide simple HowTo info for Plug Fest participants
- Demonstrate
  - Discovery of devices regardless of the ecosystem they belong to (e.g., in the home appliances domain). To be accomplished together with Task 3.

ACTIVITY 2

SEMANTIC PROCESSING FOR WEB OF THINGS

Semantic Processing for Web of Things
(Danh, Victor, Maria)

- Problem Statement
  - Interop client is capable to validate and verify a chosen Thing Description. For example, to check whether a TD is valid.
  - Interop client is capable to discover “Semantic Compatible” description across TD with different “Semantic Mappings” (based on the model(s) from Task 1).
- Tasks
  - Evaluate different approaches for semantic constraints and validation of Linked Data in terms of expressiveness, performance, adequacy to the TD model
  - Evaluate the capability to processing “Semantic Bridge” among
- Demonstrate
  - Validate and verify
  - Semantic Bridge (see the demo scenario) :
    - Provide an alignment rule as the “Semantic Bridge” in different
    - Use a Java-script-based reasoner to infer the ”isA” and “property relation”

Semantic Processing for Web of Things
(Danh, Victor, Maria)

- Choose 2-3 TDs annotated with SSN/SOSA, SAREF (oneM2M), Haystack, ECHONET etc. (probably, from 2nd Level (horizontal voc) of The Linked Data for WoT application demo)
- Build an alignment rules which use SubClassOf, EquivalentClass, SubProperyOf and EquivalentProperty
- Use HyLAR (https://github.com/ucbl/HyLAR-Reasoner) to infer the Semantic Bridges (iSA/rdf type and RDF property) in JavaScript(run both in Browser and NodeJS)
- Demo the capability to discover Things (sensor/things/properties) by using only one annotated ontology (SSN/SOA or SAREF) to find other things annotated in other ontologies (the demo will run in browser)
- The demo discovery queries in SPARQL: to be defined after discussing Task 1 in details

