T2TRG: Thing-to-Thing Research Group

IETF 106, November 21, 2019, Singapore, SG

Chairs: Carsten Bormann & Ari Keränen

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- You may be recorded
- The IPR guidelines of the IETF apply:
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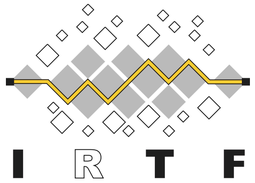

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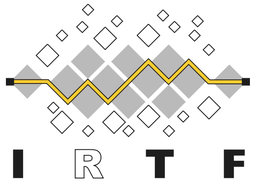

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Goals of the IRTF

- The Internet Research Task Force (IRTF) focuses on longer term research issues related to the Internet while the parallel organisation, the IETF, focuses on shorter term issues of engineering and standards making

- **The IRTF conducts research; it is not a standards development organisation**

- While the IRTF can publish informational or experimental documents in the RFC series, its primary goal is to promote development of research collaboration and teamwork in exploring research issues related to Internet protocols, applications, architecture, and technology
- See “An IRTF Primer for IETF Participants” – RFC 7418

Administrivia (I)

- Pink Sheet
- Note-Takers
- Off-site (Jabber, Hangout?)
  - **xmpp:t2trg@jabber.ietf.org?join**
- Mailing List: **t2trg@irtf.org** — subscribe at: **https://www.ietf.org/mailman/listinfo/t2trg**
- Repo: **https://github.com/t2trg/2019-ietf106**

Agenda

Time	Who	Subject	Docs
10:00	Chairs	Intro, RG status, upcoming meetings and activities	draft-irtf-t2trg-rest-iot draft-hong-t2trg-iot-edge-computing
10:10	Chairs, various	Report from WISHI, Pre-IETF workshop with W3C WoT, Hackathon, and CoRE Applications side-meeting	draft-petrov-t2trg-youpi
10:35	Michael Koster	Activities on IoT data model convergence	
11:00	Michael McCool	W3C Web of Things WG/IG update	
11:15	Michael Richardson	Discussion of IoT operations/security management/onboarding/lifecycle/ applications-network-access-integration	draft-sarikaya-t2trg-sbootstrapping

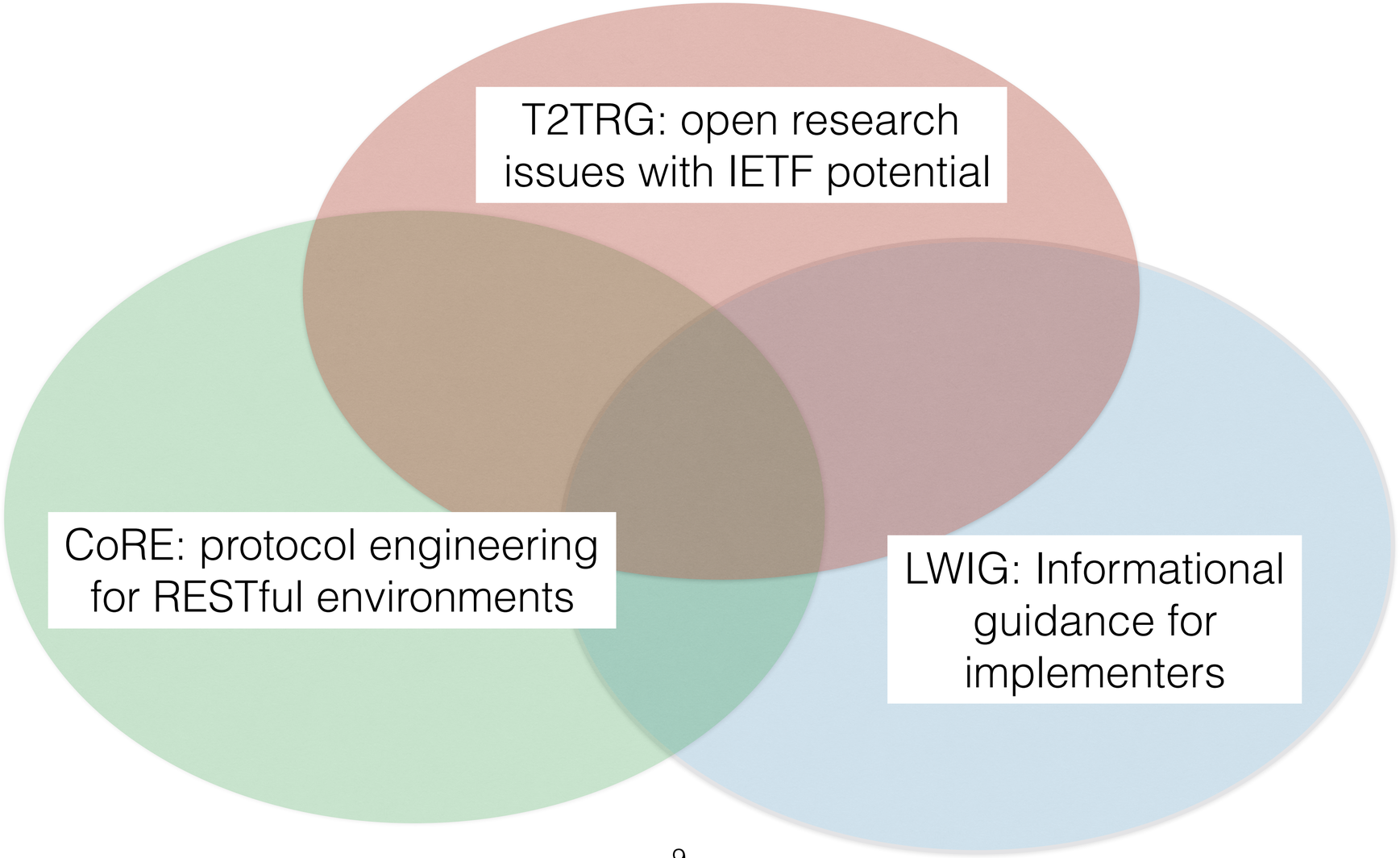
T2TRG scope & goals

- Open research issues in turning a true "Internet of Things" into reality
  - Internet where low-resource nodes ("things", "constrained nodes") can communicate among themselves and with the wider Internet
- Focus on issues with opportunities for IETF standardization
  - Start at the IP adaptation layer
  - End at the application layer with architectures and APIs for communicating and making data and management functions, including security

IRTF and IETF

IRTF
(Research)

IETF
(Engineering)



Related activities at IETF106

- Pre-IETF106: T2TRG/W3C WoT Workshop last Friday at National University of Singapore

- @ IETF106: CoRE Applications: Tuesday 15:00..17:00. Discussed Problem Details for CoAP APIs and Error Response Codes. Drafts coming for both topics.

