

OCF Device Specification

VERSION 1.3.0 | November 2017



OPEN CONNECTIVITY
FOUNDATION™

CONTACT admin@openconnectivity.org

Copyright Open Connectivity Foundation, Inc. © 2016-2017.
All Rights Reserved.

Legal Disclaimer

3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20

NOTHING CONTAINED IN THIS DOCUMENT SHALL BE DEEMED AS GRANTING YOU ANY KIND OF LICENSE IN ITS CONTENT, EITHER EXPRESSLY OR IMPLIEDLY, OR TO ANY INTELLECTUAL PROPERTY OWNED OR CONTROLLED BY ANY OF THE AUTHORS OR DEVELOPERS OF THIS DOCUMENT. THE INFORMATION CONTAINED HEREIN IS PROVIDED ON AN "AS IS" BASIS, AND TO THE MAXIMUM EXTENT PERMITTED BY APPLICABLE LAW, THE AUTHORS AND DEVELOPERS OF THIS SPECIFICATION HEREBY DISCLAIM ALL OTHER WARRANTIES AND CONDITIONS, EITHER EXPRESS OR IMPLIED, STATUTORY OR AT COMMON LAW, INCLUDING, BUT NOT LIMITED TO, IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. OPEN CONNECTIVITY FOUNDATION, INC. FURTHER DISCLAIMS ANY AND ALL WARRANTIES OF NON-INFRINGEMENT, ACCURACY OR LACK OF VIRUSES.

The OCF logo is a trademark of Open Connectivity Foundation, Inc. in the United States or other countries. *Other names and brands may be claimed as the property of others.

Copyright © 2016-2017 Open Connectivity Foundation, Inc. All rights reserved.

Copying or other form of reproduction and/or distribution of these works are strictly prohibited.

CONTENTS

21			
22			
23	1	Scope	5
24	2	Normative references	5
25	3	Terms, definitions symbols and abbreviations	5
26	3.1	Terms and definitions	5
27	3.2	Symbols and abbreviations	6
28	3.3	Conventions	6
29	4	Document conventions and organization	6
30	4.1	Notation.....	7
31	4.2	Data types	7
32	4.3	Document structure	7
33	5	Operational Scenarios.....	9
34	5.1	Specification Version	9
35	6	Core Resource model.....	9
36	6.1	Introduction	9
37	6.2	Device Type	9
38	6.3	Profile of OCF Core Specification	10
39	7	Discovery	11
40	7.1	Endpoint Discovery.....	11
41	7.2	Resource Discovery.....	11
42	8	Security.....	11
43	9	Device Types	11
44	9.1	Standardized device types.....	11
45	9.2	Standardized enumeration values	16
46	9.3	Alphabetical list of standardized enumeration types.....	16
47	9.4	Standardized list of supported values for Mode Resource Type (oic.r.mode)	19
48	9.5	Standardized list of supported values for Operational State Resource Type (oic.r.operational.state).....	20
49			
50	9.6	Standardized list of supported values for Consumable and Consumable Collection Resource Types (oic.r.consumable, oic.r.consumablecollection)	23
51			
52	9.6	Camera Media Format (oic.r.media).....	24
53			
54			

Figures

55		
56	Figure 1 Device building blocks.	9
57		

Tables

58		
59	Table 6-1 Required Resources for OCF Devices.....	10
60	Table 6-2 Required Properties in Resource	10
61	Table 9-1 Alphabetical list of device types (“rt”), including required Resources.....	11
62	Table 9-2 list of required oic.r.mode supported values per device type (“rt”)	19
63	Table 9-3 list of required oic.r.operational.state supported values per Device Type (“rt”)	20
64	Table 9-4 list of defined enumeration values for oic.r.consumable,	
65	oic.r.consumablecollection.....	23
66	Table 9-5 Recommended media profiles.....	24
67		
68		

69 **1 Scope**

70 The OCF Device specification is an Application Profile specification.

71 The Device definitions use Resource definitions from the OCF Resource Type Specification.

72 The Device Specification is built on top of the Core Specification. The Core Specification specifies
73 the core architecture, interfaces protocols and services to enable the implementation of profiles
74 for IoT usages and ecosystems. The Core specification also defines the main architectural
75 components of network connectivity, discovery, data transmission, device & service management
76 and ID & security. The core architecture is scalable to support simple devices (constrained devices)
77 and more capable devices (smart devices).

78 **2 Normative references**

79 The following documents, in whole or in part, are normatively referenced in this document and are
80 indispensable for its application. For dated references, only the edition cited applies. For undated
81 references, the latest edition of the referenced document (including any amendments) applies.

