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1 Scope

This document defines functional extensions to the capabilities defined in ISO/IEC 30118-1:2018 to meet the requirements of Wi-Fi Easy Setup. It specifies new Resource Types to enable the functionality and any extensions to the existing capabilities defined in ISO/IEC 30118-1:2018.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

https://www.iso.org/standard/53238.html
Latest version available at: https://openconnectivity.org/specs/OCF_Core_Specification.pdf

https://www.iso.org/standard/74239.html

https://www.iso.org/standard/74242.html

https://standards.ieee.org/findstds/standard/802.11-2016.html

IETF RFC 5646, Tags for Identifying Languages, September 2009
https://www.rfc-editor.org/info/rfc5646

OpenAPI specification, aka Swagger RESTful API Documentation Specification, Version 2.0
https://github.com/OAI/OpenAPI-Specification/blob/master/versions/2.0.md
3 Terms, definitions, and abbreviated terms

3.1 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO/IEC 30118-1:2018 and the following apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:
– ISO Online browsing platform: available at https://www.iso.org/obp

3.1.1 Easy Setup
process of configuring an Enrollee (3.1.3) using a Mediator (3.1.5) by transferring of essential information to the Enrollee (3.1.3)

3.1.2 Easy Setup Enrollment
step during Easy Setup in which the Enrollee (3.1.3) is contacted by the Mediator (3.1.5) to configure the Enroller's (3.1.4) information by means of accessing Easy Setup (3.1.1) Resources

3.1.3 Enrollee
device that needs to be configured and connected. E.g. Air-conditioner, Printer

3.1.4 Enroller
target network entity to which the Enrollee (3.1.3) connects. E.g. Wi-Fi AP

3.1.5 Mediator
logical function that enables the Enrollee (3.1.3) to connect to the target network (i.e. Enroller (3.1.4))

Note 1 to Entry: The Mediator transfers configuration information to the Enrollee. E.g. Mobile Phone

3.2 Abbreviated terms

3.2.1 CID
Company Identifier (ID)

3.2.2 IE
Information Element

3.2.3 Soft AP
Software Enabled Access Point

3.2.4 TLV
type-length-value
4 Document conventions and organization

4.1 Conventions

In this document a number of terms, conditions, mechanisms, sequences, parameters, events, states, or similar terms are printed with the first letter of each word in uppercase and the rest lowercase (e.g., Network Architecture). Any lowercase uses of these words have the normal technical English meaning.

4.2 Notation

In this document, features are described as required, recommended, allowed or DEPRECATED as follows:

Required (or shall or mandatory) (M).

– These basic features shall be implemented to comply with Core Architecture. The phrases "shall not", and "PROHIBITED" indicate behaviour that is prohibited, i.e. that if performed means the implementation is not in compliance.

Recommended (or should) (S).

– These features add functionality supported by Core Architecture and should be implemented. Recommended features take advantage of the capabilities Core Architecture, usually without imposing major increase of complexity. Notice that for compliance testing, if a recommended feature is implemented, it shall meet the specified requirements to be in compliance with these guidelines. Some recommended features could become requirements in the future. The phrase "should not" indicates behaviour that is permitted but not recommended.

Allowed (may or allowed) (O).

– These features are neither required nor recommended by Core Architecture, but if the feature is implemented, it shall meet the specified requirements to be in compliance with these guidelines.

DEPRECATED.

– Although these features are still described in this document, they should not be implemented except for backward compatibility. The occurrence of a deprecated feature during operation of an implementation compliant with the current document has no effect on the implementation’s operation and does not produce any error conditions. Backward compatibility may require that a feature is implemented and functions as specified but it shall never be used by implementations compliant with this document.

Conditionally allowed (CA)

– The definition or behaviour depends on a condition. If the specified condition is met, then the definition or behaviour is allowed, otherwise it is not allowed.

Conditionally required (CR)

– The definition or behaviour depends on a condition. If the specified condition is met, then the definition or behaviour is required. Otherwise the definition or behaviour is allowed as default unless specifically defined as not allowed.

Strings that are to be taken literally are enclosed in "double quotes".

Words that are emphasized are printed in italic.
5 Overview

5.1 Introduction

This document describes a way to setup and configure a new OCF Device, using an already
configured OCF Device or onboarding tool.

The described setup and configure mechanism is optional and other mechanisms are allowed to
be used.

Specifically, this method allows the transferring of essential information to the new Device, which
includes:

- Local network connection information, e.g. in case of Wi-Fi it will be Wi-Fi access point
  information.
- Device Configuration: Additional Device configuration information.

Easy Setup can be enhanced in future by incorporating other suitable technologies.

Annex A specifies the Resource Type definitions using the schema defined in the OpenAPI
specification as the API definition language that shall be followed by an OCF Device realizing the
Resources specified in this document.

5.2 Architecture

Figure 1 shows the deployment architectural approach.

![Easy Setup deployment architecture](image)

Easy Setup defines the following roles: Enrollee, Enroller, and Mediator. Please refer to clause 3
for the definitions thereof.

5.3 Example Scenario

The following scenario presents a typical setup case.

The configuration information and steps taken may vary depending on the Device’s type and status.
1) The Enrollee enters Easy Setup mode (when the Device is unboxed for the first time, it may be in this mode by default).

2) The Mediator discovers and connects to the Enrollee.


4) The Mediator transmits Wi-Fi Setting Information to the Enrollee.

5) Using the information received from the Mediator, the Enrollee connects to the Enroller (Wi-Fi AP).

6 Resource model

6.1 Introduction

Devices capable of Easy Setup shall support the following Resource Types.

1) EasySetup Resource Type

2) WiFiConf Resource Type

3) DevConf Resource Type

The EasySetup Resource Type is a Collection Resource and shall contain Links to instances of at least WiFiConf and DevConf. A vendor may add links to other Resource Types. The relationship between the EasySetup Resource Type and linked Resources is shown in Figure 2.

NOTE The EasySetup Resource Type supports the batch Interface (oic.if.b) which allows for efficient data delivery with a single request rather than multiple requests to each linked Resource.

Figure 2 – Easy Setup Resource Types

6.2 EasySetup Resource

6.2.1 Overview

The EasySetup Resource stores useful information including current status of Enrollee and last error code which was produced in the process of Easy Setup.

6.2.2 Resource

The Easy Setup Resource Type is as defined in Table 1.

Table 1 – EasySetup Resource Type

<table>
<thead>
<tr>
<th>Example URI</th>
<th>Resource Type Title</th>
<th>Resource Type ID (&quot;rt&quot; value)</th>
<th>Interfaces</th>
<th>Description</th>
<th>Related Functional Interaction</th>
</tr>
</thead>
<tbody>
<tr>
<td>/example/EasySetupResURI</td>
<td>EasySetup</td>
<td>oic.r.easysetup, oic.wk.col</td>
<td>oic.if.baseline, oic.if.ll, oic.if.b</td>
<td>Top level Resource for Easy Setup. Indicates easy setup status.</td>
<td>N/A</td>
</tr>
</tbody>
</table>
Table 2 defines the details for the "oic.r.easysetup" Resource Type.

<table>
<thead>
<tr>
<th>Property title</th>
<th>Property name</th>
<th>Value type</th>
<th>Value rule</th>
<th>Unit</th>
<th>Access mode</th>
<th>Mandatory</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Easy Setup Provisioning Status</td>
<td>ps</td>
<td>integer</td>
<td>enum</td>
<td>N/A</td>
<td>R</td>
<td>Yes</td>
<td>Easy setup provisioning status of the Device</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0: Need to Setup, 1: Connecting to Enroller, 2: Connected to Enroller, 3:</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Failed to Connect to Enroller, 4~254: Reserved, 255: EOF</td>
</tr>
<tr>
<td>Last Error Code</td>
<td>lec</td>
<td>integer</td>
<td>enum</td>
<td>N/A</td>
<td>R</td>
<td>Yes</td>
<td>Indicates a failure reason if it fails to connect to Enroller</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0: NO error, 1: Given SSID is not found, 2: Wi-Fi password is wrong, 3:</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>IP address is not allocated, 4: NO internet connection, 5: Timeout, 6:</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Wi-Fi Auth Type is not supported by the Enrollee, 7: Wi-Fi Encryption Type</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>is not supported by the Enrollee, 8: Wi-Fi Auth Type is wrong (failure</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>while connecting to the Enroller), 9: Wi-Fi Encryption Type is wrong</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>(failure while connecting to the Enroller), 10~254: Reserved, 255: Unknown</td>
</tr>
<tr>
<td>Connect</td>
<td>cn</td>
<td>array of integer</td>
<td>N/A</td>
<td>N/A</td>
<td>RW</td>
<td>Yes</td>
<td>Array of connection types to trigger Enrollee to initiate connection:</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1: Wi-Fi, 2: Other transport to be added in a future (e.g. BLE)</td>
</tr>
<tr>
<td>Links</td>
<td>links</td>
<td>array</td>
<td>N/A</td>
<td>N/A</td>
<td>R</td>
<td>Yes</td>
<td>Array of links that are WiFiConf and DevConf Resource.</td>
</tr>
</tbody>
</table>
6.3 WiFiConf Resource Type

6.3.1 Introduction
The WiFiConf Resource Type stores information to help an Enrollee to connect to an existing Wi-Fi AP.

6.3.2 Resource Type
The WiFiConf Resource Type is as defined in Table 3.

Table 3 – WiFiConf Resource Type

<table>
<thead>
<tr>
<th>Example URI</th>
<th>Resource Title</th>
<th>Resource Type ID</th>
<th>Interfaces</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>/example/WiFiConfResURI</td>
<td>WiFiConf</td>
<td>oic.r.wificonf</td>
<td>oic.if.baseline, oic.if_rw</td>
<td>Contains Wi-Fi related properties. The Resource properties exposed are listed in Table 4.</td>
</tr>
</tbody>
</table>

Table 4 defines the details for the "oic.r.wificonf" Resource Type.