T2TRG/W3C WoT Workshop Fri 2019-11-15 → ~ WISHI

- Modeling data and interaction for IoT
- REST-based hypermedia for IoT
- Connectivity for IoT

On topic last Friday

- In-network and edge computing for IoT
- Security for IoT
- Terminology

Next meetings

- Regular WISHI calls (~ monthly; next in January?)
- Virtual meetings with OCF / OMA SpecWorks (LwM2M&IPSO) / W3C WoT?
- Vancouver IETF 107 (Mar 23–27)
  - WISHI hackathon Sat/Sun, Mar 21/22
- Co-locating with academic conferences 2020 & 2021?

RG Doc Status

- “RESTful Design for IoT” (next slide)
- Upcoming:
  - Edge & IoT (short update today)
  - Secure Bootstrapping for IoT (next slides)
  - YOUPI (update later today)
  - CoRE apps, collections part from CoRE interfaces
  - Layer 3 considerations?
  - WISHI notes (see WISHI wiki)

RESTful Design for IoT

- Added CoRAL and Constrained URI info and pointers
- Server push mechanisms configured with CoRE dynlink
- TBD(?):
  - affordances
  - Discovery in IoT? Aligned with CoRE interfaces & RD

Secure Bootstrapping for IoT

- (Same) plans on future work
  - Document device bootstrapping terminology and relationships: onboarding, commissioning, configuration, setup, initialization
  - Identify common design assumptions, architectural components and underlying protocols that device configuration methods use
  - Investigate the benefits and challenges of EAP for IoT

Work on IoT Semantic/Hypermedia Interoperability (WISHI)

- WISHI f2f work meeting
  - Kista, Sweden, 2019-10-04, co-located with OneDM f2f meeting
  - Focus on OneDM topics
    - Architectural and terminology considerations
    - JSON pointer use and semantic breadcrumbs
    - Processing model
- WISHI online meeting
  - Data model versioning
    - WISHI note / draft planned (lots of material in the notes)
  - One Data Model

WISHI

(Work on IoT Semantic/
Hypermedia Interoperability)

IETF 106
Nov. 16-17, 2019
Singapore

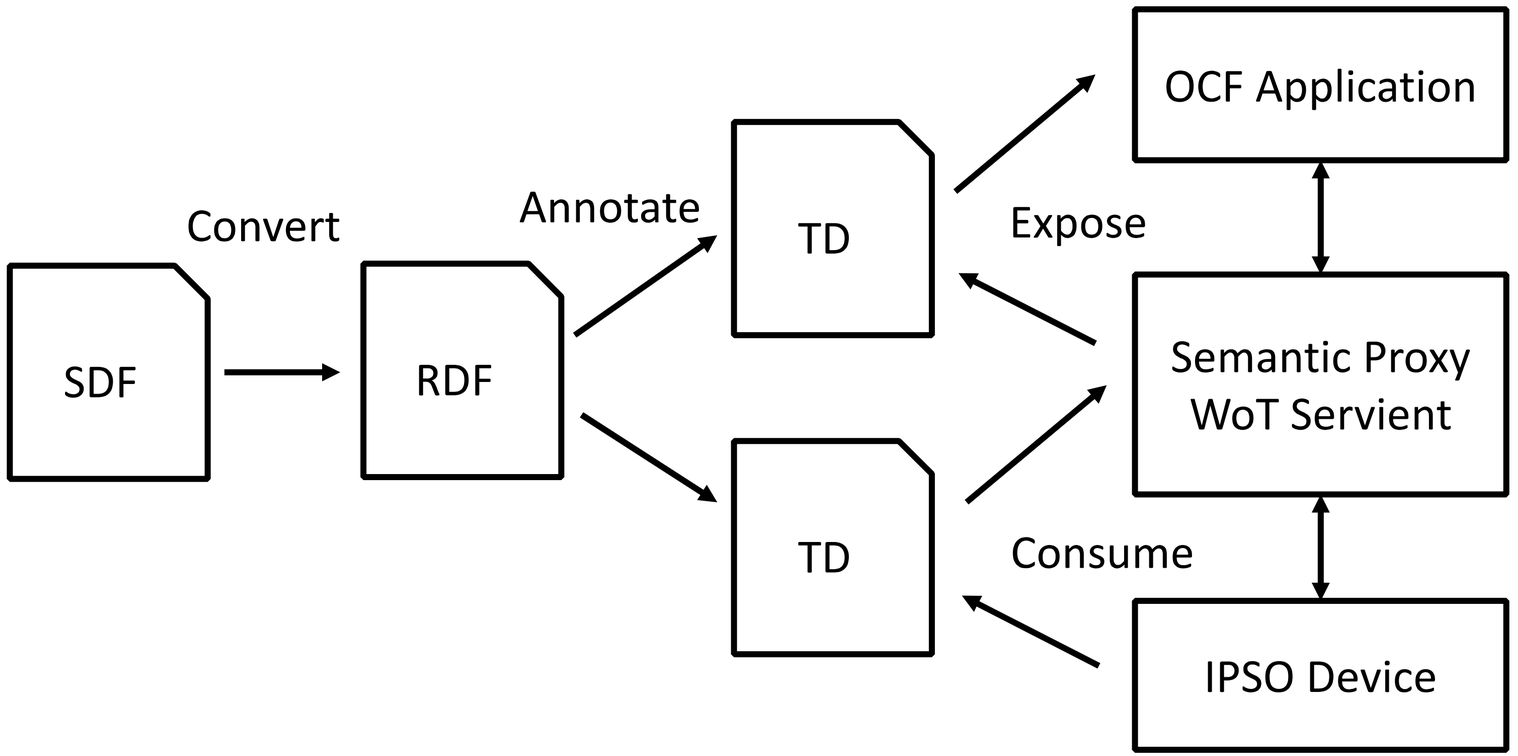
Hackathon Plan

- Data Model convergence and automatic translation with OneDM
- Work together with W3C WoT
  - Integration with CoRE resource directories to support discovery
- YOUPI (YANG based conversion from binary to JSON/CBOR) enhancements

What got done

- One Data Model tools and concepts
  - Conversion from OneDM SDF to LwM2M/IPSO models
    - With improved IPSO to OneDM (from hackathon @ 105)
  - Enhanced OneDM data model linter
  - Data model CI for Github
  - https://github.com/EricssonResearch/ipso-odm
  - Good discussions on architecture, use of semantics, dynamic descriptions, convergence across SDOs, etc.
- W3C Web of Things
  - First version of WoT Thing Description discovery using CoAP RD
- YOUPI
  - Next presentation