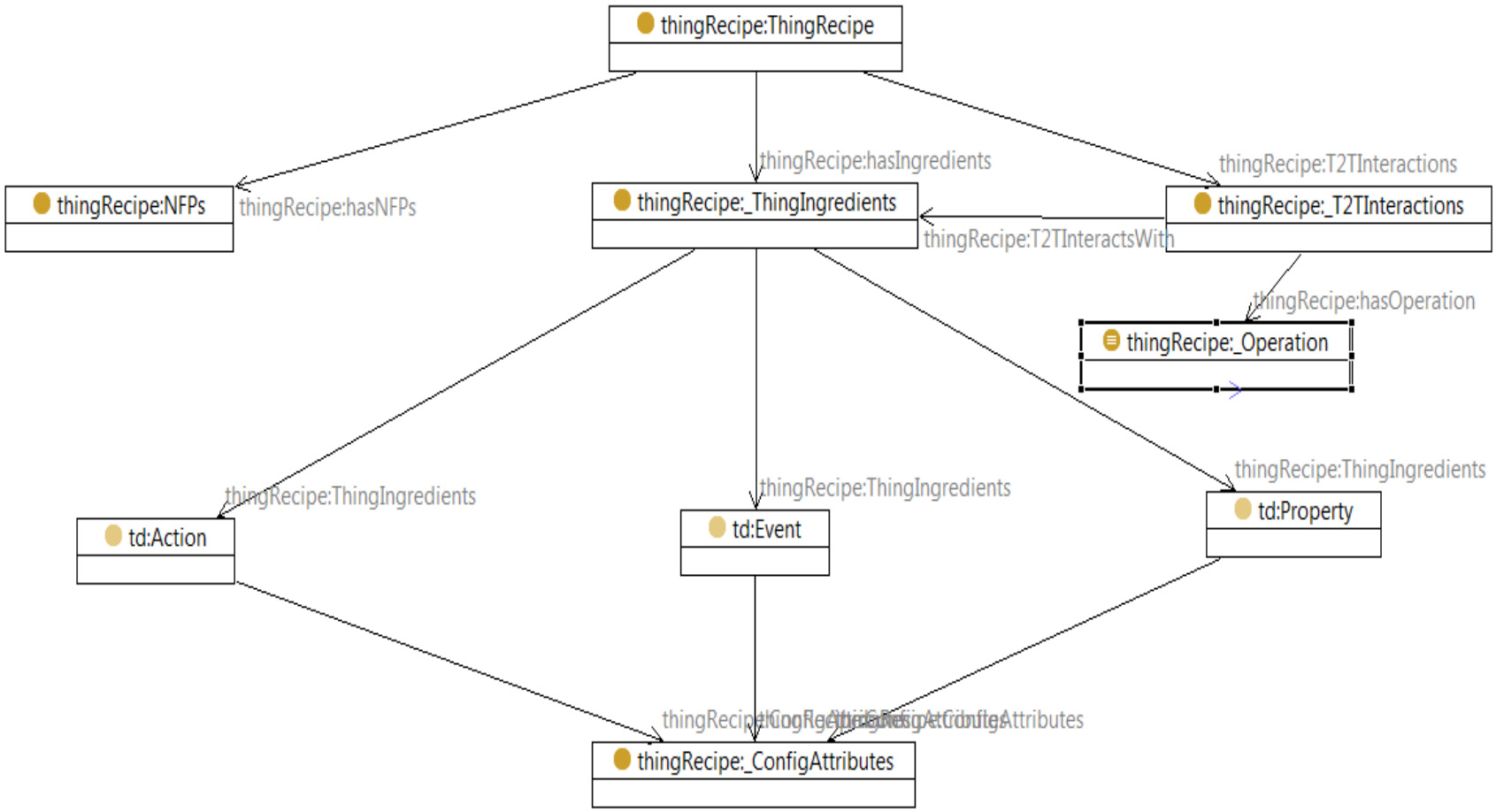
ACTIVITY 3

THING DESCRIPTION RECIPES

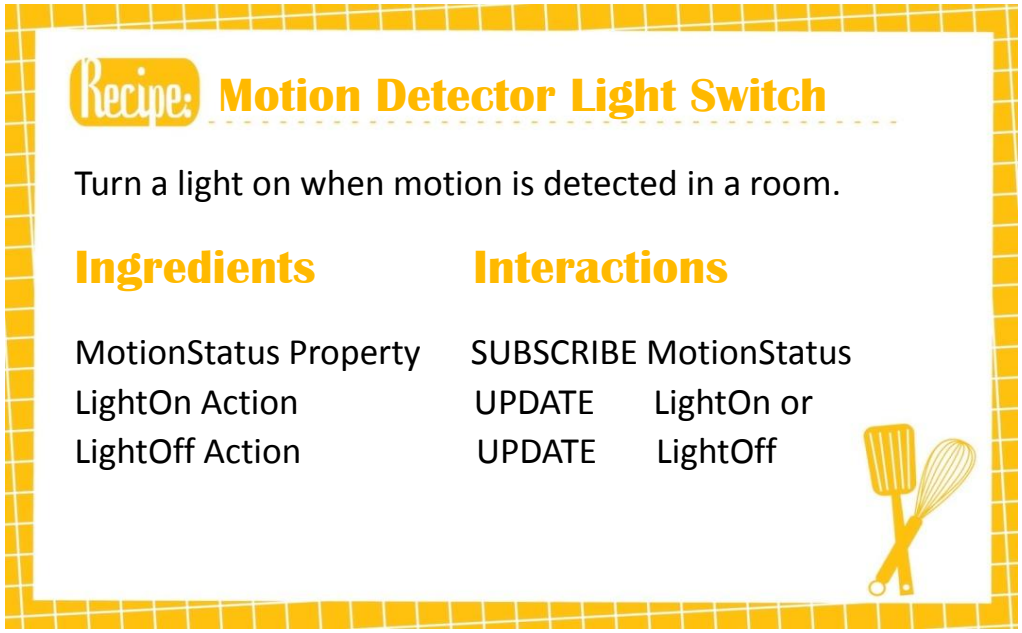
Thing Description Recipes
(Koster, Danh, Aparna, Darko)

