

OCF Resource to UPlus Mapping Specification

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CONTACT admin@openconnectivity.org

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1 Scope

This document provides detailed mapping information between UPlus (U+) and OCF defined Resources.

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.

ISO/IEC 30118-1:2018 Information technology -- Open Connectivity Foundation (OCF) Specification -- Part 1: Core specification
<https://www.iso.org/standard/53238.html>
Latest version available at: https://openconnectivity.org/specs/OCF_Core_Specification.pdf

ISO/IEC 30118-2:2019, Information technology – Open Connectivity Foundation (OCF) Specification – Part 2: Security specification
<https://www.iso.org/standard/74239.html>
Latest version available at: https://openconnectivity.org/specs/OCF_Security_Specification.pdf

ISO/IEC 30118-3:2019, Information technology – Open Connectivity Foundation (OCF) Specification – Part 3: Bridging specification
<https://www.iso.org/standard/74240.html>
Latest version available at: https://openconnectivity.org/specs/OCF_Bridging_Specification.pdf

Derived Models for Interoperability between IoT Ecosystems, Stevens & Merriam, March 2016
https://www.iab.org/wp-content/IAB-uploads/2016/03/OCF-Derived-Models-for-Interoperability-Between-IoT-Ecosystems_v2-examples.pdf

3 Terms, definitions symbols and abbreviations

For the purposes of this document, the terms and definitions given in ISO/IEC 30118-1:2018, ISO/IEC 30118-2:2019, and ISO/IEC 30118-3:2019 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>
- IEC Electropedia: available at <http://www.electropedia.org/>

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).

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

Recommended (or should).

These features add functionality supported by the Mapping Specification and should be implemented. Recommended features take advantage of the capabilities the Mapping Specification, 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 behavior that is permitted but not recommended.

Allowed (or allowed).

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

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.

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.

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

Words that are emphasized are printed in *italic*.

5 Theory of Operation

5.1 Interworking Approach

The interworking between UPlus (U+) and OCF defined Resources is modelled using the derived model syntax described in Derived Models for Interoperability between IoT Ecosystems.

5.2 Mapping Syntax

5.2.1 Introduction

Within the defined syntax for derived modelling used by this document there are two blocks that define the actual Property-Property equivalence or mapping. These blocks are identified by the keywords "x-to-ocf" and "x-from-ocf". Derived Models for Interoperability between IoT Ecosystems does not define a rigid syntax for these blocks; they are free form string arrays that contain pseudo-coded mapping logic.

176 Within this document we apply the rules in defined in clause 5.2 to these blocks to ensure
177 consistency and re-usability and extensibility of the mapping logic that is defined.

178 **5.2.2 General**

179 All statements are terminated with a carriage return.

180 **5.2.3 Value Assignment**

181 The equals sign (=) is used to assign one value to another. The assignee is on the left of the
182 operator; the value being assigned on the right.

183 **5.2.4 Property Naming**

184 All Property names are identical to the name used by the original model; for example, from the
185 OCF Temperature Resource the Property name "temperature" is used whereas when referred to
186 the derived ecosystem then the semantically equivalent Property name is used.

187 The name of the OCF defined Property is prepended by the ecosystem designator "ocf" to avoid
188 ambiguity (e.g. "ocf.step")

189 **5.2.5 Range**

190 The range on the OCF side is fixed.

191 **5.2.6 Arrays**

192 An array element is indicated by the use of square brackets "[]" with the index of the element
193 contained therein, e.g. range [1]. All arrays start at an index of 0.

194 **5.2.7 Default Mapping**

195 There are cases where the specified mapping is not possible as one or more of the Properties
196 being mapped is optional in the source model. In all such instances a default mapping is provided.
197 (e.g. "transitiontime = 1")

198 **5.2.8 Conditional Mapping**

199 When a mapping is dependent on the meeting of other conditions then the syntax:

200 If "condition", then "mapping".

201 is applied.

202 E.g. if onoff = false, then ocf.value = false

203 **5.2.9 Method Invocation**

204 The invocation of a command from the derived ecosystem as part of the mapping from an OCF
205 Resource is indicated by the use of a double colon "::" delimiter between the applicable resource,
206 service, interface or other construct identifier and the command name. The command name always
207 includes trailing parentheses which would include any parameters should they be passed.

208 **6 U+ Translation**

209 **6.1 Operational Scenarios**

210 **6.1.1 Introduction**

211 The goal is to make Bridged U+ Servers appear to OCF Clients as if they were native OCF Servers.
212 "Deep translation" between specific U+ properties and OCF resources is specified in clause 9.

