



OCF CORE SPECIFICATION BANGKOK

Deleted: OCF CORE
SPECIFICATION
V1.3.1OCF CORE
SPECIFICATION
BANGKOK

Part 1

Open Connectivity Foundation (OCF)
admin@openconnectivity.org

Legal Disclaimer

2 Legal Disclaimer
3
4 NOTHING CONTAINED IN THIS DOCUMENT SHALL BE DEEMED AS GRANTING YOU ANY
5 KIND OF LICENSE IN ITS CONTENT, EITHER EXPRESSLY OR IMPLIEDLY, OR TO ANY
6 INTELLECTUAL PROPERTY OWNED OR CONTROLLED BY ANY OF THE AUTHORS OR
7 DEVELOPERS OF THIS DOCUMENT. THE INFORMATION CONTAINED HEREIN IS PROVIDED
8 ON AN "AS IS" BASIS, AND TO THE MAXIMUM EXTENT PERMITTED BY APPLICABLE LAW,
9 THE AUTHORS AND DEVELOPERS OF THIS SPECIFICATION HEREBY DISCLAIM ALL OTHER
10 WARRANTIES AND CONDITIONS, EITHER EXPRESS OR IMPLIED, STATUTORY OR AT
11 COMMON LAW, INCLUDING, BUT NOT LIMITED TO, IMPLIED WARRANTIES OF
12 MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. OPEN CONNECTIVITY
13 FOUNDATION, INC. FURTHER DISCLAIMS ANY AND ALL WARRANTIES OF NON-
14 INFRINGEMENT, ACCURACY OR LACK OF VIRUSES.

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

17 Copyright © 2016-2018 Open Connectivity Foundation, Inc. All rights reserved.

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

20

CONTENTS

21

22	1 Scope	15
23	2 Normative references.....	15
24	3 Terms, definitions, symbols and abbreviations	18
25	3.1 Terms and definitions	18
26	3.2 Symbols and abbreviations	21
27	3.3 Conventions	23
28	3.4 Data types.....	23
29	4 Document conventions and organization.....	24
30	5 Architecture	25
31	5.1 Overview.....	25
32	5.2 Principle.....	26
33	5.3 Functional block diagram	27
34	5.4 Framework	28
35	5.5 Example Scenario with roles	29
36	5.6 Example Scenario: Bridging to Non- OCF ecosystem	30
37	5.7 OCF Cloud architecture	31
38	6 Identification and addressing.....	33
39	6.1 Introduction	33
40	6.2 Identification	33
41	6.2.1 Resource identification and addressing.....	34
42	6.3 Namespace:	35
43	6.4 Network addressing.....	35
44	7 Resource model.....	35
45	7.1 Introduction	35
46	7.2 Resource	36
47	7.3 Property	37
48	7.3.1 Introduction	37
49	7.3.2 Common Properties.....	37
50	7.4 Resource Type	39
51	7.4.1 Introduction	39
52	7.4.2 Resource Type Property	39
53	7.4.3 Resource Type definition	40
54	7.4.4 Multi-value "rt" Resource	41
55	7.5 Device Type	42
56	7.6 Interface.....	42
57	7.6.1 Introduction.....	42
58	7.6.2 Interface Property	43
59	7.6.3 Interface methods	43
60	7.7 Resource representation.....	57
61	7.8 Structure	58
62	7.8.1 Introduction.....	58

63	7.8.2	Resource Relationships.....	58
64	7.8.3	Collections	63
65	7.9	Third (3 rd) party specified extensions	65
66	7.10	Query Parameters	66
67	7.10.1	Introduction	66
68	7.10.2	Use of multiple parameters within a query.....	66
69	7.10.3	Application to multi-value "rt" Resources.....	67
70	7.10.4	Interface specific considerations for queries.....	67
71	8	CRUDN	67
72	8.1	Overview	67
73	8.2	CREATE	69
74	8.2.1	CREATE request.....	69
75	8.2.2	Processing by the Server.....	69
76	8.2.3	CREATE response	70
77	8.3	RETRIEVE	70
78	8.3.1	RETRIEVE request.....	70
79	8.3.2	Processing by the Server.....	70
80	8.3.3	RETRIEVE response	70
81	8.4	UPDATE	71
82	8.4.1	UPDATE request.....	71
83	8.4.2	Processing by the Server.....	72
84	8.4.3	UPDATE response	72
85	8.5	DELETE	73
86	8.5.1	DELETE request	73
87	8.5.2	Processing by the Server.....	73
88	8.5.3	DELETE response	73
89	8.6	NOTIFY.....	74
90	9	Network and connectivity	74
91	9.1	Introduction	74
92	9.2	Architecture.....	74
93	9.3	IPv6 network layer requirements	75
94	9.3.1	Introduction	75
95	9.3.2	IPv6 node requirements.....	76
96	10	Endpoint	76
97	10.1	Endpoint definition.....	76
98	10.2	Endpoint information.....	77
99	10.2.1	Introduction	77
100	10.2.2	"ep"	77
101	10.2.3	"pri"	77
102	10.2.4	Endpoint information in "eps" Parameter	78
103	10.3	Endpoint discovery	78
104	10.3.1	Introduction	78
105	10.3.2	Implicit discovery.....	78
106	10.3.3	Explicit discovery with "/oic/res" response	78

107	10.4 CoAP based Endpoint discovery	83
108	11 Functional interactions	83
109	11.1 Introduction	83
110	11.2 Onboarding, Provisioning and Configuration	83
111	11.3 Resource discovery	86
112	11.3.1 Introduction	86
113	11.3.2 Resource based discovery: mechanisms	86
114	11.3.3 Resource based discovery: Information publication process	88
115	11.3.4 Resource based discovery: Finding information	88
116	11.3.5 Resource discovery using "/oic/res"	95
117	11.3.6 Resource directory (RD) based discovery	97
118	11.4 Notification	109
119	11.4.1 Overview	109
120	11.4.2 Observe	109
121	11.5 Device management	111
122	11.5.1 Overview	111
123	11.5.2 Diagnostics and maintenance	111
124	11.5.3 Network monitoring	112
125	11.6 Scenes	115
126	11.6.1 Introduction	115
127	11.6.2 Scenes	115
128	11.6.3 Security considerations	120
129	11.7 Icons	121
130	11.7.1 Overview	121
131	11.7.2 Resource	121
132	11.8 Introspection	121
133	11.8.1 Overview	121
134	11.8.2 Usage of introspection	124
135	12 Messaging	125
136	12.1 Introduction	125
137	12.2 Mapping of CRUDN to CoAP	126
138	12.2.1 Overview	126
139	12.2.2 URIs	126
140	12.2.3 CoAP method with request and response	126
141	12.2.4 Content-Format negotiation	128
142	12.2.5 OCF-Content-Format-Version information	129
143	12.2.6 Content-Format policy	129
144	12.2.7 CRUDN to CoAP response codes	132
145	12.2.8 CoAP block transfer	132
146	12.3 CoAP serialization over TCP	133
147	12.3.1 Introduction	133
148	12.3.2 Indication of support	133
149	12.3.3 Message type and header	133
150	12.3.4 URI scheme	133

151	12.3.5	KeepAlive	133
152	12.3.6	CoAP native Cloud	133
153	12.4	Payload Encoding in CBOR	136
154	13	Security	136
155	Annex A (informative)	Operation Examples	137
156	A.1	Introduction	137
157	A.2	When at home: From smartphone turn on a single light	137
158	A.3	GroupAction execution	138
159	A.4	When garage door opens, turn on lights in hall; also notify smartphone	138
160	A.5	Device management.....	138
161	Annex B (informative)	OCF interaction scenarios and deployment models	140
162	B.1	OCF interaction scenarios	140
163	B.2	Deployment model.....	141
164	Annex C (informative)	Other Resource Models and OCF Mapping	143
165	C.1	Multiple resource models	143
166	C.2	OCF approach for support of multiple resource models	143
167	C.3	Resource model indication.....	144
168	C.4	An Example Profile (IPSO profile).....	144
169	C.4.1	Conceptual equivalence	144
170	Annex D (normative)	Resource Type definitions.....	147
171	D.1	List of Resource Type definitions	147
172	D.2	OCF Collection	148
173	D.2.1	Introduction	148
174	D.2.2	Example URI.....	148
175	D.2.3	Resource Type	148
176	D.2.4	RAML Definition	148
177	D.2.5	Property Definition	162
178	D.2.6	CRUDN behaviour.....	164
179	D.2.7	Referenced JSON schemas.....	164
180	D.2.8	oic.oic-link-schema.json	164
181	D.3	Device Configuration	166
182	D.3.1	Introduction	166
183	D.3.2	Example URI.....	166
184	D.3.3	Resource Type	166
185	D.3.4	RAML Definition	166
186	D.3.5	Property Definition	171
187	D.3.6	CRUDN behaviour.....	171
188	D.4	Platform Configuration	171
189	D.4.1	Introduction	171
190	D.4.2	Example URI.....	171
191	D.4.3	Resource Type	171
192	D.4.4	RAML Definition	171
193	D.4.5	Property Definition	175
194	D.4.6	CRUDN behaviour.....	175

195	D.5 Device.....	175
196	D.5.1 Introduction	175
197	D.5.2 Wellknown URI.....	175
198	D.5.3 Resource Type.....	175
199	D.5.4 RAML Definition	175
200	D.5.5 Property Definition	177
201	D.5.6 CRUDN behaviour.....	178
202	D.6 Maintenance	178
203	D.6.1 Introduction.....	178
204	D.6.2 Wellknown URI.....	178
205	D.6.3 Resource Type.....	178
206	D.6.4 RAML Definition	178
207	D.6.5 Property Definition	181
208	D.6.6 CRUDN behaviour.....	181
209	D.7 Platform	181
210	D.7.1 Introduction.....	181
211	D.7.2 Wellknown URI.....	181
212	D.7.3 Resource Type.....	181
213	D.7.4 RAML Definition	181
214	D.7.5 Property Definition	183
215	D.7.6 CRUDN behaviour.....	184
216	D.8 Discoverable Resources Baseline Interface.....	184
217	D.8.1 Introduction.....	184
218	D.8.2 Wellknown URI.....	184
219	D.8.3 Resource Type.....	184
220	D.8.4 RAML Definition	184
221	D.8.5 Property Definition	186
222	D.8.6 CRUDN behaviour.....	186
223	D.9 Discoverable Resources Link List interface	187
224	D.9.1 Introduction.....	187
225	D.9.2 Wellknown URI.....	187
226	D.9.3 Resource Type.....	187
227	D.9.4 RAML Definition	187
228	D.9.5 Property Definition	188
229	D.9.6 CRUDN behaviour.....	189
230	D.9.7 Referenced JSON schemas	189
231	D.9.8 oic.oic-link-schema.json	189
232	D.10 Scenes (Top level)	191
233	D.10.1 Introduction	191
234	D.10.2 Example URI	191
235	D.10.3 Resource Type.....	191
236	D.10.4 RAML Definition	192
237	D.10.5 Property Definition	197
238	D.10.6 CRUDN behaviour.....	197

239	D.11 Scene Collections.....	197
240	D.11.1 Introduction.....	197
241	D.11.2 Example URI.....	197
242	D.11.3 Resource Type.....	197
243	D.11.4 RAML Definition	197
244	D.11.5 Property Definition	200
245	D.11.6 CRUDN behaviour.....	200
246	D.12 Scene Member	200
247	D.12.1 Introduction.....	200
248	D.12.2 Example URI.....	200
249	D.12.3 Resource Type.....	200
250	D.12.4 RAML Definition	200
251	D.12.5 Property Definition	202
252	D.12.6 CRUDN behaviour.....	202
253	D.13 Resource directory resource	202
254	D.13.1 Introduction.....	202
255	D.13.2 Wellknown URI.....	202
256	D.13.3 Resource Type.....	202
257	D.13.4 RAML Definition	202
258	D.13.5 Property Definition	206
259	D.13.6 CRUDN behaviour.....	206
260	D.14 Icon	206
261	D.14.1 Introduction.....	206
262	D.14.2 Example URI.....	206
263	D.14.3 Resource Type.....	206
264	D.14.4 RAML Definition	206
265	D.14.5 Property Definition	207
266	D.14.6 CRUDN behaviour.....	208
267	D.15 Introspection Resource.....	208
268	D.15.1 Introduction.....	208
269	D.15.2 Example URI.....	208
270	D.15.3 Resource Type.....	208
271	D.15.4 RAML Definition	208
272	D.15.5 Property Definition	209
273	D.15.6 CRUDN behaviour.....	210
274	Annex E (normative) OIC 1.1 Resource Type definitions	211
275	E.1 List of Resource Type Definitions.....	211
276	E.2 Collection, baseline interface	211
277	E.2.1 Introduction	211
278	E.2.2 Example URI	211
279	E.2.3 Resource Type	211
280	E.2.4 RAML Definition	211
281	E.2.5 Property Definition	216
282	E.2.6 CRUDN behavior.....	217

283	E.2.7	Referenced JSON schemas	217
284	E.2.8	oic.oic-link-schema.json	217
285	E.3	Collection, link list interface	219
286	E.3.1	Introduction	219
287	E.3.2	Example URI	220
288	E.3.3	Resource Type	220
289	E.3.4	RAML Definition	220
290	E.3.5	Property Definition	221
291	E.3.6	CRUDN behavior	222
292	E.3.7	Referenced JSON schemas	222
293	E.3.8	oic.oic-link-schema.json	222
294	E.4	Discoverable Resources, baseline interface	224
295	E.4.1	Introduction	224
296	E.4.2	Wellknown URI	224
297	E.4.3	Resource Type	224
298	E.4.4	RAML Definition	224
299	E.4.5	Property Definition	226
300	E.4.6	CRUDN behavior	227
301	E.5	Discoverable Resources, link list interface	227
302	E.5.1	Introduction	227
303	E.5.2	Wellknown URI	227
304	E.5.3	Resource Type	227
305	E.5.4	RAML Definition	227
306	E.5.5	Property Definition	228
307	E.5.6	CRUDN behavior	229
308	E.5.7	Referenced JSON schemas	230
309	E.5.8	oic.oic-link-schema.json	230
310	Annex F (informative)	Swagger2.0 definitions	233
311	F.1	Icon	233
312	F.1.1	Introduction	233
313	F.1.2	Example URI	233
314	F.1.3	Resource Type	233
315	F.1.4	Swagger2.0 Definition	233
316	F.1.5	Property Definition	235
317	F.1.6	CRUDN behaviour	235
318	F.2	Introspection Resource	236
319	F.2.1	Introduction	236
320	F.2.2	Wellknown URI	236
321	F.2.3	Resource Type	236
322	F.2.4	Swagger2.0 Definition	236
323	F.2.5	Property Definition	238
324	F.2.6	CRUDN behaviour	239
325	F.3	OCF Collection	239
326	F.3.1	Introduction	239

327	F.3.2	Example URI.....	239
328	F.3.3	Resource Type.....	239
329	F.3.4	Swagger2.0 Definition	239
330	F.3.5	Property Definition	252
331	F.3.6	CRUDN behaviour.....	253
332	F.4	Platform Configuration.....	253
333	F.4.1	Introduction.....	253
334	F.4.2	Example URI.....	253
335	F.4.3	Resource Type.....	253
336	F.4.4	Swagger2.0 Definition	253
337	F.4.5	Property Definition	257
338	F.4.6	CRUDN behaviour.....	258
339	F.5	Platform Configuration.....	258
340	F.5.1	Introduction.....	258
341	F.5.2	Wellknown URI.....	258
342	F.5.3	Resource Type.....	258
343	F.5.4	Swagger2.0 Definition	258
344	F.5.5	Property Definition	262
345	F.5.6	CRUDN behaviour.....	263
346	F.6	Device Configuration.....	263
347	F.6.1	Introduction.....	263
348	F.6.2	Example URI.....	263
349	F.6.3	Resource Type.....	263
350	F.6.4	Swagger2.0 Definition	263
351	F.6.5	Property Definition	268
352	F.6.6	CRUDN behaviour.....	269
353	F.7	Device.....	269
354	F.7.1	Introduction.....	269
355	F.7.2	Wellknown URI.....	269
356	F.7.3	Resource Type.....	269
357	F.7.4	Swagger2.0 Definition	269
358	F.7.5	Property Definition	273
359	F.7.6	CRUDN behaviour.....	273
360	F.8	Maintenance	274
361	F.8.1	Introduction.....	274
362	F.8.2	Wellknown URI.....	274
363	F.8.3	Resource Type.....	274
364	F.8.4	Swagger2.0 Definition	274
365	F.8.5	Property Definition	276
366	F.8.6	CRUDN behaviour.....	277
367	F.9	Platform	277
368	F.9.1	Introduction.....	277
369	F.9.2	Wellknown URI.....	277
370	F.9.3	Resource Type.....	277

371	F.9.4	Swagger2.0 Definition	277
372	F.9.5	Property Definition	280
373	F.9.6	CRUDN behaviour.....	281
374	F.10	Resource directory resource	281
375	F.10.1	Introduction.....	281
376	F.10.2	Wellknown URI.....	281
377	F.10.3	Resource Type.....	281
378	F.10.4	Swagger2.0 Definition	281
379	F.10.5	Property Definition	290
380	F.10.6	CRUDN behaviour.....	292
381	F.11	Discoverable Resources	292
382	F.11.1	Introduction.....	292
383	F.11.2	Wellknown URI.....	292
384	F.11.3	Resource Type.....	292
385	F.11.4	Swagger2.0 Definition	292
386	F.11.5	Property Definition	299
387	F.11.6	CRUDN behaviour.....	300
388	F.12	Scene List.....	300
389	F.12.1	Introduction.....	300
390	F.12.2	Example URI.....	300
391	F.12.3	Resource Type.....	300
392	F.12.4	Swagger2.0 Definition	300
393	F.12.5	Property Definition	315
394	F.12.6	CRUDN behaviour.....	317
395	F.13	Scene Collection	317
396	F.13.1	Introduction.....	317
397	F.13.2	Example URI.....	317
398	F.13.3	Resource Type.....	317
399	F.13.4	Swagger2.0 Definition	317
400	F.13.5	Property Definition	332
401	F.13.6	CRUDN behaviour.....	334
402	F.14	Scene Member	334
403	F.14.1	Introduction.....	334
404	F.14.2	Example URI.....	334
405	F.14.3	Resource Type.....	334
406	F.14.4	Swagger2.0 Definition	335
407	F.14.5	Property Definition	349
408	F.14.6	CRUDN behaviour.....	351
409	Annex G (informative)	Swagger2.0 Schema Extension	352
410	G.1	Swagger 2.0 Schema Reference.....	352
411	G.2	Swagger 2.0 Introspection empty file	352
412			
413			

414
415
416

Figures

417	Figure 1: Architecture - concepts	26
418	Figure 2: Functional block diagram	27
419	Figure 3: Communication layering model	28
420	Figure 4: Example illustrating the Roles.....	30
421	Figure 5: Framework - Architecture Detail.....	31
422	Figure 6: Server bridging to Non- OCF device.....	31
423	Figure 7: OCF Cloud deployment architecture.....	32
424	Figure 8: Endpoint routing	33
425	Figure 9. CREATE operation	69
426	Figure 10. RETRIEVE operation	70
427	Figure 11. UPDATE operation	71
428	Figure 12. DELETE operation	73
429	Figure 13. High Level Network & Connectivity Architecture	75
430	Figure 14. Resource based discovery: Information publication process.....	88
431	Figure 15. Resource based discovery: Finding information	89
432	Figure 16. Indirect discovery of Resources by via an RD.....	98
433	Figure 17. RD discovery and RD supported query of Resources support	100
434	Figure 18. Resource Direction Deployment Scenarios	101
435	Figure 19. Observe Mechanism	110
436	Figure 20. Interactions with the network monitoring Resource	114
437	Figure 21. State transition diagram of collecting network information.....	115
438	Figure 22 Generic scene resource structure.....	116
439	Figure 23 Interactions to check Scene support and setup of specific scenes.....	117
440	Figure 24 Client interactions on a specific scene.....	118
441	Figure 25 Interaction overview due to a Scene change.....	120
442	Figure 26 Interactions to check Introspection support and download the Introspection Device Data	125
444	Figure 27 Content-Format Policy for OIC 1.1 Client and OIC 1.1 Server	130
445	Figure 28 Content-Format Policy for OCF 1.X Client with OIC 1.1 and OCF 1.X Servers (Content-Format Mismatch).....	131
447	Figure 29 Content-Format Policy for Future OCF Client with OCF 1.X Servers (Content-Format-Version Mismatch)	132
449	Figure 30 Resource discovery through OCF Cloud.....	135
450	Figure 31 Endpoint routing through OCF Cloud.....	136
451	Figure 32. When at home: from smartphone turn on a single light.....	138
452	Figure 33. Device management (maintenance)	139
453	Figure 34. Direct interaction between Server and Client	140

454	Figure 35. Interaction between Client and Server using another Server	140
455	Figure 36. Interaction between Client and Server using Intermediary.....	140
456	Figure 37. Interaction between Client and Server using support from multiple Servers and Intermediary.....	141
458	Figure 38. Example of Devices	141

459

Tables

460	Table 1. Additional OCF Types.....	23
461		
462	Table 2. Name Property Definition	38
463		
464	Table 3. Resource Identity Property Definition	39
465		
466	Table 4. Resource Type Common Property definition.....	40
467		
468	Table 5. Example foobar Resource Type	40
469		
470	Table 6. Example foobar properties	40
471		
472	Table 7. Resource Interface Property definition.....	43
473		
474	Table 8. OCF standard Interfaces.....	43
475		
476	Table 9. Common Properties for Collections (in addition to Common Properties defined in section 7.3.2).....	65
477		
478	Table 10. 3rd party defined Resource elements	65
479		
480	Table 11. Parameters of CRUDN messages.....	68
481		
482	Table 12. "ep" value for Transport Protocol Suite	77
483		
484	Table 13. List of Core Resources	83
485		
486	Table 14. Configuration Resource	84
487		
488	Table 15. "oic.wk.con" Resource Type definition	84
489		
490	Table 16. "oic.wk.con.p" Resource Type definition	85
491		
492	Table 17. Mandatory discovery Core Resources	90
493		
494	Table 18. "oic.wk.res" Resource Type definition	90
495		
496	Table 19. Protocol scheme registry.....	91
497		
498	Table 20. "oic.wk.d" Resource Type definition.....	92
499		
500	Table 21. "oic.wk.p" Resource Type definition.....	93
501		
502	Table 22. "oic.wk.rd" Resource Type definition	99
503		
504	Table 23. "oic.wk.rd" Properties.....	99
505		
506	Table 24. Optional diagnostics and maintenance device management Core Resources	111
507		
508	Table 25. "oic.wk.mnt" Resource Type definition	112
509		
510	Table 26. Optional monitoring device management Core Resources.....	112
511		
512	Table 27. "oic.wk.nmon" Resource Type definition	113
513		
514	Table 28 list of Resource Types for Scenes	120
515		
516	Table 29. Optional Icon Core Resource	121
517		
518	Table 30. "oic.r.icon" Resource Type definition	121
519		
520	Table 31. Introspection Resource	124

494	Table 32. "oic.wk.introspection" Resource Type definition	124
495	Table 33. CoAP request and response.....	126
496	Table 34. OCF Content-Formats.....	128
497	Table 35. OCF-Content-Format-Version and OCF-Accept-Content-Format-Version Option Numbers.....	129
499	Table 36. OCF-Accept-Content-Format-Version and OCF-Content-Format-Version Representation	129
501	Table 37. Examples of OCF-Content-Format-Version and OCF-Accept-Content-Format- Version Representation	129
503	Table 38. oic.example.light Resource Type definition	137
504	Table 39. oic.example.garagedoor Resource Type definition	137
505	Table 40. Light control Resource Type definition.....	145
506	Table 41. Light control Resource Type definition.....	145
507	Table 42. Alphabetized list of core resources.....	147
508	Table 43. Alphabetized list of referenced OIC 1.1 core resources.....	211
509		
510		

511 **1 Scope**

512 The OCF specifications are divided into two sets of documents:

- 513 • Core Specification documents: The Core Specification documents specify the Framework, i.e.,
514 the OCF core architecture, interfaces, protocols and services to enable OCF profiles
515 implementation for Internet of Things (IoT) usages and ecosystems.
- 516 • Vertical Domain Specification documents: The Vertical Domain Specification documents
517 specify OCF Device profiles to enable IoT usages for different vertical market segments such
518 as smart home, industrial, healthcare, and automotive. They also specify Resource definitions
519 to enable vertical services and use case. Such specifications include the Device Specification
520 which is built upon the interfaces and network security of the OCF core architecture defined in
521 the Core Specification.

522 This document is the OCF Core specification which specifies the Framework and core architecture.

523

524 **2 Normative references**

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

528 ISO 8601, *Data elements and interchange formats – Information interchange –Representation of*
529 *dates and times*, International Standards Organization, December 3, 2004

530 IEEE 754, *IEEE Standard for Floating-Point Arithmetic*, August 2008

531 IETF RFC 768, *User Datagram Protocol*, August 1980
<https://www.rfc-editor.org/info/rfc768>

533 IETF RFC 1981, *Path MTU Discovery for IP version 6*, August 1996
<https://www.rfc-editor.org/info/rfc1981>

535 IETF RFC 2460, *Internet Protocol, version 6 (IPv6)*, December, 1998
<https://www.rfc-editor.org/info/rfc2460>

537 IETF RFC 2616, *Hypertext Transfer Protocol – HTTP/1.1*, June 1999.
<https://www.rfc-editor.org/info/rfc2616>

539 [IETF RFC 3339, Date and Time on the Internet: Timestamps, July 2002](#)
<https://www.rfc-editor.org/info/rfc3339>

Comment [BRA1]: BZ #1941

541 IETF RFC 3810, *Multicast Listener Discovery Version 2 (MLDv2) for IPv6*, June 2004
<https://www.rfc-editor.org/info/rfc3810>

543 IETF RFC 3986, *Uniform Resource Identifier (URI): General Syntax*, January 2005.
<https://www.rfc-editor.org/info/rfc3986>

545 IETF RFC 4122, *A Universally Unique IDentifier (UUID) URN Namespace*, July 2005
<https://www.rfc-editor.org/info/rfc4122>

547 IETF RFC 4287, *The Atom Syndication Format*, December 2005,
<https://www.rfc-editor.org/info/rfc4287>

549 IETF RFC 4193, *Unique Local IPv6 Unicast Addresses*, October 2005
<https://www.rfc-editor.org/info/rfc4193>

- 551 IETF RFC 4291, IP Version 6 Addressing Architecture, February 2006
<https://www.rfc-editor.org/info/rfc4291>
- 553 IETF RFC 4443, *Internet Control Message Protocol (ICMPv6) for the Internet Protocol Version 6 (IPv6) Specification*, March 2006
554
555 <https://www.rfc-editor.org/info/rfc4443>
- 556 IETF RFC 4861, *Neighbor Discovery for IP version 6 (IPv6)*, September 2007
557 <https://www.rfc-editor.org/info/rfc4861>
- 558 IETF RFC 4862, *IPv6 Stateless Address Autoconfiguration*, September 2007
559 <https://www.rfc-editor.org/info/rfc4862>
- 560 IETF RFC 4941, *Privacy Extensions for Stateless Address Autoconfiguration in IPv6*, September 2007
561
562 <https://www.rfc-editor.org/info/rfc4941>
- 563 IETF RFC 4944, *Transmission of IPv6 Packets over IEEE 802.15.4 Networks*, September 2007
564 <https://www.rfc-editor.org/info/rfc4944>
- 565 IETF RFC 5646, *Tags for Identifying Languages*, September 2009
566 <https://www.rfc-editor.org/info/rfc5646>
- 567 IETF RFC 5988, *Web Linking: General Syntax*, October 2010
568 <https://www.rfc-editor.org/info/rfc5988>
- 569 IETF RFC 6347, *Datagram Transport Layer Security Version 1.2*, January 2012
570 <https://www.rfc-editor.org/info/rfc6347>
- 571 IETF RFC 6434, *IPv6 Node Requirements*, December 2011
572 <https://www.rfc-editor.org/info/rfc6434>
- 573 IETF RFC 6455, *The WebSocket Protocol*, December 2011
574 <https://www.rfc-editor.org/info/rfc6455>
- 575 IETF RFC 6573, *The Item and Collection Link Relations*, April 2012
576 <https://www.rfc-editor.org/info/rfc6573>
- 577 IETF RFC 6690, *Constrained RESTful Environments (CoRE) Link Format*, August 2012
578 <https://www.rfc-editor.org/info/rfc6690>
- 579 IETF RFC 6762, *Multicast DNS* February 2013
580 <https://www.rfc-editor.org/info/rfc6762>
- 581 IETF RFC 6763, *DNS-Based Service Discovery*, February 2013
582 <https://www.rfc-editor.org/info/rfc6763>
- 583 IETF RFC 6775, *Neighbor Discovery Optimization for IPv6 over Low-Power Wireless Personal Area Networks (6LoWPANs)*, November 2012
584
585 <https://www.rfc-editor.org/info/rfc6775>
- 586 IETF RFC 7049, *Concise Binary Object Representation (CBOR)*, October 2013
587 <https://www.rfc-editor.org/info/rfc7049>
- 588 IETF RFC 7084, *Basic Requirements for IPv6 Customer Edge Routers*, November 2013
589 <https://www.rfc-editor.org/info/rfc7084>

- 590 IETF RFC 7159, *The JavaScript Object Notation (JSON) Data Interchange Format*, March 2014
<https://www.rfc-editor.org/info/rfc7159>
- 592 IETF RFC 7252, *The Constrained Application Protocol (CoAP)*, June 2014
<https://www.rfc-editor.org/info/rfc7252>
- 594 IETF RFC 7301, *Transport Layer Security (TLS) Application-Layer Protocol Negotiation Extension*, July 2014
<https://www.rfc-editor.org/info/rfc7301>
- 597 IETF RFC 7428, *Transmission of IPv6 Packets over ITU-T G.9959 Networks*, February 2015
<https://www.rfc-editor.org/info/rfc7428>
- 599 IETF RFC 7595, *Guidelines and Registration Procedures for URI Schemes*, June 2015
<https://www.rfc-editor.org/info/rfc7595>
- 601 IETF RFC 7641, *Observing Resources in the Constrained Application Protocol (CoAP)*, September 2015
<https://www.rfc-editor.org/info/rfc7641>
- 604 IETF RFC 7668, *IPv6 over BLUETOOTH(r) Low Energy*, October 2015
<https://www.rfc-editor.org/info/rfc7668>
- 606 IETF RFC 7721, *Security and Privacy Considerations for IPv6 Address Generation Mechanisms*, March 20016
<https://www.rfc-editor.org/info/rfc7721>
- 609 IETF RFC 7959, *Block-Wise Transfers in the Constrained Application Protocol (CoAP)*, August 2016
<https://www.rfc-editor.org/info/rfc7959>
- 612 IETF RFC 8075, *Guidelines for Mapping Implementations: HTTP to the Constrained Application Protocol (CoAP)*, February 2017
<https://www.rfc-editor.org/info/rfc8075>
- 615 IETF draft-ietf-core-coap-tcp-tls-07, *CoAP over TCP, TLS, and WebSockets*, June 10 2015
<https://datatracker.ietf.org/doc/draft-ietf-core-coap-tcp-tls/>
- 617 OCF Security, *Open Connectivity Foundation Security Capabilities*, Version 1.3
- 618 [OCF Wi-Fi Easy Setup, Open Connectivity Foundation Wi-Fi Easy Setup, Version 1.3.0](#)
- 619 OCF Device, *Open Connectivity Foundation Device*, Version 1.3
- 620 IANA IPv6 Multicast Address Space Registry
<http://www.iana.org/assignments/ipv6-multicast-addresses/ipv6-multicast-addresses.xhtml>
- 622 IANA Media Types Assignment, March 2017
<http://www.iana.org/assignments/media-types/media-types.xhtml>
- 624 IANA Link Relations, October 2017
<http://www.iana.org/assignments/link-relations/link-relations.xhtml>
- 626 JSON Schema Validation, *JSON Schema: interactive and non-interactive validation*, January 2013
<http://json-schema.org/draft-04/json-schema-validation.html>
- 628

Comment [BRA2]: BZ #2189

Comment [BRA3]: [Editorial] BZ #2378

Fixed reference to the document being used/referenced.

Deleted: <http://json-schema.org/latest/json-schema-validation.html>

631 OpenAPI specification, *fka Swagger RESTful API Documentation Specification*, Version 2.0
632 <https://github.com/OAI/OpenAPI-Specification/blob/master/versions/2.0.md>

633 W3C XML character escaping, *Extensible Markup Language (XML) 1.0*, November 2008
634 <http://www.w3.org/TR/2008/REC-xml-20081126/#syntax>

635 **3 Terms, definitions, symbols and abbreviations**

636 **3.1 Terms and definitions**

637 **3.1.1 Client**

638 a logical entity that accesses a Resource on a Server

640 **3.1.2 Collection**

641 a Resource that contains zero or more Links

643 **3.1.3 Common Properties**

644 Properties specified for all Resources

Comment [BRA4]: BZ #2284

Deleted: Resource

646 **3.1.4 Composite Device**

647 a Device that is modelled as multiple Device Types; with each component Device Type being
648 exposed as a Collection

Comment [BRA5]: BZ #2283

650 **3.1.5 Configuration Source**

651 a cloud or service network or a local read-only file which contains and provides configuration
652 related information to the Devices

654 **3.1.6 Core Resources**

655 those Resources that are defined in this specification

657 **3.1.7 Default Interface**

658 an Interface used to generate the response when an Interface is omitted in a request

660 **3.1.8 Device**

661 a logical entity that assumes one or more Roles (e.g., Client, Server)

663 Note 1 to entry: More than one Device can exist on a physical platform.

664 **3.1.9 Device Type**

665 a uniquely named definition indicating a minimum set of Resource Types that a Device supports

667 Note 1 to entry: A Device Type provides a hint about what the Device is, such as a light or a fan, for use during
668 Resource discovery.

669 **3.1.10 Discoverable Resource**

670 a Resource that is listed in "/oic/res"

672 **3.1.11 Endpoint**

673 the source or destination of a request and response messages for a given Transport Protocol Suite

676 Note 1 to entry: Example of a Transport Protocol Suite would be CoAP over UDP over IPv6.
677
3.1.12 Entity
678 an aspect of the physical world that is exposed through a Device
680 Note 1 to entry: Example of an entity is an LED.
681
3.1.13 Framework
682 a set of related functionalities and interactions defined in this specification, which enable
684 interoperability across a wide range of networked devices, including IoT
685
3.1.14 Interface
686 provides a view and permissible responses on a Resource
688
3.1.15 Introspection
689 mechanism to determine the capabilities of the hosted Resources of a Device
691
3.1.16 Introspection Device Data (IDD)
692 data that describes the payloads per implemented method of the Resources that make up the
693 Device
694
695 Note 1 to entry: See section 11.8 for all requirements and exceptions
696
3.1.17 Links
697 extends typed web links according to [IETF RFC 5988](#).
698
699
3.1.18 Non-Discoverable Resource
700 A Resource that is not listed in "/oic/res". The Resource can be reached by a Link which is
701 conveyed by another resource. For example a Resource linked in a Collection Resource does not
703 have to be listed in "/oic/res", since traversing the Collection Resource would discover the
704 Resource implemented on the device.
705
3.1.19 Non-OCF Device
706 A device which does not comply with the OCF Device requirements
707
708
3.1.20 Notification
709 the mechanism to make a Client aware of resource state changes in a Resource
710
711
3.1.21 Observe
712 the act of monitoring a Resource by sending a RETRIEVE request which is cached by the Server
713 hosting the Resource and reprocessed on every change to that Resource
714
715
3.1.22 Parameter
716 an element that provides metadata about a Resource referenced by the target URI of a Link
717
718
3.1.23 Partial UPDATE
719 an UPDATE request to a Resource that includes a subset of the Properties that are visible via the
720 Interface being applied for the Resource Type
721

Deleted: s

Comment [BRA6]: BZ #2189

Deleted: IETF RFC 5988

724 **3.1.24**
725 **Physical Device**
726 **the physical thing on which a Device(s) is exposed**

Comment [BRA7]: BZ #2283

727 **3.1.25**
728 **Platform**

729 a physical device containing one or more Devices

730 **3.1.26**

731 **Resource**

732 represents an Entity modelled and exposed by the Framework

733 **3.1.27**

734 **Resource Directory**

735 a set of descriptions of Resources where the actual Resources are held on Servers external to the
736 Device hosting the Resource Directory, allowing lookups to be performed for those resources

737 Note 1 to entry: This functionality can be used by sleeping Servers or Servers that choose not to listen/respond to
738 multicast requests directly.

739 **3.1.28**

740 **Resource Interface**

741 a qualification of the permitted requests on a Resource

742 **3.1.29**

743 **Property**

744 a significant aspect or parameter of a resource, including metadata, that is exposed through the
745 Resource

Comment [BRA8]: BZ #2284

Deleted: Resource

746 **3.1.30**

747 **Resource Type**

748 a uniquely named definition of a class of Properties and the interactions that are supported by that
749 class

Comment [BRA9]: BZ #2284

Deleted: Resource

750 Note 1 to entry: Each Resource has a Property "rt" whose value is the unique name of the Resource Type.

751 **3.1.31**

752 **Scene**

753 a static entity that stores a set of defined Property values for a collection of Resources

Comment [BRA10]: BZ #2284

Deleted: Resource p

754 Note 1 to entry: A Scene is a prescribed setting of a set of resources with each having a predetermined value for the
755 property that has to change.

756 **3.1.32**

757 **Scene Collection**

758 a collection Resource that contains an enumeration of possible Scene Values and the current
759 Scene Value

760 Note 1 to entry: The member values of the Scene Collection Resource are Scene Members.

Deleted: c

761 **3.1.33**

762 **Scene Member**

763 a Resource that contains mappings of Scene Values to values of a property in the resource

764 **3.1.34**

765 **Scene Value**

766 a Scene enumerator representing the state in which a Resource can be

767 **3.1.35**

768 **Secure Endpoint**

769 an Endpoint with a secure connection (e.g., CoAPS)

774 **3.1.36**
775 **Server**
776 a Device with the role of providing resource state information and facilitating remote interaction
777 with its resources

778 Note 1 to entry: A Server can be implemented to expose non-OCF Device resources to Clients (section 5.6)

779 **3.1.37**
780 **Unsecure Endpoint**
781 an Endpoint with an unsecure connection (e.g., CoAP)

782 **3.1.38**
783 **Vertical Resource Type**
784 a Resource Type in a vertical domain specification

785 Note 1 to entry: An example of a Vertical Resource Type would be "oic.r.switch.binary".

786 **3.2 Symbols and abbreviations**

787 **3.2.1**
788 **ACL**
789 Access Control List

790 Note 1 to entry: The details are defined in OCF Security.

791 **3.2.2**
792 **BLE**
793 Bluetooth Low Energy

794 **3.2.3**
795 **CBOR**
796 Concise Binary Object Representation

797 **3.2.4**
798 **CoAP**
799 Constrained Application Protocol

800 **3.2.5**
801 **CoAPS**
802 Secure Constrained Application Protocol

803 **3.2.6**
804 **DTLS**
805 Datagram Transport Layer Security

806 Note 1 to entry: The details are defined in IETF RFC 6347.

807 **3.2.7**
808 **EXI**
809 Efficient XML Interchange

810 **3.2.8**
811 **IP**
812 Internet Protocol

813 **3.2.9**
814 **IRI**
815 Internationalized Resource Identifiers

816 **3.2.10**
817 **ISP**
818 Internet Service Provider

819 **3.2.11**
820 **JSON**
821 JavaScript Object Notation

822 **3.2.12**
823 **mDNS**
824 Multicast Domain Name Service

825 **3.2.13**
826 **MTU**
827 Maximum Transmission Unit

828 **3.2.14**
829 **NAT**
830 Network Address Translation

831 **3.2.15**
832 **OCF**
833 Open Connectivity Foundation

834 the organization that created this specification

835 **3.2.16**
836 **RAML**
837 RESTful API Modeling Language

838 **3.2.17**
839 **REST**
840 Representational State Transfer

841 **3.2.18**
842 **RESTful**
843 REST-compliant Web services

844 **3.2.19**
845 **UDP**
846 User Datagram Protocol

847 Note 1 to entry: The details are defined in IETF RFC 768.

848 **3.2.20**
849 **URI**
850 Uniform Resource Identifier

851 **3.2.21**
852 **URN**
853 Uniform Resource Name

854 **3.2.22**
855 **UTC**
856 Coordinated Universal Time

857 **3.2.23**
858 **UUID**
859 Universal Unique Identifier

860 **3.2.24**
861 **XML**
862 Extensible Markup Language

863 **3.3 Conventions**

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

868 **3.4 Data types**

869 Resources are defined using data types derived from JSON values as defined in IETF RFC 7159.
870 However, a Resource can overload a JSON defined value to specify a particular subset of the
871 JSON value, using validation keywords defined in [JSON Schema Validation](#).

Deleted: JSON Schema Validation

872

873 Among other validation keywords, section 7 in [JSON Schema Validation](#), defines a “format”
874 keyword with a number of format attributes such as “uri” and “date-time”, and a “pattern” keyword
875 with a regular expression that can be used to validate a string. This section defines patterns that
876 are available for use in describing OCF Resources. The pattern names can be used in specification
877 text where JSON format names can occur. The actual JSON schemas shall use the JSON type
878 and pattern instead.

Deleted: JSON Schema Validation

879

880 For all rows defined in [Table 1](#), below, the JSON type is string.

Deleted: Table 1

881

Table 1. Additional OCF Types

Pattern Name	Pattern	Description
csv	<none>	A comma separated list of values encoded within a string. The value type in the csv is described by the property where the csv is used. For example a csv of integers. Note: csv is considered deprecated and an array of strings should be used instead for new Resources.
date	$^{([0-9]\{4\})-(1[0-2])0[1-9]}-(3[0-1]2[0-9][1[0-9]]0[1-9])\$$	The full-date format pattern according to IETF RFC 3339
duration	$^{(P(71S)([0-9]+Y)?([0-9]+M)?([0-9]+W)?([0-9]+D)?((T(?)=(0-9)+[HMS])) ([0-9]+HH)?([0-9]+M)?([0-9]+S)?))\$ ^P([0-9]+\{4\})(1[0-2])0[1-9]}-(3[0-1]2[0-9] 1[0-9])0[1-9])T(2[0-3])1[0-9] 0[1-9]):(0-5)[0-9]):(0-5)[0-9])\$ ^P([0-9]+\{4\})(1[0-2])0[1-9])(3[0-1]2[0-9] 1[0-9])0[1-9])T(2[0-3])1[0-9] 0[1-9]):(0-5)[0-9]):(0-5)[0-9])\$$	A string representing duration formatted as defined in ISO 8601. Allowable formats are: P[n]Y[n]M[n]DT[n]H[n]M[n]S, P[n]W, P[n]Y[n]-M[n]-DT[0-23]H[0-59]M[0-59]S, P is mandatory, all other elements are optional, time elements must follow a T.

Comment [BRA11]: BZ #1941

Deleted: As defined in ISO 8601. The format is [yyyy]-[mm]-[dd].

int64	<code>^0 (-?[1-9][0-9]{0,18})\$</code>	A string instance is valid against this attribute if it contains an integer in the range $[-(2^{63}), (2^{63})-1]$ Note: IETF RFC 7159 section 6 explains that JSON integers outside the range $[-(2^{53})+1, (2^{53})-1]$ are not interoperable and so JSON numbers cannot be used for 64-bit numbers.
language-tag	<code>^[A-Za-z]{1,8}([-A-Za-z0-9]{1,8})*\$</code>	An IETF language tag formatted according to IETF RFC 5646 , section 2.1.
uint64	<code>^0 ([1-9][0-9]{0,19})\$</code>	A string instance is valid against this attribute if it contains an integer in the range $[0, (2^{64})-1]$ Also see note for int64
uuid	<code>^[a-fA-F0-9]{8}-[a-fA-F0-9]{4}-[a-fA-F0-9]{4}-[a-fA-F0-9]{4}-[a-fA-F0-9]{12}\$</code>	A UUID string representation formatted according to IETF RFC 4122 section 3.

Formatted: Default Paragraph Font

Deleted: IETF RFC 5646

887

888 Strings shall be encoded as UTF-8 unless otherwise specified.

889

890 In a JSON schema, "maxLength" for a string indicates the maximum number of characters not
891 octets. However, "maxLength" shall also indicate the maximum number of octets. If no "maxLength"
892 is defined for a string, then the maximum length shall be 64 octets.

893 **4 Document conventions and organization**

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

896 Required (or shall or mandatory)(M).

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

900 Recommended (or should)(S).

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

907 Allowed (may or allowed)(O).

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

911 DEPRECATED.

- 912 • Although these features are still described in this specification, they should not be implemented
913 except for backward compatibility. The occurrence of a deprecated feature during operation of
914 an implementation compliant with the current specification has no effect on the
915 implementation's operation and does not produce any error conditions. Backward compatibility

917 may require that a feature is implemented and functions as specified but it shall never be used
918 by implementations compliant with this specification.

919 Conditionally allowed (CA)

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

922 Conditionally required (CR)

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

926

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

928 Words that are emphasized are printed in italic.

929 In all of the Property and Resource Definition Tables that are included throughout this document
930 the "Mandatory" column indicates that the item detailed is mandatory to implement; the mandating
931 of inclusion of the item in a Resource Payload associated with a CRUDN action is dependent on
932 the applicable schema for that action.

933 5 Architecture

934 5.1 Overview

935 The architecture enables resource based interactions among IoT artefacts, i.e. physical devices
936 or applications. The architecture leverages existing industry standards and technologies and
937 provides solutions for establishing connections (either wireless or wired) and managing the flow of
938 information among devices, regardless of their form factors, operating systems or service providers.

939 Specifically, the architecture provides:

- 940 • A communication and interoperability framework for multiple market segments (Consumer,
941 Enterprise, Industrial, Automotive, Health, etc.), OSs, platforms, modes of communication,
942 transports and use cases
- 943 • A common and consistent model for describing the environment and enabling information
944 and semantic interoperability
- 945 • Common communication protocols for discovery and connectivity
- 946 • Common security and identification mechanisms
- 947 • Opportunity for innovation and product differentiation
- 948 • A scalable solution addressing different device capabilities, applicable to smart devices as
949 well as the smallest connected things and wearable devices

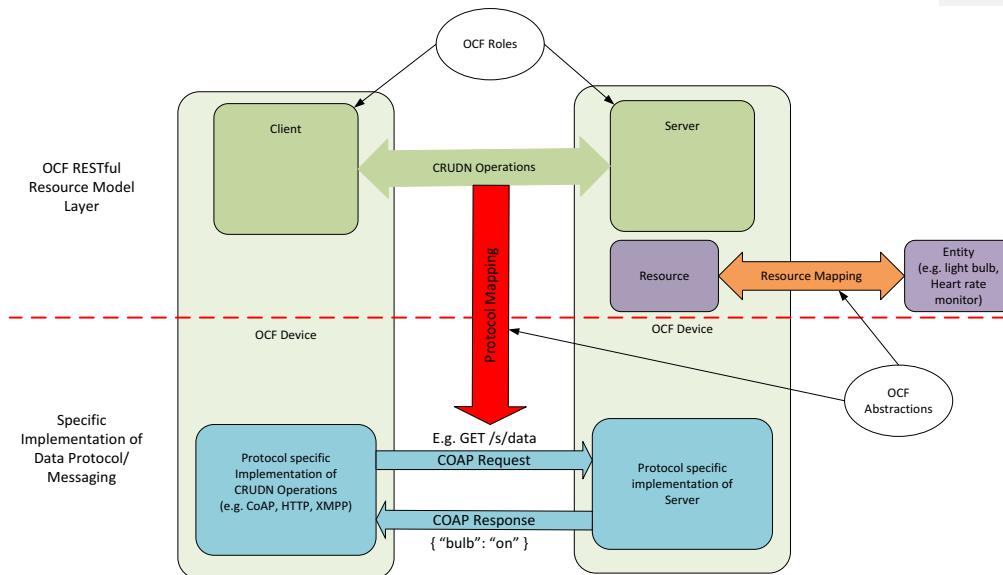
950 The architecture is based on the Resource Oriented Architecture design principles and described
951 in the sections 5.2 through 5.6 respectively. Section 5.2 presents the guiding principles for OCF
952 operations. Section 5.3 defines the functional block diagram and Framework. Section 5.5 provides
953 an example scenario with roles. Section 5.6 provides an example scenario of bridging to non- OCF
954 ecosystem.

955 **5.2 Principle**

956 In the architecture, Entities in the physical world (e.g., temperature sensor, an electric light or a
957 home appliance) are represented as resources. Interactions with an Entity are achieved through
958 its resource representations (section 7.7) using operations that adhere to Representational State
959 Transfer (REST) architectural style, i.e., RESTful interactions.

960 The architecture defines the overall structure of the Framework as an information system and the
961 interrelationships of the Entities that make up OCF. Entities are exposed as Resources, with their
962 unique identifiers (URIs) and support interfaces that enable RESTful operations on the Resources.
963 Every RESTful operation has an initiator of the operation (the client) and a responder to the
964 operation (the server). In the Framework, the notion of the client and server is realized through
965 roles (section 5.5). Any Device can act as a Client and initiate a RESTful operation on any Device
966 acting as a Server. Likewise, any Device that exposes Entities as Resources acts as a Server.
967 Conformant to the REST architectural style, each RESTful operation contains all the information
968 necessary to understand the context of the interaction and is driven using a small set of generic
969 operations, i.e., CREATE, RETRIEVE, UPDATE, DELETE and NOTIFY (CRUDN) defined in
970 section 8, which include representations of Resources.

971 Figure 1 depicts the architecture.



972 **Figure 1: Architecture - concepts**

973
974 The architecture is organized conceptually into three major aspects that provide overall separation
975 of concern: resource model, RESTful operations and abstractions.

- 976 • Resource model: The resource model provides the abstractions and concepts required to
977 logically model, and logically operate on the application and its environment. The core resource

980 model is common and agnostic to any specific application domain such as smart home,
981 industrial or automotive. For example, the resource model defines a Resource which abstracts
982 an Entity and the representation of a Resource maps the Entity's state. Other resource model
983 concepts can be used to model other aspects, for example behaviour.

- 984 • RESTful operations: The generic CRUDN operations are defined using the RESTful paradigm
985 to model the interactions with a Resource in a protocol and technology agnostic way. The
986 specific communication or messaging protocols are part of the protocol abstraction and
987 mapping of Resources to specific protocols is provided in section [11.8](#).
- 988 • Abstraction: The abstractions in the resource model and the RESTful operations are mapped
989 to concrete elements using abstraction primitives. An entity handler is used to map an Entity
990 to a Resource and connectivity abstraction primitives are used to map logical RESTful
991 operations to data connectivity protocols or technologies. Entity handlers may also be used to
992 map Resources to Entities that are reached over protocols that are not natively supported by
993 OCF.

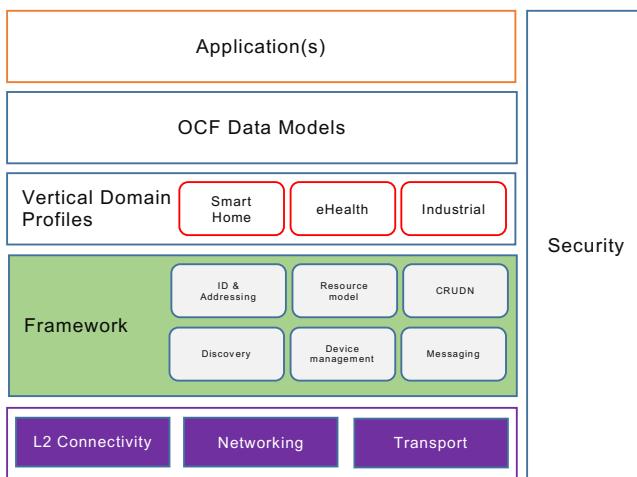
Formatted: Font:(Asian) Korean

Deleted: 11.8

994 5.3 Functional block diagram

995 The functional block diagram encompasses all the functionalities required for operation. These
996 functionalities are categorized as L2 connectivity, networking, transport, Framework, and
997 application profiles. The functional blocks are depicted in [Figure 2](#) and listed below.

Deleted: Figure 2



1000 **Figure 2: Functional block diagram**

- 1001 • **L2 connectivity**: Provides the functionalities required for establishing physical and data
1002 link layer connections (e.g., Wi-Fi™ or Bluetooth® connection) to the network.
- 1003 • **Networking**: Provides functionalities required for Devices to exchange data among
1004 themselves over the network (e.g., Internet).
- 1005 • **Transport**: Provides end-to-end flow transport with specific QoS constraints. Examples of
1006 a transport protocol include TCP and UDP or new Transport protocols under development
1007 in the IETF, e.g., Delay Tolerant Networking (DTN).

- **Framework:** Provides the core functionalities as defined in this specification. The functional block is the source of requests and responses that are the content of the communication between two Devices.
- **Vertical Domain profile:** Provides market segment specific functionalities, e.g., functions for the smart home market segment.

When two Devices communicate with each other, each functional block in a Device interacts with its counterpart in the peer Device as shown in Figure 3.

1017

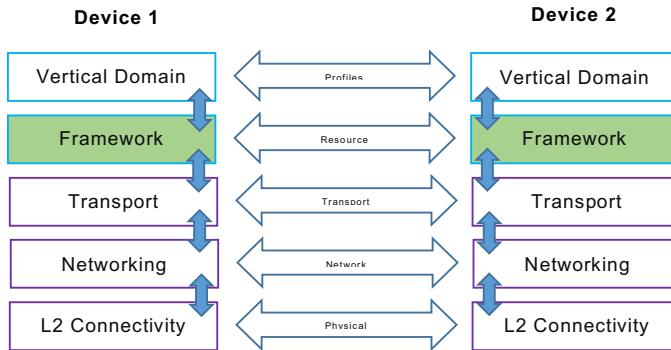


Figure 3: Communication layering model

1018

5.4 Framework

Framework consists of functions which provide core functionalities for operation.

- 1) **Identification and addressing.** Defines the identifier and addressing capability. The Identification and addressing function is defined in section 6.
- 2) **Discovery.** Defines the process for discovering available
 - a) Devices (Endpoint Discovery in section 10) and
 - b) Resources (Resource discovery in section 11.3)
- 3) **Resource model.** Specifies the capability for representation of Entities in terms of resources and defines mechanisms for manipulating the resources. The resource model function is defined in section 7.
- 4) **CRUDN.** Provides a generic scheme for the interactions between a Client and Server as defined in section 8.
- 5) **Messaging.** Provides specific message protocols for RESTful operation, i.e. CRUDN. For example, CoAP is a primary messaging protocol. The messaging function is defined in section [11.8](#).
- 6) **Device management.** Specifies the discipline of managing the capabilities of a Device, and includes device provisioning and initial setup as well as device monitoring and diagnostics. The device management function is defined in section [11.5](#).
- 7) **Security.** Includes authentication, authorization, and access control mechanisms required for secure access to Entities. The security function is defined in section 13.

Formatted: Font:(Asian) Korean

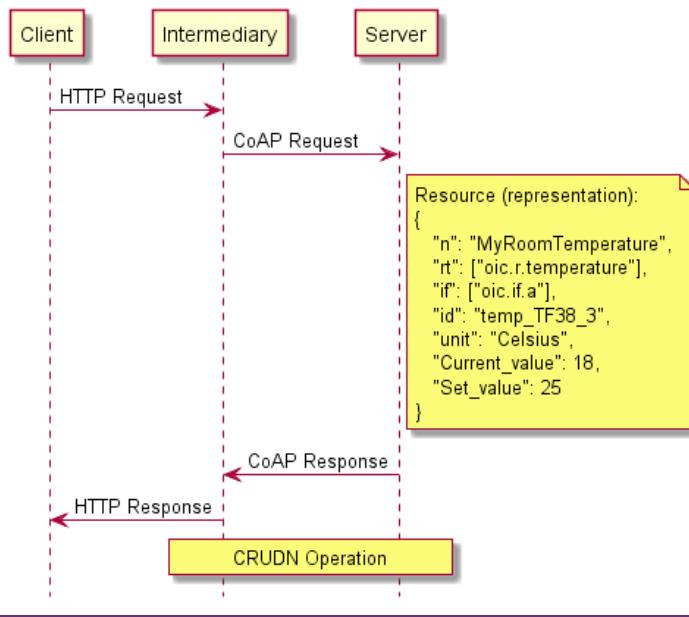
Deleted: 11.8

Deleted: 11.5

Formatted: Font:(Asian) Korean

1041 **5.5 Example Scenario with roles**

1042 Interactions are defined between logical entities known as Roles. Three roles are defined: Client,
 1043 Server and Intermediary.

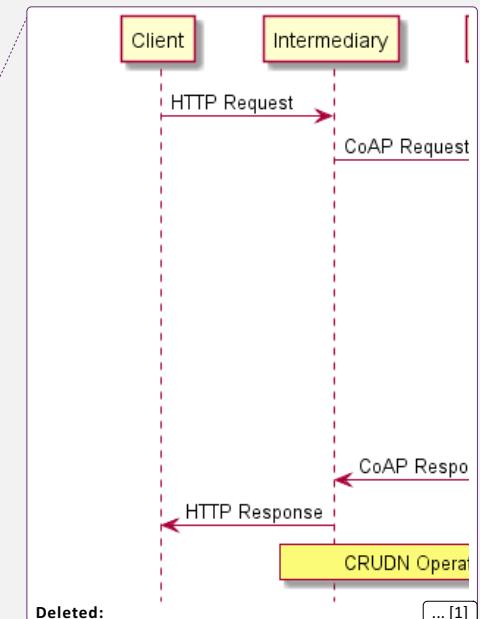


1044
1045
1046
1047
1048
1049
1050

Figure 4 illustrates an example of the Roles in a scenario where a smart phone sends a request message to a thermostat; the original request is sent over HTTP, but is translated into a CoAP request message by a gateway in between, and then delivered to the thermostat. In this example, the smart phone takes the role of a Client, the gateway takes the role of an Intermediary and the thermostat takes the role of a Server.



1051



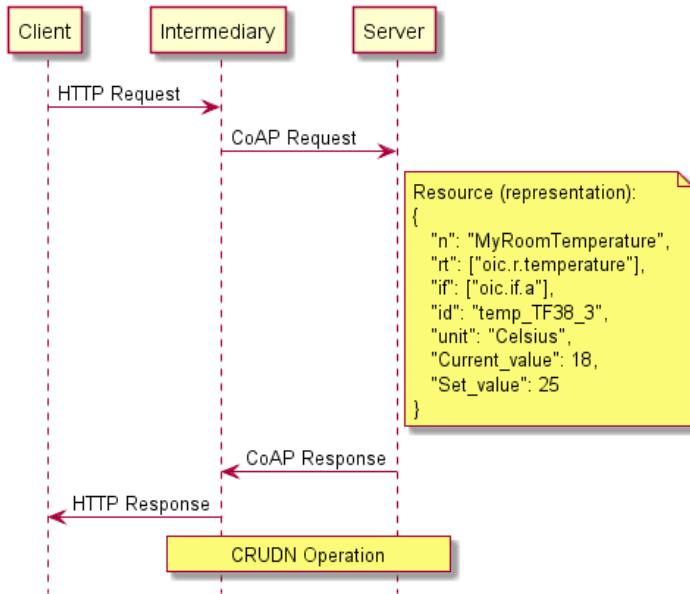


Figure 4: Example illustrating the Roles

1054
1055

1056

5.6 Example Scenario: Bridging to Non- OCF ecosystem

1058 The use case for this scenario is a display (like a wrist watch) that is used to monitor a heart rate
1059 sensor that implements a protocol that is not OCF supported.

1060 Figure 5 provides a detailed logical view of the concepts described in Figure 1.

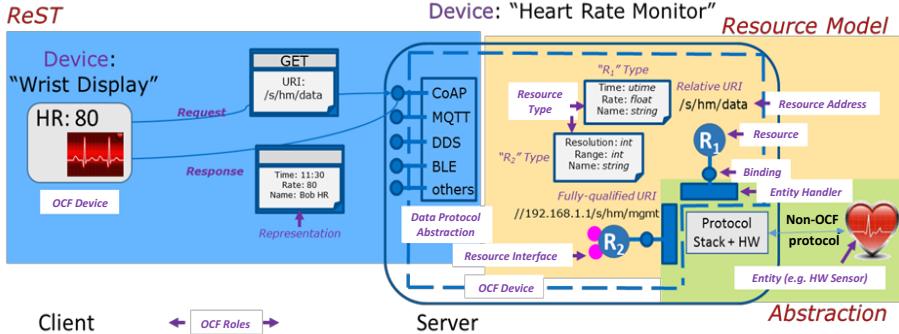


Figure 5: Framework - Architecture Detail

1061
1062

1063

1064

1065 The details may be implemented in many ways, for example, by using a Server with an entity
1066 handler to interface directly to a non- OCF device as shown in Figure 6.

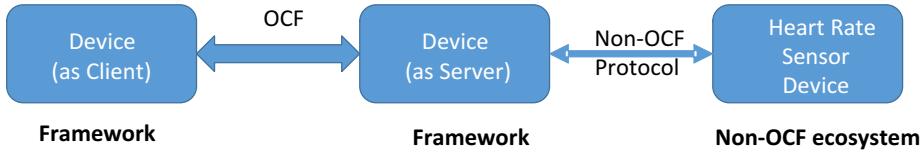


Figure 6: Server bridging to Non- OCF device

1067

1068

1069 On start-up the Server runs the entity handlers which discover the non- OCF systems (e.g., Heart
1070 Rate Sensor Device) and create resources for each device or functionality discovered. The entity
1071 handler creates a Resource for each discovered device or functionality and binds itself to that
1072 Resource. These resources are made discoverable by the Server.

1073
1074
1075
1076
1077
1078

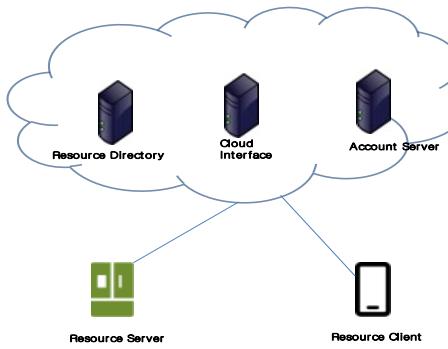
Once the resources are created and made discoverable, then the Display Device can discover
these resources and operate on them using the mechanisms described in this specification. The
requests to a resource on the Server are then interpreted by the entity handler and forwarded to
the non- OCF device using the protocol supported by the non-OCF device. The returned
information from the non- OCF device is then mapped to the appropriate response for that resource.

1079

5.7 OCF Cloud architecture

1080

This section describes the architecture of OCF Cloud in Figure 7:



1081

1082

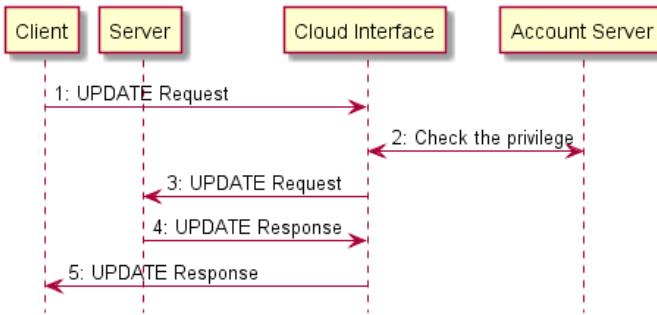
Figure 7: OCF Cloud deployment architecture

1083 The Cloud architecture comprises of following three network entities:

- 1084 • *Cloud Interface Server* – A logical entity to which an OCF Device primarily. It encapsulates
1085 Account Server and Resource Directory features. The Cloud Interface routes the packet
1086 between OCF Devices based on the request URI in the packet header. The Client needs to
1087 keep the persistent connection alive to the Server
- 1088 • *Account Server* – A logical entity that handles Device registration, Auth Token validation and
1089 handles sign-in and token-refresh requests from the Device.
- 1090 • *Resource Directory* – A logical entity holding resource information published by Servers. A
1091 Client when looking for a Resource receives a response from the Resource Directory on behalf
1092 of the Server. Then with information included in the response form the Resource Directory, the
1093 Client directly connects to the Server.

1094 When a Client try to access a Server, the Client connects to Cloud Interface Server then Cloud
1095 Interface routes the received message to the indicated Server after checking the privilege.

1096



1097

1098 **Figure 8: Endpoint routing**

1099 **6 Identification and addressing**

1100 **6.1 Introduction**

1101 Facilitating proper and efficient interactions between elements in the Framework, requires a means
1102 to identify, name and address these elements.

1103 The *identifier* unambiguously identifies an element in a context or domain. The context or domain
1104 may be determined by the use or the application. The identifier is expected to be immutable over
1105 the lifecycle of that element and is unambiguous within a context or domain.

1106 The *address* is used to define a place, way or means of reaching or accessing the element in order
1107 to interact with it. An address may be mutable based on the context.

1108 The *name* is a handle that distinguishes the element from other elements in the framework. The
1109 name may be changed over the lifecycle of that element.

1110 There may be methods or resolution schemes that allow determining any of these based on the
1111 knowledge of one or more of others (e.g., determine name from address or address from name).

1112 Each of these aspects may be defined separately for multiple contexts (e.g., a context could be a
1113 layer in a stack). So an address may be a URL for addressing resource and an IP address for
1114 addressing at the connectivity layer. In some situations, both these addresses would be required.
1115 For example, to do RETRIEVE (section 8.3) operation on a particular resource representation, the
1116 client needs to know the address of the target resource and the address of the server through
1117 which the resource is exposed.

1118 In a context or domain of use, a name or address could be used as identifier or vice versa. For
1119 example, a URL could be used as an identifier for a resource and designated as a URI.

1120 The remainder of this section discusses the identifier, address and naming from the point of view
1121 of the resource model and the interactions to be supported by the resource model. Examples of
1122 interactions are the RESTful interactions, i.e. CRUDN operation (section 8) on a resource. Also
1123 the mapping of these to transport protocols, e.g., CoAP is described.