Semantic Proxy - Schematic



Source: "Semantic Proxy", Michael Koster

draft-petrov-t2trg-youpi

Ivaylo Petrov <ivaylo@ackl.io>

Problem statement (reminder)

- LPWAN and other very constrained networks use proprietary binary formats (including Modbus)
- Other systems can not easy interoperate with those
- There is a need for a format to express binary payloads and be able to reformat it as CBOR/JSON/JSON-LD/XML/something else

Status update

- Hackathon activity
  - Played with encoding - looks promising
  - Looked at CoAP decoding with YOUPI - delta encoding is ugly and encoding will be difficult, but could work thanks to xpaths
  - Looked at Modbus - seems simple, but would like to do some concrete examples with it
- -00 vs -01
  - Introduction of possible use of "when" statement with more complex xpath expressions
  - Added details about "list" length definitions
  - Explicit listing of supported built-in types
  - Enumerations as mappings
  - Moving some definitions around to have smoother read

Steps forward

- Try to write models well-known binary protocols (modbus examples, others)
- Take it from there

Questions and answers

Thank you!

~~Problem Statement of~~
~~IoT integrated with Edge Computing~~

IoT Edge Computing Challenges and Functions

IETF 106 T2TRG Meeting, Singapore, 21 Nov 2019

J. Hong, Y-G. Hong, X. de Foy, **M. Kovatsch**, E. Schooler, and D. Kutscher

History of the Draft

- draft-hong-iot-edge-computing-01 (IETF 103)
  - Showed two demo videos as use cases of IoT Edge computing
    - Smart constructions providing a monitoring service of construction site
    - Real-time control monitoring system by Rotary Inverted Pendulum system
- draft-hong-iot-edge-computing-02 (IETF 104)
  - Interest by new authors
  - Discussion about Edge functions for IoT devices
- draft-hong-t2trg-iot-edge-computing-00 (IETF 105)
  - Integrated with *Survey and gap analysis* presented at IETF 100

Major Updates

- draft-hong-t2trg-iot-edge-computing-01 (IETF 106)
  - *Moved to GitHub and set up operations for multiple authors*
  - Changed from Edge “architecture” to “models”
    - Do not promote/preclude a particular model
    - Provide a list of Edge concepts / building blocks
  - Changed from use case examples to Edge function analysis
    - Finding resources, such as compute, storage or data resources
    - Authenticating platforms, end devices, functions, data
    - Providing compute and storage offloading
    - Management, e.g. of IoT end devices and data

Plan for the Draft

- Todos
  - Different understandings of “Edge”
    - Depends on background (e.g., cloud, telco, industry..)
    - Also include term “Fog”
  - Collect Edge building blocks
    - Cluster heads, gateways, Edge cloud, ...
  - Discuss different Edge models
    - From simple to complex
  - Look for security contributor
- *Identify whitespots in Edge functions*

- Timeline
  - Update by ca. Christmas 2019
  - Collect feedback early 2020
  - New version before IETF 107
  - Ask for RG adoption at IETF 107

IoT Data Model Convergence

T2TRG Report Out

IETF 106

November 21, 2019

IoT Data Model Convergence

- One Data Model
- IoT extensions for schema.org

What is One Data Model?

- A loose organization of SDOs, Device vendors, IoT Platform operators, and IoT experts
- Goal is to harmonize IoT semantic models across SDOs and vendors
- Heavy participation from connected home sector
- Initially – a common "language" for IoT semantic models, usable by application domain experts
- Eventually - convergence of semantic definitions for common IoT device types, broad adoption of the language

History

- Emerged from Zigbee "Hive" meeting, fall 2018
- Cross-industry consensus on lack of common IoT data models as a key inhibitor to IoT growth
- Broad industry group of SDOs and vendors
- No legal organization – working under a liaison
- Weekly teleconferences, 4 face to face meetings, in 2019
- Working in a github repository
- Language, tools, and models

Process

- Create a common representation language for existing IoT data and interaction models
  - Enable contribution of the best existing models across all participating organizations
- Collect a set of representative models for a "pressure test" of the language
  - Convert to the new language and note any gaps
- Organizations contribute models for evaluation
  - Process for selecting a single model per function, e.g. lighting, door lock, thermostat
- Publication of selected models

Status

- Weekly technical meetings since December 2018
- Four face to face meetings
- Diverse models are being used to test the language
- At the October 2019 Face to Face meeting we approved a version of the modeling language to proceed with contributions
  - SDF - Simple Definition Format
- Set up an area for contributions to be uploaded and evaluated

