OCF Resource to AllJoyn Interface Mapping Specification

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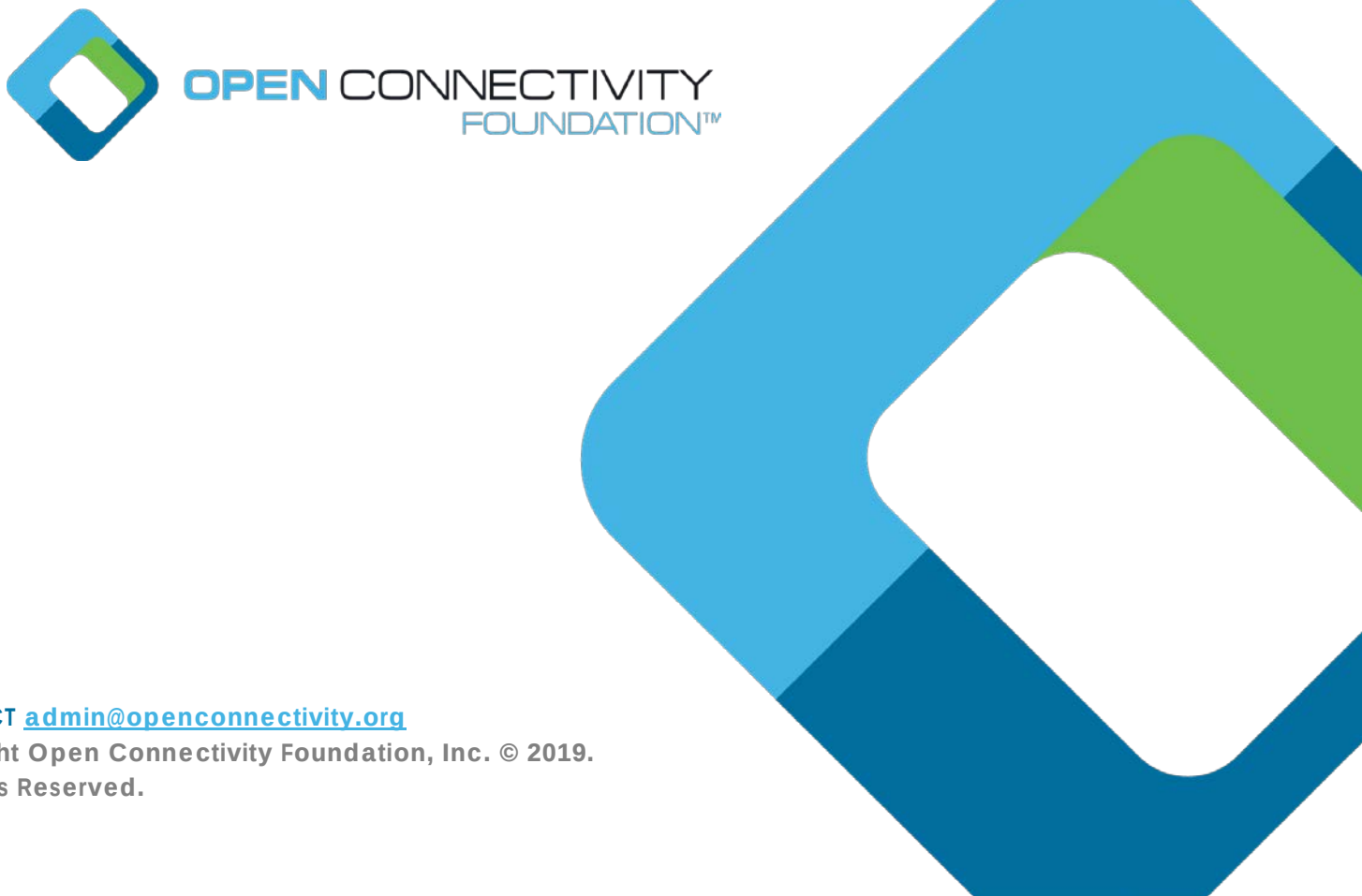

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1 Scope

This document provides detailed mapping information to provide equivalency between AllJoyn defined Interfaces and OCF defined Resources.

This document provides mapping for Device Types (AllJoyn to/from OCF), identifies equivalent OCF Resources for both mandatory and optional AllJoyn interfaces and for each interface defines the detailed Property by Property mapping using OCF defined extensions to JSON schema to programmatically define the mappings.

1 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 30118-4:2018 Information technology -- Open Connectivity Foundation (OCF) Specification -- Part 4: Resource type specification
https://www.iso.org/standard/74241.html
Latest version available at:
https://openconnectivity.org/specs/OCF_Resource_Type_Specification.pdf

ISO/IEC 30118-5:2019, Information technology – Open Connectivity Foundation (OCF) Specification – Part 5: Smart home device specification
https://www.iso.org/standard/74242.html
Latest version available at: https://openconnectivity.org/specs/OCF_Device_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

AllJoyn Common Data Model Interface Definitions
https://wiki.alljoyn.org/cdm

2 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

– IEC Electropedia: available at http://www.electropedia.org/

3 Document conventions and organization

3.1 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.

3.2 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 behaviour 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 behaviour 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*.

4 Theory of operation

4.1 Interworking approach

The interworking between AllJoyn defined interfaces and OCF defined Resource Types is modelled using the derived model syntax described in Derived Models for Interoperability between IoT Ecosystems. Determination of the minimum set of AllJoyn interfaces for which equivalency is required within the OCF data model was done by listing the set of interfaces required for each of

the device types defined by the CDM Project inside of AllJoyn. Where the AllJoyn interface supports methods then an actuation design pattern is applied.

4.2 Mapping syntax

4.2.1 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.

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

4.2.2 General

All statements are terminated with a carriage return.

4.2.3 Value assignment

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

4.2.4 Property naming

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

When the same name is used by both OCF and the derived ecosystem for semantically equivalent values then the name of the OCF defined Property is prepended by the ecosystem designator "ocf" to avoid ambiguity (e.g. "ocf.step").

4.2.5 Arrays

An array element is indicated by the use of square brackets "[]" with the index of the element contained therein, e.g. range[1]. All arrays start at an index of 0. If an entire array is being referenced then no index is included, e.g. selectablehumiditylevels[].

4.2.6 Default mapping

There are cases where the specified mapping is not possible as one or more of the Properties being mapped is optional in the source model. In all such instances a default mapping is provided. The default map is indicated by the prepending of an "otherwise:" modifier to the assignment. (e.g. "otherwise: step = 1").

4.2.7 Conditional mapping

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

if "condition", "mapping".

Is applied.

E.g. if step >0, ocf.step = step.

4.2.8 Loops

When a mapping can be represented by a repeated loop governed by some condition then the syntax:

for "initialize", "condition", "increment": "mapping"

Where:

"initialize" is an initial local loop control variable setting.

"condition" is the loop controller, the loop repeats until the condition evaluates to "false".

"increment" allows for update of the control variable, if omitted an increment of "1" is assumed.

Is applied.

E.g. for x=0, x < sizeof(supportedmodes): ocf.supportedmodes[x] = modearray[supportedmodes[x]]

4.2.9 Method invocation

The invocation of a method or remote procedure call (RPC) from the derived ecosystem as part of the mapping from an OCF Resource is indicated by the use if a double colon "::" delimiter between the applicable resource, service, interface or other construct identifier and the method or RPC name. The method name always includes trailing parentheses which would include any parameters should they be passed.

For example, when dealing with the switchon() method from AllJoyn this gives a complete method invocation as: operation.oncontrol::switchon().

5 Device type mapping

5.1 AllJoyn device types to OCF device types

Table 1 captures the equivalency mapping between AllJoyn defined Device Types (see AllJoyn Common Data Model Interface Definitions) and OCF defined Device Types (see Table 10-1 in ISO/IEC 30118-5:2019). The minimum interface set for the AllJoyn definitions is provided in the HAE Theory of Operation; the minimum Resource sets for each OCF Device is provided in ISO/IEC 30118-5:2019.

Table 1 – AllJoyn to OCF device type mapping

Classification	AllJoyn Device Type	AllJoyn ID	OCF Device Type
Air Care	Air Conditioner	5	oic.d.airconditioner
	Air Purifier	9	oic.d.airpurifier
	Air Quality Monitor	11	oic.d.airqualitymonitor
	Dehumidifier	8	oic.d.dehumidifier
	Humidifier	7	oic.d.humidifier
	Electric Fan	10	oic.d.fan
	Thermostat	6	oic.d.thermostat
Fabric Care	Clothes Washer	12	oic.d.washer
	Clothes Dryer	13	oic.d.dryer
	Clothes Washer-Dryer	14	oic.d.washerdryer
Food Preservation	Refrigerator	2	oic.d.refrigerator
	Ice-Maker	4	oic.r.icemaker (maps to Resource)
	Freezer	3	oic.d.freezer
Food Preparation	Oven	17	oic.d.oven

	Cooktop	18	oic.d.cooktop
	Cookerhood	19	oic.d.cookerhood
	Food probe	20	oic.d.foodprobe
Dish Care	Dishwasher	15	oic.d.dishwasher
Floor Care	Robot Cleaner	16	oic.d.robotcleaner
Entertainment	Television	21	oic.d.tv
	Set Top Box (STB)	22	oic.d.stb

5.2 OCF device types with no AllJoyn equivalent

Table 2 captures the Device Types defined by OCF have no direct equivalent in AllJoyn, they shall all be mapped to an AllJoyn Device Type of "Other" (Id of "1").