1124 **6.2 Identification**

1125 An identifier is unambiguous within the context or domain of use. There are many schemes that
1126 may be used to generate an identifier that has the required properties. The identifier may be
1127 context-specific in that the identifier is expected to be and guaranteed to be unambiguous only
1128 within that context or domain. Identifier may also be context-independent where these identifiers

1129 are guaranteed to be unambiguous across all contexts and domains both spatially and temporally.
1130 The context-specific identifiers could be defined by simple schemes like monotonic enumeration
1131 or may be defined by overloading an address or name, for example an IP address may be an
1132 identifier within the private domain behind a gateway in a smart home. On the other hand, context-
1133 independent identifiers require a stronger scheme that derives universally unique identities, for
1134 example any one of the versions of Universally Unique Identifiers (UUIDs). Context independent
1135 identifier may also be generated using hierarchy of domains where the root of the hierarchy is
1136 identified with a UUID and sub-domains may generate context independent identifier by
1137 concatenating context-specific identifiers for that domain to the context-independent identifier of
1138 their parent.

1139 **6.2.1 Resource identification and addressing**

1140 A resource may be identified using a URI and addressed by the same URI if the URI is a URL. In
1141 some cases a resource may need an identifier that is different from a URL; in this case, the resource
1142 may have a property whose value is the identifier. When the URI is in the form of a URL, then the
1143 URI may be used to address the resource.

1144 An OCF URI is based on the general form of a URI as defined in IETF RFC 3986 as follows:

1145 **<scheme>://<authority>/<path>?<query>**

1146 Specifically the OCF URI is specified in the following form:

1147 **ocf://<authority>/<path>?<query>**

1148 A description of values that each component takes is given below.

1149 The *scheme* for the URI is 'ocf'. The 'ocf' scheme represents the semantics, definitions and use
1150 as defined in this document. If a URI has the portion preceding the '/' (double slash) omitted, then
1151 the 'ocf' scheme shall be assumed.

1152 Each transport binding is responsible for specifying how an OCF URI is converted to a transport
1153 protocol URI before sending over the network by the requestor. Similarly on the receiver side, each
1154 transport binding is responsible for specifying how an OCF URI is converted from a transport
1155 protocol URI before handing over to the resource model layer on the receiver.

1156 The authority of an OCF URI shall be the Device ID ("di") value, as defined in [OCF Security], of
1157 the Server.

1158 The *path* is a string that unambiguously identifies or references a resource within the context of
1159 the Server. In this version of the specification, a path shall not include pct-encoded non-ASCII
1160 characters or NUL characters. A *path* shall be preceded by a '/' (slash). The *path* may have '/'
1161 (slash) separated segments for human readability reasons. In the OCF context, the '/' (slash)
1162 separated segments are treated as a single string that directly references the resources (i.e. a flat
1163 structure) and not parsed as a hierarchy. On the Server, the path or some substring in the path
1164 may be shortened by using hashing or some other scheme provided the resulting reference is
1165 unique within the context of the host.

1166 Once a path is generated, a Client accessing the resource or recipient of the URI should use that
1167 path as an opaque string and should not parse to infer a structure, organization or semantic.

1168 A query string shall contain a list of <name>=<value> segments (aka "name-value pair") each
1169 separated by a '&' (ampersand). The query string will be mapped to the appropriate syntax of the
1170 protocol used for messaging. (e.g., CoAP).

1171 A URI may be either

1172 • Fully qualified or
1173 • Relative

1174 *Generation of URI:*

1175 A URI may be defined by the Client which is the creator of that resource. Such a URI may be
1176 relative or absolute (fully qualified). A relative URI shall be relative to the Device on which it is
1177 hosted. Alternatively, a URI may be generated by the Server of that resource automatically based
1178 on a pre-defined convention or organization of the resources, based on an interface, based on
1179 some rules or with respect to different roots or bases.

1180 *Use of URI:*

1181 The absolute path reference of a URI is to be treated as an opaque string and a Client should not
1182 infer any explicit or implied structure in the URI – the URI is simply an address. It is also
1183 recommended that Devices hosting a resource treat the URI of each resource as an opaque string
1184 that addresses only that resource. (e.g., URI's /a and /a/b are considered as distinct addresses
1185 and resource b cannot be construed as a child of resource a).

1186 **6.3 Namespace:**

1187 The relative URI prefix "/oic/" is reserved as a namespace for URIs defined in OCF specifications
1188 and shall not be used for URIs that are not defined in OCF specifications.

1189 **6.4 Network addressing**

1190 The following are the addresses used in this specification:

1191 • **IP address**

1192 An IP address is used when the device is using an IP configured interface.

1193 When a Device only has the identity information of its peer, a resolution mechanism is needed to
1194 map the identifier to the corresponding address.

1195 **7 Resource model**

1196 **7.1 Introduction**

1197 The Resource Model defines concepts and mechanisms that provide consistency and core
1198 interoperability between devices in the OCF ecosystems. The Resource Model concepts and
1199 mechanisms are then mapped to the transport protocols to enable communication between the
1200 devices – each transport provides the communication protocol interoperability. The Resource
1201 Model, therefore, allows for interoperability to be defined independent of the transports.

1202 In addition, the concepts in the Resource Model support modelling of the primary artefacts and
1203 their relationships to one and another and capture the semantic information required for
1204 interoperability in a context. In this way, OCF goes beyond simple protocol interoperability to
1205 capture the rich semantics required for true interoperability in Wearable and Internet of Things
1206 ecosystems.

1207 The primary concepts in the Resource Model are: Entity, Resources, Uniform Resource Identifiers
1208 (URI), Resource Types, Properties, Representations, Interfaces, Collections and Links. In addition,
1209 the general mechanisms are CREATE, RETRIEVE, UPDATE, DELETE and NOTIFY. These
1210 concepts and mechanisms may be composed in various ways to define the rich semantics and
1211 interoperability needed for a diverse set of use cases that the OCF framework is applied to.

1212 In the OCF Resource Model framework, an Entity needs to be visible, interacted with or
1213 manipulated, it is represented by an abstraction called a Resource. A Resource encapsulates and
1214 represents the state of an Entity. A Resource is identified, addressed and named using URIs.

1215 Properties are "key=value" pairs and represent state of the Resource. A snapshot of these
1216 Properties is the Representation of the Resource. A specific view of the Representation and the
1217 mechanisms applicable in that view are specified as Interfaces. Interactions with a Resource are
1218 done as Requests and Responses containing Representations.

1219 A resource instance is derived from a Resource Type. The uni-directional relationship between
1220 one Resource and another Resource is defined as a Link. A Resource that has Properties and
1221 Links is a Collection.

1222 A set of Properties can be used to define a state of a Resource. This state may be retrieved or
1223 updated using appropriate Representations respectively in the response from and request to that
1224 Resource.

1225 A Resource (and Resource Type) could represent and be used to expose a capability. Interactions
1226 with that Resource can be used to exercise or use that capability. Such capabilities can be used
1227 to define processes like discovery, management, advertisement etc. For example: "discovery of
1228 resources on a device" can be defined as the retrieval of a representation of a specific resource
1229 where a property or properties have values that describe or reference the resources on the device.

1230 The information for Request or Response with the Representation may be communicated "on the
1231 wire" by serializing using a transfer protocol or encapsulated in the payload of the transport
1232 protocol – the specific method is determined by the normative mapping of the Request or Response
1233 to the transport protocol. See section 11.8 for transport protocols supported.

1234 The RAML definitions used in this document are normative. This also includes that all defined
1235 JSON payloads shall comply with the indicated JSON schema. See Annex D for Resource Types
1236 defined in this specification.

1237 **7.2 Resource**

1238 A Resource shall be defined by one or more Resource Type(s) – see Annex D for Resource Type.
1239 A request to CREATE a Resource shall specify one or more Resource Types that define that
1240 Resource.

1241 A Resource is hosted in a Device. A Resource shall have a URI as defined in section 6. The URI
1242 may be assigned by the Authority at the creation of the Resource or may be pre-defined by the
1243 specification of the Resource Type.

```
/my/resource/example
{
  "rt": ["oic.r.foobar"],
  "if": ["oic.if.a"],
  "value": "foo value"
}
```

The diagram shows a JSON object with three properties: "rt", "if", and "value". Brackets on the right side group these properties into two categories: "URI" (covering "rt") and "Properties" (covering "if" and "value").

1244

1245 Core Resources are the Resources defined in this specification to enable functional interactions
1246 as defined in section 10 (e.g., Discovery, Device Management, etc). Among the Core Resources,
1247 "/oic/res", "/oic/p", and "/oic/d" shall be supported on all Devices. Devices may support other Core
1248 Resources depending on the functional interactions they support.

1249 **7.3 Property**
1250 **7.3.1 Introduction**
1251 A Property describes an aspect that is exposed through a Resource including meta-information
1252 related to that resource.

1253 A Property shall have a name i.e. Property Name and a value i.e. Property Value. The Property is
1254 expressed as a key-value pair where key is the Property Name and value the Property Value like
1255 <Property Name> = <Property Value>. For example if the "temperature" Property has a Property
1256 Name "temp" and a Property Value "30F", then the Property is expressed as "temp=30F". The
1257 specific format of the Property depends on the encoding scheme. For example, in JSON, Property
1258 is represented as "key": value (e.g., "temp": 30).

1259 In addition, the Property definition shall have a

1260 • **Value Type** – the Value Type defines the values that a Property Value may take. The Value
1261 Type may be a simple data type (e.g. string, Boolean) as defined in section 3.4 or may be a
1262 complex data type defined with a schema. The Value Type may define
1263 ◦ Value Rules define the rules for the set of values that the Property Value may take.
1264 Such rules may define the range of values, the min-max, formulas, the set of
1265 enumerated values, patterns, conditional values, and even dependencies on values
1266 of other Properties. The rules may be used to validate the specific values in a
1267 Property Value and flag errors.
1268 • **Mandatory** – specifies if the Property is mandatory or not for a given Resource Type.
1269 • **Access modes** – specifies whether the Property may be read, written or both. Updates are
1270 equivalent to a write. "r" is used for read and "w" is used for write – both may be specified.
1271 Write does not automatically imply read.

1272 The definition of a Property may include the following additional information – these items are
1273 informative:

1274 • **Property Title** - a human-friendly name to designate the Property; usually not sent over the
1275 wire
1276 • **Description** – descriptive text defining the purpose and expected use of this Property.

1277 In general, a Property is meaningful only within the Resource to which it is associated. However a
1278 base set of Properties that may be supported by all Resources, known as Common Properties,
1279 keep their semantics intact across Resources i.e. their "key=value" pair means the same in any
1280 Resource. Detailed tables with the above fields for all Common Properties are defined in section
1281 7.3.2.

1282 **7.3.2 Common Properties**
1283 **7.3.2.1 Introduction**
1284 The Common Properties defined in this section may be specified for all Resources. The following
1285 Properties are defined as Common Properties: "Resource Type", "Resource Interface", "Name",
1286 and "Resource Identity".

1287 The name of a Common Property shall be unique and shall not be used by other properties. When
1288 defining a new Resource Type, its non-common properties shall not use the name of existing
1289 Common Properties (e.g., "rt", "if", "n", "id"). When defining a new "Common Property", it should
1290 be ensured that its name has not been used by any other properties. The uniqueness of a new
1291 Common Property name can be verified by checking all the Properties of all the existing OCF
1292 defined Resource Types. However, this may become cumbersome as the number of Resource
1293 Types grow. To prevent such name conflicts in the future, OCF may reserve a certain name space
1294 for common property. Potential approaches are (1) a specific prefix (e.g. "oic") may be designated

1295 and the name preceded by the prefix (e.g. "oic.psize") is only for Common Property; (2) the names
1296 consisting of one or two letters are reserved for Common Property and all other Properties shall
1297 have the name with the length larger than the 2 letters; (3) Common Properties may be nested
1298 under specific object to distinguish themselves.

1299 The ability to UPDATE a Common Property (that supports write as an access mode) is restricted
1300 to the "oic.if.rw" (read-write) Interface; thus a Common Property shall be updatable using the read-
1301 write Interface if and only if the Property supports write access as defined by the Property definition
1302 and the associated schema for the read-write Interface.

1303 The following Common Properties for all Resources are specified in section 7.3.2.2 through section
1304 7.3.2.6 and summarized as follows:

- 1305 • Resource Type ("rt") – this Property is used to declare the Resource Type of that Resource.
1306 Since a Resource could be define by more than one Resource Type the Property Value of the
1307 Resource Type Property can be used to declare more than one Resource type. For example:
1308 "rt": ["oic.wk.d", "oic.d.airconditioner"] declares that the Resource containing this Property is
1309 defined by either the "oic.wk.d" Resource Type or the "oic.d.airconditioner" Resource Type.
1310 See section 7.3.2.3 for details.
- 1311 • Interface ("if") – this Property declares the Interfaces supported by the Resource. The Property
1312 Value of the Interface Property can be multi-valued and lists all the Interfaces supported. See
1313 section 7.3.2.4 for details.
- 1314 • Name ("n") – the Property declares "human-readable" name assigned to the Resource. See
1315 section 7.3.2.5.
- 1316 • Resource Identity ("id"): its Property Value shall be a unique (across the scope of the host
1317 Server) instance identifier for a specific instance of the Resource. The encoding of this identifier
1318 is device and implementation dependent. See section 7.3.2.6 for details.

1319 7.3.2.2 Property Name and Property Value definitions

1320 The Property Name and Property Value as used in this specification:

- 1321 • **Property Name** – the key in "key=value" pair. Property Name is case sensitive and its data type
1322 is "string". Property names shall contain only letters A to Z, a to z, digits 0 to 9, hyphen, and
1323 dot, and shall not begin with a digit.
- 1324 • **Property Value** – the value in "key=value" pair. Property Value is case sensitive when its data
1325 type is "string".

1326 7.3.2.3 Resource Type

1327 Resource Type Property is specified in section 7.4.

1328 7.3.2.4 Interface

1329 Interface Property is specified in section 7.5.

1330 7.3.2.5 Name

1331 A human friendly name for the Resource, i.e. a specific resource instance name (e.g.,
1332 MyLivingRoomLight), The Name Property is as defined in [Table 2](#).

Deleted: Table 2

1333 **Table 2. Name Property Definition**

Property title	Property name	Value type	Value rule	Unit	Access mode	Mandatory	Description
Name	n	string			R, W	no	Human understandable name for the resource.

1335 The 'Name' Property is read-write unless otherwise restricted by the Resource Type (i.e. the
1336 Resource Type does not support UPDATE or does not support UPDATE using read-write).

1337 **7.3.2.6 Resource Identity**

1338 The Resource Identity Property shall be a unique (across the scope of the host Server) instance
1339 identifier for a specific instance of the Resource. The encoding of this identifier is device and
1340 implementation dependent as long as the uniqueness constraint is met, noting that an
1341 implementation may use a uuid as defined in section 3.4. The Resource Identity Property is as
1342 defined in [Table 3](#).

Deleted: Table 3

1343 **Table 3. Resource Identity Property Definition**

1344

Property title	Property name	Value type	Value rule	Unit	Access mode	Mandatory	Description
Resource Identity	id	string or uuid	Implementation Dependent		R	No	Unique identifier of the Resource (over all Resources in the Device)

1345

1346 **7.4 Resource Type**

1347 **7.4.1 Introduction**

1348 Resource Type is a class or category of Resources and a Resource is an instance of one or more
1349 Resource Types.

1350 The Resource Types of a Resource is declared using the Resource Type Common Property as
1351 described in section 7.3.2.3 or in a Link using the Resource Type Parameter.

1352 A Resource Type may either be pre-defined by OCF or in custom definitions by manufacturers,
1353 end users, or developers of Devices (vendor-defined Resource Types). Resource Types and their
1354 definition details may be communicated out of band (i.e. in documentation) or be defined explicitly
1355 using a meta-language which may be downloaded and used by APIs or applications. OCF has
1356 adopted RAML and JSON Schema as the specification method for OCF's RESTful interfaces and
1357 Resource definitions.

1358 Every Resource Type shall be identified with a Resource Type ID which shall be represented using
1359 the requirements and ABNF governing the Resource Type attribute in [IETF RFC 6690](#)(section 2
1360 for ABNF and section 3.1 for requirements) with the caveat that segments are separated by a ":"
1361 (period). The entire string represents the Resource Type ID. When defining the ID each segment
1362 may represent any semantics that are appropriate to the Resource Type. For example, each
1363 segment could represent a namespace. Once the ID has been defined, the ID should be used
1364 opaquely and an implementations should not infer any information from the individual segments.
1365 The string "oic", when used as the first segment in the definition of the Resource Type ID, is
1366 reserved for OCF-defined Resource Types. All OCF defined Resource Types are to be registered
1367 with the IANA Core Parameters registry as described also in [IETF RFC 6690](#).

Deleted: IETF RFC 6690

1368 **7.4.2 Resource Type Property**

1369 A Resource when instantiated or created shall have one or more Resource Types that are the
1370 template for that Resource. The Resource Types that the Resource conforms to shall be declared
1371 using the "rt" Common Property for the Resource. The Property Value for the "rt" Common Property
1372 shall be the list of Resource Type IDs for the Resource Types used as templates (i.e., "rt"=<list of
1373 Resource Type IDs>).

Deleted: IETF RFC 6690

Table 4. Resource Type Common Property definition

Property title	Property name	Value type	Value rule	Unit	Access mode	Mandatory	Description
Resource type	rt	array	Array of strings, conveying resource Type IDs		R	yes	The property name rt is as described in IETF RFC 6690 .

Deleted: IETF RFC 6690

1378 Resource Types may be explicitly discovered or implicitly shared between the user (i.e. Client) and
 1379 the host (i.e. Server) of the Resource.

7.4.3 Resource Type definition

1381 Resource Type is specified as follows:

- **Pre-defined URI** (optional) – a pre-defined URI may be specified for a specific Resource Type in an OCF specification. When a Resource Type has a pre-defined URI, all instances of that Resource Type shall use only the pre-defined URI. An instance of a different Resource Type shall not use the pre-defined URI.
- **Resource Type Title (optional)** – a human friendly name to designate the Resource Type.
- **Resource Type ID** – the value of "rt" [Property](#) which identifies the Resource Type, (e.g., "oic.wk.p").
- **Resource Interfaces** – list of the interfaces that may be supported by the Resource Type.
- **Properties** – definition of all the [Properties](#) that apply to the Resource Type. The Resource Type definition shall define whether a property is mandatory, conditional mandatory, or optional.
- **Related Resource Types** (optional) – the specification of other Resource Types that may be referenced as part of the Resource Type, applicable to collections.
- **Mime Types** (optional) – mime types supported by the resource including serializations (e.g., application/cbor, application/json, application/xml).

Comment [BRA12]: BZ #2284**Deleted: p****Comment [BRA13]: BZ #2284****Comment [BRA14]: BZ #2284****Deleted: Resource****Deleted: p**

1396 [Table 5](#) and [Table 6](#) provide an example description of an illustrative foobar Resource Type and
 1397 its associated Properties.

Deleted: Table 5**Deleted: Table 6****Table 5. Example foobar Resource Type**

Pre-defined URI	Resource Type Title	Resource Type ID ("rt" value)	interfaces	Description	Related Functional Interaction	M/C/R/O
none	foobar	oic.r.foobar	"oic.if.a"	Example "foobar" resource	Actuation	O

Table 6. Example foobar properties

Property title	Property name	Value type	Value rule	Unit	Access mode	Mandatory	Description
Resource Type	rt	array			R	yes	Resource Type
Interface	if	array			R	yes	Interface
Foo value	value	string			R	yes	Foo value

1401 An instance of the foobar Resource Type is as shown below

```
{
  "rt": ["oic.r.foobar"],
  "if": ["oic.if.a"],
  "value": "foo value"
}
```

1408

1409 An example schema for the foobar Resource Type is shown below

```
{
  "$schema": "http://json-schema.org/draft-04/schema",
  "type": "object",
  "properties": {
    "rt": {
      "type": "array",
      "items": {
        "type": "string",
        "maxLength": 64
      },
      "minItems": 1,
      "readOnly": true,
      "description": "Resource Type of the Resource"
    },
    "if": {
      "type": "array",
      "items": {
        "type": "string",
        "enum": ["oic.if.baseline", "oic.if.ll",
        "oic.if.b", "oic.if.lb", "oic.if.rw", "oic.if.r",
        "oic.if.a", "oic.if.s"]
      },
      "value": {"type": "string"}
    },
    "required": ["rt", "if", "value"]
  }
}
```

1410

1411 7.4.4 Multi-value "rt" Resource

1412 Multi-value "rt" Resource means a Resource with multiple Resource Types. Such a Resource is
 1413 associated with multiple Resource Types and so has an "rt" Property Value of multiple Resource
 1414 Type IDs (e.g. "rt": ["oic.r.switch.binary", "oic.r.light.brightness"]). The order of the Resource Type
 1415 IDs in the "rt" Property Value is meaningless. For example, "rt": ["oic.r.switch.binary",
 1416 "oic.r.light.brightness"] and "rt": ["oic.r.light.brightness", "oic.r.switch.binary"] have the same
 1417 meaning.

1418 Resource Types for multi-value "rt" Resources shall satisfy the following conditions.

- 1419 • **Property Name** – Property Names for each Resource Type shall be unique (within the scope
 1420 of the multi-value "rt" Resource) with the exception of Common Properties, otherwise there will
 1421 be conflicting Property semantics. If two Resource Types have a Property with the same
 1422 Property Name, a multi-value "rt" Resource shall not be composed of these Resource Types.

1423 A multi-value "rt" Resource satisfies all the requirements for each Resource Type and conforms to
 1424 the RAML/JSON definitions for each component Resource Type. Thus the mandatory Properties
 1425 of a multi-value "rt" Resource shall be the union of all the mandatory Properties of each Resource

1426 Type. For example, mandatory Properties of a Resource with "rt": ["oic.r.switch.binary",
1427 "oic.r.light.brightness"] are "value" and "brightness", where the former is mandatory for
1428 "oic.r.switch.binary" and the latter for "oic.r.light.brightness".

1429 The multi-value "rt" Resource Interface set shall be the union of the sets of interfaces from the
1430 component Resource Types. The Resource Representation in response to a CRUDN action on an
1431 Interface shall be the union of the schemas that are defined for that Interface. The Default Interface
1432 for a multi-value "rt" Resource shall be the baseline Interface ("oic.if.baseline") as that is the only
1433 guaranteed common Interface between the Resource Types.

1434 For clarity if each Resource Type supports the same set of Interfaces, then the resultant multi-
1435 value "rt" Resource has that same set of Interfaces with a Default Interface of baseline
1436 ("oic.if.baseline").

1437 See section 7.10.3 for the handling of query parameters as applied to a multi-value "rt" Resource.

1438 **7.5 Device Type**

1439 A Device Type is a class of Device. Each Device Type defined will include a list of minimum
1440 Resource Types that a device shall implement for that Device Type. A device may expose
1441 additional standard and vendor defined Resource Types beyond the minimum list. The Device
1442 Type is used in Resource discovery as specified in section 11.3.4.

1443 Like a Resource Type, a Device Type can be used in the Resource Type Common Property or in
1444 a Link using the Resource Type Parameter.

1445 A Device Type may either be pre-defined (in the OCF Device specification) or in custom definitions
1446 by manufacturers, end users, or developers of Devices (vendor-defined Device Types). Device
1447 Types and their definition details may be communicated out of band (like in documentation).

1448 Every Device Type shall be identified with a Resource Type ID using the same syntax constraints
1449 as a Resource Type.

1450 **7.6 Interface**

1451 **7.6.1 Introduction**

1452 An Interface provides first a view into the Resource and then defines the requests and responses
1453 permissible on that view of the Resource. So this view provided by an Interface defines the context
1454 for requests and responses on a Resource. Therefore, the same request to a Resource when
1455 targeted to different Interfaces may result in different responses.

1456 An Interface may be defined by either this specification (a Core Interface), the OCF Device
1457 specifications (a "vertical Interface") or manufacturers, end users or developers of Devices (a
1458 "vendor-defined Interface").

1459 The Interface Property lists all the Interfaces the Resource support. All resources shall have at
1460 least one Interface. The Default Interface shall be defined by an OCF specification and inherited
1461 from the Resource Type definition. The Default Interface associated with all Resource Types
1462 defined in this specification shall be the supported Interface listed first within the applicable
1463 enumeration in the definition of the Resource Type (see Annex D). All Default Interfaces specified
1464 in an OCF specification shall be mandatory.

1465 In addition to any OCF specification defined interface, all Resources shall support the Baseline
1466 Interface ("oic.if.baseline") as defined in section 7.6.3.2.

1467 See section 7.10.4 for the use of queries to enable selection of a specific interface in a request.

1468 An Interface may accept more than one media type. An Interface may respond with more than one
 1469 media type. The accepted media types may be different from the response media types. The media
 1470 types are specified with the appropriate header parameters in the transfer protocol. (NOTE: This
 1471 feature has to be used judiciously and is allowed to optimize representations on the wire) Each
 1472 Interface shall have at least one media type.

1473

1474 7.6.2 Interface Property

1475 **Table 7. Resource Interface Property definition**

Property title	Property name	Value type	Value rule	Unit	Access mode	Mandatory	Description
Interface	if	array	Array of strings, conveying interfaces		R	yes	Property to declare the Interfaces supported by a Resource.

1476 The Interfaces supported by a Resource shall be declared using the Interface Common Property
 1477 ([Table 7](#)) as "if=<array of Interfaces>". The Property Value of an Interface Property shall be a
 1478 lower case string with segments separated by a "." (dot). The string "oic", when used as the first
 1479 segment in the Interface Property Value, is reserved for OCF-defined Interfaces. The Interface
 1480 Property Value may also be a reference to an authority similar to IANA that may be used to find
 1481 the definition of an Interface. A Resource Type shall support one or more of the Interfaces defined
 1482 in section 7.6.3.

Deleted: Table 7

1483 7.6.3 Interface methods

1484 7.6.3.1 Overview

1485 The OCF-defined Interfaces are listed in the table below:

1486 **Table 8. OCF standard Interfaces**

Interface	Name	Applicable Operations	Description
baseline	"oic.if.baseline"	RETRIEVE, NOTIFY, UPDATE	The baseline Interface defines a view into all Properties of a Resource including the Meta Properties. This Interface is used to operate on the full Representation of a Resource.
links list	"oic.if.ll"	RETRIEVE, NOTIFY	The 'links list' Interface provides a view into Links in a Collection (Resource). Since Links represent relationships to other Resources, the links list interfaces may be used to discover Resources with respect to a context. The discovery is done by retrieving Links to these Resources. For example: the Core Resource "/oic/res" uses this Interface to allow discovery of Resource "hosted" on a Device.
batch	"oic.if.b"	RETRIEVE, NOTIFY, UPDATE	The batch Interface is used to interact with a collection of Resources at the same time. This also removes the need for the Client to first discover the Resources it is manipulating – the Server forwards the requests and aggregates the responses
read-only	"oic.if.r"	RETRIEVE, NOTIFY	The read-only Interface exposes the Properties of a Resource that may be 'read'. This Interface does not provide methods to update Properties of a Resource and so can only be used to 'read' Property Values.
read-write	"oic.if.rw"	RETRIEVE, NOTIFY, UPDATE	The read-write Interface exposes only those Properties that may be both 'read' and "written" and provides methods to read and write the Properties of a Resource.

Deleted:

Comment [BRA15]: BZ #2352

All changes in this table

Deleted: Methods

actuator	"oic.if.a"	RETRIEVE, NOTIFY, UPDATE	The actuator Interface is used to read or write the Properties of an actuator Resource.
sensor	"oic.if.s"	RETRIEVE, NOTIFY	The sensor Interface is used to read the Properties of a sensor Resource.

Deleted: CREATE,

1491

1492 7.6.3.2 Baseline Interface

1493 7.6.3.2.1 Overview

1494 The Representation that is visible using the "baseline" Interface includes all the Properties of the
 1495 Resource including the Common Properties. The "baseline" Interface shall be defined for all
 1496 Resource Types. All Resources shall support the "baseline" Interface.

1497 7.6.3.2.2 Use of RETRIEVE

1498 The "baseline" Interface is used when a Client wants to retrieve all Properties of a Resource; that
 1499 is the Server shall respond with a Resource representation that includes all of the implemented
 1500 Properties of the Resource. When the Server is unable to send back the whole Resource
 1501 representation, it shall reply with an error message. The Server shall not return a partial Resource
 1502 representation.

1503 An example response to a RETRIEVE request using the baseline Interface is shown below:

```
{
  "rt": ["oic.r.temperature"],
  "if": ["oic.if.a","oic.if.baseline"],
  "temperature": 20,
  "units": "C",
  "range": [0,100]
}
```

1504

1505 7.6.3.2.3 Use of UPDATE

1506 Using the baseline Interface, all Properties of a Resource with the exception of Common Properties
 1507 may be modified using an UPDATE request with a list of Properties and their desired values if a
 1508 Resource Type has an associated schema for UPDATE using baseline. If the Interfaces exposed
 1509 by a Resource in addition to the baseline Interface do not support the UPDATE semantic then
 1510 UPDATE using the baseline Interface is also not supported.

1511 7.6.3.3 Link List Interface

1512 7.6.3.3.1 Overview

1513 The links list Interface provides a view into the list of Links in a Collection (Resource). The
 1514 Representation visible through this Interface has only the Links ~~exposed as Property(-ies) that~~
 1515 ~~is(are) an array (or arrays) of Links by the Resource~~ – so this Interface is used to manipulate or
 1516 interact with the list of Links in a Collection. The Links list may be RETRIEVEd using this Interface.

Comment [BRA16]: BZ #2284

Deleted: defined in the Property Value of the "links" Property

1517 The Interface definition and semantics are given as follows:

- 1518 • The links list Interface name shall be "oic.if.ll".
- 1519 • ~~In response to a RETRIEVE request on the "links list" Interface, the URIs of the referenced~~
 1520 Resources shall be returned as a URI reference.
- 1521 • If there are no links present in a Resource, then an empty list shall be returned.
- 1522 • The Representation determined by this Interface depends on the requesting Client. For a Client
 1523 that includes an OCF-Accept-Content-Format-Version option as defined in section 12.2.5 in

Deleted: <#>If specified in a request (usually in the
 request header), the serialization in the response shall
 be in the format expected in the request.

Deleted: <#> -

1531 the request the response only includes the Property value(s) of the Property(-ies) that are
1532 arrays of Links, hence a Collection or /oic/res response with oic.if.ll is an array of Links. For a
1533 Client that does not include an OCF-Accept-Content-Format-Version option the response is as
1534 defined in E.5.

7.6.3.3.2 Example: "links list" Interface

Example: Request to a Collection

Request to RETRIEVE the Links in room

(the Links could be
referencing lights, fans,
electric sockets etc)

```
GET ocf://<devID>/a/room/1?if=oic.if.ll
The response would be the array of OCF Links
[

{
    "href": "/the/light/1",
    "rt": ["oic.r.switch.binary"],
    "if": ["oic.if.a", "oic.if.baseline"],
    "eps": [
        {"ep": "coaps://[2001:db8:a::b1d4]:55555"}
    ],
    {
        "href": "/the/light/2",
        "rt": ["oic.r.switch.binary"],
        "if": ["oic.if.a", "oic.if.baseline"],
        "eps": [
            {"ep": "coaps://[2001:db8:a::b1d4]:55555"}
        ],
        {
            "href": "/my/fan/1",
            "rt": ["oic.r.switch.binary"],
            "if": ["oic.if.a", "oic.if.baseline"],
            "eps": [
                {"ep": "coaps://[2001:db8:a::b1d4]:55555"}
            ]
        }
    }
}
```

Comment [BRA18]: BZ #2284

Deleted: Value of the "links" Property

Deleted: OCF

```

        "rt": ["oic.r.switch.binary"],
        "if": ["oic.if.a", "oic.if.baseline"],
        "eps": [
            {"ep": "coaps://[2001:db8:a::b1d4]:55555"}]
    }
]
```

1539

1540 7.6.3.4 Batch Interface

1541 7.6.3.4.1 Overview

1542 The batch Interface is used to interact with a collection of Resources using a single/same Request.
 1543 The batch Interface can be used to RETRIEVE or UPDATE the Properties of the ~~linked~~ Resources
 1544 with a single request.

1545 The batch Interface is defined as follows:

- 1546 • The batch Interface name is "oic.if.b"
- 1547 • A Collection Resource has linked Resources that are represented as URIs. In the "href" Property of the batch payload the URI shall be fully qualified for remote Resources and a relative reference for local Resources.
- 1548 • The original request is modified to create new requests targeting each of the linked Resources in the Collection by substituting the URI in the original request with the URI of the linked Resource. The payload in the original request is replicated in the payload of the new requests.
- 1549 • The requests shall be forwarded assuming use of the Default Interface of the linked Resources.
- 1550 • Requests shall only be forwarded to linked Resources that are identified by relation types "item" or "hosts" ("hosts" is the default relation type ~~value~~ should the "rel" Link Parameter not be present). Requests shall not be forwarded to linked Resources that do not contain the "item" or "hosts" relation type values.
- 1551 • ~~Properties of the Collection Resource itself may be included in payloads using "oic.if.b" Interface, by exposing a single Link with the link relation "self" along with "item" within the Collection, and ensuring that Link resolution cannot become an infinite loop due to recursive references. For example, if the Default Interface of the Collection is "oic.if.b", then the Server might recursively include its batch representation within its batch representation, in an endless loop. See 7.6.3.4.2 for an example of use of a Link containing "rel": ["self","item"] to include Properties of the Collection Resource, along with linked Resources, in "oic.if.b" payloads.~~
- 1552 • ~~If the Default Interface of a Collection Resource is exposed using the Link relation "self", and the Default Interface contains Properties that expose any Links, those Properties shall not be included in a batch representation which includes the "self" Link.~~
- 1553 • Any request forwarded to a linked Resource that is a Collection (including a "self" Link reference) shall have the Default Interface of the linked Collection Resource applied.
- 1554 • All the responses from the linked Resources shall be aggregated into a single Response to the Client. The Server may timeout the response to a time window, the Server may choose any appropriate window based on conditions.
- 1555 • If a linked Resource cannot process the request, an empty response, i.e. a JSON object with no content ("{}") as the representation for the "rep" Property, or error response should the

Comment [BRA20]: BZ #2055

Deleted: "

Deleted: "

Deleted: unless otherwise stated

Comment [BRA22]: BZ #2055

Deleted: T

Deleted: the batch response

Deleted: (i.e. "rel": ["self","item"], see also the example in section 7.6.3.4.2)

Deleted: the "if" Link Parameter of the "self" Link contains an Interface(s) that do(es) not expose the "links" Property, i.e. "oic.if.b" and not "oic.if.baseline" or "oic.if.l", otherwise

Deleted: s

Comment [BRA24]: BZ #2055

Deleted: also

Comment [BRA25]: BZ #2055

Deleted: also have the batch

1589 linked Resource Type provide an error schema or diagnostic payload, shall be returned by the
1590 linked Resource. These empty or error responses for all linked Resources that exhibit an error
1591 shall be included in the aggregated response to the original Client request. See the example
1592 in section 7.6.3.4.2.

- 1593 • If any of the linked Resources returns an error response, the aggregated response sent to the
1594 Client shall also indicate an error (e.g. 4.xx in CoAP). If all of the linked Resources return,
1595 successful responses, the aggregated response shall include the success response code.
- 1596 • The aggregated response shall be an array of objects representing the responses from each
1597 linked Resource. Each object in the response shall include at least two items: (1) the URI of
1598 the linked Resource (fully qualified for remote Resources, or a relative reference for local
1599 Resources) as "href": <URI> and (2) the individual response object or array of objects if the
1600 linked Resource is itself a Collection using "rep" as the key, e.g. "rep": { < representation of
1601 individual response> }.
- 1602 • If the Collection is marked as Observable, linked Resources referenced in the Collection may
1603 be observed using the batch Interface. The observe mechanism shall work as defined in 11.4.2
1604 with the observe request forwarded to each of the linked Resources. All responses to the
1605 request shall be aggregated into a single response to the Client using the same representations
1606 and status codes as for RETRIEVE operations using the batch Interface.
- 1607 • Should any one of the observable linked Resources fail to honour the observe request the
1608 response to the batch observe request shall also indicate that the entire request was not
1609 honoured using the mechanism described in section 11.4.2.3.
- 1610 • If any of the Observable Resources in a request to a Collection using the batch Interface replies
1611 with an error or Observe Cancel, the Observations of all other linked Resources shall be
1612 cancelled and the error or Observe Cancel status shall be returned to the Observing Client.
- 1613 Note: Behavior may be different for Links that do network requests vs. local Resources
- 1614 • All notifications to the Client that initiated an observe request using the batch Interface shall
1615 use the batch representation for the Collection. This is the aggregation of any individual
1616 observe notifications received by the Device hosting the Collection from the individual observe
1617 requests that were forwarded to the linked Resources.
- 1618 • Linked Resources which are not marked Observable in the Links of a Collection shall not trigger
1619 Notifications, but may be included in the response to, and subsequent Notifications resulting
1620 from, an Observe request to the batch Interface of a Collection.
- 1621 • Each notification shall contain the most current values for all of the Linked Resources that
1622 would be included if the original Observe request were processed again. The Server hosting
1623 the Collection may choose to RETRIEVE all of the linked Resources each time, or may choose
1624 to employ caching to avoid retrieving linked Resources on each Notification.
- 1625 • If a Linked Resource is Observable and has responded with a successful Observe response,
1626 the most recently reported value of that Resource is considered to be the most current value
1627 and may be reported in all subsequent Notifications.
- 1628 • Links in the Collection should be observed by using the "oic.if.ll" Interface, A notification shall
1629 be sent any time the contents of the "oic.if.ll" Interface representation are changed; that is, if a
1630 Link is added, if a Link is removed, or if a Link is updated. Notifications on the "oic.if.ll" Interface
1631 shall contain all of the Links in the "oic.if.ll" Interface representation.
- 1632 • Other Properties of the Collection Resource, if present, may be observed by using the
1633 interfaces defined in the definition for the Resource Type, including using the "oic.if.baseline"
1634 Interface.
- 1635 • The Client may choose to restrict the linked Resources to which the request is forwarded by
1636 including additional query parameters in the request. The Server should process any additional

Deleted: any of the other

Deleted: s a

Comment [BRA26]: BZ #2216

Deleted: payload

Deleted: that

Deleted: payload

Comment [BRA27]: BZ #2216

Deleted: L

Deleted: ; in this error case the individual successful
observe requests shall be cancelled as described in
section 11.4.2.6

Comment [BRA29]: BZ #2216

Comment [BRA30]: BZ #2216

Deleted: T

Deleted: itself may

Deleted: links list or baseline

Deleted: s

Comment [BRA31]: BZ #2216

Comment [BRA32]: BZ #2216

1651 query parameters in a request that includes "oic.if.b" as selectors for linked Resources that are
1652 to be processed by the request.

1653 • A Client shall perform UPDATE operations using the batch Interface by creating a payload that
1654 is similar to a RETRIEVE response payload from a batch Interface request. The Server shall
1655 send a separate UPDATE request to each of the linked Resources according to each "href"
1656 Property and the corresponding value of the "rep" Property.

1657 • If the "href" value is empty, denoted by a zero length string or "" in JSON, the "rep" Property
1658 shall be applied to linked Resources in the Collection.

1659 • Items with the empty "href" and link-specific "href" shall not be mixed in the same UPDATE
1660 request.

1661 • All of the Properties in the UPDATE request may not be supported by the linked Resource. In
1662 such cases, writable Properties in the UPDATE request that are supported by the linked
1663 Resource shall be modified and Properties that are not supported shall be silently ignored.

1664 • The UPDATE response shall contain the updated values using the same payload schema as
1665 RETRIEVE operations if provided by the linked Resource, along with the appropriate status
1666 code. The aggregated response payload shall reflect the known state of the updated Properties
1667 after the batch update was completed. If no payload is provided by the updated Resource then
1668 an empty response (i.e. "rep": {}) shall be provided for that Resource.

1669 • A Collection shall not support the use of the UPDATE operation to add, modify or remove Links
1670 in an existing Collection using the "oic.if.baseline" or "oic.if.rw" or "oic.if.a" Interfaces.

Comment [BRA33]: BZ #2284

Deleted: Resource

Comment [BRA34]: BZ #2364

7.6.3.4.2 Examples: Batch Interface

1672 Note that the examples provided are illustrative and do not include all mandatory schema elements
1673 in all cases. It is assumed that the Default Interface for the Resource Type "x.org.example.rt.room"
1674 is specified in its Resource Type definition file as "oic.if.rw", which exposes the Properties
1675 "x.org.example.colour" and "x.org.example.size".

Comment [BRA35]: BZ #2055

Resources	<pre>/a/room/1 { "rt": "x.org.example.rt.room", "if": ["oic.if.rw", "oic.if.baseline", "oic.if.b", "oic.if.ll"], "x.org.example.colour": "blue", "x.org.example.dimension": "15bx15wx10h", "links": [{"href": "/a/room/1", "rel": ["self", "item"], "rt": ["x.org.example.rt.room"], "if": ["oic.if.rw", "oic.if.baseline", "oic.if.b", "oic.if.ll"], "p": {"bm": 2} }, {"href": "/the/light/1", "rel": ["item"], "rt": ["oic.r.switch.binary"], "if": ["oic.if.a", "oic.if.baseline"], "ins": "11111", "p": {"bm": 2} }, {"href": "/the/light/2", "rel": ["item"], "rt": ["oic.r.switch.binary"], "if": ["oic.if.a", "oic.if.baseline"], "ins": "22222", "p": {"bm": 2} }] }</pre>
-----------	---

Deleted: ["oic.wk.col",

Comment [BRA37]: BZ #2055

Deleted: "oic.wk.col",

Comment [BRA39]: BZ #2055

Deleted: b

```

        {"href": "/my/fan/1", "rel": ["item"], "rt": ["oic.r.switch.binary"], "if": ["oic.if.a", "oic.if.baseline"], "ins": "33333", "p": {"bm": 2} },

        {"href": "/his/fan/2", "rel": ["item"], "rt": ["oic.r.switch.binary"], "if": ["oic.if.a", "oic.if.baseline"], "ins": "44444", "p": {"bm": 2} },

        {"href": "/the/switches/1", "rel": ["item"], "rt": ["oic.wk.col"], "if": ["oic.if.ll", "oic.if.b", "oic.if.baseline"], "ins": "55555", "p": {"bm": 2} }

    ]

}

/the/light/1
{
    "rt": ["oic.r.switch.binary"],
    "if": ["oic.if.a", "oic.if.baseline"],
    "value": false
}

/the/light/2
{
    "rt": ["oic.r.switch.binary"],
    "if": ["oic.if.a", "oic.if.baseline"],
    "value": true
}

/my/fan/1
{
    "rt": ["oic.r.switch.binary"],
    "if": ["oic.if.a", "oic.if.baseline"],
    "value": true
}

```

	<pre> /his/fan/2 { "rt": ["oic.r.switch.binary"], "if": ["oic.if.a", "oic.if.baseline"], "value": false } /the/switches/1 { "rt": ["oic.wk.col"], "if": ["oic.if.ll", "oic.if.b", "oic.if.baseline"], "links": [{ "href": "/switch-1a", "rt": ["oic.r.switch.binary"], "if": ["oic.if.a", "oic.if.baseline"], "p": {"bm": 2} }, { "href": "/switch-1b", "rt": ["oic.r.switch.binary"], "if": ["oic.if.a", "oic.if.baseline"], "p": {"bm": 2} }] } </pre>
Use of batch, successful response	<p> </p> <p><u>Request: GET /a/room/1?if=oic.if.b</u></p> <p><u>Becomes the following individual request messages issued by the Device in the Client role</u></p> <p><u>GET /a/room/1 (NOTE: uses the Default Interface as specified for the Collection Resource, in this example oic.if.rw)</u></p>

```

GET /the/light/1 (NOTE: Uses the Default Interface as specified
for this resource)

GET /the/light/2 (NOTE: Uses the Default Interface as specified for
this resource)

GET /my/fan/1 (NOTE: Uses the Default Interface as specified for
this resource)

GET /his/fan/2 (NOTE: Uses the Default Interface as specified for
this resource)

GET /the/switches/1?rt=oic.if.b (NOTE: Uses the batch Interface for
the Collection that is within the Collection)

Response:

[

{

  "href": "/a/room/1",

  "rep": {"x.org.example.colour": "blue", "x.org.example.dimension": "15bx15wx10h"},

},

{

  "href": "/the/light/1",

  "rep": {"value": false}

},

{

  "href": "/the/light/2",

  "rep": {"value": true}

},

{

  "href": "/my/fan/1",

  "rep": {"value": true}

},

{

  "href": "/his/fan/2",

  "rep": {"value": false}

}
]

```

	<pre>{ "href": "/the/switches/1", "rep": [{"href": "/switch-1a", "rep": {"value": "true"}}, {"href": "/switch-1b", "rep": {"value": "false"}}] }</pre>
Use of batch, error response	<p>Should any of the RETRIEVE requests in the previous example fail, then the response includes an empty payload for that Resource instance and an error code is sent. The example below assumes errors from "/my/fan/1" and "/the/switches/1"</p> <p>Error Response:</p> <pre>[{ "href": "/a/room/1", "rep": {"x.org.example.colour": "blue", "x.org.example.dimension": "15bx15wx10h"}, "err": "BRA40" }, { "href": "/the/light/1", "rep": {"value": false}, "err": "BRA40" }, { "href": "/the/light/2", "rep": {"value": true}, "err": null }, { "href": "/my/fan/1", "rep": {} }]</pre>

Comment [BRA40]: BZ #2055

Deleted: ..

[... [2]]

	<pre> }, { "href": "/his/fan/2", "rep": {"value": false} }, { "href": "/the/switches/1", "rep": {} }] </pre>
Use of batch (UPDATE has POST semantics)	<pre>UPDATE /a/room/1?if=oic.if.b [{ "href": "", "rep": { "value": false } }]</pre> <p>Since the "href" value in the UPDATE request is empty, the request is forwarded to all Resources in the Collection and becomes:</p> <pre>UPDATE /a/room/1 { "value": false } UPDATE /the/light/1 { "value": false } UPDATE /the/light/2 { "value": false } UPDATE /my/fan/1 { "value": false } UPDATE /his/fan/2 { "value": false } UPDATE /the/switches/1?if=oic.if.b { "value": false }</pre> <p>The response will be same as response for GET /a/room/1?if=oic.if.b.</p> <p>Since /a/room/1 does not have a "value" Property exposed by its Default Interface, the UPDATE request will be silently ignored and it will not be included in the UPDATE response.</p>
Use of batch (UPDATE has POST semantics)	<pre>UPDATE /a/room/1?if=oic.if.b [{ "href": "/the/light/1", "rep": { "value": false } }, { "href": "/the/light/2", "rep": {} }]</pre>

```

        "rep": {
            "value": true
        }
    },
{
    "href": "/a/room/1",
    "rep": {
        "x.org.example.colour": "red"
    }
}
]

```

This turns /the/light/1 off, turns /the/light/2 on, and sets the colour of /a/room/1 to "red".

The response will be same as response for GET /a/room/1?if=oic.if.b with the updated Property values as shown below.

```

[
{
    "href": "/a/room/1",
    "rep": {"x.org.example.colour": "red",
            "x.org.example.dimension": "15bx15wx10h"}
},
{
    "href": "/the/light/1",
    "rep": {"value": false}
},
{
    "href": "/the/light/2",
    "rep": {"value": true}
}
]

```

Example use of additional query parameters to select items by matching Link Parameters.

Turn on light 1 based on the "ins" Link Parameters value of "11111"

```

UPDATE /a/room/1?if=oic.if.b&ins=11111
[
{
    "href": "",
    "rep": {
        "value": false
    }
}
]
```

```
}
```

Similar to the earlier example, "href": "" applies the UPDATE request to all of the Resources in the Collection. Since the additional query parameter ins=11111 selects only links that have a matching "ins" value, only one link is selected. The payload is applied to the target Resource of that link, /the/light/1.

Retrieving the item using the same query parameter:

```
RETRIEVE /a/room/1?if=oic.if.b&ins=11111
```

Response payload:

```
[  
  {  
    "href": "/the/light/1",  
    "rep": {  
      "value": false  
    }  
  }  
]
```

1682

1683 7.6.3.5 Actuator Interface

1684 The actuator Interface is the Interface for viewing Resources that may be actuated i.e. changes
1685 some value within or the state of the entity abstracted by the Resource:

- 1686 • The actuator Interface name shall be "oic.if.a"
- 1687 • The actuator Interface shall expose in the Resource Representation all mandatory Properties
1688 as defined by the applicable JSON; the actuator interface may also expose in the Resource
1689 Representation optional Properties as defined by the applicable JSON schema that are
1690 implemented by the target Device.

1691 "Heater" Resource (for illustration only):

For the following Resource

```
| /a/act/heater  
| {  
|   "rt": ["acme.gas"],  
|   "if": ["oic.if.baseline", "oic.if.r", "oic.if.a", "oic.if.s"],  
|   "settemp": 10,  
|   "currenttemp" : 7  
| }
```

Deleted: NOTE: "prm" is the Property name for
'parameters' Property

Deleted: ..

Deleted: "prm": {"sensitivity": 5,
"units": "C", "range": [0,10],

Deleted: ..

1692
1693
1694

"Actuator" interface in respect to "Heater" Resource (for illustration only):

1. Retrieving values of an actuator

```
Request: GET /a/act/heater?if="oic.if.a"
```

Response:

```
    "settemp": 10,  
    "currenttemp" : 7  
}
```

2. Correct use of actuator:

```
Request: POST /a/act/heater?if="oic.if.a"  
        {  
            "settemp": 20  
        }
```

Response:

```
        {  
            Ok  
        }
```

3. Incorrect use of actuator

```
Request: POST /a/act/heater?if="oic.if.a"  
        {  
            "if": ["oic.if.s"] ← this is visible through baseline  
Interface  
        }  
Response:  
        {  
            Error  
        }
```

Deleted: "prm": {"sensitivity": 5,
"units": "C", "range": [0,10]},
Deleted: ..

1701

- A RETRIEVE request using this Interface shall return the Representation for this Resource subject to any query and filter parameters that may also exist
- An UPDATE request using this Interface shall provide a payload or body that contains the Properties that will be updated on the target Resource.

7.6.3.6 Sensor Interface

The sensor Interface is the Interface for retrieving measured, sensed or capability specific information from a Resource that senses:

- The sensor Interface name shall be "oic.if.s"
- The sensor Interface shall expose in the Resource Representation all mandatory Properties as defined by the applicable JSON; the sensor interface may also expose in the Resource Representation optional Properties as defined by the applicable JSON schema that are implemented by the target Device.
- A RETRIEVE request using this Interface shall return this Representation for the Resource subject to any query and filter parameters that may also exist
-

NOTE: The example here is with respect to

1. Retrieving values of sensor

```
Request: GET /a/act/heater?if="oic.if.s"
```

Formatted: Font:Bold

Formatted: PARAGRAPH

Deleted: ..

```

Response:
{
    "currenttemp": 7
}

2. Incorrect use of sensor

Request: PUT /a/act/heater?if=oic.if.s ← PUT is not allowed
{
    "settemp": 20 ← this is possible through actuator Interface
}
Response:
{
    Error
}

3. Incorrect use of sensor

Request: POST /a/act/heater?if=oic.if.s ← POST is not allowed
{
    "currenttemp": 15 ← this is possible through actuator
Interface
}
Response:
{
    Error
}

```

1721

1722 **7.6.3.7 Read-only Interface**

1723 The read-only Interface exposes only the Properties that may be “read”. This includes Properties
 1724 that may be “read-only”, “read-write” but not Properties that are “write-only” or “set-only”. The
 1725 applicable methods that can be applied to a Resource is RETRIEVE only. An attempt by a Client
 1726 to apply a method other than RETRIEVE to a Resource shall be rejected with an error response
 1727 code.

1728 **7.6.3.8 Read-write Interface**

1729 The read-write Interface exposes only the Properties that may be “read” and “written”. The “read-
 1730 only” Properties shall not be included in Representation for the “read-write” Interface. This is a
 1731 generic Interface to support “reading” and “setting” Properties in a Resource. The applicable
 1732 methods that can be applied to a Resource are RETRIEVE and UPDATE only. An attempt by a
 1733 Client to apply a method other than RETRIEVE or UPDATE to a Resource shall be rejected with
 1734 an error response code.

1735 **7.7 Resource representation**

1736 Resource representation captures the state of a Resource at a particular time. The resource
 1737 representation is exchanged in the request and response interactions with a Resource. A Resource
 1738 representation may be used to retrieve or update the state of a resource.

1739 The resource representation shall not be manipulated by the data connectivity protocols and
 1740 technologies (e.g., CoAP, UDP/IP or BLE).

1741 **7.8 Structure**

1742 **7.8.1 Introduction**

1743 In many scenarios and contexts, the Resources may have either an implicit or explicit structure
1744 between them. A structure can, for example, be a tree, a mesh, a fan-out or a fan-in. The
1745 Framework provides the means to model and map these structures and the relationships among
1746 Resources. The primary building block for resource structures in Framework is the collection. A
1747 collection represents a container, which is extensible to model complex structures.

1748 **7.8.2 Resource Relationships**

1749 Resource relationships are expressed as Links. A Link embraces and extends typed web links
1750 concept as a means of expressing relationships between Resources. A Link consists of a set of
1751 Parameters that define:

- 1752 • a context URI,
1753 • a target URI,
1754 • a relation from the context URI to the target URI
1755 • elements that provide metadata about the target URI, the relationship or the context of the Link.

1756 The target URI is mandatory and the other items in a Link are optional. Additional items in the Link
1757 may be made mandatory based on the use of the links in different contexts (e.g. in collections, in
1758 discovery, in bridging etc.). Schema for the Link payload is provided in Annex D.

1759 An example of a Link is shown in:

```
{"href": "/switch", "rt": ["oic.r.switch.binary"], "if": ["oic.if.a", "oic.if.baseline"], "p": {"bm": 3}, "rel": "item"}
```

1760 Two Links are distinct from each other when at least one parameter is different. For example the
1761 two Links shown below are distinct and can appear in the same list of Links.

```
{"href": "/switch", "rt": ["oic.r.switch.binary"], "if": ["oic.if.a", "oic.if.baseline"], "p": {"bm": 2}, "rel": "item"}  
  
{"href": "/switch", "rt": ["oic.r.switch.binary"], "if": ["oic.if.a", "oic.if.baseline"], "p": {"bm": 2}}
```

1762 The specification may mandate Parameters and Parameter values as required for certain
1763 capabilities. For all Links returned in a response to a RETRIEVE on "/oic/res", if a Link does not
1764 explicitly include the "rel" Parameter, a value of "rel"="hosts" shall be assumed. The relation value
1765 of "hosts" is defined by [IETF RFC 6690](#), the value of "item" by IETF RFC 6573, and the value of
1766 "self" by IETF RFC 4287 and all are registered in the IANA Registry for Link Relations defined in
1767 [IANA Link Relations](#).

Deleted: IETF RFC 6690

Deleted: IANA Link Relations

1768 As shown in D.2.8 the relation between the context URI and target URI in a Link is specified using
1769 the "rel" JSON element and the value of this element specifies the particular relation.

1770 The context URI of the Link shall implicitly be the URI of the Resource (or specifically a Collection)
1771 that contains the Link unless the Link specifies the anchor parameter. The anchor parameter is
1772 used to change the context URI of a Link – the relationship with the target URI is based off the
1773 anchor URI when the anchor is specified. Anchor parameter uses transfer protocol URI for OIC 1.1
1774 Link (e.g. "anchor": "coaps://fe80::b1d6]:44444") and OCF URI defined in Sec 6 for OCF 1.0 Links
1775 (e.g. "anchor": "ocf://dc70373c-1e8d-4fb3-962e-017eaa863989").

1778 An example of using anchors in the context of Collections – a floor has rooms and rooms have
1779 lights – the lights may be defined in floor as Links but the Links will have the anchor set to the URI
1780 of the rooms that contain the lights (the relation is contains). This allows all lights in a floor to be
1781 turned on or off together while still having the lights defined with respect to the rooms that contain
1782 them (lights may also be turned on by using the room URI too). See example use of anchor in
1783 Link:

```
/a/floor {  
    "links": [  
        {  
            "href": "/x/light1",  
            "anchor": "/a/room1",  ** Note: /a/room1 has the "item" relationship with /x/light1;  
not /a/floor **  
            "rel": "item"  
        }  
    ]  
}  
  
/a/room1 {  
    "links": [  
        {  
            ** Note: /a/room1 "contains" the /x/light since /a/room1 is the implicit context URI **  
            "href": "/x/light1",  
            "rel": "item"  
        }  
    ]  
}
```

1784

1785 7.8.2.1 Parameters

1786 7.8.2.1.1 "ins" or Link Instance Parameter

1787 The "ins" parameter identifies a particular Link instance in a list of Links. The "ins" parameter may
1788 be used to modify or delete a specific Link in a list of Links. The value of the "ins" parameter is set
1789 at instantiation of the Link by the OCF Device (Server) that is hosting the list of Links – once it has
1790 been set, the "ins" parameter shall not be modified for as long as the Link is a member of that list.

1791 7.8.2.1.2 "p" or Policy Parameter

1792 The Policy Parameter defines various rules for correctly accessing a Resource referenced by a
1793 target URI. The Policy rules are configured by a set of key-value pairs as defined below.

1794 The policy Parameter "p" is defined by:

- 1795 • "bm" key: The "bm" key corresponds to an integer value that is interpreted as an 8-bit bitmask.
1796 Each bit in the bitmask corresponds to a specific Policy rule. The following rules are specified
1797 for "bm":

1798

Bit Position	Policy rule	Comment
Bit 0 (the LSB)	discoverable	The discoverable rule defines whether the Link is to be included in the Resource discovery message via "/oic/res".

		<ul style="list-style-type: none"> If the Link is to be included in the Resource discovery message, then "p" shall include the "bm" key and set the discoverable bit to value 1. If the Link is NOT to be included in the Resource discovery message, then "p" shall either include the "bm" key and set the discoverable bit to value 0 or omit the "bm" key entirely.
Bit 1 (2 nd LSB)	observable	<p>The observable rule defines whether the Resource referenced by the target URI supports the NOTIFY operation. With the self-link, i.e. the Link with "rel" value of "self", "/oic/res" can have a Link with the target URI of "/oic/res" and indicate itself observable. The "self" is defined by IETF RFC 4287 and registered in the IANA Registry for "rel" value defined at IANA Link Relations.</p> <ul style="list-style-type: none"> If the Resource supports the NOTIFY operation, then "p" shall include the "bm" key and set the observable bit to value 1. If the Resource does NOT support the NOTIFY operation, then "p" shall either include the "bm" key and set the observable bit to value 0 or omit the "bm" key entirely.
Bits 2-7	--	Reserved for future use. All reserved bits in "bm" shall be set to value 0.

1799

1800 Note that if all the bits in "bm" are defined to value 0, then the "bm" key may be omitted entirely
 1801 from "p" as an efficiency measure. However, if any bit is set to value 1, then "bm" shall be
 1802 included in "p" and all the bits shall be defined appropriately.

- 1803 • "sec" and "port" in the remaining bullets shall be used only in a response payload when the
 1804 request does not include an OCF-Accept-Content-Format-Version option as defined in section
 1805 12.2.5. In a payload sent in response to a request that includes an OCF-Accept-Content-
 1806 Format-Version option "sec" and "port" shall not be used and instead the "eps" Parameter shall
 1807 provide the information for an encrypted connection. See E.2.8 for the schema for the "p"
 1808 Parameter that includes "sec" and "port".
- 1809 • "sec" key: The "sec" key corresponds to a Boolean value that indicates whether the Resource
 1810 referenced by the target URI is accessed via an encrypted connection. If "sec" is true, the
 1811 resource is accessed via an encrypted connection, using the "port" specified (see below). If
 1812 "sec" is false, the resource is accessed via an unencrypted connection, or via an encrypted
 1813 connection (if such a connection is made using the "port" settings for another Resource, for
 1814 which "sec" is true).
- 1815 • "port" key: The "port" key corresponds to an integer value that is used to indicate the port
 1816 number where the Resource referenced by the target URI may be accessed via an encrypted
 1817 connection.
- 1818 • If the Resource is only available via an encrypted connection (i.e. DTLS over IP), then
- 1819 ○ "p" shall include the "sec" key and its value shall be true.
- 1820 ○ "p" shall include the "port" key and its value shall be the port number where the
 1821 encrypted connection may be established.

Deleted: IANA Link Relations

- If the Resource is only available via an unencrypted connection, then
 - "p" shall include the "sec" key and its value shall be false or "p" shall omit the "sec" key; the default value of "sec" is false.
 - "p" shall omit the "port" key.
- • If the Resource is available via both an encrypted and unencrypted connection, then
 - "p" shall include the "sec" key and its value shall be false or "p" shall omit the "sec" key; the default value of "sec" is false.
 - "p" may omit the "port" key. If the "port" key is omitted, the Resource shall be available using the same "port" information as another Resource on the Device for which "sec" is true.
- Access to the Resource on the port specified by the "port" key shall be made by an encrypted connection (e.g. coaps://). (Note that unencrypted connection to the Resource may be possible on a separate port discovered thru multicast discovery).
- Note that access to the Resource is controlled by the ACL for the Resource. A successful encrypted connection does not ensure that the requested action will succeed. See OCF Security – Access Control section for more information.

Example 1: below shows the Policy Parameter for a Resource that is discoverable but not observable, and for which authenticated accesses shall be done via CoAPS port 33275:

```
1841 "p": { "bm": 1 }
```

Example 2: below shows a self-link, i.e. the "/oic/res" Link in itself that is discoverable and observable.

```
1845 {
1846   "href": "/oic/res",
1847   "rel": "self",
1848   "rt": ["oic.wk.res"],
1849   "if": ["oic.if.ll", "oic.if.baseline"],
1850   "p": {"bm": 3}
}
```

7.8.2.1.3 “type” or Media Type Parameter

The “type” Parameter may be used to specify the various media types that are supported by a specific target Resource. The default type of “application/cbor” shall be used when the “type” element is omitted. Once a Client discovers this information for each Resource, it may use one of the available representations in the appropriate header field of the Request or Response.

7.8.2.1.4 “di” or Device ID parameter

The “di” Parameter specifies the device ID of the Device that hosts the target Resource defined in the in the “href” Parameter.

The device ID may be used to qualify a relative reference used in the “href” or to lookup endpoint information for the relative reference.

7.8.2.1.5 “eps” Parameter

The “eps” Parameter indicates the Endpoint information of the target Resource.

1864 "eps" shall have as its value an array of items and each item represents Endpoint information with
1865 "ep" and "pri" as specified in 10.2. "ep" is mandatory but "pri" is optional.

1866 Example of "eps" with multiple Endpoints:

```
"eps": [
    {"ep": "coap://[fe80::b1d6]:1111", "pri": 2},
    {"ep": "coaps://[fe80::b1d6]:1122"},
    {"ep": "coap+tcp://[2001:db8:a::123]:2222", "pri": 3}
]
```

1867

1868 When "eps" is present in a link, the Endpoint information in "eps" can be used to access the target
1869 Resource referred by the "href" Parameter.

1870 Note that the type of Endpoint – Secure or Unsecure – that a Resource exposes merely determines
1871 the connection type(s) guaranteed to be available for sending requests to the Resource. For
1872 example, if a Resource only exposes a single CoAP "ep", it does not guarantee that the Resource
1873 cannot also be accessed via a Secure Endpoint (e.g. via a CoAPS "ep" from another Resource's
1874 "eps" information). Nor does exposing a given type of Endpoint ensure that access to the Resource
1875 will be granted using the "ep" information. Whether requests to the Resource are granted or denied
1876 by the Access Control layer is separate from the "eps" information, and is determined by the
1877 configuration of the /acl2 Resource (see OCF Security specification section 13.4.2 for details).

1878 When present, max-age information (e.g. Max-Age option for CoAP defined in IETF RFC 7252)
1879 determines the maximum time "eps" values may be cached before they are considered stale.

1880 7.8.2.2 Formatting

1881 When formatting in JSON, the list of Links shall be an array.

1882 7.8.2.3 List of Links in a Collection

1883 A Resource that exposes one or more Properties that are defined to be an array of Links where
1884 each Link can be discretely accessed is a Collection. The Property Name "links" is recommended
1885 for such an array of Links.

1886 A Resource with a list of Links:

```
/Room1
{
  "rt": ["my.room"],
  "if": ["oic.if.ll", "oic.if.baseline"],
  "color": "blue",
  "links": [
    {
      "href": "/oic/d",
      "rt": ["oic.d.light", "oic.wk.d"],
      "if": [ "oic.if.r", "oic.if.baseline" ],
      "p": {"bm": 1}
    },
    {
      "href": "/oic/p",
      "rt": ["oic.wk.p"],
      "if": [ "oic.if.r", "oic.if.baseline" ],
      "p": {"bm": 1}
    }
  ]
}
```

Comment [BRA44]: BZ #2284

Deleted: A list of Links in a Resource shall be included in that Resource as the value of the "links" Property of that Resource. A Resource that contains Links is a Collection.

```

},
{
  "href": "/switch",
  "rt": ["oic.r.switch.binary"],
  "if": [ "oic.if.a", "oic.if.baseline" ],
  "p": {"bm": 3},
  "mt": [ "application/cbor", "application/exi+xml" ]
},
{
  "href": "/brightness",
  "rt": ["oic.r.light.brightness"],
  "if": [ "oic.if.a", "oic.if.baseline" ],
  "p": {"bm": 3}
}
]
}

```

1891

1892 7.8.3 Collections

1893 7.8.3.1 Overview

1894 A Resource that contains one or more references (specified as Links) to other resources is a
 1895 Collection. These reference may be related to each other or just be a list; the Collection provides
 1896 a means to refer to this set of references with a single handle (i.e. the URI). A simple resource is
 1897 kept distinct from a collection. Any Resource may be turned into a Collection by binding resource
 1898 references as Links. Collections may be used for creating, defining or specifying hierarchies,
 1899 indexes, groups, and so on.

1900 A Collection shall have at least one Resource Type and at least one Interface bound at all times
 1901 during its lifetime. During creation time of a collection the Resource Type and interfaces are
 1902 specified. The initial defined Resource Types and interfaces may be updated during its life time.
 1903 These initial values may be overridden using mechanism used for overriding in the case of a
 1904 Resource. Additional Resource Types and Interfaces may be bound to the Collection at creation
 1905 or later during the lifecycle of the Collection.

1906 A Collection shall define a Property that is an array with zero or more Links. The target URIs in
 1907 the Links may reference another Collection or another Resource. The referenced Collection or
 1908 Resource may reside on the same Device as the Collection that includes that Link (called a local
 1909 reference) or may reside on another Device (called a remote reference). The context URI of the
 1910 Links in the array shall (implicitly) be the Collection that contains that Property. The (implicit)
 1911 context URI may be overridden with explicit specification of the "anchor" parameter in the Link
 1912 where the value of "anchor" is the new base of the Link.