82 OCF Core Specification, *Open Connectivity Foundation Core Specification*, Version 1.0.

83 Available at: https://openconnectivity.org/specs/OCF_Core_Specification_v1.0.0.pdf

84 Latest version available at: https://openconnectivity.org/specs/OCF_Core_Specification.pdf

85 OCF Resource Type Specification, *Open Connectivity Foundation Resource Type Specification*,
86 Version 1.0. Available at:

87 https://openconnectivity.org/specs/OCF_Resource_Type_Specification_v1.0.0.pdf

88 Latest version available at:

89 https://openconnectivity.org/specs/OCF_Resource_Type_Specification.pdf

90 OCF Security Specification, *Open Connectivity Foundation Security Capabilities*, Version 1.0.

91 Available at: https://openconnectivity.org/specs/OCF_Security_Specification_v1.0.0.pdf

92 Latest version available at: https://openconnectivity.org/specs/OCF_Security_Specification.pdf

93 IETF RFC 7049, *Concise Binary Object Representation (CBOR)*, October 2013

94 <http://www.ietf.org/rfc/rfc7049.txt>

95

96 IETF RFC 7159, *The JavaScript Object Notation (JSON) Data Interchange Format*, March 2014

97 <http://www.ietf.org/rfc/rfc7159.txt>

98 RAML, *Restful API modelling language*, Version 0.8.

99 <https://github.com/raml-org/raml-spec/blob/master/versions/raml-08/raml-08.md>

100

101 IETF RFC 4566, *SDP: Session Description Protocol*, July 2006

102 <https://tools.ietf.org/html/rfc4566>

103 **3 Terms, definitions symbols and abbreviations**

104 **3.1 Terms and definitions**

105 **3.1.1**

106 **Actuator**

107 Resource with support of the UPDATE operation.

108 **3.1.2**

109 **Bridge Device**

110 A Device that is capable of representing other devices that exist on the network.

111 **3.1.3**
112 **OCF Device**
113 A Device that is conformant to the normative requirements contained in this specification.

114 **3.1.4**
115 **Sensor**
116 Resource without support of the UPDATE operation.

117 **3.2 Symbols and abbreviations**

118 **3.2.1**
119 **CRUDN**
120 Create Retrieve Update Delete Notify
121 This is an acronym indicating which operations are possible on the Resource.

122 **3.2.2**
123 **CSV**
124 Comma Separated Value
125 Comma Separated Value is a construction to have more fields in 1 string separated by commas. If
126 a value itself contains a comma then the comma can be escaped by adding “\” in front of the
127 comma.

128 **3.2.3**
129 **OCF**
130 Open Connectivity Foundation
131 The organization that created these specifications.

132 **3.2.4**
133 **RAML**
134 RESTful API Modelling Language
135 RAML is a simple and succinct way of describing practically-RESTful APIs. See RAML.

136 **3.2.5**
137 **REST**
138 Representational State Transfer
139 REST is an architecture style for designing networked applications and relies on a stateless, client-
140 server, cacheable communications protocol.

141 **3.2.6**
142 **SDP**
143 Session Description Protocol
144 SDP describes multimedia sessions for the purposes of session announcement, session invitation,
145 and other forms of multimedia session initiation. It is fully defined in IETF RFC 4566.

146 **3.3 Conventions**
147 In this specification a number of terms, conditions, mechanisms, sequences, parameters, events,
148 states, or similar terms are printed with the first letter of each word in uppercase and the rest
149 lowercase (e.g., Network Architecture). Any lowercase uses of these words have the normal
150 technical English meaning.

151 **4 Document conventions and organization**
152 This document lists all the Devices used in identified vertical domains, as of this Specification that
153 encompasses the Smart Home. The devices are specified by which mandatory and optional
154 Resources are used.

155 For the purposes of this document, the terms and definitions given in OCF Core Specification and
156 OCF Resource Type Specification apply.

157 **4.1 Notation**

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

160 Required (or shall or mandatory).

161 These basic features shall be implemented. The phrases “shall not”, and “PROHIBITED”
162 indicate behavior that is prohibited, i.e. that if performed means the implementation is not in
163 compliance.

164 Recommended (or should).

165 These features add functionality supported by a Device and should be implemented.
166 Recommended features take advantage of the capabilities a Device, usually without imposing
167 major increase of complexity. Notice that for compliance testing, if a recommended feature is
168 implemented, it shall meet the specified requirements to be in compliance with these guidelines.
169 Some recommended features could become requirements in the future. The phrase “should
170 not” indicates behavior that is permitted but not recommended.

171 Allowed (or allowed).

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

174 Conditionally allowed (CA).

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

177 Conditionally required (CR).

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

181 DEPRECATED

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

188 Strings that are to be taken literally are enclosed in “double quotes”.

189 Words that are emphasized are printed in *italic*.

190 **4.2 Data types**

191 See OCF Core Specification.

192 **4.3 Document structure**

193 This document describes a Device and makes use of functionality defined in the OCF Core
194 Specification and OCF Resource Type Specification.

195 The OCF Core Specification provides building blocks to define Devices. The following functionality
196 is used:

- 197 • Required Core Resources.
198 • Required transports.

199 Note that other mandatory functions in the OCF Core Specification might be needed to create an
200 OCF compliant device, but are not mentioned in this document.

201 The Device profile consists of using RAML as a specification language and using JSON Schemas
202 as payload definitions for all CRUDN actions. The mapping of the CRUDN actions is specified in
203 the CORE.