Figure 1 shows an overview of OCF U+ Bridge Platform and its general topology. The U+ Translator supports asymmetric bridging. It exposes U+ Servers to OCF Clients. Each Bridged U+ Server is represented as a Virtual OCF Server.

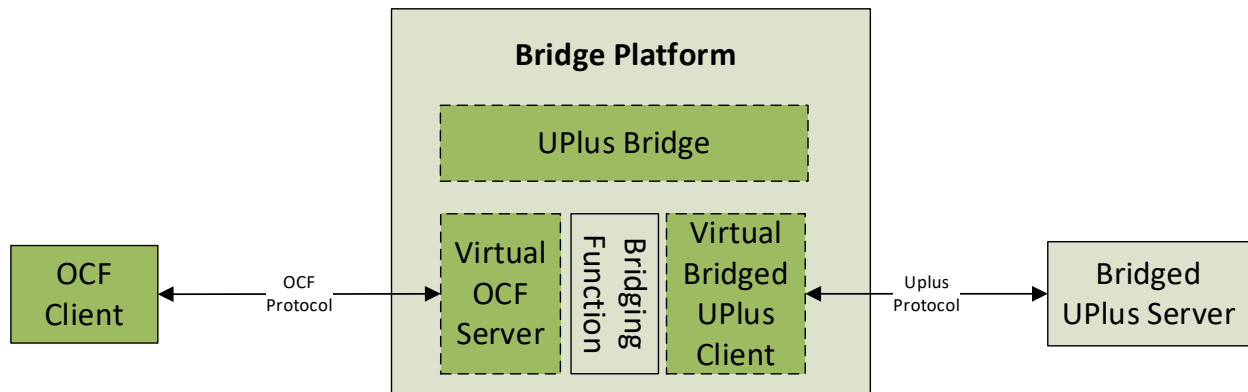


Figure 1 – OCF U+ Bridge Platform and Components

6.1.2 Use case for U+ Bridging

Figure 2 shows a use case for U+ bridging. U+ washer air conditioner is installed in the user's house. The user uses OCF Client application on the smartphone to control the washer. OCF U+ Bridge Platform can reside in different physical platforms, for example, the smartphone, the washer or the gateway device.

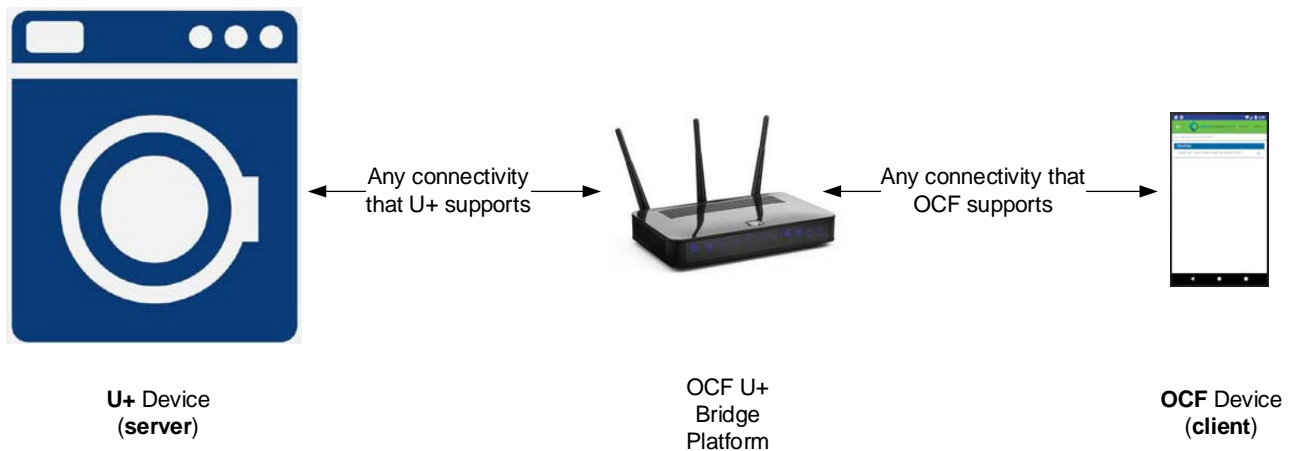


Figure 2 – U+ Bridging Use Case

6.2 Requirements specific to U+ Translator

6.2.1 General

OCF U+ Bridge Platform shall satisfy the normative requirements from ISO/IEC 30118-3:2019.