Deleted: the "links"

Deleted: . The value of the "links" Property

Deleted: "links"

Deleted: "links" p

Comment [BRA45]: BZ #2284

1913 A Resource may be referenced in more than one Collection, therefore, a unique parent-child
 1914 relationship is not guaranteed. There is no pre-defined relationship between a Collection and the
 1915 Resource referenced in the Collection, i.e., the application may use Collections to represent a
 1916 relationship but none is automatically implied or defined. The lifecycles of the Collection and the
 1917 referenced Resource are also independent of one another.

1918 If the "drel" property is defined for the Collection then all Links that don't explicitly specify a
 1919 relationship shall inherit this default relationship in the context of that Collection. The default
 1920 relationship defines the implicit relationship between the Collection and the target URI in the Link.

1925 In the example below, a Property "links" represents the list of Links in a Collection. The "links"
1926 Property has, as its value, an array of items and each item is a Link.

```
/my/house ----- IRI/URI (resource)

{
  "rt": ["my.r.house"],
  "color": "blue",
  "n": "myhouse",
  "links": [
    {
      "href": "/door",
      "rt": ["oic.r.door"],
      "if": ["oic.if.b", "oic.if.ll", "oic.if.baseline"]
    },
    {
      "href": "/door/lock",
      "rt": ["oic.r.lock"],
      "if": ["oic.if.b", "oic.if.baseline"],
      "type": ["application/cbor", "application/exi+xml"]
    },
    {
      "href": "/light",
      "rt": ["oic.r.light"],
      "if": ["oic.if.s", "oic.if.baseline"]
    },
    {
      "href": "/binarySwitch",
      "rt": ["oic.r.switch.binary"],
      "if": ["oic.if.a", "oic.if.baseline"],
      "type": ["application/cbor"]
    }
  ]
}
```

Deleted: A

Comment [BRA46]: BZ #2284

Deleted: n OCF

Deleted: as shown

1927

1928

1929 A Collection may be:

- A pre-defined Collection where the Collection has been defined a priori and the Collection is static over its lifetime. Such Collections may be used to model, for example, an appliance that is composed of other devices or fixed set of resource representing fixed functions.
- A Device local Collection where the Collection is used only on the Device that hosts the Collection. Such collections may be used as a short-hand on a client for referring to many Servers as one.
- A centralized Collection where the Collection is hosted on an Device but other Devices may access or update the Collection
- A hosted Collection where the collection is centralized but is managed by an authorized agent or party.

7.8.3.2 Collection Properties

1941 A Collection shall define a Property that is an array of Links (the Property Name "links" is
1942 recommended). In addition, other Properties may be defined for the Collection by the Resource
1943 Type. The mandatory and recommended Common Properties for a Collection are shown in Table
1944 9. This list of Common Properties is in addition to those defined for Resources in section 7.3.2.

Deleted: the "links"

Comment [BRA47]: BZ #2284

Deleted: Table 9

1950
1951

Table 9. Common Properties for Collections (in addition to Common Properties defined in section 7.3.2)

Property	Description	Property Name	Type	Mandatory
Links	The array of Links in the Collection	Per Resource Type definition	json Array of Links	Yes
Resource Types	The list of allowed Resource Types for links in the Collection. If this property is not defined or is null string then any Resource Type is permitted	"rts"	json Array of Resource Type names	No

7.8.3.3 Default Resource Type

A default Resource Type, "oic.wk.col", is available for Collections. This Resource Type shall be used only when another type has not been defined on the Collection or when no Resource Type has been specified at the creation of the Collection.

The default Resource Type provides support for the Common Properties including an array of Links with the Property Name "links".

7.8.3.4 Default Interface

All instances of a Collection shall support the links list ("oic.if.ll") Interface in addition to the baseline ("oic.if.baseline") Interface. An instance of a Collection may optionally support additional Interfaces that are defined within this Specification. The Default Interface for a Collection shall be links list ("oic.if.ll") unless otherwise specified by the Resource Type definition.

7.9 Third (3rd) party specified extensions

This section describes how a 3rd party may add Device Types, Resource Types, 3rd party defined Properties to an existing or 3rd party defined Resource Type, 3rd party defined enumeration values to an existing enumeration and 3rd party defined parameters to an existing defined Property.

A 3rd party may specify additional (non-OCF) Resources within an OCF Device. A 3rd party may also specify additional Properties within an existing OCF defined Resource Type. Further a 3rd party may extend an OCF defined enumeration with 3rd party defined values.

A 3rd party defined Device Type may expose both 3rd party and OCF defined Resource Types. A 3rd party defined Device Type must expose the mandatory Resources for all OCF Devices defined within this specification.

A 3rd party defined Resource Type shall include any mandatory Properties defined in this specification and also any vertical specified mandatory Properties. All Properties defined within a 3rd party defined Resource Type that are part of the OCF namespace that are not Common Properties as defined in this specification shall follow the 3rd party defined Property rules in Table 10.

The following table defines the syntax rules for 3rd party defined Resource Type elements. Within the table the term "Domain_Name" refers to a domain name that is owned by the 3rd party that is defining the new element.

Table 10. 3rd party defined Resource elements

	Resource Element	Vendor Definition Rules
New 3 rd party defined Device Type	"rt" Property Value of "/oic/d"	x.<Domain_Name>.<resource identification>

Deleted: n
Deleted: set
Deleted: l
Deleted: c
Deleted: "links"
Deleted: l
Deleted: c
Deleted: Requests for addition of links using link list or link batch interfaces will be validated against this list.
Comment [BRA48]: BZ #2284
Deleted: ... [3]
Deleted: ...
Comment [BRA49]: BZ #2284
Deleted: shall be
Comment [BRA50]: BZ #2284
Deleted: the
Deleted: Property
Deleted: For the default Resource Type, the value of "links" shall be a simple array of Links. ... [4]
Comment [BRA51]: BZ #2284
Deleted: ...

Deleted: Table 10

New 3 rd party defined Resource Type	"rt" Property Value	x.<Domain_Name>.<resource identification>
New 3 rd party defined Property within the OCF namespace	Property Name	x.<Domain_Name>.<property>
Additional 3 rd party defined values in an OCF specified enumeration	Enumeration Property Value	x.<Domain_Name>.<enum value>
Additional 3 rd party defined parameter in an OCF specified Property	Parameter key word	x.<Domain_Name>.<parameter keyword>

Deleted: Resource

2002

2003 With respect to the use of the Domain_Name in this scheme the labels are reversed from how they
2004 appear in DNS or other resolution mechanisms. The 3rd party defined Device Type and Resource
2005 Type otherwise follow the rules defined in section 7.4.2 Resource Type Property. 3rd party defined
2006 Resource Types should be registered in the IANA Constrained RESTful Environments (CoRE)
2007 Parameters registry.

2008 For example:

2009 x.com.samsung.galaxyphone.accelerator

2010 x.com.cisco.ciscorouterport

2011 x.com.hp.printerhead

2012 x.org.allseen.newinterface.newproperty

2013 7.10 Query Parameters

2014 7.10.1 Introduction

2015 Properties and Parameters (including those that are part of a Link) may be used in the query part
2016 of a URI (see section 6.2.1) as one criterion for selection of a particular Resource. This is done by
2017 declaring the Property (i.e. <Property Name> = <desired Property Value>) as one of the segments
2018 of the query. Only ASCII strings are permitted in query filters, and NULL characters are disallowed
2019 in query filters. This means that only Property Values with ASCII characters may be matched in a
2020 query filter.

2021 The Resource is selected when all the declared Properties or Link Parameters in the query match
2022 the corresponding Properties or Link Parameters in the target.

2023 7.10.2 Use of multiple parameters within a query

2024 When a query contains multiple separate query parameters these are delimited by an "&" as
2025 described in section 6.2.1.

2026 A Client may apply multiple separate query parameters, for example
2027 "?ins=11111&rt=oic.r.switch.binary". If such queries are supported by the Server this
2028 shall be accomplished by matching "all of" the different query parameter types ("rt", "ins", "if", etc)
2029 against the target of the query. In the example, this resolves to an instance of oic.r.switch.binary
2030 that also has an "ins" populated as "11111". There is no significance applied to the order of the
2031 query parameters.

2032
2033 A Client may select more than one Resource Type using repeated query parameters, for example
2034 "?rt=oic.r.switch.binary&rt=oic.r.ramptime". If such queries are supported by the Server this shall
2035 be accomplished by matching "any of" the repeated query parameters against the target of the
2036 query. In the example, any instances of "oic.r.switch.binary" and/or "oic.r.ramptime" that may exist
2037 are selected.
2038

2040 A Client may combine both multiple repeated parameters and multiple separate parameters in a
2041 single query, for example "?if=oic.if.b&ins=11111&rt=oic.r.switch.binary&rt=oic.r.ramptime". If
2042 such queries are supported by the Server this shall be accomplished by matching "any of" the
2043 repeated query parameters and then matching "all of" the different query parameter types. In the
2044 example any instances of "oic.r.switch.binary" and/or "oic.r.ramptime" that also have an "ins" of
2045 "11111" that may exist are selected in a batch response.
2046

2047 Note that the parameters within a query string are represented within the actual messaging
2048 protocol as defined in section 12.

2049 **7.10.3 Application to multi-value "rt" Resources**

2050 An "rt" query for a multi-value "rt" Resource with the Default Interface of "oic.if.a", "oic.if.s", "oic.if.r",
2051 "oic.if.rw" or "oic.if.baseline" is an extension of a generic "rt" query. When a Server receives a
2052 RETRIEVE request for a multi-value "rt" Resource with an "rt" query, (i.e. GET
2053 /ResExample?rt=oic.r.foo), the Server should respond only when the query value is an item of the
2054 "rt" Property Value of the target Resource and should send back only the Properties associated
2055 with the query value(s). For example, upon receiving GET /ResExample?rt=oic.r.switch.binary
2056 targeting a Resource with "rt": ["oic.r.switch.binary", "oic.r.light.brightness"], the Server responds
2057 with only the Properties of oic.r.switch.binary.

2058 **7.10.4 Interface specific considerations for queries**

2059 **7.10.4.1 Interface selection**

2060 When an Interface is to be selected for a request, it shall be specified as a query parameter in the
2061 URI of the Resource in the request message. If no query parameter is specified, then the Default
2062 Interface shall be used. If the selected Interface is not one of the permitted Interfaces on the
2063 Resource then selecting that Interface is an error and the Server shall respond with an error
2064 response code.

2065 For example, the baseline Interface may be selected by adding "if=oic.if.baseline" to the list of
2066 query parameters in the URI of the target Resource. For example: "GET /oic/res?if=oic.if.baseline".

2067 **7.10.4.2 Batch Interface**

2068 See section 7.6.3.4 for details on the batch Interface itself. Query parameters may be used with
2069 the batch Interface in order to select particular Resources in a Collection for retrieval or update;
2070 these parameters are used to select items in the Collection by matching Link Parameter Values.

2071 When Link selection query parameters are used with RETRIEVE operations applied using the
2072 batch Interface, only the Resources in the Collection with matching Link Parameters should be
2073 returned.

2074 When Link selection query parameters are used with UPDATE operations applied using the batch
2075 Interface, only the Resources having matching Link Parameters should be updated.

2076 See 7.6.3.4.2 for examples of RETRIEVE and UPDATE operations that use Link selection query
2077 parameters.

2078 **8 CRUDN**

2079 **8.1 Overview**

2080 CREATE, RETRIEVE, UPDATE, DELETE, and NOTIFY (CRUDN) are operations defined for
2081 manipulating Resources. These operations are performed by a Client on the resources contained
2082 in a Server.

2083 On reception of a valid CRUDN operation n Server hosting the Resource that is the target of the
2084 request shall generate a response depending on the Interface included in the request; or based
2085 on the Default Interface for the Resource Type if no Interface is included.

2086 CRUDN operations utilize a set of parameters that are carried in the messages and are defined in
2087 Table 11. A Device shall use CBOR as the default payload (content) encoding scheme for resource
2088 representations included in CRUDN operations and operation responses; a Device may negotiate
2089 a different payload encoding scheme (e.g. see in section 12.2.4 for CoAP messaging). The
2090 following subsections specify the CRUDN operations and use of the parameters. The type
2091 definitions for these terms will be mapped in the messaging section for each protocol.

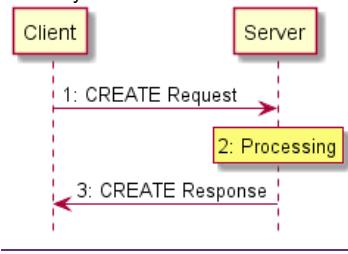
2092

Table 11. Parameters of CRUDN messages

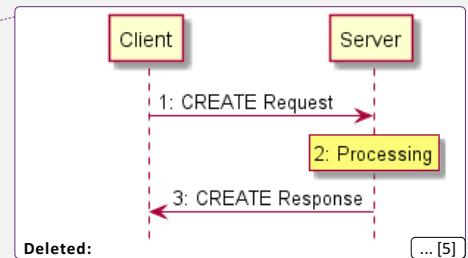
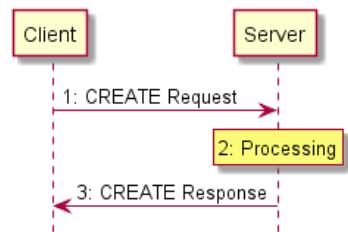
Applicability	Name	Denotation	Definition
All messages	<i>fr</i>	From	The URI of the message originator.
	<i>to</i>	To	The URI of the recipient of the message.
	<i>ri</i>	Request Identifier	The identifier that uniquely identifies the message in the originator and the recipient.
	<i>cn</i>	Content	Information specific to the operation.
Requests	<i>op</i>	Operation	Specific operation requested to be performed by the Server.
	<i>obs</i>	Observe	Indicator for an observe request.
Responses	<i>rs</i>	Response Code	Indicator of the result of the request; whether it was accepted and what the conclusion of the operation was. The values of the response code for CRUDN operations shall conform to those as defined in section 5.9 and 12.1.2 in IETF RFC 7252.
	<i>obs</i>	Observe	Indicator for an observe response.

2093 **8.2 CREATE**

2094 The CREATE operation is used to request the creation of new Resources on the Server. The
2095 CREATE operation is initiated by the Client and consists of three steps, as depicted in



2096 Figure 9, and described below.



2100 **Figure 9. CREATE operation**

2101 **8.2.1 CREATE request**

2102 The CREATE request message is transmitted by the Client to the Server to create a new Resource
2103 by the Server. The CREATE request message will carry the following parameters:

- 2104 • *fr*: Unique identifier of the Client
- 2105 • *to*: URI of the target resource responsible for creation of the new resource.
- 2106 • *ri*: Identifier of the CREATE request
- 2107 • *cn*: Information of the resource to be created by the Server
 - 2108 i) *cn* will include the URI and Resource Type property of the resource to be created.
 - 2109 ii) *cn* may include additional properties of the resource to be created.
- 2110 • *op*: CREATE

2111 **8.2.2 Processing by the Server**

2112 Following the receipt of a CREATE request, the Server may validate if the Client has the
2113 appropriate rights for creating the requested resource. If the validation is successful, the Server
2114 creates the requested resource. The Server caches the value of *ri* parameter in the CREATE
2115 request for inclusion in the CREATE response message.

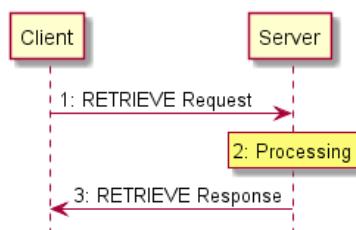
2118 **8.2.3 CREATE response**

2119 The Server shall transmit a CREATE response message in response to a CREATE request
2120 message from a Client. The CREATE response message will include the following parameters.

- 2121 • *fr*: Unique identifier of the Server
- 2122 • *to*: Unique identifier of the Client
- 2123 • *ri*: Identifier included in the CREATE request
- 2124 • *cn*: Information of the resource as created by the Server.
 - 2125 i) *cn* will include the URI of the created resource.
 - 2126 ii) *cn* will include the resource representation of the created resource.
- 2127 • *rs*: The result of the CREATE operation

2128 **8.3 RETRIEVE**

2129 The RETRIEVE operation is used to request the current state or representation of a Resource.
2130 The RETRIEVE operation is initiated by the Client and consists of three steps, as depicted in
2131 Figure 10 and described below.



2132 **Figure 10. RETRIEVE operation**

2133 **8.3.1 RETRIEVE request**

2134 RETRIEVE request message is transmitted by the Client to the Server to request the
2135 representation of a Resource from a Server. The RETRIEVE request message will carry the
2136 following parameters.

- 2137 • *fr*: Unique identifier of the Client
- 2138 • *to*: URI of the resource the Client is targeting
- 2139 • *ri*: Identifier of the RETRIEVE request
- 2140 • *op*: RETRIEVE

2141 **8.3.2 Processing by the Server**

2142 Following the receipt of a RETRIEVE request, the Server may validate if the Client has the
2143 appropriate rights for retrieving the requested data and the properties are readable. The Server
2144 caches the value of *ri* parameter in the RETRIEVE request for use in the response.

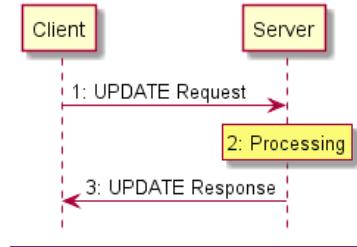
2145 **8.3.3 RETRIEVE response**

2146 The Server shall transmit a RETRIEVE response message in response to a RETRIEVE request
2147 message from a Client. The RETRIEVE response message will include the following parameters.

- *fr*: Unique identifier of the Server
- *to*: Unique identifier of the Client
- *ri*: Identifier included in the RETRIEVE request
- *cn*: Information of the resource as requested by the Client
 - i) *cn* should include the URI of the resource targeted in the RETRIEVE request
- *rs*: The result of the RETRIEVE operation

8.4 UPDATE

The UPDATE operation is either a Partial UPDATE or a complete replacement of the information in a Resource in conjunction with the interface that is also applied to the operation. The UPDATE operation is initiated by the Client and consists of three steps, as depicted in



[Figure 11](#), and described below.

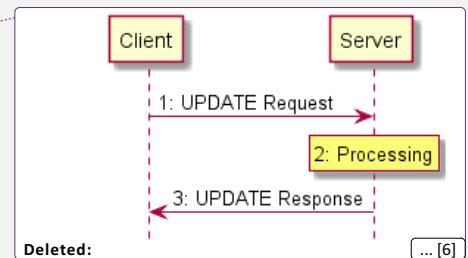
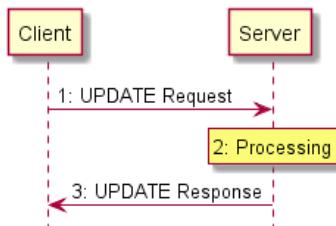


Figure 11. UPDATE operation

8.4.1 UPDATE request

The UPDATE request message is transmitted by the Client to the Server to request the update of information of a Resource on the Server. The UPDATE request message will carry the following parameters.

- *fr*: Unique identifier of the Client
- *to*: URI of the resource targeted for the information update
- *ri*: Identifier of the UPDATE request
- *op*: UPDATE
- *cn*: Information, including properties, of the resource to be updated at the target resource

2177 **8.4.2 Processing by the Server**

2178 Following the receipt of an UPDATE request, the Server may validate if the Client has the
2179 appropriate rights for updating the requested data. If the validation is successful the Server
2180 updates the target Resource information according to the information carried in *cn* parameter of
2181 the UPDATE request message. The Server caches the value of *ri* parameter in the UPDATE
2182 request for use in the response.

2183 An UPDATE request that includes Properties that are read-only shall be rejected by the Server
2184 with an *rs* indicating a bad request.

2185 An UPDATE request shall be applied only to the Properties in the target resource visible via the
2186 applied interface that support the operation. An UPDATE of non-existent Properties is ignored.

2187 An UPDATE request shall be applied to the Properties in the target resource even if those Property
2188 Values are the same as the values currently exposed by the target resource.

Comment [BRA53]: BZ #2230

2189 **8.4.2.1 Resource monitoring by the Server**

2190 The Server shall monitor the state the Resource identified in the observe request from the Client.
2191 Anytime there is a change in the state of the observed resource or an UPDATE operation applied
2192 to the Resource, the Server sends another RETRIEVE response with the observe indication. The
2193 mechanism does not allow the Client to specify any bounds or limits which trigger a notification,
2194 the decision is left entirely to the Server.

2195 **8.4.2.2 Additional RETRIEVE responses with observe indication**

2196 The Server shall transmit updated RETRIEVE response messages following observed changes in
2197 the state of the Resources requested by the Client. The RETRIEVE response message shall
2198 include the parameters listed in section 11.4.2.3.

Comment [BRA54]: BZ #2230

2200 **8.4.3 UPDATE response**

2201 The UPDATE response message will include the following parameters:

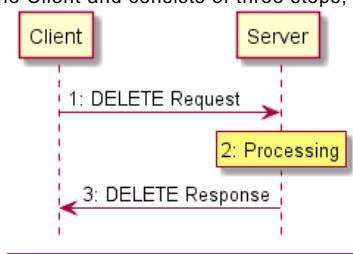
- 2202 • *fr*: Unique identifier of the Server
- 2203 • *to*: Unique identifier of the Client
- 2204 • *ri*: Identifier included in the UPDATE request
- 2205 • *rs*: The result of the UPDATE request

2206 The UPDATE response message may also include the following parameters:

- 2207 • *cn*: The Resource representation following processing of the UPDATE request

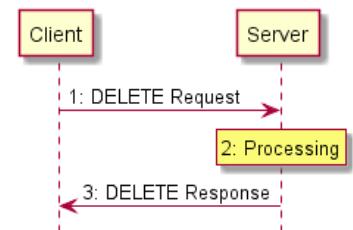
2208 **8.5 DELETE**

2209 The DELETE operation is used to request the removal of a Resource. The DELETE operation is
2210 initiated by the Client and consists of three steps, as depicted in



2211 [Figure 12](#) and described below.

2212



2213

2214 **Figure 12. DELETE operation**

2215 **8.5.1 DELETE request**

2216 DELETE request message is transmitted by the Client to the Server to delete a Resource on the
2217 Server. The DELETE request message will carry the following parameters:

- 2218
- *fr*: Unique identifier of the Client
 - *to*: URI of the target resource which is the target of deletion
 - *ri*: Identifier of the DELETE request
 - *op*: DELETE

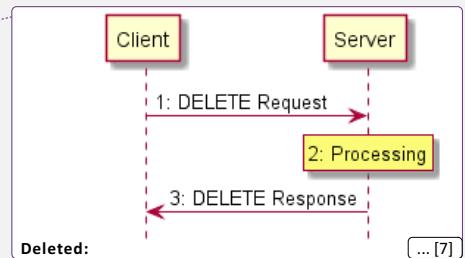
2219 **8.5.2 Processing by the Server**

2220 Following the receipt of a DELETE request, the Server may validate if the Client has the
2221 appropriate rights for deleting the identified resource, and whether the identified resource exists.
2222 If the validation is successful, the Server removes the requested resource and deletes all the
2223 associated information. The Server caches the value of *ri* parameter in the DELETE request for
2224 use in the response.

2225 **8.5.3 DELETE response**

2226 The Server shall transmit a DELETE response message in response to a DELETE request
2227 message from a Client. The DELETE response message will include the following parameters.

- 2228
- *fr*: Unique identifier of the Server



- 2235 • *to*: Unique identifier of the Client
2236 • *ri*: Identifier included in the DELETE request
2237 • *rs*: The result of the DELETE operation

2238 **8.6 NOTIFY**

2239 The NOTIFY operation is used to request asynchronous notification of state changes. Complete
2240 description of the NOTIFY operation is provided in section 11.4. The NOTIFY operation uses the
2241 NOTIFICATION response message which is defined here.

2242 **8.6.1.1 NOTIFICATION response**

2243 The NOTIFICATION response message is sent by a Server to notify the URLs identified by the
2244 Client of a state change. The NOTIFICATION response message carries the following parameters.

- 2245 • *fr*: Unique identifier of the Server
2246 • *to*: URI of the Resource target of the NOTIFICATION message
2247 • *ri*: Identifier included in the CREATE request
2248 • *op*: NOTIFY
2249 • *cn*: The updated state of the resource

2250 **9 Network and connectivity**

2251 **9.1 Introduction**

2252 The Internet of Things is comprised of a wide range of applications which sense and actuate the
2253 physical world with a broad spectrum of device and network capabilities: from battery powered
2254 nodes transmitting 100 bytes per day and able to last 10 years on a coin cell battery, to mains
2255 powered nodes able to maintain Megabit video streams. It is estimated that many 10s of billions
2256 of IoT devices will be deployed over the coming years.

2257 It is desirable that the connectivity options be adapted to the IP layer. To that end, IETF has
2258 completed considerable work to adapt Bluetooth®, Wi-Fi, 802.15.4, LPWAN, etc. to IPv6. These
2259 adaptations, plus the larger address space and improved address management capabilities, make
2260 IPv6 the clear choice for the OCF network layer technology.

2261 **9.2 Architecture**

2262 While the aging IPv4 centric network has evolved to support complex topologies, its deployment
2263 was primarily provisioned by a single Internet Service Provider (ISP) as a single network. More
2264 complex network topologies, often seen in residential home, are mostly introduced through the
2265 acquisition of additional home network devices, which rely on technologies like private Network
2266 Address Translation (NAT). These technologies require expert assistance to set up correctly and
2267 should be avoided in a home network as they most often result in breakage of constructs like
2268 routing, naming and discovery services.

2269 The multi-segment ecosystem OCF addresses will not only cause a proliferation of new devices
2270 and associated routers, but also new services introducing additional edge routers. All these new
2271 requirements require advance architectural constructs to address complex network topologies like
2272 the one shown in Figure 13.

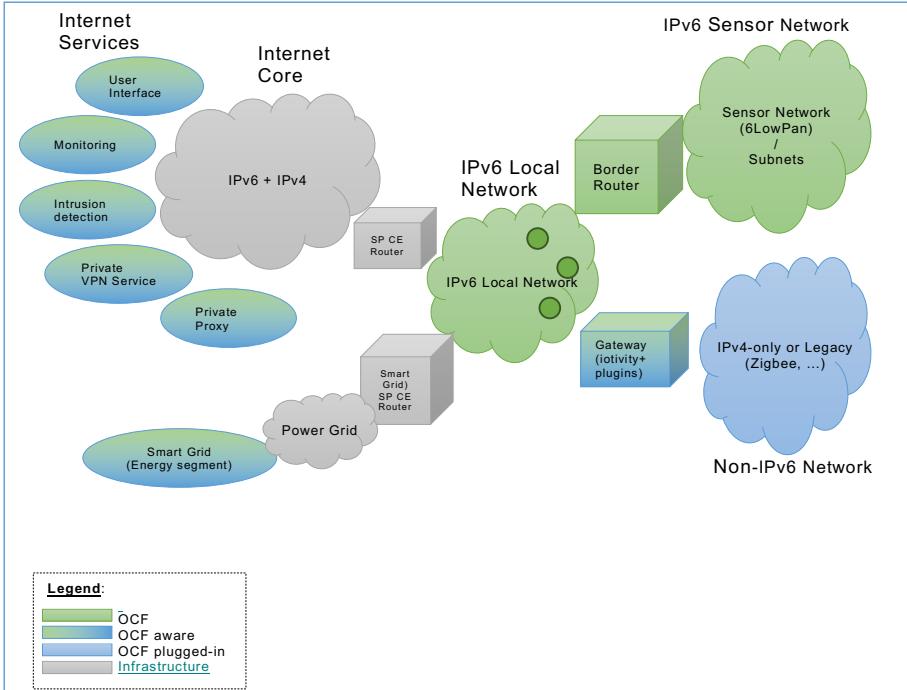


Figure 13. High Level Network & Connectivity Architecture

2273

2274 In terms of IETF RFC 6434, IPv6 nodes assume either a router or host role. Nodes may further
2275 implement various specializations of those roles:

- 2276
- A Router may implement Customer Edge Router capabilities as defined in IETF RFC 7084.
 - Nodes limited in processing power, memory, non-volatile storage or transmission capacity
2277 requires special IP adaptation layers (6LoWPAN) and/or dedicated routing protocols (RPL).
2278 Examples include devices transmitting over low power physical layer like IEEE 802.14.5, ITU
2279 G9959, Bluetooth Low Energy, DECT Ultra Low Energy, and Near Field Communication (NFC).
 - A node may translate and route messaging between IPv6 and non-IPv6 networks.

2280 **9.3 IPv6 network layer requirements**

2281 **9.3.1 Introduction**

2282 Projections indicate that many 10s of billions of new IoT endpoints and related services will be
2283 brought online in the next few years. These endpoint's capabilities will span from battery powered
2284 nodes with limited compute, storage, and bandwidth to more richly resourced devices operating
2285 over Ethernet and WiFi links.

2286 Internet Protocol version 4 (IPv4), deployed some 30 years ago, has matured to support a wide
2287 variety of applications such as Web browsing, email, voice, video, and critical system monitoring
2288 and control. However, the capabilities of IPv4 are at the point of exhaustion, not the least of which
2289 is that available address space has been consumed.

- 2293 The IETF long ago saw the need for a successor to IPv4, thus the development of IPv6. OCF
 2294 recommends IPv6 at the network layer. Amongst the reasons for IPv6 recommendations are:
 2295 • Larger address space. Side-effect: greatly reduce the need for NATs.
 2296 • More flexible addressing architecture. Multiple addresses and types per interface: Link-local,
 2297 ULA, GUA, variously scoped Multicast addresses, etc. Better ability to support multi-homed
 2298 networks, better re-numbering capability, etc.
 2299 • More capable auto configuration capabilities: DHCPv6, SLAAC, Router Discovery, etc.
 2300 • Technologies enabling IP connectivity on constrained nodes are based upon IPv6.
 2301 • All major consumer operating systems (iOS, Android, Windows, Linux) are already IPv6 enabled.
 2302 • Major Service Providers around the globe are deploying IPv6.

2303 9.3.2 IPv6 node requirements

2304 9.3.2.1 Introduction

2305 In order to ensure network layer services interoperability from node to node, mandating a common
 2306 network layer across all nodes is vital. The protocol should enable the network to be: secure,
 2307 manageable, and scalable and to include constrained and self-organizing meshed nodes. OCF
 2308 mandates IPv6 as the common network layer protocol to ensure interoperability across all Devices.
 2309 More capable devices may also include additional protocols creating multiple-stack devices. The
 2310 remainder of this section will focus on interoperability requirements for IPv6 hosts, IPv6
 2311 constrained hosts and IPv6 routers. The various protocol translation permutations included in
 2312 multi-stack gateway devices may be addressed in subsequent addendums of this specification.

2313 9.3.2.2 IP Layer

2314 An IPv6 node shall support IPv6 and it shall conform to the requirements as specified in
 2315 IETF RFC 6434.

2316

2317 10 Endpoint

2318 10.1 Endpoint definition

2319 The specific definition of an Endpoint depends on the Transport Protocol Suite being used. For the
 2320 example of CoAP over UDP over IPv6, the Endpoint is identified by an IPv6 address and UDP port
 2321 number.

Comment [BRA55]: BZ #2214

Deleted: e

2322 Each OCF Device shall associate with at least one Endpoint with which it can exchange request
 2323 and response messages. When a message is sent to an Endpoint, it shall be delivered to the OCF
 2324 Device which is associated with the Endpoint. When a request message is delivered to an Endpoint,
 2325 path component is enough to locate the target Resource.

2326 OCF Device can be associated with multiple Endpoints. For example, an OCF Device can have
 2327 several IP addresses or port numbers or support both CoAP and HTTP transfer protocol. **Different**
 2328 **Resources in an OCF Device may be accessed with the same Endpoint or need different ones.**
 2329 **Some Resources may use one Endpoint and others a different one. It depends on an**
 2330 **implementation.**

Comment [BRA56]: BZ #2214

2331 On the other hand, an Endpoint can be shared among multiple OCF Devices, only when there is a
 2332 way to clearly designate the target Resource with request URI. For example, when multiple CoAP
 2333 servers use uniquely different URI paths for all their hosted Resources, and the CoAP
 2334 implementation demultiplexes by path, they can share the same CoAP Endpoint. However, this is
 2335 not possible **In this version of the specification, because a pre-determined URI (e.g. "/oic/d") is**
 2336 mandatory for some mandatory Resources (e.g. "oic.wk.d").

Deleted: -

Comment [BRA58]: BZ #2214

Deleted: for

Deleted: OIC 1.1 and OCF 1.0

2341 **10.2 Endpoint information**

2342 **10.2.1 Introduction**

2343 Endpoint is represented by Endpoint information which consists of two items of key-value pair,
2344 "ep" and "pri".

2345 **10.2.2 "ep"**

2346 "ep" represents Transport Protocol Suite and Endpoint Locator specified as follows:

- 2347 • **Transport Protocol Suite** - a combination of protocols (e.g. CoAP + UDP + IPv6) with which
2348 request and response messages can be exchanged for RESTful transaction (i.e. CRUDN). A
2349 Transport Protocol Suite shall be indicated by a URI scheme name. All scheme names
2350 supported by this specification are IANA registered, these are listed in Table 12. A vendor may
2351 also make use of a non-IANA registered scheme name for their own use (e.g.
2352 "com.example.foo"), this shall follow the syntax for such scheme names defined by
2353 IETF RFC 7595. The behaviour of a vendor-defined scheme name is undefined by this
2354 specification. All OCF defined Resource Types when exposing Endpoint Information in an "eps"
2355 (see section 10.2.4) shall include at least one "ep" with a Transport Protocol Suite as defined
2356 in Table 12.

- 2357 • **Endpoint Locator** – an address (e.g. IPv6 address + Port number) through which a message
2358 can be sent to the Endpoint and in turn associated OCF Device. The Endpoint Locator for
2359 "coap", "coaps", "coap+tcp", "coaps+tcp", "http", and "https" shall be specified as "IP address:
2360 port number". Temporary addresses should not be used because Endpoint Locators are for the
2361 purpose of accepting incoming sessions, whereas temporary addresses are for initiating
2362 outgoing sessions (IETF RFC 4941). Moreover its inclusion in "/oic/res" can cause a privacy
2363 concern (IETF RFC 7721).

2364 "ep" shall have as its value a URI (as specified in IETF RFC 3986) with the scheme component
2365 indicating Transport Protocol Suite and the authority component indicating the Endpoint Locator:

"ep": "coap://[fe80::b1d6]:1111"

2366

2367 The current list of "ep" with corresponding Transport Protocol Suite is shown in [Table 12](#):

Deleted: Table 12

2368 **Table 12. "ep" value for Transport Protocol Suite**

Transport Protocol Suite	scheme	Endpoint Locator	"ep" Value example
coap + udp + ip	coap	IP address + port number	coap://[fe80::b1d6]:1111
coaps + udp + ip	coaps	IP address + port number	coaps://[fe80::b1d6]:1122
coap + tcp + ip	coap+tcp	IP address + port number	coap+tcp://[2001:db8:a::123]:2222
coaps + tcp + ip	coaps+tcp	IP address + port number	coaps+tcp://[2001:db8:a::123]:2233
http + tcp + ip	http	IP address + port number	http://[2001:db8:a::123]:1111
https + tcp + ip	https	IP address + port number	https://[2001:db8:a::123]:1122

2369 **10.2.3 "pri"**

2370 When there are multiple Endpoints, "pri" indicates the priority among them.

2371 "pri" shall be represented as a positive integer (e.g. "pri": 1) and the lower the value, the higher
2372 the priority.

2382 The default "pri" value is 1, i.e. when "pri" is not present, it shall be equivalent to "pri": 1.

2383 **10.2.4 Endpoint information in "eps" Parameter**

2384 To carry Endpoint information, a new Link Parameter "eps" is defined in 7.8.2.1.5. "eps" has an
2385 array of items as its value and each item represents Endpoint information with two key-value pairs,
2386 "ep" and "pri", of which "ep" is mandatory and "pri" is optional.|

2387 **Endpoint Information in an "eps" Parameter is valid for the target Resource of the Link, i.e., the**
2388 **Resource referred by "href" Parameter. Endpoint information in an "eps" Parameter may be used**
2389 **to access other Resources on the Device, but such access is not guaranteed.**

2390 A Link with "eps":

```
{  
    "anchor": "ocf://e61c3e6b-9c54-4b81-8ce5-f9039c1d04d9",  
    "href": "/myLightSwitch",  
    "rt": ["oic.r.switch.binary"],  
    "if": ["oic.if.a", "oic.if.baseline"],  
    "p": {"pm": 3},  
    "eps": [{"ep": "coap://[fe80::b1d6]:1111", "pri": 2}, {"ep": "coaps://[fe80::b1d6]:1122"}]  
}
```

2391 In the previous example, "anchor" represents the hosting OCF Device, "href", target Resource and
2392 "eps" the two Endpoints for the target Resource.

2393 If the target Resource of a Link requires a secure connection (e.g. CoAPS), "eps" Parameter shall
2394 be used to indicate the necessary information (e.g. port number) in OCF 1.0 payload, because
2395 "sec" and "port" shall be used only in OIC 1.1 payload.

2396 **10.3 Endpoint discovery**

2397 **10.3.1 Introduction**

2398 "Endpoint discovery" is defined as the process for a Client to acquire the Endpoint information for
2399 OCF Device or Resource.

2400 **10.3.2 Implicit discovery**

2401 If a Device is the source of a CoAP message (e.g. "/oic/res" response), the source IP address and
2402 port number may be combined to form the Endpoint Locator for the Device. Along with a "coap"
2403 scheme and default "pri" value, Endpoint information for the Device may be constructed.

2404 In other words, an "/oic/res" response message with CoAP may implicitly carry the Endpoint
2405 information of the responding Device and in turn all the hosted Resources, which may be accessed
2406 with the same transfer protocol of CoAP.

2407 **10.3.3 Explicit discovery with "/oic/res" response**

2408 Endpoint information may be explicitly indicated with the "eps" Parameter of the Links in "/oic/res".

2409 As in 10.3.2, an "/oic/res" response may implicitly indicate the Endpoint information for some
2410 Resources hosted by the responding Device. However Implicit discovery, i.e., inference of
2411 Endpoint information from CoAP response message, may not work for some Resources on the
2412 same Device. For example, some Resources may allow only secure access via CoAPS which
2413 requires the "eps" Parameter to indicate the port number. Moreover "/oic/res" may expose a target
2414 Resource which belongs to another Device.

Comment [BRA62]: BZ #2214

Deleted: l

Comment [BRA63]: BZ #2214

Deleted: light_device_id

Comment [BRA64]: BZ #2214

Deleted: can

Comment [BRA65]: BZ #2214

Deleted: can

Comment [BRA66]: BZ #2214

Deleted: can

Comment [BRA67]: BZ #2214

Deleted: can

Comment [BRA68]: BZ #2214

Deleted: can

Comment [BRA69]: BZ #2214

Comment [BRA70]: BZ #2214

Deleted: can

Deleted: the target

Comment [BRA71]: BZ #2214

2424 When the Endpoint for a target Resource of a Link cannot be implicitly inferred, the "eps"
2425 Parameter shall be included to provide explicit Endpoint information with which a Client can access
2426 the target Resource. [To access the target Resource of a Link, a Client may use the "eps" Parameter](#)
2427 [in the Link, if it is present and fall back on implicit discovery if not.](#)

Comment [BRA72]: BZ #2214

2428 This applies to the case of "/oic/res" for a Resource Directory or Bridge Device which usually
2429 carries the Links for Resources which another Device hosts.

2430 An "oic/res" response [from a Bridge Device with two Bridged Devices, having](#) the "eps" Parameter
2431 in Links:

```
[  
  {  
    "anchor": "ocf://e61c3e6b-9c54-4b81-8ce5-f9039c1d04d9",  
    "href": "/oic/res",  
    "rel": "self",  
    "rt": ["oic.wk.res"],  
    "if": ["oic.if.ll", "oic.if.baseline"],  
    "p": {"bm": 3},  
    "eps": [{"ep": "coap://[2001:db8:a::b1d4]:55555"},  
            {"ep": "coaps://[2001:db8:a::b1d4]:11111"}]  
  },  
  {  
    "anchor": "ocf://e61c3e6b-9c54-4b81-8ce5-f9039c1d04d9",  
    "href": "/oic/d",  
    "rt": ["oic.wk.d", "oic.d.bridge"],  
    "if": ["oic.if.r", "oic.if.baseline"],  
    "p": {"bm": 3},  
    "eps": [{"ep": "coap://[2001:db8:a::b1d4]:55555"},  
            {"ep": "coaps://[2001:db8:a::b1d4]:11111"}]  
  },  
  {  
    "anchor": "ocf://e61c3e6b-9c54-4b81-8ce5-f9039c1d04d9",  
    "href": "/oic/p",  
    "rt": ["oic.wk.p"],  
    "if": ["oic.if.r", "oic.if.baseline"],  
    "p": {"bm": 3},  
    "eps": [{"ep": "coap://[2001:db8:a::b1d4]:55555"},  
            {"ep": "coaps://[2001:db8:a::b1d4]:11111"}]  
  },  
  {  
    "anchor": "ocf://e61c3e6b-9c54-4b81-8ce5-f9039c1d04d9",  
    "href": "/mySecureMode",  
    "rt": ["oic.r.securemode"],  
    "if": ["oic.if.rw", "oic.if.baseline"],  
    "p": {"bm": 3},  
    "eps": [{"ep": "coaps://[2001:db8:a::b1d4]:11111"}]  
  },  
  {  
    "anchor": "ocf://e61c3e6b-9c54-4b81-8ce5-f9039c1d04d9",  
    "href": "/oic/sec/doxm",  
    "rt": ["oic.r.doxm"],  
    "if": ["oic.if.baseline"],  
    "p": {"bm": 1},  
    "eps": [{"ep": "coap://[2001:db8:a::b1d4]:55555"},  
            {"ep": "coaps://[2001:db8:a::b1d4]:11111"}]  
  },  
  {  
    "anchor": "ocf://e61c3e6b-9c54-4b81-8ce5-f9039c1d04d9",  
    "href": "/oic/sec/pstat",  
    "rt": ["oic.r.pstat"]  
  },
```

Comment [BRA73]: BZ #2214

Deleted: with

Comment [BRA74]: BZ #2214

```

    "if": ["oic.if.baseline"],
    "p": {"bm": 1},
    "eps": [{"ep": "coaps://[2001:db8:a::b1d4]:11111"}]
},
{
    "anchor": "ocf://e61c3e6b-9c54-4b81-8ce5-f9039c1d04d9",
    "href": "/oic/sec/cred",
    "rt": ["oic.r.cred"],
    "if": ["oic.if.baseline"],
    "p": {"bm": 1},
    "eps": [{"ep": "coaps://[2001:db8:a::b1d4]:11111"}]
},
{
    "anchor": "ocf://e61c3e6b-9c54-4b81-8ce5-f9039c1d04d9",
    "href": "/oic/sec/acl2",
    "rt": ["oic.r.acl2"],
    "if": ["oic.if.baseline"],
    "p": {"bm": 1},
    "eps": [{"ep": "coaps://[2001:db8:a::b1d4]:11111"}]
},
{
    "anchor": "ocf://e61c3e6b-9c54-4b81-8ce5-f9039c1d04d9",
    "href": "/myIntrospection",
    "rt": ["oic.wk.introspection"],
    "if": ["oic.if.r", "oic.if.baseline"],
    "p": {"bm": 3},
    "eps": [{"ep": "coaps://[2001:db8:a::b1d4]:11111"}]
},
{
    "anchor": "ocf://dc70373c-1e8d-4fb3-962e-017eaa863989",
    "href": "/oic/res",
    "rt": ["oic.wk.res"],
    "if": ["oic.if.ll", "oic.if.baseline"],
    "p": {"bm": 3},
    "eps": [{"ep": "coap://[2001:db8:a::b1d4]:66666"}, {"ep": "coaps://[2001:db8:a::b1d4]:22222"}]
},
{
    "anchor": "ocf://dc70373c-1e8d-4fb3-962e-017eaa863989",
    "href": "/oic/d",
    "rt": ["oic.wk.d", "oic.d.light", "oic.d.virtual"],
    "if": ["oic.if.r", "oic.if.baseline"],
    "p": {"bm": 3},
    "eps": [{"ep": "coap://[2001:db8:a::b1d4]:66666"}, {"ep": "coaps://[2001:db8:a::b1d4]:22222"}]
},
{
    "anchor": "ocf://dc70373c-1e8d-4fb3-962e-017eaa863989",
    "href": "/oic/p",
    "rt": ["oic.wk.p"],
    "if": ["oic.if.r", "oic.if.baseline"],
    "p": {"bm": 3},
    "eps": [{"ep": "coap://[2001:db8:a::b1d4]:66666"}, {"ep": "coaps://[2001:db8:a::b1d4]:22222"}]
},
{
    "anchor": "ocf://dc70373c-1e8d-4fb3-962e-017eaa863989",
    "href": "/myLight",
    "rt": ["oic.r.switch.binary"],
    "if": ["oic.if.a", "oic.if.baseline"],
    "p": {"bm": 3},
    "eps": [{"ep": "coaps://[2001:db8:a::b1d4]:22222"}]
}

```

Comment [BRA75]: BZ #2214

```

},
{
  "anchor": "ocf://dc70373c-1e8d-4fb3-962e-017eaa863989",
  "href": "/oic/sec/doxm",
  "rt": ["oic.r.doxm"],
  "if": ["oic.if.baseline"],
  "p": {"bm": 1},
  "eps": [{"ep": "coap://[2001:db8:a::b1d4]:66666"}, {"ep": "coaps://[2001:db8:a::b1d4]:22222"}]
},
{
  "anchor": "ocf://dc70373c-1e8d-4fb3-962e-017eaa863989",
  "href": "/oic/sec/pstat",
  "rt": ["oic.r.pstat"],
  "if": ["oic.if.baseline"],
  "p": {"bm": 1},
  "eps": [{"ep": "coaps://[2001:db8:a::b1d4]:22222"}]
},
{
  "anchor": "ocf://dc70373c-1e8d-4fb3-962e-017eaa863989",
  "href": "/oic/sec/cred",
  "rt": ["oic.r.cred"],
  "if": ["oic.if.baseline"],
  "p": {"bm": 1},
  "eps": [{"ep": "coaps://[2001:db8:a::b1d4]:22222"}]
},
{
  "anchor": "ocf://dc70373c-1e8d-4fb3-962e-017eaa863989",
  "href": "/oic/sec/acl2",
  "rt": ["oic.r.acl2"],
  "if": ["oic.if.baseline"],
  "p": {"bm": 1},
  "eps": [{"ep": "coaps://[2001:db8:a::b1d4]:22222"}]
},
{
  "anchor": "ocf://dc70373c-1e8d-4fb3-962e-017eaa863989",
  "href": "/myLightIntrospection",
  "rt": ["oic.wk.introspection"],
  "if": ["oic.if.r", "oic.if.baseline"],
  "p": {"bm": 3},
  "eps": [{"ep": "coaps://[2001:db8:a::b1d4]:22222"}]
},
{
  "anchor": "ocf://88b7c7f0-4b51-4e0a-9faa-cfb439fd7f49",
  "href": "/oic/res",
  "rt": ["oic.wk.res"],
  "if": ["oic.if.ll", "oic.if.baseline"],
  "p": {"bm": 3},
  "eps": [{"ep": "coap://[2001:db8:a::b1d4]:77777"}, {"ep": "coaps://[2001:db8:a::b1d4]:33333"}]
},
{
  "anchor": "ocf://88b7c7f0-4b51-4e0a-9faa-cfb439fd7f49",
  "href": "/oic/d",
  "rt": ["oic.wk.d", "oic.d.fan", "oic.d.virtual"],
  "if": ["oic.if.r", "oic.if.baseline"],
  "p": {"bm": 3},
  "eps": [{"ep": "coap://[2001:db8:a::b1d4]:77777"}, {"ep": "coaps://[2001:db8:a::b1d4]:33333"}]
},
{
  "anchor": "ocf://88b7c7f0-4b51-4e0a-9faa-cfb439fd7f49",
  "href": "/oic/p",

```

```

    "rt": ["oic.wk.p"],
    "if": ["oic.if.r", "oic.if.baseline"],
    "p": {"bm": 3},
    "eps": [{"ep": "coap://[2001:db8:a::b1d4]:77777"}, {"ep": "coaps://[2001:db8:a::b1d4]:33333"}]
},
{
    "anchor": "ocf://88b7c7f0-4b51-4e0a-9faa-cfb439fd7f49",
    "href": "/myFan",
    "rt": ["oic.r.switch.binary"],
    "if": ["oic.if.a", "oic.if.baseline"],
    "p": {"bm": 3},
    "eps": [{"ep": "coaps://[2001:db8:a::b1d4]:33333"}]
},
{
    "anchor": "ocf://88b7c7f0-4b51-4e0a-9faa-cfb439fd7f49",
    "href": "/oic/sec/doxm",
    "rt": ["oic.r.doxm"],
    "if": ["oic.if.baseline"],
    "p": {"bm": 1},
    "eps": [{"ep": "coap://[2001:db8:a::b1d4]:77777"}, {"ep": "coaps://[2001:db8:a::b1d4]:33333"}]
},
{
    "anchor": "ocf://88b7c7f0-4b51-4e0a-9faa-cfb439fd7f49",
    "href": "/oic/sec/pstat",
    "rt": ["oic.r.pstat"],
    "if": ["oic.if.baseline"],
    "p": {"bm": 1},
    "eps": [{"ep": "coaps://[2001:db8:a::b1d4]:33333"}]
},
{
    "anchor": "ocf://88b7c7f0-4b51-4e0a-9faa-cfb439fd7f49",
    "href": "/oic/sec/cred",
    "rt": ["oic.r.cred"],
    "if": ["oic.if.baseline"],
    "p": {"bm": 1},
    "eps": [{"ep": "coaps://[2001:db8:a::b1d4]:33333"}]
},
{
    "anchor": "ocf://88b7c7f0-4b51-4e0a-9faa-cfb439fd7f49",
    "href": "/oic/sec/acl2",
    "rt": ["oic.r.acl2"],
    "if": ["oic.if.baseline"],
    "p": {"bm": 1},
    "eps": [{"ep": "coaps://[2001:db8:a::b1d4]:33333"}]
},
{
    "anchor": "ocf://88b7c7f0-4b51-4e0a-9faa-cfb439fd7f49",
    "href": "/myFanIntrospection",
    "rt": ["oic.wk.introspection"],
    "if": ["oic.if.r", "oic.if.baseline"],
    "p": {"bm": 3},
    "eps": [{"ep": "coaps://[2001:db8:a::b1d4]:33333"}]
}
]

```

Comment [BRA76]: BZ #2214

2433

2434 The exact format of the "/oic/res" response and a way for a Client to acquire a "/oic/res" response
 2435 message is specified in D.9 and 11.3.5 respectively.

2436 **10.4 CoAP based Endpoint discovery**

2437 The following describes CoAP based Endpoint discovery:

- 2438 a) Devices shall join the 'All OCF Nodes' multicast groups (as defined in [IANA IPv6 Multicast Address Space Registry](#)) with scopes 2, 3, and 5 (i.e., ff02::158, ff03::158 and ff05::158) and
2439 shall listen on the port 5683. For compliance to IETF RFC 7252 a Device may additionally join
2440 the 'All CoAP Nodes' multicast groups.
2441
- 2442 b) Clients intending to discover resources shall join the multicast groups as defined in a).
2443
- 2444 c) Devices shall expose "/oic/res" via an unsecured endpoint.
2445
- 2446 d) Clients shall send discovery requests (GET request) to the 'All OCF Nodes' multicast group
2447 address with scope 2 (ff02::158) at port 5683. The requested URI shall be "/oic/res". For
2448 compliance to IETF RFC 7252 a Client may additionally send to the 'All CoAP Nodes' multicast
2449 groups.
2450
- 2451 e) If the discovery request is intended for a specific Resource Type, the Query parameter "rt" shall
2452 be included in the request (section 6.2.1) with its value set to the desired Resource Type. Only
2453 Devices hosting the Resource Type shall respond to the discovery request.
2454
- 2455 f) When the "rt" Query parameter is omitted, all Devices shall respond to the discovery request.
2456
- 2457 g) Handling of multicast requests shall be as described in section 8 of IETF RFC 7252 and section
2458 4.1 in [IETF RFC 6690](#).
2459
- 2460 h) Devices which receive the request shall respond using CBOR payload encoding. A Device shall
2461 indicate support for CBOR payload encoding for multicast discovery as described in section
2462 12.3.6.
2463

Deleted: IANA IPv6 Multicast Address Space Registry

2457 **11 Functional interactions**

2458 **11.1 Introduction**

2459 The functional interactions between a Client and a Server are described in section 11.2 through
2460 section 11.6 respectively. The functional interactions use CRUDN messages (section 8) and
2461 include Discovery, Notification, and Device management. These functions require support of core
2462 defined resources as defined in [Table 13](#). More details about these resources are provided later
2463 in this section.

Deleted: IETF RFC 6690

2464 **Table 13. List of Core Resources**

Pre-defined URI	Resource Name	Resource Type	Related Functional Interaction	Mandatory
"/oic/res"	Default	"oic.wk.res"	Discovery	Yes
"/oic/p"	Platform	"oic.wk.p"	Discovery	Yes
"/oic/d"	Device	"oic.wk.d"	Discovery	Yes
(none)	Configuration	"oic.wk.con"	Device Management	No
"/oic/mnt"	Maintenance	"oic.wk.mnt"	Device Management	No

Deleted: Table 13

2465

2466 **11.2 Onboarding, Provisioning and Configuration**

2467 Onboarding and Provisioning are fully defined by the OCF Security Specification.
2468

2472 Should a Device support Client update of configurable information it shall do so via exposing an
 2473 oic.wk.con Core Resource ([Table 14](#)) in "/oic/res";

Deleted: Table 14

2474

2475

Table 14. Configuration Resource

Example URI	Resource Type Title	Resource Type ID ("rt" value)	Interfaces	Description	Related Functional Interaction
"/example/oic/con"	Device Configuration	"oic.wk.con"	"oic.if.rw"	The Resource Type through which configurable information specific to the Device is exposed. The resource properties exposed in "oic.wk.con" are listed in Table 15 .	Configuration
"/example/oic/con"	Platform Configuration	"oic.wk.con.p"	"oic.if.rw"	The optional Resource Type through which configurable information specific to the Platform is exposed. The Properties exposed in "oic.wk.con.p" are listed in Table 16 .	Configuration

2476

2477 [Table 15](#) defines the "oic.wk.con" resource type.

2478

Table 15. "oic.wk.con" Resource Type definition

Property title	Property name	Value type	Value rule	Unit	Access mode	Mandatory	Description
(Device) Name	n (Common Property of "/example/oic/con")	string			R, W	yes	Human friendly name configurable by the end user (e.g. Bob's thermostat). The "n" Common Property of the oic.wk.con Core Resource and the "n" Common Property of the "/oic/d" Core Resource shall have the same Value. When the "n" Common Property Value of the oic.wk.con Core Resource is modified, it shall be reflected to the "n" Common Property of "/oic/d" Core Resource.
Location	loc	array of float (has two elements, the first is latitude, the second is longitude)		Degrees	R, W	no	Provides location information where available.
Location Name	locn	string			R, W	no	Human friendly name for location For example, "Living Room".
Currency	c	string			R,W	no	Indicates the currency that is used for any monetary transactions

Region	r	string			R,W	no	Free form text Indicating the current region in which the device is located geographically.
Localized Names	In	array			R,W	no	Human-friendly name of the Device, in one or more languages. This property is an array of objects where each object has a 'language' field (containing an IETF RFC 5646 language tag) and a 'value' field containing the device name in the indicated language. If this property and the Device Name (n) property are both supported, the Device Name (n) value shall be included in this array.
Default Language	dl	language-tag			R,W	no	The default language supported by the Device, specified as an IETF RFC 5646 language tag. By default, clients can treat any string property as being in this language unless the property specifies otherwise.

2485

2486 Table 16 defines the “oic.wk.con.p” resource type.**Deleted:** Table 16

2487

Table 16. “oic.wk.con.p” Resource Type definition

Property title	Property name	Value type	Value rule	Unit	Access mode	Mandatory	Description
Platform Names	mnpn	array			R,W	no	<p>Friendly name of the Platform. This property is an array of objects where each object has a 'language' field (containing an IETF RFC 5646 language tag) and a 'value' field containing the platform friendly name in the indicated language.</p> <p>For example, [{"language":"en", "value":"Dave's Laptop"}]</p>

2488

2489

2491 **11.3 Resource discovery**
2492 **11.3.1 Introduction**
2493 Discovery is a function which enables endpoint discovery as well as resource based discovery.
2494 Endpoint discovery is described in detail in section 10. This section mainly describes the resource
2495 based discovery.

2496 **11.3.2 Resource based discovery: mechanisms**
2497 **11.3.2.1 Overview**
2498 As part of discovery, a Client may find appropriate information about other OCF peers. This
2499 information could be instances of Resources, Resource Types or any other information
2500 represented in the resource model that an OCF peer would want another OCF peer to discover.

2501 At the minimum, Resource based discovery uses the following:

2502 1) A resource to enable discovery shall be defined. The representation of that resource shall
2503 contain the information that can be discovered.
2504 2) The resource to enable discovery shall be specified and commonly known a-priori. A Device
2505 for hosting the resource to enable discovery shall be identified.
2506 3) A mechanism and process to publish the information that needs to be discovered with the
2507 resource to enable discovery.
2508 4) A mechanism and process to access and obtain the information from the resource to enable
2509 discovery. A query may be used in the request to limit the returned information.
2510 5) A scope for the publication
2511 6) A scope for the access.
2512 7) A policy for visibility of the information.
2513

2514 Depending on the choice of the base aspects defined above, the Framework defines three resource
2515 based discovery mechanisms:
2516 • Direct discovery, where the Resources are published locally at the Device hosting the
2517 resources and are discovered through peer inquiry.
2518 • Indirect discovery, where Resources are published at a third party assisting with the
2519 discovery and peers publish and perform discovery against the resource to enable
2520 discovery on the assisting 3rd party.
2521 • Advertisement discovery, where the resource to enable discovery is hosted local to the
2522 initiator of the discovery inquiry but remote to the Devices that are publishing discovery
2523 information.

2524 A Device shall support direct discovery.

2525 **11.3.2.2 Direct discovery**
2526 In direct discovery,
2527 1) The Device that is providing the information shall host the resource to enable discovery.
2528 2) The Device publishes the information available for discovery with the local resource to
2529 enable discovery (i.e. local scope).
2530 3) Clients interested in discovering information about this Device shall issue RETRIEVE
2531 requests directly to the resource. The request may be made as a unicast or multicast.
2532 The request may be generic or may be qualified or limited by using appropriate queries in
2533 the request.

- 2534 4) The "server" Device that receives the request shall send a response with the discovered
2535 information directly back to the requesting "client" Device.
2536 5) The information that is included in the request is determined by the policies set for the
2537 resource to be discovered locally on the responding Device.

2538

2539 **11.3.2.3 Indirect discovery of Resources (resource directory based discovery)**

2540 In indirect discovery the information about the resource to be discovered is hosted on a Server
2541 that is not hosting the resource. See section 11.3.6 for details on resource directory based
2542 discovery.

2543 In indirect discovery:

- 2544 a) The resource to be discovered is hosted on a Device that is neither the client initiating
2545 the discovery nor the Device that is providing or publishing the information to be
2546 discovered. This Device may use the same resource to provide discovery for multiple
2547 agents looking to discover and for multiple agents with information to be discovered.
2548 b) The Device to be discovered or with information to discover, publishes that information
2549 with resource to be discovered on a different Device. The policies on the information
2550 shared including the lifetime/validity are specified by the publishing Device. The
2551 publishing Device may modify these policies as required.
2552 c) The client doing the discovery may send a unicast discovery request to the Device
2553 hosting the discovery information or send a multicast request that shall be monitored and
2554 responded to by the Device. In both cases, the Device hosting the discovery information
2555 is acting on behalf of the publishing Device.
2556 d) The discovery policies may be set by the Device hosting the discovery information or by
2557 the party that is publishing the information to be discovered. The discovery information
2558 that is returned in the discovery response shall adhere to the policies that are in effect at
2559 the time of the request.

2560

2561 **11.3.2.4 Advertisement Discovery**

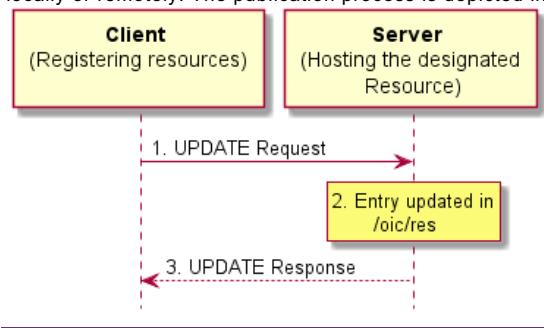
2562 In advertisement discovery:

- 2563 a) The resource to enable discovery is hosted local to the Device that is initiating the discovery
2564 request (client). The resource to enable discovery may be a Core Resource or discovered
2565 as part of a bootstrap.
2566 b) The request could be an implementation dependent lookup or be a local RETRIEVE request
2567 against the resource that enables discovery.
2568 c) The Device with information to be discovered shall publish the appropriate information to
2569 the resource that enables discovery.
2570 d) The publishing Device is responsible for the published information. The publishing Device
2571 may UPDATE the information at the resource to enable discovery based on its needs by
2572 sending additional publication requests. The policies on the information that is discovered
2573 including lifetime is determined by the publishing Device.

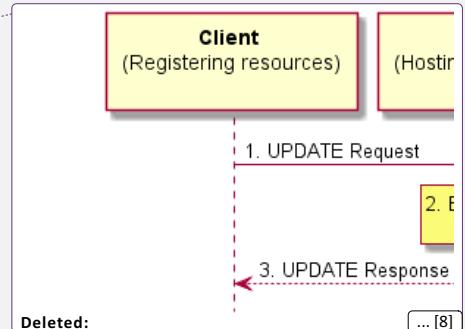
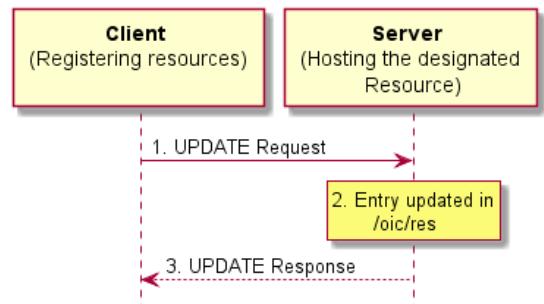
2574

2575 **11.3.3 Resource based discovery: Information publication process**

2576 The mechanism to publish information with the resource to enable discovery can be done either
 2577 locally or remotely. The publication process is depicted in



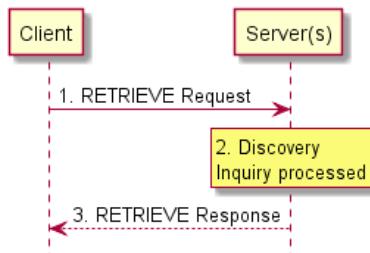
2578
 2579 **Figure 14.** The Device which has discovery information to publish shall a) either update the
 2580 resource that enables discovery if hosted locally or b) issue an UPDATE request with the
 2581 information to the Device which hosts the resource that enables discovery. The Device hosting the
 2582 resource to enable discovery adds/updates the resource to enable discovery with the provided
 2583 information and then responds to the Device which has requested the publication of the resource
 2584 with an UPDATE response.



2585
 2586 **Figure 14. Resource based discovery: Information publication process**

2587 **11.3.4 Resource based discovery: Finding information**

2588 The discovery process (Figure 15) is initiated as a RETRIEVE request to the resource to enable
 2589 discovery. The request may be sent to a single Device (as in a Unicast) or to multiple Devices (as
 2590 in Multicast). The specific mechanisms used to do Unicast or Multicast are determined by the
 2591 support in the data connectivity layer. The response to the request has the information to be
 2592 discovered based on the policies for that information. The policies can determine which information
 2593 is shared, when and to which requesting agent. The information that can be discovered can be
 2594 resources, types, configuration and many other standards or custom aspects depending on the
 2595 request to appropriate resource and the form of request. Optionally the requester may narrow the
 2596 information to be returned in the request using query parameters in the URI query.



2600

Figure 15. Resource based discovery: Finding information

2602

Discovery Resources

2604 The following Core Resources shall be implemented on all Devices to support discovery:

- 2605 • “/oic/res” for discovery of resources
 2606 • “/oic/p” for discovery of platform
 2607 • “/oic/d” for discovery of device information

2608 Devices shall expose each of “/oic/res”, “/oic/d”, and “/oic/p” via an unsecured endpoint. Further
 2609 details for these mandatory Core Resources are described in [Table 17](#).

Deleted: Table 17

Platform resource –

2611 The OCF recognizes that more than one instance of Device may be hosted on a single platform.
 2612 Clients need a way to discover and access the information on the platform. The core resource,
 2613 “/oic/p” exposes platform specific Properties. All instances of Device on the same Platform shall
 2614 have the same values of any Properties exposed (i.e. a Device may choose to expose optional
 2615 Properties within “/oic/p” but when exposed the value of that Property should be the same as the
 2616 value of that Property on all other Devices on that Platform)

Deleted: p**Deleted: p****Deleted: p****Deleted: p****Deleted: p**

Device resource

2617 The device resource shall have the pre-defined URI “/oic/d”. The resource “/oic/d” exposes the
 2618 Properties pertaining to a Device as defined in [Table 17](#). The Properties exposed are determined
 2619 by the specific instance of Device and defined by the Resource Type(s) of “/oic/d” on that Device.
 2620 Since all the Resource Types of “/oic/d” are not known a priori, the Resource Type(s) of “/oic/d”
 2621 shall be determined by discovery through the core resource “/oic/res”. The device resource “/oic/d”
 2622 shall have a default Resource Type that helps in bootstrapping the interactions with this device
 2623 (the default type is described in [Table 17](#).)

Comment [BRA78]: BZ #2284**Deleted: p****Deleted: Table 17****Deleted: p****Deleted: Table 17**

Protocol indication

2624 A Device may need to support different messaging protocols depending on requirements for
 2625 different vertical domain profiles. For example, a Smart Home profile may use CoAP and an
 2626 Industrial profile may use DDS. To enable interoperability, a Device uses the protocol indication
 2627 to indicate the transport protocols they support and can communicate over.