Outcomes

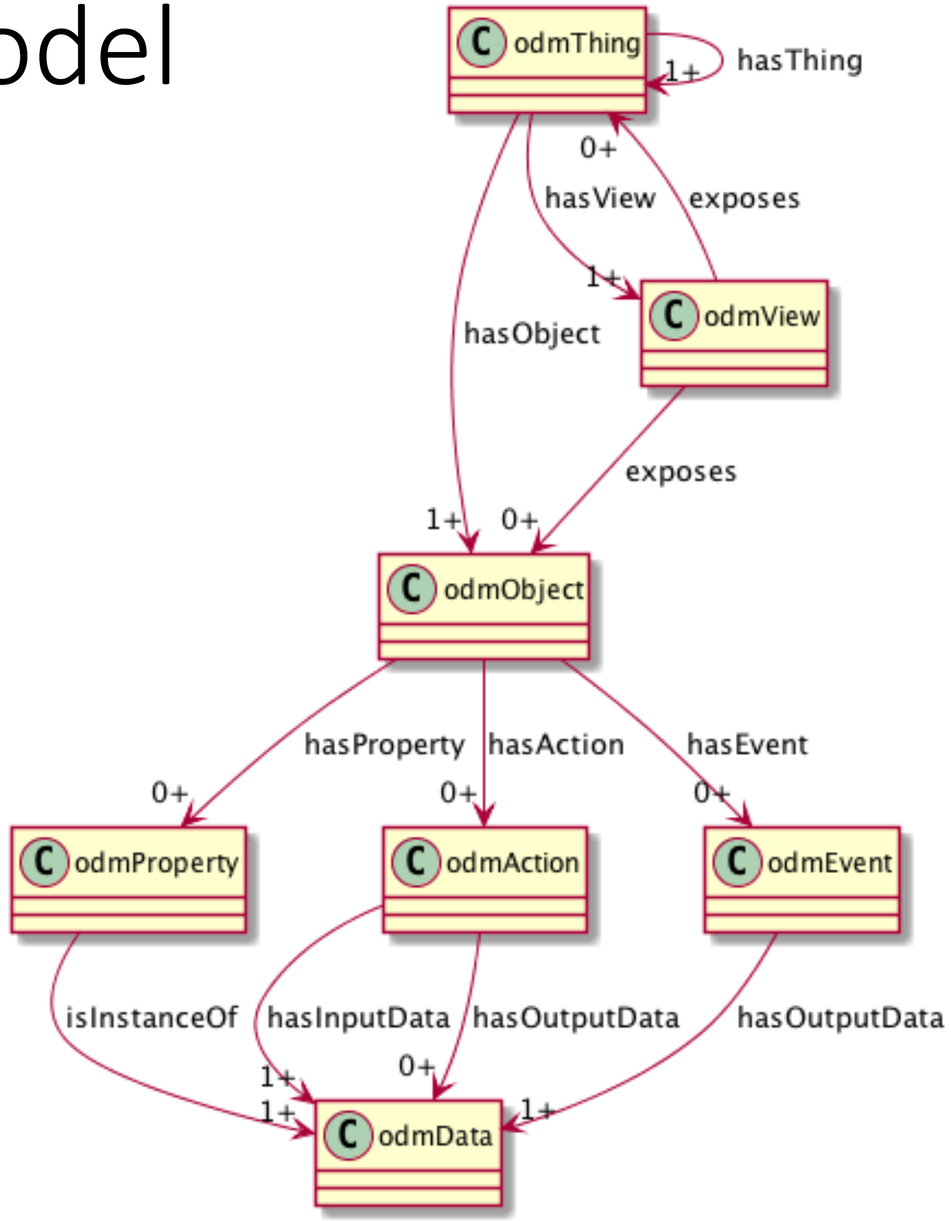
- All participants have agreed to publish the models under the BSD 3-Clause Open Source license
- 2-way translation between OMA LWM2M XML models and the SDF language
- SDF models for Dotdot thermostat and lighting clusters are in progress, energy clusters next
- SDF models for OCF appliances are in progress
- OCF may use the SDF language as the "entry point" for developers to create and maintain data models
  - Automatic mapping to OCF styled Swagger definitions

What is a semantic model – Practical IoT Semantics

- Abstract meta-model for IoT device affordances, behavior, and context
  - Decoupled from network bindings, protocol-agile
  - Common categories for affordances
  - Common categories for constraints
  - Common format for definitions
- Initial focus on affordances to normalize device-facing interactions across SDOs and vendors
- Behavioral and contextual models also are needed but not in the initial scope

ODM Meta-Model

- Thing Class to compose Objects
- View (Interface) Class to virtualize affordances
- Reusable Objects
  - Property, Action, and Event Affordances
- Reusable Data Types



SDF Design Overview

- JSON based DSL – JSON Schema validation
- Associates semantic terms with type definitions of ODM classes
- Example odmObject definition for a simple binary (on/off) switch control
  - The odmObject for "Switch" object has three affordances:
  - odmProperty for state "value" with a defined string enum allowing "on" and "off" values
  - odmActions for "on" and "off" (that implicitly act on the "State" Property)

SDF - Simple Definition Format

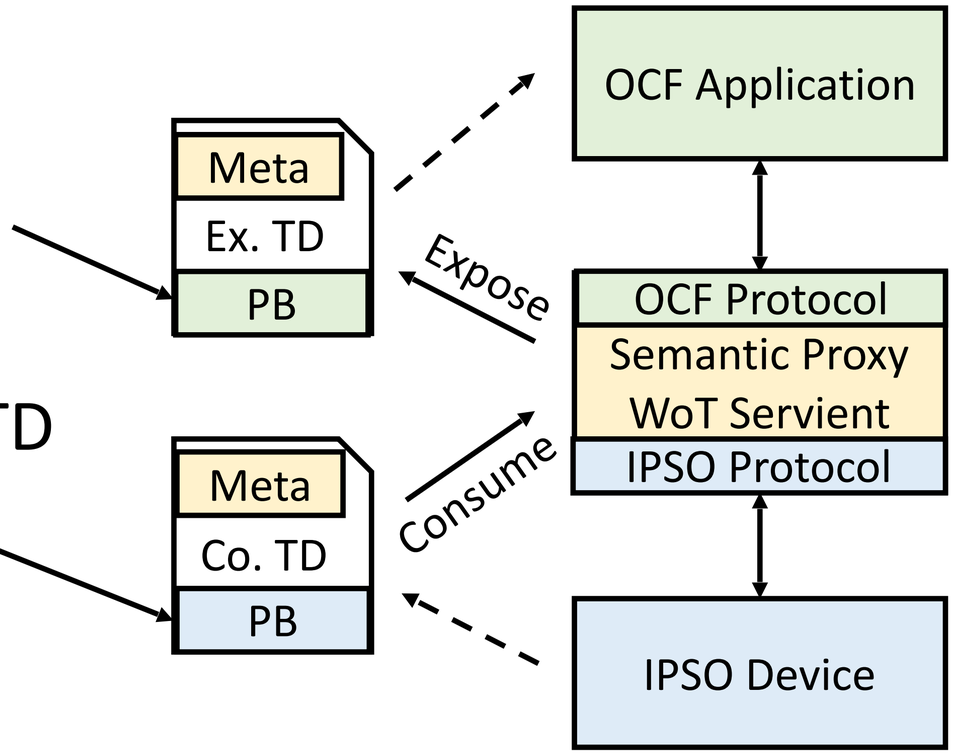
```
{
  "info": {
    "title": "Example file for ODM Simple JSON Definition Format",
    "version": "20190404",
    "copyright": "Copyright 2019 Example Corp. All rights reserved.",
    "license": "http://example.com/license"
  },
  "namespace": {
    "st": "http://example.com/capability/odm#"
  },
  "defaultNamespace": "st",
  "odmObject": {
    "Switch": {
      "odmProperty": {
        "value": {
          "type": "string",
          "enum": ["on", "off"]
        }
      },
      "odmAction": {
        "on": {},
        "off": {}
      }
    }
  }
}
```

Next steps

- More updates to the language in progress
- Model convergence across vendors, SDOs
- Demonstration based on translation and gateway
- Public announcement soon, timing discussion
- Semantic Proxy project – W3C WoT integration