Table 4 – "oic.r.wificonf" Resource Type definition

<table>
<thead>
<tr>
<th>Property title</th>
<th>Property name</th>
<th>Value type</th>
<th>Value rule</th>
<th>Unit</th>
<th>Access mode</th>
<th>Mandatory</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Supported Wi-Fi Mode Type</td>
<td>swmt</td>
<td>array of string</td>
<td>enum</td>
<td>N/A</td>
<td>R</td>
<td>Yes</td>
<td>Supported Wi-Fi modes by Enrollee. Can be multiple. (&quot;A&quot;, &quot;B&quot;, &quot;G&quot;, &quot;N&quot;, &quot;AC&quot;)</td>
</tr>
<tr>
<td>Supported Wi-Fi Frequency</td>
<td>swf</td>
<td>array of string</td>
<td>Refer to description for valid values.</td>
<td>N/A</td>
<td>R</td>
<td>Yes</td>
<td>Supported Wi-Fi frequencies by Enrollee. Can be multiple. (&quot;2.4G&quot;, &quot;5G&quot;)</td>
</tr>
<tr>
<td>Target Network Name</td>
<td>tnn</td>
<td>string</td>
<td>N/A</td>
<td>N/A</td>
<td>RW</td>
<td>Yes</td>
<td>Target network name (SSID of Wi-Fi AP i.e. enrollee)</td>
</tr>
<tr>
<td>Credential</td>
<td>cd</td>
<td>string</td>
<td>N/A</td>
<td>N/A</td>
<td>RW</td>
<td>No</td>
<td>Credential information of Wi-Fi AP (Password used to connect to enrollee).</td>
</tr>
<tr>
<td>Wi-Fi Auth Type</td>
<td>wat</td>
<td>string</td>
<td>enum</td>
<td>N/A</td>
<td>RW</td>
<td>Yes</td>
<td>Wi-Fi auth type (&quot;None&quot;, &quot;WEP&quot;, &quot;WPA_PSK&quot;, &quot;WPA2_PSK&quot;)</td>
</tr>
<tr>
<td>Wi-Fi Encryption Type</td>
<td>wet</td>
<td>string</td>
<td>enum</td>
<td>N/A</td>
<td>RW</td>
<td>Yes</td>
<td>Wi-Fi encryption type (&quot;None&quot;, &quot;WEP_64&quot;, &quot;WEP_128&quot;, &quot;TKIP&quot;, &quot;AES&quot;, &quot;TKIP_AES&quot;)</td>
</tr>
</tbody>
</table>
6.4 DevConf Resource Type

6.4.1 Introduction

The DevConf Resource Type stores Device configuration information required in Wi-Fi Easy Setup.

6.4.2 Resource Type

The DevConf Resource Type is as defined in Table 5

<table>
<thead>
<tr>
<th>Example URI</th>
<th>Resource Type Title</th>
<th>Resource Type ID (&quot;rt&quot; value)</th>
<th>Interfaces</th>
<th>Description</th>
<th>Related Functional Interaction</th>
</tr>
</thead>
<tbody>
<tr>
<td>/example/DevConfResURI</td>
<td>DevConf</td>
<td>oic.r.devconf</td>
<td>oic.if.baseline, oic.if.r</td>
<td>Stores device configuration information required in Easy Setup process. The Resource properties exposed are listed in Table 6.</td>
<td>N/A</td>
</tr>
</tbody>
</table>

Table 6 defines the details for the "oic.r.devconf" Resource Type.

<table>
<thead>
<tr>
<th>Property title</th>
<th>Property name</th>
<th>Value type</th>
<th>Value rule</th>
<th>Unit</th>
<th>Access mode</th>
<th>Mandatory</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Device Name</td>
<td>dn</td>
<td>one of: string or array of object</td>
<td>N/A</td>
<td>N/A</td>
<td>R</td>
<td>Yes</td>
<td>Indicates a pre-configured device name in language indicated by 'dl' in /oic/con. or An array of objects where each object has a 'language' field (containing an IETF RFC 5646 language tag) and a 'value' field containing the pre-configured device name in the indicated language. The pre-configured device name is presented by enrollee to mediator during easy-setup process.</td>
</tr>
</tbody>
</table>
7 Network and connectivity

Both the Mediator and Enrollee communicate via a common connectivity (e.g. Wi-Fi).

If using Wi-Fi for Easy Setup then the Enrollee shall have capability to act as a Soft AP. A Soft AP shall support the access point requirements defined by IEEE 802.11:2016.

8 Functional interactions

8.1 Onboarding, Provisioning and Configuration

The Mediator may be present as a standalone function or in conjunction with other functions or services such as AMS as part of an OBT (Onboarding Tool); please refer to the ISO/IEC 30118-2:2018.

8.2 Resource discovery

The Mediator connects to the Enrollee via a mutually supported connection.

When in Easy Setup phase, if using Wi-Fi as the connectivity between the Enrollee and the Mediator then the Enrollee shall make itself discoverable as a Soft AP. The Soft AP has additional availability constraints which are documented in ISO/IEC 30118-2:2018.

8.3 Retrieving and Updating Easy Setup Resources

The Enrollee shall expose Easy Setup Resources such that a Mediator is able to discover them using standard OCF Resource discovery methods (i.e. via a RETRIEVE on /oic/res); see the ISO/IEC 30118-1:2018, clause 11.3.

Easy Setup Resources shall expose only secure Endpoints (e.g. CoAPS); see the ISO/IEC 30118-1:2018, clause 10.

The Mediator may RETRIEVE a Resource within the Easy Setup Collection or the Collection itself to check the Enrollee’s status at any stage of Easy Setup. This applies only when the Enrollee & the Mediator are on a common network.

The Mediator may UPDATE Resource Property(-ies) on the Enrollee. Upon receipt of the request from the Mediator the Enrollee shall update its current Resource Property Values, and shall perform any required action. For example, if the "cn" Property of "EasySetup" Resource is updated by the Mediator, to indicate connection to Wi-Fi, the Enrollee shall start the connection to Enroller.

For details of Easy Setup Resources refer to clause 6.

8.4 Error Handling

The "lec" Property of the EasySetup Resource (i.e. "oic.r.easysetup") is used to indicate the error that occurred in the Easy Setup process while trying to connect to the Enroller (using the information provided by the Mediator in WiFiConf Resource):

- The Enrollee shall set "lec" Property to 1, if it fails to connect because it can’t find the SSID.
- The Enrollee shall set "lec" Property to 2, if it fails to connect due to wrong credential (password) information.
- The Enrollee should set "lec" Property to 6, if the Auth type is not supported by the Enrollee.
- The Enrollee should set "lec" Property to 7, if the Encryption type is not supported by the Enrollee.
- The Enrollee should set "lec" Property to 8, if it fails to connect due to wrong Auth type information (even though it's supported by the Enrollee).
The Enrollee should set "ilec" Property to 9, if it fails to connect due to wrong Encryption type information (even though it’s supported by the Enrollee).

When using Wi-Fi as the connectivity between the Enrollee and Mediator, if the Enrollee fails to connect to the Enroller, it shall again make itself discoverable as a Soft AP (in case it destroyed its Soft AP earlier).

8.5 Example Easy Setup Flow

Figure 3 shows an example Easy Setup flow for informative purposes:
Figure 3 – Easy Setup Flow (Informative)

1. Soft AP Creation
2. Device Discovery & Selection
3. Join Soft AP
4. Resource Discovery
5. Resource Found
6. Ownership Transfer
7. Request Enrollee Information
8. Response (ok)
9. Request to Update Resources (wificonf)
10. Response (ok)
11. Request to Connect (wifi)
12. Response (ok)
13. Disconnect Soft AP
14. Soft AP Destroy
15. Connect
16. Connect
The example flow in Figure 1 undergoes security provisioning (step 6) during Easy Setup. Alternatively, security provisioning can be done before Enrollee Discovery (steps 4 and 5) if preferred. Please refer to the ISO/IEC 30118-2:2018 for more information on the different scenarios.

### 8.6 Easy Setup SSID Tags

If using Wi-Fi as the connectivity between the Enrollee and the Mediator then the Enrollee’s Soft AP SSID should contain exactly one of the following Easy Setup SSID tags:

- "OCF_"
  - Prefix tag that has to be at the beginning of the SSID.
  - Example: OCF_MySSID
- "_OCF"
  - Suffix tag that has to be at the end of the SSID.
  - Example: MySSID_OCF

These tags are case sensitive.

### 8.7 Easy Setup Information Element

#### 8.7.1 Overview

If using Wi-Fi as the connectivity between the Enrollee and the Mediator then the Enrollee’s Soft AP beacon should contain the Easy Setup Information Element. The information element provides additional information about the device such as a friendly name or device manufacturer for the mediator application. The mediator application can then use this information to provide a better user experience.