Table 2 – OCF device types with no AllJoyn equivalent

OCF Device Name	OCF Device Type
Receiver	oic.d.receiver
Blind	oic.d.blind
Door	oic.d.door
Garage Door	oic.d.garagedoor
Generic Sensor	oic.d.sensor
Light	oic.d.light
Smart Plug	oic.d.smartplug
Switch	oic.d.switch
Water Valve	oic.d.watervalve
Printer	oic.d.printer
Multi-Function Printer	oic.d.multifunctionprinter
Scanner	oic.r.scanner
Camera	oic.d.camera
Security Panel	oic.d.securitypanel
Smart Lock	oic.d.smartlock

6 Resource to interface equivalence

6.1 Introduction

Clause 7 captures the equivalency mapping between AllJoyn defined Interfaces (see AllJoyn Common Data Model Interface Definitions) and OCF defined Resource Types (see ISO/IEC 30118-4:2018). Detailed Property by Property mappings are provided in clause 8.

Table 3 captures the mappings for Interfaces that are part of the minimum set for an AllJoyn Device.

Table 4 captures the mappings for Interfaces that are optional for an AllJoyn Device; deep translation for these interfaces via derived modelling is not within the scope of this release of the document.

325 **Table 3 – AllJoyn interface to OCF resource type mapping – minimum interface set**

AllJoyn Interface	OCF Resource Type Name	OCF Resource Type ID	OCF Interface(s)
Environment.CurrentAirQuality	Air Quality Collection	oic.r.airqualitycollection	oic.if.s
Environment.CurrentAirQualityLevel	Air Quality Collection	oic.r.airqualitycollection	oic.if.s
Environment.CurrentHumidity	Humidity	oic.r.humidity	oic.if.s
Environment.CurrentTemperature	Temperature	oic.r.temperature	oic.if.s
Environment.TargetHumidity	Humidity	oic.r.humidity, oic.r.selectablelevels	oic.if.a
Environment.TargetTemperature	Temperature	oic.r.temperature	oic.if.a
Operation.AudioVolume	Audio Controls	oic.r.audio	oic.if.a
Operation.Channel	Not mapped		
Operation.ClimateControlMode	Mode	oic.r.mode	oic.if.a
	Operational State	oic.r.operational.state	oic.if.s
Operation.ClosedStatus	Door	oic.r.door	oic.if.s
Operation.CycleControl	Operational State	oic.r.operational.state	oic.if.s
Operation.FanSpeedLevel	Air Flow	oic.r.airflow	oic.if.a
Operation.HeatingZone	Heating Zone Collection	oic.r.heatingzonecollection	oic.if.s
Operation.HvacFanMode	Mode	oic.r.mode	oic.if.a
Operation.OnOffStatus	Binary Switch	oic.r.switch.binary	oic.if.s
Operation.OvenCyclePhase	Operational State	oic.r.operationalstate	oic.if.s

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327 **Table 4 – AllJoyn interface to OCF resource type mapping – optional interface set**

AllJoyn Interface	OCF Resource Type Name	OCF Resource Type ID	OCF Interface(s)
Environment.TargetTemperatureLevel	Mode	oic.r.mode	oic.if.a
Environment.WaterLevel	TBD	TBD	oic.if.s
Environment.WindDirection	Air Flow	oic.r.airflow	oic.if.a
Operation.AirRecirculationMode	Mode	oic.r.mode	oic.if.a
Operation.Alerts	TBD	TBD	TBD
Operation.AudioVideoInput	Media Source List	oic.r.media.input	oic.if.a
Operation.BatteryStatus	Battery	oic.r.energy.battery	oic.if.s
Operation.CurrentPower	Energy Usage	oic.r.energy.usage	oic.if.s
Operation.DishWashingCyclePhase	Operational State	oic.r.operationalstate	oic.if.s
Operation.EnergyUsage	Energy Usage	oic.r.energy.usage	oic.if.s
Operation.FilterStatus	TBD	TBD	TBD
Operation.LaundryCyclePhase	Mode	oic.r.mode	oic.if.s
Operation.MoistureOutputLevel	Mode	oic.r.mode	oic.if.a
Operation.PlugInUnits	TBD	TBD	TBD

Operation.RapidMode	Refrigeration	oic.r.refrigeration	oic.if.a
Operation.RemoteControllability	TBD	TBD	TBD
Operation.RepeatMode	Ecomode	oic.r.ecomode	oic.if.a
Operation.ResourceSaving	TBD	TBD	TBD
Operation.RobotCleaningCyclePhase	Mode	oic.r.mode	oic.if.s
Operation.SoilLevel	Mode	oic.r.mode	oic.if.a
Operation.SpinSpeedLevel	Mode	oic.r.mode	oic.if.a
Operation.Timer	Time Period	oic.r.time.period	oic.if.s

6.2 Environment.CurrentAirQuality mapping

If more than one instance of the AirQuality interface is exposed, then each instance maps to an instance of the OCF AirQuality Resource. The mapping defined in clause 8.2 describes the population of the OCF AirQuality Resource. Even if there is only a single instance of an OCF AirQuality Resource this shall be included in an instance of an OCF AirQualityCollection. The number of links in the collection equates to the number of instances of the AllJoyn CurrentAirQuality interface that are exposed. When mapping from OCF the valueType of the Resource shall be introspected, this API is invoked only if this is set to "Measured".

6.3 Environment.CurrentAirQualityLevel mapping

If more than one instance of the AirQualityLevel interface is exposed, then each instance maps to an instance of the OCF AirQuality Resource. The mapping defined in clause 8.2 describes the population of the OCF AirQuality Resource. Even if there is only a single instance of an OCF AirQuality Resource then this shall be included in an instance of an OCF AirQualityCollection. The number of links in the collection equates to the number of instances of the AllJoyn CurrentAirQuality interface that are exposed. When mapping from OCF the valueType of the Resource shall be introspected, this API is invoked only if this is set to "Qualitative".

6.4 Operation.ClimateControlMode mapping

ClimateControlMode has three Properties; these map as follows: mode and supportedmodes maps to the Mode Resource, operationalstate maps to the OperationalState Resource This can be represented in OCF either as two distinct Resource instances or a single instance with two Resource Types (oic.r.mode, oic.r.operationalstate).

6.5 Operation.FanSpeedLevel mapping

The setting of the FanSpeedLevel to "0x00" (off) is handled via the "OffControl" interface rather than writing directly to this interface. In such a case an instance of Binary Switch shall be exposed on the OCF side; this can be modelled as AirFlowControl which is then a collection of Binary Switch and AirFlow.

6.6 Operation.HeatingZone mapping

Each element in the array of heating zones within the AllJoyn HeatingZone interface maps to an instance of OCF HeatingZone, itself a link in an instance of an OCF HeatingZoneCollection. The mapping defined clause 8.13 describes the population of the OCF HeatingZone Resource that constitutes the Resources that are contained in the collection.

6.7 Operation.OnOffStatus, Operation.OnControl, and Operation.OffControl mapping

A discovered instance of a Binary Switch is always mapped to an Operation.OnOffStatus interface. A RETRIEVE on a Binary Switch maps to an action on an instance of an Operation.OnOffStatus Interface. An UPDATE on a Binary Switch maps to a method invocation on either Operation.OnControl or OffControl. value = true maps to Operation.OnControl value = false maps to Operation.OffControl.

6.8 Operation.OvenCyclePhase

OvenCyclePhase cyclephase Property pre-defines values 0x00-0x7F, 0x80-0xFF is for vendor specific values. The mapping defined in clause 8 covers only specification defined values. Any vendor defined value shall be represented in OCF using the x.<organization> syntax for a vendor defined Property.

7 Detailed mapping APIs

7.1 Introduction

This clause provides a mapping description (using JSON that aligns with the Derived Modelling syntax described in Derived Models for Interoperability between IoT Ecosystems for all Interfaces and Resources that are within scope.

The derived model definitions presented in clause 8 are formatted for readability, and so may appear to have extra line breaks.

Table 5 provides a reference and link to the per Interface clauses.

Table 5 – Interface to resource summary

AllJoyn Interface Name	Equivalent Resource(s)	Clause
Environment.CurrentAirQuality	oic.r.airqualitycollection	8.2
Environment.CurrentAirQualityLevel	oic.r.airqualitycollection	8.3
Environment.CurrentHumidity	oic.r.humidity	8.4
Environment.CurrentTemperature	oic.r.temperature	8.5
Environment.TargetHumidity	oic.r.humidity, oic.r.selectablelevels	8.6
Environment.TargetTemperature	oic.r.temperature	8.7
Operation.AudioVolume	oic.r.audio	8.8
Operation.ClimateControlMode	oic.r.mode, oic.r.operationalstate	8.9
Operation.ClosedStatus	oic.r.door	8.10
Operation.CycleControl	oic.r.operational.state	8.11
Operation.FanSpeedLevel	oic.r.airflow	8.12
Operation.HeatingZone	oic.r.heatingzonecollection	8.13
Operation.HvacFanMode	oic.r.mode	8.14
Operation.OnControl, Operation.OffControl	oic.r.switch.binary	8.15
Operation.OnOffStatus,	oic.r.switch.binary	8.16
Operation.OvenCyclePhase	oic.r.operationalstate	8.17

7.2 Current Air Quality

7.2.1 Derived model

The derived model: "asa.environment.currentairquality".