6.2.2 Requirements specific to U+

This document refers to version 5.0.0 or higher of U+ SDK.

6.2.3 Exposing U+ servers to OCF Clients

6.2.3.1 General

Table 1 shows translation rule between U+ and OCF data model. One U+ Device Type is mapped to one OCF Device Type or one OCF Composite Device. One or more U+ Properties are mapped to one OCF Resource Type.

Table 1 – Translation Rule between U+ and OCF Data Model

From U+	mapping count	To OCF	mapping count
U+ Device Type	1	OCF Device Type	1
U+ Property	n	OCF Resource	1
		OCF Property	n

Table 2 shows an example of the translation rule, which maps U+ air conditioner to OCF air conditioner.

- U+ Property "onOffStatus" is mapped to OCF Resource Property "value" which belongs to OCF Resource "oic.r.switch.binary".
- U+ Property "targetTemperature" is mapped to OCF Resource Property "temperature" and "units" combined which both belong to OCF Resource "oic.r.temperature".
- U+ Property "indoorTemperature", "windDirectionVertical", "windDirectionHorizontal" and "windSpeed" together are mapped to OCF Resource Property "supportedDirections", "direction", "speed" and "automode" combined which all belong to OCF Resource "oic.r.airflow".
- U+ Property "operationMode" and "healthMode" together are mapped to OCF Resource Property "supportedModes" and "modes" combined which both belong to OCF Resource "oic.r.mode".

Table 2 – Example of Translation between U+ and OCF Data Model

From U+ Air Conditioner	To OCF Air Conditioner	
U+ Property	OCF Resource	OCF Resource Property
"onOffStatus"	"oic.r.switch.binary"	"value"
"targetTemperature"	"oic.r.temperature"	"temperature"
		"units"
"indoorTemperature"	"oic.r.airflow"	"supportedDirections"
"windDirectionVertical"		"direction"
"windDirectionHorizontal"		"speed"
"windSpeed"		"automode"
"operationMode"	"oic.r.mode"	"supportedModes"
"healthMode"		"modes"

6.2.3.2 Deep translation for U+ property

All U+ devices are well defined. Table 3 is the mapping between U+ devices and their properties and OCF Devices and Resources. Table 3 includes a full list of U+ devices to be mapped to OCF. Table 4, Table 5, and Table 6 define the mapping between OCF core Resources and U+ properties.

Table 3 – Mapping between U+ Device and Property and OCF Device and Resource

U+ Device	U+ Property	OCF Resource Type	OCF Device Name	OCF Device Type ("rt")
Air Conditioner	"onOffStatus"	"oic.r.switch.binary"	Air Conditioner	"oic.d.airconditioner"
	"targetTemperature"	"oic.r.temperature"		
	"windSpeed"	"oic.r.selectablelevels"		
	"operationMode"	"oic.r.mode"		
Water Heater	"onOffStatus"	oic.r.switch.binary	Water Heater	"oic.d.waterheater"
	"targetTemperature"	"oic.r.temperature"		
Air Purifier	"onOffStatus"	"oic.r.switch.binary"	Air Purifier	"oic.d.airpurifier"
	"mode"	"oic.r.operational.state"		
	"windSpeed"	"oic.r.selectablelevels"		

256 Table 4 shows the mapping between the properties of "oic.wk.d" Resource Type (see ISO/IEC
 257 30118-1:2018) and the properties of U+ device.

Table 4 – "oic.wk.d" Resource Type definition

To OCF Property title	OCF Property name	OCF Description	OCF Mandatory	From U+ Property value	U+ Description	U+ Mandatory
(Device) Name	"n"	Human friendly name defined by the vendor. In the presence of "n" Property of "/oic/con", both have the same Property Value. When "n" Property Value of "/oic/con" is modified, it shall be reflected to "n" Property Value of "/oic/d".	Yes	"deviceid"	An unique ID of the Device	Yes
Spec Version	"icv"	Spec version of the core specification to which this Device is implemented. The syntax is "ocf.<major>.<minor>.<sub-version>" where <major>, <minor>, and <sub-version> are the major, minor and sub-version numbers of the specification respectively. The string value shall be set to the version of the Core Specification on which the implementation is built (e.g. "ocf.2.0.6").	Yes	(none)	Translator returns its own value.	No