#### 8.7.2 OCF Device Information Element (IE)

The Easy Setup Information Element has the structure shown in Figure 4.

```
1 byte 1 byte 3 bytes 1 byte <252 bytes
```

<table>
<thead>
<tr>
<th>Type = 221</th>
<th>Length</th>
<th>CID = 6A 40 65</th>
<th>OCF IE Type = 0</th>
<th>Data</th>
</tr>
</thead>
</table>

**Figure 4 – Easy Setup Information Element Definition**

- Type is a unique id allocated by the IEEE registrar to identify different information elements from each other. The Easy Setup Information Element shall have a Type value of 221 which is standard vendor specific information element.
- Length shall indicate the total size of CID, OCF IE Type, and Data in bytes.
- Company ID (CID) is a unique 24-bit identifier for a specific company or organization. The Easy Setup Information Element shall have a CID value of 6A 40 65.
- OCF IE Type is the identifier of the specific IE within OCF. The OCF IE Type shall be set to 0 for Easy Setup.
- Data is a set of type-length-value (TLV) structures that represent the device information in Table 1. The length of this field shall be less than 252 bytes.

Each TLV has the structure shown in Figure 5.
Type  Length  Value

Figure 5 – Type-Length-Value Structure

– Type shall indicate the type of the field from .
– Table 7.
– Length shall indicate the length of the Value in bytes.
– Value shall represent the corresponding information for specific TLV type from .
– Table 7.

Data is a set of TLVs as defined in Table 7.

Table 7 – Easy Setup Information Element TLVs

<table>
<thead>
<tr>
<th>Type</th>
<th>Length (bytes)</th>
<th>Value</th>
<th>Description of TLV</th>
<th># of Occurrences in IE or IEC</th>
<th>Required</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>&lt;65</td>
<td>Friendly name of the device</td>
<td>Device Friendly Name</td>
<td>1</td>
<td>Y</td>
</tr>
<tr>
<td>2</td>
<td>&lt;27</td>
<td>Device Type</td>
<td>Device type/Class</td>
<td>&gt;=1</td>
<td>Y</td>
</tr>
<tr>
<td>3</td>
<td>&lt;65</td>
<td>Name of Device Manufacturer</td>
<td>Manufacturer Name</td>
<td>1</td>
<td>Y</td>
</tr>
<tr>
<td>4</td>
<td>&lt;43</td>
<td>Language tag for strings</td>
<td>See IETF RFC 5646</td>
<td>1</td>
<td>Y</td>
</tr>
<tr>
<td>5</td>
<td>16</td>
<td>Protocol Independent ID in network byte order</td>
<td>See ISO/IEC 30118-1:2018</td>
<td>1</td>
<td>Y</td>
</tr>
<tr>
<td>101</td>
<td>&lt;65</td>
<td>Device Type/Class</td>
<td>Device Type as string</td>
<td>&gt;=0</td>
<td>N</td>
</tr>
</tbody>
</table>

The TLVs may be set in any order inside an IE or IEC. All strings shall be UTF-8 encoded and shall not include a null terminator. All TLVs in .

Table 7 with a ‘Required’ value of ‘Y’ shall be included in the IE or IEC (if multiple IEs are required).
The value of each TLV shall meet the length requirements specified in Table 1.

8.7.2.1 Device Friendly Name (Type 1)

User readable string representing the friendly name of the device that is beaconing and ready to undergo Easy Setup. This should match ‘n’ from oic.wk.d as defined in the ISO/IEC 30118-1:2018.

This string is in the same language specified in the type 4 TLV.

8.7.2.2 Device Type (Type 2)

Device type shall be the shortened form of ‘Device Type’ as specified in the ISO/IEC 30118-5:2018. For example:

– ‘Device Type’ as specified in a type 2 TLV: "airconditioner"
In cases where the device supports multiple functions, several type 2 TLVs may be included to represent each function of the device.

If the device does not support any of the functions as specified in the ISO/IEC 30118-5:2018, at least one type 101 TLV shall be included. Type 101 TLV contains a user readable string in the same language specified in the type 4 TLV. (Ex: "Lock").

If the device supports more than one function, a mix of type 2 and type 101 TLVs may be used depending on which functions are defined in the ISO/IEC 30118-5:2018.

8.7.2.3 Device Manufacturer Name (Type 3)
User readable string representing the manufacturer name of the device that is beaconing and ready to undergo Easy Setup. This should match ‘mnmn’ from oic.wk.p as defined in the ISO/IEC 30118-1:2018.

This string is in the same language specified in the type 4 TLV.

8.7.2.4 Language Tag (Type 4)
The language of all strings shall be specified in a type 4 TLV. The value of the type 4 TLV shall contain a language tag as described in IETF RFC 5646 (Ex: "en-us"). If the actual length of the language tag exceeds 42 bytes the manufacturer shall exclude subtags on the language tag until it is less than 43 bytes.

Please see 8.7.2.8 for information on supporting multiple languages.

If an IE contains a TLV that is a string (i.e. type 1, type 3 or type 101), then a type 4 TLV corresponding to the language of the string(s) shall also be present in the IE.

8.7.2.5 Protocol Independent ID (Type 5)
This shall match 'piid' from oic.wk.d as defined in the ISO/IEC 30118-1:2018.

The piid in the TLV shall be in network byte order.

8.7.2.6 Multiple Information Elements
Additional Easy Setup IEs may be present in the Soft AP beacon in the following situations:

– The total size of the TLVs is larger than the size of ‘Data’ as defined in an Easy Setup Information Element.

– Support for multiple languages is necessary.

Two or more Easy Setup Information Elements are referred to as an Information Element Collection (IEC).

8.7.2.7 IEC for Large TLV Size Support
If a TLV or set of TLVs will not fit into the current IE, a manufacturer may add additional Easy Setup IEs to contain the TLV/s thereby creating or extending an IEC. The additional IE shall contain the following fields as described in 8.7.2:

– Type
– Length
– CID
– OCF IE Type
If an IE contains a TLV that is a string (i.e. type 1, type 3 or type 101), then a type 4 TLV corresponding to the language of the string(s) shall also be present in the IE.

8.7.2.8 IEC for Multiple Language Support

A manufacturer may include additional Easy Setup IEs to support multiple languages in the Soft AP beacon. In the case that a manufacturer needs to provide device information in more than one language, they shall include an additional copy of the IE/IEC for each additional language. Each additional IE/IEC shall include all of the mandatory TLVs defined in 8.7.2.

9 Security

Annex A(normative)

OpenAPI 2.0 specification definitions

A.1 List of Resource Type definitions

Table A.1 contains the list of defined resources in this document.

<table>
<thead>
<tr>
<th>Friendly Name (informative)</th>
<th>Resource Type (rt)</th>
<th>Clause</th>
</tr>
</thead>
<tbody>
<tr>
<td>Device Configuration</td>
<td>&quot;oic.r.devconf&quot;</td>
<td>A.1</td>
</tr>
<tr>
<td>Easy Setup</td>
<td>&quot;oic.r.easysetup&quot;</td>
<td>A.2</td>
</tr>
<tr>
<td>Wi-Fi Configuration</td>
<td>&quot;oic.r.wificonf&quot;</td>
<td>A.3</td>
</tr>
</tbody>
</table>

A.2 Device Configuration

A.2.1 Introduction

Device configuration resource stores a preference of device settings like device name. Vendor-specific information can be added to the resource.

A.2.2 Example URI

/example/DevConfResURI

A.2.3 Resource type

The resource type (rt) is defined as: ["oic.r.devconf"].

A.2.4 OpenAPI 2.0 definition

```json
{
    "swagger": "2.0",
    "info": {
        "title": "Device Configuration",
        "version": "v0.0.2-20170604",
        "license": {
            "name": "copyright 2016-2017 Open Connectivity Foundation, Inc. All rights reserved.",
            "x-description": "Redistribution and use in source and binary forms, with or without modification, are permitted provided that the following conditions are met:

1. Redistributions of source code must retain the above copyright notice, this list of conditions and the following disclaimer.
2. Redistributions in binary form must reproduce the above copyright notice, this list of conditions and the following disclaimer in the documentation and/or other materials provided with the distribution.

THIS SOFTWARE IS PROVIDED BY THE Open Connectivity Foundation, INC. "AS IS" AND ANY EXPRESS OR IMPLIED WARRANTIES, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE OR WARRANTIES OF NON-INFRINGEMENT, ARE DISCLAIMED. IN NO EVENT SHALL THE Open Connectivity Foundation, INC. OR CONTRIBUTORS BE LIABLE FOR ANY DIRECT, INDIRECT, INCIDENTAL, SPECIAL, EXEMPLARY, OR CONSEQUENTIAL DAMAGES (INCLUDING, BUT NOT LIMITED TO, PROCUREMENT OF SUBSTITUTE GOODS OR SERVICES; LOSS OF USE, DATA, OR PROFITS; OR BUSINESS INTERRUPTION) HOWEVER CAUSED AND ON ANY THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT (INCLUDING NEGLIGENCE OR OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OF THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGE."
        }
    },
    "schemes": ["http"],
    "consumes": ["application/json"],
    "produces": ["application/json"],
    "paths": {
        "/example/DevConfResURI": {
        
```
"get": {
  "description": "Device configuration resource stores a preference of device settings like device name. Vendor-specific information can be added to the resource. Retrieve various settings regarding to device-specific settings. Device name (human-friendly name to be detected by mediator during easy setup)",
  "parameters": [
    {"$ref": "#/parameters/interface"}
  ],
  "responses": {
    "200": {
      "description": "",
      "x-example": {
        "rt": ["oic.r.devconf"],
        "dn": "My Refrigerator"
      }
    },
    "schema": { "$ref": "#/definitions/DevConf" }
  }
}
"parameters": {
  "interface": {
    "in": "query",
    "name": "if",
    "type": "string",
    "enum": ["oic.if.baseline", "oic.if.r"]
  }
},
"definitions": {
  "DevConf": {
    "properties": {
      "rt": {
        "description": "Resource Type of the Resource",
        "items": {
          "maxLength": 64,
          "type": "string"
        },
        "minItems": 1,
        "readOnly": true,
        "type": "array"
      },
      "dn": {
        "description": "Friendly name of the resource",
        "maxLength": 64,
        "readOnly": true,
        "type": "string"
      },
      "id": {
        "description": "Instance ID of this specific resource",
        "maxLength": 64,
        "readOnly": true,
        "type": "string"
      },
      "if": {
        "description": "The interface set supported by this resource",
        "items": [
          {"enum": ["oic.if.baseline", "oic.if.ll", "oic.if.b", "oic.if.lb", "oic.if.rw", "oic.if.r", "oic.if.e", "oic.if.s", "oic.if.s"]}
        ],
        "type": "string"
465 },
466   "minItems": 1,
467   "readOnly": true,
468   "type": "array"
469 },
470   "dn": {
471     "oneOf": [
472       { "type": "string",
473        "description": "Indicates a pre-configured device name in language indicated by 'dl'
474        in /oic/con: presented by enrollee device to mediator device during easy-setup process",
475        "pattern": "^.*$",
476        "readOnly": true
477     },
478     { "type": "array",
479        "items": {
480          "type": "object",
481          "properties": {
482            "language": {
483              "$ref": "http://openconnectivityfoundation.github.io/core/schemas/oic.types-schema.json#/definitions/language-tag",
484              "readOnly": true,
485              "description": "An RFC 5646 language tag."
486            },
487            "value": {
488              "type": "string",
489              "description": "Pre-configured device name in the indicated language."
490            },
491            "readOnly": true
492          }
493        },
494        "minItems": 1,
495        "readOnly": true,
496        "description": "Localized device name."
497     }
498   }
499  },
500   "n": string,
501   "readOnly": true,
502   "description": "Friendly name of the resource"
503  },
504   { "type": "object",
505   "required": [ "dn"]
506 }
507 }
508 }
509 }
510