7.2.2 Property definition

Table 6 provides the detailed per Property mapping for "asa.environment.currentairquality".

Table 6 – The property mapping for "asa.environment.currentairquality".

AllJoyn Property name	OCF Resource	To OCF	From OCF
minvalue	oic.r.airquality	range[0] = minvalue	minvalue = range[0]
maxvalue	oic.r.airquality	range[1] = maxvalue	maxvalue = range[1]
contaminanttype	oic.r.airquality	valuetype = Measuredcontaminanttypearray = [CH2O,CO2,CO,PM2_5,PM10,VOC] ocf.contaminanttype = contaminanttypearray[contaminanttype]	contaminanttype = indexof contaminanttypearray[ocf.contaminanttype]
currentvalue	oic.r.airquality	contaminantvalue = currentvalue	currentvalue = contaminantvalue
updatemintime	oic.r.value.conditional	ocf.minnotifyperiod = updatemintime	updatemintime = ocf.minnotifyperiod
precision	oic.r.airquality	ocf.precision = precision	precision = ocf.precision

Table 7 provides the details of the Properties that are part of "asa.environment.currentairquality".

Table 7 – The properties of "asa.environment.currentairquality".

AllJoyn Property name	Type	Required	Description
minvalue	number	yes	
maxvalue	number	yes	
contaminanttype	integer	yes	The contaminant type
currentvalue	number	yes	
updatemintime	integer	yes	
precision	number	yes	

7.2.3 Derived model definition

```
{
  "id": "http://openinterconnect.org/asamapping/schemas/asa.environment.currentairquality.json#",
  "$schema": "http://json-schema.org/draft-04/schema#",
  "description" : "Copyright (c) 2017 Open Connectivity Foundation, Inc. All rights reserved.",
  "title": "Current Air Quality",
  "definitions": {
    "asa.environment.currentairquality": {
      "type": "object",
      "properties": {
        "contaminanttype": {
          "type": "integer",
          "description": "The contaminant type",
          "x-ocf-conversion": {
            "x-ocf-alias": "oic.r.airquality",
            "x-to-ocf": [
              "valuetype = Measured",
              "contaminanttypearray = [CH2O,CO2,CO,PM2_5,PM10,VOC]",
              "ocf.contaminanttype = contaminanttypearray[contaminanttype]"
            ],
            "x-from-ocf": [
              "contaminanttype = indexof contaminanttypearray[ocf.contaminanttype]"
            ]
          }
        },
        "currentvalue": {
          "type": "number",
```

```
            "x-ocf-conversion": {
              "x-ocf-alias": "oic.r.airquality",
              "x-to-ocf": [
                "contaminantvalue = currentvalue"
              ],
              "x-from-ocf": [
                "currentvalue = contaminantvalue"
              ]
            }
          },
          "minvalue": {
            "type": "number",
            "x-ocf-conversion": {
              "x-ocf-alias": "oic.r.airquality",
              "x-to-ocf": [
                "range[0] = minvalue"
              ],
              "x-from-ocf": [
                "minvalue = range[0]"
              ]
            }
          },
          "maxvalue": {
            "type": "number",
            "x-ocf-conversion": {
              "x-ocf-alias": "oic.r.airquality",
              "x-to-ocf": [
                "range[1] = maxvalue"
              ],
              "x-from-ocf": [
                "maxvalue = range[1]"
              ]
            }
          },
          "precision": {
            "type": "number",
            "x-ocf-conversion": {
              "x-ocf-alias": "oic.r.airquality",
              "x-to-ocf": [
                "ocf.precision = precision"
              ],
              "x-from-ocf": [
                "precision = ocf.precision"
              ]
            }
          },
          "updatemintime": {
            "type": "integer",
            "x-ocf-conversion": {
              "x-ocf-alias": "oic.r.value.conditional",
              "x-to-ocf": [
                "ocf.minnotifyperiod = updatemintime"
              ],
              "x-from-ocf": [
                "updatemintime = ocf.minnotifyperiod"
              ]
            }
          }
        }
      }
    },
    "type": "object",
    "allOf": [
      {"$ref": "#/definitions/asa.environment.currentairquality"}
    ],
    "required": ["contaminanttype","currentvalue","minvalue","maxvalue","precision","updatemintime"]
  }
```


7.3 Current Air Quality Level

7.3.1 Derived model

The derived model: "asa.environment.currentairqualitylevel".

7.3.2 Property definition

Table 8 provides the detailed per Property mapping for "asa.environment.currentairqualitylevel".

Table 8 – The property mapping for "asa.environment.currentairqualitylevel".

AllJoyn Property name	OCF Resource	To OCF	From OCF
contaminanttype	oic.r.airquality	valuetype = Qualitativeif contaminanttype = 0, ocf.contaminanttype = CH2Oif contaminanttype = 1, ocf.contaminanttype = CO2if contaminanttype = 2, ocf.contaminanttype = COif contaminanttype = 3, ocf.contaminanttype = PM2_5if contaminanttype = 4, ocf.contaminanttype = PM10if contaminanttype = 5, ocf.contaminanttype = VOCif contaminanttype = 253, ocf.contaminanttype = Smokeif contaminanttype = 254, ocf.contaminanttype = Odorif contaminanttype = 255, ocf.contaminanttype = AirPollution	if ocf.contaminanttype = CH2O, contaminanttype = 0if ocf.contaminanttype = CO2, contaminanttype = 1if ocf.contaminanttype = CO, contaminanttype = 2if ocf.contaminanttype = PM2_5, contaminanttype = 3if ocf.contaminanttype = PM10, contaminanttype = 4if ocf.contaminanttype = VOC, contaminanttype = 5if ocf.contaminanttype = Smoke, contaminanttype = 253if ocf.contaminanttype = Odor, contaminanttype = 254if ocf.contaminanttype = AirPollution, contaminanttype = 255
maxlevel	oic.r.airquality	range[0] = 0range[1] = maxvalue	maxvalue = range[1]
currentlevel	oic.r.airquality	contaminantvalue = currentlevel	currentlevel = contaminantvalue

Table 9 provides the details of the Properties that are part of "asa.environment.currentairqualitylevel".

Table 9 – The properties of "asa.environment.currentairqualitylevel".

AllJoyn Property name	Type	Required	Description
contaminanttype	integer	yes	The contaminant type

maxlevel	integer	yes	
currentlevel	integer	yes	

7.3.3 Derived model definition

```
{
  "id":
"http://openinterconnect.org/asamapping/schemas/asa.environment.currentairqualitylevel.json#",
  "$schema": "http://json-schema.org/draft-04/schema#",
  "description" : "Copyright (c) 2017 Open Connectivity Foundation, Inc. All rights reserved.",
  "title": "Current Air Quality Level",
  "definitions": {
    "asa.environment.currentairqualitylevel": {
      "type": "object",
      "properties": {
        "contaminanttype": {
          "type": "integer",
          "description": "The contaminant type",
          "x-ocf-conversion": {
            "x-ocf-alias": "oic.r.airquality",
            "x-to-ocf": [
              "valuetype = Qualitative",
              "if contaminanttype = 0, ocf.contaminanttype = CH2O",
              "if contaminanttype = 1, ocf.contaminanttype = CO2",
              "if contaminanttype = 2, ocf.contaminanttype = CO",
              "if contaminanttype = 3, ocf.contaminanttype = PM2_5",
              "if contaminanttype = 4, ocf.contaminanttype = PM10",
              "if contaminanttype = 5, ocf.contaminanttype = VOC",
              "if contaminanttype = 253, ocf.contaminanttype = Smoke",
              "if contaminanttype = 254, ocf.contaminanttype = Odor",
              "if contaminanttype = 255, ocf.contaminanttype = AirPollution"
            ],
            "x-from-ocf": [
              "if ocf.contaminanttype = CH2O, contaminanttype = 0",
              "if ocf.contaminanttype = CO2, contaminanttype = 1",
              "if ocf.contaminanttype = CO, contaminanttype = 2",
              "if ocf.contaminanttype = PM2_5, contaminanttype = 3",
              "if ocf.contaminanttype = PM10, contaminanttype = 4",
              "if ocf.contaminanttype = VOC, contaminanttype = 5",
              "if ocf.contaminanttype = Smoke, contaminanttype = 253",
              "if ocf.contaminanttype = Odor, contaminanttype = 254",
              "if ocf.contaminanttype = AirPollution, contaminanttype = 255"
            ]
          }
        },
        "currentlevel": {
          "type": "integer",
          "x-ocf-conversion": {
            "x-ocf-alias": "oic.r.airquality",
            "x-to-ocf": [
              "contaminantvalue = currentlevel"
            ],
            "x-from-ocf": [
              "currentlevel = contaminantvalue"
            ]
          }
        },
        "maxlevel": {
          "type": "integer",
          "x-ocf-conversion": {
            "x-ocf-alias": "oic.r.airquality",
            "x-to-ocf": [
              "range[0] = 0",
              "range[1] = maxvalue"
            ],
            "x-from-ocf": [
              "maxvalue = range[1]"
            ]
          }
        }
      }
```



```
    }
  },
  "type": "object",
  "allOf": [
    {"$ref": "#/definitions/asa.environment.currentairqualitylevel"}
  ],
  "required": ["contaminanttype","currentlevel","maxlevel"]
}
```

7.4 Current Humidity

7.4.1 Derived model

The derived model: "asa.environment.currenthumidity".