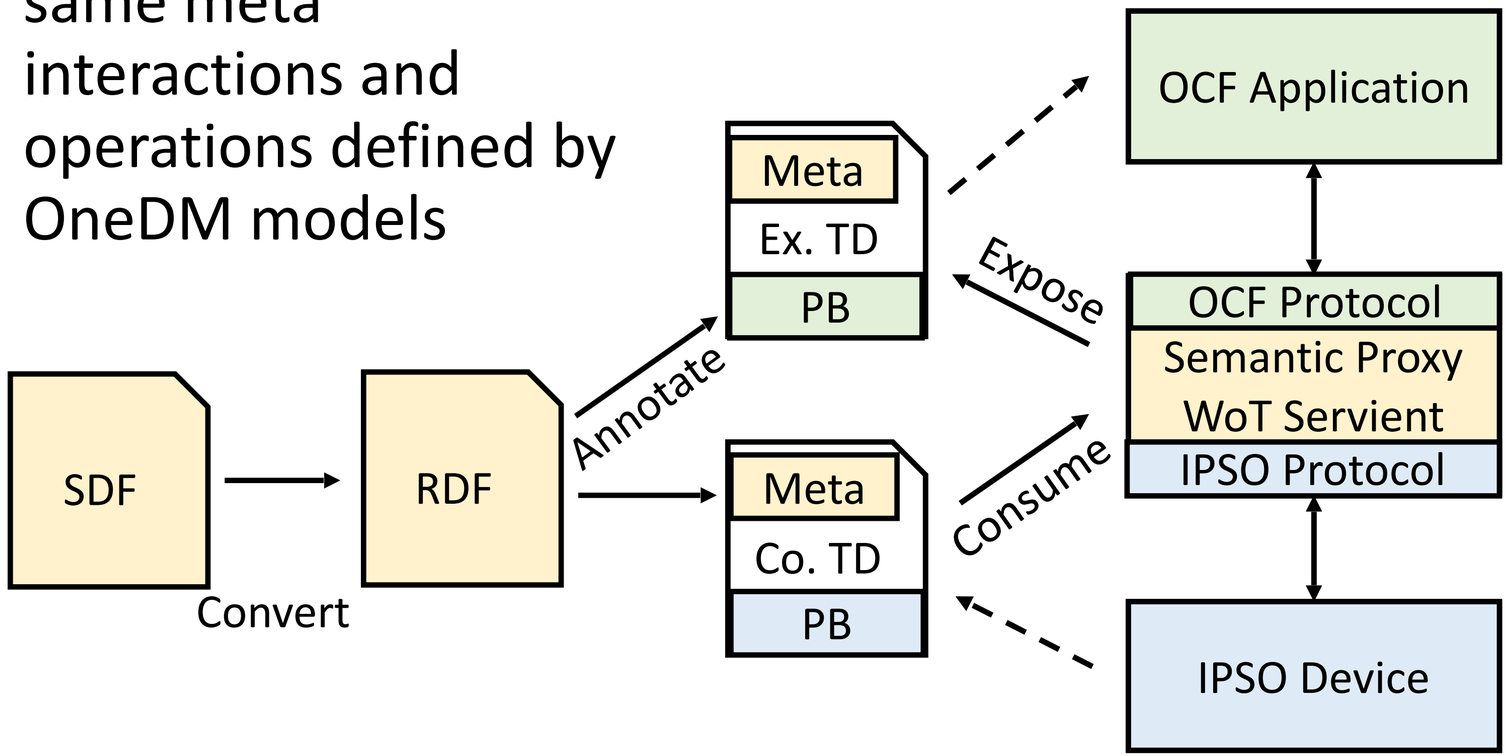
Semantic Proxy - Schematic

- Exposed Thing TD has OCF protocol binding
- Consumed Thing TD has IPSO protocol binding



Semantic Proxy - Schematic

- Both TDs have the same meta interactions and operations defined by OneDM models



IoT Extensions for schema.org

- Charter and Objectives – What we started out to do
- Status – What we have accomplished
- W3C WoT integration – Test case and results
- Schema.org integration – Proposal and issues
- W3C Community Group – IPR policy and continuity
- Work with the OneDM Liaison Group
- Going forward