Device ID	"di"	Unique identifier for Device. This value shall be the same value (i.e. mirror) as the doxm.deviceuuid Property as defined in ISO/IEC 30118-2:2019.	Yes	(none)	As defined in ISO/IEC 30118-2:2019	No
Data Model Version	"dmv"	Spec version of the Resource Specification to which this Device data model is implemented; if implemented against a Vertical specific Device specification(s), then the Spec version of the vertical specification this Device model is implemented to.	Yes	"specVersion"	Data model version of the Device	Yes
Permanent Immutable ID	"piid"	A unique and immutable Device identifier. A Client can detect that a single Device supports multiple communication protocols if it discovers that the Device uses a single Permanent Immutable ID value for all the protocols it supports. Handling privacy-sensitivity for the "piid" Property, refer to ISO/IEC 30118-2:2019	Yes	(none)	Translator returns its own value.	No
Localized Descriptions	"ld"	Detailed description of the Device, in one or more languages. This property is an array of objects where each object has a "language" field (containing an IETF RFC 5646 language tag) and a "value" field containing the Device description in the indicated language.	No	(none)	(none)	No
Software Version	"sv"	Version of the Device software.	No	"swver"	Software version of the Device	Yes

Manufacturer Name	"dmn"	Name of manufacturer of the Device, in one or more languages. This property is an array of objects where each object has a "language" field (containing an IETF RFC 5646 language tag) and a "value" field containing the manufacturer name in the indicated language.	No	"manufacturerName"	The value of property "manufacturerName" indicates the name of manufacturer.	Yes
Model Number	"dmno"	Model number as designated by manufacturer.	No	"modelName"	The value of property "modelName" indicates the model number of the Device.	Yes

Table 5 shows the mapping between the properties of "oic.wk.p" Resource Type (see ISO/IEC 30118-1:2018) and the properties of U+ device.

Table 5 – "oic.wk.p" Resource Type definition

To OCF Property title	OCF Property name	OCF Description	OCF Mandatory	From U+ Property value	U+ Description	U+ Mandatory
Platform ID	"pi"	Unique identifier for the physical platform (UUID); this shall be a UUID in accordance with IETF RFC 4122. It is recommended that the UUID be created using the random generation scheme (version 4 UUID) specific in the RFC. Handling privacy-sensitivity for the "pi" Property, refer to ISO/IEC 30118-2:2019	Yes	(none)	Translator generates a UUID as "pi" value.	No
Manufacturer Name	"mnmn"	Name of manufacturer	Yes	"manufacturerName"	The value of property "manufacturerName" indicates the name of manufacturer.	Yes
Model Number	"mnmo"	Model number as designated by manufacturer	No	"modelName"	The value of property "modelName" indicates the model number of the Device.	Yes

Table 6 shows the mapping between the properties of "oic.wk.con" Resource Type (see ISO/IEC 30118-1:2018) and the properties of U+ device.

Table 6 – oic.wk.con Resource Type definition

To OCF Property title	OCF Property name	OCF Description	OCF Mandatory	From U+ Property value	U+ Description	U+ Mandatory
(Device) Name	"n"	Human friendly name configurable by the end user (e.g. Bob's thermostat). The "n" Common Property of the oic.wk.con Core Resource and the "n" Common Property of the "/oic/d" Core Resource shall have the same Value. When the "n" Common Property Value of the oic.wk.con Core Resource is modified, it shall be reflected to the "n" Common Property of "/oic/d" Core Resource.	Yes	"deviceId"	An unique ID of the device	Yes

265 6.2.3.3 On-the-fly Translation

266 If a U+ device is not in the well-defined set, the U+ Translator does not translate it.

267 6.2.3.4 Protocol translation between U+ and OCF

268 U+ framework is based on the CoAP protocol. There are three operations defined for handling the
 269 properties on U+ device. Table 7 shows the mapping between U+ operations and OCF CRUDN
 270 operations.

271 If a U+ translator receives CREATE or DELETE Request from OCF Client, it shall return an error
 272 response indicating "Method Not Allowed" due to no corresponding operation in U+ framework.

273 **Table 7 – Mapping of operations between U+ and OCF**

U+ operation	OCF CRUDN
Not applicable	CREATE
GET	RETRIEVE
PUT	UPDATE
Not applicable	DELETE
GET (Option: COAP_OPTION_OBSERVE)	NOTIFY

274 The U+ translator shall translate RETRIEVE Request from OCF Client into GET Request to U+
 275 server, and translate corresponding Response from U+ server into RETRIEVE Response back to
 276 OCF Client, as in Figure 3.