7.4.2 Property definition

Table 10 provides the detailed per Property mapping for "asa.environment.currenthumidity".

Table 10 – The property mapping for "asa.environment.currenthumidity".

AllJoyn Property name	OCF Resource	To OCF	From OCF
maxvalue	oic.r.humidity	range[0] = 0range[1] = maxvalue	maxvalue = range[1]
currentvalue	oic.r.humidity	humidity = currentValue	currentvalue = humidity

Table 11 provides the details of the Properties that are part of "asa.environment.currenthumidity".

Table 11 – The properties of "asa.environment.currenthumidity".

AllJoyn Property name	Type	Required	Description
maxvalue	number	yes	Max measured value for humidty
currentvalue	number	yes	Measured value

7.4.3 Derived model definition

```
{
  "id": "http://openinterconnect.org/asamapping/schemas/asa.environment.currenthumidity.json#",
  "$schema": "http://json-schema.org/draft-04/schema#",
  "description" : "Copyright (c) 2017 Open Connectivity Foundation, Inc. All rights reserved.",
  "title": "Current Humidity",
  "definitions": {
    "asa.environment.currenthumidity": {
      "type": "object",
      "properties": {
        "currentvalue": {
          "type": "number",
          "description": "Measured value",
          "x-ocf-conversion": {
            "x-ocf-alias": "oic.r.humidity",
            "x-to-ocf": [
              "humidity = currentValue"
            ],
            "x-from-ocf": [
              "currentvalue = humidity"
            ]
          }
        },
        "maxvalue": {
          "type": "number",
          "description": "Max measured value for humidty",
          "x-ocf-conversion": {
            "x-ocf-alias": "oic.r.humidity",
```

```
              "x-to-ocf": [
                "range[0] = 0",
                "range[1] = maxvalue"
              ],
              "x-from-ocf": [
                "maxvalue = range[1]"
              ]
            }
          }
        }
      }
    },
    "type": "object",
    "allOf": [
      {"$ref": "#/definitions/asa.environment.currenthumidity"}
    ],
    "required": [ "currentvalue","maxvalue"]
}
```

7.5 Current Temperature

7.5.1 Derived model

The derived model: "asa.environment.currenttemperature".

7.5.2 Property definition

Table 12 provides the detailed per Property mapping for "asa.environment.currenttemperature".

Table 12 – The property mapping for "asa.environment.currenttemperature".

AllJoyn Property name	OCF Resource	To OCF	From OCF
precision	oic.r.temperature	ocf.precision = precision	precision = ocf.precision
currentvalue	oic.r.temperature	temperature = currentValueunits = C	oneOf
updatemintime	oic.r.value.conditional	ocf.minnotifyperiod = updatemintime	updatemintime = ocf.minnotifyperiod

Table 13 provides the details of the Properties that are part of "asa.environment.currenttemperature".

Table 13 – The properties of "asa.environment.currenttemperature".

AllJoyn Property name	Type	Required	Description
precision	number	yes	
currentvalue	number	yes	Measured value
updatemintime	integer	yes	

7.5.3 Derived model definition

```
{
  "id": "http://openinterconnect.org/asamapping/schemas/asa.environment.currenttemperature.json#",
  "$schema": "http://json-schema.org/draft-04/schema#",
  "description" : "Copyright (c) 2017 Open Connectivity Foundation, Inc. All rights reserved.",
  "title": "Current Temperature",
  "definitions": {
    "asa.environment.currenttemperature": {
      "type": "object",
      "properties": {
        "currentvalue": {
          "type": "number",
          "description": "Measured value",
          "x-ocf-conversion": {
```



```
              "x-ocf-alias": "oic.r.temperature",
              "x-to-ocf": [
                "temperature = currentValue",
                "units = C"
              ],
              "x-from-ocf": {
                "oneOf": [
                  {
                    "properties": {
                      "units": "string",
                      "enum": ["C"]
                    },
                    "x-from-ocf": [
                      "currentvalue = temperature"
                    ]
                  },
                  {
                    "properties": {
                      "units": "string",
                      "enum": ["F"]
                    },
                    "x-from-ocf": [
                      "currentvalue = (temperature-32)*5/9"
                    ]
                  },
                  {
                    "properties": {
                      "units": "string",
                      "enum": ["K"]
                    },
                    "x-from-ocf": [
                      "currentvalue = temperature-273.15"
                    ]
                  }
                ]
              }
            }
          },
          "precision": {
            "type": "number",
            "x-ocf-conversion": {
              "x-ocf-alias": "oic.r.temperature",
              "x-to-ocf": [
                "ocf.precision = precision"
              ],
              "x-from-ocf": [
                "precision = ocf.precision"
              ]
            }
          },
          "updatemintime": {
            "type": "integer",
            "x-ocf-conversion": {
              "x-ocf-alias": "oic.r.value.conditional",
              "x-to-ocf": [
                "ocf.minnotifyperiod = updatemintime"
              ],
              "x-from-ocf": [
                "updatemintime = ocf.minnotifyperiod"
              ]
            }
          }
        }
      }
    },
    "type": "object",
    "allOf": [
      {"$ref": "#/definitions/asa.environment.currenttemperature"}
    ],
    "required": [ "currentvalue","precision","updatemintime" ]
```


}

7.6 Target Humidity

7.6.1 Derived model

The derived model: "asa.environment.targethumidity".

7.6.2 Property definition

Table 14 provides the detailed per Property mapping for "asa.environment.targethumidity".

Table 14 – The property mapping for "asa.environment.targethumidity".

AllJoyn Property name	OCF Resource	To OCF	From OCF
minvalue	oic.r.humidity	range[0] = minvalue	minvalue = range[0]otherwise: minvalue = 0
targetvalue	oic.r.humidity,oic.r.selectablelevels	if minvalue != maxvalue, ocf.desiredhumidity = targetvalue;ocf.targetlevel = selectablehumiditylevels[0].if minvalue == maxvalue, ocf.targetlevel = targetvalue.	if x-ocf-alias == oic.r.humidity, targetvalue = desiredhumidity.if x-ocf-alias == oic.r.selectablelevels, targetvalue = targetlevel.
maxvalue	oic.r.humidity	range[1] = maxvalue	maxvalue = range[1]otherwise: maxvalue = 100
stepvalue	oic.r.humidity	step = stepvalue	stepvalue = stepotherwise: stepvalue = 1
selectablehumiditylevels	oic.r.selectablelevels	availablelevels[] = selectablehumiditylevels[]	selectablehumiditylevels[] = availablelevels[]

Table 15 provides the details of the Properties that are part of "asa.environment.targethumidity".

Table 15 – The properties of "asa.environment.targethumidity".

AllJoyn Property name	Type	Required	Description
minvalue	number	yes	
targetvalue	number	yes	Measured value
maxvalue	number	yes	
stepvalue	number	yes	
selectablehumiditylevels	array	yes	

7.6.3 Derived model definition

```
{
  "id": "http://openinterconnect.org/asamapping/schemas/asa.environment.targethumidity.json#",
  "$schema": "http://json-schema.org/draft-04/schema#",
  "description" : "Copyright (c) 2017 Open Connectivity Foundation, Inc. All rights reserved.",
  "title": "Target Humidity",
  "definitions": {
    "asa.environment.targethumidity": {
      "type": "object",
      "properties": {
        "targetvalue": {
```

```
            "type": "number",
            "description": "Measured value",
            "x-ocf-conversion": {
              "x-ocf-alias": "oic.r.humidity,oic.r.selectablelevels",
              "x-to-ocf": [
                "if minvalue != maxvalue, ocf.desiredhumidity = targetvalue;ocf.targetlevel =
selectablehumiditylevels[0].",
                "if minvalue == maxvalue, ocf.targetlevel = targetvalue."
              ],
              "x-from-ocf": [
                "if x-ocf-alias == oic.r.humidity, targetvalue = desiredhumidity.",
                "if x-ocf-alias == oic.r.selectablelevels, targetvalue = targetlevel."
              ]
            }
          },
          "minvalue": {
            "type": "number",
            "x-ocf-conversion": {
              "x-ocf-alias": "oic.r.humidity",
              "x-to-ocf": [
                "range[0] = minvalue"
              ],
              "x-from-ocf": [
                "minvalue = range[0]",
                "otherwise: minvalue = 0"
              ]
            }
          },
          "maxvalue": {
            "type": "number",
            "x-ocf-conversion": {
              "x-ocf-alias": "oic.r.humidity",
              "x-to-ocf": [
                "range[1] = maxvalue"
              ],
              "x-from-ocf": [
                "maxvalue = range[1]",
                "otherwise: maxvalue = 100"
              ]
            }
          },
          "stepvalue": {
            "type": "number",
            "x-ocf-conversion": {
              "x-ocf-alias": "oic.r.humidity",
              "x-to-ocf": [
                "step = stepvalue"
              ],
              "x-from-ocf": [
                "stepvalue = step",
                "otherwise: stepvalue = 1"
              ]
            }
          },
          "selectablehumiditylevels": {
            "type": "array",
            "items": {
              "type": "number"
            },
            "x-ocf-conversion": {
              "x-ocf-alias": "oic.r.selectablelevels",
              "x-to-ocf": [
                "availablelevels[] = selectablehumiditylevels[]"
              ],
              "x-from-ocf": [
                "selectablehumiditylevels[] = availablelevels[]"
              ]
            }
          }
        }
      }
```



```
  },
  "type": "object",
  "allOf": [
    {"$ref": "#/definitions/asa.environment.targethumidity"}
  ],
  "required": [ "targetvalue","minvalue","maxvalue","stepvalue","selectablehumiditylevels" ]
}
```