A.2.5 Property definition

Table A.2 defines the Properties that are part of the ['oic.r.devconf'] Resource Type

<table>
<thead>
<tr>
<th>Property name</th>
<th>Value type</th>
<th>Mandatory</th>
<th>Access mode</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>rt</td>
<td>array: see schema</td>
<td>No</td>
<td>Read Only</td>
<td>Resource Type of the Resource</td>
</tr>
<tr>
<td>dn</td>
<td>multiple types: see schema</td>
<td>Yes</td>
<td>Read Write</td>
<td></td>
</tr>
<tr>
<td>n</td>
<td>string</td>
<td>No</td>
<td>Read Only</td>
<td>Friendly name of the resource</td>
</tr>
<tr>
<td>if</td>
<td>array: see schema</td>
<td>No</td>
<td>Read Only</td>
<td>The interface set supported by this resource</td>
</tr>
<tr>
<td>id</td>
<td>string</td>
<td>No</td>
<td>Read Only</td>
<td>Instance ID of this specific resource</td>
</tr>
</tbody>
</table>
A.2.6 CRUDN behaviour

Table A.3 defines the CRUDN operations that are supported on the ['oic.r.devconf'] Resource Type

<table>
<thead>
<tr>
<th>Create</th>
<th>Read</th>
<th>Update</th>
<th>Delete</th>
<th>Notify</th>
</tr>
</thead>
<tbody>
<tr>
<td>get</td>
<td>observe</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table A.3 – The CRUDN operations of the Resource with type 'rt' = ['oic.r.devconf']

A.3 Easy Setup Collection Link List Interface

A.3.1 Introduction

Easy Setup resource stores useful information including current status of unboxing device and last error code which are produced in a process of easy setup.

Note that, Easy Setup resource is a type of collection resource, which contains links to WiFiConf, DevConf resources and may additionally contain links to other resources.

A.3.2 Example URI

/EasySetupResURI

A.3.3 Resource type

The resource type (rt) is defined as: ['oic.r.easysetup', 'oic.wk.col'].

A.3.4 OpenAPI 2.0 definition

```
{
  "swagger": "2.0",
  "info": {
    "title": "Easy Setup Collection Link List Interface",
    "version": "v0.0.3-20170611",
    "license": {
      "name": "copyright 2016-2017 Open Connectivity Foundation, Inc. All rights reserved.",
      "x-description": "Redistribution and use in source and binary forms, with or without modification, are permitted provided that the following conditions are met:
1. Redistributions of source code must retain the above copyright notice, this list of conditions and the following disclaimer.
2. Redistributions in binary form must reproduce the above copyright notice, this list of conditions and the following disclaimer in the documentation and/or other materials provided with the distribution.
3. THIS SOFTWARE IS PROVIDED BY THE Open Connectivity Foundation, INC. "AS IS" AND ANY EXPRESS OR IMPLIED WARRANTIES, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE OR WARRANTIES OF NONINFRINGEMENT, ARE DISCLAIMED.
IN NO EVENT SHALL THE Open Connectivity Foundation, INC. OR CONTRIBUTORS BE LIABLE FOR ANY DIRECT, INDIRECT, INCIDENTAL, SPECIAL, EXEMPLARY, OR CONSEQUENTIAL DAMAGES (INCLUDING, BUT NOT LIMITED TO, PROCUREMENT OF SUBSTITUTE GOODS OR SERVICES; LOSS OF USE, DATA, OR PROFITS; OR BUSINESS INTERRUPTION) HOWEVER CAUSED AND ON ANY THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT (INCLUDING NEGLIGENCE OR OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OF THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGE."
    }
  },
  "schemes": ["http"],
  "consumes": ["application/json"],
  "produces": ["application/json"],
  "paths": {
    "/EasySetupResURI?if=oic.if.ll" : {
      "get": {
        "description": "Easy Setup resource stores useful information including current status of
unboxing device and last error code which are produced in a process of easy setup.

Note that, Easy Setup resource is a type of collection resource, which contains links to WiFiConf, DevConf resources and may additionally contain links to other resources.

Retrieve useful information during easy setup process:
1. A current status in easy setup process.
2. A last error code describing reason for failure occurred at the last time.

"parameters": [
```
"responses": {
  "200": {
    "description": "",
    "x-example": {
      "href": "/EasySetupResURI",
      "rt": ["oic.r.easysetup", "oic.wk.col"],
      "if": ["oic.if.b"],
      "p": {"bm": 3},
      "eps": [
        {"ep": "coaps://[fe80::b1d6]:1111", "pri": 2}
      ],
      "rel": ["self", "item"]
    },
    "href": "/WiFiConfResURI",
    "rt": ["oic.r.wificonf"],
    "if": ["oic.if.baseline"],
    "p": {"bm": 3},
    "eps": [
      {"ep": "coaps://[fe80::b1d6]:1111", "pri": 2}
    ],
    "href": "/DevConfResURI",
    "rt": ["oic.r.devconf"],
    "if": ["oic.if.baseline"],
    "p": {"bm": 3},
    "eps": [
      {"ep": "coaps://[fe80::b1d6]:1111", "pri": 2}
    ]
  }
}
"swf": ["2.4G", "5G"],
"tnn": "Home_AP_SSID",
"cd": "Home_AP_PWD",
"wat": "WPA2_PSK",
"wet": "AES"
}

"href": "/DevConfResURI",
"rep": {
  "dn": "My Refrigerator"
}

"schema": { "$ref": "#/definitions/sbatch-update" }

"post": {
  "description": "Able to deliver Wi-Fi, Device configuration and other
configuration\ninformation in a batch by utilizing 'batch' interface.\nIf you want to deliver Wi-Fi
and Device configuration information in a batch, you can write all properties you want to send with
a 'batch' interface. The below example is the case to send Easy Setup and Wi-Fi
configuration (i.e. connection type, target network, auth type information) in a batch.\n",
  "parameters": [
    { "$ref": "#/parameters/interface-batch"},
    { "name": "body",
      "x-example": 
        { "href": "/EasySetupResURI",
          "rep": {
            "ps": 0,
            "lec": 0,
            "cn": [1]
          }
        }
      }
    ,
    { "href": "/WiFiConfResURI",
      "rep": {
        "tnn": "Home_AP_SSID",
        "cd": "Home_AP_PWD",
        "wat": "WPA2_PSK",
        "wet": "AES"
      }
    }
  ],
  "responses": {
    "200": {
      "description": "",
      "x-example": {
        "href": "/EasySetupResURI",
        "rep": {
          "ps": 0,
          "lec": 0,
          "cn": [1]
        }
      }
    },
    { "href": "/WiFiConfResURI",
      "rep": {
        "swmt": ["A", "B", "G"],
        "swf": ["2.4G", "5G"],
"tnn": "Home_AP_SSID",
"cd": "Home_AP_PWD",
"wat": "WPA2_PSK",
"wt": "AES"
}
,
"href": "/DevConfResURI",
"rep": {
  "dn": "My Refrigerator"
}
,
"schema": { "$ref": "#/definitions/sbatch" }
]
,
"/EasySetupResURI?if=oic.if.baseline" : {
  "get": {
    "description": "Easy Setup resource stores useful information including current status of\nunboxing device and last error code which are produced in a process of\nneasy setup.\n\nNote that, Easy Setup resource is a type of collection resource, which\n\ncontains links to WiFiConf, DevConf resources and may additionally contain\n\nlinks to other resources.\n\nRetrieve useful information during easy setup process:\n 1. A current status in easy setup process.\n 2. A last error code describing reason for failure occurred at the last\n\ntime.\n",
    "parameters": [
      {"$ref": "#/parameters/interface-baseline"}
    ],
    "responses": {
      "200": {
        "description": "",
        "x-example": {
          "rt" : ["oic.r.easysetup", "oic.wk.col"],
          "if" : ["oic.if.ll", "oic.if.baseline", "oic.if.b"],
          "ps" : 0,
          "lec": 0,
          "cn": [1],
          "links": ["/EasySetupResURI",
          "rt" : ["oic.r.easysetup", "oic.wk.col"],
          "if" : ["oic.if.b"],
          "p":{"bm":3},
          "eps" : ["coaps://[fe80::b1d6]:1111", "pri": 2]
          ],
          "rel" :["self", "item"]
        },
        "href": "/WiFiConfResURI",
        "rt": ["oic.r.wificonf"],
        "if": ["oic.if.baseline"],
        "p":{"bm":3},
        "eps" : ["coaps://[fe80::b1d6]:1111", "pri": 2]
      } ,
      "/DevConfResURI",
      "rt": ["oic.r.devconf"],
      "if": ["oic.if.baseline"],
      "p":{"bm":3},
      "eps" : ["coaps://[fe80::b1d6]:1111", "pri": 2]
    } }
"schema": { "$ref": "#/definitions/EasySetup" }