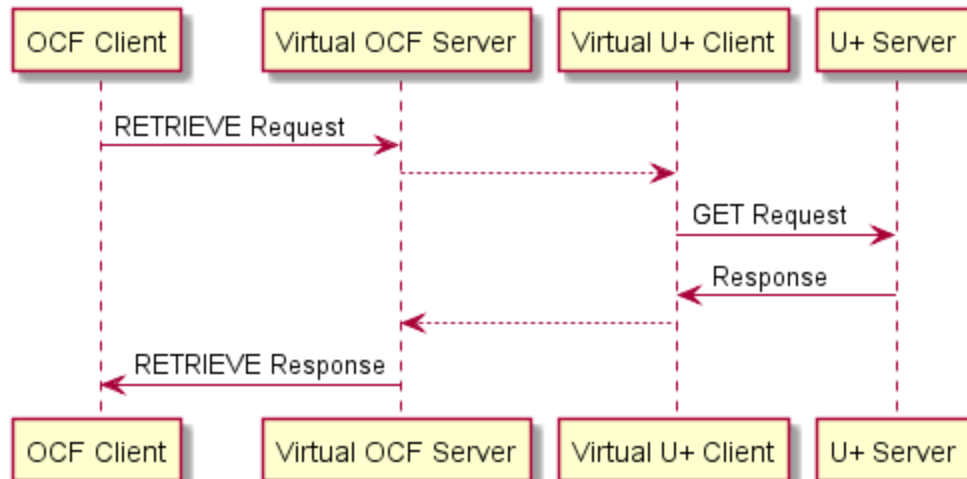


Figure 3 – Mapping of RETRIEVE operation

The U+ translator shall translate UPDATE Request from OCF Client into PUT Request to U+ server, and translate corresponding Response from U+ server into UPDATE Response back to OCF Client, as in Figure 4. The PUT Request shall update all properties needed in the payload, i.e. a full replacement.

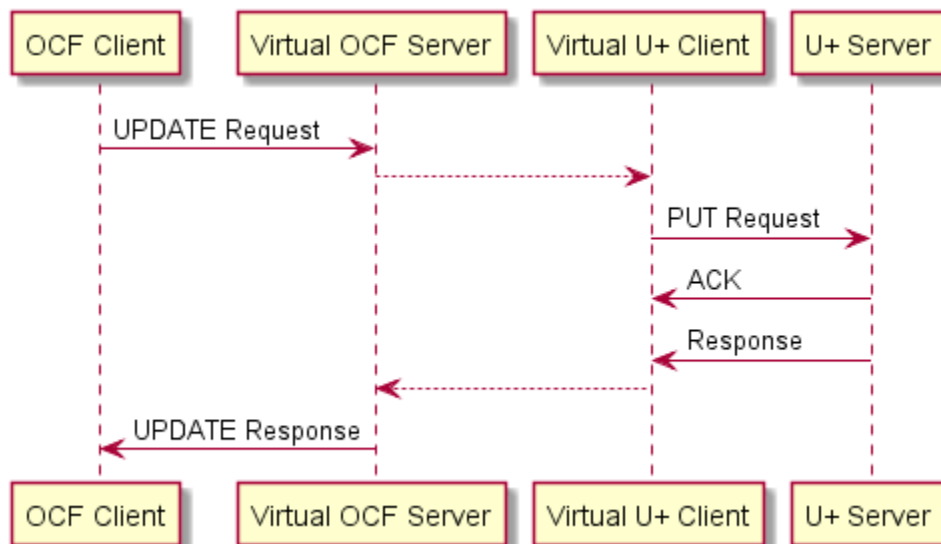


Figure 4 – Mapping of UPDATE operation

The U+ translator shall translate RETRIEVE Request (Observe), i.e. Notification, from OCF Client into GET Request (Option: COAP_OPTION_OBSERVE) to U+ server, and translate corresponding Response from U+ server into RETRIEVE Response (Observe) back to OCF Client, as in Figure 5.