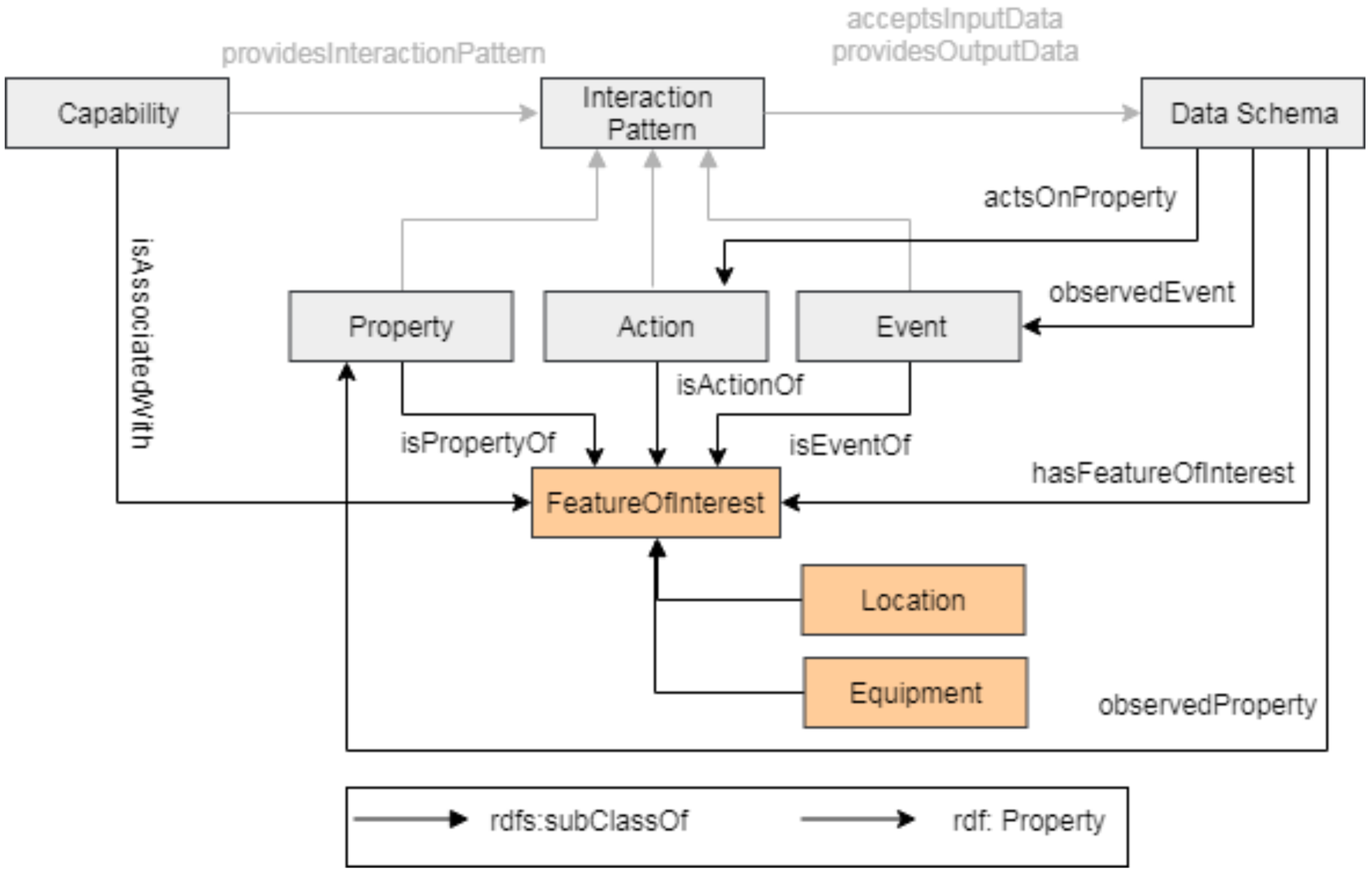
Charter and Objectives

- Create an extension to Schema.org that will enable IoT semantics
- Work with relevant vendors and SDOs to architect a common information model for IoT
- Develop a process to enable free contribution from diverse organizations, driving toward normalization to a common model
- Enable domain and subject experts to create and maintain definitions and models
- Work on practical integration with Schema.org

Status

- Developed a common meta-model which is already well adopted in industry
  - Functional/semantic capabilities with common Property, Action, and Event classes of affordances
  - Feature of Interest integration from other namespaces – GENIVI/VSS, BrickSchema, Project Haystack
  - Integration with W3C SOSA/SSN
- Published strawman definitions for some common IoT capabilities
- Conducted test case evaluation with W3C Web of Things and IRTF T2TRG WISHI including hands-on

Information Meta-Model



W3C WoT Test Case

- Integrated iotschema definitions with WoT Thing Description as semantic annotation (example)
- Created strawman definitions for common use
- Investigated use in discovery and configuration
- Several organizations used semantic annotation
- Node-RED application for semantic interoperability
  - Uses WoT Thing Description with iotschema annotation
- WoT discovery will be further developed

iotschema for Node-RED

Recipe-based applications

- iotschema embedded in Node-RED tool
  - Enables an easy configuration of things using iotschema definitions
- Easies the use of semantics for IoT developers
  - No need for a developer to know RDF(S), JSON-LD, RDF Shapes ...
- Simplify creation of applications with W3C WoT
  - Avoids translations of serializations formats, data types, units ...
- Demonstrates semantic discovery and processing
  - Integrates WoT Thing Directory
- GitHub project location:
  - https://github.com/iot-schema-collab/iotschema-node-red

Schema.org Integration

- iotschema model has been adapted in order to comply with schema.org model and software
- Some issues
  - Class names Event, Action, Property conflict
  - iotschema has diverse semantic types for objects, schema.org has diverse property types
  - Property types could be synthesized from objects but…
  - iotschema will potentially define hundreds of types for physical quantities (temperature, humidity, voltage, acceleration…), control affordances (open/close, brightness, color control, camera controls, operating modes…), and features of interest (rooms, machines…)

W3C Community Group

- Started early 2019
- A few members have joined but not active yet
- IPR policy for contributions based on CG membership
- CG membership will become part of the community and be required for contributors and participants
- Can we adopt the BSD 3-Clause license for our contributed and published content?

Work with OneDM Liaison Group

- High level alignment with the Property-Action-Event meta-model
- OneDM definitions can feed iotschema
- We can share OneDM language and tools
- RDF Conversion from OneDM SDF
  - RDF uses URIs where sometimes SDF only has constraints, for example ENUM values

Going Forward

- Create an experimental area on schema.org for normalized, accepted iotschema content
- Create a namespaced area per contributing org in the public github, allow open contribution of raw content
  - CI tools validate the contributed definitions
- The definition can immediately be dereferenced in the contributor's namespace (on schema.org?)
- Move definitions into the official github repository and schema.org experimental area when they are accepted

Resources

One Data Model SDF and Model work in progress

https://github.com/one-data-model/language

https://github.com/one-data-model/playground

Semantic Proxy and W3C WoT

https://github.com/tum-ei-esi/virtual-thing

https://www.w3.org/TR/2019/CR-wot-thing-description-20191106/

https://www.w3.org/TR/2019/CR-wot-architecture-20191106/

Resources

- W3C Community Group:

  The Schema Extensions For IoT

- https://www.w3.org/community/iotschema/

- GitHub repository:

- https://github.com/iot-schema-collab/iotschema

  Teleconferences:

- https://github.com/iot-schema-collab/teleconferences

  Contributions:

- https://github.com/iot-schema-collab/iotschema

  Charter:

- https://github.com/iot-schema-collab/ws-charter

- Web site:

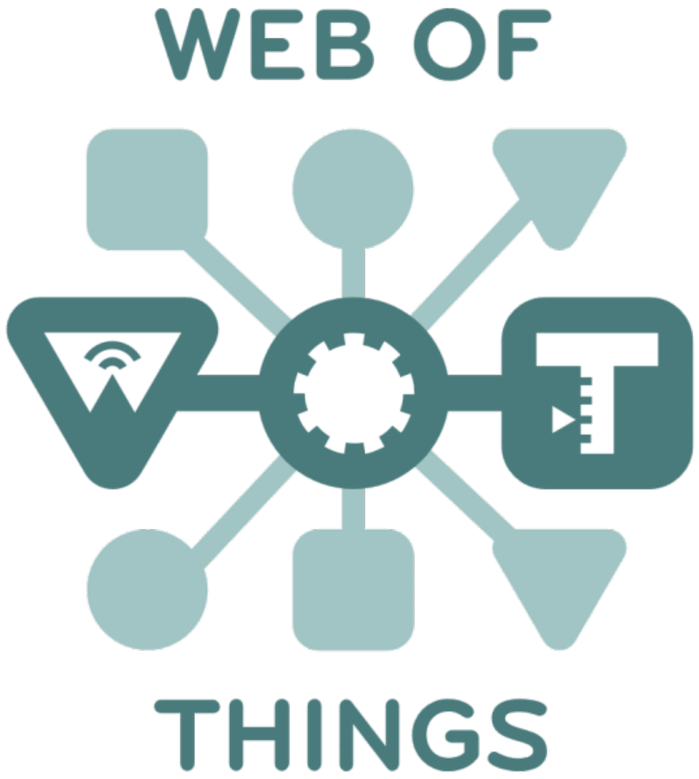
  Current location

- http://iotschema.org/docs/full.html

- Tools:

  iotschema for Node-RED

- https://github.com/iot-schema-collab/iotschema-node-red



WoT Status Update and Next Steps

ITRF T2TRG @ IETF106, 21 November 2019, Singapore

Michael McCool

W3C Web of Things

Goal: Support IoT Interoperability via Open Standards

- **W3C WoT Interest Group (IG)**
  https://www.w3.org/2016/07/wot-ig-charter.html
  - Started spring 2015
  - ~200 participants
  - Informal work and outreach
  - “PlugFest” validation with running code
  - Exploration of new building blocks
  - “OpenDays” with external speakers
  - Liaisons and collaborations with other organizations and SDOs
  - ***Second Workshop on Web of Things held 3-5 June 2019 in Munich***
  - ***IG charter renewal accepted October 2019***