7.7 Target Temperature

7.7.1 Derived model

The derived model: "asa.environment.targettemperature".

7.7.2 Property definition

Table 16 provides the detailed per Property mapping for "asa.environment.targettemperature".

Table 16 – The property mapping for "asa.environment.targettemperature".

AllJoyn Property name	OCF Resource	To OCF	From OCF
minvalue	oic.r.temperature	range[0] = minvalue	minvalue = range[0]otherwise: minvalue = -MAXINT
targetvalue	oic.r.temperature	temperature = targetvalueunits = C	oneOf
maxvalue	oic.r.temperature	range[1] = maxvalue	maxvalue = range[1]otherwise: maxvalue = MAXINT
step	oic.r.temperature	ocf.step = step	step = ocf.stepotherwise: step = undefined (0x00)

Table 17 provides the details of the Properties that are part of "asa.environment.targettemperature".

Table 17 – The properties of "asa.environment.targettemperature".

AllJoyn Property name	Type	Required	Description
minvalue	number	yes	
targetvalue	number	yes	Measured value
maxvalue	number	yes	
step	number	yes	

7.7.3 Derived model definition

```
{
  "id": "http://openinterconnect.org/asamapping/schemas/asa.environment.targettemperature.json#",
  "$schema": "http://json-schema.org/draft-04/schema#",
  "description" : "Copyright (c) 2017 Open Connectivity Foundation, Inc. All rights reserved.",
  "title": "Target Temperature",
  "definitions": {
    "asa.environment.targettemperature": {
      "type": "object",
      "properties": {
        "targetvalue": {
          "type": "number",
          "description": "Measured value",
          "x-ocf-conversion": {
            "x-ocf-alias": "oic.r.temperature",
            "x-to-ocf": [
              "temperature = targetvalue",
              "units = C"
```



```
            ],
            "x-from-ocf": {
              "oneOf": [
                {
                  "properties": {
                    "units": "string",
                    "enum": ["C"]
                  },
                  "x-from-ocf": [
                    "targetvalue = temperature"
                  ]
                },
                {
                  "properties": {
                    "units": "string",
                    "enum": ["F"]
                  },
                  "x-from-ocf": [
                    "targetvalue = (temperature-32)*5/9"
                  ]
                },
                {
                  "properties": {
                    "units": "string",
                    "enum": ["K"]
                  },
                  "x-from-ocf": [
                    "targetvalue = temperature-273.15"
                  ]
                }
              ]
            }
          }
        },
        "minvalue": {
          "type": "number",
          "x-ocf-conversion": {
            "x-ocf-alias": "oic.r.temperature",
            "x-to-ocf": [
              "range[0] = minvalue"
            ],
            "x-from-ocf": [
              "minvalue = range[0]",
              "otherwise: minvalue = -MAXINT"
            ]
          }
        },
        "maxvalue": {
          "type": "number",
          "x-ocf-conversion": {
            "x-ocf-alias": "oic.r.temperature",
            "x-to-ocf": [
              "range[1] = maxvalue"
            ],
            "x-from-ocf": [
              "maxvalue = range[1]",
              "otherwise: maxvalue = MAXINT"
            ]
          }
        },
        "step": {
          "type": "number",
          "x-ocf-conversion": {
            "x-ocf-alias": "oic.r.temperature",
            "x-to-ocf": [
              "ocf.step = step"
            ],
            "x-from-ocf": [
              "step = ocf.step",
              "otherwise: step = undefined (0x00)"
            ]
```



```
            }
          }
        }
      }
    },
    "type": "object",
    "allOf": [
      {"$ref": "#/definitions/asa.environment.targettemperature"}
    ],
    "required": [ "targetvalue","minvalue","maxvalue","step" ]
}
```

7.8 Audio Volume

7.8.1 Derived model

The derived model: "asa.operation.audiovolume".

7.8.2 Property definition

Table 18 provides the detailed per Property mapping for "asa.operation.audiovolume".

Table 18 – The property mapping for "asa.operation.audiovolume".

AllJoyn Property name	OCF Resource	To OCF	From OCF
mute	oic.r.audio	ocf.mute = mute	mute = ocf.mute
maxvolume	oic.r.audio	range[0] = 0range[1] = maxvolume	maxvolume = range[1]otherwise: maxvalue = 100
volume	oic.r.audio	ocf.volume = volume	volume = ocf.volume

Table 19 provides the details of the Properties that are part of "asa.operation.audiovolume".

Table 19 – The properties of "asa.operation.audiovolume".

AllJoyn Property name	Type	Required	Description
mute	boolean	yes	
maxvolume	integer	yes	
volume	integer	yes	Speaker volume index

7.8.3 Derived model definition

```
{
  "id": "http://openinterconnect.org/asamapping/schemas/asa.operation.audiovolume.json#",
  "$schema": "http://json-schema.org/draft-04/schema#",
  "description" : "Copyright (c) 2017 Open Connectivity Foundation, Inc. All rights reserved.",
  "title": "Audio Volume",
  "definitions": {
    "asa.operation.audiovolume": {
      "type": "object",
      "properties": {
        "volume": {
          "type": "integer",
          "description": "Speaker volume index",
          "x-ocf-conversion": {
            "x-ocf-alias": "oic.r.audio",
            "x-to-ocf": [
              "ocf.volume = volume"
            ],
            "x-from-ocf": [
              "volume = ocf.volume"
            ]
          }
        },
        "maxvolume": {
```

```
            "type": "integer",
            "x-ocf-conversion": {
              "x-ocf-alias": "oic.r.audio",
              "x-to-ocf": [
                "range[0] = 0",
                "range[1] = maxvolume"
              ],
              "x-from-ocf": [
                "maxvolume = range[1]",
                "otherwise: maxvalue = 100"
              ]
            }
          },
          "mute": {
            "type": "boolean",
            "x-ocf-conversion": {
              "x-ocf-alias": "oic.r.audio",
              "x-to-ocf": [
                "ocf.mute = mute"
              ],
              "x-from-ocf": [
                "mute = ocf.mute"
              ]
            }
          }
        }
      }
    },
    "type": "object",
    "allOf": [
      {"$ref": "#/definitions/asa.operation.audiovolume"}
    ],
    "required": [ "volume","maxvolume","mute" ]
}
```

7.9 Climate Control Mode

7.9.1 Derived model

The derived model: "asa.operation.climatecontrolmode".

7.9.2 Property definition

Table 20 provides the detailed per Property mapping for "asa.operation.climatecontrolmode".

Table 20 – The property mapping for "asa.operation.climatecontrolmode".

AllJoyn Property name	OCF Resource	To OCF	From OCF
operationalstate	oic.r.operationalstate	machinestates = [Idle,Heating,Cooling,PendingHeat,PendingCool,AuxilliaryHeat]currentmachinestate = machinestates[operationalstate]	statearray = [Idle,Heating,Cooling,PendingHeat,PendingCool,AuxilliaryHeat]operationalstate = indexof statearray[currentmachinestate[0]]
supportedmodes	oic.r.mode	modearray = [Off,Heat,Cool,Auto,AuxilliaryHeat,Dry,ContinuousDry]for x=0, x < sizeof(supportedmodes): ocf.supportedmodes[x] = modearray[supportedmodes[x]]	modearray = [Off,Heat,Cool,Auto,AuxilliaryHeat,Dry,ContinuousDry]for x=0, x < sizeof(supportedmodes): supportedmodes[x] = indexof modearray[ocf.supportedmodes[x]]
mode	oic.r.mode	modearray = [Off,Heat,Cool,Auto,AuxilliaryHeat,D	modearray = [Off,Heat,Cool,Auto,AuxilliaryHeat,

		ry,ContinuousDry]ocf.mode[0] = modearray[mode]	Dry,ContinuousDry]mode = indexof modeArray[ocf.mode[0]]

Table 21 provides the details of the Properties that are part of "asa.operation.climatecontrolmode".