2632

Table 17. Mandatory discovery Core Resources

Pre-defined URI	Resource Type Title	Resource Type ID ("rt" value)	Interfaces	Description	Related Functional Interaction
"/oic/res"	Default	"oic.wk.res"	"oic.if.ll"	The resource through which the corresponding Server is discovered and introspected for available resources. "/oic/res" shall expose the resources that are discoverable on a Device. When a Server receives a RETRIEVE request targeting "/oic/res" (e.g., "GET /oic/res"), it shall respond with the link list of all the discoverable resources of itself. The "/oic/d" and "/oic/p" are discoverable resources, hence their links are included in "/oic/res" response. The Properties exposed by "/oic/res" are listed in Table 18.	Discovery
"/oic/p"	Platform	"oic.wk.p"	"oic.if.r"	The discoverable resource through which platform specific information is discovered. The Properties exposed by "/oic/p" are listed in Table 21.	Discovery
"/oic/d"	Device	"oic.wk.d" and/or one or more Device Specific Resource Type ID(s)	"oic.if.r"	The discoverable via "/oic/res" resource which exposes properties specific to the Device instance. The Properties exposed by "/oic/d" are listed in Table 20. "/oic/d" may have one or more Resource Type(s) that are specific to the Device in addition to the default Resource Type or if present overriding the default Resource Type. The base type "oic.wk.d" defines the Properties that shall be exposed by all Devices. The Device specific Resource Type(s) exposed are dependent on the class of device (e.g. air conditioner, smoke alarm, and combined light/fan); applicable values are defined by the OCF Device specification.	Discovery

2644

2645 Table 18 defines "oic.wk.res" Resource Type.

2646

Table 18. "oic.wk.res" Resource Type definition

Property title	Property name	Value type	Value rule	Unit	Access mode	Mandatory	Description
Name	n	string		R	no	Human-friendly name defined by the vendor	
Links	links	array	See 7.8.2	R	yes	The array of Links describes the URI, supported Resource Types and interfaces, and access policy.	

2647
2648

A Device shall support CoAP based discovery as the baseline discovery mechanism (see section 10.4).

2649
2650

The "/oic/res" shall list all Resources that are indicated as discoverable (see section 11.3). Also the following architecture Resource Types shall be listed:

2651
2652

- Introspection resource indicated with an "rt" value of "oic.wk.introspection"
- "/oic/p" indicated with an "rt" value of "oic.wk.p"

Comment [BRA79]: BZ #2284

Deleted: resource p

Deleted: Table 18

Comment [BRA80]: BZ #2284

Deleted: resource p

Deleted: Table 21

Comment [BRA81]: BZ #2283

Comment [BRA83]: BZ #2284

Deleted: resource p

Deleted: Table 20

Comment [BRA84]: BZ #2283

Deleted: is

Comment [BRA82]: BZ #2283

Comment [BRA85]: BZ #2284

Deleted: properties

Comment [BRA86]: BZ #2284

Deleted: device

Deleted: is

Comment [BRA87]: BZ #2283

Deleted: Table 18

Deleted: Messaging Protocol ... [9]

Comment [BRA88]: [Editorial] BZ #2372

Deleted: A Client which sees this property in a discovery response can choose any of the supported messaging protocols for communicating with the Server for further messages. For example, if a Device supporting multiple protocols indicates it supports a value of "1 3" for the 'mpro' property in the discovery response, then it cannot be assumed that there is an implied ordering or priority. But a vertical specification may choose to specify an implied ordering or priority. If the 'mpro' property is not present in the response, A Client shall use the default messaging protocol as specified in the vertical specification for further communication.

- 2678 • "/oic/d" indicated with an "rt" value of "oic.wk.d"
 2679 • "/oic/sec/doxm" indicated with an "rt" value of "oic.r.doxm" as defined in the OCF Security
 2680 Specification
 2681 • "/oic/sec/pstat" indicated with an "rt" value of "oic.r.pstat" as defined in the OCF Security
 2682 Specification
 2683 • "/oic/sec/acl2" indicated with an "rt" value of "oic.r.acl2" as defined in the OCF Security
 2684 Specification
 2685 • "/oic/sec/cred" indicated with an "rt" value of "oic.r.cred" as defined in the OCF Security
 2686 Specification

2687 Conditionally required:

- 2688 • "/oic/res" with an "rt" value of "oic.wk.res" as self-reference, on the condition that "oic/res" has
 2689 to signal that it is observable by a Client.

2690 The Introspection Resource is only applicable for Devices that host Vertical Resource Types (e.g.
 2691 "oic.r.switch.binary") or vendor-defined Resource Types. Devices that only host Resources
 2692 required to onboard the Device as a Client do not have to implement the Introspection Resource.

2693 [Table 19](#) provides an OCF registry for protocol schemes.

2694 **Table 19. Protocol scheme registry**

SI Number	Protocol
1	coap
2	coaps
3	http
4	https
5	coap+tcp
6	coaps+tcp

2695 Note: The discovery of an endpoint used by a specific protocol is out of scope. The mechanism used by a Client to form
 2696 requests in a different messaging protocol other than discovery is out of scope.

2697

2698 The following applies to the use of "/oic/d" as defined above:

- 2699 • A Device may choose to expose its Device Type(s) (e.g., refrigerator or A/C or composite of
 2700 multiple Device Types) by adding the Device Type to the list of Resource Types associated
 2701 with "/oic/d".
 2702 ○ For example; "rt" of "/oic/d" becomes ["oic.wk.d", "oic.d.<thing1>", "oic.d.<thing2>"];
 2703 where "oic.d.<thing1>" and "oic.d.<thing2>" are defined in another spec such as
 2704 the OCF Device specification.
 2705 ○ This implies that the Properties exposed by "/oic/d" are by default the mandatory
 2706 Properties in [Table 20](#).
 2707 • A vertical may choose to extend the list of Properties defined by the Resource Type "oic.wk.d".
 2708 In that case, the vertical shall assign a new Device Type specific Resource Type ID. The
 2709 mandatory Properties defined in [Table 20](#) shall always be present.
 2710 • A Device may choose to expose a separate, discoverable Resource with its Resource Type ID
 2711 set to an OCF defined Device Type. In this case the Resource is equivalent to an instance of
 2712 "oic.wk.d" and adheres to the definition thereof. As such the Resource shall at a minimum
 2713 expose the mandatory Properties of "oic.wk.d". In the case where the Resource tagged in this

Deleted: Table 19

Comment [BRA89]: BZ #2283

Deleted: is

Comment [BRA90]: BZ #2283

Deleted: p

Comment [BRA91]: BZ #2284

Deleted: p

Deleted: Table 20

Comment [BRA92]: BZ #2284

Deleted: p

Comment [BRA93]: BZ #2284

Deleted: p

Deleted: Table 20

Comment [BRA94]: BZ #2284

Comment [BRA95]: BZ #2283

Deleted: Resource

Deleted: "

Deleted: "

2725 manner is defined to be an instance of a Collection [in accordance with section 7.8.3](#), then the
 2726 Resources that are part of that Collection shall at a minimum include the Resource Types
 2727 mandated for the Device Type. For example, if a [Collection](#) Resource has an "rt" value of
 2728 ["oic.d.light"], the [Collection](#) includes an instance of "oic.r.switch.binary" which is mandatory
 2729 for an "oic.d.light" as per the OCF Device specification.

2730 [Table 20](#), "oic.wk.d" Resource Type definition defines the base Resource Type for the "/oic/d"
 2731 resource.
 2732

Table 20. "oic.wk.d" Resource Type definition

Property title	Property name	Value type	Value rule	Unit	Access mode	Mandatory	Description
(Device) Name	n	string			R	yes	Human friendly name defined by the vendor. In the presence of "n" Property of "/oic/con", both have the same Property Value. When "n" Property Value of "/oic/con" is modified, it shall be reflected to "n" Property Value of "/oic/d".
Spec Version	icv	string			R	yes	Spec version of the core specification this device is implemented to. The syntax is "ocf.<major>.<minor>.<sub-version>" where <major>, <minor>, and <sub-version> are the major, minor and sub-version numbers of the specification respectively. This version of the specification the string value shall be "ocf.1.3.0".
Device ID	di	uuid			R	yes	Unique identifier for Device. This value shall be the same value (i.e. mirror) as the doxm.deviceuuid Property as defined in OCF Security. Handling privacy-sensitivity for the "di" Property, refer to section 13.8 in OCF Security.
Data Model Version	dmv	csv			R	yes	Spec version of the Resource Specification to which this device data model is implemented; if implemented against a Vertical specific device specification(s), then the Spec version of the vertical specification this device model is implemented to. The syntax is a comma separated list of <res>.<major>.<minor>.<sub-version> or <vertical>.<major>.<minor>.<sub-version>, <res> is the string "ocf.res" and <vertical> is the name of the vertical defined in the Vertical specific resource specification. The <major>, <minor>, and <sub-version> are the major, minor and sub-version numbers of the specification respectively. One entry in the csv string shall be the applicable version of the Resource Type Specification for the Device (e.g "ocf.res.1.0.0"). If applicable, additional entry(-ies) in the csv shall be the vertical(s) being realized

Comment [BRA96]: BZ #2284

Deleted: (i.e. it also includes the "rt" value of "oic.wk.col")

Comment [BRA97]: BZ #2284

Deleted: , "oic.wk.col"

Deleted: that Resource follows the definitions of both "oic.wk.d" and "oic.wk.col". In this example,

Deleted: c

Deleted: Table 20

							(e.g. "ocf.sh.1.0.0"). This value may be extended by the vendor. The syntax for extending this value, as a comma separated entry, by the vendor shall be by adding x.<Domain_Name>.<vendor_string>. For example "ocf.res.1.0.0, ocf.sh.1.0.0, x.com.example.string", The order of the values in the comma separated string can be in any order (i.e. no prescribed order). This property shall not exceed 256 octets.
Protocol Independent ID	piid	uuid		R	yes	A unique and immutable Device identifier. A Client can detect that a single Device supports multiple communication protocols if it discovers that the Device uses a single Protocol Independent ID value for all the protocols it supports. Handling privacy-sensitivity for the "piid" Property, refer to section 13.8 in OCF Security.	
Localized Descriptions	ld	array		R	no	Detailed description of the Device, in one or more languages. This property is an array of objects where each object has a 'language' field (containing an IETF RFC 5646 language tag) and a 'value' field containing the device description in the indicated language.	
Software Version	sv	string		R	no	Version of the device software.	
Manufacturer Name	dmn	array		R	no	Name of manufacturer of the Device, in one or more languages. This property is an array of objects where each object has a 'language' field (containing an IETF RFC 5646 language tag) and a 'value' field containing the manufacturer name in the indicated language.	
Model Number	dmno	string		R	no	Model number as designated by manufacturer.	

2741

2742 The additional Resource Type(s) of the "/oic/d" resource are defined by the OCF Device
2743 specification.

2744

2745 [Table 21](#) defines "oic.wk.p" Resource Type.
2746**Deleted:** Table 21**Table 21. "oic.wk.p" Resource Type definition**

Property title	Property name	Value type	Value rule	Unit	Access mode	Mandatory	Description
Platform ID	pi	string			R	yes	Unique identifier for the physical platform (UIUID); this shall be a UUID in accordance with

							IETF RFC 4122. It is recommended that the UUID be created using the random generation scheme (version 4 UUID) specific in the RFC. Handling privacy-sensitivity for the "pi" Property, refer to section 13.8 in OCF Security.
Manufacturer Name	mnmn	string		R	yes	Name of manufacturer	
Manufacturer Details Link	mnml	uri		R	no	Reference to manufacturer, represented as a URI	
Model Number	mnm0	string		R	no	Model number as designated by manufacturer	
Date of Manufacture	mndt	date	Time	R	no	Manufacturing date of Platform	Comment [BRA98]: BZ #1941
Serial number	mnsel	string		R	no	Serial number of the Platform, can may be unique for each Platform of the same model number.	Deleted: as defined in ISO 8601
Platform Version	mnpv	string		R	no	Version of platform – string (defined by manufacturer)	Comment [BRA99]: BZ #2011
OS Version	mnos	string		R	no	Version of platform resident OS – string (defined by manufacturer)	
Hardware Version	mnhw	string		R	no	Version of platform hardware	
Firmware version	mnfv	string		R	no	Version of Platform firmware	
Support link	mnsl	uri		R	no	URI that points to support information from manufacturer	
SystemTime	st	date-time		R	no	Reference time for the Platform.	
Vendor ID	vid	string		R	no	Vendor defined string for the platform. The string is freeform and up to the vendor on what text to populate it.	

2749

2750 **Composite Device**2751 A physical device may be modelled as a single device or as a composition of other devices. For
2752 example a refrigerator may be modelled as a composition, as such part of its definition of may

2754 include a sub-tending thermostat device which itself may be composed of a sub-tending
2755 thermometer device.

2756 There may be more than one way to model a server as a composition. One example method would
2757 be to have Platform which represents the composite device to have more than one instance of a
2758 Device on the Platform. Each Device instance represents one of the distinct devices in the
2759 composition. Each instance of Device may itself have or host multiple instances of other resources.

2760 An implementation irrespective of how it is composed shall only expose a single instance of "/oic/d"
2761 with an 'rt' of choice for each logical Server.

2762 Thus, for the above refrigerator example if modeled as a single Server; "/oic/res" would expose
2763 "/oic/d" with a Resource Type name appropriate to a refrigerator. The sub-tending thermostat and
2764 thermometer devices would be exposed simply as instances of a resource with a device
2765 appropriate Resource Type with an associated URI assigned by the implementation; e.g.,
2766 /MyHost/MyRefrigerator/Termostat and /MyHost/MyRefrigerator/Termostat/Termometer.

2767

2768 **11.3.5 Resource discovery using "/oic/res"**

2769 Discovery using "/oic/res" is the default discovery mechanism that shall be supported by all Devices
2770 as follows:

2771 a) Every Device updates its local "/oic/res" with the resources that are discoverable (see section
2772 7.3.2.2). Every time a new resource is instantiated on the Device and if that resource is
2773 discoverable by a remote Device then that resource is published with the "/oic/res" resource
2774 that is local to the Device (as the instantiated resource).

2775 b) A Device wanting to discover resources or Resource Types on one or more remote Devices
2776 makes a RETRIEVE request to the "/oic/res" on the remote Devices. This request may be sent
2777 multicast (default) or unicast if only a specific host is to be probed. The RETRIEVE request
2778 may optionally be restricted using appropriate clauses in the query portion of the request.
2779 Queries may select based on Resource Types, interfaces, or properties.

2780 c) The query applies to the representation of the resources. "/oic/res" is the only resource whose
2781 representation has "rt". So "/oic/res" is the only resource that can be used for Multicast
2782 discovery at the transport protocol layer.

2783 d) The Device receiving the RETRIEVE request responds with a list of resources, the Resource
2784 Type of each of the resources and the interfaces that each resource supports. Additionally,
2785 information on the policies active on the resource can also be sent. The policy supported
2786 includes observability and discoverability. (More details below)

2787 e) The receiving Device may do a deeper discovery based on the resources returned in the
2788 request to "/oic/res".

2789

2790 The information that is returned on discovery against "/oic/res" is at the minimum:

- 2791 • The URI (relative or fully qualified URL) of the resource
- 2792 • The Resource Type(s) of each resource. More than one Resource Type may be returned if the
2793 resource enables more than one type. To access resources of multiple types, the specific
2794 Resource Type that is targeted shall be specified in the request.
- 2795 • The Interfaces supported by that Resource. Multiple interfaces may be returned. To access a
2796 specific interface that interface shall be specified in the request. If the interface is not specified,
2797 then the Default Interface is assumed.

2798 Different "/oic/res" responses are returned according to requesting Clients, which indicate their
2799 preference via inclusion or otherwise of an OCF-Accept-Content-Format-Version option.

2800 For Clients that do not include the OCF-Accept-Content-Format-Version option, an "/oic/res"
2801 response shall use "sec" and "port" to provide the information for an encrypted connection. See
2802 E.2.8 for the schema for the Link.

2803 For Clients that do include the OCF-Accept-Content-Format-Version option, an "/oic/res" response
2804 includes an "array of Links" to conform to [IETF RFC 6690](#). Each Link shall use an "eps" Parameter
2805 to provide the information for an encrypted connection and carry "anchor" of the value OCF URI
2806 where the authority component of <deviceID> indicates the Device hosting the target Resource.

2807 The JSON schema for discovery using "/oic/res" is described in D.9; the schema that is applicable
2808 to requesting Clients that do not include an OCF-Accept-Content-Format-Version option is
2809 described in E.4 and E.5. Also refer to section 10 (Endpoint Discovery) for details of Multicast
2810 discovery using "/oic/res" on a CoAP transport.

2811 For example, a Light device might return the following to OIC 1.1 clients:

```
[  
  {  
    "di": "e61c3e6b-9c54-4b81-8ce5-f9039c1d04d9",  
    "links": [  
      {  
        "href": "coaps://[fe80::b1d6]:44444/oic/res",  
        "rel": "self",  
        "rt": ["oic.wk.res"],  
        "if": ["oic.if.ll", "oic.if.baseline"],  
        "p": {"bm": 3}  
      },  
      {  
        "href": "/oic/p",  
        "rt": ["oic.wk.p"],  
        "if": ["oic.if.r", "oic.if.baseline"],  
        "p": {"bm": 3, "sec": true, "port": 11111}  
      },  
      {  
        "href": "/oic/d",  
        "rt": ["oic.wk.d", "oic.d.light"],  
        "if": ["oic.if.r", "oic.if.baseline"],  
        "p": {"bm": 3, "sec": true, "port": 11111}  
      },  
      {  
        "href": "/myLight",  
        "rt": ["oic.r.switch.binary"],  
        "if": ["oic.if.a", "oic.if.baseline"],  
        "p": {"bm": 3, "sec": true, "port": 11111}  
      }  
    ]  
  }]
```

2844 The light device might return the following to clients that request with the Content Format of
2845 "application/vnd.ocf+cbor" in Accept Option:

```
[  
  {  
    "href": "/oic/res",  
    "anchor": "ocf://dc70373c-1e8d-4fb3-962e-017eaa863989/oic/res",  
    "rel": "self",  
    "rt": ["oic.wk.res"],
```

Deleted: IETF RFC 6690

```

2853
2854     "if": ["oic.if.ll", "oic.if.baseline"],
2855     "p": {"bm": 3},
2856     "eps": [{"ep": "coap://[fe80::b1d6]:44444"}]
2857   },
2858   {
2859     "href": "/oic/p",
2860     "anchor": "ocf://dc70373c-1e8d-4fb3-962e-017eaa863989,
2861     "rt": ["oic.wk.p"],
2862     "if": ["oic.if.r", "oic.if.baseline"],
2863     "p": {"bm": 3},
2864     "eps": [{"ep": "coap://[fe80::b1d6]:44444"}, {"ep": "coaps://[fe80::b1d6]:11111"}]
2865   ],
2866 },
2867 {
2868   "href": "/oic/d",
2869   "anchor": "ocf://dc70373c-1e8d-4fb3-962e-017eaa863989,
2870   "rt": ["oic.wk.d", "oic.d.light"],
2871   "if": ["oic.if.r", "oic.if.baseline"],
2872   "p": {"bm": 3},
2873   "eps": [{"ep": "coap://[fe80::b1d6]:44444"}, {"ep": "coaps://[fe80::b1d6]:11111"}]
2874   ],
2875 },
2876 },
2877 {
2878   "href": "/myLight",
2879   "anchor": "ocf://dc70373c-1e8d-4fb3-962e-017eaa863989,
2880   "rt": ["oic.r.switch.binary"],
2881   "if": ["oic.if.a", "oic.if.baseline"],
2882   "p": {"bm": 3},
2883   "eps": [{"ep": "coap://[fe80::b1d6]:44444"}, {"ep": "coaps://[fe80::b1d6]:11111"}]
2884   ],
2885 },
2886 }
2887 ]

```

2888 After performing discovery using "/oic/res", Clients may discover additional details about Server
2889 by performing discovery using "/oic/p", /oic/rts etc. If a Client already knows about Server it may
2890 discover using other resources without going through the discovery of "/oic/res".

2891 **11.3.6 Resource directory (RD) based discovery**

2892 **11.3.6.1 Introduction**

2893 **11.3.6.1.1 Indirect discovery for lookup of the Resources**

2894 Direct discovery is the mechanism used currently to find Resources in the network. When needed,
2895 Resources are queried at a particular Device directly or a multicast packet is sent to all Devices.
2896 Each queried Device responds directly with its Resources to the discovering Device. Resources
2897 available locally are registered on the same Device.

2898 In some situations, one of the other mechanisms described in section 11.3.2.3, called indirect
2899 discovery, may be required. Indirect discovery is when a 3rd party Device, other than the
2900 discovering Device and the discovered Device, assists with the discovery process. The 3rd party
2901 Device, called Resource Directory (RD), only provides information on Resources on behalf of
2902 another Device but does not host Resources on part of that Device.

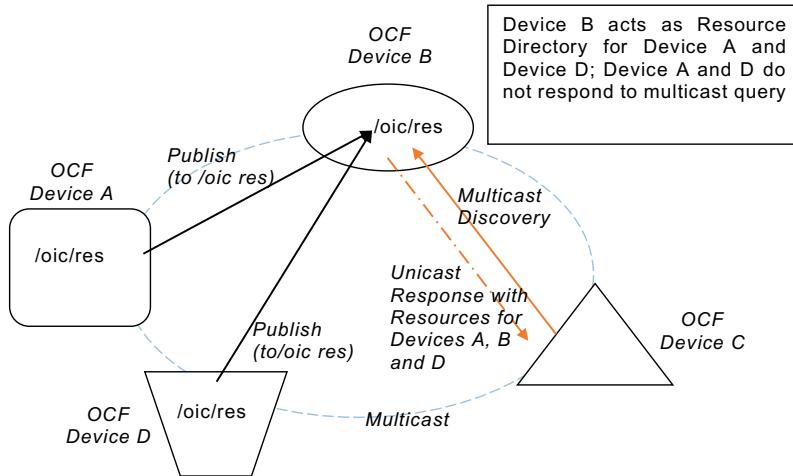


Figure 16. Indirect discovery of Resources by via an RD

2903

2904

2905 In Figure 16, Device B acts as Resource Directory for Device A and Device D. Device A and Device
2906 D publish their Resource information to Device B. Device C may query Deice B to acquire the
2907 Resource information of Device A and Device D. Device A and Device D may not respond to a
2908 multicast query when Device B, as a Resource Directory, responds to the query on their behalf.

2909 Indirect discovery is useful for a constrained Device that needs to sleep to manage power and
2910 cannot process every discovery request, or when Devices may not be on the same network and
2911 requires optimization for discovery. Once Resources are discovered using indirect discovery, i.e.,
2912 RD query, then the access to the Resource is done by a request sent directly to the Device that
2913 hosts that Resource.

2914 11.3.6.1.2 Resource directory

2915 A Resource Directory (RD) is a Device that assists with indirect discovery. A Device which acts as
2916 an RD will be involved in the following operations.

- 2917 • **RD discovery** – the procedure with which publishing Devices discover an RD and acquire the
2918 criteria to select from among multiple detected RDs.
- 2919 • **Resource publish** – the procedures with which Devices publish their Resource information,
2920 i.e. Links. Future revision of this specification will allow modifying RD entries with UPDATE
2921 and DELETE operations. Any UPDATE or DELETE operations performed on an RD in this
2922 specification should be either silently ignored or generate an error.
- 2923 • **Resource exposure** – the feature with which RDs expose the Links hosted by the 3rd party
2924 Devices via their own "/oic/res".

2925 For the above, RDs make use of Resource Type "oic.wk.rd" defined in [Table 22](#) and [Table 23](#). A
2926 Device that supports the capability to host indirect discovery shall expose an instance of "oic.wk.rd"
2927 in its "/oic/res" to announce that it serves as an RD. The discoverable instance of "oic.wk.rd" shall
2928 allow only secure connections (e.g. endpoint with a scheme of "coaps" or "coaps+tcp"). A
2929 publishing Device may send a RETRIEVE request to "/oic/rd" to acquire the selection criteria
2930 among multiple RDs. Then it may send an UPDATE request to "/oic/rd" with its Links in the

Deleted: Table 22

Deleted: Table 23

2933 payload to publish the Links in "/oic/res" of the RD. A publishing Device is responsible to insure
 2934 an RD has the correct published Links to expose via its "/oic/res".

2935 **Table 22. "oic.wk.rd" Resource Type definition**

Pre-defined URI	Resource Type Title	Resource Type ID ("rt" value)	Interfaces	Description	Related Functional Interaction
"/oic/rd"	Resource Directory	"oic.wk.rd"	"oic.if.baseline"	The discoverable Resource Type through which an RD 1) facilitates its discovery and provides the criteria to select an RD and 2) allows Devices to publish their Links in "/oic/res" of the RD.	Discovery

2936

2937 **Table 23. "oic.wk.rd" Properties**

Property title	Property name	Value type	Value rule	Unit	Access mode	Mandatory	Description
Selector	sel	Integer			R	yes	Provides the criteria for RD selection. An integer representing a value calculated by the RD. The value is in the range of 0 to 100. The lower the value, the more preferable the RD is.

2938

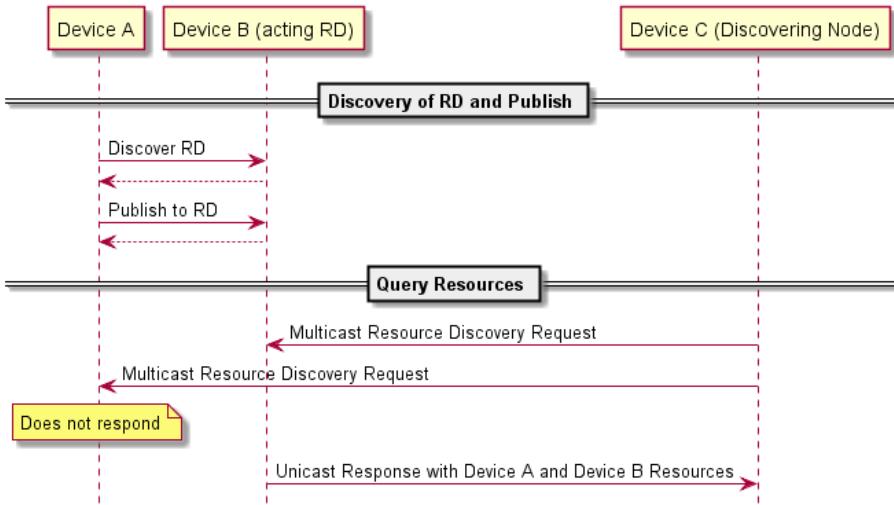
2939 An RD may be queried at its "/oic/res" Resource to find Resources hosted on other Devices. These
 2940 Devices can be sleepy nodes or any other device that cannot or may not respond to discovery
 2941 requests. A publishing Device may publish all or a partial list of Resources they host to an RD.
 2942 The RD then responds to queries for Resource discovery on behalf of the publishing Device (for
 2943 example: when a Device may go to sleep). For general Resource discovery, the RD behaves like
 2944 any other Server in responding to requests to "/oic/res".

2945 The remainder of section 11.3.6 is divided into three parts. The first part covers "RD Discovery"
 2946 (section 11.3.6.2), i.e., discovering and selecting of an RD. The second part covers "Resource
 2947 publish" (section 11.3.6.3), i.e., publishing of Resources. The third part covers "Resource
 2948 exposure" (section 11.3.6.4) where the RD replies to queries from Devices looking to discover
 2949 Resources.

2950 **11.3.6.2 RD discovery**

2951 **11.3.6.2.1 Discovering an RD**

2952 An RD shall support RD discovery.

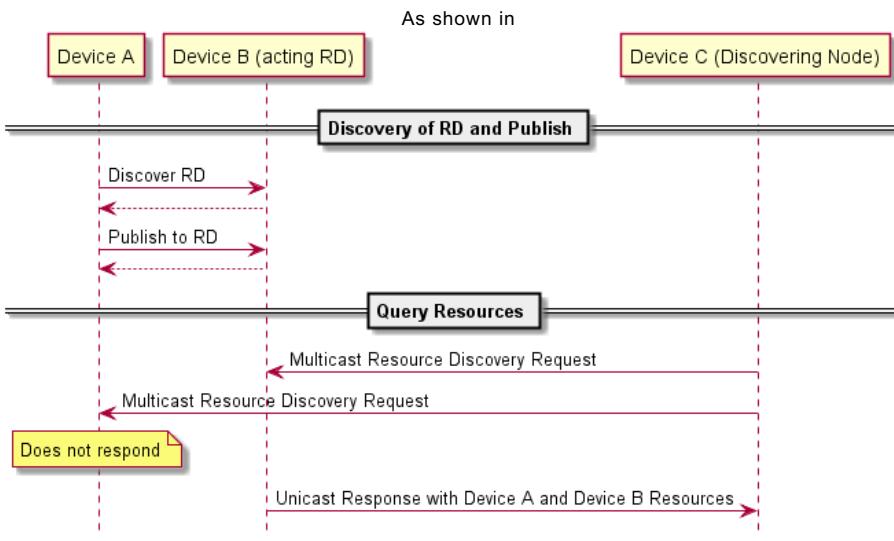


2953

2954

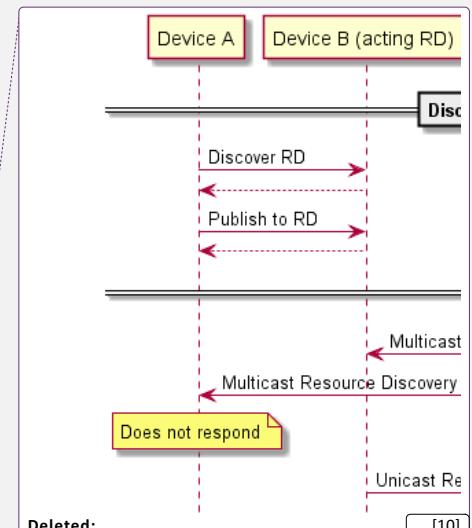
Figure 17. RD discovery and RD supported query of Resources support

2955



2956

Figure 17. a Device that wishes to publish its Resources first discovers an RD and then publishes the desired Resource information. Once a set of Resources have been published to an RD then the publishing Device should not respond to multicast Resource discovery queries for those published Resources when the RD is on the same multicast domain. In that case, only the RD should respond to multicast Resource discovery requests on the Resource published to it.



2964 It is allowed for more than one Device to act as an RD. The reason to have multiple RD support is
2965 to make networks scalable, handle network failures and prevent centralized Device failure
2966 bottlenecks. This does not preclude a scenario where a use case or deployment environment may
2967 require a single Device in the environment to be deployed as the only RD (e.g. gateway model).

2968 Discovering an RD may result in responses from more than one RD. If more than one RD responds,
2969 the discovering Device may select one of them based on the weighting parameter(s) provided in
2970 the response from the RD.

2971 A Client that performs Resource discovery uses an RD just like it uses any other Server for
2972 discovery. It may send a unicast request to the RD when it needs only the Resources published
2973 on the RD or do a multicast query when it does not require or have explicit knowledge of an RD.

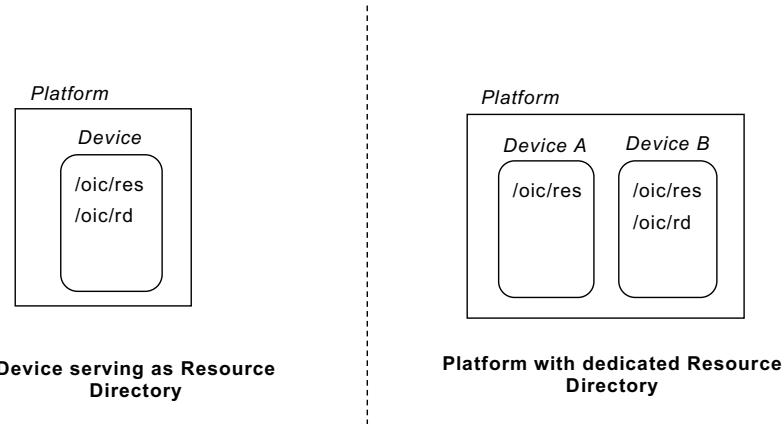


Figure 18. Resource Direction Deployment Scenarios

2974 RDs may also be discovered in the following ways:

- 2975
- 2976 • Pre-configuration: Devices wishing to publish Resource information may be configured a priori
2977 with the information (e.g. IP address, port, transport etc.) of a specific RD. This pre-
2978 configuration may be done at onboarding or may be updated on the Device using an out-of-
2979 band method. This pre-configuration may be done by the manufacturer.
 - 2980 • Query-oriented: A publishing Device wanting to discover resource directories using query-
2981 oriented discovery may issue a multicast Resource discovery request for "/oic/res?rt=oic.wk.rd".
2982 Only and all Devices that can be an RD shall respond to this query. The "/oic/rd" response shall
2983 include information about the RD i.e., the presence of "oic.wk.rd" Link (as defined by the
2984 Resource Type) and a subsequent query to "/oic/rd" would produce weighting parameters to
2985 allow the discovering Device to select between RDs (see details in RD selection section
2986 11.3.6.2.2). The "oic.wk.rd" resource shall be instantiated on the Devices acting as RDs. The
2987 "oic.wk.rd" schema is as defined in D.13.

2988 **11.3.6.2.2 RD selection process**

2989 The Device that wants to use an RD will find zero or more RDs on the network. There may not be
2990 an RD within the network. When discovering RDs, the Device needs to select an RD of all RDs
2991 found on the network. The Device may send a RETRIEVE request to "/oic/rd" of a specific RD, the
2992 RD shall respond with the representation of "/oic/rd/" containing selection criteria as defined by

2994 the "sel" Property. The lower the "sel" Property value is, the more preferable the responding RD
2995 is. The creation of the "sel" value is vendor defined.

2996 For example an "/oic/rd" response may return the following.

```
2997
2998     {
2999         "rt": ["oic.wk.rd"],
3000         "if": ["oic.if.baseline"],
3001         "sel": 50
3002     }
```

3001 The selection based on the "sel" Property value will ensure that a Device can judge if the found
3002 RD is suitable for its needs.

3003 The following situations may occur during the selection of an RD:

3004 1) A single or multiple RDs are present in the network

3005 2) No RD is present in the network

3006 3) an additional RD arrives on the network

3007 In the first scenario, the RDs are already present. If a single RD is detected then that RD may be
3008 used. When multiple RDs are detected the Device may use the "sel" Property value to select the
3009 RD.

3010 In the second scenario, the publishing Device may continue looking for an RD until one is found
3011 or give up using an RD altogether.

3012 In the third scenario, the Device has already published its resources to an existing RD, then
3013 discovers a new RD on the network. After judging the "sel" Property value, the Device may choose
3014 to move to the new RD. The Device should delete its Resource information from the currently used
3015 RD and publish the information to the new RD.

3016 **11.3.6.3 Resource publish**

3017 **11.3.6.3.1 Overview**

3018 An RD shall provide the facility to allow Devices to publish their Resource information to an RD.

3019 **11.3.6.3.2 Publish resources**

3020 **11.3.6.3.2.1 Overview**

3021 After the selection process of an RD, a device may push its Resource information to the selected
3022 RD, i.e., publish the Links in its "/oic/res" to the "/oic/res" of the RD.

3023 The publishing Device may decide to publish all Resources or just a few of the Resources on the
3024 RD. The publishing Device should only publish Resources that are otherwise published to its own
3025 "/oic/res"; a publishing Device should not publish non-discoverable Resources or Resources
3026 hosted by some other Device. A publishing Device shall respond to discovery requests on its
3027 "/oic/res" resource unless all its discoverable Resources have been published in an RD.

3028 **11.3.6.3.2.2 Publish: Push Resource information**

3029 Resource information may be published using an UPDATE request sent to "/oic/rd".

3030 A Device which hosts a Resource may publish the Resource information, i.e. the Link targeting the
3031 Resource, to an RD by sending an UPDATE request with the Link in the payload. The published
3032 Link shall be exposed through the "/oic/res" of the RD.

3033 When a Device first publishes a Link or Links, it shall send an UPDATE request to the "/oic/rd"
3034 Resource of the RD including the following key-value pairs in the payload:

- **di** – its value shall be the Device ID of the publishing Device, i.e. the "di" value of "/oic/d".
- **links** – its value shall be the array of Links to be published. Links may omit the "ins" parameter
3037 in which case the RD will assign a value for each Link. The supplied "ins" parameter by the
3038 Client is allowed to be overruled by the RD, e.g. an RD can ignore the supplied "ins" value.
- **ttl** – its value indicates how long (in seconds) the publishing Device requests the RD to keep
3040 this published Link.

3041 Take notice that the payload shall carry the appropriate Content-Format of
3042 "application/vnd.ocf+cbor":

```
{  
    "di": "e61c3e6b-9c54-4b81-8ce5-f9039c1d04d9",  
    "links": [  
        {  
            "anchor": "ocf://e61c3e6b-9c54-4b81-8ce5-f9039c1d04d9",  
            "href": "/myLightSwitch",  
            "rt": ["oic.r.switch.binary"],  
            "if": ["oic.if.a", "oic.if.baseline"],  
            "p": {"bm": 3},  
            "eps": [  
                {"ep": "coaps://[fe80::b1d6]:1111", "pri": 2},  
                {"ep": "coaps://[fe80::b1d6]:1122"},  
                {"ep": "coaps+tcp://[2001:db8:a::123]:2222", "pri": 3}  
            ]  
        },  
        {  
            "anchor": "ocf://e61c3e6b-9c54-4b81-8ce5-f9039c1d04d9",  
            "href": "/myLightBrightness",  
            "rt": ["oic.r.brightness"],  
            "if": ["oic.if.a", "oic.if.baseline"],  
            "p": {"bm": 3},  
            "eps": [  
                {"ep": "coaps://[[2001:db8:a::123]:2222"}  
            ]  
        }  
    ],  
    "ttl": 600  
}
```

3043

3044 When an RD receives this initial UPDATE request, it determines whether to grant the request or
3045 not. Upon granting the request, the RD shall send back an UPDATE response to the publishing
3046 Device. The response shall include a payload with the same information as the original UPDATE
3047 request with the following possible differences:

- 3048 • For each Link, an "ins" Parameter shall be included in the response. The RD shall assign a
3049 unique "ins" value identifying the Link among all the Links it advertises. If the publishing Device
3050 included an "ins" value in the UPDATE request, the RD may use it as long as it doesn't match
3051 any existing "ins" value in the published Links.
3052 • The "ttl" Property Value shall be assigned by the RD and it shall be included in the response.
3053 The RD should use the value included in the UPDATE request but may assign a value that is
3054 lower if it is not able to honour the requested "ttl" value. After this time elapses, the RD shall
3055 remove the Links. To keep a Link alive the publishing Device may update the "ttl" using the
3056 UPDATE schema.

3057 The RD shall add the new Links to its "/oic/res" and expose them to a valid discovery query, i.e.
3058 RETRIEVE request:

3059

```
{  
    "di": "e61c3e6b-9c54-4b81-8ce5-f9039c1d04d9",  
    "links": [  
        {  
            "anchor": "ocf://e61c3e6b-9c54-4b81-8ce5-f9039c1d04d9",  
            "href": "/myLightSwitch",  
            "rt": ["oic.r.switch.binary"],  
            "if": ["oic.if.a", "oic.if.baseline"],  
            "p": {"bm": 3},  
            "eps": [  
                {"ep": "coaps://[fe80::b1d6]:1111", "pri": 2},  
                {"ep": "coaps://[fe80::b1d6]:1122"},  
                {"ep": "coaps+tcp://[[2001:db8:a::123]:2222", "pri": 3}  
            ],  
            "ins": 11235  
        },  
        {  
            "anchor": "ocf://e61c3e6b-9c54-4b81-8ce5-f9039c1d04d9",  
            "href": "/myLightBrightness",  
            "rt": ["oic.r.brightness"],  
            "if": ["oic.if.a", "oic.if.baseline"],  
            "p": {"bm": 3},  
            "eps": [  
                {"ep": "coaps://[[2001:db8:a::123]:2222"}  
            ],  
            "ins": 11236  
        }  
    ]  
}
```

```

        "ins": 112358
    }
],
"ttl": 600
}

```

3060

3061 Once a publishing Device has published Resources to an RD, it may choose not respond to the
 3062 multicast discovery queries for the same Resources against its own "/oic/res", especially when on
 3063 the same multicast domain as the RD. After publishing Resources, primarily it is the RDs
 3064 responsibility to reply to the queries for the published Resources.

3065 There is another possibility that the RD and the publishing Device both respond to the multicast
 3066 query from the discovering Device. This will create a duplication of the information but is an
 3067 alternative that may be used for non-robust networks. It is not a recommended option but for
 3068 industrial scenarios, this is one of the possibilities. Either way, discovering Clients need to always
 3069 be prepared to process duplicate information in responses to multicast discovery request. The
 3070 "/oic/rd" schema is as defined in D.13 to specify publishing to the "/oic/rd" Resource.

3071 11.3.6.4 Resource exposure

3072 11.3.6.4.1 "/oic/res" and retrieving of the Resources

3073 The "/oic/res" based discovery process remains the same as that in the absence of an RD.
 3074 Resources may be discovered by retrieving the "/oic/res" Resource by sending a multicast or
 3075 unicast request. In the case of a multicast discovery request, an RD shall include in its response
 3076 any published Resources on behalf of the Device that hosts the Resources. Clients should be
 3077 prepared to process duplicate Resource information from more than one RD responding with the
 3078 same information or from an RD and the hosting Device (publishing the Resource information) both
 3079 responding to the request. Interaction with Resources discovered using the RD is done using the
 3080 same mechanism and methods as with Resources discovered by retrieving the "/oic/res" Resource
 3081 of the Device hosting the Resources (e.g., connect to the hosting Device and perform CRUDN
 3082 operations on the Resource).

3083 Resource Directories provide different "/oic/res" responses according to the requesting Clients,
 3084 which indicate their preference with content format. OCF 1.0 Clients request with a "Content
 3085 Format of "application/vnd.ocf+cbor" in the Accept Option, whereas the Content-Format
 3086 "application/cbor" in the Accept Option indicates OIC 1.1 Clients. For OIC 1.1 Clients, the "/oic/res"
 3087 response includes Links conforming to OIC 1.1 specification, which OIC 1.1 Clients can understand.
 3088 In this case the Resources hosted by the same Device shall be grouped together within a single
 3089 JSON Object with "di" indicating the hosting Device. For a 3rd party Resource, i.e., a Resource
 3090 which doesn't belong to the responding RD, its "href" value shall be a fully qualified transfer
 3091 protocol URI with an IP address and port number as its authority component (e.g.,
 3092 coaps://[2001:db8:b::c2e5]:22222/myLightSwitch).

3093 For example, an RD might return the following to an OIC 1.1 Clients:

```

[{
  "di": "88b7c7f0-4b51-4e0a-9faa-cfb439fd7f49",
  "links": [
    {
      "href": "/oic/res",
      "rel": "self",
      "rt": ["oic.wk.res"],
      "if": ["oic.if.ll", "oic.if.baseline"],
      "p": {"bm": 3, "sec": false}
    }
  ]
}

```

```

3104 },
3105 {
3106     "href": "/oic/d",
3107     "rt": ["oic.wk.d", "oic.d.fan"],
3108     "if": ["oic.if.r", "oic.if.baseline"],
3109     "p": {"bm": 3, "sec": false}
3110 },
3111 {
3112     "href": "/oic/p",
3113     "rt": ["oic.wk.p"],
3114     "if": ["oic.if.r", "oic.if.baseline"],
3115     "p": {"bm": 3, "sec": true, "port": 33333}
3116 },
3117 {
3118     "href": "/myFanIntrospection",
3119     "rt": ["oic.wk.introspection"],
3120     "if": ["oic.if.r", "oic.if.baseline"],
3121     "p": {"bm": 3, "sec": true, "port": 33333}
3122 },
3123 {
3124     "href": "/oic/rd",
3125     "rt": ["oic.wk.rd"],
3126     "if": ["oic.if.baseline"],
3127     "p": {"bm": 3, "sec": true, "port": 33333}
3128 },
3129 {
3130     "href": "/myFanSwitch",
3131     "rt": ["oic.r.switch.binary"],
3132     "if": ["oic.if.a", "oic.if.baseline"],
3133     "p": {"bm": 3, "sec": true, "port": 33333}
3134 },
3135 {
3136     "href": "/oic/sec/doxm",
3137     "rt": ["oic.r.doxm"],
3138     "if": ["oic.if.baseline"],
3139     "p": {"bm": 1, "sec": false}
3140 },
3141 {
3142     "href": "/oic/sec/pstat",
3143     "rt": ["oic.r.pstat"],
3144     "if": ["oic.if.baseline"],
3145     "p": {"bm": 1, "sec": true, "port": 33333}
3146 },
3147 {
3148     "href": "/oic/sec/cred",
3149     "rt": ["oic.r.cred"],
3150     "if": ["oic.if.baseline"],
3151     "p": {"bm": 1, "sec": true, "port": 33333}
3152 },
3153 {
3154     "href": "/oic/sec/acl2",
3155     "rt": ["oic.r.acl2"],
3156     "if": ["oic.if.baseline"],
3157     "p": {"bm": 1, "sec": true, "port": 33333}
3158 }
3159 ]
3160 },
3161 {
3162     "di": "dc70373c-1e8d-4fb3-962e-017eaa863989",
3163     "links": [
3164         {
3165             "href": "coap://[2001:db8:b::c2e5]:6666/oic/d",
3166             "rt": ["oic.wk.d", "oic.d.light", "oic.d.virtual"]
3167         }
3168     ]
3169 },
3170 {
3171     "di": "dc70373c-1e8d-4fb3-962e-017eaa863989",
3172     "links": [
3173         {
3174             "href": "coap://[2001:db8:b::c2e5]:6666/oic/p",
3175             "rt": ["oic.wk.p"]
3176         }
3177     ]
3178 },
3179 {
3180     "di": "dc70373c-1e8d-4fb3-962e-017eaa863989",
3181     "links": [
3182         {
3183             "href": "coap://[2001:db8:b::c2e5]:6666/oic/rd",
3184             "rt": ["oic.wk.rd"]
3185         }
3186     ]
3187 },
3188 {
3189     "di": "dc70373c-1e8d-4fb3-962e-017eaa863989",
3190     "links": [
3191         {
3192             "href": "coap://[2001:db8:b::c2e5]:6666/oic/switch",
3193             "rt": ["oic.wk.switch"]
3194         }
3195     ]
3196 },
3197 {
3198     "di": "dc70373c-1e8d-4fb3-962e-017eaa863989",
3199     "links": [
3200         {
3201             "href": "coap://[2001:db8:b::c2e5]:6666/oic/sec/doxm",
3202             "rt": ["oic.wk.doxm"]
3203         }
3204     ]
3205 },
3206 {
3207     "di": "dc70373c-1e8d-4fb3-962e-017eaa863989",
3208     "links": [
3209         {
3210             "href": "coap://[2001:db8:b::c2e5]:6666/oic/sec/pstat",
3211             "rt": ["oic.wk.pstat"]
3212         }
3213     ]
3214 },
3215 {
3216     "di": "dc70373c-1e8d-4fb3-962e-017eaa863989",
3217     "links": [
3218         {
3219             "href": "coap://[2001:db8:b::c2e5]:6666/oic/sec/cred",
3220             "rt": ["oic.wk.cred"]
3221         }
3222     ]
3223 },
3224 {
3225     "di": "dc70373c-1e8d-4fb3-962e-017eaa863989",
3226     "links": [
3227         {
3228             "href": "coap://[2001:db8:b::c2e5]:6666/oic/sec/acl2",
3229             "rt": ["oic.wk.acl2"]
3230         }
3231     ]
3232 }
3233 ],
3234 ],
3235 ],
3236 ],
3237 ],
3238 ],
3239 ],
3240 ],
3241 ],
3242 ],
3243 ],
3244 ],
3245 ],
3246 ],
3247 ],
3248 ],
3249 ],
3250 ],
3251 ],
3252 ],
3253 ],
3254 ],
3255 ],
3256 ],
3257 ],
3258 ],
3259 ],
3260 ],
3261 ],
3262 ],
3263 ],
3264 ],
3265 ],
3266 ],
3267 ],
3268 ],
3269 ],
3270 ],
3271 ],
3272 ],
3273 ],
3274 ],
3275 ],
3276 ],
3277 ],
3278 ],
3279 ],
3280 ],
3281 ],
3282 ],
3283 ],
3284 ],
3285 ],
3286 ],
3287 ],
3288 ],
3289 ],
3290 ],
3291 ],
3292 ],
3293 ],
3294 ],
3295 ],
3296 ],
3297 ],
3298 ],
3299 ],
3300 ],
3301 ],
3302 ],
3303 ],
3304 ],
3305 ],
3306 ],
3307 ],
3308 ],
3309 ],
3310 ],
3311 ],
3312 ],
3313 ],
3314 ],
3315 ],
3316 ],
3317 ],
3318 ],
3319 ],
3320 ],
3321 ],
3322 ],
3323 ],
3324 ],
3325 ],
3326 ],
3327 ],
3328 ],
3329 ],
3330 ],
3331 ],
3332 ],
3333 ],
3334 ],
3335 ],
3336 ],
3337 ],
3338 ],
3339 ],
3340 ],
3341 ],
3342 ],
3343 ],
3344 ],
3345 ],
3346 ],
3347 ],
3348 ],
3349 ],
3350 ],
3351 ],
3352 ],
3353 ],
3354 ],
3355 ],
3356 ],
3357 ],
3358 ],
3359 ],
3360 ],
3361 ],
3362 ],
3363 ],
3364 ],
3365 ],
3366 ],
3367 ],
3368 ],
3369 ],
3370 ],
3371 ],
3372 ],
3373 ],
3374 ],
3375 ],
3376 ],
3377 ],
3378 ],
3379 ],
3380 ],
3381 ],
3382 ],
3383 ],
3384 ],
3385 ],
3386 ],
3387 ],
3388 ],
3389 ],
3390 ],
3391 ],
3392 ],
3393 ],
3394 ],
3395 ],
3396 ],
3397 ],
3398 ],
3399 ],
3399 ]

```

```

3167
3168     "if": ["oic.if.r", "oic.if.baseline"],
3169     "p": {"bm": 3, "sec": false}
3170   },
3171   {
3172     "href": "coaps://[2001:db8:b::c2e5]:22222/oic/p",
3173     "rt": ["oic.wk.p"],
3174     "if": ["oic.if.r", "oic.if.baseline"],
3175     "p": {"bm": 3, "sec": true, "port": 22222}
3176   },
3177   {
3178     "href": "coaps://[2001:db8:b::c2e5]:22222/myLightSwitch",
3179     "rt": ["oic.r.switch.binary"],
3180     "if": ["oic.if.a", "oic.if.baseline"],
3181     "p": {"bm": 3, "sec": true, "port": 22222}
3182   },
3183   {
3184     "href": "coaps://[2001:db8:b::c2e5]:22222/myLightBrightness",
3185     "rt": ["oic.r.brightness"],
3186     "if": ["oic.if.a", "oic.if.baseline"],
3187     "p": {"bm": 3, "sec": true, "port": 22222}
3188   }
3189 }
3190 ]
3191

```

For OCF 1.0 Clients, the "/oic/res" response includes the OCF 1.0 Links with the "anchor" Parameter containing an OCF URI. The "/oic/res" response has a single array of Links to conform to [IETF RFC 6690](#). Each Link shall contain the "anchor" Parameter of the value OCF URI where the authority component of <deviceID> indicates the Device hosting the target Resource.

Deleted: IETF RFC 6690

For example, an RD may return the following to an OCF 1.0 Client.

```

3197 [
3198   {
3199     "anchor": "ocf://88b7c7f0-4b51-4e0a-9faa-cfb439fd7f49",
3200     "href": "/oic/res",
3201     "rel": "self",
3202     "rt": ["oic.wk.res"],
3203     "if": ["oic.if.ll", "oic.if.baseline"],
3204     "p": {"bm": 3},
3205     "eps": [{"ep": "coap://[2001:db8:a::b1d4]:77777"}, {"ep": "coaps://[2001:db8:a::b1d4]:33333"}]
3206   },
3207   {
3208     "anchor": "ocf://88b7c7f0-4b51-4e0a-9faa-cfb439fd7f49",
3209     "href": "/oic/d",
3210     "rt": ["oic.wk.d", "oic.d.fan"],
3211     "if": ["oic.if.r", "oic.if.baseline"],
3212     "p": {"bm": 3},
3213     "eps": [{"ep": "coap://[2001:db8:a::b1d4]:77777"}, {"ep": "coaps://[2001:db8:a::b1d4]:33333"}]
3214   },
3215   {
3216     "anchor": "ocf://88b7c7f0-4b51-4e0a-9faa-cfb439fd7f49",
3217     "href": "/oic/p",
3218     "rt": ["oic.wk.p"],
3219     "if": ["oic.if.r", "oic.if.baseline"],
3220     "p": {"bm": 3},
3221     "eps": [{"ep": "coaps://[2001:db8:a::b1d4]:33333"}]
3222   },
3223   {
3224   }
3225 ]

```

```

3227 "anchor": "ocf://88b7c7f0-4b51-4e0a-9faa-cfb439fd7f49",
3228 "href": "/myFanIntrospection",
3229 "rt": ["oic.wk.introspection"],
3230 "if": ["oic.if.r", "oic.if.baseline"],
3231 "p": {"bm": 3},
3232 "eps": [{"ep": "coaps://[2001:db8:a::b1d4]:33333"}]
3233 },
3234 {
3235     "anchor": "ocf://88b7c7f0-4b51-4e0a-9faa-cfb439fd7f49",
3236     "href": "/oic/rd",
3237     "rt": ["oic.wk.rd"],
3238     "if": ["oic.if.baseline"],
3239     "p": {"bm": 3},
3240     "eps": [{"ep": "coaps://[2001:db8:a::b1d4]:33333"}]
3241 },
3242 {
3243     "anchor": "ocf://88b7c7f0-4b51-4e0a-9faa-cfb439fd7f49",
3244     "href": "/myFanSwitch",
3245     "rt": ["oic.r.switch.binary"],
3246     "if": ["oic.if.a", "oic.if.baseline"],
3247     "p": {"bm": 3},
3248     "eps": [{"ep": "coaps://[2001:db8:a::b1d4]:33333"}]
3249 },
3250 {
3251     "anchor": "ocf://88b7c7f0-4b51-4e0a-9faa-cfb439fd7f49",
3252     "href": "/oic/sec/doxm",
3253     "rt": ["oic.r.doxm"],
3254     "if": ["oic.if.baseline"],
3255     "p": {"bm": 1},
3256     "eps": [{"ep": "coap://[2001:db8:a::b1d4]:77777"}, {"ep": "coaps://[2001:db8:a::b1d4]:33333"}]
3257 },
3258 {
3259     "anchor": "ocf://88b7c7f0-4b51-4e0a-9faa-cfb439fd7f49",
3260     "href": "/oic/sec/pstat",
3261     "rt": ["oic.r.pstat"],
3262     "if": ["oic.if.baseline"],
3263     "p": {"bm": 1},
3264     "eps": [{"ep": "coaps://[2001:db8:a::b1d4]:33333"}]
3265 },
3266 {
3267     "anchor": "ocf://88b7c7f0-4b51-4e0a-9faa-cfb439fd7f49",
3268     "href": "/oic/sec/cred",
3269     "rt": ["oic.r.cred"],
3270     "if": ["oic.if.baseline"],
3271     "p": {"bm": 1},
3272     "eps": [{"ep": "coaps://[2001:db8:a::b1d4]:33333"}]
3273 },
3274 },
3275 {
3276     "anchor": "ocf://88b7c7f0-4b51-4e0a-9faa-cfb439fd7f49",
3277     "href": "/oic/sec/ac12",
3278     "rt": ["oic.r.ac12"],
3279     "if": ["oic.if.baseline"],
3280     "p": {"bm": 1},
3281     "eps": [{"ep": "coaps://[2001:db8:a::b1d4]:33333"}]
3282 },
3283 },
3284 {
3285     "anchor": "ocf://dc70373c-1e8d-4fb3-962e-017eaa863989",
3286     "href": "/oic/d",
3287     "rt": ["oic.wk.d", "oic.d.light"],
3288     "if": ["oic.if.r", "oic.if.baseline"],
3289     "p": {"bm": 3},

```

```

3290
3291     "eps": [{"ep": "coap://[2001:db8:b::c2e5]:66666"},  

3292         {"ep": "coaps://[2001:db8:b::c2e5]:22222"}]  

3293     },  

3294     {  

3295         "anchor": "ocf://dc70373c-1e8d-4fb3-962e-017eaa863989",  

3296         "href": "/oic/p",  

3297         "rt": ["oic.wk.p"],  

3298         "if": ["oic.if.r", "oic.if.baseline"],  

3299         "p": {"bm": 3},  

3300         "eps": [{"ep": "coaps://[2001:db8:b::c2e5]:22222"}]  

3301     },  

3302     {  

3303         "anchor": "ocf://dc70373c-1e8d-4fb3-962e-017eaa863989",  

3304         "href": "/myLightSwitch",  

3305         "rt": ["oic.r.switch.binary"],  

3306         "if": ["oic.if.a", "oic.if.baseline"],  

3307         "p": {"bm": 3},  

3308         "eps": [{"ep": "coaps://[2001:db8:b::c2e5]:22222"}]  

3309     },  

3310     {  

3311         "anchor": "ocf://dc70373c-1e8d-4fb3-962e-017eaa863989",  

3312         "href": "/myLightBrightness",  

3313         "rt": ["oic.r.brightness"],  

3314         "if": ["oic.if.a", "oic.if.baseline"],  

3315         "p": {"bm": 3},  

3316         "eps": [{"ep": "coaps://[2001:db8:b::c2e5]:22222"}]  

3317     }
]

```

3318

3319 **11.4 Notification**

3320 **11.4.1 Overview**

3321 A Server shall support NOTIFY operation to enable a Client to request and be notified of desired
3322 states of one or more Resources in an asynchronous manner. Section 11.4.2 specifies the observe
3323 mechanism in which updates are delivered to the requester.

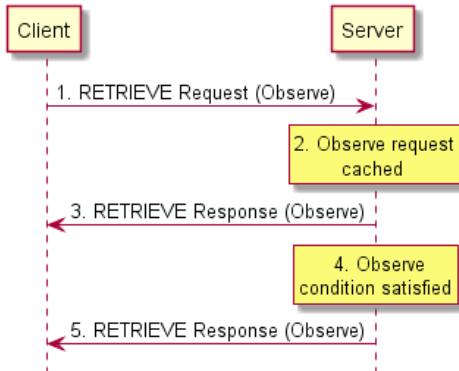
3324 **11.4.2 Observe**

3325 In observe mechanism the Client utilizes the RETRIEVE operation to require the Server for updates
3326 in case of Resource state changes. The Observe mechanism consists of five steps which are
3327 depicted in [Figure 19](#) and described below.

3328 Note: the observe mechanism can only be used for a resource with a property of observable
3329 (section 7.3.2.2).

Deleted: Figure 19

3331



3332

3333

3334

Figure 19. Observe Mechanism

3335 **11.4.2.1 RETRIEVE request with observe indication**

3336 The Client transmits a RETRIEVE message to the Server to request updates for the
3337 Resource on the Server if there is a state change. The RETRIEVE request message carries the
3338 following parameters:

- 3339 • *fr*: Unique identifier of the Client
3340 • *to*: Resource that the Client is requesting to observe
3341 • *ri*: Identifier of the RETRIEVE request
3342 • *op*: RETRIEVE
3343 • *obs*: Indication for observe request

3344 **11.4.2.2 Processing by the Server**

3345 Following the receipt of the RETRIEVE request, the Server may validate if the Client has the
3346 appropriate rights for the requested operation and the properties are readable and observable. If
3347 the validation is successful, the Server caches the information related to the observe request. The
3348 Server caches the value of the *ri* parameter from the RETRIEVE request for use in the initial
3349 response and future responses in case of a change of state.

3350 **11.4.2.3 RETRIEVE response with observe indication**

3351 The Server shall transmit a RETRIEVE response message in response to a RETRIEVE request
3352 message from a Client. The RETRIEVE response message shall include the following parameters.
3353 If validation succeeded, the response includes an observe indication. If not, the observe indication
3354 is omitted from the response which signals to the requesting client that registration for notification
3355 was not allowed.

3356 The RETRIEVE response message shall include the following parameters:

- 3357 • *fr*: Unique identifier of the Server
3358 • *to*: Unique identifier of the Client

- 3359 • *ri*: Identifier included in the RETRIEVE request
 3360 • *cn*: Information resource representation as requested by the Client
 3361 • *rs*: The result of the RETRIEVE operation
 3362 • *obs*: Indication that the response is made to an observe request

3363 11.4.2.4 Resource monitoring by the Server

3364 The Server shall monitor the state the Resource identified in the observe request from the Client.
 3365 Anytime there is a change in the state of the observed resource, the Server sends another
 3366 RETRIEVE response with the observe indication. The mechanism does not allow the client to
 3367 specify any bounds or limits which trigger a notification, the decision is left entirely to the server.

3368 11.4.2.5 Additional RETRIEVE responses with observe indication

3369 The Server shall transmit updated RETRIEVE response messages following observed changes in
 3370 the state of the Resources indicated by the Client. The RETRIEVE response message shall include
 3371 the parameters listed in section 11.4.2.3.

3372 11.4.2.6 Cancelling Observe

3373 The Client can explicitly cancel observe by sending a RETRIEVE request without the observe
 3374 indication field to the same resource on Server which it was observing. For certain protocol
 3375 mappings, the client may also be able to cancel an observe by ceasing to respond to the
 3376 RETRIEVE responses.

3377 11.5 Device management

3378 11.5.1 Overview

3379 The Device Management includes the following functions:

- 3380 • Diagnostics and maintenance

3381 The device management functionalities specified in this version of specification are intended to
 3382 address the basic device management features. Addition of new device management features in
 3383 the future versions of the specification is expected.

3384 11.5.2 Diagnostics and maintenance

3385 The Diagnostics and Maintenance function is intended for use by administrators to resolve issues
 3386 encountered with the Devices while operating in the field. If diagnostics and maintenance is
 3387 supported by a Device, the Core Resource "/oic/mnt" shall be supported as described in [Table 24](#).

Deleted: Table 24

3388 **Table 24. Optional diagnostics and maintenance device management Core Resources**

Pre-defined URI	Resource Type Title	Resource Type ID ("rt" value)	Interfaces	Description	Related Functional Interaction
"/oic/mnt"	Maintenance	"oic.wk.mnt"	"oic.if.rw"	The resource through which the device is maintained and can be used for diagnostic purposes. The Properties exposed by "/oic/mnt" are listed in Table 25 .	Device Management

3389

3390 [Table 25](#) defines the "oic.wk.mnt" Resource Type. At least one of the Factory_Reset, Reboot or
 3391 last_errpr Properties shall be implemented.

Comment [BRA100]: BZ #2284

Deleted: resource p

Deleted: Table 25

Deleted: Table 25

Deleted: _

Deleted: and

Comment [BRA101]: BZ #2011

Deleted: p

3399

Table 25. "oic.wk.mnt" Resource Type definition

Comment [BRA102]: BZ #2011

Property title	Property name	Value type	Value rule	Unit	Access mode	Mandatory	Description
Factory_Reset	fr	boolean			R, W	no	<p>When writing to this Property:</p> <p>false – No action (Default*) true – Start Factory Reset After factory reset all configuration and state data will be lost.</p> <p>When reading this Property, a value of true indicates a pending factory reset. Once the factory reset has been completed, the Device shall set the value back to false.</p>
Reboot	rb	boolean			R, W	no	<p>When writing to this Property:</p> <p>false – No action (Default) true – Start Reboot</p> <p>After Reboot, this value shall be changed back to the default value (i.e., false).</p>
Last error	err	integer	HTTP error code		R	no	<p>Last occurred error code, shall be cleared to 503 (service unavailable), when doing a Factory Reset or Reboot.</p> <p>All HTTP errors outside the 100, 200 or 300 range shall be stored.</p>

3400

3401 Note: * - Default indicates the value of this property as soon as the device is rebooted or factory reset

11.5.3 Network monitoring

3402 3403 Network monitoring is used for monitoring the current network state of the Device.

3404 3405 3406 3407 The network monitoring Resource Type is "oic.wk.nmon" and is described in Table 26. The Resource Type may occur multiple times if more than 1 network interface is implemented. The Common Property "n" may be used to distinguish the different network interfaces, like distinguish the 2.4 and 5G Wi-Fi network interfaces.

3408

Table 26. Optional monitoring device management Core Resources

Example URI	Resource Type Title	Resource Type ID ("rt" value)	Interfaces	Description	Related Functional Interaction
"/example/oic/nmon"	Network Monitoring	"oic.wk.nmon"	"oic.if.rw oic.if.baseleine"	<p>The Resource through which the Device is monitored.</p> <p>The Resource exposes Properties relevant to aspects that may be monitored. The Resource Properties exposed by Resource Type "oic.wk.nmon" are listed in Table 27.</p>	Device Management

3409

3410 Table 27 defines oic.wk.nmon resource type.

Comment [BRA103]: BZ #2011

New section added.