"parameters": {
  "interface-ll": {
    "in": "query",
    "name": "if",
    "type": "string",
    "enum": ["oic.if.ll"]
  },
  "interface-baseline": {
    "in": "query",
    "name": "if",
    "type": "string",
    "enum": ["oic.if.baseline"]
  },
  "interface-all": {
    "in": "query",
    "name": "if",
    "type": "string",
    "enum": ["oic.if.baseline", "oic.if.ll", "oic.if.b"]
  },
  "interface-batch": {
    "in": "query",
    "name": "if",
    "type": "string",
    "enum": ["oic.if.b"]
  }
},

"definitions": {
  "slinks": {
    "items": {
      "properties": {
        "anchor": {
          "description": "This is used to override the context URI e.g. override the URI of the
          containing collection.",
          "format": "uri",
          "maxLength": 256,
          "type": "string"
        },
        "di": {
          "description": "The Device ID formatted according to IETF RFC 4122.",
          "pattern": "^[a-fA-F0-9]{8}-[a-fA-F0-9]{4}-[a-fA-F0-9]{4}-[a-fA-F0-9]{4}-[a-fA-F0-9]{12}$",
          "type": "string"
        },
        "eps": {
          "description": "the Endpoint information of the target Resource",
          "items": {
            "properties": {
              "ep": {
                "description": "Transport Protocol Suite + Endpoint Locator",
                "format": "uri",
                "type": "string"
              },
              "pri": {
                "description": "The priority among multiple Endpoints",
                "minimum": 1,
                "type": "integer"
              }
            }
          },
          "type": "object"
        }
      }
    },
    "type": "array"
  }
}
"hhref": {
  "description": "This is the target URI, it can be specified as a Relative Reference or fully-qualified URI."
},
"if": {
  "description": "The interface set supported by this resource",
  "items": {
    "enum": ["oic.if.baseline", "oic.if.ll", "oic.if.b", "oic.if.rw", "oic.if.r", "oic.if.a", "oic.if.s"],
    "type": "string"
  },
  "minItems": 1,
  "type": "array"
},
"ins": {
  "description": "The instance identifier for this web link in an array of web links - used in collections",
  "type": "integer"
},
"p": {
  "description": "Specifies the framework policies on the Resource referenced by the target URI",
  "properties": {
    "bm": {
      "description": "Specifies the framework policies on the Resource referenced by the target URI for e.g. observable and discoverable",
      "type": "integer"
    }
  },
  "required": ["bm"],
  "type": "object"
},
"rel": {
  "description": "The relation of the target URI referenced by the link to the context URI",
  "oneOf": [
    {"default": ["hosts"],
     "items": {
      "maxLength": 64,
      "type": "string"
     },
     "minItems": 1,
     "type": "array"
    },
    {"default": ["hosts"],
     "maxLength": 64,
     "type": "string"
    }
  ]
},
"rt": {
  "description": "Resource Type of the Resource",
  "items": ["oic.rt", "oic.rt1", "oic.rt2", "oic.rt3", "oic.rt4", "oic.rt5"]
}
"maxLength": 64,
    "type": "string"
  },
  "minItems": 1,
  "type": "array"
},
"title": {
  "description": "A title for the link relation. Can be used by the UI to provide a
  context. ",
  "maxLength": 64,
  "type": "string"
},
"type": {
  "default": "application/cbor",
  "description": "A hint at the representation of the resource referenced by the target
  URI. This represents the media types that are used for both accepting and emitting.",
  "items": {
    "maxLength": 64,
    "type": "string"
  },
  "minItems": 1,
  "type": "array"
},
"required": [
  "href",
  "rt",
  "if"
],
"type": "object",
"type": "array",
"title": "EasySetup Object Links List Schema (auto merged)"
},
"sbatch": {
  "minItems": 1,
  "items": {
    "properties": {
      "href": {
        "description": "URI of the target resource relative assuming the collection URI as
        anchor",
        "format": "uri",
        "maxLength": 256,
        "type": "string"
      },
      "rep": {
        "oneOf": [
          {
            "description": "The response payload from a single resource",
            "type": "object"
          },
          {
            "description": "The response payload from a collection (batch) resource",
            "items": {
              "anchor": {
                "description": "This is used to override the context URI e.g. override the URI
                of the containing collection."
              },
              "di": {
                "allOf": [
                  {
                    "description": "Format pattern according to IETF RFC 4122."
                  }
                ]
              }
            }
          }
        ]
      }
    }
  }
},
"if": {
  "description": "If you are implementing the cfcdvEasySetup service you must support
  the collection link relation.
  The collection link relation is used to support the getQuickSetup primitive.
  It is a list of easy setup objects that can be used by the user to define a
  quick setup for their devices.
  Only one easy setup object from the collection should be selected to
  configure a device.
  Each easy setup object in the collection contains a list of link relations
  that define the operands and target resources that are used to
  configure a device.
  The link relations are defined as:
  
  **href**
  "description": "URI of the target resource relative assuming the collection URI as
  anchor",
  "format": "uri",
  "maxLength": 256,
  "type": "string"
}
"type": "string"

],
"description": "The device ID"
}

],
"eps": {
"description": "the Endpoint information of the target Resource",
"items": {
"properties": {
"ep": {
"description": "Transport Protocol Suite + Endpoint Locator",
"format": "uri",
"type": "string"
},
"pri": {
"description": "The priority among multiple Endpoints",
"minimum": 1,
"type": "integer"
}
}
}
}

,"href": {
"description": "This is the target URI, it can be specified as a Relative Reference or fully-qualified URI.",
"format": "uri",
"maxLength": 256,
"type": "string"
}

,"if": {
"description": "The interface set supported by this resource",
"items": {
"enum": [
"oic.if.baseline",
"oic.if.ll",
"oic.if.b",
"oic.if.rw",
"oic.if.f",
"oic.if.a",
"oic.if.s"
],
"type": "string"
},
"minItems": 1,
"type": "array"
},
"ins": {
"description": "The instance identifier for this web link in an array of web links - used in collections",
"type": "integer"
}

