WoT Summary and Status

Michael McCool

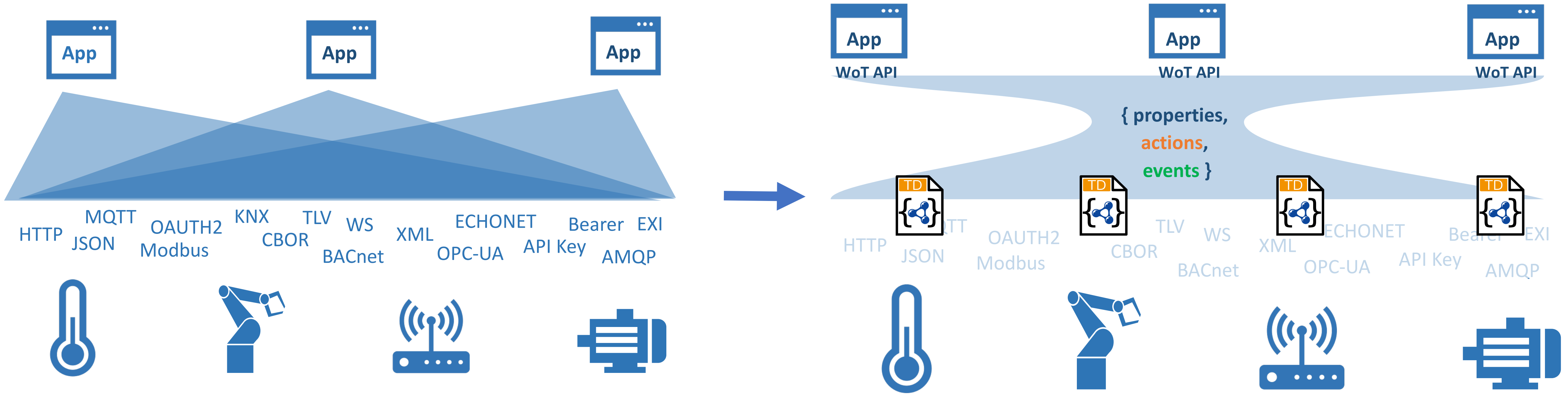
October 2021

Outline

- What is WoT?
  - Applying and extending web standards for IoT
  - Descriptive interoperability
  - Current status of deliverables
- Recent Activity
  - Plugfest
  - Commercial usages
  - Discovery/directory implementations
  - Relationship to IETF activity
  - Items under discussion
  - New charters/new deliverables

W3C Web of Things (WoT)

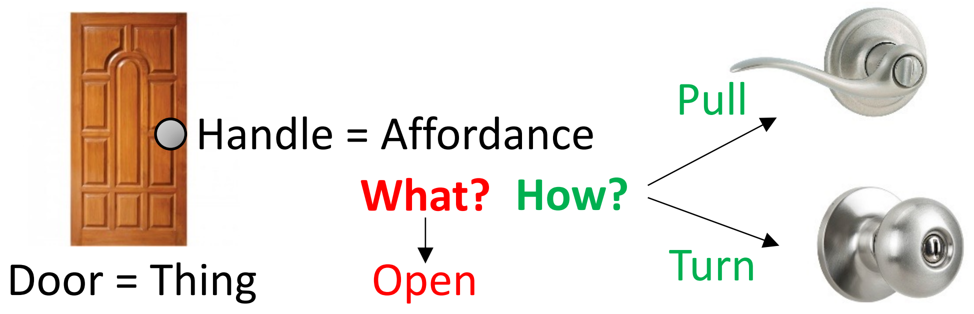
- W3C Working Group goal: Adapting web technologies to IoT
- Already published: Thing Description (TD) metadata format
  - TD describes the available interactions (network API) of a Thing
- New standards work in progress, including Discovery
  - How does a potential user obtain the TDs for a Thing?