- **W3C WoT Working Group (WG)**
  https://www.w3.org/2016/12/wot-wg-2016.html
  - Started end of 2016 (effectively Feb 2017)
  - ~100 participants
  - Normative work on specific deliverables
  - W3C Patent Policy for royalty-free standards
  - Only W3C Members and Invited Experts
  - ***Architecture and Thing Description were (re)published as Candidate Recommendations on 6 November 2019***
  - ***Transition to Proposed Recommendations expected by December 2019***
  - ***Notes published on Protocol Bindings, Security, and Scripting API***
  - ***WG charter renewal in progress (draft); final version expected to be submitted Nov 20***

W3C Web of Things – Building Blocks

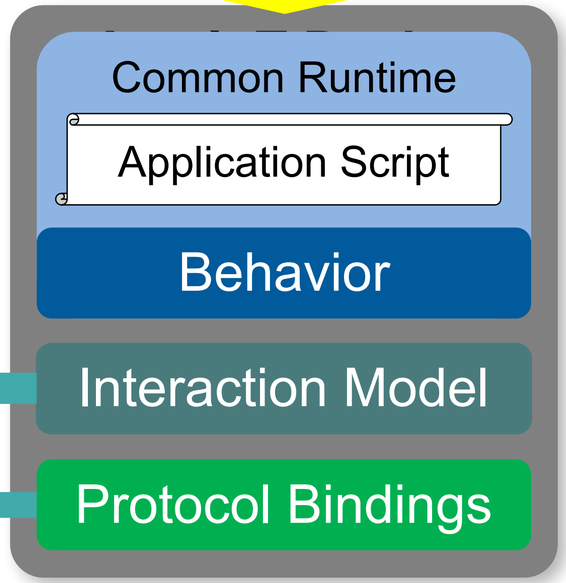
WoT Architecture

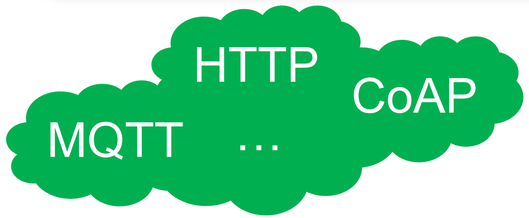
Overarching umbrella with architectural constraints and guidance on how to use and combine building blocks.

WoT Thing Description (TD)

JSON-LD representation format to describe Thing *instances* with **metadata**. Uses **formal interaction model** and **domain-specific vocabularies** to uniformly describe how to use Things, which enables semantic interoperability.

Security Guidelines





WoT Scripting API

Standardized **JavaScript** object API for an IoT runtime system **similar to the Web browser**. Provides an interface between applications and Things to simplify IoT application development and enable **portable apps** across vendors, devices, edge, and cloud.

WoT Binding Templates

Capture how the **formal Interaction Model** is mapped to concrete protocol operations (e.g., CoAP) and platform features (e.g., OCF). These templates are re-used by concrete TDs.

W3C Web of Things – Building Blocks

REC Track

WoT Architecture

Overarching umbrella with architec[illegible]nstraints and guidance on h[illegible]w to use and combine building blocks.

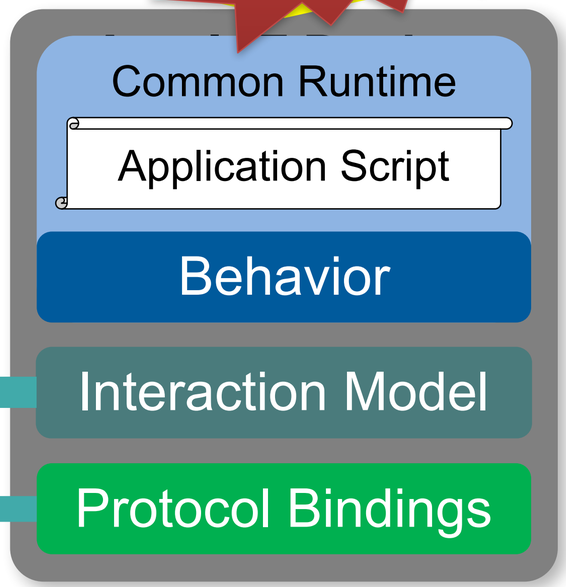
WoT Thing Description (TD)

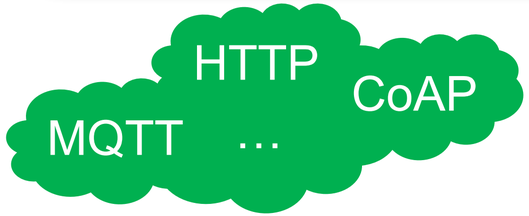
REC Track

JSON-LD represent[illegible]ion format to describe Thin[illegible]s with **metadata**. Uses **forma[illegible] model** and **domain-s[illegible]ularies** to uniformly de[illegible]w to use Things, which enable[illegible] semantic interoperability.

Secur[illegible]

WG Note





WoT Scripting API

Standardized **JavaScri[illegible]** object API for an IoT runti[illegible] sy[illegible] **milar to the Web brow[illegible]** [illegible]terface between a[illegible] [illegible]lings to simplify Io[illegible] [illegible]evelopment and enable [illegible]**rtable apps** across vendors, devices, edge, and cloud.