204 Other building blocks used in this document are the Resource Types specified in the OCF
205 Resource Type Specification.

```
206 @startuml
207
208 node "OCF Device" {
209 [Vendor Extensions] #Yellow
210 [OCF Device] #White
211 [Required Resources] #White
212 [Core Profile] #White
213 [Core Resources] #White
214 }
215
216 [Vendor Extensions] --> [OCF Device]
217 [OCF Device] --> [Required Resources]
218 [Required Resources] --> [Core Profile]
219 [Core Profile] --> [Core Resources]
220
221 @enduml
```

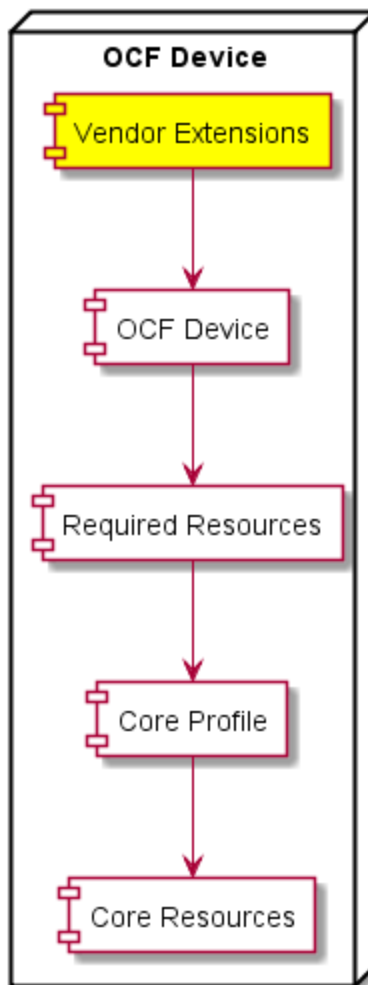


Figure 1 Device building blocks.

222
223
224

225 This document describes which constructs are used for an OCF Device and which Resources are
226 mandated to be implemented for each Device. A typical Device consisting of data elements defined
227 in the referenced specification documents is depicted in Figure 1.

228 **5 Operational Scenarios**

229 **5.1 Specification Version**

230 Devices conformant to this specification version shall add the string “ocf.sh.1.3.0” to the dmvr
231 Property in oic.wk.d.

232 **6 Core Resource model**

233 **6.1 Introduction**

234 The Core Resource model is described in the OCF Core Specification.

235 **6.2 Device Type**

236 The device types of all devices shall have a Resource Type name (“rt”) prefixed with “oic.d.”

237 Examples of Device Types are:

- 238 • oic.d.fan
- 239 • oic.d.thermostat

240 The full list of defined OCF Device names and types are in Table 9-1. This table also includes the
241 list of minimal Resource(s) that a Device shall implement for that device type. An OCF Device may
242 expose additional OCF and vendor defined Resources than indicated in this Table.

243 The OCF Core Specification defines a Device Resource with a URI of “/oic/d”. An OCF Device
244 shall include in the Resource Type ID of “/oic/d” the device type from Table 9-1 of the physical
245 device hosting the Server; the inclusion of the device type shall be done using one of the methods
246 provided by Section 11.3.4 of the OCF Core Specification (i.e. add to the array of values). An
247 instance of “/oic/d” with its Resource Type name modified in this manner shall expose all
248 mandatory Properties for “/oic/d” defined in the OCF Core Specification.

249 Therefore an OCF Device may be discovered by adding a query for the “rt” of the Device Type
250 itself (e.g. oic.d.fan) to the OCF Core Specification defined multicast endpoint discovery method
251 (see also Section 7.1).

252 An OCF Device may additionally define a Resource with a vendor defined URI that is discoverable
253 within “/oic/res” with a Resource Type ID from Table 9-1. In this instance the Resource shall have
254 the Resource Properties and be subject to the same semantics as oic.wk.d as defined in the OCF
255 Core Specification. In the case where the Resource tagged in this manner additionally follows the
256 Collection semantics defined in the OCF Core Specification then the Resources that are part of
257 that Collection shall at a minimum include the Resources defined for the Resource Type ID in
258 Table 9-1.

259 **6.3 Profile of OCF Core Specification**

260 This section describes the profiling of the Core Resources and transport mechanisms and functions
261 that are defined in the OCF Core Specification.

262 The required OCF Core Specification Resources are also required for a profile implementation.

263 In addition to the required Resources the optional OCF Core Specification Resources in Table 6-1
264 shall be required.

265 **Table 6-1 Required Resources for OCF Devices**

Resource (“rt”)	Required in Profile
Intentionally left blank	Intentionally left blank

266 For each of the Resources listed in Table 6-1 Required Resources for OCF Devices, Table 6-2
267 Required Properties in Resource details the Properties within those Resources that shall be
268 required.

269 **Table 6-2 Required Properties in Resource**

Resource (“rt”)	Property name	Required in Profile
Intentionally left blank	Intentionally left blank	Intentionally left blank

270

271 An OCF Device shall support CoAP based endpoint discovery as defined in Section 10.2 of the
272 OCF Core Specification.