Deleted: Table 26

Deleted: Table 27

Deleted: Table 27

Table 27. "oic.wk.nmon" Resource Type definition

Property title	Property name	Value type	Value rule	Unit	Access mode	Mandatory	Description
<u>Network indicator</u>	<u>ianaifType</u>	<u>integer</u>	<u>The integer value of the ianaifType</u>		<u>R</u>	<u>yes</u>	<u>The network type this rResource is collecting information from as defined by: https://www.iana.org/assignments/ianaiftype-mib/ianaiftype-mib</u>
<u>reset</u>	<u>reset</u>	<u>boolean</u>	<u>true, all collected values should be reset. The server should reset the value automatically to false after the reset occurred.</u>		<u>RW</u>	<u>yes</u>	<u>Reset of the collected values</u>
<u>Collecting status indication</u>	<u>col</u>	<u>boolean</u>	<u>True: collecting data. False: not collecting data</u>		<u>RW</u>	<u>yes</u>	<u>Boolean to start/stop collecting data.</u>
<u>Transmission bytes</u>	<u>tx</u>	<u>integer</u>		<u>kilo bytes</u>	<u>R</u>	<u>no</u>	<u>Amount of transmitted kilo bytes from collection start time indicated by the Property "time".</u>
<u>Reception bytes</u>	<u>rx</u>	<u>integer</u>		<u>kilo bytes</u>	<u>R</u>	<u>no</u>	<u>Amount of received kilo bytes from collection start time indicated with by the pProperty "time".</u>
<u>Maximum message size tx</u>	<u>mmstx</u>	<u>integer</u>	<u>bytes</u>	<u>bytes</u>	<u>R</u>	<u>no</u>	<u>Maximum transmitted message, e.g. Max(tx) in the collection period</u>
<u>Maximum message size rx</u>	<u>mmsrx</u>	<u>integer</u>	<u>bytes</u>	<u>bytes</u>	<u>R</u>	<u>no</u>	<u>Maximum received message, e.g. Max(rx) in the collection period</u>
<u>Average message size -tx</u>	<u>amstx</u>	<u>integer</u>	<u>bytes</u>	<u>bytes</u>	<u>R</u>	<u>no</u>	<u>Average transmitted message size, e.g. AVG(tx) in the collection period.</u>
<u>Average message size -rx</u>	<u>amsrx</u>	<u>integer</u>	<u>bytes</u>	<u>bytes</u>	<u>R</u>	<u>no</u>	<u>Average received message size e.g. AVT(rx) in the collection period.</u>

3427 Examples of typical used values for ianaifType are 71 (ieee80211) for Wi-Fi and 6
 3428 (ethernetCsmacd) for Ethernet.

3429 A Device should start collecting network monitoring data when receiving an UPDATE operation
 3430 with the parameter "col" = true. A Device should stop collecting network data when receiving an
 3431 UPDATE operation with parameter "col" = false. The collected network data should be reset when
 3432 an UPDATE operation with parameter "reset" = true is received, if the parameter "reset" is false
 3433 then the values should not be reset. Figure 20, illustrates the interactions with the network
 3434 monitoring Resource

Deleted: Figure 20

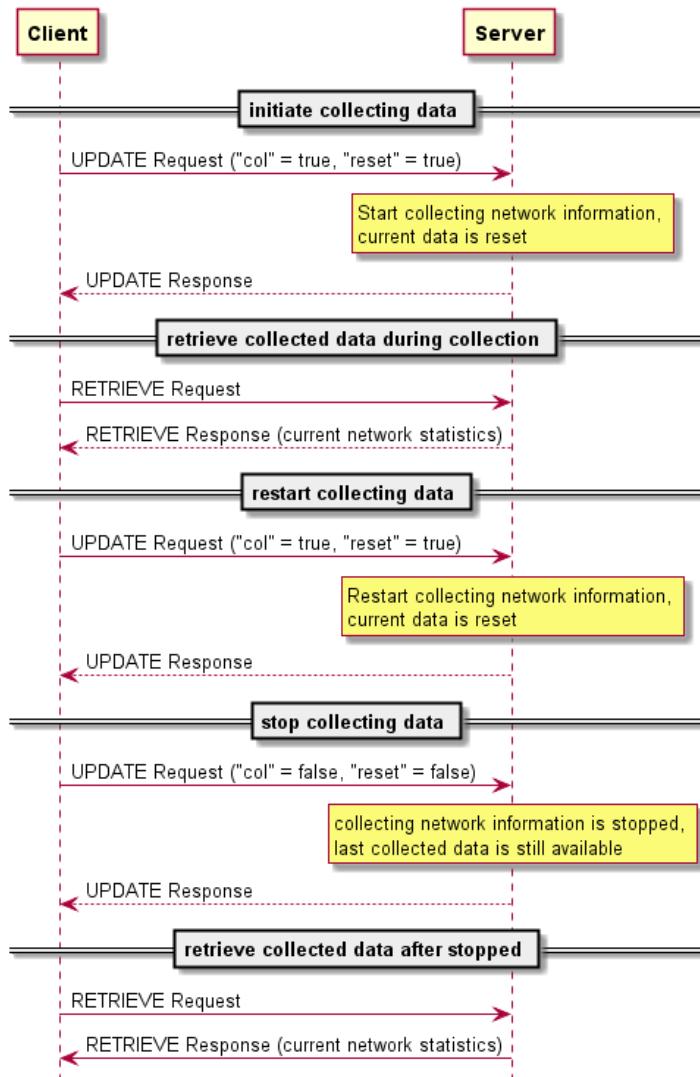


Figure 20. Interactions with the network monitoring Resource

3436
3437

3438 The state transition diagram for collecting or not collecting network information is described by
3439 Figure 21.

Deleted: Figure 21

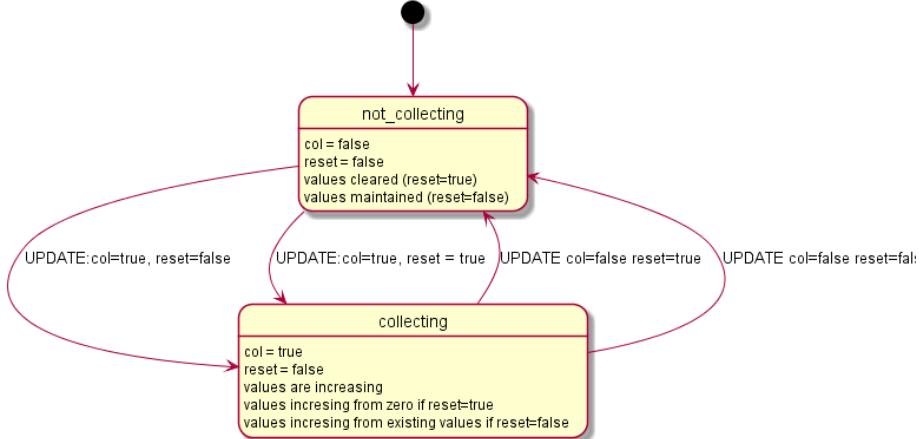


Figure 21. State transition diagram of collecting network information

3441
3442
3443
3444

11.6 Scenes

11.6.1 Introduction

Scenes are a mechanism for automating certain operations.

A **Scene** is a static entity that stores a set of defined **Property** values for a collection of resources. Scenes provide a mechanism to store a setting over multiple Resources that may be hosted by multiple separate Servers. Scenes, once set up, can be used by multiple Clients to recall a setup.

Scenes can be grouped and reused, a group of **Scenes** is also a **Scene**.

In short, **Scenes** are bundled user settings.

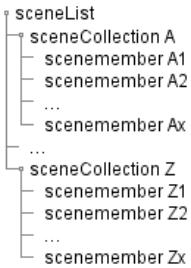
11.6.2 Scenes

11.6.2.1 Introduction

Scenes are described by means of resources. The **Scene** **Resources** are hosted by a Server and the top level **Resource** is listed in "/oic/res". This means that a Client can determine if the **Scene** functionality is hosted on a Server via Resource discovery as defined in section 11.3. The setup of **Scenes** is driven by Client interactions. This includes creating new **Scenes**, and mappings of Server **Properties** that are part of a **Scene**.

The **Scene** functionality is created by multiple **Resources** and has the structure depicted in Figure 22. The **sceneList** and **sceneCollection** **Resources** are overloaded **Collection** **Resources**. The **sceneCollection** **Resource** contains a list of **Scenes**. This list contains zero or more **Scenes**. The **sceneMember** **Resource** contains the mapping between a **Scene** and what needs to happen according to that **Scene** on an indicated **Resource**.

Comment [BRA104]: BZ #2284
Deleted: s
Deleted: resource p
Deleted: s
Deleted: s
Comment [BRA105]: BZ #2389
All changes in this sections except as noted otherwise.
Deleted: s
Deleted: r
Deleted: r
Deleted: s
Deleted: s
Deleted: s
Comment [BRA106]: BZ #2284
Deleted: resource p
Deleted: s
Deleted: s
Deleted: r
Deleted: Figure 22
Deleted: r
Deleted: c
Deleted: r
Deleted: s
Deleted: s
Deleted: r
Deleted: s
Deleted: s
Deleted: r



3490

Figure 22 Generic Scene Resource structure**11.6.2.2 Scene creation**

3493 A Client desiring to interact with ~~Scenes~~ needs to first determine if the ~~Server~~ supports the ~~Scene~~
 3494 feature; the sceneMembers of a ~~Scene~~ that are Resources of end Device being updated by the
 3495 ~~Scene change~~ do not have to be co-located on the ~~Server~~ supporting the ~~Scene~~ feature. This can
 3496 be done by checking if "~~/oic/res~~" contains the "~~it~~" of the ~~sceneList~~ Resource. This is depicted in
 3497 first steps of [Figure 23](#). The ~~sceneCollection~~ Resource is created by the Server using some out of
 3498 bound mechanism, Client creation of ~~Scenes~~ is not supported at this time. This will entail defining
 3499 the ~~Scene~~ with an applicable list of ~~Scene~~ Values and the mappings for each Resource being part
 3500 of the ~~Scene~~. The mapping for each ~~Resource~~ being part of the ~~sceneCollection~~ Resource is
 3501 described by a ~~Resource~~ called ~~sceneMember~~. The ~~sceneMember~~ Resource contains the link to a
 3502 ~~Resource~~ and the mapping between the ~~Scene~~ listed in the "~~sceneValues~~" Property and the actual
 3503 ~~Property~~ value of the ~~Resource~~ indicated by the ~~Link~~.

Deleted: s

Deleted: r

Deleted: s

Deleted: s

Deleted: s

Deleted: s

Deleted: s

Deleted: "

Deleted: "

Deleted: "

Deleted: "

Deleted: "

Deleted: r

Deleted: Figure 23

Deleted: s

Deleted: s

Deleted: v

Deleted: s

Deleted: r

Deleted: r

Deleted: r

Comment [BRA107]: BZ #2284

Deleted: r

Deleted: s

Deleted: p

Comment [BRA108]: BZ #2284

Deleted: resource p

Deleted: l

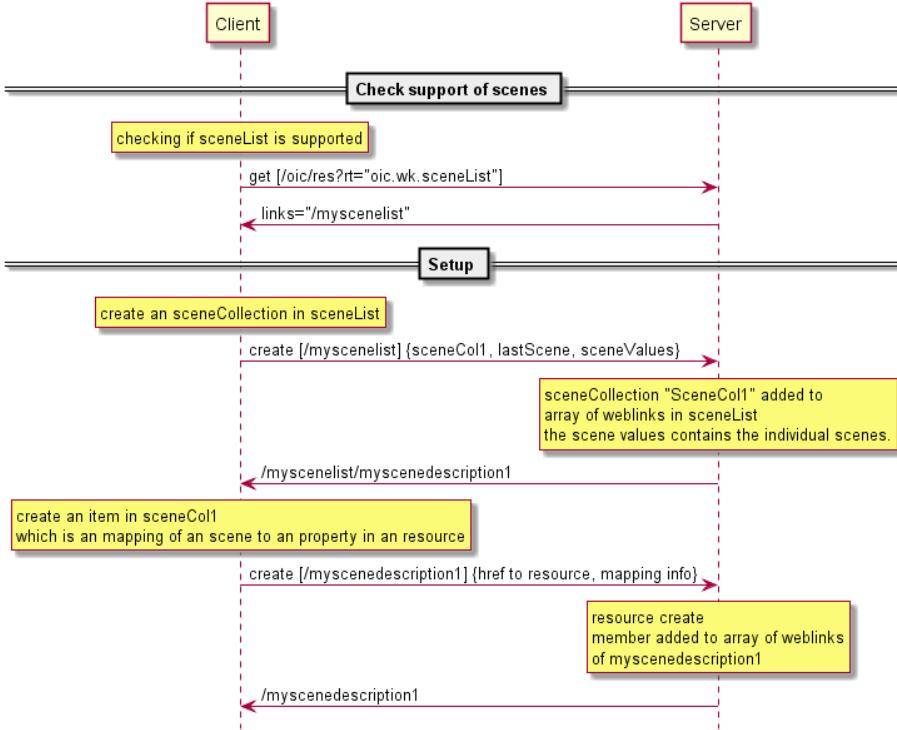


Figure 23 Interactions to check Scene support and setup of specific *Scenes*

11.6.2.3 Interacting with Scenes

All capable Clients can interact with *Scenes*. The allowed *Scene Values* and the *last applied Scene Value* can be retrieved from the *Server* hosting the *Scene*. The *Scene Value* shall be changed by issuing an *UPDATE* operation with a payload that sets the "*lastScene*" *Property* to one of the listed allowed *Scene Values*. These steps are depicted in [Figure 24](#). Note that the "*lastScene*" *Property* value does not imply that the current state of all *Resources* that are part of the *Scene* will be at the mapped value. This is due to that the setting the *Scene Values* are not modelled as actual states of the system. This means that another Client can change just one *Resource* being part of the *Scene* without having feedback that the state of the *Scene* is changed.

Deleted: s
Deleted: s
Deleted: s
Deleted: v
Deleted: s
Deleted: v
Deleted: s
Deleted: v
Comment [BRA109]: BZ #2284
Deleted: p
Deleted: s
Deleted: v
Deleted: Figure 24
Deleted: r
Deleted: s
Deleted: s
Deleted: v
Deleted: r
Deleted: s
Deleted: s

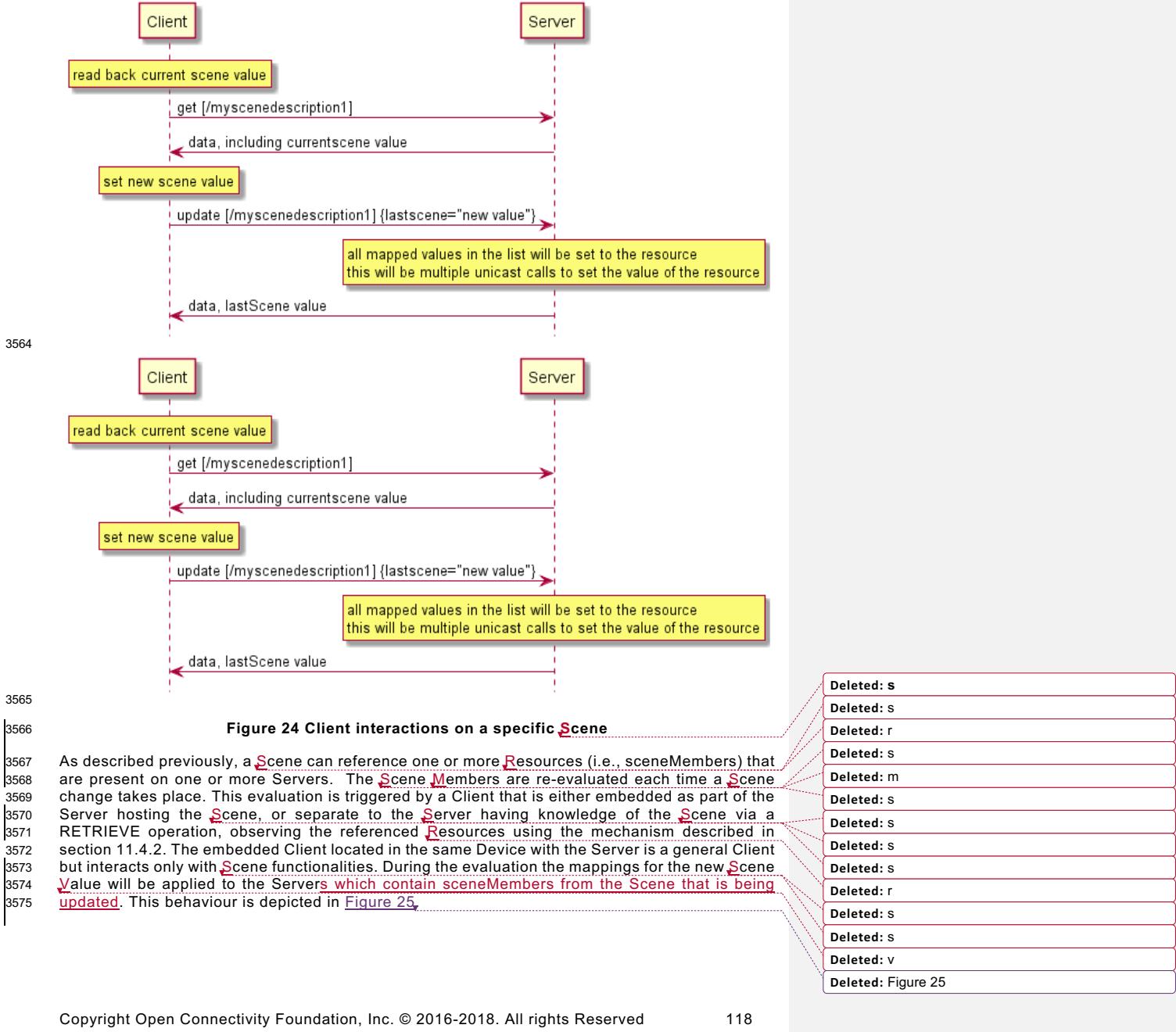
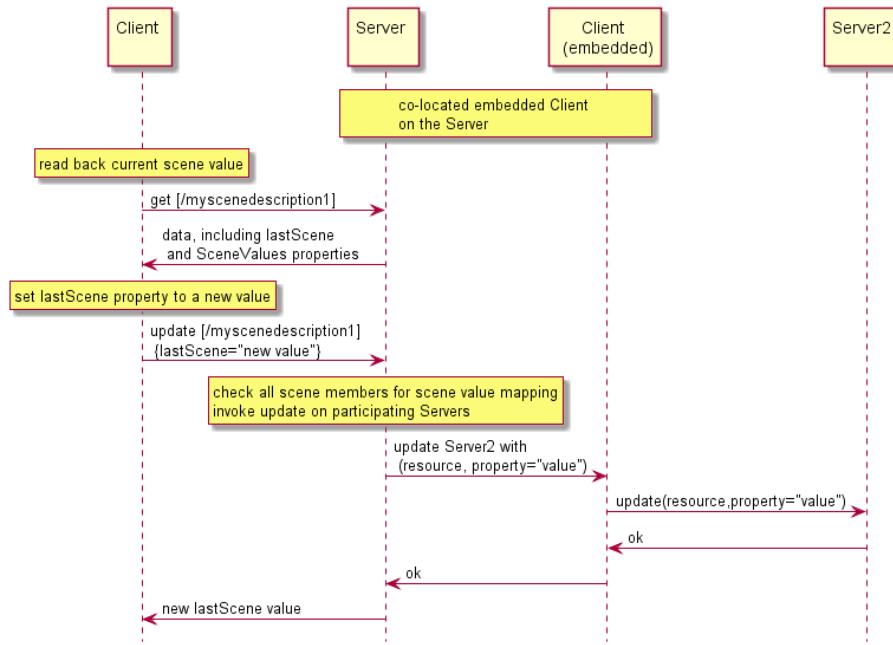
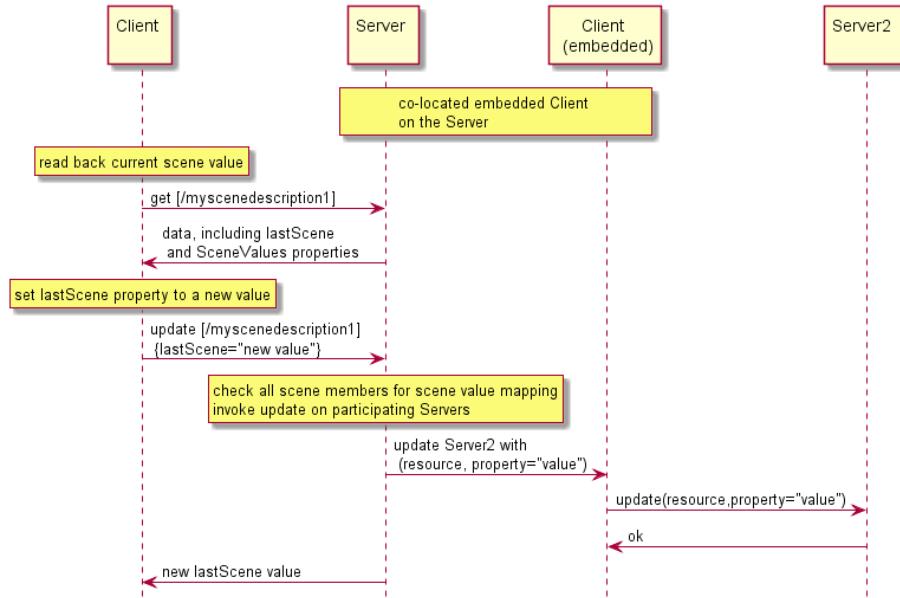


Figure 24 Client interactions on a specific Scene

As described previously, a Scene can reference one or more Resources (i.e., sceneMembers) that are present on one or more Servers. The Scene Members are re-evaluated each time a Scene change takes place. This evaluation is triggered by a Client that is either embedded as part of the Server hosting the Scene, or separate to the Server having knowledge of the Scene via a RETRIEVE operation, observing the referenced Resources using the mechanism described in section 11.4.2. The embedded Client located in the same Device with the Server is a general Client but interacts only with Scene functionalities. During the evaluation the mappings for the new Scene Value will be applied to the Servers which contain sceneMembers from the Scene that is being updated. This behaviour is depicted in Figure 25.



3590



3591

3592

Figure 25 Interaction overview due to a Scene change

3593

11.6.2.4 Summary of Resource Types defined for Scene functionality

3594

[Table 28](#) summarizes the list of Resource Types that are part of Scenes.**Deleted:** Table 28

3595

Table 28 list of Resource Types for Scenes

Friendly Name (informative)	Resource Type (rt)	Short Description	Section
sceneList	oic.wk.scenelist	Top Level collection containing sceneCollections	
sceneCollection	oic.wk.scenecollection	Description of zero or more scenes	
sceneMember	oic.wk.scenemember	Description of mappings for each specific resource part of the sceneCollection	

3596

11.6.3 Security considerations

3597

Creation of Scenes on a Server that is capable of this functionality is dependent on the ACLs applied to the Resources and the Client having the appropriate permissions. Interaction between a Client (embedded or separate) and a Server that hosts the Resource that is referenced as a Scene Member is contingent on the Client having appropriate permissions to access the Resource on the host Server.

3602

See OCF Security for details on the use of ACLs and also the mechanisms around Device Authentication that are necessary to ensure that the correct permissions exist for the Client to access the Scene Member resource(s) on the Server.

Deleted: r**Deleted:** r**Deleted:** s**Deleted:** m**Deleted:** r**Deleted:** s**Deleted:** m

3613 **11.7 Icons**

3614 **11.7.1 Overview**

3615 Icons are a primitive that are needed by various OCF subsystems, such as bridging. An optional
 3616 Resource Type of "oic.r.icon" has been defined to provide a common representation of an icon
 3617 Resource that can be used by Devices.

3618 **11.7.2 Resource**

3619 The icon Resource is as defined in [Table 29](#).

Deleted: Table 29

3620 **Table 29. Optional Icon Core Resource**

Example URI	Resource Type Title	Resource Type ID ("rt" value)	Interfaces	Description	Related Functional Interaction
"/example/oic/icon"	Icon	"oic.r.icon"	"oic.if.r"	The Resource through which the Device can obtain icon images. The Properties exposed by "/example/oic/mnt" are listed in Table 30 .	Icon

3621

3622 [Table 30](#) defines the details for the "oic.r.icon" Resource Type.

3623 **Table 30. "oic.r.icon" Resource Type definition**

Property title	Property name	Value type	Value rule	Unit	Access mode	Mandatory	Description
Mime Type	mimetype	string			R	yes	Specifies the format (media type) of the icon. It should be a template string as specified in IANA Media Types Assignment
Width	width	integer	>= 1	pixels	R	yes	Width of the icon in pixels greater than or equal to 1.
Height	height	integer	>= 1	pixels	R	yes	Height of the icon in pixels greater than or equal to 1.
Icon	media	uri			R	yes	URI to the location of the icon image.

3624

3625 **11.8 Introspection**

3626 **11.8.1 Overview**

3627 Introspection is a mechanism to announce the capabilities of Resources hosted on the Device.

3628 The intended usage of the Introspection Device Data ([IDD](#)) is to enable dynamic [Clients](#), e.g. [Clients](#)
 3629 that can use the [IDD](#) to generate dynamically a [UI](#) or dynamically create translations of the hosted
 3630 Resources to another eco-system. Other usages of [Introspection](#) is that the information can be
 3631 used to generate [Client code](#). The [IDD](#) is designed to augment the existing data already on the
 3632 wire. This means that existing mechanisms need to be used to get a full overview of what is
 3633 implemented in the Device. For example, the [IDD](#) does not convey information about observability,
 3634 since that is already conveyed with the "p" Property on the [Links](#) in "/oic/res" (see section 7.8.2.1.2).

3635 The [IDD](#) is recommended to be conveyed as static data. Meaning that the data does not change
 3636 during the uptime of a Device. However, when the [IDD](#) is not static, the Introspection Resource

Comment [BRA110]: BZ #2284

Deleted: Resource p

Deleted: Table 30

Deleted: Table 30

Comment [BRA111]: BZ #2189

All mark ups in this entire section are released to this BZ entry.

Deleted: c

Deleted: .

Deleted: E

Deleted: c

Deleted: Introspection Device Data

Deleted: n

Deleted: the

Deleted: c

Deleted: Introspection Device Data

Deleted: s

Deleted: Introspection Device Data

Deleted: e

Deleted: l

Deleted: Introspection Device Data

Deleted: "

Deleted: "

Deleted: data

3658	shall be observable and the url Property <u>Value</u> of "oic.wk.introspection" Resource shall change to	Deleted: indicate to
3659	indicate that the <u>IDD</u> is changed.	Deleted: v
3660	The <u>IDD</u> describes the Resources that make up the Device. For the complete list of included	Deleted: Introspection Device Data
3661	Resources <u>Table 13</u> . The <u>IDD</u> is described as a <u>Swagger2.0</u> in JSON format file. <u>The text below</u>	Deleted: Introspection Device Data
3662	<u>contains also Swagger2.0 terms, like paths, methods etc.</u> The <u>Swagger2.0</u> file <u>shall</u> contain the	Deleted: Table 13
3663	description of the Resources as defined below:	Deleted: Introspection Device Data
3664	• The <u>IDD</u> will use the HTTP syntax, e.g., define the CRUDN operation as HTTP methods and	Deleted: s
3665	use the HTTP status codes.	Deleted: s
3666	• The <u>IDD</u> does not have to define all the status codes that indicate an error situation.	Deleted: will
3667	• The <u>IDD</u> does not have to define a schema when the status code indicates that there is no	Deleted: All Resources with the next remarks:
3668	payload (see HTTP status code 204 as an example)	Deleted: Introspection Device Data
3669	• The <u>paths (URLs)</u> of the Resources in the <u>IDD</u> shall be without the <u>Endpoint</u> description, e.g.	Deleted: Introspection Device Data
3670	it shall not be a <u>fully-qualified URL</u> but only the relative path from the <u>Endpoint, aka the "href"</u> .	Deleted: Introspection Device Data
3671	The relative path shall be the same as being conveyed by "/oic/res".	Deleted: Introspection Device Data
3672	• <u>The following Resources shall be excluded in the IDD:</u>	Deleted: e
3673	○ <u>Resource with Resource Type: "oic.wk.res"</u> , unless 3 rd party defined or optional	Deleted: e
3674	Properties are implemented.	Deleted: "/oic/res" Resource shall not be listed in the Introspection Device Data
3675	○ <u>Resource with Resource Type: "oic.wk.introspection"</u> .	Deleted: OCF Wi-Fi Easy Setup
3676	○ <u>Resources that handle Wi-Fi Easy Setup, see OCF Wi-Fi Easy Setup specification.</u>	
3677	• <u>The following Resources shall be included in the IDD when optional or 3rd party defined</u>	
3678	<u>Properties are implemented:</u>	
3679	○ <u>Resources with type: "oic.wk.p" and "oic.wk.d" (e.g. discovery related Resources).</u>	Deleted: <#>The Resources "/oic/d", "/oic/p", the Introspection Resource and the Security Virtual Resources may be included in the Introspection Device Data. ... [11]
3680	○ <u>Security Virtual Resources from the OCF Security specification.</u>	Deleted: <#>Introspection Resource Data
3681	• When the Device does not expose instances of Vertical Resource Types, and does not have	Deleted: <#>Introspection Device Data
3682	any 3 rd party defined Resources (see section 7.9), and does not need to include Resources in	Deleted: are required to
3683	the <u>IDD</u> due to other clauses in this section, then the <u>IDD</u> shall be an empty Swagger2.0 file.	Deleted: Introspection Device Data
3684	An example of an empty Swagger2.0 file can be found in found in Annex G.2:	Deleted: it will
3685	• All other Resources <u>shall</u> be listed in the <u>IDD</u> .	Deleted: I
3686	• Per Resource <u>the IDD shall include:</u>	Deleted: M
3687	○ All <u>implemented methods</u> :	Deleted: Introspection Device Data
3688	▪ For an OCF defined Resource, only the methods that are standardized are	Deleted: S
3689	allowed to exist in the <u>IDD</u> . The supported methods shall comply with the	Deleted: M
3690	listed Interfaces. For example, if an Interface is listed that allows updates,	Deleted: M
3691	then the update method shall be listed. It is not allowed to have methods	Deleted: i
3692	listed for OCF defined Resources that does not have this method defined.	Deleted: M
3693	○ Per <u>supported method</u> :	
3694	▪ Implemented query Parameters per <u>method</u> .	
3695	• This includes the supported <u>Interfaces ("if")</u> as enum values.	
3696	▪ Schemas of the payload for the request and response bodies of the <u>method</u>	
3697	▪ The schema data shall be conveyed by the swagger schema object as	
3698	defined in the parameters section.	
3699	▪ The swagger2.0 schema object shall comply with:	
3700	• The schemas shall be fully resolved, e.g. no references shall exist	
3701	outside the swagger file.	

- 3739
- The schemas shall list which Interfaces are supported on the method.
 - The schemas shall list if a Property is optional or required.
 - The schemas shall include all Property validation keywords. Where an enum is defined the enum shall contain the values supported by the Device. When vendor defined extensions exist to the enum (defined in accordance to Section 7.9) these shall be included in the enum.
 - The schemas shall indicate if a Property is read only or read-write
 - By means of the readOnly schema tag belonging to the Property
 - Default value of readOnly is false as defined by Swagger2.0.
 - The default value of the "rt" Property shall be used to indicate the supported Resource Types.
 - oneOf and anyOf constructs are allowed to be used as part of an Swagger2.0 schema object. The Swagger2.0 schema with oneOf and anyOf constructs can be found in Annex G.1.

Deleted: i

3750 Dynamic Resources (e.g. Resources that can be created on a request by a Client) shall have a URL definition which contains a URL identifier (e.g. using the {} syntax). A URL with {} identifies that the Resource definition applies to the whole group of Resources that may be created. The actual path may contain the collection node that links to the Resource.

Deleted: up

3751 Example of a URL with identifiers:

Deleted: can

3752 /SceneListResURI/{SceneCollectionResURI}/{SceneMemberResURI}:

Deleted: can

3753 When different Resource Types are allowed to be created in a Collection, then the different
3754 schemas for the CREATE method shall define all possible Resource Types that may be created.
3755 The schema construct oneOf allows the definition of a schema with selectable Resources. The
3756 oneOf construct allows the integration of all schemas and that only one existing sub schema shall
3757 be used to indicate the definition of the Resource that may be created.

Deleted: s

3758 Example usage of oneOf JSON schema construct:

Deleted: can

```
3761 {
3762   "oneOf": [
3763     { <>subschema 1 definition>> },
3764     { <> sub schema 2 definition >> }
3765     ...
3766   ]
3767 }
```

3774 A Client using the IDD of a Device should check the version of the supported IDD of the Device.
3775 The swagger version is indicated in each file with the tag "swagger". Example of the 2.0 supported
3776 version of the tag is: "swagger": "2.0". Later versions of the specification may reference newer
3777 versions of the OpenAPI specification (swagger specification), for example 3.0.

Deleted: Introspection Device Data

Deleted: Introspection Device Data

3793 A Device shall support one Resource with a Resource Type of "oic.wk.introspection" as defined in
3794 Table 31. The Resource with a Resource Type of "oic.wk.introspection" shall be included in the
3795 Resource "/oic/res".

Deleted: Server

3796 An empty IDD file, e.g. no URLs are exposed, shall still have the mandatory Swagger2.0 fields.
3797 See OpenAPI specification ([swagger specification](#)). An example of an empty Swagger2.0 file can
3798 be found in [Annex G.2](#).

3799 **Table 31. Introspection Resource**

Pre-defined URI	Resource Type Title	Resource Type ID ("rt" value)	Interfaces	Description		Related Functional Interaction
none	Introspection	oic.wk.introspection	"oic.if.r"	The Resource that announces the URL of the Introspection file.		Introspection

3800

3801 Table 32 defines "oic.wk.introspection" Resource Type.

3802 **Table 32. "oic.wk.introspection" Resource Type definition**

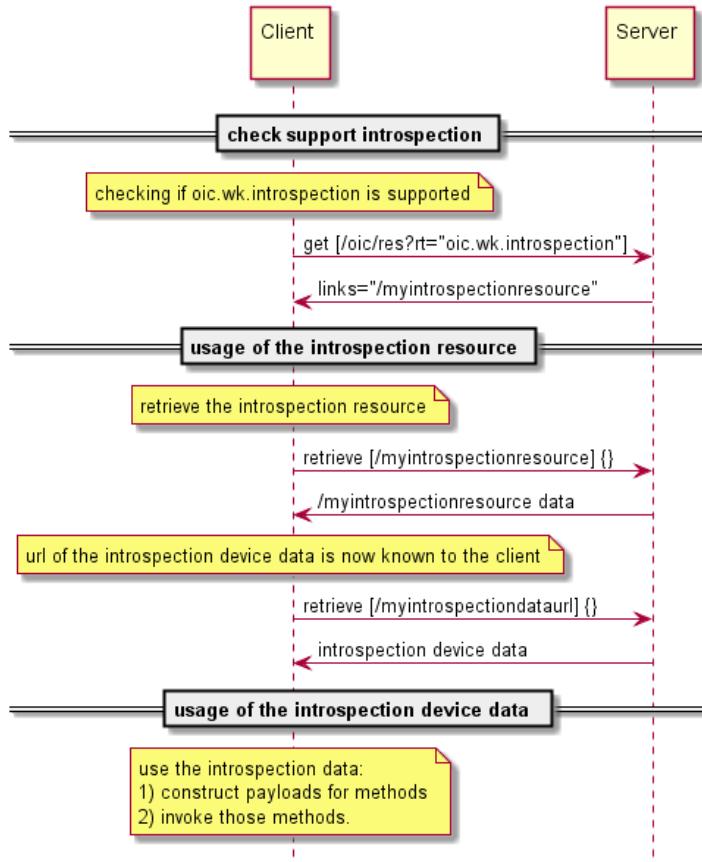
Property title	Property name	Value type	Value rule	Unit	Access mode	Mandatory	Description
urlInfo	urlInfo	array			R	yes	array of objects
url	url	string	uri		R	yes	URL to the hosted payload
protocol	protocol	string	enum		R	yes	Protocol definition to retrieve the Introspection Device Data from the url.
content-type	content-type	string	enum		R	no	content type of the url.
version	version	integer	enum		R	no	Version of the Introspection protocol, indicates which rules are applied on the Introspection Device Data regarding the content of the RAML file. Current value is 1.

3803 **11.8.2 Usage of introspection**

3804 The Introspection Device Data is retrieved in the following steps:

- 3805 1) Check if the Introspection Resource is supported and retrieve the URL of the Resource.
3806 2) Retrieve the contents of the Introspection Resource
3807 3) Download the Introspection Device Data from the URL specified the Introspection Resource.
3808 4) Usage of the Introspection Device Data by the Client

3809



3811

3812 **Figure 26 Interactions to check Introspection support and download the Introspection**
 3813 **Device Data.**

3814 **12 Messaging**

3815 **12.1 Introduction**

3816 This section specifies the protocol messaging mapping to the CRUDN messaging operations
 3817 (section 8) for each messaging protocol specified (e.g., CoAP.). Mapping to additional protocols is
 3818 expected in later version of this specification. All the property information from the resource model
 3819 shall be carried within the message payload. This payload shall be generated in the resource
 3820 model layer and shall be encapsulated in the data connectivity layer. The message header shall
 3821 only be used to describe the message payload (e.g., verb, mime-type, message payload format),
 3822 in addition to the mandatory header fields defined in messaging protocol (e.g., CoAP) specification.
 3823 If the message header does not support this, then this information shall also be carried in the
 3824 message payload. Resource model information shall not be included in the message header
 3825 structure unless the message header field is mandatory in the messaging protocol specification.

3826 When a Resource is specified with a restful description language like RAML or Swagger2.0 then
3827 the HTTP syntax definitions are used in the description (e.g., HTTP syntax for the CRUDN
3828 operations, status codes, etc). The HTTP syntax will be mapped to the actual used web transfer
3829 protocol (e.g., CoAP).

3830 **12.2 Mapping of CRUDN to CoAP**

3831 **12.2.1 Overview**

3832 A Device implementing CoAP shall conform to IETF RFC 7252 for the methods specified in section
3833 12.2.3. A Device implementing CoAP shall conform to IETF RFC 7641 to implement the CoAP
3834 Observe option. Support for CoAP block transfer when the payload is larger than the MTU is
3835 defined in section 12.2.8.

3836 **12.2.2 URIs**

3837 An OCF: URI is mapped to a coap: URI by replacing the scheme name "ocf" with "coap" if unsecure
3838 or 'coaps' if secure before sending over the network by the requestor. Similarly on the receiver
3839 side, the scheme name is replaced with "ocf".

3840 Any query string that is present within the URI is encoded as one or more URI-Query Options as
3841 defined in IETF RFC 7252 section 6.4.

3842

3843 **12.2.3 CoAP method with request and response**

3844 **12.2.3.1 Overview**

3845 Every request has a CoAP method that realizes the request. The primary methods and their
3846 meanings are shown in Table 33, which provides the mapping of GET/PUT/POST/DELETE
3847 methods to CREATE, RETRIEVE, UPDATE, and DELETE operations. The associated text provides
3848 the generic behaviours when using these methods, however resource interfaces may modify these
3849 generic semantics. The HTTP codes in the restful descriptions will be translated as described in
3850 IETF RFC 8075 section 7 Response Code Mapping.

3851

3852 **Table 33. CoAP request and response**

Method for CRUDN	(mandatory) Request data	(mandatory) Response data
GET for RETRIEVE	- Method code: GET (0.01) - Request URI: an existing URI for the Resource to be retrieved	- Response code: success (2.xx) or error (4.xx or 5.xx) - Payload: Resource representation of the target Resource (when successful)
POST for CREATE	- Method code: POST (0.02) - Request URI: an existing URI for the Resource responsible for the creation - Payload: Resource presentation of the Resource to be created	- Response code: success (2.xx) or error (4.xx or 5.xx) - Payload: the URI of the newly created Resource (when successful).
PUT for CREATE	- Method code: PUT (0.03) - Request URI: a new URI for the Resource to be created. - Payload: Resource presentation of the Resource to be created.	- Response code: success (2.xx) or error (4.xx or 5.xx)
POST for UPDATE	- Method code: POST (0.02) - Request URI: an existing URI for the Resource to be updated. - Payload: representation of the Resource to be updated.	- Response Code: success (2.xx) or error (4.xx or 5.xx)

DELETE for DELETE	<ul style="list-style-type: none"> - Method code: DELETE (0.04) - Request URI: an existing URI for the Resource to be deleted. 	<ul style="list-style-type: none"> - Response code: success (2.xx) or error (4.xx or 5.xx)
------------------------------	--	--

3853

12.2.3.2 CREATE with POST or PUT**12.2.3.2.1 With POST**

3856 POST shall be used only in situations where the request URI is valid, that is it is the URI of an
 3857 existing Resource on the Server that is processing the request. If no such Resource is present,
 3858 the Server shall respond with an error response code of 4.xx. The use of POST for CREATE shall
 3859 use an existing request URI which identifies the Resource on the Server responsible for creation.
 3860 The URI of the created Resource is determined by the Server and provided to the Client in the
 3861 response.

3862 A Client shall include the representation of the new Resource in the request payload. The new
 3863 resource representation in the payload shall have all the necessary properties to create a valid
 3864 Resource instance, i.e. the created Resource should be able to properly respond to the valid
 3865 Request with mandatory Interface (e.g., "GET with ?if=oic.if.base").

3866 Upon receiving the POST request, the Server shall either

- create the new Resource with a new URI, respond with the new URI for the newly created Resource and a success response code (2.xx); or
- respond with an error response code (4.xx or 5.xx).

3870 POST is unsafe and is the supported method when idempotent behaviour cannot be expected or
 3871 guaranteed.

12.2.3.2.2 With PUT

3873 PUT shall be used to create a new Resource or completely replace the entire representation of an
 3874 existing Resource. The resource representation in the payload of the PUT request shall be the
 3875 complete representation. PUT for CREATE shall use a new request URI identifying the new
 3876 Resource to be created.

3877 The new resource representation in the payload shall have all the necessary properties to create
 3878 a valid Resource instance, i.e. the created Resource should be able to properly respond to the
 3879 valid Request with mandatory Interface (e.g. "GET with ?if=oic.if.base").

3880 Upon receiving the PUT request, the Server shall either

- create the new Resource with the request URI provided in the PUT request and send back a response with a success response code (2.xx); or
- respond with an error response code (4.xx or 5.xx).

3884 PUT is an unsafe method but it is idempotent, thus when a PUT request is repeated the outcome
 3885 is the same each time.

12.2.3.3 RETRIEVE with GET

3887 GET shall be used for the RETRIEVE operation. The GET method retrieves the representation of
 3888 the target Resource identified by the request URI.

3889 Upon receiving the GET request, the Server shall either

- 3890 • send back the response with the representation of the target Resource with a success response
 3891 code (2.xx); or
 3892 • respond with an error response code (4.xx or 5.xx) or ignore it (e.g. non-applicable multicast
 3893 GET).

3894 GET is a safe method and is idempotent.

3895 **12.2.3.4 UPDATE with POST**

3896 POST shall be used only in situations where the request URI is valid, that is it is the URI of an
 3897 existing Resource on the Server that is processing the request. If no such Resource is present,
 3898 the Server shall respond with an error response code of 4.xx. A client shall use POST to UPDATE
 3899 Property values of an existing Resource (see sections 3.1.32 and 8.4.2).

3900 Upon receiving the request, the Server shall either

- 3901 • apply the request to the Resource identified by the request URI in accordance with the applied
 3902 interface (i.e. POST for non-existent Properties is ignored) and send back a response with a
 3903 success response code (2.xx); or
 3904 • respond with an error response code (4.xx or 5.xx). Note that if the representation in the
 3905 payload is incompatible with the target Resource for POST using the applied interface (i.e. the
 3906 "overwrite" semantic cannot be honored because of read-only property in the payload), then
 3907 the error response code 4.xx shall be returned.

3908 POST is unsafe and is the supported method when idempotent behaviour cannot be expected or
 3909 guaranteed.

3910 **12.2.3.5 DELETE with DELETE**

3911 DELETE shall be used for DELETE operation. The DELETE method requests that the resource
 3912 identified by the request URI be deleted.

3913 Upon receiving the DELETE request, the Server shall either

- 3914 • delete the target Resource and send back a response with a success response code (2.xx); or
 3915 • respond with an error response code (4.xx or 5.xx).

3916 DELETE is unsafe but idempotent (unless URIs are recycled for new instances).

3917

3918

3919 **12.2.4 Content-Format negotiation**

3920 The OCF Framework mandates support of CBOR, however it allows for negotiation of the payload
 3921 body if more than one Content-Format (e.g. CBOR and JSON) is supported by an implementation.
 3922 In this case the Accept Option defined in section 5.10.4 of IETF RFC 7252 shall be used to indicate
 3923 which Content-Format (e.g. JSON) is requested by the Client.

3924 The Content-Formats supported are shown in Table 34.

3925 **Table 34. OCF Content-Formats**

Media Type	ID
"application/cbor"	60
"application/vnd.ocf+cbor" "	10000

3926 Clients shall include a Content-Format Option in every message that contains a payload. Servers
 3927 shall include a Content-Format Option for all success (2.xx) responses with a payload body. Per
 3928 IETF RFC 7252 section 5.5.1, Servers shall include a Content-Format Option for all error (4.xx or
 3929 5.xx) responses with a payload body unless they include a Diagnostic Payload; error responses
 3930 with a Diagnostic Payload do not include a Content-Format Option. The Content-Format Option
 3931 shall use the ID column numeric value from Table 34. An OCF vertical may mandate a specific
 3932 Content-Format Option.

3933 Clients shall also include an Accept Option in every request message. The Accept Option shall
 3934 indicate the required Content-Format as defined in Table 34 for response messages. The Server
 3935 shall return the required Content-Format if available. If the required Content-Format cannot be
 3936 returned, then the Server shall respond with an appropriate error message.

3937 **12.2.5 OCF-Content-Format-Version information**

3938 Servers and Clients shall include the OCF-Content-Format-Version Option in both request and
 3939 response messages with a payload. Clients shall include the OCF-Accept-Content-Format-Version
 3940 Option in request messages. The OCF-Content-Format-Version Option and OCF-Accept-Content-
 3941 Format-Version Option are specified as Option Numbers in the CoAP header as shown in Table
 3942 35.

3943 **Table 35. OCF-Content-Format-Version and OCF-Accept-Content-Format-Version Option
 3944 Numbers**

CoAP Option Number	Name	Format	Length (bytes)
2049	OCF-Accept-Content-Format-Version	uint	2
2053	OCF-Content-Format-Version	uint	2

3945 The value of both the OCF-Accept-Content-Format-Version Option and the OCF-Content-Format-
 3946 Version Option is a two-byte unsigned integer that is used to define the major, minor and sub
 3947 versions. The major and minor versions are represented by 5 bits and the sub version is
 3948 represented by 6 bits as shown in Table 36.

3949 **Table 36. OCF-Accept-Content-Format-Version and OCF-Content-Format-Version
 3950 Representation**

Bit	Major Version					Minor Version					Sub Version				
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1

3951 Table 37 illustrates several examples:

3952 **Table 37. Examples of OCF-Content-Format-Version and OCF-Accept-Content-Format-
 3953 Version Representation**

OCF version	Binary representation	Integer value
1.0.0	0000 1000 0000 0000	2048
1.1.0	0000 1000 0100 0000	2112

3954 The OCF-Accept-Content-Format-Version Option and OCF-Content-Format-Version Option for this
 3955 version of the specification shall be 1.0.0 (i.e. 0b0000 1000 0000 0000).

3956 **12.2.6 Content-Format policy**

3957 To maintain compatibility between devices implemented to different versions of this specification,
 3958 Devices ~~should~~ follow the policy as described in [Figure 27](#), [Figure 28](#), and [Figure 29](#).

Comment [BRA112]: BZ #2207

All changes in this section except as otherwise noted for BZ #2300.

Comment [BRA113]: BZ #2300

Comment [BRA114]: BZ #2300

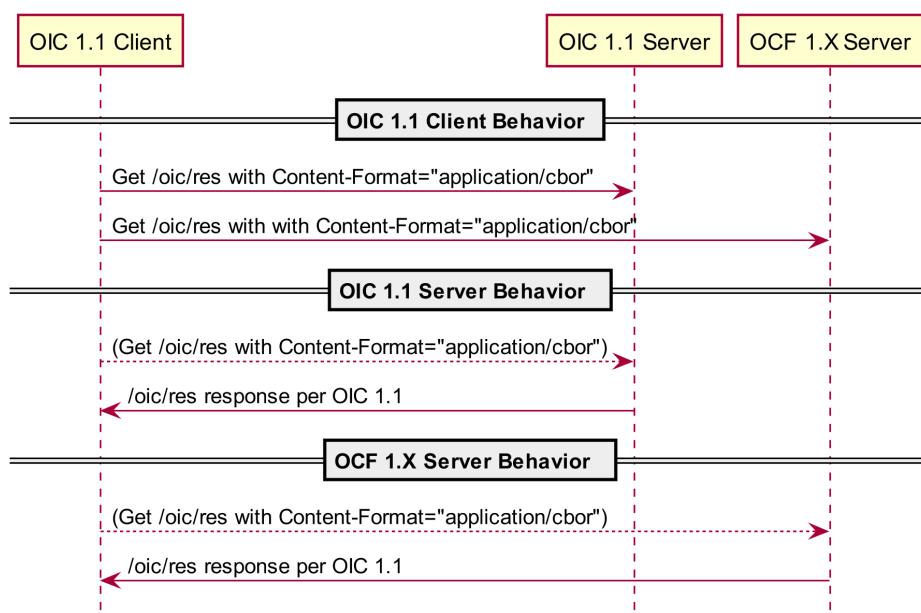
Deleted: shall

Deleted: Figure 27

Deleted: Figure 28

Deleted: Figure 29

3964

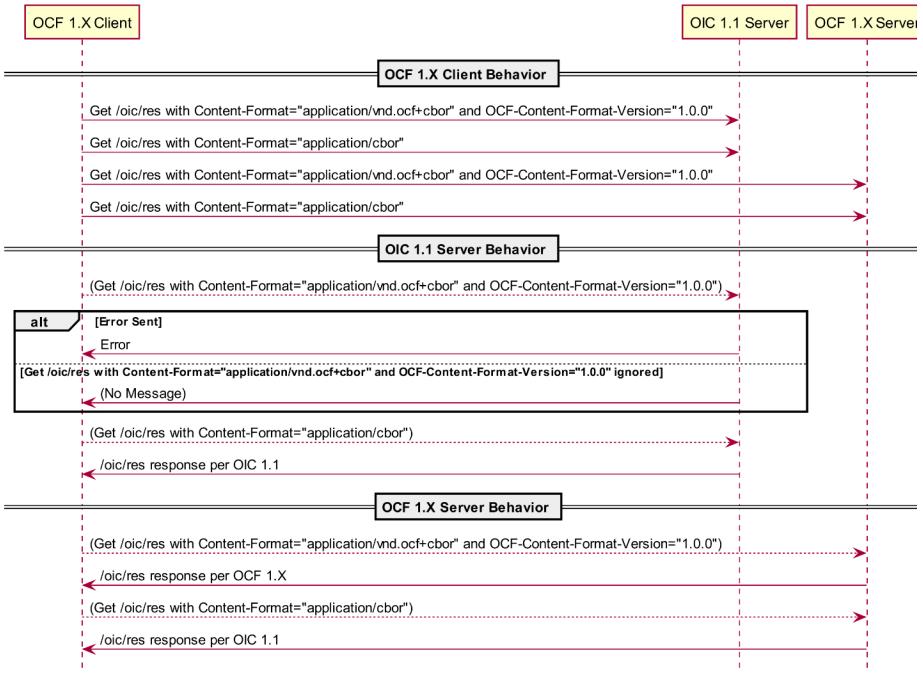
Figure 27 Content-Format Policy for OIC 1.1 Client and OIC 1.1 Server

3965

3966

3967

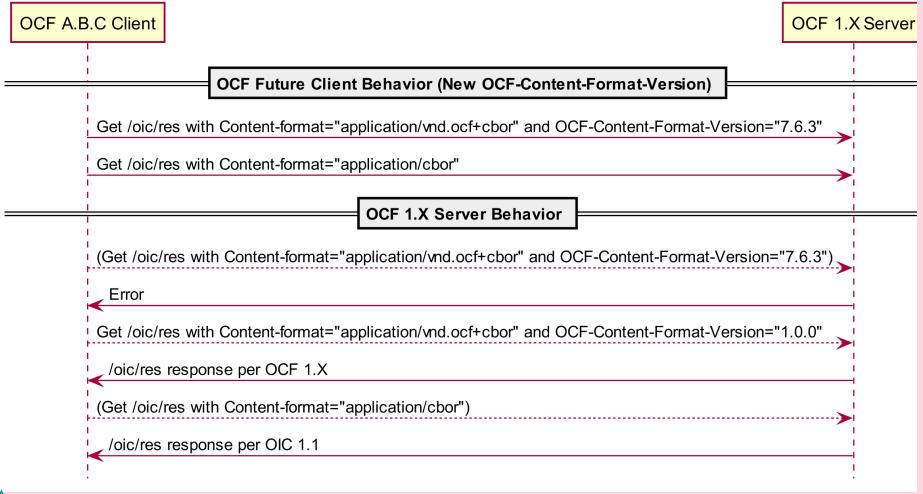
3968



Formatted: Font:

Figure 28 Content-Format Policy for OCF 1.X Client with OIC 1.1 and OCF 1.X Servers (Content-Format Mismatch)

Comment [BRA115]: BZ #2300



3973

**Figure 29 Content-Format Policy for Future OCF Client with OCF 1.X Servers
(Content-Format-Version Mismatch)**

All Devices shall support the current and all previous Content-Format Options and OCF-Content-Format-Versions. A Client shall send discovery request messages with the current and all previous Content-Formats and OCF-Content-Format-Versions until it discovers all Servers in the network.

12.2.7 CRUDN to CoAP response codes

The mapping of CRUDN operations response codes to CoAP response codes are identical to the response codes defined in IETF RFC 7252.

12.2.8 CoAP block transfer

Basic CoAP messages work well for the small payloads typical of light-weight, constrained IoT devices. However scenarios can be envisioned in which an application needs to transfer larger payloads.

CoAP block-wise transfer as defined in IETF RFC 7959 shall be used by all Servers which generate a content payload that would exceed the size of a CoAP datagram as the result of handling any defined CRUDN operation.

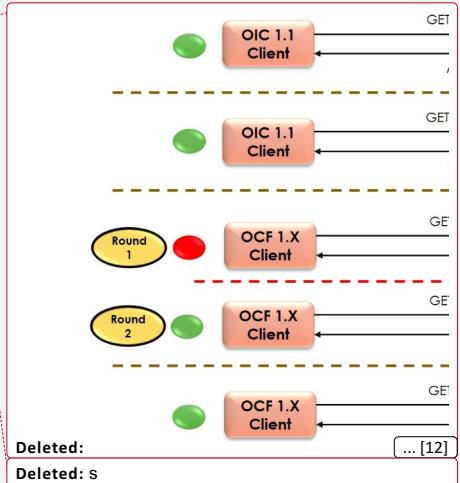
Similarly, CoAP block-wise transfer as defined in IETF RFC 7959 shall be supported by all Clients. The use of block-wise transfer is applied to both the reception of payloads as well as transmission of payloads that would exceed the size of a CoAP datagram.

All blocks that are sent using this mechanism for a single instance of a transfer shall all have the same reliability setting (i.e. all confirmable or all non-confirmable).

A Client may support both the block1 (as descriptive) and block2 (as control) options as described by IETF RFC 7959. A Server may support both the block1 (as control) and block2 (as descriptive) options as described by IETF RFC 7959.

Formatted: Font:

Comment [BRA116]: BZ #2300

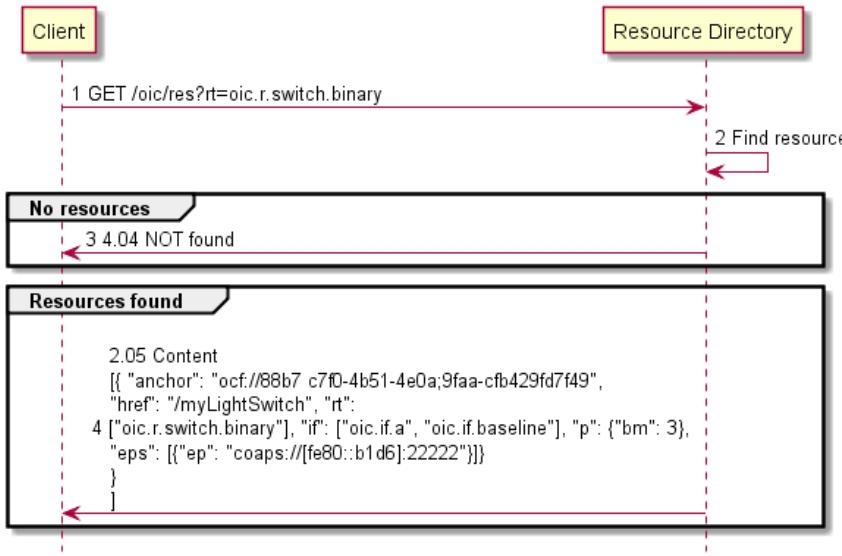


4000 12.3 CoAP serialization over TCP 4001 12.3.1 Introduction 4002 In environments where TCP is already available, CoAP can take advantage of it to provide 4003 reliability. Also in some environments UDP traffic is blocked, so deployments may use TCP. For 4004 example, consider a cloud application acting as a Client and the Server is located at the user's 4005 home. A Server which already support CoAP as a messaging protocol could easily support CoAP 4006 serialization over TCP rather than adding another messaging protocol. A Device implementing 4007 CoAP Serialization over TCP should conform to IETF draft-ietf-core-coap-tcp-tls-07 .	Deleted: IETF draft-ietf-core-coap-tcp-tls-07
4008 12.3.2 Indication of support 4009 If UDP is blocked, clients depend on the pre-configured details on the device to find support for 4010 CoAP over TCP. If UDP is not-blocked, a Device which supports CoAP serialization over TCP 4011 <u>should</u> populate the Messaging Protocol ("mpro") property in "/oic/res" with the value "coap+tcp" 4012 or "coaps+tcp" to indicate that the device supports messaging protocol as specified by section 4013 11.3.4.	Deleted: shall Comment [BRA117]: [Editorial] BZ #2372 This section text got reworded in BZ #1545 with "mpro" already removed.
4014 12.3.3 Message type and header 4015 The message type transported between Client and Server shall be a non-confirmable message 4016 (NON). The protocol stack used in this scenario should be as described in section 3 in IETF draft-ietf-core-coap-tcp-tls-07 .	Deleted: IETF draft-ietf-core-coap-tcp-tls-07
4018 The CoAP header as described in figure 6 in IETF draft-ietf-core-coap-tcp-tls-07 , should be used 4019 for messages transmitted between a Client and a Server. A Device should use "Alternative L3" as 4020 defined in IETF draft-ietf-core-coap-tcp-tls-07 .	Deleted: IETF draft-ietf-core-coap-tcp-tls-07 Deleted: IETF draft-ietf-core-coap-tcp-tls-07
4021 12.3.4 URI scheme 4022 The URI scheme used shall be as defined in section 6 in IETF draft-ietf-core-coap-tcp-tls-07 .	Deleted: IETF draft-ietf-core-coap-tcp-tls-07
4023 For the "coaps+tcp" URI scheme the "TLS Application Layer Protocol Negotiation Extension" 4024 IETF RFC 7301 shall be used.	
4025 12.3.5 KeepAlive 4026 12.3.5.1 Overview 4027 In order to ensure that the connection between a Devices is maintained, when using CoAP 4028 serialization over TCP, a Device that initiated the connection should send application layer 4029 KeepAlive messages. The reasons to support application layer KeepAlive are as follows:	
4030 • TCP KeepAlive only guarantees that a connection is alive at the network layer, but not at the 4031 application layer 4032 • Interval of TCP KeepAlive is configurable only using kernel parameters, and is OS dependent 4033 (e.g., 2 hours by default in Linux)	
4034 12.3.5.2 KeepAlive Mechanism 4035 Devices supporting CoAP over TCP should use Ping and Pong messages as described in 4036 IETF draft-ietf-core-coap-tcp-tls-07 .	Deleted: IETF draft-ietf-core-coap-tcp-tls-07
4037 12.3.6 CoAP native Cloud 4038 12.3.6.1 Overview 4039 CoAP native Cloud extends the use of CoAP to reach a native Cloud service without the need of 4040 a hub or gateway by utilizing following features	
4041 • CoAP over TCP protocol defined in section 12.3	

- 4049 • Keep-Alive defined in section 12.3.5
 4050 • Resource Directory defined in section 11.3.6

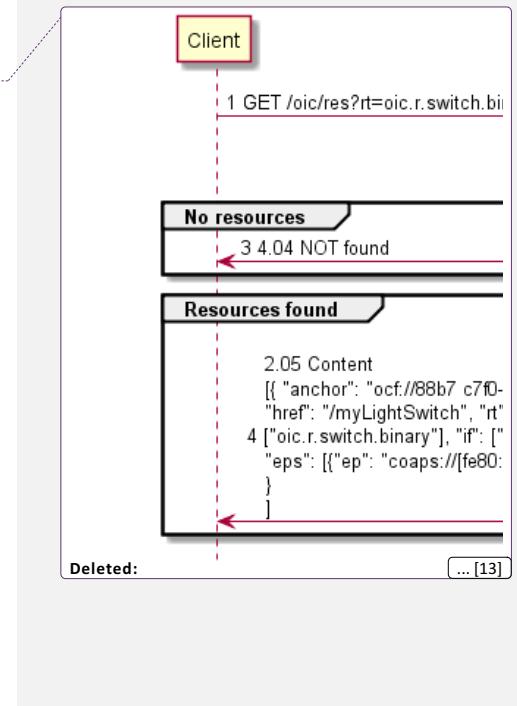
4051 12.3.6.2 Architecture flow

4052 This section describes the operational flow utilizing CoAP native Cloud for Resource discovery
 4053 and endpoint routing.

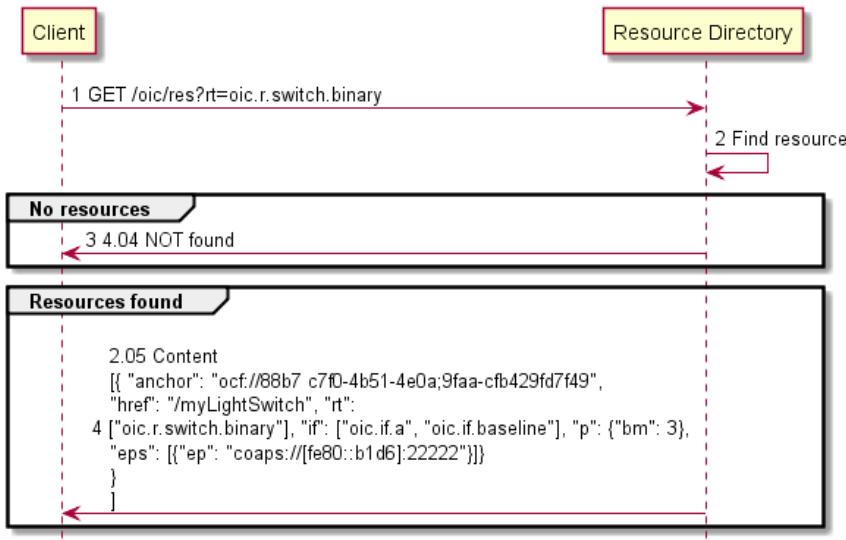


4054

4055 [Figure 30](#) illustrates the case when a Client discovers the published Resources on a Resource
 4056 Directory (RD). The RD responds with Links for the Resources on the Server. The "anchor"
 4057 Property and the "eps" Property in the response message imply the value of the Cloud Interface.
 4058 The value of the "eps" Property can be the address of Cloud Interface.

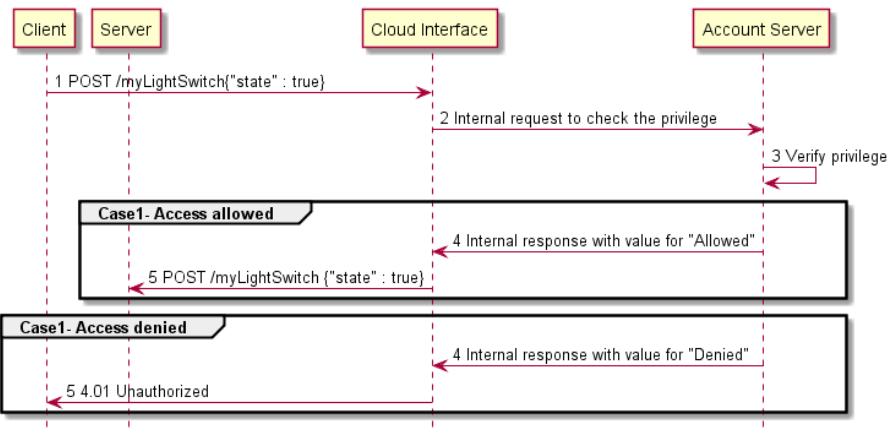


4061



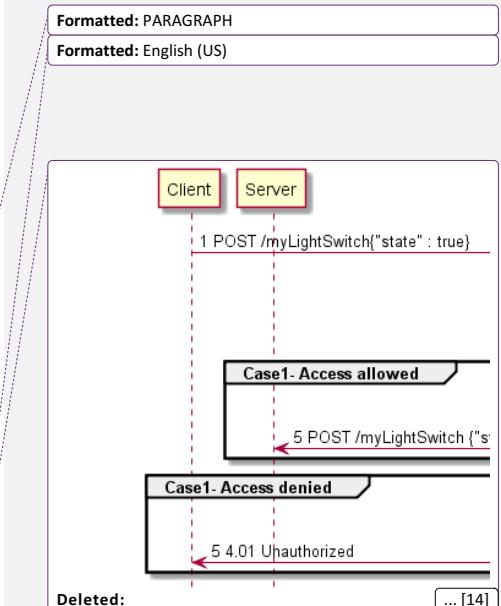
4062

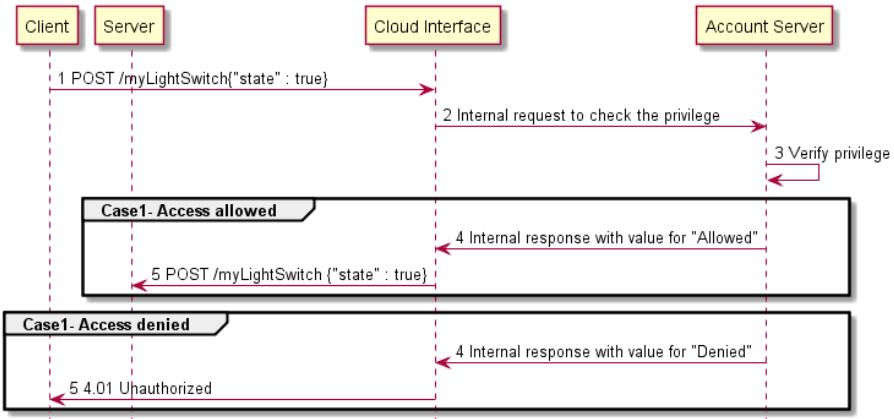
4063

Figure 30 Resource discovery through OCF Cloud

4064

4065 Figure 31 illustrates the case when a Client accesses a Server. The Client sends message to Cloud Interface, then the Cloud Interface will route the packets to the Server. The Cloud Interface maintains mapping table between URI and packet addressing information (ex, port number, socket id, etc).