Table 21 – The properties of "asa.operation.climatecontrolmode".

AllJoyn Property name	Type	Required	Description
operationalstate	integer	yes	Current status of device
supportedmodes	array	yes	Array of supported modes
mode	integer	yes	Current mode of device.

7.9.3 Derived model definition

```
{
  "id": "http://openinterconnect.org/asamapping/schemas/asa.operation.climatecontrolmode.json#",
  "$schema": "http://json-schema.org/draft-04/schema#",
  "description" : "Copyright (c) 2017 Open Connectivity Foundation, Inc. All rights reserved.",
  "title": "Climate Control Mode",
  "definitions": {
    "asa.operation.climatecontrolmode": {
      "type": "object",
      "properties": {
        "mode": {
          "type": "integer",
          "description": "Current mode of device.",
          "x-ocf-conversion": {
            "x-ocf-alias": "oic.r.mode",
            "x-to-ocf": [
              "modearray = [Off,Heat,Cool,Auto,AuxilliaryHeat,Dry,ContinuousDry]",
              "ocf.mode[0] = modearray[mode]"
            ],
            "x-from-ocf": [
              "modearray = [Off,Heat,Cool,Auto,AuxilliaryHeat,Dry,ContinuousDry]",
              "mode = indexof modeArray[ocf.mode[0]]"
            ]
          }
        },
        "supportedmodes": {
          "type": "array",
          "items": {
            "type": "integer"
          },
          "description": "Array of supported modes",
          "x-ocf-conversion": {
            "x-ocf-alias": "oic.r.mode",
            "x-to-ocf": [
              "modearray = [Off,Heat,Cool,Auto,AuxilliaryHeat,Dry,ContinuousDry]",
              "for x=0, x < sizeof(supportedmodes): ocf.supportedmodes[x] =
modearray[supportedmodes[x]]"
            ],
            "x-from-ocf": [
              "modearray = [Off,Heat,Cool,Auto,AuxilliaryHeat,Dry,ContinuousDry]",
              "for x=0, x < sizeof(supportedmodes): supportedmodes[x] = indexof
modearray[ocf.supportedmodes[x]]"
            ]
          }
        },
        "operationalstate": {
          "type": "integer",
          "description": "Current status of device",
          "x-ocf-conversion": {
            "x-ocf-alias": "oic.r.operationalstate",
            "x-to-ocf": [
```

```
              "machinestates = [Idle,Heating,Cooling,PendingHeat,PendingCool,AuxilliaryHeat]",
              "currentmachinestate = machinestates[operationalstate]"
            ],
            "x-from-ocf": [
              "statearray = [Idle,Heating,Cooling,PendingHeat,PendingCool,AuxilliaryHeat]",
              "operationalstate = indexof statearray[currentmachinestate[0]]"
            ]
          }
        }
      }
    }
  },
  "type": "object",
  "allOf": [
    {"$ref": "#/definitions/asa.operation.climatecontrolmode"}
  ],
  "required": [ "mode","supportedmodes","operationalstate" ]
}
```

7.10 Closed Status

7.10.1 Derived model

The derived model: "asa.operation.closedstatus".

7.10.2 Property definition

Table 22 provides the detailed per Property mapping for "asa.operation.closedstatus".

Table 22 – The property mapping for "asa.operation.closedstatus".

AllJoyn Property name	OCF Resource	To OCF	From OCF
isclosed	oic.r.door	if isClosed ocf.openState = Closed.if !isClosed ocf.openState = Open.	isClosed = (openState == Closed)

Table 23 provides the details of the Properties that are part of "asa.operation.closedstatus".

Table 23 – The properties of "asa.operation.closedstatus".

AllJoyn Property name	Type	Required	Description
isclosed	boolean	yes	Open/Closed status Indicator

7.10.3 Derived model definition

```
{
  "id": "http://openinterconnect.org/asamapping/schemas/asa.operation.closedstatus.json#",
  "$schema": "http://json-schema.org/draft-04/schema#",
  "description" : "Copyright (c) 2017 Open Connectivity Foundation, Inc. All rights reserved.",
  "title": "Closed Status",
  "definitions": {
    "asa.operation.closedstatus": {
      "type": "object",
      "properties": {
        "isclosed": {
          "type": "boolean",
          "description": "Open/Closed status Indicator",
          "x-ocf-conversion": {
            "x-ocf-alias": "oic.r.door",
            "x-to-ocf": [
              "if isClosed ocf.openState = Closed.",
              "if !isClosed ocf.openState = Open."
```



```
            ],
            "x-from-ocf": [
              "isClosed = (openState == Closed)"
            ]
          }
        }
      }
    },
    "type": "object",
    "allOf": [
      {"$ref": "#/definitions/asa.operation.closedstatus"}
    ],
    "required": [ "isclosed"]
}
```

7.11 Cycle Control

7.11.1 Derived model

The derived model: "asa.operation.cyclecontrol".

7.11.2 Property definition

Table 24 provides the detailed per Property mapping for "asa.operation.cyclecontrol".

Table 24 – The property mapping for "asa.operation.cyclecontrol".

AllJoyn Property name	OCF Resource	To OCF	From OCF
operationalstate	oic.r.operationalstate	statearray = [Idle,Working,ReadyToStart,DelayedStart,Pause,EndOfCycle]currentmachinestate = statearray[operationalstate]	statearray = [Idle,Working,ReadyToStart,DelayedStart,Pause,EndOfCycle]operationalstate = indexof statearray[currentmachinestate[0]]
executeoperationalcomand	oic.r.action		
SupportedOperationalcommands	oic.r.action		
supportedoperationalstates	oic.r.operationalstate	statearray = [Idle,Working,ReadyToStart,DelayedStart,Pause,EndOfCycle]for x=0, x < sizeof(supportedoperationalstates): machinestates[x] = statearray[supportedoperationalstates[x]]	statearray = [Idle,Working,ReadyToStart,DelayedStart,Pause,EndOfCycle]for x=0, x < sizeof(machinestates): supportedoperationalstates[x] = indexof statearray[machinestates[x]]

Table 25 provides the details of the Properties that are part of "asa.operation.cyclecontrol".

Table 25 – The properties of "asa.operation.cyclecontrol".

AllJoyn Property name	Type	Required	Description
operationalstate	integer	yes	Current operational state of the appliance
executeoperationalcomand		no	Execute an operational command

SupportedOperationalcommands	array	no	Array of operatinal commands supported by the appliance
supportedoperationalstates	array	yes	Array of operational states supported by the Appliance.

7.11.3 Derived model definition

```
{
  "id": "http://openinterconnect.org/asamapping/schemas/asa.operation.cyclecontrol.json#",
  "$schema": "http://json-schema.org/draft-04/schema#",
  "description" : "Copyright (c) 2017 Open Connectivity Foundation, Inc. All rights reserved.",
  "title": "Cycle Control",
  "definitions": {
    "asa.operation.cyclecontrol": {
      "type": "object",
      "properties": {
        "operationalstate": {
          "type": "integer",
          "description": "Current operational state of the appliance",
          "x-ocf-conversion": {
            "x-ocf-alias": "oic.r.operationalstate",
            "x-to-ocf": [
              "statearray = [Idle,Working,ReadyToStart,DelayedStart,Pause,EndOfCycle]",
              "currentmachinestate = statearray[operationalstate]"
            ],
            "x-from-ocf": [
              "statearray = [Idle,Working,ReadyToStart,DelayedStart,Pause,EndOfCycle]",
              "operationalstate = indexof statearray[currentmachinestate[0]]"
            ]
          }
        },
        "supportedoperationalstates": {
          "type": "array",
          "items": {
            "type": "integer"
          },
          "description": "Array of operational states supported by the Appliance.",
          "x-ocf-conversion": {
            "x-ocf-alias": "oic.r.operationalstate",
            "x-to-ocf": [
              "statearray = [Idle,Working,ReadyToStart,DelayedStart,Pause,EndOfCycle]",
              "for x=0, x < sizeof(supportedoperationalstates): machinestates[x] =
statearray[supportedoperationalstates[x]]"
            ],
            "x-from-ocf": [
              "statearray = [Idle,Working,ReadyToStart,DelayedStart,Pause,EndOfCycle]",
              "for x=0, x < sizeof(machinestates): supportedoperationalstates[x] = indexof
statearray[machinestates[x]]"
            ]
          }
        },
        "SupportedOperationalcommands": {
          "type": "array",
          "items": {
            "type": "integer"
          },
          "description": "Array of operatinal commands supported by the appliance",
          "x-ocf-conversion": {
            "x-ocf-alias": "oic.r.action"
          }
        },
        "executeoperationalcomand": {
          "x-ocf-type": "method",
          "description": "Execute an operational command",
          "x-ocf-conversion": {
```

```
            "x-ocf-alias": "oic.r.action"
          }
        }
      }
    }
  },
  "type": "object",
  "allOf": [
    {"$ref": "#/definitions/asa.operation.cyclecontrol"}
  ],
  "required": [ "operationalstate","supportedoperationalstates" ]
}
```

7.12 Fan Speed Level

7.12.1 Derived model

The derived model: "asa.operation.fanspeedlevel".