,"p": {
"description": "Specifies the framework policies on the Resource referenced by the target URI",
"properties": {
"bm": {
"description": "Specifies the framework policies on the Resource referenced by the target URI for e.g. observable and discoverable",
"type": "integer"
}
},
"required": [
"bm"
],
"type": "object"
"rel": {
  "description": "The relation of the target URI referenced by the link to the context URI",
  "oneOf": [
    {
      "default": [
        "hosts"
      ],
      "items": {
        "maxLength": 64,
        "type": "string"
      },
      "minItems": 1,
      "type": "array"
    },
    {
      "default": "hosts",
      "maxLength": 64,
      "type": "string"
    }
  ],
  "rt": {
    "description": "Resource Type of the Resource",
    "items": {
      "maxLength": 64,
      "type": "string"
    },
    "minItems": 1,
    "type": "array"
  },
  "title": {
    "description": "A title for the link relation. Can be used by the UI to provide a context.",
    "maxLength": 64,
    "type": "string"
  },
  "type": {
    "default": "application/cbor",
    "description": "A hint at the representation of the resource referenced by the target URI. This represents the media types that are used for both accepting and emitting.",
    "items": {
      "maxLength": 64,
      "type": "string"
    },
    "minItems": 1,
    "type": "array"
  }
},
"required": [
  "href",
  "rt",
  "if"
],
"type": "object"}
"sbatch-update": {
  "title": "Collection Batch Update Format (auto merged)",
  "minItems": 1,
  "items": { "$ref": "#/definitions/oic.batch-update.item" },
  "type": "array"
},
"EasySetup": {
  "properties": {
    "rt": {
      "items": {
        "enum": [
          "oic.r.easysetup",
          "oic.wk.col"
        ],
        "maxItems": 2,
        "minItems": 2,
        "type": "array",
        "uniqueItems": true
      }
    },
    "ps": {
      "description": "Indicates the easy setup status of the device. (0: Need to Setup, 1: Connecting to Enroller, 2: Connected to Enroller, 3: Failed to Connect to Enroller, 4-254: Reserved, 255: EOF)",
      "enum": [0, 1, 2, 3],
      "readOnly": true,
      "type": "integer"
    },
    "lec": {
      "description": "Indicates a failure reason (0: NO error, 1: A given SSID is not found, 2: Wi-Fi's password is wrong, 3: IP address is not allocated, 4: No internet connection, 5: Timeout, 6: Wi-Fi Auth Type is not supported by the Enrollee, 7: Wi-Fi Encryption Type is not supported by the Enrollee, 8: Wi-Fi Auth Type is wrong (failure while connecting to the Enroller), 9: Wi-Fi Encryption Type is wrong (failure while connecting to the Enroller), 10-254: Reserved, 255: Unknown error)",
      "enum": [0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 255],
      "readOnly": true,
      "type": "integer"
    }
  }
},
"cn": {
  "description": "Indicates an array of connection types that trigger an attempt to connect to the Enroller to start.",
  "items": {
    "description": "Connection type to attempt. (1 : Wi-Fi, 2 : other entities / transports to be added in future (e.g. Connect to cloud / BLE))",
    "type": "integer"
  },
  "type": "array"
}
}
"anchor": {
  "description": "This is used to override the context URI e.g. override the URI of
the containing collection.",
  "format": "uri",
  "maxLength": 256,
  "type": "string"
},
"di": {
  "description": "The Device ID formatted according to IETF RFC 4122.",
  "pattern": "^[a-fA-F0-9]{8}\-[a-fA-F0-9]{4}\-[a-fA-F0-9]{4}\-[a-fA-F0-9]{4}\-[a-fA-F0-9]{12}$",
  "type": "string"
},
"eps": {
  "description": "the Endpoint information of the target Resource",
  "items": {
    "properties": {
      "ep": {
        "description": "Transport Protocol Suite + Endpoint Locator",
        "format": "uri",
        "type": "string"
      },
      "pri": {
        "description": "The priority among multiple Endpoints",
        "minimum": 1,
        "type": "integer"
      }
    },
    "type": "object"
  },
  "type": "array"
},
"href": {
  "description": "This is the target URI, it can be specified as a Relative Reference
or fully-qualified URI.",
  "format": "uri",
  "maxLength": 256,
  "type": "string"
},
"if": {
  "description": "The interface set supported by this resource",
  "items": {
    "enum": [
      "oic.if.baseline",
      "oic.if.ll",
      "oic.if.b",
      "oic.if.rw",
      "oic.if.r",
      "oic.if.a",
      "oic.if.s"
    ],
    "type": "string"
  },
  "minItems": 1,
  "type": "array"
},
"ins": {
  "description": "The instance identifier for this web link in an array of web links -
used in collections",
  "type": "integer"
},
"p": {
  "description": "Specifies the framework policies on the Resource referenced by the
target URI",
  "properties": {
    "bm": {
      "description": "Specifies the framework policies on the Resource referenced by
the target URI for e.g. observable and discoverable",
      "type": "integer"
    }
  }
"required": [ "href", "rel" ],
"type": "object"
},
"rel": {
"description": "The relation of the target URI referenced by the link to the context URI",
"oneOf": [
{
"default": [ "hosts" ],
"items": {
"maxLength": 64,
"type": "string"
},
"minItems": 1,
"type": "array"
},
{
"default": "hosts",
"maxLength": 64,
"type": "string"
}
]
},
"rt": {
"description": "Resource Type of the Resource",
"items": {
"maxLength": 64,
"type": "string"
},
"minItems": 1,
"type": "array"
},
"title": {
"description": "A title for the link relation. Can be used by the UI to provide a context.",
"maxLength": 64,
"type": "string"
},
"type": {
"default": "application/cbor",
"description": "A hint at the representation of the resource referenced by the target URI. This represents the media types that are used for both accepting and emitting.",
"items": {
"maxLength": 64,
"type": "string"
},
"minItems": 1,
"type": "array"
},
"required": [ "href", "rt" ],
"if"
"type": "object"
},
"type": "array"
},
"n": {
"description": "Friendly name of the resource",
"maxLength": 64,
"readOnly": true,
"type": "string"
},
"n": {"description": "Friendly name of the resource",
"maxLength": 64,
"readOnly": true,
"type": "string"}
"rts" : {
    "description": "Resource Type of the Resource",
    "items": { 
        "maxLength": 64,
        "type": "string"
    },
    "minItems": 1,
    "readOnly": true,
    "type": "array"
},
"id" : { 
    "description": "Instance ID of this specific resource",
    "maxLength": 64,
    "readOnly": true,
    "type": "string"
},
"rts-m" : { 
    "description": "Resource Type of the Resource",
    "items": { 
        "maxLength": 64,
        "type": "string"
    },
    "minItems": 1,
    "readOnly": true,
    "type": "array"
},
"if" : { 
    "description": "The interface set supported by this resource",
    "items": { 
        "enum": [ 
            "oic.if.baseline",
            "oic.if.ll",
            "oic.if.b",
            "oic.if.lb",
            "oic.if.rw",
            "oic.if.r",
            "oic.if.a",
            "oic.if.s"
        ],
        "type": "string"
    },
    "minItems": 1,
    "readOnly": true,
    "type": "array"
}
"type" : "object",
"required": ["ps","lec","cn"]
"oic.batch-update.item" : {
    "additionalProperties": true,
    "description": "array of resource representations to apply to the batch collection, using href to indicate which resource(s) in the batch to update. If the href property is empty, effectively making the URI reference to the collection itself, the representation is to be applied to all resources in the batch",
    "properties": { 
        "href": { 
            "description": "URI of the target resource relative assuming the collection URI as anchor",
            "format": "uri",
            "maxLength": 256,
            "type": "string"
        },
        "rep": { 
            "oneOf": [ 
                { "description": "The response payload from a single resource",
                "type": "object" }
            ]
        }
    }
}
"description": "The response payload from a collection (batch) resource",
"items": {
  "$ref": "#/definitions/oic.oic-link"
},
"type": "array"
}

"required": [
  "href",
  "rep"
],
"type": "object"
"oic.oic-link": {
  "properties": {
    "anchor": {
      "description": "This is used to override the context URI e.g. override the URI of the containing collection.",
      "format": "uri",
      "maxLength": 256,
      "type": "string"
    },
    "di": {
      "allOf": [
        {"$ref": "#/definitions/uuid"}
      ],
      "description": "The device ID"
    }
  }
},
"eps": {
  "description": "the Endpoint information of the target Resource",
  "items": {
    "properties": {
      "ep": {
        "description": "Transport Protocol Suite + Endpoint Locator",
        "format": "uri",
        "type": "string"
      },
      "pri": {
        "description": "The priority among multiple Endpoints",
        "minimum": 1,
        "type": "integer"
      }
    },
    "type": "object"
  },
  "type": "array"
},
"href": {
  "description": "This is the target URI, it can be specified as a Relative Reference or fully-qualified URI.",
  "format": "uri",
  "maxLength": 256,
  "type": "string"
},
"if": {
  "description": "The interface set supported by this resource",
  "items": {
    "enum": [
      "oic.if.baseline",
      "oic.if.l1",
      "oic.if.l2",
      "oic.if.rw",
      "oic.if.r",
      "oic.if.a"
    ]
  }
}
"ins": {
  "description": "The instance identifier for this web link in an array of web links - used in collections",
  "type": "integer"
},
"p": {
  "description": "Specifies the framework policies on the Resource referenced by the target URI",
  "properties": {
    "bm": {
      "description": "Specifies the framework policies on the Resource referenced by the target URI for e.g. observable and discoverable",
      "type": "integer"
    }
  },
  "required": [
    "bm"
  ],
  "type": "object"
},
"rel": {
  "description": "The relation of the target URI referenced by the link to the context URI",
  "oneOf": [
    {
      "default": [
        "hosts"
      ],
      "items": {
        "maxLength": 64,
        "type": "string"
      },
      "minItems": 1,
      "type": "array"
    },
    {
      "default": "hosts",
      "maxLength": 64,
      "type": "string"
    }
  ]
},
"rt": {
  "description": "Resource Type of the Resource",
  "items": {
    "maxLength": 64,
    "type": "string"
  },
  "minItems": 1,
  "type": "array"
},
"title": {
  "description": "A title for the link relation. Can be used by the UI to provide a context",
  "maxLength": 64,
  "type": "string"
},
"type": {
  "default": "application/cbor",
  "description": "A hint at the representation of the resource referenced by the target URI. This represents the media types that are used for both accepting and emitting.”,
  "items": {
    "maxLength": 64,
    "type": "string"
  }
}
"minItems": 1,
    "type": "array"
  },
  "required": [
    "href",
    "rt",
    "if"
  ],
  "type": "object"
},
"uuid": {
  "description": "Format pattern according to IETF RFC 4122.",
  "pattern": "^[a-fA-F0-9]{8}-[a-fA-F0-9]{4}-[a-fA-F0-9]{4}-[a-fA-F0-9]{4}-[a-fA-F0-9]{12}$",
  "type": "string"
},
"oic.wk.col-batch-update": {
  "description": "array of resource representations to apply to the batch collection, using href to indicate which resource(s) in the batch to update. If the href property is empty, effectively making the URI reference to the collection itself, the representation is to be applied to all resources in the batch",
  "items": {
    "$ref": "#/definitions/oic.batch-update.item"
  },
  "minItems": 1,
  "type": "array"
}

### A.3.5 Property definition

Table A.4 defines the Properties that are part of the ['oic.r.easysetup', 'oic.wk.col'] Resource Type