4071

4072 **Figure 31 Endpoint routing through OCF Cloud**4073 **12.4 Payload Encoding in CBOR**

4074 OCF implementations shall perform the conversion to CBOR from JSON defined schemas and to
 4075 JSON from CBOR in accordance with IETF RFC 7049 section 4 unless otherwise specified in this
 4076 section.

4077 Properties defined as a JSON integer shall be encoded in CBOR as an integer (CBOR major types
 4078 0 and 1). Properties defined as a JSON number shall be encoded as an integer, single- or double-
 4079 precision floating point (CBOR major type 7, sub-types 26 and 27); the choice is implementation
 4080 dependent. Half-precision floating point (CBOR major 7, sub-type 25) shall not be used. Integer
 4081 numbers shall be within the closed interval [-2^53, 2^53]. Properties defined as a JSON number
 4082 should be encoded as integers whenever possible; if this is not possible Properties defined as a
 4083 JSON number should use single-precision if the loss of precision does not affect the quality of
 4084 service, otherwise the Property shall use double-precision.

4085

4086 On receipt of a CBOR payload, an implementation shall be able to interpret CBOR integer values
 4087 in any position. If a property defined as a JSON integer is received encoded other than as an
 4088 integer, the implementation may reject this encoding using a final response as appropriate for the
 4089 underlying transport (e.g. 4.00 for CoAP) and thus optimise for the integer case. If a property is
 4090 defined as a JSON number an implementation shall accept integers, single- and double-precision
 4091 floating point.

4092 **13 Security**

4093 The details for handling security and privacy are specified in [OCF Security].

4094

4095
4096
4097
4098

Annex A (informative)

Operation Examples

4099

A.1 Introduction

4100 This section describes some example scenarios using sequence of operations between the entities
 4101 involved. In all the examples below "Light" is a Server and "Smartphone" is a Client. In one of the
 4102 scenario "Garage" additionally acts as a Server. All the examples are based on the following
 4103 example resource definitions:

4104 rt=oic.example.light with Resource Type definition as illustration in [Table 38](#).

Deleted: Table 38

4105 **Table 38. oic.example.light Resource Type definition**

Property title	Property name	Value type	Value rule	Unit	Access mode	Mandatory	Description
Name	n	string			R, W	no	
on-off	of	boolean			R, W	yes	On/Off Control: 0 = Off 1 = On
dim	dm	integer	0-255		R, W	yes	Resource which can take a range of values minimum being 0 and maximum being 255

4106

4107 rt=oic.example.garagedoor with Resource Type definition as illustration in Table 39.

4108 **Table 39. oic.example.garagedoor Resource Type definition**

Property title	Property name	Value type	Value rule	Unit	Access mode	Mandatory	Description
Name	n	string			R, W	no	
open-close	oc	boolean			R, W	yes	Open/Close Control: 0 = Open 1 = Close

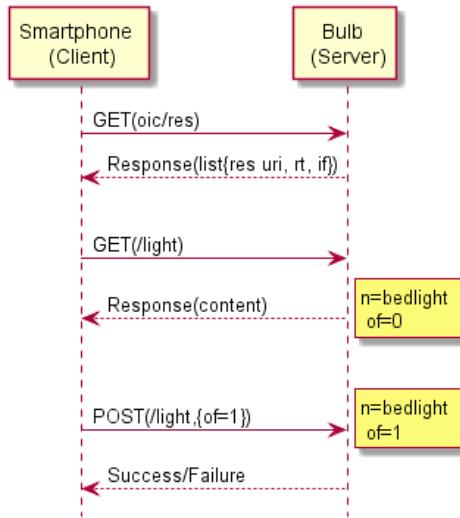
4109

4110 "/oic/mnt" ("rt=oic.wk.mnt") used in below examples is defined in section 11.5.2.

4111 **A.2 When at home: From smartphone turn on a single light**

4112 This sequence highlights (Figure 32) the discovery and control of an OCF light resource from an
 4113 OCF smartphone.

4114



4116

4117 **Figure 32. When at home: from smartphone turn on a single light**

4118 Discovery request can be sent to "All OCF Nodes" Multicast address FF0X::158 or can be sent
4119 directly to the IP address of device hosting the light resource.

- 4120 1) Smartphone sends a GET request to "/oic/res" resource to discover all resources hosted on
4121 targeted end point
4122 5) The end point (bulb) responds with the list of Resource URI, Resource Type and
4123 Interfaces supported on the end point (one of the resource is '/light' whose
4124 rt=oic.example.light)
4125 6) Smartphone sends a GET request to '/light' resource to know its current state
4126 7) The end point responds with representation of light resource ({n=bedlight;of=0})
4127 8) Smartphone changes the 'of' property of the light resource by sending a POST
4128 request to '/light' resource ({of=1})
4129 9) On Successful execution of the request, the end point responds with the changed
4130 resource representation. Else, error code is returned. Details of the error codes are defined
4131 in section 12.2.7.

4132 **A.3 GroupAction execution**

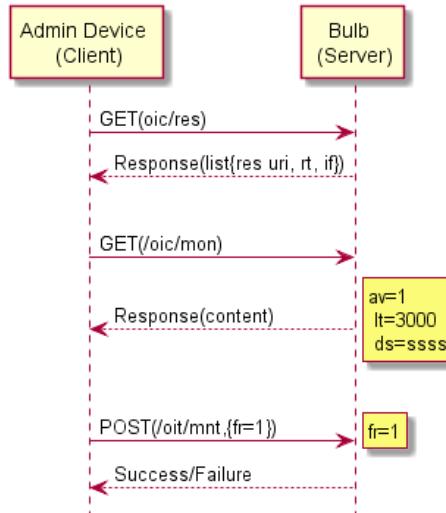
4133 This example will be added when groups feature is added in later version of specification

4134 **A.4 When garage door opens, turn on lights in hall; also notify smartphone**

4135 This example will be added when scripts feature is added in later version of specification

4136 **A.5 Device management**

4137 This sequence highlights (Figure 33) the device management function of maintenance.

**Figure 33. Device management (maintenance)**

4141 **Pre-Condition:** Admin device has different security permissions and hence can perform device
 4142 management operations on the Device

- 4143 1) Admin device sends a GET request to "/oic/res" resource to discover all resources hosted on
 4144 a targeted end point (in this case Bulb)
- 4145 10) The end point (bulb) responds with the list of Resource URI, Resource Type and Interfaces
 4146 supported on the end point (one of the resources is "/oic/mnt" whose "rt=oic.wk.mnt")
- 4147 11) Admin Device changes the 'fr' property of the maintenance resource by
 4148 sending a POST request to "/oic/mnt" resource ({fr=1}). This triggers a factory reset of the
 4149 end point (bulb)
- 4150 12) On successful execution of the request, the end point responds with the changed
 4151 resource representation. Else, error code is returned. Details of the error codes are defined
 4152 in section 12.2.7.

4153
4154
4155
4156

Annex B
(informative)

OCF interaction scenarios and deployment models

4157 **B.1 OCF interaction scenarios**

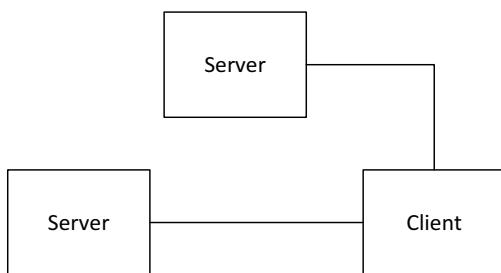
4158 A Client connects to one or multiple Servers in order to access the resources provided by those
4159 Servers. The following are scenarios representing possible interactions among Roles:

- 4160 • Direct interaction between Client and Server (Figure 34). In this scenario the Client and the
4161 Server directly communicate without involvement of any other Device. A smartphone which
4162 controls an actuator directly uses this scenario.



4164 **Figure 34. Direct interaction between Server and Client**

- 4165 • Interaction between Client and Server using another server (Figure 35). In this scenario, another
4166 Server provides the support needed for the Client to directly access the desired
4167 resource on a specific Server. This scenario is used for example, when a smartphone first
4168 accesses a discovery server to find the addressing information of a specific appliance, and
4169 then directly accesses the appliance to control it.



4171 **Figure 35. Interaction between Client and Server using another Server**

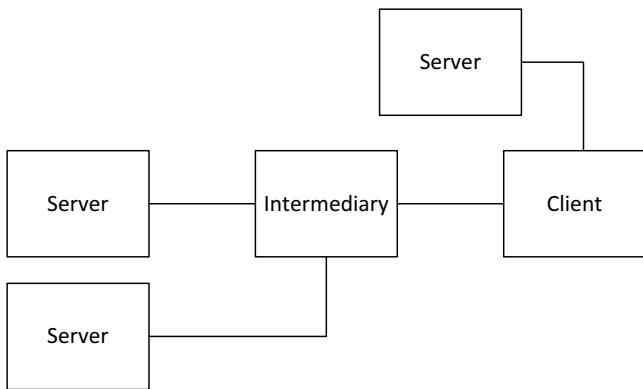
- 4172 • Interaction between Client and Server using Intermediary (Figure 36). In this scenario an
4173 Intermediary facilitates the interaction between the Client and the Server. A smartphone which
4174 controls appliances in a smart home via MQTT broker uses this scenario.



4176 **Figure 36. Interaction between Client and Server using Intermediary**

- 4177 • Interaction between Client and Server using support from multiple Servers and intermediary
4178 (Figure 37). In this scenario, both Server and Intermediary roles are present to facilitate the
4179 transaction between the Client and a specific Server. An example scenario is when a

4180 smartphone first accesses a Resource Directory (RD) server to find the address to a specific
4181 appliance, then utilizes MQTT broker to deliver a command message to the appliance. The
4182 smartphone can utilize the mechanisms defined in CoRE Resource Directory such as default
4183 location, anycast address or DHCP to discover the Resource Directory information.

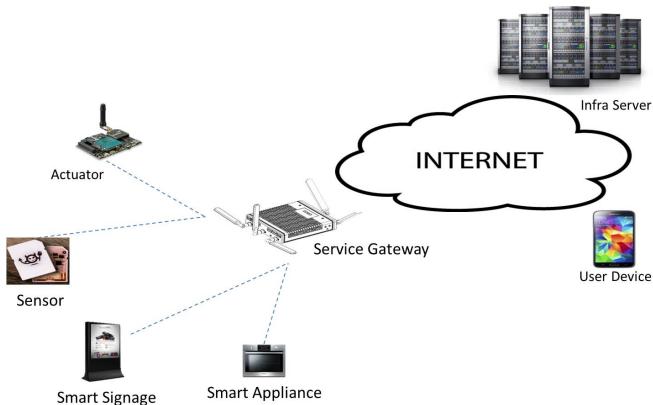


4184

4185 **Figure 37. Interaction between Client and Server using support from multiple Servers and**
4186 **Intermediary**

4187 **B.2 Deployment model**

4188 In deployment, Devices are deployed and interact via either wired or wireless connections. Devices
4189 are the physical entities that may host resources and play one or more Roles. There is no constraint
4190 on the structure of a deployment or number of Devices in it. Architecture is flexible and scalable
4191 and capable of addressing large number of devices with different device capabilities, including
4192 constrained devices which have limited memory and capabilities. Constrained devices are defined
4193 and categorized in [TCNN].



4194

4195

Figure 38. Example of Devices

4196 Figure 38 depicts a typical deployment and set of Devices, which may be divided in the following
4197 categories:

- 4198
- 4199 • **Things:** Networked devices which are able to interface with physical environments. Things are
4200 the devices which are primarily controlled and monitored. Examples include smart appliances,
4201 sensors, and actuators. Things mostly take the role of Server but they may also take the role of
4202 Client, for example in machine-to-machine communications.
 - 4203 • **User Devices:** Devices employed by the users enabling the users to access resources and
4204 services. Examples include smart phones, tablets, and wearable devices. User Devices mainly
4205 take the role of Client, but may also take the role of Server or Intermediary.
 - 4206 • **Service Gateways:** Network equipment which take the role of Intermediary. Examples are
4207 home gateways.
 - 4208 • **Infra Servers:** Data centers residing in cloud infrastructure, which facilitate the interaction
4209 among Devices by providing network services such as AAA, NAT traversal or discovery. It can
also play the role of Client or Intermediary

4210
4211
4212
4213

Annex C (informative)

Other Resource Models and OCF Mapping

4214

C.1 Multiple resource models

4215 RESTful interactions are defined dependent on the resource model; hence, Devices require a
4216 common understanding of the resource model for interoperability.

4217 There are multiple resource models defined by different organizations including OCF, IPSO
4218 Alliance and oneM2M, and used in the industry, which may restrict interoperability among
4219 respective ecosystems. The main differences from Resource model are as follows:

- 4220 • **Resource structure:** Resources may be defined to have properties (e.g., oneM2M defined
4221 resources), or may be defined as an atomic entity and not be decomposable into properties
4222 (e.g., IPSO alliance defined resources). For example, a smart light may be represented as a
4223 resource with an on-off property or a resource collection containing an on-off resource. In the
4224 former, on-off property doesn't have a URI of its own and can only be accessed indirectly via
4225 the resource. In the latter, being a resource itself, on-off resource is assigned its own URI and
4226 can be directly manipulated.
- 4227 • **Resource name & type:** Resources may be allowed to be named freely and have their
4228 characteristics indicated using a Resource Type property (e.g., as defined in oneM2M).
4229 Alternatively, the name of resources may be defined a priori in a way that the name by itself is
4230 indicative of its characteristic (e.g., as defined by IPSO alliance). For example, in oneM2M
4231 resource model, a smart light can be named with no restrictions, such as 'LivingRoomLight_1'
4232 but in IPSO alliance resource model it is required to have the fixed Object name with numerical
4233 Object ID of "IPSO Light Control (3311)". Consequently, it's likely that in the former case the
4234 data path in URI is freely defined and in the latter case it is predetermined.
- 4235 • **Resource hierarchy:** Resources may be allowed to be organized in hierarchy where a resource
4236 contains another resource with a parent-child relationship (e.g., in oneM2M definition of
4237 resource model). Resources may also be required to have a flat structure and associate with
4238 other resources only by referencing their links.

4239 In addition to the above, different organizations use different syntax and define different features
4240 (e.g., resource interface), which preclude interoperability.

4241

C.2 OCF approach for support of multiple resource models

4242 In order to expand the IoT ecosystem the Framework takes an inclusive approach for interworking
4243 with existing resource models. Specifically, the Framework defines a resource model while
4244 providing a mechanism to easily map to other models. By embracing existing resource models
4245 OCF is inclusive of existing ecosystems while allowing for the transition toward definition of a
4246 comprehensive resource model integrating all ecosystems.

4247 The following OCF characteristics enable support of other resource models:

- 4248 • **resource model is the superset of multiple models:** the resource model is defined as the
4249 superset of existing resource models. In other words, any existing resource model can be
4250 mapped to a subset of resource model concepts.
- 4251 • **Framework may allow for resource model negotiation:** the Client and Server exchange the
4252 information about what resource model(s) each supports. Based on the exchanged information,
4253 the Client and Server choose a resource model to perform RESTful interactions or to perform
4254 translation. This feature is out of scope of the current version of this specification, however,
4255 the following is a high level description for resource model negotiation.

4256 **C.3 Resource model indication**

4257 The Client and server exchange the information about what resource model(s) each supports.
4258 Based on the exchanged information, the Client and Server choose a resource model to perform
4259 RESTful interactions or to perform translation. The exchange could be part of discovery and
4260 negotiation. Based on the exchange, the Client and Server follow a procedure to ensure
4261 interoperability among them. They may choose a common resource model or execute translation
4262 between resource models.

- 4263 • **Resource model schema exchange:** The Client and Server may share the resource model
4264 information when they initiate a RESTful interaction. They may exchange the information about
4265 which resource model they support as part of session establishment procedures. Alternatively,
4266 each request or response message may carry the indication of which resource model it is using.
4267 For example, [COAP] defines "Content-Format option" to indicate the "representation format"
4268 such as "application/json". It's possible to extend the Content-Format Option to indicate the
4269 resource model used with the representation format such as "application/ipso-json".
4270 • **Ensuing procedures:** After the Client and Server exchange the resource model information,
4271 they perform a suitable procedure to ensure interoperability among them. The simplest way is
4272 to choose a resource model supported by both the Client and Server. In case there is no
4273 common resource model, the Client and Server may interact through a 3rd party.

4274 In addition to translation which can be resource intensive, a method based on profiles can be used
4275 in which an OCF implementation can accommodate multiple profiles and hence multiple
4276 ecosystems.

- 4277 • **Resource Model Profile:** the Framework defines resource model profiles and implementers or
4278 users choose the active profile. The chosen profile constrains the Device to strict rules in how
4279 resources are defined, instantiated and interacted with. This would allow for interoperation with
4280 devices from the ecosystem identified by the profile (e.g., IPSO, OneM2M etc.). Although this
4281 enables a Device to participate in and be part of any given ecosystem, this scheme does not
4282 allow for generic interoperability at runtime. While this approach may be suitable for resource
4283 constrained devices, more resource capable devices are expected to support more than one
4284 profile.

4285 **C.4 An Example Profile (IPSO profile)**

4286 IPSO defines smart objects that have specific resources and they take values determined by the
4287 data type of that resource. The smart object specification defines a category of such objects. Each
4288 resource represents a characteristic of the smart object being modelled.

4289 While the terms may be different, there are equivalent concepts in OCF to represent these terms.
4290 This section provides the equivalent OCF terms and then frames the IPSO smart object in OCF
4291 terms.

4292 The IPSO object Light Control defined in section 16 of the IPSO Smart Objects 1.0 is used as the
4293 reference example.

4294 **C.4.1 Conceptual equivalence**

4295 The IPSO smart object definition is equivalent to a Resource Type definition which defines the
4296 relevant characteristics of an entity being modelled. The specific IPSO Resource is equivalent to
4297 a Property that like an IPSO Resource has a defined data type, enumeration of acceptable values,
4298 units, a general description and access modes (based on the Interface).

4299 The general method for developing the equivalent Resource Type from an IPSO Smart Object
4300 definition is to ignore the Object ID and replace the Object URN with and OCF '.' (dot) separated
4301 name that incorporates the IPSO object. Alternatively the Object URN can be used as the Resource

4302 Type ID as is (as long as the URN does not contain any '.' (dots)) – using the same Object URN
4303 as the Resource Type ID allows for compatibility when interacting with an IPSO compliant device.
4304 The object URN based naming does not have any bearing for OCF to OCF interoperability and so
4305 the OCF format is preferred – for OCF to OCF interoperability only the data model consistency is
4306 required.

4307 Two models are available to render IPSO objects into OCF.

4308 1) One is where the IPSO Smart Object represents a Resource. In this case, the IP Smart Object
4309 is regarded as a resource with the Resource Type matching the description of the Smart Object.
4310 Furthermore, each resource in the IPSO definition is represented as a Property in the Resource
4311 Type (the IPSO Resource ID is replaced with a string representing the Property). This is the
4312 preferred approach when the IPSO Data Model is expressed in the Resource Model.

4313 13) The other approach is to model an IPSO Smart Object as a Collection. Each IPSO
4314 Resource is then modelled as a Resource with a Resource Type that matches the definition
4315 of the IPSO Resource. Each of these resource instances are then bound to the Collection
4316 that represents this IPSO Smart Object.

4317

4318 Below is an example showing how an IPSO LightControl Object is modelled as a Resource.

4319 **Resource Type: Light Control**

4320 Description: This Object is used to control a light source, such as a LED or other light. It allows a
4321 light to be turned on or off and its dimmer setting to be controlled as a percentage value between
4322 0 and 100. An optional colour setting enables a string to be used to indicate the desired colour.
4323 [Table 40](#) and [Table 41](#) define the Resource Type and its properties, respectively.

4324 **Table 40. Light control Resource Type definition**

Deleted: Table 40

Deleted: Table 41

Resource Type	Resource Type ID	Multiple Instances	Description
Light Control	"oic.light.control" or "urn:oma:lwm2m:ext:3311"	Yes	Light control object with on/off and optional dimming and energy monitor

4325

4326 **Table 41. Light control Resource Type definition**

Property title	Property name	Value type	Value rule	Unit	Access mode	Mandatory	Description
On/Off	"on-off"	boolean			R, W	yes	On/Off Control: 0 = Off 1 = On
Dimmer	"dim"	integer		%	R, W	no	Proportional Control, integer value between 0 and 100 as percentage
Color	"color"	string	0 – 100	Defined by "units" property	R, W	no	String representing some value in color space
Units	"units"	string			R	no	Measurement Units Definition e.g., "Cel" for Temperature in Celsius.
On Time	"ontime"	integer		s	R, W	no	The time in seconds that the light has been on.

							Writing a value of 0 resets the counter
Cumulative active power	"cumap"	float		Wh	R	no	The cumulative active power since the last cumulative energy reset or device start
Power Factor	"powfact"	float			R	no	The power factor of the load

4329

4330

4331
4332
4333
4334

Annex D (normative)

Resource Type definitions

D.1 List of Resource Type definitions

Table 42 contains the list of defined core resources in this specification.

Deleted: Table 42

Table 42. Alphabetized list of core resources

Friendly Name (informative)	Resource Type (rt)	Section
Collections	“oic.wk.col”	D.2
Device Configuration	“oic.wk.con”	D.3
Platform Configuration	“oic.wk.con.p”	D.4
Device	“oic.wk.d”	D.5
Discoverable Resources, baseline interface	“oic.wk.res”	D.8
Discoverable Resources, link list interface	“oic.wk.res”	D.9
Icon	“oic.r.icon”	D.14
Introspection	“oic.wk.introspection”	D.15
Maintenance	“oic.wk.mnt”	D.6
Platform	“oic.wk.p”	D.7
Resource Directory	“oic.wk.rd”	D.13
Scenes (Top Level)	“oic.wk.scenelist”	D.10
Scenes Collections	“oic.wk.scenecollection”	D.11
Scenes Member	“oic.wk.scenemember”	D.12

```

4339 D.2 OCF Collection
4340 D.2.1 Introduction
4341 OCF Collection Resource Type contains properties and links. The oic.if.baseline interface exposes
4342 a representation of the links and the properties of the collection resource itself
4343 D.2.2 Example URI
4344 /CollectionBaselineInterfaceURI
4345 D.2.3 Resource Type
4346 The resource type (rt) is defined as: oic.wk.col.
4347 D.2.4 RAML Definition
4348 #%RAML 0.8
4349 title: Collections
4350 version: 1.0
4351 traits:
4352 - interface-ll :
4353   queryParameters:
4354     if:
4355       enum: ["oic.if.ll"]
4356 - interface-b :
4357   queryParameters:
4358     if:
4359       enum: ["oic.if.b"]
4360 - interface-baseline :
4361   queryParameters:
4362     if:
4363       enum: ["oic.if.baseline"]
4364 - interface-all :
4365   queryParameters:
4366     if:
4367       enum: ["oic.if.ll", "oic.if.baseline", "oic.if.b"]
4368
4369 /CollectionBaselineInterfaceURI:
4370   description: |
4371     OCF Collection Resource Type contains properties and links.
4372     The oic.if.baseline interface exposes a representation of
4373     the links and the properties of the collection resource itself
4374
4375   is : ['interface-baseline']
4376   get:
4377     description: |
4378       Retrieve on Baseline Interface
4379
4380   responses :
4381     200:
4382       body:
4383         application/json:
4384           schema: |
4385             {
4386               "$schema": "http://json-schema.org/draft-04/schema#",
4387               "description" : "Copyright (c) 2016 Open Connectivity Foundation, Inc. All rights
4388 reserved.",
4389               "id": "http://www.openconnectivity.org/ocf-apis/core/schemas/oic.collection-
4390 schema.json#",

```

```

4391         "title": "Collection",
4392         "definitions": {
4393             "oic.oic-link": {
4394                 "type": "object",
4395                 "properties": {
4396                     "href": {
4397                         "type": "string",
4398                         "maxLength": 256,
4399                         "description": "This is the target URI, it can be specified as a
4400                         Relative Reference or fully-qualified URI.",
4401                         "format": "uri"
4402                     },
4403                     "rel": {
4404                         "oneOf": [
4405                             {
4406                             "type": "array",
4407                             "items": {
4408                                 "type": "string",
4409                                 "maxLength": 64
4410                             },
4411                             "minItems": 1,
4412                             "default": ["hosts"]
4413                         },
4414                         {
4415                             "type": "string",
4416                             "maxLength": 64,
4417                             "default": "hosts"
4418                         }
4419                     ],
4420                     "description": "The relation of the target URI referenced by the link
4421                     to the context URI"
4422                 },
4423                 "rt": {
4424                     "type": "array",
4425                     "items" : {
4426                         "type" : "string",
4427                         "maxLength": 64
4428                     },
4429                     "minItems" : 1,
4430                     "description": "Resource Type of the Resource"
4431                 },
4432                 "if": {
4433                     "type": "array",
4434                     "items": {
4435                         "type" : "string",
4436                         "enum" : ["oic.if.baseline", "oic.if.ll", "oic.if.b", "oic.if.rw",
4437 "oic.if.r", "oic.if.a", "oic.if.s" ]
4438                     },
4439                     "minItems": 1,
4440                     "description": "The interface set supported by this resource"
4441                 },
4442                 "di": {
4443                     "Sref": "#/definitions/uuid",
4444                     "description": "The device ID"
4445                 },
4446                 "p": {
4447                     "description": "Specifies the framework policies on the Resource
4448                     referenced by the target URI",
4449                     "type": "object",
4450                     "properties": {
4451                         "bm": {
4452                             "description": "Specifies the framework policies on the Resource
4453                             referenced by the target URI for e.g. observable and discoverable",
4454                             "type": "integer"
4455                         }
4456                     },
4457                     "required" : ["bm"]
4458                 },
4459                 "title": {
4460                     "type": "string",
4461                     "maxLength": 64,

```

```

4462           "description": "A title for the link relation. Can be used by the UI to
4463 provide a context."
4464     },
4465     "anchor": {
4466       "type": "string",
4467       "maxLength": 256,
4468       "description": "This is used to override the context URI e.g. override
4469 the URI of the containing collection.",
4470       "format": "uri"
4471     },
4472     "ins": {
4473       "type": "integer",
4474       "description": "The instance identifier for this web link in an array
4475 of web links - used in collections"
4476     },
4477     "type": {
4478       "type": "array",
4479       "description": "A hint at the representation of the resource referenced
4480 by the target URI. This represents the media types that are used for both accepting and emitting.",
4481       "items" : {
4482         "type": "string",
4483         "maxLength": 64
4484       },
4485       "minItems": 1,
4486       "default": "application/cbor"
4487     },
4488     "eps": {
4489       "type": "array",
4490       "description": "the Endpoint information of the target Resource",
4491       "items": {
4492         "type": "object",
4493         "properties": {
4494           "ep": {
4495             "type": "string",
4496             "format": "uri",
4497             "description": "Transport Protocol Suite + Endpoint Locator"
4498           },
4499           "pri": {
4500             "type": "integer",
4501             "minimum": 1,
4502             "description": "The priority among multiple Endpoints"
4503           }
4504         }
4505       }
4506     }
4507   },
4508   "required": [ "href", "rt", "if" ]
4509 },
4510 "oic.collection.linksexpanded": {
4511   "type": "object",
4512   "properties": {
4513     "links": {
4514       "description": "A set of simple or individual OIC Links.",
4515       "type": "array",
4516       "items": {
4517         "type": "object",
4518         "properties": {
4519           "href": {
4520             "type": "string",
4521             "maxLength": 256,
4522             "description": "This is the target URI, it can be specified
4523 as a Relative Reference or fully-qualified URI.",
4524             "format": "uri"
4525           },
4526           "rel": {
4527             "oneOf": [
4528               {
4529                 "type": "array",
4530                 "items": {
4531                   "type": "string",
4532                   "maxLength": 64

```

```

4533
4534
4535
4536
4537
4538
4539
4540
4541
4542
4543
4544 the link to the context URI"
4545
4546
4547
4548
4549
4550
4551
4552
4553
4554
4555
4556
4557
4558
4559
4560 "oic.if.rw", "oic.if.r", "oic.if.a", "oic.if.s" ]
4561
4562
4563
4564
4565
4566
4567
4568
4569 fA-F0-9]{4}-[a-fA-F0-9]{12}$"
4570
4571
4572
4573 Resource referenced by the target URI",
4574
4575
4576
4577
4578 Resource referenced by the target URI for e.g. observable and discoverable",
4579
4580
4581
4582
4583
4584
4585
4586
4587 the UI to provide a context."
4588
4589
4590
4591
4592
4593
4594
4595
4596
4597
4598
4599
4600
4601
4602
4603
,
"minItems": 1,
"default": ["hosts"]
},
{
  "type": "string",
  "maxLength": 64,
  "default": "hosts"
}
],
"description": "The relation of the target URI referenced by
the link to the context URI"
},
"rt": {
  "type": "array",
  "items": {
    "type": "string",
    "maxLength": 64
  },
  "minItems": 1,
  "description": "Resource Type of the Resource"
},
"if": {
  "type": "array",
  "items": {
    "type": "string",
    "enum": ["oic.if.baseline", "oic.if.ll", "oic.if.b",
"oic.if.rw", "oic.if.r", "oic.if.a", "oic.if.s" ]
  },
  "minItems": 1,
  "description": "The interface set supported by this resource"
},
"di": {
  "description": "Format pattern according to IETF RFC 4122.",
  "type": "string",
  "pattern": "^[a-fA-F0-9]{8}-[a-fA-F0-9]{4}-[a-fA-F0-9]{4}-[a-fA-F0-9]{4}-[a-fA-F0-9]{12}$"
},
"p": {
  "description": "Specifies the framework policies on the
Resource referenced by the target URI",
  "type": "object",
  "properties": {
    "bm": {
      "description": "Specifies the framework policies on the
Resource referenced by the target URI for e.g. observable and discoverable",
      "type": "integer"
    }
  },
  "required": ["bm"]
},
"title": {
  "type": "string",
  "maxLength": 64,
  "description": "A title for the link relation. Can be used by
override the URI of the containing collection.",
  "format": "uri"
},
"ins": {
  "type": "integer",
  "description": "The instance identifier for this web link in
an array of web links - used in collections"
},
"type": {
  "type": "array",

```

```

4604         "description": "A hint at the representation of the resource
4605 referenced by the target URI. This represents the media types that are used for both accepting and
4606 emitting.",
4607         "items" : {
4608             "type": "string",
4609             "maxLength": 64
4610         },
4611         "minItems": 1,
4612         "default": "application/cbor"
4613     },
4614     "eps": {
4615         "type": "array",
4616         "description": "the Endpoint information of the target
4617 Resource",
4618         "items": {
4619             "type": "object",
4620             "properties": {
4621                 "ep": {
4622                     "type": "string",
4623                     "format": "uri",
4624                     "description": "Transport Protocol Suite + Endpoint
4625 Locator"
4626                 },
4627                 "pri": {
4628                     "type": "integer",
4629                     "minimum": 1,
4630                     "description": "The priority among multiple Endpoints"
4631                 }
4632             }
4633         }
4634     },
4635     "required": [ "href", "rt", "if" ]
4636 },
4637
4638 }
4639 }
4640 },
4641 "oic.core": {
4642     "type": "object",
4643     "properties": {
4644         "rt": {
4645             "type": "array",
4646             "items" : {
4647                 "type" : "string",
4648                 "maxLength": 64
4649             },
4650             "minItems" : 1,
4651             "readOnly": true,
4652             "description": "Resource Type of the Resource"
4653         }
4654     }
4655 },
4656 "uuid": {
4657     "description": "Format pattern according to IETF RFC 4122.",
4658     "type": "string",
4659     "pattern": "^([a-fA-F0-9]{8}-[a-fA-F0-9]{4}-[a-fA-F0-9]{4}-[a-fA-F0-9]{4})-
4660 ([a-fA-F0-9]{12})$"
4661 },
4662     "oic.collection.links": {
4663         "type": "object",
4664         "properties": {
4665             "links": {
4666                 "description": "A set of simple or individual OIC Links.",
4667                 "type": "array",
4668                 "items": {
4669                     "$ref": "#/definitions/oic.oic-link"
4670                 }
4671             }
4672         },
4673     },
4674     "oic.collection.properties": {

```

```

4675             "type": "object",
4676             "description": "A collection is a set of links along with additional
4677 properties to describe the collection itself",
4678             "properties": {
4679                 "rts": {
4680                     "$ref": "#/definitions/oic.core/properties/rt",
4681                     "description": "The list of allowable resource types (for
4682 Target and anchors) in links included in the collection"
4683                 }
4684             }
4685         },
4686     },
4687     "type": "object",
4688     "allOf": [
4689         {"$ref": "oic.core-schema.json#/definitions/oic.core"},
4690         {"$ref": "#/definitions/oic.collection.properties"},
4691         {"$ref": "#/definitions/oic.collection.links"}
4692     ]
4693 }
4694
4695 example: |
4696 {
4697     "rt": ["oic.wk.col"],
4698     "id": "unique_example_id",
4699     "rts": [ "oic.r.switch.binary", "oic.r.airflow" ],
4700     "links": [
4701         {
4702             "href": "switch",
4703             "rt": [ "oic.r.switch.binary" ],
4704             "if": [ "oic.if.a", "oic.if.baseline" ],
4705             "eps": [
4706                 {"ep": "coap://[fe80::b1d6]:1111", "pri": 2},
4707                 {"ep": "coaps://[fe80::b1d6]:1122"},
4708                 {"ep": "coap+tcp://[2001:db8:a::123]:2222", "pri": 3}
4709             ],
4710         },
4711         {
4712             "href": "airFlow",
4713             "rt": [ "oic.r.airflow" ],
4714             "if": [ "oic.if.a", "oic.if.baseline" ],
4715             "eps": [
4716                 {"ep": "coap://[fe80::b1d6]:1111", "pri": 2},
4717                 {"ep": "coaps://[fe80::b1d6]:1122"},
4718                 {"ep": "coap+tcp://[2001:db8:a::123]:2222", "pri": 3}
4719             ],
4720         }
4721     ]
4722 }
4723
4724 post:
4725     description: |
4726         Update on Baseline Interface
4727
4728 body:
4729     application/json:
4730     schema: |
4731         {
4732             "$schema": "http://json-schema.org/draft-04/schema#",
4733             "description" : "Copyright (c) 2016 Open Connectivity Foundation, Inc. All rights
4734 reserved.",
4735             "id": "http://www.openconnectivity.org/ocf-apis/core/schemas/oic.collection-
4736 schema.json#",
4737             "title": "Collection",
4738             "definitions": {
4739                 "oic.oic-link": {
4740                     "type": "object",
4741                     "properties": {

```

```

4742           "href": {
4743             "type": "string",
4744             "maxLength": 256,
4745             "description": "This is the target URI, it can be specified as a Relative
4746 Reference or fully-qualified URI.",
4747             "format": "uri"
4748         },
4749         "rel": {
4750           "oneOf": [
4751             {
4752               "type": "array",
4753               "items": {
4754                 "type": "string",
4755                 "maxLength": 64
4756               },
4757               "minItems": 1,
4758               "default": ["hosts"]
4759             },
4760             {
4761               "type": "string",
4762               "maxLength": 64,
4763               "default": "hosts"
4764             }
4765           ],
4766           "description": "The relation of the target URI referenced by the link to
4767 the context URI"
4768       },
4769       "rt": {
4770         "type": "array",
4771         "items" : {
4772           "type" : "string",
4773           "maxLength": 64
4774         },
4775         "minItems" : 1,
4776         "description": "Resource Type of the Resource"
4777       },
4778       "if": {
4779         "type": "array",
4780         "items": {
4781           "type" : "string",
4782           "enum": ["oic.if.baseline", "oic.if.ll", "oic.if.b", "oic.if.rw",
4783           "oic.if.r", "oic.if.a", "oic.if.s" ]
4784         },
4785         "minItems": 1,
4786         "description": "The interface set supported by this resource"
4787       },
4788       "di": {
4789         "$ref": "#/definitions/uuid",
4790         "description": "The device ID"
4791       },
4792       "P": {
4793         "description": "Specifies the framework policies on the Resource referenced
4794 by the target URI",
4795         "type": "object",
4796         "properties": {
4797           "bm": {
4798             "description": "Specifies the framework policies on the Resource
4799             referenced by the target URI for e.g. observable and discoverable",
4800             "type": "integer"
4801           }
4802         },
4803         "required" : ["bm"]
4804       },
4805       "title": {
4806         "type": "string",
4807         "maxLength": 64,
4808         "description": "A title for the link relation. Can be used by the UI to
4809 provide a context."
4810       },
4811       "anchor": {
4812         "type": "string",

```

```

4813             "maxLength": 256,
4814             "description": "This is used to override the context URI e.g. override the
4815             URI of the containing collection.",
4816             "format": "uri"
4817         },
4818         "ins": {
4819             "type": "integer",
4820             "description": "The instance identifier for this web link in an array of
4821             web links - used in collections"
4822         },
4823         "type": {
4824             "type": "array",
4825             "description": "A hint at the representation of the resource referenced by
4826             the target URI. This represents the media types that are used for both accepting and emitting."
4827             "items" : {
4828                 "type": "string",
4829                 "maxLength": 64
4830             },
4831             "minItems": 1,
4832             "default": "application/cbor"
4833         },
4834         "eps": {
4835             "type": "array",
4836             "description": "the Endpoint information of the target Resource",
4837             "items": {
4838                 "type": "object",
4839                 "properties": {
4840                     "ep": {
4841                         "type": "string",
4842                         "format": "uri",
4843                         "description": "Transport Protocol Suite + Endpoint Locator"
4844                     },
4845                     "pri": {
4846                         "type": "integer",
4847                         "minimum": 1,
4848                         "description": "The priority among multiple Endpoints"
4849                     }
4850                 }
4851             }
4852         },
4853     },
4854     "required": [ "href", "rt", "if" ]
4855 },
4856     "oic.collection.linksexpanded": {
4857         "type": "object",
4858         "properties": {
4859             "links": {
4860                 "description": "A set of simple or individual OIC Links.",
4861                 "type": "array",
4862                 "items": {
4863                     "type": "object",
4864                     "properties": {
4865                         "href": {
4866                             "type": "string",
4867                             "maxLength": 256,
4868                             "description": "This is the target URI, it can be specified as a
4869                             Relative Reference or fully-qualified URI."
4870                             "format": "uri"
4871                         },
4872                         "rel": {
4873                             "oneOf": [
4874                                 {
4875                                     "type": "array",
4876                                     "items": {
4877                                         "type": "string",
4878                                         "maxLength": 64
4879                                     },
4880                                     "minItems": 1,
4881                                     "default": ["hosts"]
4882                                 },
4883                                 {
4884

```

```

4884         "type": "string",
4885         "maxLength": 64,
4886         "default": "hosts"
4887     },
4888     ],
4889     "description": "The relation of the target URI referenced by the
4890 link to the context URI"
4891 },
4892 "rt": {
4893     "type": "array",
4894     "items" : [
4895         "type" : "string",
4896         "maxLength": 64
4897     ],
4898     "minItems" : 1,
4899     "description": "Resource Type of the Resource"
4900 },
4901 "if": {
4902     "type": "array",
4903     "items": [
4904         "type" : "string",
4905         "enum" : ["oic.if.base", "oic.if.ll", "oic.if.b",
4906         "oic.if.rw", "oic.if.r", "oic.if.a", "oic.if.s"]
4907     ],
4908     "minItems": 1,
4909     "description": "The interface set supported by this resource"
4910 },
4911 "di": {
4912     "description": "Format pattern according to IETF RFC 4122.",
4913     "type": "string",
4914     "pattern": "[a-fA-F0-9]{8}-[a-fA-F0-9]{4}-[a-fA-F0-9]{4}-[a-fA-
4915 F0-9]{4}-[a-fA-F0-9]{12}$"
4916 },
4917 "p": {
4918     "description": "Specifies the framework policies on the Resource
4919 referenced by the target URI",
4920     "type": "object",
4921     "properties": {
4922         "bm": {
4923             "description": "Specifies the framework policies on the
4924             Resource referenced by the target URI for e.g. observable and discoverable",
4925             "type": "integer"
4926         }
4927     },
4928     "required" : ["bm"]
4929 },
4930     "title": {
4931         "type": "string",
4932         "maxLength": 64,
4933         "description": "A title for the link relation. Can be used by the
4934 UI to provide a context."
4935 },
4936     "anchor": {
4937         "type": "string",
4938         "maxLength": 256,
4939         "description": "This is used to override the context URI e.g.
4940 override the URI of the containing collection."
4941         "format": "uri"
4942     },
4943     "ins": {
4944         "type": "integer",
4945         "description": "The instance identifier for this web link in an
4946 array of web links - used in collections"
4947     },
4948     "type": {
4949         "type": "array",
4950         "description": "A hint at the representation of the resource
4951 referenced by the target URI. This represents the media types that are used for both accepting and
4952 emitting.",
4953         "items" : [
4954             "type": "string",

```

```

4955         "maxLength": 64
4956     },
4957     "minItems": 1,
4958     "default": "application/cbor"
4959   },
4960   "eps": {
4961     "type": "array",
4962     "description": "the Endpoint information of the target Resource",
4963     "items": {
4964       "type": "object",
4965       "properties": {
4966         "ep": {
4967           "type": "string",
4968           "format": "uri",
4969           "description": "Transport Protocol Suite + Endpoint
4970 Locator"
4971         },
4972         "pri": {
4973           "type": "integer",
4974           "minimum": 1,
4975           "description": "The priority among multiple Endpoints"
4976         }
4977       }
4978     }
4979   },
4980   "required": [ "href", "rt", "if" ]
4981 }
4982 }
4983 }
4984 }
4985 },
4986   "oic.core": {
4987     "type": "object",
4988     "properties": {
4989       "rt": {
4990         "type": "array",
4991         "items" : {
4992           "type" : "string",
4993           "maxLength": 64
4994         },
4995         "minItems" : 1,
4996         "readOnly": true,
4997         "description": "Resource Type of the Resource"
4998       }
4999     }
5000   },
5001   "uuid": {
5002     "description": "Format pattern according to IETF RFC 4122.",
5003     "type": "string",
5004     "pattern": "^{a-fA-F0-9}{8}-[a-fA-F0-9]{4}-[a-fA-F0-9]{4}-[a-
5005 fA-F0-9]{4}-[a-fA-F0-9]{12}$"
5006 },
5007   "oic.collection.links": {
5008     "type": "object",
5009     "properties": {
5010       "links": {
5011         "description": "A set of simple or individual OIC Links.",
5012         "type": "array",
5013         "items": {
5014           "$ref": "#/definitions/oic.oic-link"
5015         }
5016       }
5017     },
5018   },
5019   "oic.collection.properties": {
5020     "type": "object",
5021     "description": "A collection is a set of links along with additional
5022 properties to describe the collection itself",
5023     "properties": {
5024       "rts": {
5025         "$ref": "#/definitions/oic.core/properties/rt",

```

```

5026             "description": "The list of allowable resource types (for
5027 Target and anchors) in links included in the collection"
5028         }
5029     }
5030   },
5031   "type": "object",
5032   "allOf": [
5033     {"$ref": "oic.core-schema.json#/definitions/oic.core"},
5034     {"$ref": "#/definitions/oic.collection.properties"},
5035     {"$ref": "#/definitions/oic.collection.links"}
5036   ]
5037 }
5038 }
5039

5040 responses :
5041 200:
5042   body:
5043     application/json:
5044       schema: |
5045         {
5046           "$schema": "http://json-schema.org/draft-04/schema#",
5047           "description": "Copyright (c) 2016 Open Connectivity Foundation, Inc. All rights
5048 reserved.",
5049           "id": "http://www.openconnectivity.org/ocf-apis/core/schemas/oic.collection-
5050 schema.json#",
5051           "title": "Collection",
5052           "definitions": {
5053             "oic.oic-link": {
5054               "type": "object",
5055               "properties": {
5056                 "href": {
5057                   "type": "string",
5058                   "maxLength": 256,
5059                   "description": "This is the target URI, it can be specified as a
5060 Relative Reference or fully-qualified URI."
5061                   "format": "uri"
5062                 },
5063                 "rel": {
5064                   "oneOf": [
5065                     {
5066                       "type": "array",
5067                       "items": {
5068                         "type": "string",
5069                         "maxLength": 64
5070                       },
5071                         "minItems": 1,
5072                         "default": ["hosts"]
5073                     },
5074                     {
5075                       "type": "string",
5076                       "maxLength": 64,
5077                       "default": "hosts"
5078                     }
5079                   ],
5080                   "description": "The relation of the target URI referenced by the link
5081 to the context URI"
5082                 },
5083                 "rt": {
5084                   "type": "array",
5085                   "items": {
5086                     "type": "string",
5087                     "maxLength": 64
5088                   },
5089                     "minItems": 1,
5090                     "description": "Resource Type of the Resource"
5091                 },
5092                 "if": {
5093                   "type": "array",
5094

```

```

5094         "items": {
5095             "type" : "string",
5096             "enum" : ["oic.if.baseline", "oic.if.ll", "oic.if.b", "oic.if.rw",
5097             "oic.if.r", "oic.if.a", "oic.if.s" ]
5098         },
5099         "minItems": 1,
5100         "description": "The interface set supported by this resource"
5101     },
5102     "di": {
5103         "$ref": "#/definitions/uuid",
5104         "description": "The device ID"
5105     },
5106     "p": {
5107         "description": "Specifies the framework policies on the Resource
5108         referenced by the target URI",
5109         "type": "object",
5110         "properties": {
5111             "bm": {
5112                 "description": "Specifies the framework policies on the Resource
5113         referenced by the target URI for e.g. observable and discoverable",
5114             "type": "integer"
5115         }
5116     },
5117     "required" : ["bm"]
5118 },
5119     "title": {
5120         "type": "string",
5121         "maxLength": 64,
5122         "description": "A title for the link relation. Can be used by the UI to
5123         provide a context."
5124     },
5125     "anchor": {
5126         "type": "string",
5127         "maxLength": 256,
5128         "description": "This is used to override the context URI e.g. override
5129         the URI of the containing collection.",
5130         "format": "uri"
5131     },
5132     "ins": {
5133         "type": "integer",
5134         "description": "The instance identifier for this web link in an array
5135         of web links - used in collections"
5136     },
5137     "type": {
5138         "type": "array",
5139         "description": "A hint at the representation of the resource referenced
5140         by the target URI. This represents the media types that are used for both accepting and emitting.",
5141         "items" : {
5142             "type": "string",
5143             "maxLength": 64
5144         },
5145         "minItems": 1,
5146         "default": "application/cbor"
5147     },
5148     "eps": {
5149         "type": "array",
5150         "description": "the Endpoint information of the target Resource",
5151         "items": {
5152             "type": "object",
5153             "properties": {
5154                 "ep": {
5155                     "type": "string",
5156                     "format": "uri",
5157                     "description": "Transport Protocol Suite + Endpoint Locator"
5158                 },
5159                 "pri": {
5160                     "type": "integer",
5161                     "minimum": 1,
5162                     "description": "The priority among multiple Endpoints"
5163                 }
5164             }
5165         }
5166     }
5167 }

```

```

5165
5166
5167
5168
5169
5170
5171
5172
5173
5174
5175
5176
5177
5178
5179
5180
5181
5182
5183 as a Relative Reference or fully-qualified
5184
5185
5186
5187
5188
5189
5190
5191
5192
5193
5194
5195
5196
5197
5198
5199
5200
5201
5202
5203
5204 the link to the context URI"
5205
5206
5207
5208
5209
5210
5211
5212
5213
5214
5215
5216
5217
5218
5219
5220 "oic.if.rw", "oic.if.r", "oic.if.a", "oic.if.s"
5221
5222
5223
5224
5225
5226
5227
5228
5229 fA-F0-9]{4}-[a-fA-F0-9]{12}$
5230
5231
5232
5233
5234
5235
}
},
"required": [ "href", "rt", "if" ]
},
"oic.collection.linksexpanded": {
  "type": "object",
  "properties": {
    "links": {
      "description": "A set of simple or individual OIC Links.",
      "type": "array",
      "items": {
        "type": "object",
        "properties": {
          "href": {
            "type": "string",
            "maxLength": 256,
            "description": "This is the target URI, it can be specified
as a Relative Reference or fully-qualified
URI."
          },
          "format": "uri"
        },
        "rel": {
          "oneOf": [
            {
              "type": "array",
              "items": {
                "type": "string",
                "maxLength": 64
              },
              "minItems": 1,
              "default": ["hosts"]
            },
            {
              "type": "string",
              "maxLength": 64,
              "default": "hosts"
            }
          ],
          "description": "The relation of the target URI referenced by
the link to the context URI"
        },
        "rt": {
          "type": "array",
          "items": {
            "type": "string",
            "maxLength": 64
          },
          "minItems": 1,
          "description": "Resource Type of the Resource"
        },
        "if": {
          "type": "array",
          "items": {
            "type": "string",
            "enum": ["oic.if.baseline", "oic.if.ll", "oic.if.b",
"oic.if.rw", "oic.if.r", "oic.if.a", "oic.if.s"]
          },
          "minItems": 1,
          "description": "The interface set supported by this resource"
        },
        "di": {
          "description": "Format pattern according to IETF RFC 4122.",
          "type": "string",
          "pattern": "[a-fA-F0-9]{8}-[a-fA-F0-9]{4}-[a-fA-F0-9]{4}-[a-
fA-F0-9]{4}-[a-fA-F0-9]{12}$$"
        },
        "p": {
          "description": "Specifies the framework policies on the
Resource referenced by the target URI",
          "type": "object",
          "properties": {

```

```

5236          "bm": {
5237            "description": "Specifies the framework policies on the
5238            Resource referenced by the target URI for e.g. observable and discoverable",
5239            "type": "integer"
5240          }
5241        },
5242        "required" : ["bm"]
5243      },
5244      "title": {
5245        "type": "string",
5246        "maxLength": 64,
5247        "description": "A title for the link relation. Can be used by
5248        the UI to provide a context."
5249      },
5250      "anchor": {
5251        "type": "string",
5252        "maxLength": 256,
5253        "description": "This is used to override the context URI e.g.
5254        override the URI of the containing collection.",
5255        "format": "uri"
5256      },
5257      "ins": {
5258        "type": "integer",
5259        "description": "The instance identifier for this web link in
5260        an array of web links - used in collections"
5261      },
5262      "type": {
5263        "type": "array",
5264        "description": "A hint at the representation of the resource
5265        referenced by the target URI. This represents the media types that are used for both accepting and
5266        emitting.",
5267        "items" : {
5268          "type": "string",
5269          "maxLength": 64
5270        },
5271        "minItems": 1,
5272        "default": "application/cbor"
5273      },
5274      "eps": {
5275        "type": "array",
5276        "description": "the Endpoint information of the target
5277        Resource",
5278        "items": {
5279          "type": "object",
5280          "properties": {
5281            "ep": {
5282              "type": "string",
5283              "format": "uri",
5284              "description": "Transport Protocol Suite + Endpoint
5285              Locator"
5286            },
5287            "pri": {
5288              "type": "integer",
5289              "minimum": 1,
5290              "description": "The priority among multiple Endpoints"
5291            }
5292          }
5293        }
5294      },
5295      "required": [ "href", "rt", "if" ]
5296    }
5297  }
5298}
5299
5300},
5301  "oic.core": {
5302    "type": "object",
5303    "properties": {
5304      "rt": {
5305        "type": "array",
5306        "items" : {

```

```

5307             "type" : "string",
5308             "maxLength": 64
5309         },
5310         "minItems" : 1,
5311         "readOnly": true,
5312         "description": "Resource Type of the Resource"
5313     }
5314 }
5315 },
5316 "uuid": {
5317     "description": "Format pattern according to IETF RFC 4122.",
5318     "type": "string",
5319     "pattern": "[a-fA-F0-9]{8}-[a-fA-F0-9]{4}-[a-fA-F0-9]{4}-[a-fA-F0-9]{4}-[a-fA-F0-9]{12}$"
5320
5321 },
5322     "oic.collection.links": {
5323         "type": "object",
5324         "properties": {
5325             "links": {
5326                 "description": "A set of simple or individual OIC Links.",
5327                 "type": "array",
5328                 "items": {
5329                     "$ref": "#/definitions/oic.oic-link"
5330                 }
5331             }
5332         }
5333     },
5334     "oic.collection.properties": {
5335         "type": "object",
5336         "description": "A collection is a set of links along with additional
5337 properties to describe the collection itself",
5338         "properties": {
5339             "rts": {
5340                 "$ref": "#/definitions/oic.core/properties/rt",
5341                 "description": "The list of allowable resource types (for
5342 Target and anchors) in links included in the collection"
5343             }
5344         }
5345     },
5346 },
5347 "type": "object",
5348 "allOf": [
5349     {"$ref": "oic.core-schema.json#/definitions/oic.core"},
5350     {"$ref": "#/definitions/oic.collection.properties"},
5351     {"$ref": "#/definitions/oic.collection.links"}
5352 ]
5353 }
5354
5355

```

D.2.5 Property Definition

Property name	Value type	Mandatory	Access mode	Description
rt	array: schema see	yes		Resource Type of the Resource
di	multiple types: see schema			
title	string			A title for the link relation. Can be used by the UI to provide a context.
eps	array: schema see			the Endpoint information of the target Resource

pri (eps)	integer			The priority among multiple Endpoints
ep (eps)	string			Transport Protocol Suite + Endpoint Locator
ins	integer			The instance identifier for this web link in an array of web links - used in collections
p	object: see schema			Specifies the framework policies on the Resource referenced by the target URI
bm (p)	integer	yes		Specifies the framework policies on the Resource referenced by the target URI for e.g. observable and discoverable
href	string	yes		This is the target URI, it can be specified as a Relative Reference or fully-qualified URI.
rel	multiple types: see schema			The relation of the target URI referenced by the link to the context URI
type	array: see schema			A hint at the representation of the resource referenced by the target URI. This represents the media types that are used for both accepting and emitting.
anchor	string			This is used to override the context URI e.g. override the URI of the containing collection.

if	array: schema	see	yes		The interface set supported by this resource
----	------------------	-----	-----	--	--

5356 **D.2.6 CRUDN behaviour**

Resource	Create	Read	Update	Delete	Notify
/CollectionBaselineInterfaceURI	get	post			

5357 **D.2.7 Referenced JSON schemas**

5358 **D.2.8 oic.oic-link-schema.json**

```

5359 {
5360   "$schema": "http://json-schema.org/draft-04/schema#",
5361   "description" : "Copyright (c) 2016, 2017 Open Connectivity Foundation, Inc. All rights
5362 reserved.",
5363   "id": "http://www.openconnectivity.org/ocf-apis/core/schemas/oic.oic-link-schema.json#",
5364   "definitions": {
5365     "oic.oic-link": {
5366       "type": "object",
5367       "properties": {
5368         "href": {
5369           "type": "string",
5370           "maxLength": 256,
5371           "description": "This is the target URI, it can be specified as a Relative Reference or
5372 fully-qualified URI.",
5373           "format": "uri"
5374         },
5375         "rel": {
5376           "oneOf": [
5377             {
5378               "type": "array",
5379               "items": {
5380                 "type": "string",
5381                 "maxLength": 64
5382               },
5383               "minItems": 1,
5384               "default": ["hosts"]
5385             },
5386             {
5387               "type": "string",
5388               "maxLength": 64,
5389               "default": "hosts"
5390             }
5391           ],
5392           "description": "The relation of the target URI referenced by the link to the context URI"
5393         },
5394         "rt": {
5395           "type": "array",
5396           "items" : {
5397             "type" : "string",
5398             "maxLength": 64
5399           },
5400           "minItems" : 1,
5401           "description": "Resource Type of the Resource"
5402         },
5403         "if": {
5404           "type": "array",
5405           "items": {
5406             "type" : "string",
5407             "enum" : ["oic.if.baseline", "oic.if.ll", "oic.if.b", "oic.if.rw", "oic.if.r",
5408 "oic.if.a", "oic.if.s"]
5409           },
5410           "minItems": 1,
5411           "description": "The interface set supported by this resource"
5412         },
5413         "di": {
5414           "allOf": [
5415             {
5416               "$ref": "oic.types-schema.json#/definitions/uuid"
5417             }
5418           ]
5419         }
5420       }
5421     }
5422   }
5423 }
```

```

5417     },
5418     {
5419         "description": "The device ID"
5420     }
5421 ],
5422 },
5423 "p": {
5424     "description": "Specifies the framework policies on the Resource referenced by the target
5425 URI",
5426     "type": "object",
5427     "properties": {
5428         "bm": {
5429             "description": "Specifies the framework policies on the Resource referenced by the
5430 target URI for e.g. observable and discoverable",
5431             "type": "integer"
5432         },
5433     },
5434     "required" : ["bm"]
5435 },
5436 "title": {
5437     "type": "string",
5438     "maxLength": 64,
5439     "description": "A title for the link relation. Can be used by the UI to provide a
5440 context."
5441 },
5442 "anchor": {
5443     "type": "string",
5444     "maxLength": 256,
5445     "description": "This is used to override the context URI e.g. override the URI of the
5446 containing collection.",
5447     "format": "uri"
5448 },
5449 "ins": {
5450     "type": "integer",
5451     "description": "The instance identifier for this web link in an array of web links - used
5452 in collections"
5453 },
5454     "type": {
5455         "type": "array",
5456         "description": "A hint at the representation of the resource referenced by the target
5457 URI. This represents the media types that are used for both accepting and emitting.",
5458         "items" : {
5459             "type": "string",
5460             "maxLength": 64
5461         },
5462         "minItems": 1,
5463         "default": "application/cbor"
5464     },
5465     "eps": {
5466         "type": "array",
5467         "description": "the Endpoint information of the target Resource",
5468         "items": {
5469             "type": "object",
5470             "properties": {
5471                 "ep": {
5472                     "type": "string",
5473                     "format": "uri",
5474                     "description": "Transport Protocol Suite + Endpoint Locator"
5475                 },
5476                 "pri": {
5477                     "type": "integer",
5478                     "minimum": 1,
5479                     "description": "The priority among multiple Endpoints"
5480                 }
5481             }
5482         }
5483     }
5484 },
5485     "required": [ "href", "rt", "if" ]
5486 }
5487 },

```

```

5488     "type": "object",
5489     "allOf": [
5490       { "$ref": "#/definitions/oic.oic-link" }
5491     ]
5492   }
5493

5494 D.3 Device Configuration
5495 D.3.1 Introduction
5496 Resource that allows for Device specific information to be configured.
5497 D.3.2 Example URI
5498 /exampleDeviceConfigurationResURI
5499 D.3.3 Resource Type
5500 The resource type (rt) is defined as: oic.wk.con.
5501 D.3.4 RAML Definition
5502 #%RAML 0.8
5503 title: OCF Configuration
5504 version: v1-20160622
5505 traits:
5506 - interface-rw :
5507   queryParameters:
5508     if:
5509       enum: ["oic.if.rw"]
5510 - interface-all :
5511   queryParameters:
5512     if:
5513       enum: ["oic.if.rw", "oic.if.baseline"]
5514
5515 /exampleDeviceConfigurationResURI:
5516   description: |
5517     Resource that allows for Device specific information to be configured.
5518
5519   get:
5520     description: |
5521       Retrieves the current Device configuration settings
5522
5523     is : ['interface-all']
5524
5525     responses :
5526       200:
5527         body:
5528           application/json:
5529             schema: |
5530               {
5531                 "id": "http://www.openconnectivity.org/ocf-apis/core/schemas/oic.wk.con-
5532                   schema.json#",
5533                 "$schema": "http://json-schema.org/draft-04/schema#",
5534                 "description" : "Copyright (c) 2016, 2017 Open Connectivity Foundation, Inc. All
5535 rights reserved.",
5536                 "definitions": {
5537                   "oic.wk.con": {
5538                     "type": "object",
5539                     "properties": {
5540                       "loc": {
5541                         "type": "array",
5542                         "description": "Location information (lat, long)"}
5543
5544
5545
5546
5547
5548
5549
5550
5551
5552
5553
5554
5555
5556
5557
5558
5559
5560
5561
5562
5563
5564
5565
5566
5567
5568
5569
5570
5571
5572
5573
5574
5575
5576
5577
5578
5579
5580
5581
5582
5583
5584
5585
5586
5587
5588
5589
5590
5591
5592
5593
5594
5595
5596
5597
5598
5599
55100
55101
55102
55103
55104
55105
55106
55107
55108
55109
55110
55111
55112
55113
55114
55115
55116
55117
55118
55119
55120
55121
55122
55123
55124
55125
55126
55127
55128
55129
55130
55131
55132
55133
55134
55135
55136
55137
55138
55139
55140
55141
55142
55143
55144
55145
55146
55147
55148
55149
55150
55151
55152
55153
55154
55155
55156
55157
55158
55159
55160
55161
55162
55163
55164
55165
55166
55167
55168
55169
55170
55171
55172
55173
55174
55175
55176
55177
55178
55179
55180
55181
55182
55183
55184
55185
55186
55187
55188
55189
55190
55191
55192
55193
55194
55195
55196
55197
55198
55199
55200
55201
55202
55203
55204
55205
55206
55207
55208
55209
55210
55211
55212
55213
55214
55215
55216
55217
55218
55219
55220
55221
55222
55223
55224
55225
55226
55227
55228
55229
55230
55231
55232
55233
55234
55235
55236
55237
55238
55239
55240
55241
55242
55243
55244
55245
55246
55247
55248
55249
55250
55251
55252
55253
55254
55255
55256
55257
55258
55259
55260
55261
55262
55263
55264
55265
55266
55267
55268
55269
55270
55271
55272
55273
55274
55275
55276
55277
55278
55279
55280
55281
55282
55283
55284
55285
55286
55287
55288
55289
55290
55291
55292
55293
55294
55295
55296
55297
55298
55299
552100
552101
552102
552103
552104
552105
552106
552107
552108
552109
552110
552111
552112
552113
552114
552115
552116
552117
552118
552119
552120
552121
552122
552123
552124
552125
552126
552127
552128
552129
552130
552131
552132
552133
552134
552135
552136
552137
552138
552139
552140
552141
552142
552143
552144
552145
552146
552147
552148
552149
552150
552151
552152
552153
552154
552155
552156
552157
552158
552159
552160
552161
552162
552163
552164
552165
552166
552167
552168
552169
552170
552171
552172
552173
552174
552175
552176
552177
552178
552179
552180
552181
552182
552183
552184
552185
552186
552187
552188
552189
552190
552191
552192
552193
552194
552195
552196
552197
552198
552199
552200
552201
552202
552203
552204
552205
552206
552207
552208
552209
552210
552211
552212
552213
552214
552215
552216
552217
552218
552219
552220
552221
552222
552223
552224
552225
552226
552227
552228
552229
552230
552231
552232
552233
552234
552235
552236
552237
552238
552239
552240
552241
552242
552243
552244
552245
552246
552247
552248
552249
552250
552251
552252
552253
552254
552255
552256
552257
552258
552259
552260
552261
552262
552263
552264
552265
552266
552267
552268
552269
552270
552271
552272
552273
552274
552275
552276
552277
552278
552279
552280
552281
552282
552283
552284
552285
552286
552287
552288
552289
552290
552291
552292
552293
552294
552295
552296
552297
552298
552299
552300
552301
552302
552303
552304
552305
552306
552307
552308
552309
552310
552311
552312
552313
552314
552315
552316
552317
552318
552319
552320
552321
552322
552323
552324
552325
552326
552327
552328
552329
552330
552331
552332
552333
552334
552335
552336
552337
552338
552339
552340
552341
552342
552343
552344
552345
552346
552347
552348
552349
552350
552351
552352
552353
552354
552355
552356
552357
552358
552359
552360
552361
552362
552363
552364
552365
552366
552367
552368
552369
552370
552371
552372
552373
552374
552375
552376
552377
552378
552379
552380
552381
552382
552383
552384
552385
552386
552387
552388
552389
552390
552391
552392
552393
552394
552395
552396
552397
552398
552399
552400
552401
552402
552403
552404
552405
552406
552407
552408
552409
552410
552411
552412
552413
552414
552415
552416
552417
552418
552419
552420
552421
552422
552423
552424
552425
552426
552427
552428
552429
552430
552431
552432
552433
552434
552435
552436
552437
552438
552439
552440
552441
552442
552443
552444
552445
552446
552447
552448
552449
552450
552451
552452
552453
552454
552455
552456
552457
552458
552459
552460
552461
552462
552463
552464
552465
552466
552467
552468
552469
552470
552471
552472
552473
552474
552475
552476
552477
552478
552479
552480
552481
552482
552483
552484
552485
552486
552487
552488
552489
552490
552491
552492
552493
552494
552495
552496
552497
552498
552499
552500
552501
552502
552503
552504
552505
552506
552507
552508
552509
552510
552511
552512
552513
552514
552515
552516
552517
552518
552519
552520
552521
552522
552523
552524
552525
552526
552527
552528
552529
552530
552531
552532
552533
552534
552535
552536
552537
552538
552539
552540
552541
552542
552543
552544
552545
552546
552547
552548
552549
552550
552551
552552
552553
552554
552555
552556
552557
552558
552559
552560
552561
552562
552563
552564
552565
552566
552567
552568
552569
552570
552571
552572
552573
552574
552575
552576
552577
552578
552579
552580
552581
552582
552583
552584
552585
552586
552587
552588
552589
552590
552591
552592
552593
552594
552595
552596
552597
552598
552599
552600
552601
552602
552603
552604
552605
552606
552607
552608
552609
552610
552611
552612
552613
552614
552615
552616
552617
552618
552619
552620
552621
552622
552623
552624
552625
552626
552627
552628
552629
552630
552631
552632
552633
552634
552635
552636
552637
552638
552639
552640
552641
552642
552643
552644
552645
552646
552647
552648
552649
552650
552651
552652
552653
552654
552655
552656
552657
552658
552659
552660
552661
552662
552663
552664
552665
552666
552667
552668
552669
552670
552671
552672
552673
552674
552675
552676
552677
552678
552679
552680
552681
552682
552683
552684
552685
552686
552687
552688
552689
552690
552691
552692
552693
552694
552695
552696
552697
552698
552699
552700
552701
552702
552703
552704
552705
552706
552707
552708
552709
552710
552711
552712
552713
552714
552715
552716
552717
552718
552719
552720
552721
552722
552723
552724
552725
552726
552727
552728
552729
552730
552731
552732
552733
552734
552735
552736
552737
552738
552739
552740
552741
552742
552743
552744
552745
552746
552747
552748
552749
552750
552751
552752
552753
552754
552755
552756
552757
552758
552759
552760
552761
552762
552763
552764
552765
552766
552767
552768
552769
552770
552771
552772
552773
552774
552775
552776
552777
552778
552779
552780
552781
552782
552783
552784
552785
552786
552787
552788
552789
552790
552791
552792
552793
552794
552795
552796
552797
552798
552799
552800
552801
552802
552803
552804
552805
552806
552807
552808
552809
552810
552811
552812
552813
552814
552815
552816
552817
552818
552819
552820
552821
552822
552823
552824
552825
552826
552827
552828
552829
552830
552831
552832
552833
552834
552835
552836
552837
552838
552839
552840
552841
552842
552843
552844
552845
552846
552847
552848
552849
552850
552851
552852
552853
552854
552855
552856
552857
552858
552859
552860
552861
552862
552863
552864
552865
552866
552867
552868
552869
552870
552871
552872
552873
552874
552875
552876
552877
552878
552879
552880
552881
552882
552883
552884
552885
552886
552887
552888
552889
552890
552891
552892
552893
552894
552895
552896
552897
552898
552899
552900
552901
552902
552903
552904
552905
552906
552907
552908
552909
552910
552911
552912
552913
552914
552915
552916
552917
552918
552919
552920
552921
552922
552923
552924
552925
552926
552927
552928
552929
552930
552931
552932
552933
552934
552935
552936
552937
552938
552939
552940
552941
552942
552943
552944
552945
552946
552947
552948
552949
552950
552951
552952
552953
552954
552955
552956
552957
552958
552959
552960
552961
552962
552963
552964
552965
552966
552967
552968
552969
552970
552971
552972
552973
552974
552975
552976
552977
552978
552979
552980
552981
552982
552983
552984
552985
552986
552987
552988
552989
552990
552991
552992
552993
552994
552995
552996
552997
552998
552999
5521000
5521001
5521002
5521003
5521004
5521005
5521006
5521007
5521008
5521009
5521010
5521011
5521012
5521013
5521014
5521015
5521016
5521017
5521018
5521019
5521020
5521021
5521022
5521023
5521024
5521025
5521026
5521027
5521028
5521029
5521030
5521031
5521032
5521033
5521034
5521035
5521036
5521037
5521038
5521039
5521040
5521041
5521042
5521043
5521044
5521045
5521046
5521047
5521048
5521049
5521050
5521051
5521052
5521053
5521054
5521055
5521056
5521057
5521058
5521059
5521060
5521061
5521062
5521063
5521064
5521065
5521066
5521067
5521068
5521069
5521070
5521071
5521072
5521073
5521074
5521075
5521076
5521077
5521078
5521079
5521080
5521081
5521082
5521083
5521084
5521085
5521086
5521087
5521088
5521089
5521090
5521091
5521092
5521093
5521094
5521095
5521096
5521097
5521098
5521099
5521100
5521101
5521102
5521103
5521104
5521105
5521106
5521107
5521108
5521109
5521110
5521111
5521112
5521113
5521114
5521115
5521116
5521117
5521118
5521119
5521120
5521121
5521122
5521123
5521124
5521125
5521126
5521127
5521128
5521129
5521130
5521131
5521132
5521133
5521134
5521135
5521136
5521137
5521138
5521139
5521140
5521141
5521142
5521143
5521144
5521145
5521146
5521147
5521148
5521149
5521150
5521151
5521152
5521153
5521154
5521155
5521156
5521157
5521158
5521159
5521160
5521161
5521162
5521163
5521164
5521165
5521166
5521167
5521168
5521169
5521170
5521171
5521172
5521173
5521174
5521175
5521176
5521177
5521178
5521179
5521180
5521181
5521182
5521183
5521184
5521185
5521186
5521187
5521188
5521189
5521190
5521191
5521192
5521193
5521194
5521195
5521196
5521197
5521198
5521199
5521200
5521201
5521202
5521203
5521204
5521205
5521206
5521207
5521208
5521209
5521210
5521211
5521212
5521213
5521214
5521215
5521216
5521217
5521218
5521219
5521220
5521221
5521222
5521223
5521224
5521225
5521226
5521227
5521228
5521229
5521230
5521231
5521232
5521233
5521234
5521235
5521236
5521237
5521238
5521239
5521240
5521241
5521242
5521243
5521244
5521245
5521246
5521247
5521248
5521249
5521250
5521251
5521252
5521253
5521254
5521255
5521256
5521257
5521258
5521259
5521260
5521261
5521262
5521263
5521264
5521265
5521266
5521267
5521268
5521269
5521270
5521271
5521272
5521273
5521274
5521275
5521276
5521277
5521278
5521279
5521280
5521281
5521282
5521283
5521284
5521285
5521286
5521287
5521288
5521289
5521290
5521291
5521292
5521293
5521294
5521295
5521296
5521297
5521298
5521299
5521300
5521301
5521302
5521303
5521304
5521305
5521306
5521307
5521308
5521309
5521310
5521311
5521312
5521313
5521314
5521315
5521316
5521317
5521318
5521319
5521320
5521321
5521322
5521323
5521324
5521325
5521326
5521327
5521328
5521329
5521330
5521331
5521332
5521333
5521334
5521335
5521336
5521337
5521338
5521339
5521340
5521341
5521342
5521343
5521344
5521345
5521346
5521347
5521348
5521349
5521350
5521351
5521352
5521353
5521354
5521355
5521356
5521357
5521358
5521359
5521360
5521361
5521362
5521363
5521364
5521365
5521366
5521367
5521368