273 The messaging protocol for an OCF Device shall be CoAP (see OCF Core Specification).

274 An OCF Device shall support a network layer as defined in Section 9 of the OCF Core Specification
275 including any necessary defined bridging functions that ensure inter-operability with IPv6.

276 **7 Discovery**

277 **7.1 Endpoint Discovery**

278 Clients may discover Servers by using the mechanisms defined by the OCF Core Specification
279 Section 10. A Client may populate an “rt” query parameter with the Device Types that the Client
280 wants to discover, or if no “rt” query parameter is provided then the search is for all available
281 Device Types irrespective.

282 OCF Devices may be discovered by Device Type or implemented Resource Type. This difference
283 is conveyed by the wanted “rt” argument of the OCF Core Specification discovery method (see
284 section 11.3 of the OCF Core Specification).

285 The values that may be used for discovering a specific Device Type are listed in Table 9-1 . The
286 values that may be used to discover a specific Resource Type are listed in the OCF Resource
287 Type Specification in section 6.

288 The discovery process provides the base URI of the Device that is acting as a Server to the Client.
289 The structure of the detected Device can then be retrieved by Resource Discovery.

290 **7.2 Resource Discovery**

291 Section intentionally left blank

292 **8 Security**

293 An OCF Device shall implement the mandated Security Virtual Resources specified in the OCF
294 Security Specification. Additionally, all exposed OCF Resource Type Specification defined
295 Resources shall be accessible via at least one secure Endpoint (i.e. use of a “coaps” or “coaps+tcp”
296 scheme locator within the “eps” Parameter exposed by /oic/res; see Core Specification Section
297 10.2.4). An OCF Device shall not expose OCF Resource Type Specification defined Resources
298 using unsecured Endpoints (i.e. “coap” or “coap+tcp” scheme locator in the “eps” Parameter).

299 **9 Device Types**

300 **9.1 Standardized device types**

301 Device Types can mandate that specific Resources be implemented. The required Resource per
302 Device Type is listed in Table 9-1. Additionally, specific Resources that use enumeration values
303 to indicate supported states or modes may mandate usage of standardized enumeration values.
304 The mandated allowed values are indicated for each applicable Resource Type, the Property of
305 interest on that Resource Type and to which device type it applies.

306 Per Table 9-1, some Device types support two instances of the same Resource Type. When this
307 is the case, the Resources shall support different CRUDN actions, e.g. one Resource acts as a
308 Sensor (CRUDN action write not supported) and the other Resource acts as an Actuator (CRUDN
309 actions read and write supported at a minimum) unless otherwise specified.

310 **Table 9-1 Alphabetical list of device types (“rt”), including required Resources.**

311

Device Name (informative)	Device Type (“rt”) (Normative)	Required Resource name	Required Resource Type
Active Speaker	oic.d.speaker	Binary Switch	oic.r.switch.binary
		Audio Controls	oic.r.audio
Air Conditioner	oic.d.airconditioner	Binary Switch	oic.r.switch.binary
		Temperature	oic.r.temperature
Air Purifier	oic.d.airpurifier	Binary Switch	oic.r.switch.binary
Air Quality Monitor	oic.d.airqualitymonitor	Air Quality Collection	oic.r.airqualitycollection
Battery	oic.d.battery	Battery	oic.r.battery
Blind	oic.d.blind	Open Level	oic.r.openlevel
Camera	oic.d.camera	Media	oic.r.media
Clothes Washer Dryer	oic.d.washerdryer	Binary Switch	oic.r.switch.binary
		Operational State	oic.r.operational.state
Coffee Machine	oic.d.coffeemachine	Binary Switch	oic.r.switch.binary
		Operational State	oic.r.operational.state
Cooker Hood	oic.d.cookerhood	Airflow Control	oic.r.airflowcontrol
		Binary Switch	oic.r.switch.binary
		Mode	oic.r.mode
Cooktop	oic.d.cooktop	Heating Zone Collection	oic.r.heatingzonecollection

Dehumidifier	oic.d.dehumidifier	Binary Switch	oic.r.switch.binary
		Humidity	oic.r.humidity
Dishwasher	oic.d.dishwasher	Binary Switch	oic.r.switch.binary
		Mode	oic.r.mode
Door	oic.d.door	Open Level	oic.r.openlevel
Dryer (Laundry)	oic.d.dryer	Binary switch	oic.r.switch.binary
		Mode	oic.r.mode
Electric Vehicle Charger	oic.d.electricvehiclecharger	Binary Switch	oic.r.switch.binary
		Operational State	oic.r.operational.state
		Battery	oic.r.battery
		Vehicle Connector	oic.r.vehicleconnector
Electric Meter	oic.d.electrictmeter	Energy Consumption	oic.r.energy.consumption
Energy Generator	oic.d.energygenerator	Energy Generation	oic.r.energy.generation
Fan	oic.d.fan	Binary Switch	oic.r.switch.binary
Food Probe	oic.d.foodprobe	Temperature (Sensor)	oic.r.temperature
Freezer	oic.d.freezer	Temperature(2)(1 Sensor and 1 Actuator)	oic.r.temperature
Garage Door	oic.d.garagedoor	Door	oic.r.door
Generic Sensor	oic.d.sensor	Any Resource Type that supports and exposes in "/oic/res" the oic.if.s interface.	oic.r. <x> Where this equates to any Resource Type that supports the oic.if.s Interface.