- Problem Statement - Example
  - Interop client creates a WoT application based on a recipe. Discovery of Things, which can be used in the recipe, is automated thanks to their Thing Descriptions and recipe semantic specification.
- Tasks
  - Propose a recipe format based on TD and capability templates
  - Implement a prototype
- Demonstrate
  - Discovery of recipes for rapid creation of WoT applications
  - Interaction between devices from different ecosystems
  - Semantic interoperability, cross-domain orchestration

Recipe Model



Recipe Example

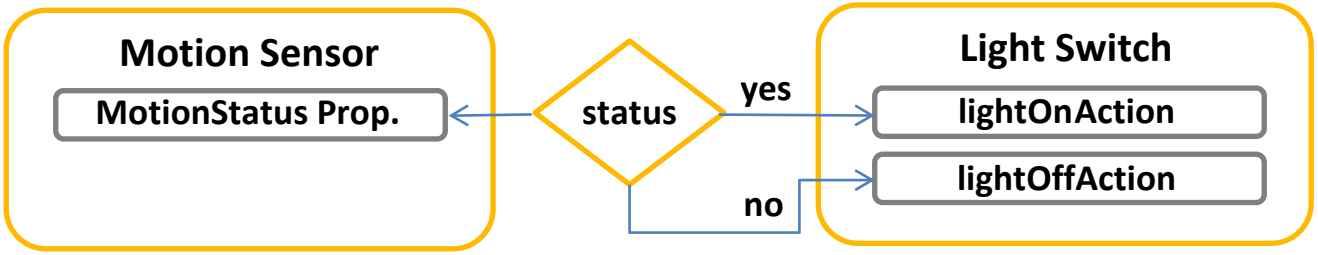


Recipe Example

Recipe: Motion Detector Light Switch

Turn a light on when motion is detected in a room.

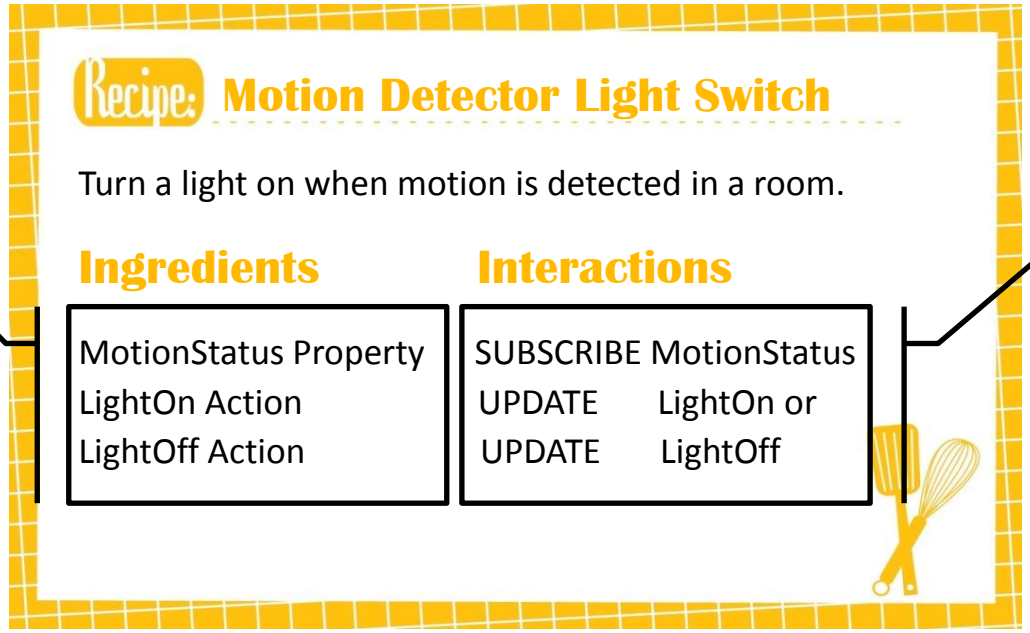
Ingredients	Interactions
MotionStatus Property	SUBSCRIBE MotionStatus
LightOn Action	UPDATE LightOn or
LightOff Action	UPDATE LightOff