<table>
<thead>
<tr>
<th>Property name</th>
<th>Value type</th>
<th>Mandatory</th>
<th>Access mode</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>p</td>
<td>object: see schema</td>
<td>No</td>
<td>Read Write</td>
<td>Specifies the framework policies on the Resource referenced by the target URI</td>
</tr>
<tr>
<td>anchor</td>
<td>string</td>
<td>No</td>
<td>Read Write</td>
<td>This is used to override the context URI e.g. override the URI of the containing collection.</td>
</tr>
<tr>
<td>rel</td>
<td>multiple types: see schema</td>
<td>No</td>
<td>Read Write</td>
<td>The relation of the target URI referenced by the link to the context URI</td>
</tr>
<tr>
<td>title</td>
<td>string</td>
<td>No</td>
<td>Read Write</td>
<td>A title for the link relation. Can be used by the UI to provide a context.</td>
</tr>
<tr>
<td>Field</td>
<td>Type</td>
<td>Access</td>
<td>Action</td>
<td>Description</td>
</tr>
<tr>
<td>---------</td>
<td>---------------</td>
<td>--------</td>
<td>--------</td>
<td>-------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>href</td>
<td>string</td>
<td>Yes</td>
<td>Read Write</td>
<td>This is the target URI, it can be specified as a Relative Reference or fully-qualified URI.</td>
</tr>
<tr>
<td>if</td>
<td>array: see schema</td>
<td>Yes</td>
<td>Read Write</td>
<td>The interface set supported by this resource</td>
</tr>
<tr>
<td>ins</td>
<td>integer</td>
<td>No</td>
<td>Read Write</td>
<td>The instance identifier for this web link in an array of web links - used in collections</td>
</tr>
<tr>
<td>rt</td>
<td>array: see schema</td>
<td>Yes</td>
<td>Read Write</td>
<td>Resource Type of the Resource</td>
</tr>
<tr>
<td>type</td>
<td>array: see schema</td>
<td>No</td>
<td>Read Write</td>
<td>A hint at the representation of the resource referenced by the target URI. This represents the media types that are used for both accepting and emitting.</td>
</tr>
<tr>
<td>di</td>
<td>string</td>
<td>No</td>
<td>Read Write</td>
<td>The Device ID formatted according to IETF RFC 4122.</td>
</tr>
<tr>
<td>eps</td>
<td>array: see schema</td>
<td>No</td>
<td>Read Write</td>
<td>the Endpoint information of the target Resource</td>
</tr>
<tr>
<td>p</td>
<td>object: see schema</td>
<td>No</td>
<td>Read Write</td>
<td>Specifies the framework policies on the Resource referenced by the target URI</td>
</tr>
<tr>
<td>anchor</td>
<td>string</td>
<td>No</td>
<td>Read Write</td>
<td>This is used to override the context URI e.g. override the URI of the containing collection.</td>
</tr>
<tr>
<td>rel</td>
<td>multiple types: see schema</td>
<td>No</td>
<td>Read Write</td>
<td>The relation of the target URI referenced by the link to the context URI</td>
</tr>
<tr>
<td>title</td>
<td>string</td>
<td>No</td>
<td>Read Write</td>
<td>A title for the link relation. Can be used by the UI to provide a context.</td>
</tr>
<tr>
<td>-------------</td>
<td>-------------</td>
<td>------------------</td>
<td>------------</td>
<td>-------------------------------------------------------------------------</td>
</tr>
<tr>
<td>href</td>
<td>string</td>
<td>Yes</td>
<td>Read Write</td>
<td>This is the target URI, it can be specified as a Relative Reference or fully-qualified URI.</td>
</tr>
<tr>
<td>if</td>
<td>array: see</td>
<td>Yes</td>
<td>Read Write</td>
<td>The interface set supported by this resource</td>
</tr>
<tr>
<td></td>
<td>schema</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ins</td>
<td>integer</td>
<td>No</td>
<td>Read Write</td>
<td>The instance identifier for this web link in an array of web links - used in collections</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>rt</td>
<td>array: see</td>
<td>Yes</td>
<td>Read Write</td>
<td>Resource Type of the Resource</td>
</tr>
<tr>
<td></td>
<td>schema</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>type</td>
<td>array: see</td>
<td>No</td>
<td>Read Write</td>
<td>A hint at the representation of the resource referenced by the target URI. This represents the media types that are used for both accepting and emitting.</td>
</tr>
<tr>
<td></td>
<td>schema</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>di</td>
<td>multiple types: see schema</td>
<td>No</td>
<td>Read Write</td>
<td></td>
</tr>
<tr>
<td>eps</td>
<td>array: see</td>
<td>No</td>
<td>Read Write</td>
<td>the Endpoint information of the target Resource</td>
</tr>
<tr>
<td></td>
<td>schema</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>href</td>
<td>string</td>
<td>Yes</td>
<td>Read Write</td>
<td>URI of the target resource relative assuming the collection URI as anchor</td>
</tr>
<tr>
<td>rep</td>
<td>multiple types: see schema</td>
<td>Yes</td>
<td>Read Write</td>
<td></td>
</tr>
<tr>
<td>rt</td>
<td>array: see</td>
<td>No</td>
<td>Read Write</td>
<td></td>
</tr>
<tr>
<td></td>
<td>schema</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>lec</td>
<td>integer</td>
<td>Yes</td>
<td>Read Only</td>
<td>Indicates a failure reason (0: NO error, 1: A given SSID is not found, 2: Wi-Fi's password is</td>
</tr>
<tr>
<td>n</td>
<td>string</td>
<td>No</td>
<td>Read Only</td>
<td>Friendly name of the resource</td>
</tr>
<tr>
<td>----</td>
<td>--------------</td>
<td>----</td>
<td>-----------</td>
<td>-------------------------------</td>
</tr>
<tr>
<td>rts-m</td>
<td>array: schema</td>
<td>see</td>
<td>No</td>
<td>Read Only</td>
</tr>
<tr>
<td>links</td>
<td>array: schema</td>
<td>see</td>
<td>No</td>
<td>Read Write</td>
</tr>
<tr>
<td>if</td>
<td>array: schema</td>
<td>see</td>
<td>No</td>
<td>Read Only</td>
</tr>
<tr>
<td>id</td>
<td>string</td>
<td>No</td>
<td>Read Only</td>
<td>Instance ID of this specific resource</td>
</tr>
<tr>
<td>cn</td>
<td>array: schema</td>
<td>see</td>
<td>Yes</td>
<td>Read Write</td>
</tr>
<tr>
<td>ps</td>
<td>integer</td>
<td>Yes</td>
<td>Read Only</td>
<td>Indicates the easy setup status of the device. (0: Need to Setup, 1: Connecting to Enroller, 2: Connected to Enroller, 3: Wrong, 4: No internet connection, 5: Timeout, 6: Wi-Fi Auth Type is not supported by the Enrollee, 7: Wi-Fi Encryption Type is not supported by the Enrollee, 8: Wi-Fi Auth Type is wrong (failure while connecting to the Enroller), 9: Wi-Fi Encryption Type is wrong (failure while connecting to the Enroller), 10~254: Reserved, 255: Unknown error)</td>
</tr>
</tbody>
</table>
Failed to Connect to Enroller, 4~254: Reserved, 255: EOF

<table>
<thead>
<tr>
<th>rts</th>
<th>array: see schema</th>
<th>No</th>
<th>Read Only</th>
<th>Resource Type of the Resource</th>
</tr>
</thead>
<tbody>
<tr>
<td>href</td>
<td>string</td>
<td>Yes</td>
<td>Read Write</td>
<td>URI of the target resource relative assuming the collection URI as anchor</td>
</tr>
<tr>
<td>rep</td>
<td>multiple types: see schema</td>
<td>Yes</td>
<td>Read Write</td>
<td></td>
</tr>
</tbody>
</table>

A.3.6 CRUDN behaviour

Table A.5 defines the CRUDN operations that are supported on the ['oic.r.easysetup', 'oic.wk.col'] Resource Type

Table A.5 – The CRUDN operations of the Resource with type 'rt' = ['oic.r.easysetup', 'oic.wk.col']

<table>
<thead>
<tr>
<th>Create</th>
<th>Read</th>
<th>Update</th>
<th>Delete</th>
<th>Notify</th>
</tr>
</thead>
<tbody>
<tr>
<td>get</td>
<td></td>
<td></td>
<td></td>
<td>observe</td>
</tr>
</tbody>
</table>

A.4 Wi-Fi Configuration Resource Baseline Interface

A.4.1 Introduction

WiFiConf resource stores essential information to help an unboxing device to connect to an existing Wi-Fi AP.

A.4.2 Example URI

/WiFiConfResURI

A.4.3 Resource type

The resource type (rt) is defined as: ['oic.r.wificonf'].