Grinder	oic.d.grinder	Operational State	oic.r.operational.state
		Grinder Settings	oic.r.grinder
Humidifier	oic.d.humidifier	Binary Switch	oic.r.switch.binary
Light	oic.d.light	Binary Switch	oic.r.switch.binary
Oven	oic.d.oven	Binary Switch	oic.r.switch.binary
		Temperature (2) (1 Sensor and 1 Actuator)	oic.r.temperature
Printer	oic.d.printer	Binary Switch	oic.r.switch.binary
		Operational State	oic.r.operational.state
Printer Multi-Function	oic.d.multifunctionprinter	Binary switch	oic.r.switch.binary
		Operational State (2) ¹	oic.r.operational.state
		Automatic Document Feeder	oic.r.automaticdocumentfeeder ²
Receiver	oic.d.receiver	Binary Switch	oic.r.switch.binary
		Audio Controls	oic.r.audio
		Media Source List (2)	oic.r.media.input, oic.r.media.output
Refrigerator	oic.d.refrigerator	Temperature (2) (1 Sensor and 1 Actuator)	oic.r.temperature
Robot Cleaner	oic.d.robotcleaner	Binary Switch	oic.r.switch.binary
		Mode	oic.r.mode

¹ A Multi-Function Printer shall expose two instances of an Operational State resource; each in discrete Collections, one for the Printer specific operational state information and one for the Scanner specific operational state information. The friendly name for the Collections should indicate the device modality (printer or scanner).

² A Multi-Function Printer shall only expose an Automatic Document Feeder resource if the device has the Automatic Document Feeder capability.

Scanner	oic.d.scanner	Binary Switch	oic.r.switch.binary
		Operational State	oic.r.operational.state
		Automatic Document Feeder	oic.r.automaticdocumentfeeder
Security Panel	oic.d.securitypanel	Mode	oic.r.mode
Set Top Box	oic.d.stb	Binary Switch	oic.r.switch.binary
Smart Lock	oic.d.smartlock	Lock Status	oic.r.lock.status
Smart Plug	oic.d.smartplug	Binary Switch	oic.r.switch.binary
Switch	oic.d.switch	Binary Switch	oic.r.switch.binary
Television	oic.d.tv	Binary Switch	oic.r.switch.binary
		Audio Controls	oic.r.audio
		Media Source List	oic.r.media.input
Thermostat	oic.d.thermostat	Temperature (2) (1 Sensor and 1 Actuator)	oic.r.temperature
Washer (Laundry)	oic.d.washer	Binary Switch	oic.r.switch.binary
		Operational State	oic.r.operational.state
Water Heater	oic.d.waterheater	Binary Switch	oic.r.switch.binary
		Temperature(2) (1 Sensor and 1 Actuator)	oic.r.temperature
Water Valve	oic.d.watervalve	Open Level	oic.r.openlevel
Window	oic.d.window	Open Level	oic.r.openlevel

312 **9.2 Standardized enumeration values**

313 Resource Types may have a list of supported enumeration values. The supported enumeration
314 values may differ when applied in different devices. In this section the affected Resource Types
315 are described by:

- 316 • Generic list of supported values
- 317 • Mandated list of supported values when applied to a specific Device

318 **9.3 Alphabetical list of standardized enumeration types**

319 This section lists the standardized enumeration types that are used in the oic.r.mode,
320 oic.r.operational.state, and oic.r.consumable Resources.

- 321 • aborted
 - 322 ○ An internal device, communication or security error
- 323 • active
 - 324 ○ Unit is active
- 325 • airDry
 - 326 ○ unit is air drying
- 327 • armedAway
 - 328 ○ unit is armed for away
- 329 • armedInstant
 - 330 ○ unit is armed instantly
- 331 • armedMaximum
 - 332 ○ unit is armed at maximum level
- 333 • armedNightStay
 - 334 ○ unit is armed in night stay
- 335 • armedStay
 - 336 ○ unit is armed in stay mode
- 337 • brewing
 - 338 ○ unit is in brewing state or mode
- 339 • cancelled
 - 340 ○ the job was cancelled either by the remote client or by the user
- 341 • completed
 - 342 ○ job finished successfully
- 343 • down

- 344 ○ unit is unavailable
- 345 • dry
- 346 ○ unit is dry mode
- 347 • disabled
- 348 ○ unit's current operational mode is disabled
- 349 • enabled
- 350 ○ unit's current operational mode is enabled
- 351 • filterMaterial
- 352 ○ filter material that is used by a device
- 353 • grinding
- 354 ○ unit is in grinding state or mode
- 355 • idle
- 356 ○ new jobs can start processing without waiting
- 357 • ink
- 358 ○ generic ink cartridge for a device
- 359 • inkBlack
- 360 ○ black ink cartridge for a device
- 361 • inkCyan
- 362 ○ cyan ink cartridge for a device
- 363 • inkMagenta
- 364 ○ magenta ink cartridge for a device
- 365 • inkTricolour
- 366 ○ tricolour ink cartridge for a device
- 367 • inkYellow
- 368 ○ yellow ink cartridge for a device
- 369 • keepwarm
- 370 ○ unit is in keep warm state or mode
- 371 • notsupported
- 372 ○ ability to set a specific operational mode by a client is not supported
- 373 • pause