WoT Descriptive Interoperability

WoT Architecture

- Constraints
  - Things must have a TD
  - Must use hypermedia controls (general WoT)
  - URIs, standard set of methods, media types
- Thing Description Affordances
  - Describes WHAT the possible choices are
  - Describes HOW to interact with the Thing



WoT Thing Description (TD)

```
{
  "@context": [
    "https://www.w3.org/2019/wot/td/v1",
    { "iot": "http://iotschema.org/" }
  ],
  "id": "urn:dev:org:32473:1234567890",
  "title": "MyLEDThing",
  "description": "RGB LED torchiere",
  "@type": ["Thing", "iot:Light"],
  "securityDefinitions": ["default": {
    "scheme": "bearer"
  }],
  "security": ["default"],
  "properties": {
    "brightness": {
      "@type": ["iot:Brightness"],
      "type": "integer",
      "minimum": 0,
      "maximum": 100,
      "forms": [ ... ]
    }
  },
  "actions": {
    "fadeIn": {
      ...
```

Current Status

New/Updated Normative Documents in Draft Status:

- Architecture 1.1: https://github.com/w3c/wot-architecture
- Thing Description 1.1: https://github.com/w3c/wot-thing-description
- Discovery: https://github.com/w3c/wot-discovery
- Profiles: https://github.com/w3c/wot-profile

New/Updated Informative Documents in Draft Status:

- Binding Templates: https://github.com/w3c/wot-binding-templates
- Scripting API: https://github.com/w3c/wot-scripting-api
- Use Cases and Requirements: https://github.com/w3c/wot-usecases

Marketing Improvements:

- New Web Site, Animation, Resources: https://www.w3.org/WoT/

Recent Activity

- Plugfest
  - Projects: https://github.com/w3c/wot-testing/labels/Plugfest%202021.09
- New Commercial Usages
  - Takenaka Construction – Smart Building Information Management systems
  - Netzo – IoT dashboards and device management
- Directory Implementations
  - WoT Hive, LogiLab (SPARQL based), Fraunhofer LinkSmart
- IETF Relationships: JSON Path, CoreRD, COSE/JOSE, ASDF
- Under Discussion (IG Notes expected)
  - Geospatial data, Embedded JSON Signatures
- New Charters/New Deliverables