WG Note

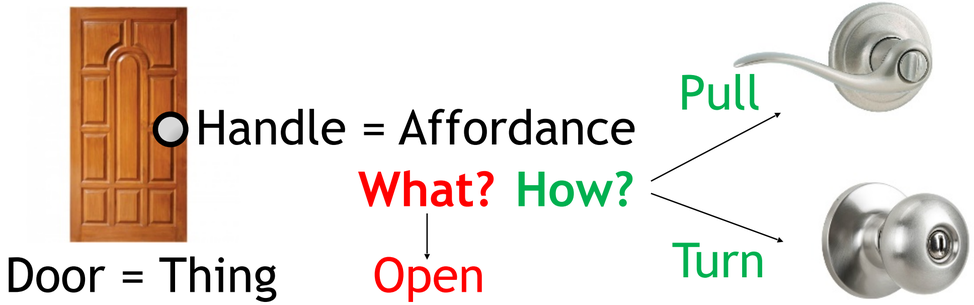
WoT Binding Templates

Capture how the **fo[illegible]al [illegible]teraction Model** is mapp[illegible] [illegible] protocol operations ([illegible]latform features ([illegible]mplates are re-use[illegible]e TDs.

WG Note

Published Candidate Recommendations

- **WoT Architecture**
  - Constraints
    - Things must have TD (W3C WoT)
    - Must use hypermedia controls (general WoT)
      - URIs
      - Standard set of methods
      - Media Types
  - Interaction Affordances
    - Metadata of a Thing that shows and describes the possible choices (what) to Consumers, thereby suggesting how Consumers may 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": {
      ...
```

Published WG Notes

- **WoT Security and Privacy Guidelines**
  - Details beyond the security considerations in each specification for a holistic security and privacy configuration of Things
  - Security testing plan
- **WoT Binding Templates**
  - Documentation for how to describe existing IoT ecosystems (e.g., OCF or generic Web) with WoT Thing Description
- **WoT Scripting API**
  - Proposal for a standard API to consume and produce WoT Thing Descriptions
  - Provides interface between applications and network-facing API of IoT devices (cf. Web browser APIs)
  - Documents learnings from the design process

Status and Recent Developments

- Decision to adopt JSON-LD 1.1 proposed features to allow:
  - Default values
  - Object notation (name: value) instead of arrays
  - Alignment with common JSON practices
- Security metadata
  - Focus on HTTPS (Basic Auth, Digest, Tokens, OAuth2)
- Protocol Bindings
  - Focus on HTTP and structured payloads compatible with JSON
  - Support for Events also using subprotocols (e.g., long polling in HTTP)
- Extension Points
  - CoAP(S), MQTT(S), and further security schemes (e.g., ACE)
  - Semantic annotations with custom vocabularies (JSON-LD @context and @type)

WG Charter Proposal: Work Items

https://cdn.statically.io/gh/w3c/wot/master/charters/wot-wg-charter-draft-2019.html?env=dev

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 for specific application domains and use cases.

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.

W3C WoT Resources

- W3C WoT Wiki
  - https://www.w3.org/WoT/IG/wiki
    (IG/WG organizational information)
- W3C WoT Interest Group
  - https://www.w3.org/2016/07/wot-ig-charter.html
    (old charter)
  - https://www.w3.org/2019/10/wot-ig-2019.html
    (new charter)
  - https://lists.w3.org/Archives/Public/public-wot-ig/
    (mailing list)
  - https://github.com/w3c/wot
    (technical proposals)
- W3C WoT Working Group
  - https://www.w3.org/2016/12/wot-wg-2016.html
    (old charter)
  - https://cdn.statically.io/gh/w3c/wot/master/charters/wot-wg-charter-draft-2019.html?env=dev
    (new charter draft)
  - https://www.w3.org/WoT/WG/
    (dashboard)
- W3C WoT Candidate Recommendations
  - https://www.w3.org/TR/wot-architecture/
  - https://www.w3.org/TR/wot-thing-description/
- W3C WoT Working Drafts / Group Notes
  - https://www.w3.org/TR/wot-binding-templates/
  - https://www.w3.org/TR/wot-scripting-api/
  - https://www.w3.org/TR/wot-security/
- W3C WoT Editors' Drafts and Issue Tracker
  - https://github.com/w3c/wot-architecture/
  - https://github.com/w3c/wot-thing-description/
  - https://github.com/w3c/wot-binding-templates/
  - https://github.com/w3c/wot-scripting-api/
  - https://github.com/w3c/wot-security/
  - https://github.com/w3c/wot-security-best-practices/
  - https://github.com/w3c/wot-profile/
- Reference Implementations and Tools: node-wot
  - node-wot: https://github.com/eclipse/thingweb.node-wot
  - TD playground: https://github.com/thingweb/thingweb-playground

Contacts

https://www.w3.org/WoT/WG/

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Discussion of IoT operations/ security management/onboarding/ lifecycle/applications-network-access-integration

IoT WG/SIG/ sidemeeting/ RG/…

What's going on already

- T2TRG – broad activities covering new and evolving IoT concepts
- IoT Directorate – Reactive review team
- A great many working groups
  - core, lake, anima, emu, 6tisch, and many many more
- A great many standards orgs
  - W3C, IETF, IEEE, THREAD, Bluetooth SIG, OCF, IIC, ODVA, OPC UA, AMI, IEC, Global Platform, IoTX, FIDO, others
- A great many building blocks

Lack of guidance on how to use building blocks

One Approach

Create a standing WG that attempts to put the building blocks together

- Track across SDOs
- Deliver architectural documents
- Spot gaps and overlaps
- Discuss alternatives

Or Not

- Discussed during Monday side meeting
  - Generally viewed as too broad / vague
- Maybe focus on onboarding

Onboarding discussions this week

- Problem: too many approaches. Market fragmented
- Can we consolidate?
- Architectural aspects:
  - What are the gazintas
  - What are the gazoutas
- What are the use cases?
- Goal: fewest possible inputs, fewest possible outputs, common components where possible

Lots of discussion around DPP/TEAP linkage

- DPP
  - Common input: public private keypair
  - Output is a profile
    - Certificate; or
    - PSK; or
    - Connector; or
    - …
  - Existing label standard

TEAP

- Lock step protocol
- Authentication-server driven
- Can support whatever TLS mechanisms necessary for certs, public keys, PSKs, etc.
  - May need some work in TLS WG
- Links back to centralized authentication server

Questions

- How to re-provision?
- What to do for wired?
- What forms of credentials should be supported?
  - For input
    - Public key
    - Certificate?
  - For output
    - Private shared key
    - Certificate

Next steps

- We need to write an architecture document
- Draft on wired onboarding
- How to handle manufacturer certificates
- How to link PSK output of DPP to next step
- Combine EAP-MECH and TEAP update drafts

So what does this mean for an IoT WG?

- Maybe start with onboarding?
  - Either an IoT Onboarding WG or broader, but starting with IoT onboarding
- Might tie into application onboarding
- Not necessarily bound to deliverables beyond maybe some architectural (informational) documents
- Tracks across SDOs

Discussion