- 374
 - unit is paused (by user)
- 375
 - pending
- 376
 - job initiated, engine is preparing
- 377
 - pendingHeld
- 378
 - job is not a candidate for processing for any number of reasons, will return to
- 379
 - pending state if reasons are solved.
- 380
 - preWash
- 381
 - unit is pre wash mode
- 382
 - processing
- 383
 - processing the job
- 384
 - rinse
- 385
 - unit is rinse mode
- 386
 - stopped
- 387
 - error condition occurred
- 388
 - spin
- 389
 - unit is in spin mode
- 390
 - testing
- 391
 - calibrating, preparing the unit
- 392
 - toner
- 393
 - generic toner cartridge for a device
- 394
 - tonerBlack
- 395
 - black toner cartridge for a device
- 396
 - tonerCyan
- 397
 - cyan toner cartridge for a device
- 398
 - tonerMagenta
- 399
 - magenta toner cartridge for a device
- 400
 - tonerYellow
- 401
 - yellow toner cartridge for a device
- 402
 - wash
- 403
 - unit is in wash mode

- 404 • wrinklePrevent
- 405 ○ unit is in winkle prevent mode

406 9.4 Standardized list of supported values for Mode Resource Type (oic.r.mode)

407 The following enumeration values apply to both the supportedModes and modes Properties within
 408 the Mode Resource Type.

409 **Table 9-2 list of required oic.r.mode supported values per device type (“rt”)**

Device Name (informative)	Device Type (rt) (Normative)	Required enumeration value
Security Panel	oic.d.securityPanel	active
		armedAway
		armedInstant
		armedMaximum
		armedNightStay
		armedStay

410

411 The modes can be viewed upon as mode changes of the device. However this specification does
 412 not impose any relationship between the different modes of a Device. Hence all mode changes are
 413 expected to occur from a Client point of view.

```

414 @startuml
415 title An example mode transition diagram of an Dryer, not all mode transistions are
416 listed.
417
418 [*] --> idle
419
420 idle --> airDry: start drying
421 idle: waiting until starting to dry
422 airDry --> completed : drying completed
423 airDry: air drying contents of Dryer
424 airDry --> aborted: drying aborted
425 aborted: functional device error, maintaince needed
426
427 airDry --> cancelled : drying cancelled
428 cancelled: cancelled by user, either resume or stop
429 cancelled --> idle : removed contents, restart machine
430 cancelled --> airDry : resume drying
431
432 aborted --> [*] : shut down machine
433 completed --> [*] : shut down machine
434 cancelled --> [*] : shut down machine
435
436 completed --> idle : contents removed
437 completed: contents of machine is dry
  
```

```

438 idle --> [*] : shutdown machine
439
440 @enduml
441

```

An example mode transition diagram of an Dryer, not all mode transitions are listed.