```

```

5542         "items": {
5543             "type": "number"
5544         },
5545         "minItems": 2,
5546         "maxItems": 2
5547     },
5548     "locn": {
5549         "type": "string",
5550         "maxLength": 64,
5551         "description": "Human Friendly Name for location"
5552     },
5553     "c": {
5554         "type": "string",
5555         "maxLength": 64,
5556         "description": "Currency"
5557     },
5558     "r": {
5559         "type": "string",
5560         "maxLength": 64,
5561         "description": "Region"
5562     },
5563     "ln": {
5564         "type": "array",
5565         "items" :
5566         {
5567             "type": "object",
5568             "properties": {
5569                 "language": {
5570                     "allOf": [
5571                         {
5572                             "$ref": "oic.types-schema.json#/definitions/language-tag"
5573                         },
5574                         {
5575                             "description": "An RFC 5646 language tag."
5576                         }
5577                     ]
5578                 },
5579                 "value": {
5580                     "type": "string",
5581                     "maxLength": 64,
5582                     "description": "The Device name in the indicated language."
5583                 }
5584             }
5585         },
5586         "minItems" : 1,
5587         "description": "Localized names"
5588     },
5589     "dl": {
5590         "allOf": [
5591             {
5592                 "$ref": "oic.types-schema.json#/definitions/language-tag"
5593             },
5594             {
5595                 "description": "Default Language as an RFC 5646 language tag."
5596             }
5597         ]
5598     }
5599 }
5600 }
5601 },
5602 "type": "object",
5603 "allOf": [
5604     { "$ref": "oic.core-schema.json#/definitions/oic.core" },
5605     { "$ref": "#/definitions/oic.wk.con" }
5606 ],
5607 "required": ["n"]
5608 }
5609 }

5610 example: |

```

```

5611      {
5612          "n": "My Friendly Device Name",
5613          "rt": ["oic.wk.con"],
5614          "loc": [32.777,-96.797],
5615          "locn": "My Location Name",
5616          "c": "USD",
5617          "r": "MyRegion",
5618          "dl": "en"
5619      }
5620
5621  post:
5622      description: |
5623          Update the information about the Device
5624
5625  is : ['interface-rw']
5626
5627  body:
5628      application/json:
5629          schema: |
5630              {
5631                  "id": "http://www.openconnectivity.org/ocf-apis/core/schemas/oic.wk.con-Update-
5632                  schema.json#",
5633                  "$schema": "http://json-schema.org/draft-04/schema#",
5634                  "description": "Copyright (c) 2016 Open Connectivity Foundation, Inc. All rights
reserved.",
5635                  "definitions": {
5636                      "oic.wk.con": {
5637                          "type": "object",
5638                          "anyOf": [
5639                              {"required": ["loc"]},
5640                              {"required": ["locn"]},
5641                              {"required": ["c"]},
5642                              {"required": ["r"]},
5643                              {"required": ["ln"]},
5644                              {"required": ["dl"]},
5645                              {"required": ["n"]}
5646                          ],
5647                          "properties": {
5648                              "loc": {
5649                                  "type": "array",
5650                                  "description": "Location information (lat, long)",
5651                                  "items": {
5652                                      "type": "number"
5653                                  },
5654                                  "minItems": 2,
5655                                  "maxItems": 2
5656                              },
5657                              "locn": {
5658                                  "type": "string",
5659                                  "maxLength": 64,
5660                                  "description": "Human Friendly Name for location"
5661                              },
5662                              "c": {
5663                                  "type": "string",
5664                                  "maxLength": 64,
5665                                  "description": "Currency"
5666                              },
5667                              "r": {
5668                                  "type": "string",
5669                                  "maxLength": 64,
5670                                  "description": "Region"
5671                              },
5672                              "ln": {
5673                                  "type": "array",
5674                                  "items": [
5675                                      {
5676                                          "type": "object",
5677                                          "properties": {
5678                                              "language": {
5679

```

```

5679         "allOf": [
5680             {
5681                 "$ref": "oic.types-schema.json#/definitions/language-tag"
5682             },
5683             {
5684                 "description": "An RFC 5646 language tag."
5685             }
5686         ]
5687     },
5688     "value": {
5689         "type": "string",
5690         "maxLength": 64,
5691         "description": "The Device name in the indicated language."
5692     }
5693 },
5694 "minItems" : 1,
5695     "description": "Localized names"
5696 },
5697 "dl": {
5698     "allOf": [
5699         {
5700             "$ref": "oic.types-schema.json#/definitions/language-tag"
5701         },
5702         {
5703             "description": "Default Language as an RFC 5646 language tag."
5704         }
5705     ]
5706 }
5707 }
5708 }
5709 },
5710 },
5711 "type": "object",
5712 "allOf": [
5713     { "$ref": "oic.core-schema.rw.json#/definitions/oic.core" },
5714     { "$ref": "#/definitions/oic.wk.con" }
5715 ],
5716 }
5717 }

5718 example: |
5719 {
5720     "n": "Nuevo Nombre Amistoso",
5721     "r": "MyNewRegion",
5722     "ln": [ { "language": "es", "value": "Nuevo Nombre Amistoso" } ],
5723     "dl": "es"
5724 }
5725 }

5726 responses :
5727 200:
5728     body:
5729         application/json:
5730             schema: |
5731             {
5732                 "id": "http://www.openconnectivity.org/ocf-apis/core/schemas/oic.wk.con-Update-
schema.json#",
5733                 "$schema": "http://json-schema.org/draft-04/schema#",
5734                 "description": "Copyright (c) 2016 Open Connectivity Foundation, Inc. All rights
reserved.",
5735                 "definitions": {
5736                     "oic.wk.con": {
5737                         "type": "object",
5738                         "anyOf": [
5739                             {"required": ["loc"]},
5740                             {"required": ["locn"]},
5741                             {"required": ["c"]},
5742                             {"required": ["r"]},
5743                             {"required": ["ln"]},
5744                         ]
5745                     }
5746                 }
5747             }
5748         }
5749     }
5750 }
```

```

5746     {"required": ["dl"]}),
5747     {"required": ["n"]}
5748 ],
5749 "properties": {
5750   "loc": {
5751     "type": "array",
5752     "description": "Location information (lat, long)",
5753     "items": {
5754       "type": "number"
5755     },
5756     "minItems": 2,
5757     "maxItems": 2
5758   },
5759   "locn": {
5760     "type": "string",
5761     "maxLength": 64,
5762     "description": "Human Friendly Name for location"
5763   },
5764   "c": {
5765     "type": "string",
5766     "maxLength": 64,
5767     "description": "Currency"
5768   },
5769   "r": {
5770     "type": "string",
5771     "maxLength": 64,
5772     "description": "Region"
5773   },
5774   "in": {
5775     "type": "array",
5776     "items": [
5777       {
5778         "type": "object",
5779         "properties": {
5780           "language": {
5781             "allOf": [
5782               {
5783                 "$ref": "oic.types-schema.json#/definitions/language-tag"
5784               },
5785               {
5786                 "description": "An RFC 5646 language tag."
5787               }
5788             ]
5789           },
5790           "value": {
5791             "type": "string",
5792             "maxLength": 64,
5793             "description": "The Device name in the indicated language."
5794           }
5795         }
5796       },
5797       "minItems": 1,
5798       "description": "Localized names"
5799     },
5800   "dl": {
5801     "allOf": [
5802       {
5803         "$ref": "oic.types-schema.json#/definitions/language-tag"
5804       },
5805       {
5806         "description": "Default Language as an RFC 5646 language tag."
5807       }
5808     ]
5809   }
5810 }
5811 },
5812 },
5813 "type": "object",
5814 "allOf": [
5815   {"$ref": "oic.core-schema.rw.json#/definitions/oic.core"},
5816   {"$ref": "#/definitions/oic.wk.con" }

```

```

5817         ]
5818     }
5819
5820     example: |
5821     {
5822       "n": "Nuevo Nombre Amistoso",
5823       "r": "MyNewRegion",
5824       "ln": [ { "language": "es", "value": "Nuevo Nombre Amistoso" } ],
5825       "dl": "es"
5826     }
5827

```

5828 D.3.5 Property Definition

Property name	Value type	Mandatory	Access mode	Description
loc	array: see schema			Location information (lat, long)
c	string			Currency
ln	array: see schema			Localized names
value (ln)	string			The Device name in the indicated language.
language (ln)	multiple types: see schema			
locn	string			Human Friendly Name for location
dl	multiple types: see schema			
r	string			Region

5829 D.3.6 CRUDN behaviour

Resource	Create	Read	Update	Delete	Notify
/exampleDeviceConfigurationResURI		get	post		

5830 D.4 Platform Configuration

5831 D.4.1 Introduction

5832 Resource that allows for platform specific information to be configured.

5833 D.4.2 Example URI

5834 /examplePlatformConfigurationResURI

5835 D.4.3 Resource Type

5836 The resource type (rt) is defined as: oic.wk.con.p.

5837 D.4.4 RAML Definition

```

5838 #%RAML 0.8
5839 title: OCF Platform Configuration
5840 version: v1-20160622
5841 traits:
5842   - interface-rw :
5843     queryParameters:
5844       if:
5845         enum: ["oic.if.rw"]

```

```

5846 - interface-all :
5847   queryParameters:
5848     if:
5849       enum: ["oic.if.rw", "oic.if.baseline"]
5850
5851 /examplePlatformConfigurationResURI:
5852   description: |
5853     Resource that allows for platform specific information to be configured.
5854
5855   get:
5856     description: |
5857       Retrieves the current platform configuration settings
5858
5859     is : ['interface-all']
5860
5861   responses :
5862     200:
5863       body:
5864         application/json:
5865           schema: |
5866             {
5867               "id": "http://www.openconnectivity.org/ocf-apis/core/schemas/oic.wk.con.p-
5868               schema.json#",
5869               "$schema": "http://json-schema.org/draft-04/schema#",
5870               "description" : "Copyright (c) 2017 Open Connectivity Foundation, Inc. All rights
5871               reserved.",
5872               "definitions": {
5873                 "oic.wk.con.p": {
5874                   "type": "object",
5875                   "properties": {
5876                     "mnpn": {
5877                       "type": "array",
5878                       "items" :
5879                         {
5880                           "type": "object",
5881                           "properties": {
5882                             "language": {
5883                               "allOf": [
5884                                 {
5885                                   "$ref": "oic.types-schema.json#/definitions/language-tag"
5886                                 },
5887                                 {
5888                                   "description": "An RFC 5646 language tag."
5889                                 }
5890                               ],
5891                             "value": {
5892                               "type": "string",
5893                               "maxLength": 64,
5894                               "description": "The Platform description in the indicated
5895                               language."
5896                             }
5897                           }
5898                         },
5899                         "minItems" : 1,
5900                         "description": "Platform names"
5901                     }
5902                   }
5903                 }
5904               },
5905               "type": "object",
5906               "allOf": [
5907                 { "$ref": "oic.core-schema.json#/definitions/oic.core"},
5908                 { "$ref": "#/definitions/oic.wk.con.p" }
5909               ]
5910             }
5911           }
5912         }
5913       }
5914     }
5915   }
5916 }
```

```

5910         }
5911
5912     example: |
5913     {
5914         "rt": ["oic.wk.con.p"],
5915         "mnpn": [ { "language": "en", "value": "My Friendly Device Name" } ]
5916     }
5917
5918 post:
5919     description: |
5920         Update the information about the platform
5921
5922     is : ['interface-rw']
5923     body:
5924         application/json:
5925             schema: |
5926                 {
5927                     "id": "http://www.openconnectivity.org/ocf-apis/core/schemas/oic.wk.con.p-Update-
5928 schema.json#",
5929                     "$schema": "http://json-schema.org/draft-04/schema#",
5930                     "description" : "Copyright (c) 2017 Open Connectivity Foundation, Inc. All rights
5931 reserved.",
5932                     "definitions": {
5933                         "oic.wk.con.p": {
5934                             "type": "object",
5935                             "properties": {
5936                                 "mnpn": {
5937                                     "type": "array",
5938                                     "items" :
5939                                         {
5940                                             "type": "object",
5941                                             "properties": {
5942                                                 "language": {
5943                                                     "allOf": [
5944                                                         {
5945                                                             "$ref": "oic.types-schema.json#/definitions/language-tag"
5946                                                         },
5947                                                         {
5948                                                             "description": "An RFC 5646 language tag."
5949                                                         }
5950                                                     ]
5951                                                 },
5952                                                 "value": {
5953                                                     "type": "string",
5954                                                     "maxLength": 64,
5955                                                     "description": "The Platform description in the indicated language."
5956                                                 }
5957                                             },
5958                                         },
5959                                         "minItems" : 1,
5960                                         "description": "Platform names"
5961                                     }
5962                                 }
5963                             }
5964                         }
5965                     "type": "object",
5966                     "allOf": [
5967                         { "$ref": "oic.core-schema.rw.json#/definitions/oic.core" },
5968                         { "$ref": "#/definitions/oic.wk.con.p" }
5969                     ],
5970                     "required": ["mnpn"]
5971                 }
5972             example: |

```

```

5974     {
5975         "n": "Nuevo nombre",
5976         "mnpn": [ { "language": "es", "value": "Nuevo nombre de Plataforma Amigable" } ]
5977     }
5978
5979     responses :
5980     200:
5981         body:
5982             application/json:
5983             schema: |
5984                 {
5985                     "id": "http://www.openconnectivity.org/ocf-apis/core/schemas/oic.wk.con.p-Update-
5986 schema.json#",
5987                     "$schema": "http://json-schema.org/draft-04/schema#",
5988                     "description" : "Copyright (c) 2017 Open Connectivity Foundation, Inc. All rights
5989 reserved.",
5990                     "definitions": {
5991                         "oic.wk.con.p": {
5992                             "type": "object",
5993                             "properties": {
5994                                 "mnpn": {
5995                                     "type": "array",
5996                                     "items" :
5997                                         {
5998                                             "type": "object",
5999                                             "properties": {
6000                                                 "language": {
6001                                                     "allOf": [
6002                                                         {
6003                                                             "$ref": "oic.types-schema.json#/definitions/language-tag"
6004                                                         },
6005                                                         {
6006                                                             "description": "An RFC 5646 language tag."
6007                                                         }
6008                                         ],
6009                                         },
6010                                         "value": {
6011                                             "type": "string",
6012                                             "maxLength": 64,
6013                                             "description": "The Platform description in the indicated
6014 language."
6015                                         }
6016                                         }
6017                                         },
6018                                         "minItems" : 1,
6019                                         "description": "Platform names"
6020                                         }
6021                                         }
6022                                         },
6023                                         "type": "object",
6024                                         "allOf": [
6025                                             { "$ref": "oic.core-schema.rw.json#/definitions/oic.core" },
6026                                             { "$ref": "#/definitions/oic.wk.con.p" }
6027                                         ],
6028                                         "required": ["mnpn"]
6029                                         }
6030                                         }
6031                                         }
6032                                         }
6033                                         example: |
6034                                         {
6035                                             "n": "Nuevo nombre",
6036                                             "mnpn": [ { "language": "es", "value": "Nuevo nombre de Plataforma Amigable" } ]
6037                                         }

```

6038 **D.4.5 Property Definition**

Property name	Value type	Mandatory	Access mode	Description
mnpn	array: see schema			Platform names
value (mnpn)	string			The Platform description in the indicated language.
language (mnpn)	multiple types: see schema			

6039 **D.4.6 CRUDN behaviour**

Resource	Create	Read	Update	Delete	Notify
/examplePlatformConfigurationResURI		get	post		

6040 **D.5 Device**6041 **D.5.1 Introduction**

6042 Known resource that is hosted by every Server. Allows for logical device specific information to be discovered.

6044 **D.5.2 Wellknown URI**

6045 /oic/d

6046 **D.5.3 Resource Type**

6047 The resource type (rt) is defined as: oic.wk.d.

6048 **D.5.4 RAML Definition**

```

6049 #%RAML 0.8
6050 title: OIC Root Device
6051 version: v1-20160622
6052 traits:
6053 - interface :
6054   queryParameters:
6055   if:
6056     enum: ["oic.if.r", "oic.if.baseline"]
6057
6058 /oic/d:
6059   description: |
6060     Known resource that is hosted by every Server.
6061     Allows for logical device specific information to be discovered.
6062
6063   is : ['interface']
6064   get:
6065     description: |
6066       Retrieve the information about the Device
6067
6068   responses :
6069     200:
6070       body:
6071         application/json:
6072           schema: |
6073             {
6074               "$$schema": "http://json-schemas.org/draft-04/schema#",
6075               "description" : "Copyright (c) 2016, 2017 Open Connectivity Foundation, Inc. All

```

```

6076 rights reserved.",
6077         "id": "http://www.openconnectivity.org/ocf-apis/core/schemas/oic.wk.d-
6078 schema.json#",
6079         "definitions": {
6080             "oic.wk.d": {
6081                 "type": "object",
6082                 "properties": {
6083                     "di": {
6084                         "allOf": [
6085                             {
6086                                 "$ref": "oic.types-schema.json#/definitions/uuid"
6087                             },
6088                             {
6089                                 "readOnly": true,
6090                                 "description": "Unique identifier for device"
6091                             }
6092                         ]
6093                     },
6094                     "icv": {
6095                         "type": "string",
6096                         "maxLength": 64,
6097                         "readOnly": true,
6098                         "description": "The version of the OIC Server"
6099                     },
6100                     "dmv": {
6101                         "type": "string",
6102                         "maxLength": 256,
6103                         "readOnly": true,
6104                         "description": "Spec versions of the Resource and Device Specifications to
6105 which this device data model is implemented"
6106                 },
6107                 "id": {
6108                     "type": "array",
6109                     "items": {
6110                         {
6111                             "type": "object",
6112                             "properties": {
6113                                 "language": {
6114                                     "allOf": [
6115                                         {
6116                                             "$ref": "oic.types-schema.json#/definitions/language-tag"
6117                                         },
6118                                         {
6119                                             "readOnly": true,
6120                                             "description": "An RFC 5646 language tag."
6121                                         }
6122                                     ]
6123                                 },
6124                                 "value": {
6125                                     "type": "string",
6126                                     "maxLength": 64,
6127                                     "readOnly": true,
6128                                     "description": "Device description in the indicated language."
6129                                 }
6130                             },
6131                         },
6132                         "minItems": 1,
6133                         "readOnly": true,
6134                         "description": "Localized Descriptions."
6135                     },
6136                     "sv": {
6137                         "type": "string",
6138                         "maxLength": 64,
6139                         "readOnly": true,
6140                         "description": "Software version."
6141                     },
6142                     "dmn": {
6143                         "type": "array",
6144                         "items": {
6145                             {
6146                                 "type": "object",

```

```

6147         "properties": {
6148             "language": {
6149                 "allOf": [
6150                     {
6151                         "$ref": "oic.types-schema.json#/definitions/language-tag"
6152                     },
6153                     {
6154                         "readOnly": true,
6155                         "description": "An RFC 5646 language tag."
6156                     }
6157                 ],
6158             },
6159             "value": {
6160                 "type": "string",
6161                 "maxLength": 64,
6162                 "readOnly": true,
6163                 "description": "Manufacturer name in the indicated language."
6164             }
6165         },
6166     },
6167     "minItems": 1,
6168     "readOnly": true,
6169     "description": "Manufacturer Name."
6170 },
6171     "dmno": {
6172         "type": "string",
6173         "maxLength": 64,
6174         "readOnly": true,
6175         "description": "Model number as designated by manufacturer."
6176     },
6177     "piid": {
6178         "allOf": [
6179             {
6180                 "$ref": "oic.types-schema.json#/definitions/uuid"
6181             },
6182             {
6183                 "readOnly": true,
6184                 "description": "Protocol independent unique identifier for device that
6185 is immutable."
6186             }
6187         ]
6188     }
6189   }
6190 },
6191   "type": "object",
6192   "allOf": [
6193       { "$ref": "oic.core-schema.json#/definitions/oic.core" },
6194       { "$ref": "#/definitions/oic.wk.d" }
6195   ],
6196   "required": [ "n", "di", "icv", "dmv", "piid" ]
6197 }
6198
6199
6200 example: |
6201 {
6202     "n": "Device 1",
6203     "rt": ["oic.wk.d"],
6204     "di": "54919CA5-4101-4AE4-595B-353C51AA983C",
6205     "icv": "ocf.1.0.0",
6206     "dmv": "ocf.res.1.0.0, ocf.sh.1.0.0",
6207     "piid": "6F0AAC04-2BB0-468D-B57C-16570A26AE48"
6208 }
6209

```

D.5.5 Property Definition

Property name	Value type	Mandatory	Access mode	Description
Id	array: schema	see	Read Only	Localized Descriptions.

value (ld)	string		Read Only	Device description in the indicated language.
language (ld)	multiple types: see schema			
piid	multiple types: see schema	yes		
di	multiple types: see schema	yes		
dmno	string		Read Only	Model number as designated by manufacturer.
sv	string		Read Only	Software version.
dmn	array: see schema		Read Only	Manufacturer Name.
value (dmn)	string		Read Only	Manufacturer name in the indicated language.
language (dmn)	multiple types: see schema			
dmv	string	yes	Read Only	Spec versions of the Resource and Device Specifications to which this device data model is implemented
icv	string	yes	Read Only	The version of the OIC Server

6211 **D.5.6 CRUDN behaviour**

Resource	Create	Read	Update	Delete	Notify
/oic/d		get			

6212 **D.6 Maintenance**

6213 **D.6.1 Introduction**

6214 The resource through which a Device is maintained and can be used for diagnostic purposes. fr
 6215 (Factory Reset) is a boolean. The value 0 means No action (Default), the value 1 means Start
 6216 Factory Reset After factory reset, this value shall be changed back to the default value rb (Reboot)
 6217 is a boolean. The value 0 means No action (Default), the value 1 means Start Reboot After Reboot,
 6218 this value shall be changed back to the default value

6219 **D.6.2 Wellknown URI**

6220 /oic/mnt

6221 **D.6.3 Resource Type**

6222 The resource type (rt) is defined as: oic.wk.mnt.

6223 **D.6.4 RAML Definition**

6224 `#%RAML 0.8`

6225 `title: Maintenance`
 6226 `version: v1-20160622`

```

6227 traits:
6228   - interface-rw :
6229     queryParameters:
6230       if:
6231         enum: ["oic.if.rw", "oic.if.baseline"]
6232   - interface-all :
6233     queryParameters:
6234       if:
6235         enum: ["oic.if.rw", "oic.if.r", "oic.if.baseline"]
6236
6237 /oic/mnt:
6238   description: |
6239     The resource through which a Device is maintained and can be used for diagnostic purposes.
6240     fr (Factory Reset) is a boolean.
6241     The value 0 means No action (Default), the value 1 means Start Factory Reset
6242     After factory reset, this value shall be changed back to the default value
6243     rb (Reboot) is a boolean.
6244     The value 0 means No action (Default), the value 1 means Start Reboot
6245     After Reboot, this value shall be changed back to the default value
6246
6247 get:
6248   description: |
6249     Retrieve the maintenance action status
6250
6251   is : ['interface-all']
6252   responses :
6253     200:
6254       body:
6255         application/json:
6256           schema: |
6257             {
6258               "$schema": "http://json-schemas.org/draft-04/schema#",
6259               "description" : "Copyright (c) 2016, 2017 Open Connectivity Foundation, Inc. All
6260 rights reserved.",
6261               "id": "http://www.openconnectivity.org/ocf-apis/core/schemas/oic.wk.mnt-
6262 schema.json#",
6263               "definitions": {
6264                 "oic.wk.mnt": {
6265                   "type": "object",
6266                   "anyOf": [
6267                     {"required": ["fr"]},
6268                     {"required": ["rb"]}
6269                   ],
6270                   "properties": {
6271                     "fr": {
6272                       "type": "boolean",
6273                       "description": "Factory Reset"
6274                     },
6275                     "rb": {
6276                       "type": "boolean",
6277                       "description": "Reboot Action"
6278                     }
6279                   }
6280                 },
6281                 "type": "object",
6282                 "allOf": [
6283                   { "$ref": "oic.core-schema.json#/definitions/oic.core" },
6284                   { "$ref": "#/definitions/oic.wk.mnt" }
6285                 ]
6286               }
6287             }
6288           }

```

```

6289     example: |
6290     {
6291         "rt": ["oic.wk.mnt"],
6292         "fr": false,
6293         "rb": false
6294     }
6295
6296 post:
6297     description: |
6298         Set the maintenance action(s)
6299
6300     is : ['interface-rw']
6301     body:
6302         application/json:
6303             schema: |
6304             {
6305                 "$schema": "http://json-schemas.org/draft-04/schema#",
6306                 "description": "Copyright (c) 2016, 2017 Open Connectivity Foundation, Inc. All rights
reserved.",
6307                 "id": "http://www.openconnectivity.org/ocf-apis/core/schemas/oic.wk.mnt-schema.json#",
6308                 "definitions": {
6309                     "oic.wk.mnt": {
6310                         "type": "object",
6311                         "anyOf": [
6312                             {"required": ["fr"]},
6313                             {"required": ["rb"]}
6314                         ],
6315                         "properties": {
6316                             "fr": {
6317                                 "type": "boolean",
6318                                 "description": "Factory Reset"
6319                             },
6320                             "rb": {
6321                                 "type": "boolean",
6322                                 "description": "Reboot Action"
6323                             }
6324                         }
6325                     }
6326                 },
6327                 "type": "object",
6328                 "allOf": [
6329                     { "$ref": "oic.core-schema.json#/definitions/oic.core" },
6330                     { "$ref": "#/definitions/oic.wk.mnt" }
6331                 ]
6332             }
6333         }
6334
6335     example: |
6336     {
6337         "fr": false,
6338         "rb": false
6339     }
6340
6341     responses :
6342     200:
6343         body:
6344             application/json:
6345                 schema: |
6346                 {
6347                     "$schema": "http://json-schemas.org/draft-04/schema#",
6348                     "description": "Copyright (c) 2016, 2017 Open Connectivity Foundation, Inc. All
rights reserved.",
6349                     "id": "http://www.openconnectivity.org/ocf-apis/core/schemas/oic.wk.mnt-
schema.json#",

```

```

6352
6353         "definitions": {
6354             "oic.wk.mnt": {
6355                 "type": "object",
6356                 "anyOf": [
6357                     {"required": ["fr"]},
6358                     {"required": ["rb"]}
6359                 ],
6360                 "properties": {
6361                     "fr": {
6362                         "type": "boolean",
6363                         "description": "Factory Reset"
6364                     },
6365                     "rb": {
6366                         "type": "boolean",
6367                         "description": "Reboot Action"
6368                     }
6369                 }
6370             },
6371             "type": "object",
6372             "allOf": [
6373                 { "$ref": "oic.core-schema.json#/definitions/oic.core" },
6374                 { "$ref": "#/definitions/oic.wk.mnt" }
6375             ]
6376         }
6377     }

6378     example: |
6379     {
6380         "fr": false,
6381         "rb": false
6382     }
6383

```

D.6.5 Property Definition

Property name	Value type	Mandatory	Access mode	Description
fr	boolean	yes		Factory Reset
rb	boolean	yes		Reboot Action

D.6.6 CRUDN behaviour

Resource	Create	Read	Update	Delete	Notify
/oic/mnt		get	post		

D.7 Platform

D.7.1 Introduction

Known resource that is defines the platform on which an Server is hosted. Allows for platform specific information to be discovered.

D.7.2 Wellknown URI

/oic/p

D.7.3 Resource Type

The resource type (rt) is defined as: oic.wk.p.

D.7.4 RAML Definition

```

6395 #%RAML 0.8
6396 title: Platform
6397 version: v1-20160622
6398 traits:
6399   - interface :
6400     queryParameters:
6401       if:

```

```

6402     enum: ["oic.if.r", "oic.if.baseline"]
6403
6404 /oic/p:
6405     description: |
6406         Known resource that is defines the platform on which an Server is hosted.
6407         Allows for platform specific information to be discovered.
6408
6409     is : ['interface']
6410     get:
6411         description: |
6412             Retrieve the information about the Platform
6413
6414     responses :
6415     200:
6416         body:
6417             application/json:
6418             schema: |
6419             {
6420                 "$schema": "http://json-schemas.org/draft-04/schema#",
6421                 "description" : "Copyright (c) 2016, 2017 Open Connectivity Foundation, Inc. All
rights reserved.",
6422                 "id": "http://www.openconnectivity.org/ocf-apis/core/schemas/oic.wk.p-
schema.json#",
6423                 "definitions": {
6424                     "oic.wk.p": {
6425                         "type": "object",
6426                         "properties": {
6427                             "pi": {
6428                                 "allOf": [
6429                                     {
6430                                         "$ref": "oic.types-schema.json#/definitions/uuid"
6431                                     },
6432                                     {
6433                                         "readOnly": true,
6434                                         "description": "Platform Identifier"
6435                                     }
6436                                 ]
6437                             },
6438                         },
6439                     },
6440                     "mnmn": {
6441                         "type": "string",
6442                         "readOnly": true,
6443                         "description": "Manufacturer Name",
6444                         "maxLength": 64
6445                     },
6446                     "mmml": {
6447                         "type": "string",
6448                         "readOnly": true,
6449                         "description": "Manufacturer's URL",
6450                         "maxLength": 256,
6451                         "format": "uri"
6452                     },
6453                     "mmmo": {
6454                         "type": "string",
6455                         "maxLength": 64,
6456                         "readOnly": true,
6457                         "description": "Model number as designated by the manufacturer"
6458                     },
6459                     "mndt": {
6460                         "allOf": [
6461                             {
6462                                 "$ref": "oic.types-schema.json#/definitions/date"
6463                             },
6464                             {
6465                                 "readOnly": true,
6466                                 "description": "Manufacturing Date in ISO8601 format."
6467                             }
6468                         ]
6469                     }
6470                 }
6471             }
6472         }
6473     }
6474
6475     404:
6476         description: |
6477             The requested resource was not found.
6478
6479     default:
6480         description: |
6481             An unexpected error occurred.

```

```

6467         }
6468     ]
6469 },
6470 "mnpv": {
6471   "type": "string",
6472   "maxLength": 64,
6473   "readOnly": true,
6474   "description": "Platform Version"
6475 },
6476 "mnos": {
6477   "type": "string",
6478   "maxLength": 64,
6479   "readOnly": true,
6480   "description": "Platform Resident OS Version"
6481 },
6482 "mnhw": {
6483   "type": "string",
6484   "maxLength": 64,
6485   "readOnly": true,
6486   "description": "Platform Hardware Version"
6487 },
6488 "mnfv": {
6489   "type": "string",
6490   "maxLength": 64,
6491   "readOnly": true,
6492   "description": "Manufacturer's firmware version"
6493 },
6494 "mnsl": {
6495   "type": "string",
6496   "readOnly": true,
6497   "description": "Manufacturer's Support Information URL",
6498   "maxLength": 256,
6499   "format": "uri"
6500 },
6501 "st": {
6502   "type": "string",
6503   "readOnly": true,
6504   "description": "Reference time for the device in ISO8601 format.",
6505   "format": "date-time"
6506 },
6507 "vid": {
6508   "type": "string",
6509   "maxLength": 64,
6510   "readOnly": true,
6511   "description": "Manufacturer's defined information for the platform. The
content is freeform, with population rules up to the manufacturer"
6512   }
6513   }
6514   }
6515   }
6516 },
6517 "type": "object",
6518 "allOf": [
6519   { "$ref": "oic.core-schema.json#/definitions/oic.core" },
6520   { "$ref": "#/definitions/oic.wk.p" }
6521 ],
6522 "required": [ "pi", "mnnmn" ]
6523 }
6524 }

6525 example: |
6526 {
6527   "pi": "54919CA5-4101-4AE4-595B-353C51AA983C",
6528   "rt": ["oic.wk.p"],
6529   "mnnmn": "Acme, Inc"
6530 }
6531

```

D.7.5 Property Definition

Property name	Value type	Mandatory	Access mode	Description
---------------	------------	-----------	-------------	-------------

mnnv	string		Read Only	Manufacturer's firmware version
vid	string		Read Only	Manufacturer's defined information for the platform. The content is freeform, with population rules up to the manufacturer
mnmn	string	yes	Read Only	Manufacturer Name
mnmo	string		Read Only	Model number as designated by the manufacturer
mnml	string		Read Only	Manufacturer's URL
mnos	string		Read Only	Platform Resident OS Version
mnrt	multiple types: see schema			
st	string		Read Only	Reference time for the device in ISO8601 format.
mnsl	string		Read Only	Manufacturer's Support Information URL
mnpv	string		Read Only	Platform Version
pi	multiple types: see schema	yes		
mnhw	string		Read Only	Platform Hardware Version

6533 **D.7.6 CRUDN behaviour**

Resource	Create	Read	Update	Delete	Notify
/oic/p		get			

6534 **D.8 Discoverable Resources Baseline Interface**

6535 **D.8.1 Introduction**

6536 Baseline representation of /oic/res; list of discoverable resources

6537 **D.8.2 Wellknown URI**

6538 /oic/res

6539 **D.8.3 Resource Type**

6540 The resource type (rt) is defined as: oic.wk.res.

6541 **D.8.4 RAML Definition**

6542 `#%RAML 0.8`

6543 `title: Discoverable Resources`

6544 `version: v1-20160622`

```

6545 traits:
6546   - interface-ll :
6547     queryParameters:
6548       if:
6549         enum: ["oic.if.ll"]
6550   - interface-baseline :
6551     queryParameters:
6552       if:
6553         enum: ["oic.if.baseline"]
6554   - interface-all :
6555     queryParameters:
6556       if:
6557         enum: ["oic.if.ll", "oic.if.baseline"]
6558
6559 /oic/res?if=oic.if.baseline:
6560   description: |
6561     Baseline representation of /oic/res; list of discoverable resources
6562
6563   is : ['interface-baseline']
6564
6565   get:
6566     description: |
6567       Retrieve the discoverable resource set, baseline interface
6568
6569   responses :
6570     200:
6571       body:
6572         application/json:
6573           schema: |
6574             {
6575               "$schema": "http://json-schema.org/draft-v4/schema#",
6576               "description" : "Copyright (c) 2016, 2017 Open Connectivity Foundation, Inc. All
rights reserved.",
6577               "id": "http://www.openconnectivity.org/ocf-apis/core/schemas/oic.wk.res-
schema.json#",
6578               "definitions": {
6579                 "oic.res-baseline": {
6580                   "type": "object",
6581                   "properties": {
6582                     "rt": {
6583                       "type": "array",
6584                       "items" : {
6585                         "type" : "string",
6586                         "maxLength": 64
6587                       },
6588                       "minItems" : 1,
6589                       "readOnly": true,
6590                       "description": "Resource Type of the Resource"
6591                     },
6592                     "if": {
6593                       "type": "array",
6594                       "items": {
6595                         "type" : "string",
6596                         "enum" : ["oic.if.baseline", "oic.if.ll"]
6597                       },
6598                       "minItems": 1,
6599                       "readOnly": true,
6600                       "description": "The interface set supported by this resource"
6601                     },
6602                     "n": {
6603                       "type": "string",
6604                       "maxLength": 64,
6605                       "readOnly": true,
6606                     }
6607                 }
6608               }
6609             }
6610           }
6611         }
6612       }
6613     }
6614   }
6615 }
```

```

6607         "description": "Human friendly name"
6608     },
6609     "links": {
6610         "type": "array",
6611         "items": {
6612             "$ref": "oic.oic-link-schema.json#/definitions/oic.oic-link"
6613         }
6614     },
6615     "required": ["rt", "if", "links"]
6616   },
6617   "description": "The list of resources expressed as Links",
6618   "type": "array",
6619   "items": {
6620       "$ref": "#/definitions/oic.res-baseline"
6621   }
6622 }
6623
6624
6625
6626 example: |
6627 [
6628   {
6629     "rt": ["oic.wk.res"],
6630     "if": ["oic.if.baseline", "oic.if.ll"],
6631     "links": [
6632       [
6633         {
6634           "href": "/humidity",
6635           "rt": ["oic.r.humidity"],
6636           "if": ["oic.if.s"],
6637           "p": {"bm": 3},
6638           "eps": [
6639             {"ep": "coaps://[fe80::b1d6]:1111", "pri": 2},
6640             {"ep": "coaps://[fe80::b1d6]:1122"},
6641             {"ep": "coap+tcp://[2001:db8:a::123]:2222", "pri": 3}
6642           ],
6643         },
6644         {
6645           "href": "/temperature",
6646           "rt": ["oic.r.temperature"],
6647           "if": ["oic.if.s"],
6648           "p": {"bm": 3},
6649           "eps": [
6650             {"ep": "coaps://[2001:db8:a::123]:2222"}
6651           ]
6652         }
6653       ]
6654     ]
6655   ]
6656 ]

```

D.8.5 Property Definition

Property name	Value type	Mandatory	Access mode	Description
rt	array: schema	see	yes	Read Only Resource Type of the Resource
n	string			Read Only Human friendly name
links	array: schema	see	yes	
if	array: schema	see	yes	Read Only The interface set supported by this resource

D.8.6 CRUDN behaviour

Resource	Create	Read	Update	Delete	Notify
----------	--------	------	--------	--------	--------

Deleted:
 "mpro": {
 "readOnly":
 true,
 "description":
 "Supported messaging protocols",
 "type":
 "string",
 "maxLength": 64

Comment [BRA119]: [Editorial] BZ #2372

Deleted: mpro

[... [15]

/oic/res		get			
----------	--	-----	--	--	--

6669 **D.9 Discoverable Resources Link List interface**

6670 **D.9.1 Introduction**

6671 Link list representation of /oic/res; list of discoverable resources

6672 **D.9.2 Wellknown URI**

6673 /oic/res

6674 **D.9.3 Resource Type**

6675 The resource type (rt) is defined as: oic.wk.res.

6676 **D.9.4 RAML Definition**

```

6677 #%RAML 0.8
6678 title: Discoverable Resources
6679 version: v1-20160622
6680 traits:
6681   - interface-ll :
6682     queryParameters:
6683       if:
6684         enum: ["oic.if.ll"]
6685   - interface-baseline :
6686     queryParameters:
6687       if:
6688         enum: ["oic.if.baseline"]
6689   - interface-all :
6690     queryParameters:
6691       if:
6692         enum: ["oic.if.ll", "oic.if.baseline"]

6693
6694 /oic/res?if=oic.if.ll:
6695   description: |
6696     Link list representation of /oic/res; list of discoverable resources
6697
6698   is : ['interface-ll']
6699   get:
6700     description: |
6701       Retrieve the discoverable resource set, link list interface
6702
6703   responses :
6704     200:
6705       body:
6706         application/json:
6707           schema: |
6708             {
6709               "$schema": "http://json-schema.org/draft-v4/schema#",
6710               "description" : "Copyright (c) 2016, 2017 Open Connectivity Foundation, Inc. All
6711 rights reserved.",
6712               "id": "http://www.openconnectivity.org/ocf-apis/core/schemas/oic.wk.res-schema-
6713 ll.json#",
6714               "description": "The list of resources expressed as OCF links without di",
6715               "definitions": {
6716                 "oic.res-ll": {
6717                   "$ref": "oic.oic-link-schema.json#/definitions/oic.oic-link"
6718                 }
6719               },

```

```

6720         "type": "array",
6721         "items": {
6722             "$ref": "#/definitions/oic.res-ll"
6723         }
6724     }
6725
6726     example: |
6727     [
6728         {
6729             "href": "/humidity",
6730             "rt": ["oic.r.humidity"],
6731             "if": ["oic.if.s"],
6732             "p": {"bm": 3},
6733             "eps": [
6734                 {"ep": "coaps://[fe80::b1d6]:1111", "pri": 2},
6735                 {"ep": "coaps://[fe80::b1d6]:1122"},
6736                 {"ep": "coaps+tcp://[2001:db8:a::123]:2222", "pri": 3}
6737             ],
6738         },
6739         {
6740             "href": "/temperature",
6741             "rt": ["oic.r.temperature"],
6742             "if": ["oic.if.s"],
6743             "p": {"bm": 3},
6744             "eps": [
6745                 {"ep": "coaps://[2001:db8:a::123]:2222"}
6746             ]
6747         }
6748     ]

```

D.9.5 Property Definition

Property name	Value type	Mandatory	Access mode	Description
Rt	array: see schema	yes		Resource Type of the Resource
Di	multiple types: see schema			
Title	string			A title for the link relation. Can be used by the UI to provide a context.
Eps	array: see schema			the Endpoint information of the target Resource
pri (eps)	integer			The priority among multiple Endpoints
ep (eps)	string			Transport Protocol Suite + Endpoint Locator
Ins	integer			The instance identifier for this web link in an array of web links - used in collections
P	object: see schema			Specifies the framework policies on the

				Resource referenced by the target URI
bm (p)	integer	yes		Specifies the framework policies on the Resource referenced by the target URI for e.g. observable and discoverable
Href	string	yes		This is the target URI, it can be specified as a Relative Reference or fully-qualified URI.
Rel	multiple types: see schema			The relation of the target URI referenced by the link to the context URI
Type	array: see schema			A hint at the representation of the resource referenced by the target URI. This represents the media types that are used for both accepting and emitting.
anchor	string			This is used to override the context URI e.g. override the URI of the containing collection.
If	array: see schema	yes		The interface set supported by this resource

6751 **D.9.6 CRUDN behaviour**

Resource	Create	Read	Update	Delete	Notify
/oic/res		get			

6752 **D.9.7 Referenced JSON schemas**

6753 **D.9.8 oic.oic-link-schema.json**

```

6754 {
6755   "$schema": "http://json-schema.org/draft-04/schema#",
6756   "description" : "Copyright (c) 2016, 2017 Open Connectivity Foundation, Inc. All rights
6757 reserved.",
6758   "id": "http://www.openconnectivity.org/ocf-apis/core/schemas/oic.oic-link-schema.json#",
6759   "definitions": {
6760     "oic.oic-link": {
6761       "type": "object",

```

```

6762     "properties": {
6763         "href": {
6764             "type": "string",
6765             "maxLength": 256,
6766             "description": "This is the target URI, it can be specified as a Relative Reference or
6767             fully-qualified URI.",
6768             "format": "uri"
6769         },
6770         "rel": {
6771             "oneOf": [
6772                 {
6773                     "type": "array",
6774                     "items": {
6775                         "type": "string",
6776                         "maxLength": 64
6777                     },
6778                     "minItems": 1,
6779                     "default": ["hosts"]
6780                 },
6781                 {
6782                     "type": "string",
6783                     "maxLength": 64,
6784                     "default": "hosts"
6785                 }
6786             ],
6787             "description": "The relation of the target URI referenced by the link to the context URI"
6788         },
6789         "rt": {
6790             "type": "array",
6791             "items": [
6792                 {
6793                     "type": "string",
6794                     "maxLength": 64
6795                 },
6796                 "minItems": 1,
6797                 "description": "Resource Type of the Resource"
6798             },
6799             "if": {
6800                 "type": "array",
6801                 "items": {
6802                     "type": "string",
6803                     "enum": ["oic.if.baseline", "oic.if.ll", "oic.if.b", "oic.if.rw", "oic.if.r",
6804 "oic.if.a", "oic.if.s"]
6805                 },
6806                 "minItems": 1,
6807                 "description": "The interface set supported by this resource"
6808             },
6809             "di": {
6810                 "allOf": [
6811                     {
6812                         "$ref": "oic.types-schema.json#/definitions/uuid"
6813                     },
6814                     {
6815                         "description": "The device ID"
6816                     }
6817                 ],
6818             },
6819             "p": {
6820                 "description": "Specifies the framework policies on the Resource referenced by the target
6821                 URI",
6822                 "type": "object",
6823                 "properties": {
6824                     "bm": {
6825                         "description": "Specifies the framework policies on the Resource referenced by the
6826                         target URI for e.g. observable and discoverable",
6827                         "type": "integer"
6828                     },
6829                     "required": ["bm"]
6830                 },
6831                 "title": {
6832                     "type": "string",
6833                 }
6834             }
6835         }
6836     }
6837 }
```

```

6833     "maxLength": 64,
6834     "description": "A title for the link relation. Can be used by the UI to provide a
6835     context."
6836   },
6837   "anchor": {
6838     "type": "string",
6839     "maxLength": 256,
6840     "description": "This is used to override the context URI e.g. override the URI of the
6841     containing collection.",
6842     "format": "uri"
6843   },
6844   "ins": {
6845     "type": "integer",
6846     "description": "The instance identifier for this web link in an array of web links - used
6847     in collections"
6848   },
6849   "type": {
6850     "type": "array",
6851     "description": "A hint at the representation of the resource referenced by the target
6852     URI. This represents the media types that are used for both accepting and emitting.",
6853   "items" : {
6854     "type": "string",
6855     "maxLength": 64
6856   },
6857   "minItems": 1,
6858   "default": "application/cbor"
6859 },
6860   "eps": {
6861     "type": "array",
6862     "description": "the Endpoint information of the target Resource",
6863   "items": {
6864     "type": "object",
6865     "properties": {
6866       "ep": {
6867         "type": "string",
6868         "format": "uri",
6869         "description": "Transport Protocol Suite + Endpoint Locator"
6870       },
6871       "pri": {
6872         "type": "integer",
6873         "minimum": 1,
6874         "description": "The priority among multiple Endpoints"
6875       }
6876     }
6877   }
6878 },
6879 },
6880   "required": [ "href", "rt", "if" ]
6881 }
6882 },
6883   "type": "object",
6884   "allof": [
6885     { "$ref": "#/definitions/oic.oic-link" }
6886   ]
6887 }
6888 }
```

6889 **D.10 Scenes (Top level)**

6890 **D.10.1 Introduction**

6891 Toplevel Scene resource. This resource is a generic collection resource. The rts value shall contain
 6892 oic.wk.scenecollection resource types.

6893 **D.10.2 Example URI**

6894 /SceneListResURI

6895 **D.10.3 Resource Type**

6896 The resource type (rt) is defined as: oic.wk.scenelist.

```

6897 D.10.4 RAML Definition
6898 #%RAML 0.8
6899 title: Scene
6900 version: v1-20160622
6901 traits:
6902 - interface :
6903   queryParameters:
6904     if:
6905       enum: ["oic.if.a", "oic.if.ll", "oic.if.baseline"]
6906
6907 /SceneListResURI:
6908   description: |
6909     Toplevel Scene resource.
6910     This resource is a generic collection resource.
6911     The rts value shall contain oic.wk.scenecollection resource types.
6912
6913   get:
6914     description: |
6915       Provides the current list of web links pointing to scenes
6916
6917   responses :
6918     200:
6919       body:
6920         application/json:
6921           schema: |
6922             {
6923               "$schema": "http://json-schema.org/draft-04/schema#",
6924               "description" : "Copyright (c) 2016 Open Connectivity Foundation, Inc. All rights
6925 reserved.",
6926               "id": "http://www.openconnectivity.org/ocf-apis/core/schemas/oic.collection-
6927 schema.json#",
6928               "title": "Collection",
6929               "definitions": {
6930                 "oic.oic-link": {
6931                   "type": "object",
6932                   "properties": {
6933                     "href": {
6934                       "type": "string",
6935                       "maxLength": 256,
6936                       "description": "This is the target URI, it can be specified as a
6937 Relative Reference or fully-qualified URI."
6938                     "format": "uri"
6939                   },
6940                   "rel": {
6941                     "oneOf": [
6942                       {
6943                         "type": "array",
6944                         "items": {
6945                           "type": "string",
6946                           "maxLength": 64
6947                         },
6948                         "minItems": 1,
6949                         "default": ["hosts"]
6950                       },
6951                       {
6952                         "type": "string",
6953                         "maxLength": 64,
6954                         "default": "hosts"
6955                       }
6956                     ],
6957                     "description": "The relation of the target URI referenced by the link
6958 to the context URI"
6959                   },
6960                 }
6961               }
6962             }
6963           }
6964         }
6965       }
6966     }
6967   }
6968 }
```

```

6960
6961
6962
6963
6964
6965
6966
6967
6968
6969
6970
6971
6972
6973
6974
6975
6976
6977
6978
6979
6980
6981
6982
6983
6984
6985
6986
6987
6988
6989
6990
6991
6992
6993
6994
6995
6996
6997
6998
6999
7000
7001
7002
7003
7004
7005
7006
7007
7008
7009
7010
7011
7012
7013
7014
7015
7016
7017
7018
7019
7020
7021
7022
7023
7024
7025
7026
7027
7028
7029
7030

        "rt": {
            "type": "array",
            "items": {
                "type": "string",
                "maxLength": 64
            },
            "minItems": 1,
            "description": "Resource Type of the Resource"
        },
        "if": {
            "type": "array",
            "items": {
                "type": "string",
                "enum": ["oic.if.baseline", "oic.if.ll", "oic.if.b", "oic.if.rw",
"oic.if.r", "oic.if.a", "oic.if.s" ]
            },
            "minItems": 1,
            "description": "The interface set supported by this resource"
        },
        "di": {
            "sref": "#/definitions/uuid",
            "description": "The device ID"
        },
        "p": {
            "description": "Specifies the framework policies on the Resource
referenced by the target URI",
            "type": "object",
            "properties": {
                "bm": {
                    "description": "Specifies the framework policies on the Resource
referenced by the target URI for e.g. observable and discoverable",
                    "type": "integer"
                }
            },
            "required": ["bm"]
        },
        "title": {
            "type": "string",
            "maxLength": 64,
            "description": "A title for the link relation. Can be used by the UI to
provide a context."
        },
        "anchor": {
            "type": "string",
            "maxLength": 256,
            "description": "This is used to override the context URI e.g. override
the URI of the containing collection.",
            "format": "uri"
        },
        "ins": {
            "type": "integer",
            "description": "The instance identifier for this web link in an array
of web links - used in collections"
        },
        "type": {
            "type": "array",
            "description": "A hint at the representation of the resource referenced
by the target URI. This represents the media types that are used for both accepting and emitting.",
            "items": {
                "type": "string",
                "maxLength": 64
            },
            "minItems": 1,
            "default": "application/cbor"
        },
        "eps": {
            "type": "array",
            "description": "the Endpoint information of the target Resource",
            "items": {
                "type": "object",
                "properties": {

```

```

7031
7032
7033
7034
7035
7036
7037
7038
7039
7040
7041
7042
7043
7044
7045
7046
7047
7048
7049
7050
7051
7052
7053
7054
7055
7056
7057
7058
7059
7060
7061
7062
7063
7064
7065
7066
7067
7068
7069
7070
7071
7072
7073
7074
7075
7076
7077
7078
7079
7080
7081
7082
7083
7084
7085
7086
7087
7088
7089
7090
7091
7092
7093
7094
7095
7096
7097
7098
7099
7100
7101

    "ep": {
        "type": "string",
        "format": "uri",
        "description": "Transport Protocol Suite + Endpoint Locator"
    },
    "pri": {
        "type": "integer",
        "minimum": 1,
        "description": "The priority among multiple Endpoints"
    }
}
},
"required": [ "href", "rt", "if" ]
},
"oic.collection.linksexpanded": {
    "type": "object",
    "properties": {
        "links": {
            "description": "A set of simple or individual OIC Links.",
            "type": "array",
            "items": {
                "type": "object",
                "properties": {
                    "href": {
                        "type": "string",
                        "maxLength": 256,
                        "description": "This is the target URI, it can be specified as a Relative Reference or fully-qualified URL."
                    },
                    "format": "uri"
                },
                "rel": {
                    "oneOf": [
                        {
                            "type": "array",
                            "items": {
                                "type": "string",
                                "maxLength": 64
                            },
                            "minItems": 1,
                            "default": ["hosts"]
                        },
                        {
                            "type": "string",
                            "maxLength": 64,
                            "default": "hosts"
                        }
                    ],
                    "description": "The relation of the target URI referenced by the link to the context URI"
                }
            }
        }
    }
},
"rt": {
    "type": "array",
    "items": {
        "type": "string",
        "maxLength": 64
    },
    "minItems": 1,
    "description": "Resource Type of the Resource"
},
"if": {
    "type": "array",
    "items": {
        "type": "string",
        "enum": ["oic.if.baseline", "oic.if.ll", "oic.if.b", "oic.if.rw", "oic.if.r", "oic.if.a", "oic.if.s"]
    },
    "minItems": 1,
    "description": "The interface set supported by this resource"
},

```

```

7102         "di": {
7103             "description": "Format pattern according to IETF RFC 4122.",
7104             "type": "string",
7105             "pattern": "^[a-fA-F0-9]{8}-[a-fA-F0-9]{4}-[a-
7106 fA-F0-9]{4}-[a-fA-F0-9]{12}$"
7107         },
7108         "p": {
7109             "description": "Specifies the framework policies on the
7110             Resource referenced by the target URI",
7111             "type": "object",
7112             "properties": {
7113                 "bm": {
7114                     "description": "Specifies the framework policies on the
7115             Resource referenced by the target URI for e.g. observable and discoverable",
7116                     "type": "integer"
7117                 }
7118             },
7119             "required": ["bm"]
7120         },
7121         "title": {
7122             "type": "string",
7123             "maxLength": 64,
7124             "description": "A title for the link relation. Can be used by
7125             the UI to provide a context."
7126     },
7127     "anchor": {
7128         "type": "string",
7129         "maxLength": 256,
7130         "description": "This is used to override the context URI e.g.
7131             override the URI of the containing collection."
7132         "format": "uri"
7133     },
7134     "ins": {
7135         "type": "integer",
7136         "description": "The instance identifier for this web link in
7137             an array of web links - used in collections"
7138     },
7139     "type": {
7140         "type": "array",
7141         "description": "A hint at the representation of the resource
7142             referenced by the target URI. This represents the media types that are used for both accepting and
7143             emitting.",
7144         "items": {
7145             "type": "string",
7146             "maxLength": 64
7147         },
7148         "minItems": 1,
7149         "default": "application/cbor"
7150     },
7151     "eps": {
7152         "type": "array",
7153         "description": "the Endpoint information of the target
7154             Resource",
7155         "items": {
7156             "type": "object",
7157             "properties": {
7158                 "ep": {
7159                     "type": "string",
7160                     "format": "uri",
7161                     "description": "Transport Protocol Suite + Endpoint
7162             Locator"
7163                 },
7164                 "pri": {
7165                     "type": "integer",
7166                     "minimum": 1,
7167                     "description": "The priority among multiple Endpoints"
7168                 }
7169             }
7170         }
7171     },
7172 }

```

```

7173             "required": [ "href", "rt", "if" ]
7174         }
7175     }
7176 },
7177 "oic.core": {
7178     "type": "object",
7179     "properties": {
7180         "rt": {
7181             "type": "array",
7182             "items": {
7183                 "type" : "string",
7184                 "maxLength": 64
7185             },
7186             "minItems" : 1,
7187             "readOnly": true,
7188             "description": "Resource Type of the Resource"
7189         }
7190     }
7191 },
7192 "uuid": {
7193     "description": "Format pattern according to IETF RFC 4122.",
7194     "type": "string",
7195     "pattern": "[a-fA-F0-9]{8}-[a-fA-F0-9]{4}-[a-fA-F0-9]{4}-[a-fA-F0-9]{4}-[a-fA-F0-9]{12}$"
7196 },
7197 },
7198     "oic.collection.links": {
7199         "type": "object",
7200         "properties": {
7201             "links": {
7202                 "description": "A set of simple or individual OIC Links.",
7203                 "type": "array",
7204                 "items": {
7205                     "$ref": "#/definitions/oic.oic-link"
7206                 }
7207             }
7208         }
7209     },
7210     "oic.collection.properties": {
7211         "type": "object",
7212         "description": "A collection is a set of links along with additional
7213 properties to describe the collection itself",
7214         "properties": {
7215             "rts": {
7216                 "$ref": "#/definitions/oic.core/properties/rt",
7217                 "description": "The list of allowable resource types (for
7218 Target and anchors) in links included in the collection"
7219             }
7220         }
7221     }
7222 },
7223 },
7224 "type": "object",
7225 "allOr": [
7226     {"$ref": "oic.core-schema.json#/definitions/oic.core"},
7227     {"$ref": "#/definitions/oic.collection.properties"},
7228     {"$ref": "#/definitions/oic.collection.links"}
7229 ],
7230 }
7231
7232 example: |
7233 {
7234     "rt":      ["oic.wk.scenelist"],
7235     "n":       "list of scene Collections",
7236     "rts":     ["oic.wk.scenecollection"],
7237     "links":  [
7238     ]
7239 }
7240

```

7241 **D.10.5 Property Definition**

Property name	Value type	Mandatory	Access mode	Description
rts	multiple types: see schema			The list of allowable resource types (for Target and anchors) in links included in the collection

7242 **D.10.6 CRUDN behaviour**

Resource	Create	Read	Update	Delete	Notify
/SceneListResURI		get			

7243 **D.11 Scene Collections**7244 **D.11.1 Introduction**

Collection that models a set of Scenes. This resource is a generic collection resource with additional parameters. The rts value shall contain `oic.scenemember` resource types. The additional parameters are `lastScene`, this is the scene value last set by any OCF Client `sceneValues`, this is the list of available scenes `lastScene` shall be listed in `sceneValues`.