7.12.2 Property definition

Table 26 provides the detailed per Property mapping for "asa.operation.fanspeedlevel".

Table 26 – The property mapping for "asa.operation.fanspeedlevel".

AllJoyn Property name	OCF Resource	To OCF	From OCF
fanspeedlevel	oic.r.airflow	speed = fanspeedlevel	fanspeedlevel = speed
maxfanspeedlevel	oic.r.airflow	range[0] = 0range[1] = maxfanspeedlevel	maxfanspeedlevel = range[1]otherwise: maxfanspeedlevel = 100
automode	oic.r.airflow	if automode != NotSupported(0xFF) ocf.automode = automodeelse no mapping	automode = ocf.automodeotherwise: automode = NotSupported(0xFF)

Table 27 provides the details of the Properties that are part of "asa.operation.fanspeedlevel".

Table 27 – The properties of "asa.operation.fanspeedlevel".

AllJoyn Property name	Type	Required	Description
fanspeedlevel	integer	yes	Fan speed level. 0 = off.
maxfanspeedlevel	integer	yes	Max level allowed for fan speed
automode	integer	yes	Auto mode status.

7.12.3 Derived model definition

```
{
  "id": "http://openinterconnect.org/asamapping/schemas/asa.operation.fanspeedlevel.json#",
  "$schema": "http://json-schema.org/draft-04/schema#",
  "description" : "Copyright (c) 2017 Open Connectivity Foundation, Inc. All rights reserved.",
  "title": "Fan Speed Level",
  "definitions": {
    "asa.operation.fanspeedlevel": {
      "type": "object",
      "properties": {
        "fanspeedlevel": {
          "type": "integer",
          "description": "Fan speed level. 0 = off.",
```

```
            "x-ocf-conversion": {
              "x-ocf-alias": "oic.r.airflow",
              "x-to-ocf": [
                "speed = fanspeedlevel"
              ],
              "x-from-ocf": [
                "fanspeedlevel = speed"
              ]
            }
          },
          "maxfanspeedlevel": {
            "type": "integer",
            "description": "Max level allowed for fan speed",
            "x-ocf-conversion": {
              "x-ocf-alias": "oic.r.airflow",
              "x-to-ocf": [
                "range[0] = 0",
                "range[1] = maxfanspeedlevel"
              ],
              "x-from-ocf": [
                "maxfanspeedlevel = range[1]",
                "otherwise: maxfanspeedlevel = 100"
              ]
            }
          },
          "automode": {
            "type": "integer",
            "description": "Auto mode status.",
            "x-ocf-conversion": {
              "x-ocf-alias": "oic.r.airflow",
              "x-to-ocf": [
                "if automode != NotSupported(0xFF)",
                " ocf.automode = automode",
                "else no mapping"
              ],
              "x-from-ocf": [
                "automode = ocf.automode",
                "otherwise: automode = NotSupported(0xFF)"
              ]
            }
          }
        }
      }
    },
    "type": "object",
    "allOf": [
      {"$ref": "#/definitions/asa.operation.fanspeedlevel"}
    ],
    "required": [ "fanspeedlevel","maxfanspeedlevel","automode" ]
}
```

7.13 Heating Zone

7.13.1 Derived model

The derived model: "asa.operation.heatingzone".

7.13.2 Property definition

Table 28 provides the detailed per Property mapping for "asa.operation.heatingzone".

Table 28 – The property mapping for "asa.operation.heatingzone".

AllJoyn Property name	OCF Resource	To OCF	From OCF
numberofheatingzones	oic.r.heatingzonecollection	number of links in the collection = numberofheatingzones	numberofheatingzones = number of links in the collection

heatinglevels	oic.r.heatingzone	Instance of oic.r.heatingzone per array item for x=0, x<sizeof(heatinglevels): ocf.heatinglevel = maxheatinglevels[x]	for x=0;x<numlinks(oic.r.heatingzonecollection): heatinglevels[x] = ocf.heatinglevel
maxheatinglevels	oic.r.heatingzone	Instance of oic.r.heatingzone per array item for x=0, x<sizeof(maxheatinglevels): ocf.maxheatinglevel = maxheatinglevels[x]	for x=0;x<numlinks(oic.r.heatingzonecollection): maxheatinglevels[x] = ocf.maxheatinglevel

Table 29 provides the details of the Properties that are part of "asa.operation.heatingzone".

Table 29 – The properties of "asa.operation.heatingzone".

AllJoyn Property name	Type	Required	Description
numberofheatingzones	integer	yes	Number of heating zones.
heatinglevels	array	yes	Current heating levels for each zone.
maxheatinglevels	array	yes	Max heating levels for each zone

7.13.3 Derived model definition

```
{
  "id": "http://openinterconnect.org/asamapping/schemas/asa.operation.heatingzone.json#",
  "$schema": "http://json-schema.org/draft-04/schema#",
  "description" : "Copyright (c) 2017 Open Connectivity Foundation, Inc. All rights reserved.",
  "title": "Heating Zone",
  "definitions": {
    "asa.operation.heatingzone": {
      "type": "object",
      "properties": {
        "numberofheatingzones": {
          "type": "integer",
          "description": "Number of heating zones.",
          "x-ocf-conversion": {
            "x-ocf-alias": "oic.r.heatingzonecollection",
            "x-to-ocf": [
              "number of links in the collection = numberofheatingzones"
            ],
            "x-from-ocf": [
              "numberofheatingzones = number of links in the collection"
            ]
          }
        },
        "maxheatinglevels": {
          "type": "array",
          "items": {
            "type": "integer"
          },
          "description": "Max heating levels for each zone",
          "x-ocf-conversion": {
            "x-ocf-alias": "oic.r.heatingzone",
            "x-to-ocf": [
```

```
              "Instance of oic.r.heatingzone per array item ",
              "for x=0, x<sizeof(maxheatinglevels): ocf.maxheatinglevel = maxheatinglevels[x]"
            ],
            "x-from-ocf": [
              "for x=0;x<numlinks(oic.r.heatingzonecollection): maxheatinglevels[x] =
ocf.maxheatinglevel"
            ]
          }
        },
        "heatinglevels": {
          "type": "array",
          "items": {
            "type": "integer"
          },
          "description": "Current heating levels for each zone.",
          "x-ocf-conversion": {
            "x-ocf-alias": "oic.r.heatingzone",
            "x-to-ocf": [
              "Instance of oic.r.heatingzone per array item ",
              "for x=0, x<sizeof(heatinglevels): ocf.heatinglevel = maxheatinglevels[x]"
            ],
            "x-from-ocf": [
              "for x=0;x<numlinks(oic.r.heatingzonecollection): heatinglevels[x] = ocf.heatinglevel"
            ]
          }
        }
      }
    }
  },
  "type": "object",
  "allOf": [
    {"$ref": "#/definitions/asa.operation.heatingzone"}
  ],
  "required": [ "numberofheatingzones","maxheatinglevels","heatinglevels" ]
}
```

7.14 HVAC Fan Mode

7.14.1 Derived model

The derived model: "asa.operation.hvacfanmode".

7.14.2 Property definition

Table 30 provides the detailed per Property mapping for "asa.operation.hvacfanmode".

Table 30 – The property mapping for "asa.operation.hvacfanmode".

AllJoyn Property name	OCF Resource	To OCF	From OCF
mode	oic.r.mode	modearray = [Auto,Circulation,Continuous]ocf.mode[0] = modearray[mode]	modearray = [Auto,Circulation,Continuous] mode = indexof modeArray[ocf.mode[0]]
supportedmodes	oic.r.mode	modearray = [Auto,Circulation,Continuous]for x=0, x < sizeof(supportedmodes): ocf.supportedmodes[x] = modearray[supportedmodes[x]]	modearray = [Auto,Circulation,Continuous] for x=0, x < sizeof(supportedmodes): supportedmodes[x] = indexof modearray[ocf.supportedmodes[x]]

Table 31 provides the details of the Properties that are part of "asa.operation.hvacfanmode".

Table 31 – The properties of "asa.operation.hvacfanmode".