A.4.4 OpenAPI 2.0 definition

```json
{
    "swagger": "2.0",
    "info": {
        "title": "Wi-Fi Configuration Resource Baseline Interface",
        "version": "v0.0.3-20170611",
        "license": {
            "name": "copyright 2016-2019 Open Connectivity Foundation, Inc. All rights reserved."
        },
        "x-description": "Redistribution and use in source and binary forms, with or without modification, are permitted provided that the following conditions are met:

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```
"schemes": ["http"],
"consumes": ["application/json"],
"produces": ["application/json"],
"paths": {
  "/WiFiConfResURI?if=oic.if.baseline" : {
"get": {
  "description": "WiFiConf resource stores essential information to help an unboxing device
  to connect to an existing Wi-Fi AP.

  Retrieve properties of WiFiConf resource.
  The information includes:
  1. Wi-Fi SSID and password
  2. Wi-Fi Security type (i.e. auth type and encryption type)
  3. Wi-Fi hardware capability (i.e. supported frequencies, modes, auth types and encryption types)

  "parameters": [{$ref: "/parameters/interface-baseline"}],
  "responses": {
    "200": {
      "description": "",
      "x-example": {
        "rt": ["oic.r.wificonf"],
        "swmt": ["A", "B", "G"],
        "swf": ["2.4G", "5G"],
        "tnn": "Home_AP_SSID",
        "cd": "Home_AP_PWD",
        "wat": "WPA2_PSK",
        "wet": "TKIP",
        "swat": ["WPA_PSK", "WPA2_PSK"],
        "swet": ["TKIP", "AES", "TKIP_AES"]
      }
    }
  }
},
"post": {
  "description": "Deliver Wi-Fi AP's information for an unboxing device to connect to it.

  "parameters": [{$ref: "/parameters/interface-baseline"}],
  "responses": {
    "200": {
      "description": "",
      "x-example": {
        "tnn": "Home_AP_SSID",
        "cd": "Home_AP_PWD",
        "wat": "WPA2_PSK",
        "wet": "AES"
      }
    }
  }
},
"/WiFiConfResURI?if=oic.if.rw" : {
}
"get": {
  "description": "WiFiConf resource stores essential information to help an unboxing device connect to an existing Wi-Fi AP. Retrieve properties of WiFiConf resource that can be updated by a client.";
  "parameters": [
    {
      "$ref": "#/parameters/interface-rw"
    }
  ],
  "responses": {
    "200": {
      "description": "",
      "x-example": {
        "tnn": "Home_AP_SSID",
        "cd": "Home_AP_PWD",
        "wat": "WPA2_PSK",
        "wet": "AES"
      }
    }
  },
  "schema": { "$ref": "#/definitions/WiFiConfUpdate" }
}
}
"post": {
  "description": "Deliver Wi-Fi AP's information for an unboxing device to connect to it."
  "parameters": [
    {
      "$ref": "#/parameters/interface-rw"},
    {
      "name": "body",
      "in": "body",
      "required": true,
      "schema": { "$ref": "#/definitions/WiFiConfUpdate" },
      "x-example": {
        "tnn": "Home_AP_SSID",
        "cd": "Home_AP_PWD",
        "wat": "WPA2_PSK",
        "wet": "AES"
      }
    }
  ],
  "responses": {
    "200": {
      "description": "",
      "x-example": {
        "tnn": "Home_AP_SSID",
        "cd": "Home_AP_PWD",
        "wat": "WPA2_PSK",
        "wet": "AES"
      },
      "schema": { "$ref": "#/definitions/WiFiConfUpdate" }
    }
  }
}
"parameters": {
  "interface-rw" : {
    "in" : "query",
    "name" : "if",
    "type" : "string",
    "enum" : ["oic.if.rw"]
  },
  "interface-baseline" : {
    "in" : "query",
    "name" : "if",
    "type" : "string",
    "enum" : ["oic.if.baseline"]
  },
  "interface-all" : {

"in": "query",
"name": "if",
"type": "string",
"enum": ["oic.if.baseline", "oic.if.rw"]
}
}
"definitions": {
"WiFiConf": {
"properties": {
"rt": {
"description": "Resource Type of the Resource",
"items": {
"maxLength": 64,
"type": "string"
},
"minItems": 1,
"readOnly": true,
"type": "array"
},
"tnn": {
"description": "Indicates Target Network Name (SSID of Wi-Fi AP)",
"pattern": "^.*$",
"type": "string"
},
"swmt": {
"description": "Indicates supported Wi-Fi mode types. It can be multiple",
"items": {
"description": "Supported Wi-Fi Mode Type.",
"enum": [
"A",
"G",
"N",
"AC"
],
"type": "string"
},
"readOnly": true,
"type": "array"
},
"wat": {
"description": "Indicates Wi-Fi Auth Type",
"enum": [
"None",
"WEP",
"WPA_PSK",
"WPA2_PSK"
],
"type": "string"
},
"n": {
"description": "Friendly name of the resource",
"maxLength": 64,
"readOnly": true,
"type": "string"
},
"swat": {
"description": "Indicates supported Wi-Fi Auth types. It can be multiple",
"items": {
"description": "Indicates Wi-Fi Auth Type",
"enum": [
"None",
"WEP",
"WPA_PSK",
"WPA2_PSK"
],
"type": "string"
},
"readOnly": true,
"type": "array"
}
"swf": {
    "description": "Indicates Supported Wi-Fi frequencies by the Enrollee. Can be multiple. Valid values are '2.4G', '5G'.",
    "items": {
        "pattern": "^[2\.|5]$",
        "type": "string"
    },
    "readOnly": true,
    "type": "array"
},
"swet": {
    "description": "Indicates supported Wi-Fi Encryption types. It can be multiple",
    "items": {
        "description": "Indicates Wi-Fi Encryption Type",
        "enum": [ "None", "WEP_64", "WEP_128", "TKIP", "AES", "TKIP_AES"
        ],
        "type": "string"
    },
    "readOnly": true,
    "type": "array"
},
"wet": {
    "description": "Indicates Wi-Fi Encryption Type",
    "enum": [ "None", "WEP_64", "WEP_128", "TKIP", "AES", "TKIP_AES"
    ],
    "type": "string"
},
"cd": {
    "description": "Indicates credential information of Wi-Fi AP",
    "pattern": "^.*$",
    "type": "string"
},
"id": {
    "description": "Instance ID of this specific resource",
    "maxLength": 64,
    "readOnly": true,
    "type": "string"
},
"if": {
    "description": "The interface set supported by this resource",
    "items": {
        "enum": [ "oic.if.baseline", "oic.if.1l",
        "oic.if.b", "oic.if.lb",
        "oic.if.rw", "oic.if.r",
        "oic.if.a", "oic.if.a"
        ],
        "type": "string"
    },
    "minItems": 1,
    "readOnly": true,
    "type": "array"
}
A.4.5 Property definition

Table A.6 defines the Properties that are part of the [oic.r.wificonf] Resource Type

<table>
<thead>
<tr>
<th>Property name</th>
<th>Value type</th>
<th>Mandatory</th>
<th>Access mode</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>swmt</td>
<td>array: see schema</td>
<td>Yes</td>
<td>Read Only</td>
<td>Indicates supported Wi-Fi mode types. It can be multiple</td>
</tr>
<tr>
<td>swf</td>
<td>array: see schema</td>
<td>Yes</td>
<td>Read Only</td>
<td>Indicates supported Wi-Fi frequencies by the Enrollee. Can be multiple. Valid values are ('2.4G', '5G')</td>
</tr>
<tr>
<td>cd</td>
<td>string</td>
<td>No</td>
<td>Read Write</td>
<td>Indicates credential information of Wi-Fi AP</td>
</tr>
</tbody>
</table>

Table A.6 – The Property definitions of the Resource with type ‘rt’ = ['oic.r.wificonf']
<table>
<thead>
<tr>
<th>Name</th>
<th>Type</th>
<th>Read/Write</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>wet</td>
<td>string</td>
<td>Yes</td>
<td>Indicates Wi-Fi Encryption Type</td>
</tr>
<tr>
<td>swat</td>
<td>array: see</td>
<td>Yes</td>
<td>Indicates supported Wi-Fi Auth types. It can be multiple</td>
</tr>
<tr>
<td>if</td>
<td>array: see</td>
<td>No</td>
<td>The interface set supported by this resource</td>
</tr>
<tr>
<td>swet</td>
<td>array: see</td>
<td>Yes</td>
<td>Indicates supported Wi-Fi Encryption types. It can be multiple</td>
</tr>
<tr>
<td>rt</td>
<td>array: see</td>
<td>No</td>
<td>Resource Type of the Resource</td>
</tr>
<tr>
<td>n</td>
<td>string</td>
<td>Yes</td>
<td>Friendly name of the resource</td>
</tr>
<tr>
<td>wat</td>
<td>string</td>
<td>Yes</td>
<td>Indicates Wi-Fi Auth Type</td>
</tr>
<tr>
<td>id</td>
<td>string</td>
<td>Yes</td>
<td>Instance ID of this specific resource</td>
</tr>
<tr>
<td>tnn</td>
<td>string</td>
<td>Yes</td>
<td>Indicates Target Network Name (SSID of Wi-Fi AP)</td>
</tr>
<tr>
<td>cd</td>
<td>string</td>
<td>Yes</td>
<td>Indicates credential information of Wi-Fi AP</td>
</tr>
<tr>
<td>wet</td>
<td>multiple types: see schema</td>
<td>Yes</td>
<td>Indicates Wi-Fi Encryption Type</td>
</tr>
<tr>
<td>wat</td>
<td>multiple types: see schema</td>
<td>Yes</td>
<td>Indicates Wi-Fi Auth Type</td>
</tr>
<tr>
<td>tnn</td>
<td>string</td>
<td>Yes</td>
<td>Indicates Target Network Name (SSID of Wi-Fi AP)</td>
</tr>
</tbody>
</table>

### A.4.6 CRUDN behaviour

Table A.7 defines the CRUDN operations that are supported on the ['oic.r.wificonf'] Resource Type

<table>
<thead>
<tr>
<th>CRUDN Operation</th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Create</td>
<td>Read</td>
<td>Update</td>
<td>Delete</td>
<td>Notify</td>
</tr>
<tr>
<td>get</td>
<td>post</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table A.7 – The CRUDN operations of the Resource with type 'rt' = ['oic.r.wificonf']