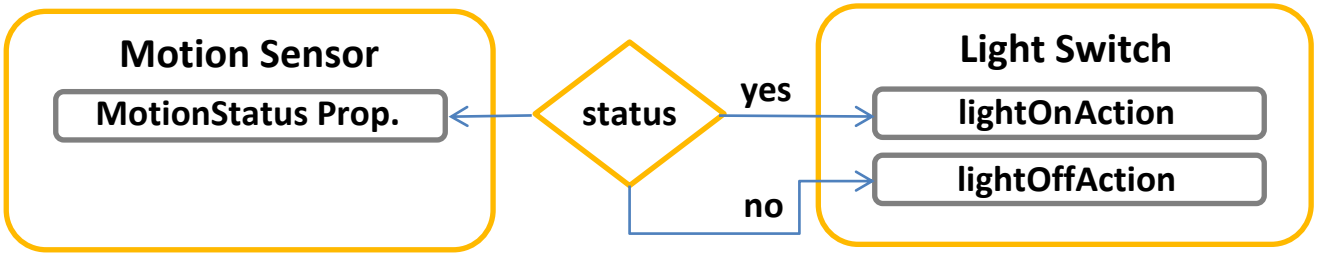


Recipe Example

Capability from iot.schema.org

Impl. with W3C WoT Script API





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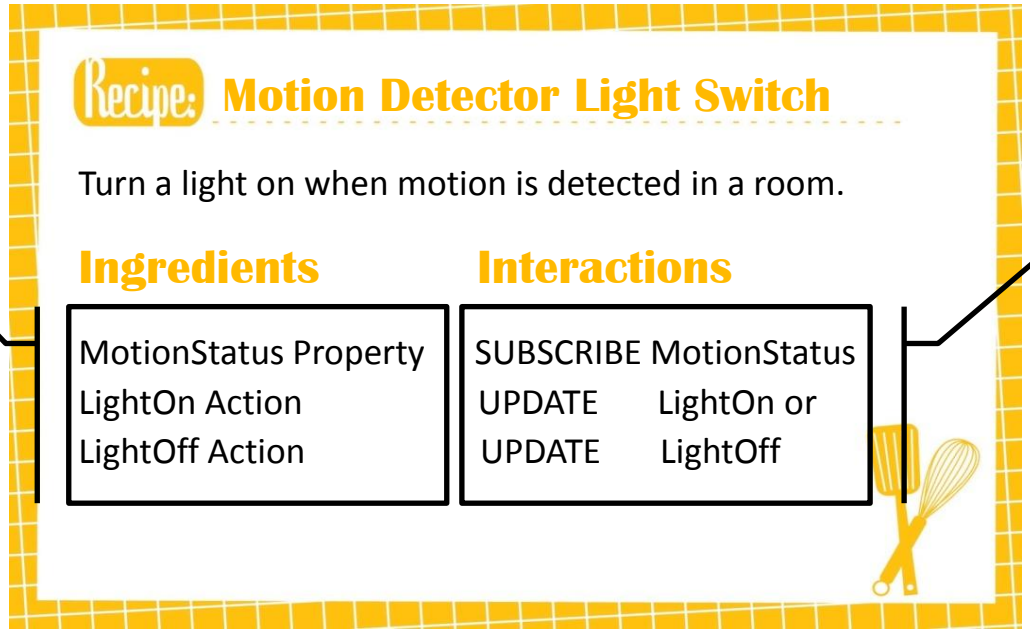
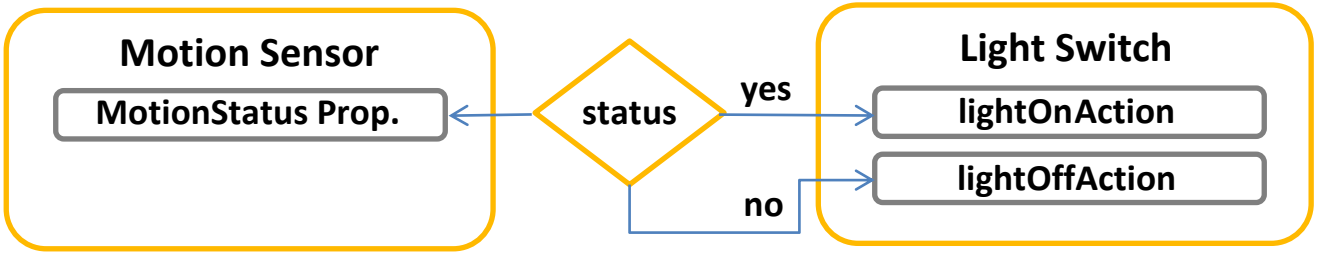