AllJoyn Property name	Type	Required	Description
mode	integer	yes	Current mode of device.
supportedmodes	array	yes	Array of supported modes

7.14.3 Derived model definition

```
{
  "id": "http://openinterconnect.org/asamapping/schemas/asa.operation.hvacfanmode.json#",
  "$schema": "http://json-schema.org/draft-04/schema#",
  "description" : "Copyright (c) 2017 Open Connectivity Foundation, Inc. All rights reserved.",
  "title": "HVAC Fan Mode",
  "definitions": {
    "asa.operation.hvacfanmode": {
      "type": "object",
      "properties": {
        "mode": {
          "type": "integer",
          "description": "Current mode of device.",
          "x-ocf-conversion": {
            "x-ocf-alias": "oic.r.mode",
            "x-to-ocf": [
              "modearray = [Auto,Circulation,Continuous]",
              "ocf.mode[0] = modearray[mode]"
            ],
            "x-from-ocf": [
              "modearray = [Auto,Circulation,Continuous]",
              "mode = indexof modeArray[ocf.mode[0]]"
            ]
          }
        },
        "supportedmodes": {
          "type": "array",
          "items": {
            "type": "integer"
          },
          "description": "Array of supported modes",
          "x-ocf-conversion": {
            "x-ocf-alias": "oic.r.mode",
            "x-to-ocf": [
              "modearray = [Auto,Circulation,Continuous]",
              "for x=0, x < sizeof(supportedmodes): ocf.supportedmodes[x] =
modearray[supportedmodes[x]]"
            ],
            "x-from-ocf": [
              "modearray = [Auto,Circulation,Continuous]",
              "for x=0, x < sizeof(supportedmodes): supportedmodes[x] = indexof
modearray[ocf.supportedmodes[x]]"
            ]
          }
        }
      }
    }
  },
  "type": "object",
  "allOf": [
    {"$ref": "#/definitions/asa.operation.hvacfanmode"}
  ],
  "required": [ "mode","supportedmodes" ]
}
```

7.15 On/Off Control

7.15.1 Derived model

The derived model: "asa.operation.offcontrol".
The derived model: "asa.operation.oncontrol".

7.15.2 Property definition

Table 32 provides the detailed per Property mapping for "asa.operation.offcontrol".

Table 32 – The property mapping for "asa.operation.offcontrol".

AllJoyn Property name	OCF Resource	To OCF	From OCF
switchon	oic.r.switch.binary	value = false	if ocf.value = false, asa.operation.offcontrol::switchoff().

Table 33 provides the details of the Properties that are part of "asa.operation.offcontrol".

Table 33 – The properties of "asa.operation.offcontrol".

AllJoyn Property name	Type	Required	Description
switchon	string	no	Turn off the device

Table 34 provides the detailed per Property mapping for "asa.operation.oncontrol".

Table 34 – The property mapping for "asa.operation.oncontrol".

AllJoyn Property name	OCF Resource	To OCF	From OCF
switchon	oic.r.switch.binary	value = true	if ocf.value = true, asa.operation.oncontrol::switchon().

Table 35 provides the details of the Properties that are part of "asa.operation.oncontrol".

Table 35 – The properties of "asa.operation.oncontrol".

AllJoyn Property name	Type	Required	Description
switchon	string	no	Turn on the device

7.15.3 Derived model definition

```
{
  "id": "http://openinterconnect.org/asamapping/schemas/asa.operation.oncontrol.json#",
  "$schema": "http://json-schema.org/draft-04/schema#",
  "description" : "Copyright (c) 2017 Open Connectivity Foundation, Inc. All rights reserved.",
  "title": "On/Off Control",
  "definitions": {
    "asa.operation.oncontrol": {
      "type": "object",
      "properties": {
        "switchon": {
          "type": "string",
          "format": "method",
          "description": "Turn on the device",
          "x-ocf-conversion": {
            "x-ocf-alias": "oic.r.switch.binary",
            "x-to-ocf": [
              "value = true"
            ],
            "x-from-ocf": [
              "if ocf.value = true, asa.operation.oncontrol::switchon()."
            ]
```

```
            }
          }
        }
      },
      "asa.operation.offcontrol": {
        "type": "object",
        "properties": {
          "switchon": {
            "type": "string",
            "format": "method",
            "description": "Turn off the device",
            "x-ocf-conversion": {
              "x-ocf-alias": "oic.r.switch.binary",
              "x-to-ocf": [
                "value = false"
              ],
              "x-from-ocf": [
                "if ocf.value = false, asa.operation.offcontrol::switchoff()."
              ]
            }
          }
        }
      }
    },
    "type": "object",
    "oneOf": [
      {"$ref": "#/definitions/asa.operation.oncontrol"},
      {"$ref": "#/definitions/asa.operation.offcontrol"}
    ]
}
```

7.16 On Off Mapping

7.16.1 Derived model

The derived model: "asa.operation.onoffstatus".

7.16.2 Property definition

Table 36 provides the detailed per Property mapping for "asa.operation.onoffstatus".

Table 36 – The property mapping for "asa.operation.onoffstatus".

AllJoyn Property name	OCF Resource	To OCF	From OCF
onoff	oic.r.switch.binary	value = onoff	onoff = value

Table 37 provides the details of the Properties that are part of "asa.operation.onoffstatus".

Table 37 – The properties of "asa.operation.onoffstatus".

AllJoyn Property name	Type	Required	Description
onoff	boolean	yes	On/Off status of the device

7.16.3 Derived model definition

```
{
  "id": "http://openinterconnect.org/asamapping/schemas/asa.operation.onoffstatus.json#",
  "$schema": "http://json-schema.org/draft-04/schema#",
  "description" : "Copyright (c) 2017 Open Connectivity Foundation, Inc. All rights reserved.",
  "title": "On Off Mapping",
  "definitions": {
    "asa.operation.onoffstatus": {
      "type": "object",
      "properties": {
        "onoff": {
          "type": "boolean",
```

```
            "description": "On/Off status of the device",
            "x-ocf-conversion": {
              "x-ocf-alias": "oic.r.switch.binary",
              "x-to-ocf": [
                "value = onoff"
              ],
              "x-from-ocf": [
                "onoff = value"
              ]
            }
          }
        }
      }
    },
    "type": "object",
    "allOf": [
      {"$ref": "#/definitions/asa.operation.onoffstatus"}
    ],
    "required": [ "onoff" ]
}
```

7.17 Oven Cycle Phase

7.17.1 Derived model

The derived model: "asa.operation.ovencyclephase".

7.17.2 Property definition

Table 38 provides the detailed per Property mapping for "asa.operation.ovencyclephase".

Table 38 – The property mapping for "asa.operation.ovencyclephase".

AllJoyn Property name	OCF Resource	To OCF	From OCF
getvendorphasedescription	oic.r.action		
supportedcyclephases	oic.r.operationalstate	phasearray = [Unavailable,Preheating,Cooking,Cleaning]for x=0, x < sizeof(supportedcyclephases): machinestates[x] = phasearray[supportedcyclephases[x]]	phasearray = [Unavailable,Preheating,Cooking,Cleaning]for x=0, x < sizeof(machinestates): supportedcyclephases[x] = indexof phasearray[machinestates[x]]
cyclephase	oic.r.operationalstate	phasearray = [Unavailable,Preheating,Cooking,Cleaning]currentmachinestate = phasearray[cyclephase]	phasearray = [Unavailable,Preheating,Cooking,Cleaning]cyclephase = indexof statearray[currentmachinestate[0]]

Table 39 provides the details of the Properties that are part of "asa.operation.ovencyclephase".

Table 39 – The properties of "asa.operation.ovencyclephase".

AllJoyn Property name	Type	Required	Description
getvendorphasedescription		no	Get cycle phases description
supportedcyclephases	array	yes	Array of cycle phases supported by the Appliance.

cyclephase	integer	yes	Current phase of the operational cycle

7.17.3 Derived model definition

```
{
  "id": "http://openinterconnect.org/asamapping/schemas/asa.operation.ovencyclephase.json#",
  "$schema": "http://json-schema.org/draft-04/schema#",
  "description" : "Copyright (c) 2017 Open Connectivity Foundation, Inc. All rights reserved.",
  "title": "Oven Cycle Phase",
  "definitions": {
    "asa.operation.ovencyclephase": {
      "type": "object",
      "properties": {
        "cyclephase": {
          "type": "integer",
          "description": "Current phase of the operational cycle",
          "x-ocf-conversion": {
            "x-ocf-alias": "oic.r.operationalstate",
            "x-to-ocf": [
              "phasearray = [Unavailable,Preheating,Cooking,Cleaning]",
              "currentmachinestate = phasearray[cyclephase]"
            ],
            "x-from-ocf": [
              "phasearray = [Unavailable,Preheating,Cooking,Cleaning]",
              "cyclephase = indexof statearray[currentmachinestate[0]]"
            ]
          }
        },
        "supportedcyclephases": {
          "type": "array",
          "items": {
            "type": "integer"
          },
          "description": "Array of cycle phases supported by the Appliance.",
          "x-ocf-conversion": {
            "x-ocf-alias": "oic.r.operationalstate",
            "x-to-ocf": [
              "phasearray = [Unavailable,Preheating,Cooking,Cleaning]",
              "for x=0, x < sizeof(supportedcyclephases): machinestates[x] =
phasearray[supportedcyclephases[x]]"
            ],
            "x-from-ocf": [
              "phasearray = [Unavailable,Preheating,Cooking,Cleaning]",
              "for x=0, x < sizeof(machinestates): supportedcyclephases[x] = indexof
phasearray[machinestates[x]]"
            ]
          }
        },
        "getvendorphasedescription": {
          "x-ocf-type": "method",
          "description": "Get cycle phases description",
          "x-ocf-conversion": {
            "x-ocf-alias": "oic.r.action"
          }
        }
      }
    }
  },
  "type": "object",
  "allOf": [
    {"$ref": "#/definitions/asa.operation.ovencyclephase"}
  ],
  "required": [ "cyclephase","supportedcyclephases" ]
}
```