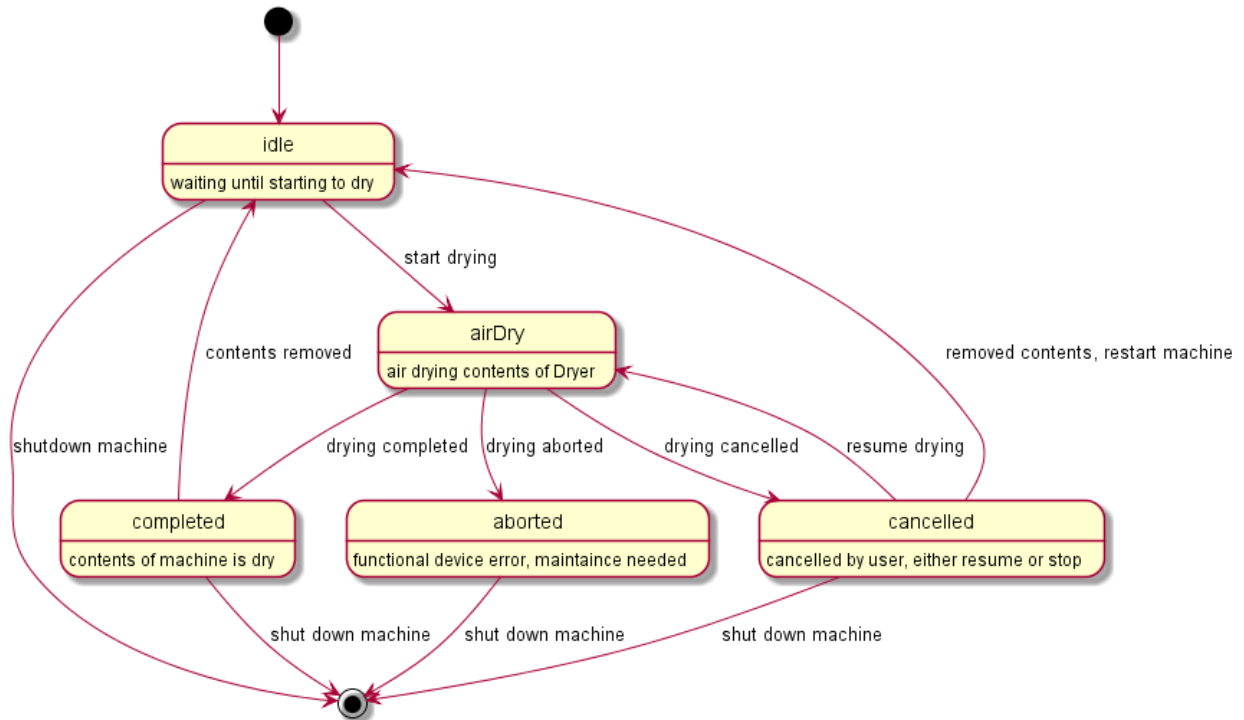


Figure 2 Example of mode transitions of a Dryer.

9.5 Standardized list of supported values for Operational State Resource Type (oic.r.operational.state)

The following enumeration values apply to the jobStates and machineStates Properties within the operational state Resource Type.

Table 9-3 list of required oic.r.operational.state supported values per Device Type (“rt”)

Device Name (informative)	Device Type (rt) (Normative)	Required enumeration value machineStates	Required enumeration value jobStates
Printer	oic.d.printer	idle	pending
		processing	pendingHeld
		stopped	processing
			cancelled

			aborted
			completed
Printer Multi-Function	oic.d.multifunctionPrinter	See printer	See printer
		See scanner	See scanner
scanner	oic.d.scanner	idle	cancelled
		processing	aborted
		testing	completed
		stopped	pending
		down	processing

450 The operational state can be viewed as state changes of the device that includes separate handling
451 of jobs within the overall machine state. However this specification does not impose any
452 relationship between the different machine or job states of a device. Hence all machine states and
453 or jobstate changes are expected to occur from a Client point of view.

454

```

455 @startuml
456 title An example machine and job states of an Printer, not all state transistions are
457 listed.
458
459 [*] --> idle
460 idle --> processing: process an job
461 idle: waiting until starting an job
462 processing --> completed : job completed
463 processing: printing an job
464 completed --> idle: ready for next job
465 completed: printing completed (or cancelled)
466 stopped --> idle: blockage removed
467 stopped: device in error state
468 processing --> stopped : job stopped
469
470
471 idle --> [*] : shutdown printer
472 stopped --> [*] : shutdown printer
473 completed --> [*] : shutdown printer
474
475 state "processing" as processing {
476
477 [*] --> jobpending
478 state "pending (job)" as jobpending
479 state "pendingHeld (job)" as jobpendingheld
480 state "processing (job)" as jobprocessing
481 state "completed (job)" as jobcompleted
482 state "cancelled (job)" as jobcancelled
483 state "aborted (job)" as jobaborted
484
485

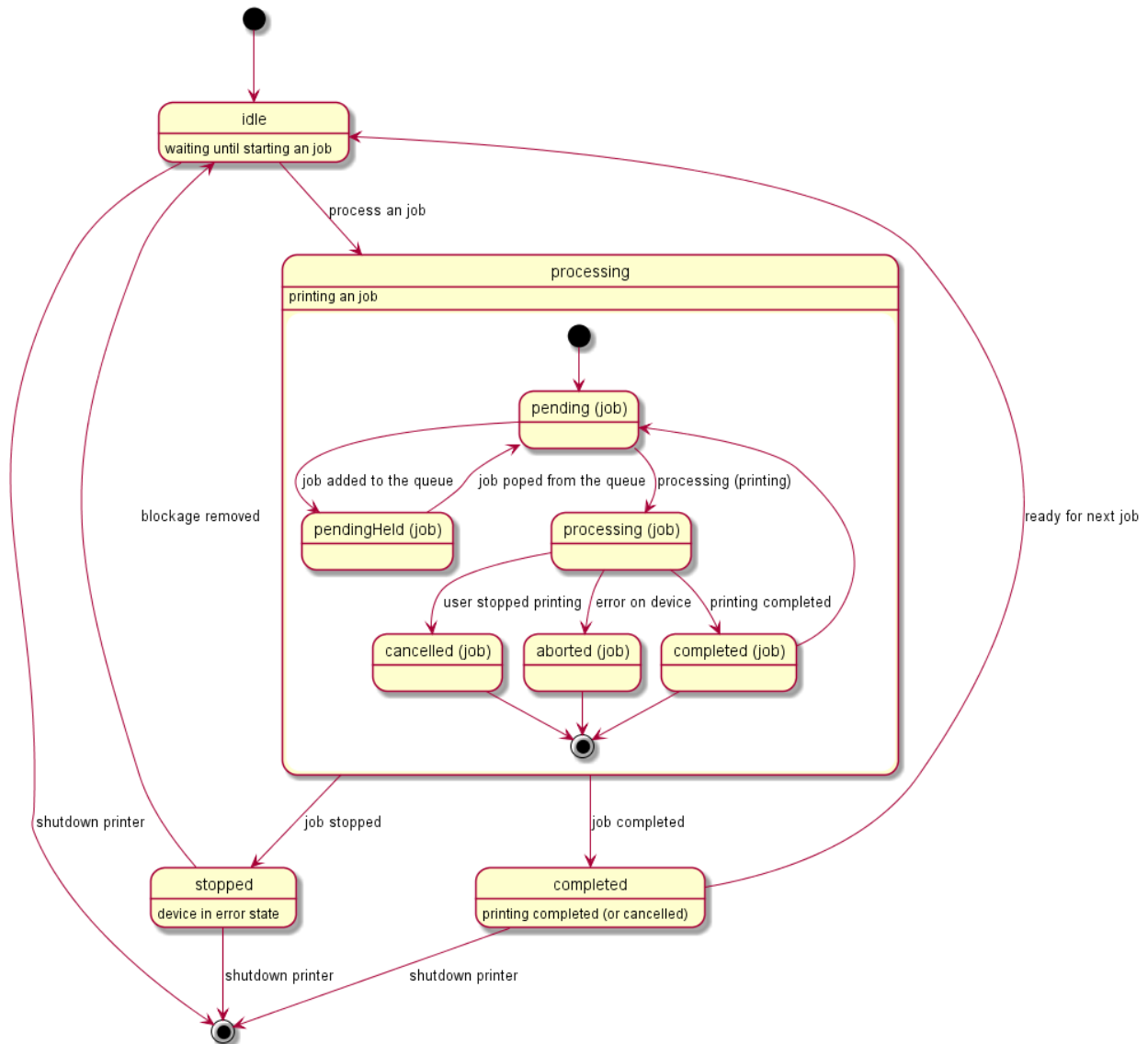
```

```

486 jobpending --> jobpendingheld : job added to the queue
487 jobpendingheld --> jobpending : job popped from the queue
488 jobpending --> jobprocessing : processing (printing)
489 jobprocessing --> jobcompleted : printing completed
490 jobprocessing --> jobaborted : error on device
491 jobprocessing --> jobcancelled : user stopped printing
492
493
494 jobcompleted --> jobpending
495 jobaborted --> [*]
496 jobcompleted --> [*]
497 jobcancelled --> [*]
498
499 }
500
501
502 @enduml