Impl. with W3C WoT Script API

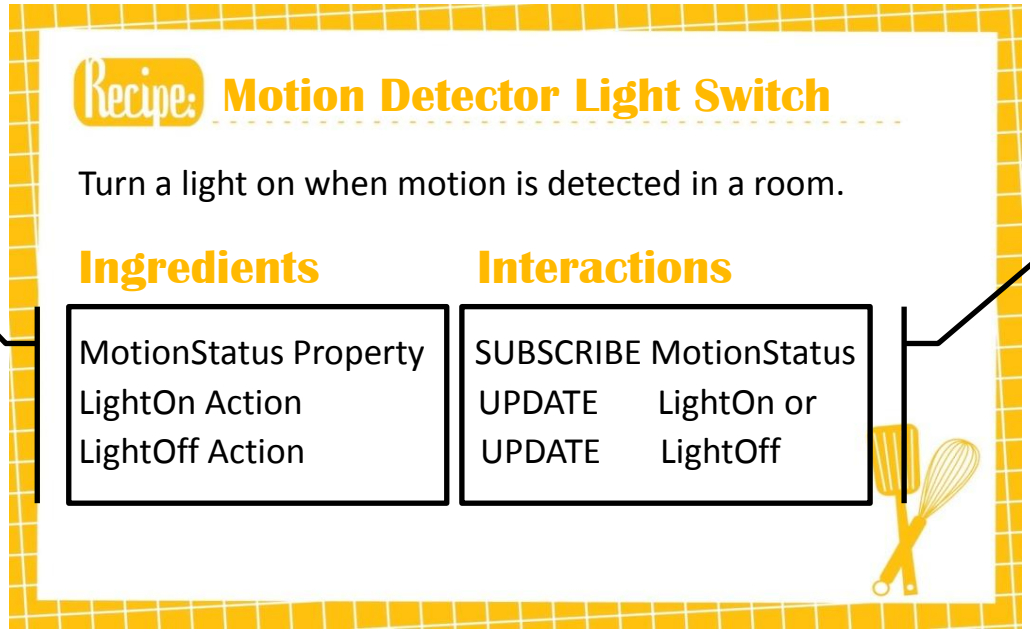
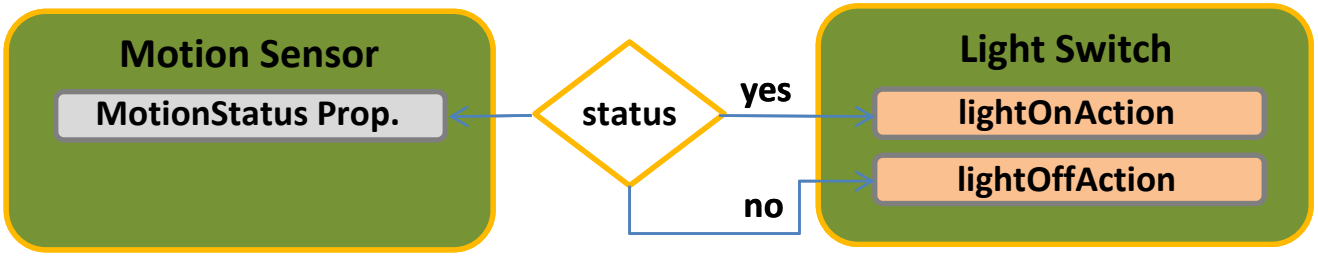
Discovery



Recipe Example

Capability from iot.schema.org

Impl. with W3C WoT Script API



Discovery