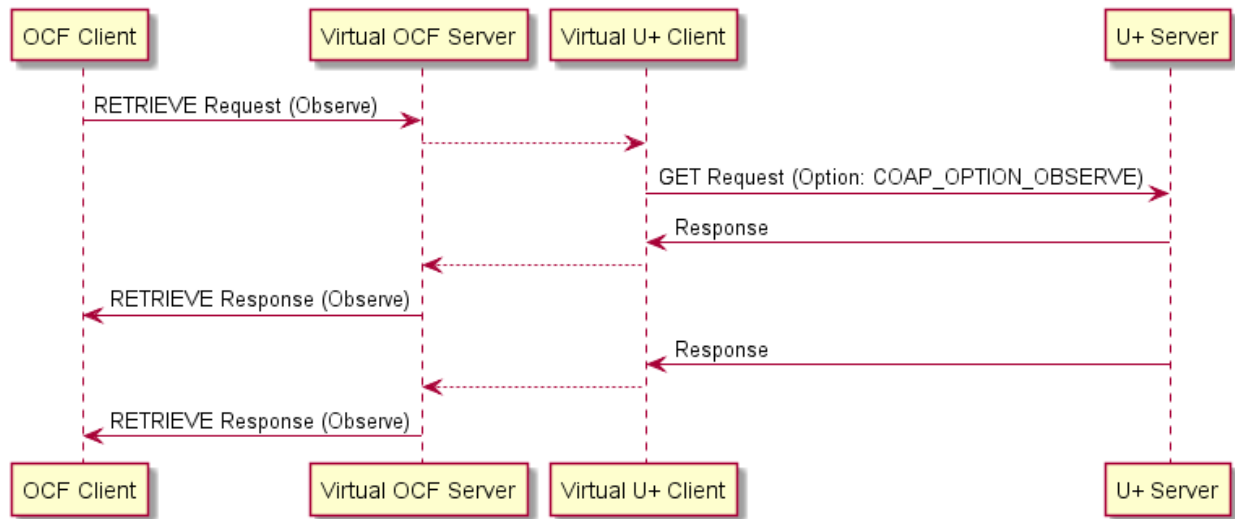


Figure 5 – Mapping of NOTIFICATION operation

6.2.3.5 Error Handling

If a U+ operation fails, the translator sends an appropriate OCF error response to the OCF Client.

7 Device Type Mapping

7.1 Introduction

This clause contains the mappings from U+ Device Types to OCF Device Types.

7.2 U+ Device Types to OCF Device Types

Table 8 captures the equivalency mapping between U+ Device Types and OCF Device Types.

Table 8 – U+ to OCF Device Type Mapping

U+ Device Type	OCF Device Type
Air Conditioner	"oic.d.airconditioner"
Air Purifier	"oic.d.airpurifier"
Water Heater	"oic.d.waterheater"

8 Resource to U+ Property Equivalence

8.1 Introduction

This clause lists the U+ Properties and provides the equivalent OCF Resource Type(s) to which the Properties map.

8.2 U+ Property to OCF Resources

Table 9 captures the equivalency mapping between U+ Properties and OCF Resource Types. U+ properties are device type-dependent. The properties with same name may be different within different device types.

Table 9 – U+ Property to OCF Resource Type Mapping

U+ Device Type	U+ Property	OCF Resource Type Name	OCF Resource Type ID	OCF Interface(s)
Air Conditioner	"onOffStatus"	Binary Switch	"oic.r.switch.binary"	"oic.if.a"
	"targetTemperature"	Temperature	"oic.r.temperature"	"oic.if.s", "oic.if.a"
	"windSpeed"	Selectable Levels	"oic.r.selectablelevels"	"oic.if.a"
	"operationMode"	Mode	"oic.r.mode"	"oic.if.a"
Air Purifier	"onOffStatus"	Binary Switch	"oic.r.switch.binary"	"oic.if.a"
	"windSpeed"	Selectable Levels	"oic.r.selectablelevels"	"oic.if.a"
	"operationMode"	Mode	"oic.r.mode"	"oic.if.a"
Water Heater	"onOffStatus"	Binary Switch	"oic.r.switch.binary"	"oic.if.a"
	"targetTemperature"	Temperature	oic.r.temperature	"oic.if.s", "oic.if.a"

9 Detailed Mapping APIs

9.1 Introduction

This clause provides a Device Type mapping description (using JSON that aligns with the Derived Modelling syntax described in Derived Models for Interoperability between IoT Ecosystems) for all U+ Properties and OCF Resources that are within scope.

9.2 Air Conditioner Mapping

9.2.1 Derived model

The derived model: "uplus.device.airconditioner".

9.2.2 Property definition

Table 10 provides the detailed per Property mapping for "uplus.device.airconditioner".

Table 10 – The Property mapping for "uplus.device.airconditioner".