```

An example machine and job states of a Printer, not all state transitions are listed.



503 **Figure 3 Example of mode transitions of a Printer.**

505

506 **9.6 Standardized list of supported values for Consumable and Consumable Collection**
 507 **Resource Types (oic.r.consumable, oic.r.consumablecollection)**

508 The following enumeration values may be populated in both the supportedconsumables (in
 509 oic.r.consumablecollection) and typeofconsumable (in oic.r.consumable) Properties within the
 510 Consumable and Consumable Collection Resource Types. The typeofconsumable Property shall
 511 only be populated with a value exposed within the supportedconsumables Property in a specific
 512 instance of the Consumable Collection Resource Type.

513 This constitutes the known set of possible values for these Properties in the Consumable and
 514 Consumable Collection Resources. A vendor may extend this set by providing vendor defined
 515 enumerations following the convention defined in the OCF Resource Type Specification.

516 **Table 9-4 list of defined enumeration values for oic.r.consumable,**
 517 **oic.r.consumablecollection**

Friendly Name (informative)	Enumeration Value (Normative)	Description (Informative)
Toner Cartridge	toner	Generic toner cartridge.
Black Toner Cartridge	tonerBlack	Black toner cartridge
Cyan Toner Cartridge	tonerCyan	Cyan toner cartridge
Magenta Toner Cartridge	tonerMagenta	Magenta toner cartridge
Yellow Toner Cartridge	tonerYellow	Yellow toner cartridge
Filter Material	filterMaterial	Any replaceable or reusable filter material; such as water filters, air filters, dust filters etc.
Ink Cartridge	ink	Generic ink cartridge
Black Ink Cartridge	inkBlack	Black ink cartridge
Cyan Ink Cartridge	inkCyan	Cyan ink cartridge
Magenta Ink Cartridge	inkMagenta	Magenta ink cartridge
Yellow Ink Cartridge	inkYellow	Yellow ink cartridge

Tricolour Ink Cartridge	inkTricolour	Tri-colour ink cartridge; typically Cyan plus Magenta plus Yellow.
-------------------------	--------------	--

518

519 **9.6 Camera Media Format (oic.r.media)**

520 The supported camera media formats can be discovered by looking at the SDP (see IETF RFC
521 4566) list of the media Resource Type. The recommended list of supported media formats are
522 listed in Table 9-5.

523

Table 9-5 Recommended media profiles.

Mediatype	codec	Content container format	transport	Additional information
Audio	AAC		RTP	
Video	H.264		RTP	Recommended minimal resolution 1920x1080 (width, height)
Video	H.264/AAC	MPEG-2 TS	RTP	Recommended minimal resolution 1920x1080 (width, height)
Still image	JPEG	JPEG	RTP	Recommended minimal resolution 1920x1080 (width, height)

524