Contacts

https://www.w3.org/WoT

Dr. Michael McCool

Principal Engineer

Intel

Technology Pathfinding

michael.mccool@intel.com

Dr. Sebastian Kaebisch

Senior Key Expert

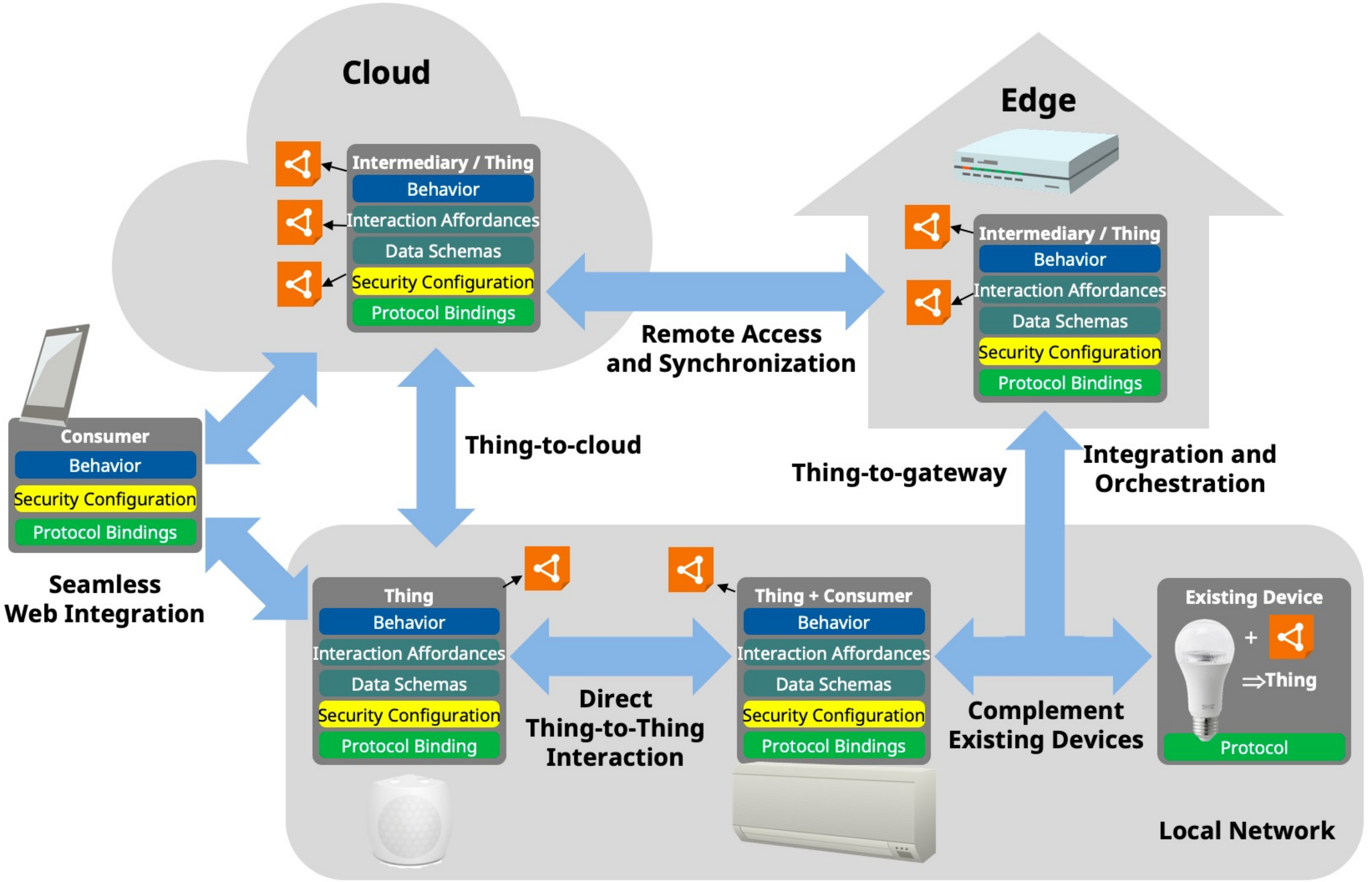
Siemens

Technology

sebastian.kaebisch@siemens.com

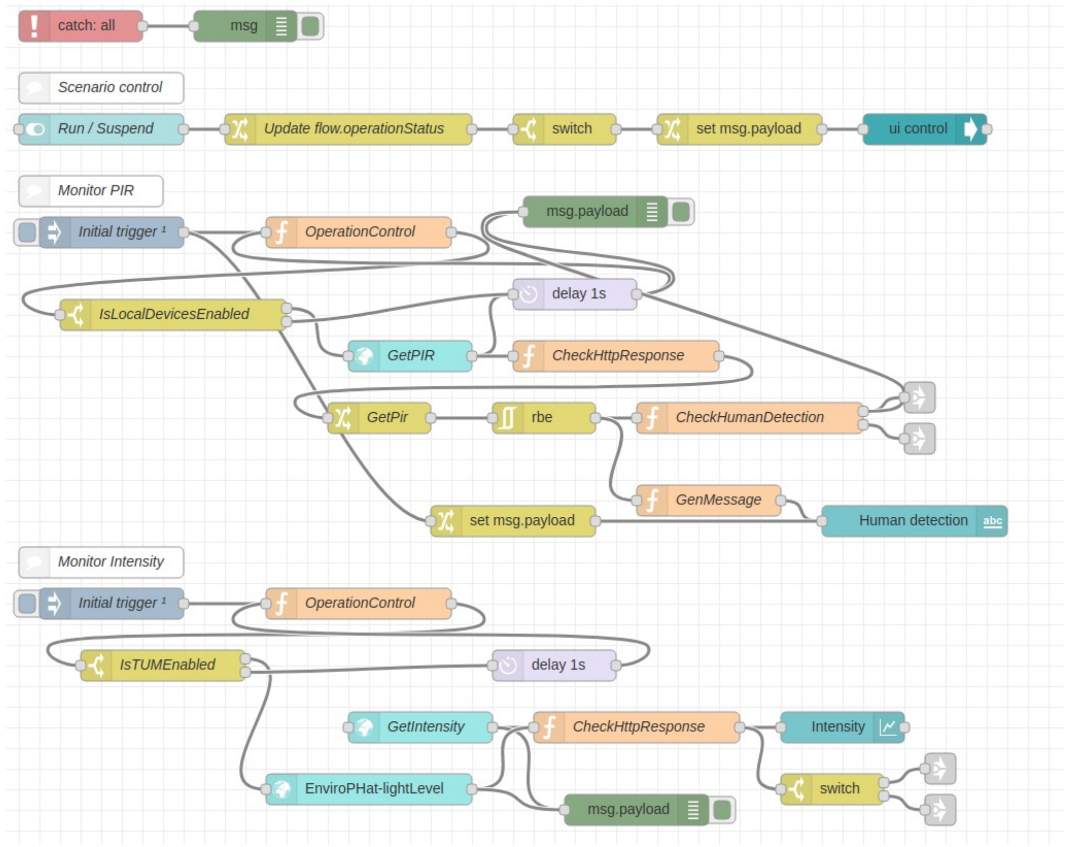
Backup

Usage Patterns Overview



WoT Orchestration

Node-RED/node-gen



node-wot/Scripting API

```
WoTHelpers.fetch( "coap://localhost:5683/counter" ).then( async (td) => {
 // using await for serial execution (note 'async' in then() of fetch())
 try {
  let thing = await WoT.consume(td);
  console.info( "=== TD ===" );
  console.info(td);
  console.info( "==========" );

  // read property #1
  let read1 = await thing.readProperty( "count" );
  console.info( "count value is" , read1);

  // increment property #1 (without step)
  await thing.invokeAction( "increment" );
  let inc1 = await thing.readProperty( "count" );
  console.info( "count value after increment #1 is" , inc1);

  // increment property #2 (with step)
  await thing.invokeAction( "increment" , {'step' : 3});
  let inc2 = await thing.readProperty( "count" );
  console.info( "count value after increment #2 (with step 3) is" , inc2);

  // decrement property
  await thing.invokeAction( "decrement" );
  let dec1 = await thing.readProperty( "count" );
  console.info( "count value after decrement is" , dec1);

 } catch(err) {
  console.error( "Script error:" , err);
 }

}).catch( (err) => { console.error( "Fetch error:" , err); });
```

Current WoT WG Charter Work Items

Architectural Requirements, Use Cases, and Vocabulary

- Understand and state requirements for new use cases, architectural patterns, and concepts.

Link Relation Types:

- Definition of specific link relation types for specific relationships.

Observe Defaults:

- For protocols such as HTTP where multiple ways to implement "observe" is possible, define a default.

Implementation View Spec:

- More fully define details of implementations.

Interoperability Profiles:

- Support plug-and-play interoperabilty via a profile mechanism
- Define profiles that allow for finite implementability

Thing Description Templates:

- Define how Thing Descriptions can defined in a modular way.

Complex Interactions:

- Document how complex interactions can be supported via hypermedia controls.

Discovery:

- Define how Things are discovered in both local and global contexts and Thing Descriptions are distributed.

Identifier Management:

- Mitigate privacy risks by defining how identifiers are managed and updated.

Security Schemes:

- Vocabulary for new security schemes supporting targeted protocols and use cases.

Thing Description Vocabulary:

- Extensions to Thing Description vocabulary definitions.

Protocol Vocabulary and Bindings:

- Extensions to protocol vocabulary definitions and protocol bindings.