UPlus Property name	OCF Resource	To OCF	From OCF
onOffStatus	oic.r.switch.binary.value	oic.r.switch.value = onOffStatus	onOffStatus=oic.r.switch.value
targetTemperature	oic.r.temperature.temperature	oic.r.temperature.temperature=targetTemperature	targetTemperature=oic.r.temperature.temperature
windSpeed	oic.r.selectablelevels	availablelevels=[1,2,3,4,5]targetlevel=windSpeed	windSpeed=targetlevel
operationMode	oic.r.mode	supportedModes=["Auto","Cool","Dry","Warm","Wind"]modes=supportedModes[operationMode]	operationMode=supportedModes.indexOf(modes)

Table 11 provides the details of the Properties that are part of "uplus.device.airconditioner".

Table 11 – The Properties of "uplus.device.airconditioner".

UPlus Property name	Type	Required	Description
onOffStatus	boolean	yes	the switch of air conditioner
targetTemperature	number	yes	target temperature
windSpeed	integer	yes	wind speed
operationMode	integer	yes	

9.2.3 Derived model definition

```

322 {
323   "id": "http://openinterconnect.org/uplusocfmapping/schemas/uplus.device.airconditioner.json#",
324   "$schema": "http://json-schema.org/draft-04/schema#",
325   "description": "Copyright (c) 2018 Open Connectivity Foundation, Inc. All rights reserved.",
326   "title": "AirConditioner Mapping",
327   "definitions": {
328     "uplus.device.airconditioner": {
329       "type": "object",
330       "properties": {
331         "onOffStatus": {
332           "type": "boolean",
333           "description": "the switch of air conditioner",
334           "x-ocf-conversion": {
335             "x-ocf-alias": "oic.r.switch.binary.value",
336             "x-to-ocf": [
337               "oic.r.switch.value = onOffStatus"
338             ],
339             "x-from-ocf": [
340               "onOffStatus=oic.r.switch.value"
341             ]
342           }
343         },
344         "targetTemperature": {
345           "type": "number",
346           "description": "target temperature",
347           "x-ocf-conversion": {
348             "x-ocf-alias": "oic.r.temperature.temperature",
349             "x-to-ocf": [
350               "oic.r.temperature.temperature=targetTemperature"
351             ],
352             "x-from-ocf": [
353               "targetTemperature=oic.r.temperature.temperature"
354             ]
355           }
356         },
357         "windSpeed": {
358           "type": "integer",
359           "description": "wind speed",
360           "x-ocf-conversion": {
361             "x-ocf-alias": "oic.r.selectablelevels",
362             "x-to-ocf": [
363               "availablelevels=[1,2,3,4,5]",
364               "targetlevel=windSpeed"
365             ],
366             "x-from-ocf": [
367               "windSpeed=targetlevel"
368             ]
369           }
370         },
371         "operationMode": {
372           "type": "integer",
373           "description": "",
374           "x-ocf-conversion": {
375             "x-ocf-alias": "oic.r.mode",
376             "x-to-ocf": [
377               "supportedModes= [\"Auto\", \"Cool\", \"Dry\", \"Warm\", \"Wind\"]",
378             ]
379           }
380         }
381       }
382     }
383   }

```

```

380         "modes=supportedModes[operationMode]"
381     ],
382     "x-from-ocf": [
383         "operationMode= supportedModes.indexOf(modes)"
384     ]
385 }
386 }
387 }
388 }
389 },
390 "type": "object",
391 "allOf": [
392     {"$ref": "#/definitions/uplus.device.airconditioner"}
393 ],
394 "required": ["onOffStatus", "targetTemperature", "windSpeed", "operationMode"]
395 }

```

9.3 Air Purifier Mapping

9.3.1 Derived model

The derived model: "uplus.device.airpurifier".

9.3.2 Property definition

Table 12 provides the detailed per Property mapping for "uplus.device.airpurifier".

Table 12 – The Property mapping for "uplus.device.airpurifier".

UPlus Property name	OCF Resource	To OCF	From OCF
onOffStatus	oic.r.switch.binary	oic.r.switch.value = onOffStatus	onOffStatus = oic.r.switch.value
windSpeed	oic.r.selectablelevels	availablelevels=[0,1,2,3,4]targetlevel=windSpeed	windSpeed=targetlevel
operationMode	oic.r.mode	supportedModes=["Auto","Quiet","Sleep"]modes=supportedModes[operationMode]	operationMode=supportedModes.indexOf(modes)

Table 13 provides the details of the Properties that are part of "uplus.device.airpurifier".

Table 13 – The Properties of "uplus.device.airpurifier".

UPlus Property name	Type	Required	Description
onOffStatus	boolean	yes	the switch of air purifier
windSpeed	integer	yes	wind speed
operationMode	integer	yes	

9.3.3 Derived model definition

```

405 {
406     "id": "http://openinterconnect.org/uplusocfmapping/schemas/uplus.device.airpurifier.json#",
407     "$schema": "http://json-schema.org/draft-04/schema#",
408     "description": "Copyright (c) 2018 Open Connectivity Foundation, Inc. All rights reserved.",
409     "title": "AirPurifier Mapping",
410     "definitions": {
411         "uplus.device.airpurifier": {
412             "type": "object",
413             "properties": {
414                 "onOffStatus": {
415                     "type": "boolean",
416                     "description": "the switch of air purifier",
417                     "x-ocf-conversion": {
418                         "x-ocf-alias": "oic.r.switch.binary.value",

```

```

419         "x-to-ocf": [
420             "oic.r.switch.value = onOffStatus"
421         ],
422         "x-from-ocf": [
423             "onOffStatus = oic.r.switch.value"
424         ]
425     },
426 },
427 "windSpeed": {
428     "type": "integer" ,
429
430     "description": "wind speed",
431     "x-ocf-conversion": {
432         "x-ocf-alias": "oic.r.selectablelevels",
433         "x-to-ocf": [
434             "availablelevels=[0,1,2,3,4]",
435             "targetlevel=windSpeed"
436         ],
437         "x-from-ocf": [
438             "windSpeed=targetlevel"
439         ]
440     }
441 },
442 "operationMode": {
443     "type": "integer" ,
444     "description": "",
445     "x-ocf-conversion": {
446         "x-ocf-alias": "oic.r.mode",
447         "x-to-ocf": [
448             "supportedModes= [\"Auto\\",\"Quiet\\",\"Sleep\\"]",
449             "modes=supportedModes[operationMode]"
450         ],
451         "x-from-ocf": [
452             "operationMode= supportedModes.indexOf(modes)"
453         ]
454     }
455 },
456 }
457 },
458 },
459 "type": "object",
460 "allOf": [
461     {"$ref": "#/definitions/uplus.device.airpurifier"}
462 ],
463 "required": ["onOffStatus", "windSpeed", "operationMode"]
464 }

```

9.4 Water Heater Mapping

9.4.1 Derived model

The derived model: "uplus.device.waterheater".

9.4.2 Property definition

Table 14 provides the detailed per Property mapping for "uplus.device.waterheater".

Table 14 – The Property mapping for "uplus.device.waterheater".

UPlus Property name	OCF Resource	To OCF	From OCF
onOffStatus	oic.r.switch.binary	oic.r.switch.binary.value = onOffStatus	onOffStatus = oic.r.switch.binary.value
targetTemperature	oic.r.temperature.temperature	oic.r.temperature.temperature=targetTemperature	targetTemperature=oic.r.temperature.temperature

Table 15 provides the details of the Properties that are part of "uplus.device.waterheater".

Table 15 – The Properties of "uplus.device.waterheater".

UPlus Property name	Type	Required	Description
onOffStatus	boolean	yes	the switch of water heater
targetTemperature	number	yes	target temperature

9.4.3 Derived model definition

```

473 {
474   "id": "http://openinterconnect.org/uplusocfmapping/schemas/uplus.device.waterheater.json#",
475   "$schema": "http://json-schema.org/draft-04/schema#",
476   "description": "Copyright (c) 2018 Open Connectivity Foundation, Inc. All rights reserved.",
477   "title": "WaterHeater Mapping",
478   "definitions": {
479     "uplus.device.waterheater": {
480       "type": "object",
481       "properties": {
482         "onOffStatus": {
483           "type": "boolean",
484           "description": "the switch of water heater",
485           "x-ocf-conversion": {
486             "x-ocf-alias": "oic.r.switch.binary.value",
487             "x-to-ocf": [
488               "oic.r.switch.binary.value = onOffStatus"
489             ],
490             "x-from-ocf": [
491               "onOffStatus = oic.r.switch.binary.value"
492             ]
493           }
494         },
495         "targetTemperature": {
496           "type": "number",
497           "description": "target temperature",
498           "x-ocf-conversion": {
499             "x-ocf-alias": "oic.r.temperature.temperature",
500             "x-to-ocf": [
501               "oic.r.temperature.temperature=targetTemperature"
502             ],
503             "x-from-ocf": [
504               "targetTemperature=oic.r.temperature.temperature"
505             ]
506           }
507         }
508       }
509     }
510   },
511   "type": "object",
512   "allOf": [
513     { "$ref": "#/definitions/uplus.device.warterheater" }
514   ],
515   "required": ["onOffStatus", "targetTemperature"]
516 }
517

```