7249 **D.11.2 Example URI**

7250 `/SceneCollectionResURI`

7251 **D.11.3 Resource Type**

7252 The resource type (`rt`) is defined as: `oic.wk.scenecollection`.

7253 **D.11.4 RAML Definition**

```

7254 #&RAML 0.8
7255 title: Scene
7256 version: v1-20160622
7257 traits:
7258 - interface :
7259   queryParameters:
7260   if:
7261     enum: ["oic.if.a", "oic.if.ll", "oic.if.baseline"]
7262
7263 /SceneCollectionResURI:
7264   description: |
7265     Collection that models a set of Scenes.
7266     This resource is a generic collection resource with additional parameters.
7267     The rts value shall contain oic.scenemember resource types.
7268     The additional parameters are
7269       lastScene, this is the scene value last set by any OCF Client
7270       sceneValues, this is the list of available scenes
7271       lastScene shall be listed in sceneValues.
7272
7273   get:
7274     description: |
7275       Provides the current list of web links pointing to scenes
7276
7277   responses :
7278     200:
7279       body:
7280         application/json:

```

```

7281     schema: |
7282     {
7283         "$schema": "http://json-schema.org/draft-04/schema#",
7284         "description" : "Copyright (c) 2016, 2017 Open Connectivity Foundation, Inc. All
7285 rights reserved.",
7286         "id": "http://www.openconnectivity.org/ocf-apis/core/schemas/oic.sceneCollection-
7287 schema.json#",
7288         "title" : "Scene Collection",
7289         "definitions": {
7290             "oic.sceneCollection": {
7291                 "type": "object",
7292                 "properties": {
7293                     "lastScene": {
7294                         "type": "string",
7295                         "description": "Last selected Scene from the set of sceneValues"
7296                     },
7297                     "sceneValues": {
7298                         "type": "array",
7299                         "readOnly": true,
7300                         "description": "All available scene values",
7301                         "items": {
7302                             "type": "string"
7303                         }
7304                     }
7305                 },
7306                 "required": [ "lastScene", "sceneValues", "rts", "id" ]
7307             }
7308         },
7309         "type": "object",
7310         "allOf" : [
7311             { "$ref": "oic.core-schema.json#/definitions/oic.core" },
7312             { "$ref": "oic.collection-schema.json#/definitions/oic.collection.properties" },
7313             { "$ref": "oic.collection-schema.json#/definitions/oic.collection.linksexpanded" },
7314             { "$ref": "#/definitions/oic.sceneCollection" }
7315         ]
7316     }
7317 }

7318 example: |
7319 {
7320     "lastScene": "off",
7321     "sceneValues": [ "off", "Reading", "TVWatching" ],
7322     "rt": [ "oic.wk.scenecollection" ],
7323     "n": "My Scenes for my living room",
7324     "id": "0685B960-736F-46F7-BEC0-9E6CBD671ADC1",
7325     "rts": [ "oic.wk.scenemember" ],
7326     "links": [
7327     ]
7328 }
7329

7330 post:
7331     description: |
7332         Provides the action to change the last set scene selection.
7333         Calling this method shall update all scene members to the prescribed membervalue.
7334         When this method is called with the same value as the current lastScene value
7335         then all scene members shall be updated.
7336

7337 body:
7338     application/json:
7339     schema: |
7340     {
7341         "$schema": "http://json-schema.org/draft-04/schema#",
7342         "description" : "Copyright (c) 2016, 2017 Open Connectivity Foundation, Inc. All rights
7343 reserved.",
7344         "id": "http://www.openconnectivity.org/ocf-apis/core/schemas/oic.sceneCollection-
7345 Update-schema.json#",
7346         "title" : "Scene Collection",
7347         "definitions": {

```

```

7348     "oic.sceneCollection-Update": {
7349         "type": "object",
7350         "properties": {
7351             "lastScene": {
7352                 "type": "string",
7353                 "description": "Last selected Scene from the set of sceneValues"
7354             }
7355         },
7356         "required": [ "lastScene" ]
7357     }
7358 },
7359     "type": "object",
7360     "allOf" : [
7361         { "$ref": "oic.core-schema.json#/definitions/oic.core" },
7362         { "$ref": "#/definitions/oic.sceneCollection-Update" }
7363     ]
7364 }
7365
7366 example: |
7367     {
7368         "lastScene": "Reading"
7369     }
7370
7371 responses :
7372 200:
7373     description: |
7374         Indicates that the value is changed.
7375         The changed properties are provided in the response.
7376
7377 body:
7378     application/json:
7379     schema: |
7380         {
7381             "$schema": "http://json-schema.org/draft-04/schema#",
7382             "description" : "Copyright (c) 2016, 2017 Open Connectivity Foundation, Inc. All
7383 rights reserved.",
7384             "id": "http://www.openconnectivity.org/ocf-apis/core/schemas/oic.sceneCollection-
7385 Update-schema.json#",
7386             "title" : "Scene Collection",
7387             "definitions": {
7388                 "oic.sceneCollection-Update": {
7389                     "type": "object",
7390                     "properties": {
7391                         "lastScene": {
7392                             "type": "string",
7393                             "description": "Last selected Scene from the set of sceneValues"
7394                         }
7395                     },
7396                     "required": [ "lastScene" ]
7397                 }
7398             },
7399             "type": "object",
7400             "allOf" : [
7401                 { "$ref": "oic.core-schema.json#/definitions/oic.core" },
7402                 { "$ref": "#/definitions/oic.sceneCollection-Update" }
7403             ]
7404         }
7405
7406 example: |
7407     {
7408         "lastScene": "Reading"
7409     }
7410

```

7411 **D.11.5 Property Definition**

Property name	Value type	Mandatory	Access mode	Description
lastScene	string	yes		Last selected Scene from the set of sceneValues
sceneValues	array: schema	see yes	Read Only	All available scene values

7412 **D.11.6 CRUDN behaviour**

Resource	Create	Read	Update	Delete	Notify
/SceneCollectionResURI		get	post		

7413 **D.12 Scene Member**7414 **D.12.1 Introduction**

7415 Collection that models a scene member.

7416 **D.12.2 Example URI**

7417 /SceneMemberResURI

7418 **D.12.3 Resource Type**

7419 The resource type (rt) is defined as: oic.wk.scenemember.

7420 **D.12.4 RAML Definition**

```

7421 #%RAML 0.8
7422 title: Scene
7423 version: v1-20160622
7424 traits:
7425 - interface :
7426   queryParameters:
7427     if:
7428       enum: ["oic.if.a", "oic.if.ll", "oic.if.baseline"]
7429
7430 /SceneMemberResURI:
7431   description: |
7432     Collection that models a scene member.
7433
7434   get:
7435     description: |
7436       Provides the scene member
7437
7438   responses :
7439     200:
7440       body:
7441         application/json:
7442           schema: |
7443             {
7444               "$schema": "http://json-schema.org/draft-04/schema#",
7445               "description" : "Copyright (c) 2016, 2017 Open Connectivity Foundation, Inc. All
7446 rights reserved.",
7447               "id": "http://www.openconnectivity.org/ocf-apis/core/schemas/oic.sceneMember-
7448 schema.json#",
7449               "title" : "Scene Member",
7450               "definitions": {
7451                 "oic.sceneMember": {

```

```

7452     "type": "object",
7453     "properties": {
7454       "SceneMappings" : {
7455         "type": "array",
7456         "description": "array of mappings per scene, can be one(1)",
7457         "items": {
7458           "type": "object",
7459           "properties": {
7460             "scene": {
7461               "type": "string",
7462               "description": "Specifies a scene value that will be acted upon"
7463             },
7464             "memberProperty": {
7465               "type": "string",
7466               "readOnly": true,
7467               "description": "property name that will be mapped"
7468             },
7469             "memberValue": {
7470               "type": "string",
7471               "readOnly": true,
7472               "description": "value of the Member Property"
7473             }
7474           },
7475           "required": [ "scene", "memberProperty", "memberValue" ]
7476         }
7477       },
7478       "link": {
7479         "allOf": [
7480           {
7481             "$ref": "oic.oic-link-schema.json#/definitions/oic.oic-link"
7482           },
7483           {
7484             "description": "OCF link that points to a resource"
7485           }
7486         ]
7487       }
7488     },
7489     "required": [ "link" ]
7490   },
7491 },
7492
7493   "type": "object",
7494   "allOf" : [
7495     { "$ref": "oic.core-schema.json#/definitions/oic.core" },
7496     { "$ref": "#/definitions/oic.sceneMember" }
7497   ]
7498 }
7499

7500 example: |
7501 {
7502   "rt": ["oic.wk.scenemember"],
7503   "id": "0685B960-FFFF-46F7-BEC0-9E6234671ADC1",
7504   "n": "my binary switch (for light bulb) mappings",
7505   "link": {
7506     "href": "binaryswitch",
7507     "rt": ["oic.r.switch.binary"],
7508     "if": ["oic.if.a", "oic.if.baseline"],
7509     "eps": [
7510       {"ep": "coap://[fe80::b1d6]:1111", "pri": 2},
7511       {"ep": "coaps://[fe80::b1d6]:1122"},  

7512       {"ep": "coap+tcp://[2001:db8:a::123]:2222", "pri": 3}
7513     ]
7514   },
7515   "sceneMappings": [
7516     {
7517       "scene": "off",
7518       "memberProperty": "value",
7519       "memberValue": true
7520     },
7521   {

```

```

7522         "scene": "Reading",
7523         "memberProperty": "value",
7524         "memberValue": false
7525     },
7526     {
7527         "scene": "TVWatching",
7528         "memberProperty": "value",
7529         "memberValue": true
7530     }
7531 ]
7532
7533

```

7534 D.12.5 Property Definition

Property name	Value type	Mandatory	Access mode	Description
SceneMappings	array: see schema			array of mappings per scene, can be one(1)
memberValue (SceneMappings)	string	yes	Read Only	value of the Member Property
memberProperty (SceneMappings)	string	yes	Read Only	property name that will be mapped
scene (SceneMappings)	string	yes		Specifies a scene value that will be acted upon
link	multiple types: see schema	yes		

7535 D.12.6 CRUDN behaviour

Resource	Create	Read	Update	Delete	Notify
/SceneMemberResURI		get			

7536 D.13 Resource directory resource

7537 D.13.1 Introduction

7538 Resource to be exposed by any Device that can act as a Resource Directory. 1) Provides selector
 7539 criteria (e.g., integer) with GET request 2) Publish a Link in /oic/res with POST request

7540 D.13.2 Wellknown URI

7541 /oic/rd

7542 D.13.3 Resource Type

7543 The resource type (rt) is defined as: oic.wk.rd.

7544 D.13.4 RAML Definition

```

7545 #%RAML 0.8
7546 title: Resource Directory
7547 version: v1-20160622
7548 traits:
7549   - rdgetinterface :
7550     queryParameters:
7551       if:
7552         enum: ["oic.if.baseline"]
7553         description: Interface is optional since there is only one interface supported for the
7554         Resource Type
7555         Both for RD selection and for publish.

```

```

7556 Example: GET /oic/rd?if=oic.if.baseline
7557
7558 - rdpostinterface :
7559   queryParameters:
7560     if:
7561       enum: ["oic.if.baseline"]
7562       description: Interface is optional since there is only one interface supported for the
7563       Resource Type
7564 Both for RD selection and for publish.
7565 Example: POST /oic/rd?if=oic.if.baseline
7566
7567
7568 /oic/rd:
7569   description: |
7570     Resource to be exposed by any Device that can act as a Resource Directory.
7571     1) Provides selector criteria (e.g., integer) with GET request
7572     2) Publish a Link in /oic/res with POST request
7573
7574   get:
7575     description: |
7576       Get the attributes of the Resource Directory for selection purposes.
7577
7578   is : ['rdgetinterface']
7579   responses :
7580     200:
7581       description: |
7582         Respond with the selector criteria - either the set of attributes or the bias factor
7583
7584   body:
7585     application/json:
7586       schema: |
7587         {
7588           "$schema": "http://json-schema.org/draft-04/schema#",
7589           "description" : "Copyright (c) 2016, 2017 Open Connectivity Foundation, Inc. All
7590 rights reserved.",
7591           "id": "http://www.openconnectivity.org/ocf-apis/core/schemas/oic.rd.selection-
7592 schema.json#",
7593           "title" : "RD Selection",
7594           "definitions": {
7595             "oic.rd.attributes": {
7596               "type": "object",
7597               "properties": {
7598                 "sel": {
7599                   "type": "integer",
7600                   "minimum": 0,
7601                   "maximum": 100,
7602                   "readOnly": true,
7603                   "description": "A bias factor calculated by the Resource directory"
7604                 }
7605               },
7606               "required": ["sel"]
7607             }
7608           },
7609           "type": "object",
7610           "allOf": [
7611             { "$ref": "oic.core-schema.json#/definitions/oic.core" },
7612             { "$ref": "#/definitions/oic.rd.attributes" }
7613           ]
7614         }
7615
7616       example: |

```

```

7617         {
7618             "rt": ["oic.wk.rd"],
7619             "if": ["oic.if.baseline"],
7620             "sel": 50
7621         }
7622
7623     post:
7624         description: |
7625             Publish the resource information for the first time in /oic/res
7626             Updates to existing entries are not allowed.
7627             Appropriates parts of the information, i.e., Links of the published Resources will be
7628             discovered through /oic/res.
7629             1) When a Device first publishes a Link, the request payload to RD may include the Links
7630             without an "ins" Parameter.
7631             2) Upon granting the request, the RD assigns a unique instance value identifying the Link
7632             among all the Links it advertises
7633                 and sends back the instance value in the "ins" Parameter in the Link to the publishing
7634             Device.
7635
7636     is : ['rdpostinterface']
7637     body:
7638         application/json:
7639             schema: |
7640                 {
7641                     "$schema": "http://json-schema.org/draft-04/schema#",
7642                     "description": "Copyright (c) 2016,2017 Open Connectivity Foundation, Inc. All rights
7643 reserved.",
7644                     "id": "http://www.openconnectivity.org/ocf-apis/core/schemas/oic.rd.publish-
7645 schema.json#",
7646                     "title": "RD Publish & Update",
7647                     "definitions": {
7648                         "oic.rd.publish": {
7649                             "properties": {
7650                                 "di": {
7651                                     "$ref": "oic.types-schema.json#/definitions/uuid",
7652                                     "description": "A UUID that is the identifier for the publishing Device"
7653                                 },
7654                                 "ttl": {
7655                                     "type": "integer",
7656                                     "description": "Time to indicate a RD, i.e. how long to keep this published
7657 item."
7658                                 }
7659                             }
7660                         }
7661                     },
7662                     "type": "object",
7663                     "allOf": [
7664                         {"$ref": "oic.core-schema.json#/definitions/oic.core"},
7665                         {"$ref": "#/definitions/oic.rd.publish"},
7666                         {"$ref": "oic.collection-schema.json#/definitions/oic.collection.linksexpanded"}
7667                     ],
7668                     "required": ["di","links","ttl"]
7669                 }
7670
7671             example: |
7672                 {
7673                     "di": "e61c3e6b-9c54-4b81-8ce5-f9039c1d04d9",
7674                     "links": [
7675                         {
7676                             "anchor": "ocf://e61c3e6b-9c54-4b81-8ce5-f9039c1d04d9",
7677                             "href": "/myLightSwitch",
7678                             "rt": ["oic.r.switch.binary"],
7679                             "if": ["oic.if.a", "oic.if.baseline"],
7680                             "p": {"bm": 3},
7681                             "eps": [
7682                                 {"ep": "coaps://[2001:db8:a::b1d6]:1111", "pri": 2},
7683                                 {"ep": "coaps://[2001:db8:a::b1d6]:1122"},
```

```

7684         {"ep": "coaps+tcp://[2001:db8:a::123]:2222", "pri": 3}
7685     ],
7686 },
7687 {
7688     "anchor": "ocf://e61c3e6b-9c54-4b81-8ce5-f9039c1d04d9",
7689     "href": "/myLightBrightness",
7690     "rt": ["oic.r.brightness"],
7691     "if": ["oic.if.a", "oic.if.baseline"],
7692     "p": {"bm": 3},
7693     "eps": [
7694         {"ep": "coaps://[[2001:db8:a::123]:2222}"}
7695     ]
7696   },
7697   "ttl": 600
7698 }
7700 }

7701 responses :
7702 200:
7703     description: |
7704       Respond with the same schema as publish with the additional "ins" Parameter in the Link.
7705

7706     body:
7707       application/json:
7708       schema: |
7709       {
7710         "$schema": "http://json-schema.org/draft-04/schema#",
7711         "description": "Copyright (c) 2016,2017 Open Connectivity Foundation, Inc. All
rights reserved.",
7712         "id": "http://www.openconnectivity.org/ocf-apis/core/schemas/oic.rd.publish-
schema.json#",
7713         "title": "RD Publish & Update",
7714         "definitions": {
7715           "oic.rd.publish": {
7716             "properties": {
7717               "di": {
7718                 "$ref": "oic.types-schema.json#/definitions/uuid",
7719                 "description": "A UUID that is the identifier for the publishing Device"
7720               },
7721               "ttl": {
7722                 "type": "integer",
7723                 "description": "Time to indicate a RD, i.e. how long to keep this published
item."
7724               }
7725             }
7726           }
7727         }
7728       },
7729       "type": "object",
7730       "allOf": [
7731         {"$ref": "oic.core-schema.json#/definitions/oic.core"},
7732         {"$ref": "#/definitions/oic.rd.publish"},
7733         {"$ref": "oic.collection-schema.json#/definitions/oic.collection.linksexpanded"}
7734       ],
7735       "required": ["di", "links", "ttl"]
7736     }
7737   }
7738 }

7739 example: |
7740   {
7741     "di": "e61c3e6b-9c54-4b81-8ce5-f9039c1d04d9",
7742     "links": [
7743       {
7744         "anchor": "ocf://e61c3e6b-9c54-4b81-8ce5-f9039c1d04d9",
7745         "href": "/myLightSwitch",
7746         "rt": ["oic.r.switch.binary"],
7747         "if": ["oic.if.a", "oic.if.baseline"],
7748         "p": {"bm": 3},
7749         "eps": [
7750

```

```

7751         {"ep": "coaps://[2001:db8:a::b1d6]:1111", "pri": 2},
7752         {"ep": "coaps://[2001:db8:a::b1d6]:1122"}, 
7753         {"ep": "coaps+tcp://[2001:db8:a::123]:2222", "pri": 3}
7754     ],
7755     "ins": 11235
7756 },
7757 {
7758     "anchor": "ocf://e61c3e6b-9c54-4b81-8ce5-f9039c1d04d9",
7759     "href": "/myLightBrightness",
7760     "rt": ["oic.r.brightness"],
7761     "if": ["oic.if.a", "oic.if.baseline"],
7762     "p": {"bm": 3},
7763     "eps": [
7764         {"ep": "coaps://[2001:db8:a::123]:2222"}
7765     ],
7766     "ins": 112358
7767 },
7768     "ttl": 600
7769 }
7770
7771

```

7772 D.13.5 Property Definition

Property name	Value type	Mandatory	Access mode	Description
sel	integer	yes	Read Only	A bias factor calculated by the Resource directory

7773 D.13.6 CRUDN behaviour

Resource	Create	Read	Update	Delete	Notify
/oic/rd		get	post		

7774 D.14 Icon

7775 D.14.1 Introduction

7776 This resource describes the attributes associated with an Icon.

7777 D.14.2 Example URI

7778 /IconResURI

7779 D.14.3 Resource Type

7780 The resource type (rt) is defined as: oic.r.icon.

7781 D.14.4 RAML Definition

```

7782 #%RAML 0.8
7783 title: OICIcon
7784 version: v1.1.0-20161107
7785 traits:
7786   - interface :
7787     queryParameters:
7788       if:
7789         enum: ["oic.if.r", "oic.if.baseline"]
7790
7791 /IconResURI:
7792   description: |
7793     This resource describes the attributes associated with an Icon.
7794
7795   is : ['interface']
7796   get:

```

```

7797     description: |
7798       Retrieves the current icon properties.
7799
7800   responses :
7801     200:
7802       body:
7803         application/json:
7804           schema: |
7805             {
7806               "id": "http://www.openconnectivity.org/ocf-apis/core/schemas/oic.r.icon.json#",
7807               "$schema": "http://json-schema.org/draft-04/schema#",
7808               "description" : "Copyright (c) 2017 Open Connectivity Foundation, Inc. All rights
7809               reserved.",
7810               "title": "Icon",
7811               "definitions": {
7812                 "oic.r.icon": {
7813                   "properties": {
7814                     "mimetype": {
7815                       "type": "string",
7816                       "maxLength": 64,
7817                       "readOnly": true,
7818                       "description": "The Media Type of the icon"
7819                     },
7820                     "width": {
7821                       "type": "integer",
7822                       "minimum": 1,
7823                       "readOnly": true,
7824                       "description": "The width in pixels"
7825                     },
7826                     "height": {
7827                       "type": "integer",
7828                       "minimum": 1,
7829                       "readOnly": true,
7830                       "description": "The height in pixels"
7831                     },
7832                     "media": {
7833                       "type": "string",
7834                       "maxLength": 256,
7835                       "format" : "uri",
7836                       "readOnly": true,
7837                       "description": "Specifies the URI to the icon"
7838                     }
7839                   }
7840                 }
7841               },
7842               "type": "object",
7843               "allOf": [
7844                 { "$ref": "oic.core-schema.json#/definitions/oic.core" },
7845                 { "$ref": "#/definitions/oic.r.icon" }
7846               ],
7847               "required": ["mimetype","width","height","media"]
7848             }
7849           }
7850           example: |
7851             {
7852               "rt": ["oic.r.icon"],
7853               "id": "unique_example_id",
7854               "mimetype": "image/png",
7855               "width": 256,
7856               "height": 256,
7857               "media": "http://findbetter.ru/public/uploads/1481662800/2043.png"
7858             }
7859           }

```

D.14.5 Property Definition

Property name	Value type	Mandatory	Access mode	Description
---------------	------------	-----------	-------------	-------------

mimetype	string	yes	Read Only	The Media Type of the icon
width	integer	yes	Read Only	The width in pixels
media	string	yes	Read Only	Specifies the URI to the icon
height	integer	yes	Read Only	The height in pixels

7861 **D.14.6 CRUDN behaviour**

Resource	Create	Read	Update	Delete	Notify
/IconResURI		get			

7862 **D.15 Introspection Resource**

7863 **D.15.1 Introduction**

7864 This resource provides the means to get the device introspection data specifying all the endpoints
 7865 of the device. The url hosted by this resource is either a local or an external url.

7866 **D.15.2 Example URI**

7867 /IntrospectionResURI

7868 **D.15.3 Resource Type**

7869 The resource type (rt) is defined as: oic.wk.introspection.

7870 **D.15.4 RAML Definition**

```

7871 #%RAML 0.8
7872 title: OICIntrospection
7873 version: v1.0.0-20160707
7874 traits:
7875 - interface :
7876   queryParameters:
7877     if:
7878       enum: ["oic.if.r", "oic.if.baseline"]
7879
7880 /IntrospectionResURI:
7881   description: |
7882     This resource provides the means to get the device introspection data specifying all the
7883     endpoints of the device.
7884     The url hosted by this resource is either a local or an external url.
7885
7886   is : ['interface']
7887   get:
7888     responses :
7889       200:
7890         body:
7891           application/json:
7892             schema: |
7893               {
7894                 "id": "http://www.openconnectivity.org/ocf-
7895 apis/core/schemas/oic.wk.introspectionInfo.json#",
7896                 "$schema": "http://json-schema.org/draft-04/schema#",
7897                 "description" : "Copyright (c) 2017 Open Interconnect Consortium, Inc. All rights
7898 reserved.",
7899                 "title": "introspection resource",
7900                 "definitions": {
7901                   "oic.wk.introspectionInfo": {

```

```

7902         "type": "object",
7903         "properties": {
7904             "urlInfo": {
7905                 "type": "array",
7906                 "description": "Information on the location of the introspection data.",
7907                 "readOnly": true,
7908                 "minItems": 1,
7909                 "items": {
7910                     "type": "object",
7911                     "properties": {
7912                         "url": {
7913                             "type": "string",
7914                             "format": "uri",
7915                             "description" : "The URL of the introspection information."
7916                         },
7917                         "protocol": {
7918                             "type": "string",
7919                             "enum": [ "coap", "coaps", "http", "https", "coap+tcp",
7920                           "coaps+tcp" ],
7921                             "description" : "Identifier for the protocol to be used to obtain the
7922                           introspection information"
7923                         },
7924                         "content-type": {
7925                             "type": "string",
7926                             "enum": [ "application/json", "application/cbor" ],
7927                             "default" : "application/cbor",
7928                             "description" : "content-type of the introspection data"
7929                         },
7930                         "version": {
7931                             "type": "integer",
7932                             "enum": [ 1 ],
7933                             "default" : 1,
7934                             "description" : "The version of the introspection data that can be
7935                           downloaded"
7936                         }
7937                     },
7938                     "required" : [ "url", "protocol" ]
7939                 }
7940             },
7941             "required" : [ "urlInfo" ]
7942         },
7943         "type": "object",
7944         "allOf": [
7945             { "$ref": "#/definitions/oic.wk.introspectionInfo" },
7946             { "$ref": "oic.core-schema.json#/definitions/oic.core" }
7947         ]
7948     }
7949 }
7950
7951 }

7952 example: |
7953 {
7954     "rt" : [ "oic.wk.introspection" ],
7955     "urlInfo" : [
7956         {
7957             "content-type" : "application/cbor",
7958             "protocol" : "coap",
7959             "url" : "coap://[fe80::1]:1234/IntrospectionExampleURI"
7960         }
7961     ]
7962 }
7963
7964

```

D.15.5 Property Definition

Property name	Value type	Mandatory	Access mode	Description
urlInfo	array: schema	see yes	Read Only	Information on the location of

				the introspection data.
url (urllInfo)	string	yes		The URL of the introspection information.
content-type (urllInfo)	string			content-type of the introspection data
version (urllInfo)	integer			The version of the introspection data that can be downloaded
protocol (urllInfo)	string	yes		Identifier for the protocol to be used to obtain the introspection information

7965

D.15.6 CRUDN behaviour

Resource	Create	Read	Update	Delete	Notify
/IntrospectionResURI		get			

7966
7967
7968
7969

**Annex E
(normative)**

7970

OIC 1.1 Resource Type definitions

7971

E.1 List of Resource Type Definitions

7972 Table 43 contains the list of OIC 1.1 defined core resources that are referenced in this specification
7973 and so included herein to enable backwards compatibility. These definitions are only to be used
when communicating with OIC 1.1 Devices where specifically referenced in this specification.

Deleted: Table 43

7974 **Table 43. Alphabetized list of referenced OIC 1.1 core resources**

Friendly Name (informative)	Resource Type (rt)	Section
Collection, baseline interface	“oic.wk.col”	E.2
Collection, link list interface	“oic.wk.col”	E.3
Discoverable Resources, baseline interface	“oic.wk.res”	E.4
Discoverable Resources, link list interface	“oic.wk.res”	E.5
Link	N/A	E.2.8

7975

E.2 Collection, baseline interface

7976

E.2.1 Introduction

7977 OCF Collection Resource Type contains properties and links. The oic.if.baseline interface exposes
7978 a representation of the links and the properties of the collection resource itself

7979

E.2.2 Example URI

7980 /CollectionBaselineInterfaceURI

7981

E.2.3 Resource Type

7982 The resource type (rt) is defined as: oic.wk.col.

7983

E.2.4 RAML Definition

7984

```
7985 #%RAML 0.8
7986 title: Collections
7987 version: 1.0
7988 traits:
7989 - interface-ll :
7990   queryParameters:
```

```

7992     if:
7993         enum: ["oic.if.ll"]
7994     - interface-b :
7995         queryParameters:
7996             if:
7997                 enum: ["oic.if.b"]
7998     - interface-baseline :
7999         queryParameters:
8000             if:
8001                 enum: ["oic.if.baseline"]
8002
8003 /CollectionBaselineInterfaceURI:
8004     description: |
8005         OCF Collection Resource Type contains properties and links.
8006         The oic.if.baseline interface exposes a representation of
8007         the links and the properties of the collection resource itself
8008
8009     is : ['interface-baseline']
8010     get:
8011         description: |
8012             Retrieve on Baseline Interface
8013
8014     responses :
8015         200:
8016             body:
8017                 application/json:
8018                 schema: |
8019                     {
8020                         "$schema": "http://json-schema.org/draft-04/schema#",
8021                         "description" : "Copyright (c) 2016 Open Connectivity Foundation, Inc. All rights
reserved.",
8022                         "id": "http://www.openconnectivity.org/ocf-apis/core/schemas/oic.collection-
schema.json#",
8023                         "title": "Collection",
8024                         "definitions": {
8025                             "oic.collection.setoflinks": {
8026                                 "description": "A set (array) of simple or individual OIC Links. In
8027 addition to properties required for an OIC Link, the identifier for that link in this set is also
8028 required",
8029                                 "type": "array",
8030                                 "items": {
8031                                     "$ref": "oic.oic-link-schema.json#/definitions/oic.oic-link"
8032                                 }
8033                             },
8034                             "oic.collection.alllinks": {
8035                                 "description": "All forms of links in a collection",
8036                                 "oneOf": [
8037                                     {
8038                                         "$ref": "#/definitions/oic.collection.setoflinks"
8039                                     }
8040                                 ],
8041                             },
8042                             "oic.collection": {
8043                                 "type": "object",
8044                                 "description": "A collection is a set (array) of tagged-link or set
8045 (array) of simple links along with additional properties to describe the collection itself",
8046                                 "properties": {
8047                                     "n": {
8048                                         "type": "string",
8049                                         "description": "User friendly name of the
8050 collection"
8051                                     },
8052                                     "id": {
8053

```

```

8054         "anyOf": [
8055             {
8056                 "type": "integer",
8057                 "description": "A number that is unique to that
8058 collection; like an ordinal number that is not repeated"
8059             },
8060             {
8061                 "type": "string",
8062                 "description": "A unique string that could be a hash or
8063 similarly unique"
8064             },
8065             {
8066                 "$ref": "oic.types-schema.json#/definitions/uuid",
8067                 "description": "A unique string that could be a UUIDv4"
8068             }
8069         ],
8070         "description": "ID for the collection. Can be an value that is
8071 unique to the use context or a UUIDv4"
8072     },
8073     "di": {
8074         "$ref": "oic.types-schema.json#/definitions/uuid",
8075         "description": "The device ID which is an UUIDv4 string; used for
8076 backward compatibility with Spec A definition of /oic/res"
8077     },
8078     "rts": {
8079         "$ref": "oic.core-
8080 schema.json#/definitions/oic.core/properties/rt",
8081         "description": "Defines the list of allowable resource types (for
8082 Target and anchors) in links included in the collection; new links being created can only be from
8083 this list"
8084     },
8085     "drel": {
8086         "type": "string",
8087         "description": "When specified this is the default relationship
8088 to use when an OIC Link does not specify an explicit relationship with *rel* parameter"
8089     },
8090     "links": {
8091         "$ref": "#/definitions/oic.collection.alllinks"
8092     }
8093 },
8094 },
8095 "type": "object",
8096 "allOf": [
8097     {"$ref": "oic.core-schema.json#/definitions/oic.core"},
8098     {"$ref": "#/definitions/oic.collection"}
8099 ]
8100 }
8101
8102 example: |
8103 {
8104     "rt": ["oic.wk.col"],
8105     "id": "unique_example_id",
8106     "rts": [ "oic.r.switch.binary", "oic.r.airflow" ],
8107     "links": [
8108         {
8109             "href": "switch",
8110             "rt": [ "oic.r.switch.binary" ],
8111             "if": [ "oic.if.a", "oic.if.baseline" ]
8112         },
8113         {
8114             "href": "airFlow",
8115             "rt": [ "oic.r.airflow" ],
8116             "if": [ "oic.if.a", "oic.if.baseline" ]
8117         }
8118     ]
8119 }
8120
8121 post:
8122     description: |

```

```

8123     Update on Baseline Interface
8124
8125     body:
8126         application/json:
8127             schema: |
8128                 {
8129                     "$schema": "http://json-schema.org/draft-04/schema#",
8130                     "description" : "Copyright (c) 2016 Open Connectivity Foundation, Inc. All rights
8131 reserved.",
8132                     "id": "http://www.openconnectivity.org/ocf-apis/core/schemas/oic.collection-
8133 schema.json#",
8134                     "title": "Collection",
8135                     "definitions": {
8136                         "oic.collection.setoflinks": {
8137                             "description": "A set (array) of simple or individual OIC Links. In addition
8138 to properties required for an OIC Link, the identifier for that link in this set is also required",
8139                             "type": "array",
8140                             "items": {
8141                                 "$ref": "oic.oic-link-schema.json#/definitions/oic.oic-link"
8142                             }
8143                         },
8144                         "oic.collection.alllinks": {
8145                             "description": "All forms of links in a collection",
8146                             "oneOf": [
8147                                 {
8148                                     "$ref": "#/definitions/oic.collection.setoflinks"
8149                                 }
8150                             ]
8151                         },
8152                         "oic.collection": {
8153                             "type": "object",
8154                             "description": "A collection is a set (array) of tagged-link or set (array)
8155 of simple links along with additional properties to describe the collection itself",
8156                             "properties": {
8157                                 "n": {
8158                                     "type": "string",
8159                                     "description": "User friendly name of the
8160 collection"
8161                                 },
8162                                 "id": {
8163                                     "anyOf": [
8164                                         {
8165                                             "type": "integer",
8166                                             "description": "A number that is unique to that collection;
8167 like an ordinal number that is not repeated"
8168                                         },
8169                                         {
8170                                             "type": "string",
8171                                             "description": "A unique string that could be a hash or
8172 similarly unique"
8173                                         },
8174                                         {
8175                                             "$ref": "oic.types-schema.json#/definitions/uuid",
8176                                             "description": "A unique string that could be a UUIDv4"
8177                                         }
8178                                     ],
8179                                     "description": "ID for the collection. Can be an value that is unique
8180 to the use context or a UUIDv4"
8181                                 },
8182                                 "di": {
8183                                     "$ref": "oic.types-schema.json#/definitions/uuid",
8184                                     "description": "The device ID which is an UUIDv4 string; used for
8185 backward compatibility with Spec A definition of /oic/res"
8186                                 },
8187                                 "rts": {
8188                                     "$ref": "oic.core-schema.json#/definitions/oic.core/properties/rt",
8189                                     "description": "Defines the list of allowable resource types (for
8190 Target and anchors) in links included in the collection; new links being created can only be from
8191 this list"
8192                                 },
8193                                 "drel": {

```

```

8192             "type": "string",
8193             "description": "When specified this is the default relationship to
8194             use when an OIC Link does not specify an explicit relationship with *rel* parameter"
8195         },
8196         "links": {
8197             "$ref": "#/definitions/oic.collection.alllinks"
8198         }
8199     }
8200 }
8201 },
8202 "type": "object",
8203 "allOf": [
8204     {"$ref": "oic.core-schema.json#/definitions/oic.core"},
8205     {"$ref": "#/definitions/oic.collection"}
8206 ]
8207 }
8208 }

8209 responses :
8210 200:
8211     body:
8212         application/json:
8213         schema: |
8214             {
8215                 "$schema": "http://json-schema.org/draft-04/schema#",
8216                 "description" : "Copyright (c) 2016 Open Connectivity Foundation, Inc. All rights
8217 reserved.",
8218                 "id": "http://www.openconnectivity.org/ocf-apis/core/schemas/oic.collection-
8219 schema.json#",
8220                 "title": "Collection",
8221                 "definitions": {
8222                     "oic.collection.setoflinks": {
8223                         "description": "A set (array) of simple or individual OIC Links. In
8224 addition to properties required for an OIC Link, the identifier for that link in this set is also
8225 required",
8226                         "type": "array",
8227                         "items": {
8228                             "$ref": "oic.oic-link-schema.json#/definitions/oic.oic-link"
8229                         }
8230                     },
8231                     "oic.collection.alllinks": {
8232                         "description": "All forms of links in a collection",
8233                         "oneOf": [
8234                             {
8235                                 "$ref": "#/definitions/oic.collection.setoflinks"
8236                             }
8237                         ]
8238                     },
8239                     "oic.collection": {
8240                         "type": "object",
8241                         "description": "A collection is a set (array) of tagged-link or set
8242 (array) of simple links along with additional properties to describe the collection itself",
8243                         "properties": {
8244                             "n": {
8245                                 "type": "string",
8246                                 "description": "User friendly name of the
8247 collection",
8248                             "id": {
8249                                 "anyOf": [
8250                                     {
8251                                         "type": "integer",
8252                                         "description": "A number that is unique to that
8253 collection; like an ordinal number that is not repeated"
8254                                     },
8255                                     {
8256                                         "type": "string",
8257                                         "description": "A unique string that could be a hash or
8258 similarly unique"
8259                                 ],
8260                             }
8261                         }
8262                     }
8263                 }
8264             }
8265         }
8266     }
8267 }
8268 }
```

```

8260
8261
8262
8263
8264
8265
8266
8267
8268
8269
8270
8271
8272
8273
8274
8275
8276
8277
8278
8279
8280
8281
8282
8283
8284
8285
8286
8287
8288
8289
8290
8291
8292
8293
8294
8295
8296
8297
8298
8299
8300
8301
8302
8303
8304
8305
8306
8307
8308
8309
8310
8311
8312
8313
8314
8315
8316
8317
8318
8319
8320
8321
8322
8323
8324
8325
8326
8327
8328
8329
8330
8331
8332
8333
8334
8335
8336
8337
8338
8339
8340
8341
8342
8343
8344
8345
8346
8347
8348
8349
8350
8351
8352
8353
8354
8355
8356
8357
8358
8359
8360
8361
8362
8363
8364
8365
8366
8367
8368
8369
8370
8371
8372
8373
8374
8375
8376
8377
8378
8379
8380
8381
8382
8383
8384
8385
8386
8387
8388
8389
8390
8391
8392
8393
8394
8395
8396
8397
8398
8399
8400
8401
8402
8403
8404
8405
8406
8407
8408
8409
8410
8411
8412
8413
8414
8415
8416
8417
8418
8419
8420
8421
8422
8423
8424
8425
8426
8427
8428
8429
8430
8431
8432
8433
8434
8435
8436
8437
8438
8439
8440
8441
8442
8443
8444
8445
8446
8447
8448
8449
8450
8451
8452
8453
8454
8455
8456
8457
8458
8459
8460
8461
8462
8463
8464
8465
8466
8467
8468
8469
8470
8471
8472
8473
8474
8475
8476
8477
8478
8479
8480
8481
8482
8483
8484
8485
8486
8487
8488
8489
8490
8491
8492
8493
8494
8495
8496
8497
8498
8499
8500
8501
8502
8503
8504
8505
8506
8507
8508
8509
8510
8511
8512
8513
8514
8515
8516
8517
8518
8519
8520
8521
8522
8523
8524
8525
8526
8527
8528
8529
8530
8531
8532
8533
8534
8535
8536
8537
8538
8539
8540
8541
8542
8543
8544
8545
8546
8547
8548
8549
8550
8551
8552
8553
8554
8555
8556
8557
8558
8559
8560
8561
8562
8563
8564
8565
8566
8567
8568
8569
8570
8571
8572
8573
8574
8575
8576
8577
8578
8579
8580
8581
8582
8583
8584
8585
8586
8587
8588
8589
8590
8591
8592
8593
8594
8595
8596
8597
8598
8599
8600
8601
8602
8603
8604
8605
8606
8607
8608
8609
8610
8611
8612
8613
8614
8615
8616
8617
8618
8619
8620
8621
8622
8623
8624
8625
8626
8627
8628
8629
8630
8631
8632
8633
8634
8635
8636
8637
8638
8639
8640
8641
8642
8643
8644
8645
8646
8647
8648
8649
8650
8651
8652
8653
8654
8655
8656
8657
8658
8659
8660
8661
8662
8663
8664
8665
8666
8667
8668
8669
8670
8671
8672
8673
8674
8675
8676
8677
8678
8679
8680
8681
8682
8683
8684
8685
8686
8687
8688
8689
8690
8691
8692
8693
8694
8695
8696
8697
8698
8699
8700
8701
8702
8703
8704
8705
8706
8707
8708
8709
8710
8711
8712
8713
8714
8715
8716
8717
8718
8719
8720
8721
8722
8723
8724
8725
8726
8727
8728
8729
8730
8731
8732
8733
8734
8735
8736
8737
8738
8739
8740
8741
8742
8743
8744
8745
8746
8747
8748
8749
8750
8751
8752
8753
8754
8755
8756
8757
8758
8759
8760
8761
8762
8763
8764
8765
8766
8767
8768
8769
8770
8771
8772
8773
8774
8775
8776
8777
8778
8779
8780
8781
8782
8783
8784
8785
8786
8787
8788
8789
8790
8791
8792
8793
8794
8795
8796
8797
8798
8799
8799

```

E.2.5 Property Definition

Property name	Value type	Mandatory	Access mode	Description
rt	array: schema	see	yes	Read Write Resource Type
di	multiple types: see schema		Read Write	Unique identifier for device (UUID)
title	string		Read Write	A title for the link relation. Can be used by the UI to provide a context
buri	string		Read Write	The base URI used to fully qualify a Relative Reference in the href parameter. Use the OCF Schema for URI
ins	multiple types: see schema		Read Write	The instance identifier for this web link in an array of web links - used in collections
p	object: schema	see	Read Write	Specifies the framework

				policies on the Resource referenced by the target URI
href	string	yes	Read Write	This is the target URI, it can be specified as a Relative Reference or fully-qualified URI. Relative Reference should be used along with the di parameter to make it unique.
rel	multiple types: see schema		Read Write	The relation of the target URI referenced by the link to the context URI
type	array: see schema		Read Write	A hint at the representation of the resource referenced by the target URI. This represents the media types that are used for both accepting and emitting
anchor	string		Read Write	This is used to override the context URI e.g. override the URI of the containing collection
if	array: see schema	yes	Read Write	The interface set supported by this resource

8298

E.2.6 CRUDN behavior

Resource	Create	Read	Update	Delete	Notify
/CollectionBaselineInterfaceURI		get	post		

8299

E.2.7 Referenced JSON schemas

8300

E.2.8 oic.oic-link-schema.json

```

8301 {
8302   "$schema": "http://json-schema.org/draft-04/schema#",
8303   "description" : "Copyright (c) 2016 Open Connectivity Foundation, Inc. All rights reserved.",
8304   "id": "http://www.openconnectivity.org/ocf-apis/core/schemas/oic.oic-link-schema.json#",
8305   "definitions": {
8306     "oic.oic-link": {
8307       "type": "object",
8308       "properties": {
8309         "href": {
8310           "type": "string",
8311           "maxLength": 256,

```

```

8312     "description": "This is the target URI, it can be specified as a Relative Reference or
8313     fully-qualified URI. Relative Reference should be used along with the di parameter to make it
8314     unique.",
8315     "format": "uri"
8316   },
8317   "rel": {
8318     "oneOf": [
8319       {
8320         "type": "array",
8321         "items": {
8322           "type": "string",
8323           "maxLength": 64
8324         },
8325         "minItems": 1,
8326         "default": ["hosts"]
8327       },
8328       {
8329         "type": "string",
8330         "maxLength": 64,
8331         "default": "hosts"
8332       }
8333     ],
8334     "description": "The relation of the target URI referenced by the link to the context URI"
8335   },
8336   "rt": {
8337     "type": "array",
8338     "items" : {
8339       "type" : "string",
8340       "maxLength": 64
8341     },
8342     "minItems" : 1,
8343     "description": "Resource Type"
8344   },
8345   "if": {
8346     "type": "array",
8347     "items": {
8348       "type" : "string",
8349       "enum": ["oic.if.baseline", "oic.if.ll", "oic.if.b", "oic.if.rw", "oic.if.r",
8350 "oic.if.a", "oic.if.s" ]
8351     },
8352     "minItems": 1,
8353     "description": "The interface set supported by this resource"
8354   },
8355   "di": {
8356     "$ref": "oic.types-schema.json#/definitions/uuid",
8357     "description": "Unique identifier for device (UUID)"
8358   },
8359   "buri": {
8360     "type": "string",
8361     "description": "The base URI used to fully qualify a Relative Reference in the href
8362 parameter. Use the OCF Schema for URI",
8363     "maxLength": 256,
8364     "format": "uri"
8365   },
8366   "p": {
8367     "description": "Specifies the framework policies on the Resource referenced by the target
URI",
8368     "type": "object",
8369     "properties": {
8370       "bm": {
8371         "description": "Specifies the framework policies on the Resource referenced by the
target URI for e.g. observable and discoverable",
8372         "type": "integer"
8373       },
8374       "sec": {
8375         "description": "Specifies if security needs to be turned on when looking to interact
with the Resource",
8376         "default": false,
8377         "type": "boolean"
8378       },
8379       "port": {

```

```

8383         "description": "Secure port to be used for connection",
8384         "type": "integer"
8385     },
8386     "required" : ["bm"]
8387   },
8388   "title": {
8389     "type": "string",
8390     "maxLength": 64,
8391     "description": "A title for the link relation. Can be used by the UI to provide a
8392 context"
8393   },
8394   "anchor": {
8395     "type": "string",
8396     "maxLength": 256,
8397     "description": "This is used to override the context URI e.g. override the URI of the
8398 containing collection",
8399     "format": "uri"
8400   },
8401   "ins": {
8402     "oneOf": [
8403       {
8404         "type": "integer",
8405         "description": "An ordinal number that is not repeated - must be unique in the
8406 collection context"
8407       },
8408       {
8409         "type": "string",
8410         "maxLength": 256,
8411         "format": "uri",
8412         "description": "Any unique string including a URI"
8413       },
8414       {
8415         "$ref": "oic.types-schema.json#/definitions/uuid",
8416         "description": "Unique identifier (UUID)"
8417       }
8418     ],
8419     "description": "The instance identifier for this web link in an array of web links - used
8420 in collections"
8421   },
8422   "type": {
8423     "type": "array",
8424     "description": "A hint at the representation of the resource referenced by the target
8425 URI. This represents the media types that are used for both accepting and emitting",
8426     "items" : {
8427       "type": "string",
8428       "maxLength": 64
8429     },
8430     "minItems": 1,
8431     "default": "application/cbor"
8432   }
8433 },
8434 },
8435 "required": [ "href", "rt", "if" ]
8436 },
8437 },
8438 "type": "object",
8439 "allOf": [
8440   { "$ref": "#/definitions/oic.oic-link" }
8441 ]
8442 }
8443
8444

```

E.3 Collection, link list interface

E.3.1 Introduction

OCF Collection Resource Type contains properties and links. The oic.if.ll interface exposes a representation of the links

	E.3.2	Example URI
8449	/CollectionLinkListInterfaceURI	
8450		
8451		E.3.3
8452	The resource type (rt) is defined as: oic.wk.col.	Resource Type
8453		
8454	#%RAML 0.8	E.3.4
8455	title: Collections	RAML Definition
8456	version: 1.0	
8457	traits:	
8458	- interface-ll :	
8459	queryParameters:	
8460	if:	
8461	enum: ["oic.if.ll"]	
8462	- interface-b :	
8463	queryParameters:	
8464	if:	
8465	enum: ["oic.if.b"]	
8466	- interface-baseline :	
8467	queryParameters:	
8468	if:	
8469	enum: ["oic.if.baseline"]	
8470		
8471	/CollectionLinkListInterfaceURI:	
8472	description:	
8473	OCF Collection Resource Type contains properties and links.	
8474	The oic.if.ll interface exposes a representation of the links	
8475		
8476	is : ['interface-ll']	
8477	get:	
8478	description:	
8479	Retrieve on Link List Interface	
8480		
8481	responses :	
8482	200:	
8483	body:	
8484	application/json:	
8485	schema:	
8486	{	
8487	"\$schema": "http://json-schema.org/draft-v4/schema#",	
8488	"description" : "Copyright (c) 2016 Open Connectivity Foundation, Inc. All rights	
8489	reserved.",	
8490	"id": "http://www.openconnectivity.org/ocf-	
8491	apis/core/schemas/oic.collection.linkslist-schema.json#",	
8492	"definitions": {	
8493	{oic.collection.alllinks": {	
8494	"\$ref": "oic.collection-	
8495	schema.json#/definitions/oic.collection.alllinks"	
8496	}	
8497	},	
8498	"type": "object",	
8499	"properties": {	
8500	"links": {	
8501	"\$ref": "#/definitions/oic.collection.alllinks"	
8502	}	
8503	}	
8504	}	
8505		

```

8506     example: |
8507     {
8508         "links": [
8509             [
8510                 {
8511                     "href": "switch",
8512                     "rt": ["oic.r.switch.binary"],
8513                     "if": ["oic.if.a", "oic.if.baseline"]
8514                 },
8515                 {
8516                     "href": "airFlow",
8517                     "rt": ["oic.r.airflow"],
8518                     "if": ["oic.if.a", "oic.if.baseline"]
8519                 }
8520             ]
8521         }
8522     }

```

E.3.5 Property Definition

Property name	Value type	Mandatory	Access mode	Description
rt	array: see schema	yes	Read Write	Resource Type
di	multiple types: see schema		Read Write	Unique identifier for device (UUID)
title	string		Read Write	A title for the link relation. Can be used by the UI to provide a context
buri	string		Read Write	The base URI used to fully qualify a Relative Reference in the href parameter. Use the OCF Schema for URI
ins	multiple types: see schema		Read Write	The instance identifier for this web link in an array of web links - used in collections
p	object: see schema		Read Write	Specifies the framework policies on the Resource referenced by the target URI
href	string	yes	Read Write	This is the target URI, it can be specified as a Relative Reference or fully-qualified URI. Relative Reference should be used along with the di parameter to make it unique.

rel	multiple types: see schema		Read Write	The relation of the target URI referenced by the link to the context URI	
type	array: schema	see	Read Write	A hint at the representation of the resource referenced by the target URI. This represents the media types that are used for both accepting and emitting	
anchor	string		Read Write	This is used to override the context URI e.g. override the URI of the containing collection	
if	array: schema	see	yes	Read Write	The interface set supported by this resource

8524

E.3.6 CRUDN behavior

Resource	Create	Read	Update	Delete	Notify
/CollectionLinkListInterfaceURI		get			

8525

E.3.7 Referenced JSON schemas

8526

E.3.8 oic.oic-link-schema.json

```

8527 {
8528     "$schema": "http://json-schema.org/draft-04/schema#",
8529     "description": "Copyright (c) 2016 Open Connectivity Foundation, Inc. All rights reserved.",
8530     "id": "http://www.openconnectivity.org/ocf-apis/core/schemas/oic.oic-link-schema.json#",
8531     "definitions": {
8532         "oic.oic-link": {
8533             "type": "object",
8534             "properties": {
8535                 "href": {
8536                     "type": "string",
8537                     "maxLength": 256,
8538                     "description": "This is the target URI, it can be specified as a Relative Reference or
8539 fully-qualified URI. Relative Reference should be used along with the di parameter to make it
8540 unique.",
8541                     "format": "uri"
8542                 },
8543                 "rel": {
8544                     "oneOf": [
8545                         {
8546                             "type": "array",
8547                             "items": {
8548                                 "type": "string",
8549                                 "maxLength": 64
8550                             },
8551                             "minItems": 1,
8552                             "default": ["hosts"]
8553                         },
8554                         {
8555                             "type": "string",
8556                             "maxLength": 64,
8557                             "default": "hosts"
8558                         }
8559                     ]
8560                 }
8561             }
8562         }
8563     }
8564 }
```

```

8558         }
8559     ],
8560   "description": "The relation of the target URI referenced by the link to the context URI"
8561 },
8562   "rt": {
8563     "type": "array",
8564     "items" : [
8565       {
8566         "type" : "string",
8567         "maxLength": 64
8568     },
8569     "minItems" : 1,
8570     "description": "Resource Type"
8571 },
8572   "if": {
8573     "type": "array",
8574     "items": [
8575       {
8576         "type" : "string",
8577         "enum": ["oic.if.baseline", "oic.if.ll", "oic.if.b", "oic.if.rw", "oic.if.r",
8578 "oic.if.a", "oic.if.s" ]
8579     },
8580       "minItems": 1,
8581       "description": "The interface set supported by this resource"
8582     },
8583   "di": {
8584     "$ref": "oic.types-schema.json#/definitions/uuid",
8585     "description": "Unique identifier for device (UUID)"
8586   },
8587   "buri": {
8588     "type": "string",
8589     "description": "The base URI used to fully qualify a Relative Reference in the href
parameter. Use the OCF Schema for URI",
8590     "maxLength": 256,
8591     "format": "uri"
8592   },
8593   "p": {
8594     "description": "Specifies the framework policies on the Resource referenced by the target
URI",
8595     "type": "object",
8596     "properties": {
8597       "bm": {
8598         "description": "Specifies the framework policies on the Resource referenced by the
target URI for e.g. observable and discoverable",
8599         "type": "integer"
8600       },
8601       "sec": {
8602         "description": "Specifies if security needs to be turned on when looking to interact
with the Resource",
8603           "default": false,
8604           "type": "boolean"
8605       },
8606       "port": {
8607         "description": "Secure port to be used for connection",
8608         "type": "integer"
8609       }
8610     },
8611     "required" : ["bm"]
8612   },
8613   "title": {
8614     "type": "string",
8615     "maxLength": 64,
8616     "description": "A title for the link relation. Can be used by the UI to provide a
context"
8617   },
8618   "anchor": {
8619     "type": "string",
8620     "maxLength": 256,
8621     "description": "This is used to override the context URI e.g. override the URI of the
containing collection",
8622     "format": "uri"
8623   },
8624   "ins": {

```

```

8629         "oneOf": [
8630             {
8631                 "type": "integer",
8632                 "description": "An ordinal number that is not repeated - must be unique in the
8633                 collection context"
8634             },
8635             {
8636                 "type": "string",
8637                 "maxLength": 256,
8638                 "format": "uri",
8639                 "description": "Any unique string including a URI"
8640             },
8641             {
8642                 "$ref": "oic.types-schema.json#/definitions/uuid",
8643                 "description": "Unique identifier (UUID)"
8644             }
8645         ],
8646         "description": "The instance identifier for this web link in an array of web links - used
8647         in collections"
8648     },
8649     "type": {
8650         "type": "array",
8651         "description": "A hint at the representation of the resource referenced by the target
8652         URI. This represents the media types that are used for both accepting and emitting",
8653         "items" : {
8654             "type": "string",
8655             "maxLength": 64
8656         },
8657         "minItems": 1,
8658         "default": "application/cbor"
8659     },
8660 },
8661     "required": [ "href", "rt", "if" ]
8662 },
8663 },
8664     "type": "object",
8665     "allOf": [
8666         { "$ref": "#/definitions/oic.oic-link" }
8667     ]
8668 }
8669
8670

```

E.4 Discoverable Resources, baseline interface

E.4.1 Introduction

8671 Baseline representation of /oic/res; list of discoverable resources

E.4.2 Wellknown URI

8672 /oic/res

E.4.3 Resource Type

8673 The resource type (rt) is defined as: oic.wk.res.

E.4.4 RAML Definition

```

8674 #%RAML 0.8
8675 title: Discoverable Resources
8676 version: v1-20160622
8677 traits:
8678     - interface-ll :
8679         queryParameters:
8680             if:
8681                 enum: ["oic.if.ll"]
8682
8683     - interface-baseline :

```

```

8689     queryParameters:
8690         if:
8691             enum: ["oic.if.baseline"]
8692
8693 /oic-res-baseline-URI:
8694     description: |
8695         Baseline representation of /oic/res; list of discoverable resources
8696
8697     is : ['interface-baseline']
8698
8699     get:
8700         description: |
8701             Retrieve the discoverable resource set, baseline interface
8702
8703     responses :
8704         200:
8705             body:
8706                 application/json:
8707                 schema: |
8708                     {
8709                         "$schema": "http://json-schema.org/draft-v4/schema#",
8710                         "description" : "Copyright (c) 2016 Open Connectivity Foundation, Inc. All rights
8711                         reserved.",
8712                         "id": "http://www.openconnectivity.org/ocf-apis/core/schemas/oic.wk.res-
8713                         schema.json#",
8714                         "definitions": {
8715                             "oic.res-baseline": {
8716                                 "type": "object",
8717                                 "properties": {
8718                                     "rt": {
8719                                         "type": "array",
8720                                         "items" : {
8721                                             "type" : "string",
8722                                             "maxLength": 64
8723                                         },
8724                                         "minItems" : 1,
8725                                         "readOnly": true,
8726                                         "description": "Resource Type"
8727                                     },
8728                                     "if": {
8729                                         "type": "array",
8730                                         "items": {
8731                                             "type" : "string",
8732                                             "enum" : ["oic.if.baseline", "oic.if.ll"]
8733                                         },
8734                                         "minItems": 1,
8735                                         "readOnly": true,
8736                                         "description": "The interface set supported by this resource"
8737                                     },
8738                                     "n": {
8739                                         "type": "string",
8740                                         "maxLength": 64,
8741                                         "readOnly": true,
8742                                         "description": "Human friendly name"
8743                                     },
8744                                     "di": {
8745                                         "$ref": "oic.types-schema.json#/definitions/uuid",
8746                                         "readOnly": true,
8747                                         "description": "Unique identifier for device (UUID) as indicated by the
8748 /oic/d resource of the device"
8749                                     },
8750                                     "mpro": {
8751                                         "readOnly": true,
8752                                         "description": "Supported messaging protocols",
8753                                         "type": "string",
8754                                     }
8755                                 }
8756                             }
8757                         }
8758                     }
8759                 }
8760             }
8761         }
8762     }
8763
8764
8765
8766
8767
8768
8769
8770
8771
8772
8773
8774
8775
8776
8777
8778
8779
8780
8781
8782
8783
8784
8785
8786
8787
8788
8789
8790
8791
8792
8793
8794
8795
8796
8797
8798
8799
8800
8801
8802
8803
8804
8805
8806
8807
8808
8809
8810
8811
8812
8813
8814
8815
8816
8817
8818
8819
8820
8821
8822
8823
8824
8825
8826
8827
8828
8829
8830
8831
8832
8833
8834
8835
8836
8837
8838
8839
8840
8841
8842
8843
8844
8845
8846
8847
8848
8849
8850
8851
8852
8853
8854
8855
8856
8857
8858
8859
8860
8861
8862
8863
8864
8865
8866
8867
8868
8869
8870
8871
8872
8873
8874
8875
8876
8877
8878
8879
8880
8881
8882
8883
8884
8885
8886
8887
8888
8889
8890
8891
8892
8893
8894
8895
8896
8897
8898
8899
8900
8901
8902
8903
8904
8905
8906
8907
8908
8909
8910
8911
8912
8913
8914
8915
8916
8917
8918
8919
8920
8921
8922
8923
8924
8925
8926
8927
8928
8929
8930
8931
8932
8933
8934
8935
8936
8937
8938
8939
8940
8941
8942
8943
8944
8945
8946
8947
8948
8949
8950
8951
8952
8953
8954
8955
8956
8957
8958
8959
8960
8961
8962
8963
8964
8965
8966
8967
8968
8969
8970
8971
8972
8973
8974
8975
8976
8977
8978
8979
8980
8981
8982
8983
8984
8985
8986
8987
8988
8989
8990
8991
8992
8993
8994
8995
8996
8997
8998
8999
9000
9001
9002
9003
9004
9005
9006
9007
9008
9009
9010
9011
9012
9013
9014
9015
9016
9017
9018
9019
9020
9021
9022
9023
9024
9025
9026
9027
9028
9029
9030
9031
9032
9033
9034
9035
9036
9037
9038
9039
9040
9041
9042
9043
9044
9045
9046
9047
9048
9049
9050
9051
9052
9053
9054
9055
9056
9057
9058
9059
9060
9061
9062
9063
9064
9065
9066
9067
9068
9069
9070
9071
9072
9073
9074
9075
9076
9077
9078
9079
9080
9081
9082
9083
9084
9085
9086
9087
9088
9089
9090
9091
9092
9093
9094
9095
9096
9097
9098
9099
9100
9101
9102
9103
9104
9105
9106
9107
9108
9109
9110
9111
9112
9113
9114
9115
9116
9117
9118
9119
9120
9121
9122
9123
9124
9125
9126
9127
9128
9129
9130
9131
9132
9133
9134
9135
9136
9137
9138
9139
9140
9141
9142
9143
9144
9145
9146
9147
9148
9149
9150
9151
9152
9153
9154
9155
9156
9157
9158
9159
9160
9161
9162
9163
9164
9165
9166
9167
9168
9169
9170
9171
9172
9173
9174
9175
9176
9177
9178
9179
9180
9181
9182
9183
9184
9185
9186
9187
9188
9189
9190
9191
9192
9193
9194
9195
9196
9197
9198
9199
9200
9201
9202
9203
9204
9205
9206
9207
9208
9209
9210
9211
9212
9213
9214
9215
9216
9217
9218
9219
9220
9221
9222
9223
9224
9225
9226
9227
9228
9229
9230
9231
9232
9233
9234
9235
9236
9237
9238
9239
9240
9241
9242
9243
9244
9245
9246
9247
9248
9249
9250
9251
9252
9253
9254
9255
9256
9257
9258
9259
9260
9261
9262
9263
9264
9265
9266
9267
9268
9269
9270
9271
9272
9273
9274
9275
9276
9277
9278
9279
9280
9281
9282
9283
9284
9285
9286
9287
9288
9289
9290
9291
9292
9293
9294
9295
9296
9297
9298
9299
9300
9301
9302
9303
9304
9305
9306
9307
9308
9309
9310
9311
9312
9313
9314
9315
9316
9317
9318
9319
9320
9321
9322
9323
9324
9325
9326
9327
9328
9329
9330
9331
9332
9333
9334
9335
9336
9337
9338
9339
9340
9341
9342
9343
9344
9345
9346
9347
9348
9349
9350
9351
9352
9353
9354
9355
9356
9357
9358
9359
9360
9361
9362
9363
9364
9365
9366
9367
9368
9369
9370
9371
9372
9373
9374
9375
9376
9377
9378
9379
9380
9381
9382
9383
9384
9385
9386
9387
9388
9389
9390
9391
9392
9393
9394
9395
9396
9397
9398
9399
9400
9401
9402
9403
9404
9405
9406
9407
9408
9409
9410
9411
9412
9413
9414
9415
9416
9417
9418
9419
9420
9421
9422
9423
9424
9425
9426
9427
9428
9429
9430
9431
9432
9433
9434
9435
9436
9437
9438
9439
9440
9441
9442
9443
9444
9445
9446
9447
9448
9449
9450
9451
9452
9453
9454
9455
9456
9457
9458
9459
9460
9461
9462
9463
9464
9465
9466
9467
9468
9469
9470
9471
9472
9473
9474
9475
9476
9477
9478
9479
9480
9481
9482
9483
9484
9485
9486
9487
9488
9489
9490
9491
9492
9493
9494
9495
9496
9497
9498
9499
9500
9501
9502
9503
9504
9505
9506
9507
9508
9509
9510
9511
9512
9513
9514
9515
9516
9517
9518
9519
9520
9521
9522
9523
9524
9525
9526
9527
9528
9529
9530
9531
9532
9533
9534
9535
9536
9537
9538
9539
9540
9541
9542
9543
9544
9545
9546
9547
9548
9549
9550
9551
9552
9553
9554
9555
9556
9557
9558
9559
9560
9561
9562
9563
9564
9565
9566
9567
9568
9569
9570
9571
9572
9573
9574
9575
9576
9577
9578
9579
9580
9581
9582
9583
9584
9585
9586
9587
9588
9589
9590
9591
9592
9593
9594
9595
9596
9597
9598
9599
9600
9601
9602
9603
9604
9605
9606
9607
9608
9609
9610
9611
9612
9613
9614
9615
9616
9617
9618
9619
9620
9621
9622
9623
9624
9625
9626
9627
9628
9629
9630
9631
9632
9633
9634
9635
9636
9637
9638
9639
9640
9641
9642
9643
9644
9645
9646
9647
9648
9649
9650
9651
9652
9653
9654
9655
9656
9657
9658
9659
9660
9661
9662
9663
9664
9665
9666
9667
9668
9669
9670
9671
9672
9673
9674
9675
9676
9677
9678
9679
9680
9681
9682
9683
9684
9685
9686
9687
9688
9689
9690
9691
9692
9693
9694
9695
9696
9697
9698
9699
9700
9701
9702
9703
9704
9705
9706
9707
9708
9709
9710
9711
9712
9713
9714
9715
9716
9717
9718
9719
9720
9721
9722
9723
9724
9725
9726
9727
9728
9729
9730
9731
9732
9733
9734
9735
9736
9737
9738
9739
9740
9741
9742
9743
9744
9745
9746
9747
9748
9749
9750
9751
9752
9753
9754
9755
9756
9757
9758
9759
9760
9761
9762
9763
9764
9765
9766
9767
9768
9769
9770
9771
9772
9773
9774
9775
9776
9777
9778
9779
9780
9781
9782
9783
9784
9785
9786
9787
9788
9789
9790
9791
9792
9793
9794
9795
9796
9797
9798
9799
9800
9801
9802
9803
9804
9805
9806
9807
9808
9809
9810
9811
9812
9813
9814
9815
9816
9817
9818
9819
9820
9821
9822
9823
9824
9825
9826
9827
9828
9829
9830
9831
9832
9833
9834
9835
9836
9837
9838
9839
9840
9841
9842
9843
9844
9845
9846
9847
9848
9849
9850
9851
9852
9853
9854
9855
9856
9857
9858
9859
9860
9861
9862
9863
9864
9865
9866
9867
9868
9869
9870
9871
9872
9873
9874
9875
9876
9877
9878
9879
9880
9881
9882
9883
9884
9885
9886
9887
9888
9889
9890
9891
9892
9893
9894
9895
9896
9897
9898
9899
9900
9901
9902
9903
9904
9905
9906
9907
9908
9909
9910
9911
9912
9913
9914
9915
9916
9917
9918
9919
9920
9921
9922
9923
9924
9925
9926
9927
9928
9929
9930
9931
9932
9933
9934
9935
9936
9937
9938
9939
9940
9941
9942
9943
9944
9945
9946
9947
9948
9949
9950
9951
9952
9953
9954
9955
9956
9957
9958
9959
9960
9961
9962
9963
9964
9965
9966
9967
9968
9969
9970
9971
9972
9973
9974
9975
9976
9977
9978
9979
9980
9981
9982
9983
9984
9985
9986
9987
9988
9989
9990
9991
9992
9993
9994
9995
9996
9997
9998
9999
9999

```

```

8753         "maxLength": 64
8754     },
8755     "links": {
8756         "type": "array",
8757         "items": {
8758             "$ref": "oic.oic-link-schema.json#/definitions/oic.oic-link"
8759         }
8760     },
8761     "required": ["rt", "if", "di", "links"]
8762 }
8763 },
8764 "description": "The list of resources expressed as OIC links",
8765 "type": "array",
8766 "items": {
8767     "$ref": "#/definitions/oic.res-baseline"
8768 }
8769 }
8770 }
8771 }

8772 example: |
8773 [
8774     {
8775         "rt": ["oic.wk.res"],
8776         "if": ["oic.if.baseline", "oic.if.ll"],
8777         "di": "0685B960-736F-46F7-BEC0-9E6CBD61ADC1",
8778         "links": [
8779             [
8780                 {
8781                     "href": "/humidity",
8782                     "rt": ["oic.r.humidity"],
8783                     "if": ["oic.if.s"]
8784                 },
8785                 {
8786                     "href": "/temperature",
8787                     "rt": ["oic.r.temperature"],
8788                     "if": ["oic.if.s"]
8789                 }
8790             ]
8791         ]
8792     ]
8793 ]

```

E.4.5 Property Definition

Property name	Value type	Mandatory	Access mode	Description
rt	array: schema	see	yes	Read Only Resource Type
links	array: schema	see	yes	Read Write
di	multiple types: see schema	yes	Read Only	Unique identifier for device (UUID) as indicated by the /oic/d resource of the device
mpro	string		Read Only	Supported messaging protocols
n	string		Read Only	Human friendly name
if	array: schema	see	yes	The interface set supported by this resource

8795

E.4.6 CRUDN behavior

Resource	Create	Read	Update	Delete	Notify
/oic/res		get			

E.5 Discoverable Resources, link list interface

8798

E.5.1 Introduction

8799 Link list representation of /oic/res; list of discoverable resources

E.5.2 Wellknown URI

8801 /oic/res

E.5.3 Resource Type

8803 The resource type (rt) is defined as: oic.wk.res.

E.5.4 RAML Definition

```

8805 #%RAML 0.8
8806 title: Discoverable Resources
8807 version: v1-20160622
8808 traits:
8809   - interface-ll :
8810     queryParameters:
8811       if:
8812         enum: ["oic.if.ll"]
8813   - interface-baseline :
8814     queryParameters:
8815       if:
8816         enum: ["oic.if.baseline"]

8817 /oic-res-ll-URI:
8818   description: |
8819     Link list representation of /oic/res; list of discoverable resources
8820
8821   is : ['interface-ll']
8822
8823   get:
8824     description: |
8825       Retrieve the discoverable resource set, link list interface
8826
8827   responses :
8828     200:
8829       body:
8830         application/json:
8831           schema: |
8832             {
8833               "$schema": "http://json-schema.org/draft-v4/schema#",
8834               "description" : "Copyright (c) 2016 Open Connectivity Foundation, Inc. All rights
8835 reserved.",
8836               "id": "http://www.openconnectivity.org/ocf-apis/core/schemas/oic.wk.res-schema-
8837 ll.json#",
8838               "definitions": {
8839                 "oic.res-ll": {
8840                   "type": "object",
8841                   "properties": {
8842                     "di": {
8843                       "$ref": "oic.types-schema.json#/definitions/uuid",
8844                       "readOnly": true,

```

```

8845         "description": "Unique identifier for device (UUID) as indicated by the
8846 /oic/d resource of the device"
8847     },
8848     "links": {
8849         "type": "array",
8850         "items": {
8851             "$ref": "oic.oic-link-schema.json#/definitions/oic.oic-link"
8852         }
8853     }
8854 },
8855 "required": ["di", "links"]
8856 },
8857 },
8858 "description": "The list of resources expressed as OIC links with di ",
8859 "type": "array",
8860 "items": {
8861     "$ref": "#/definitions/oic.res-11"
8862 }
8863 }
8864
8865 example: |
8866 [
8867 {
8868     "di": "0685B960-736F-46F7-BEC0-9E6CBD61ADC1",
8869     "links": [
8870         [
8871             {
8872                 "href": "/humidity",
8873                 "rt": ["oic.r.humidity"],
8874                 "if": ["oic.if.s"]
8875             },
8876             {
8877                 "href": "/temperature",
8878                 "rt": ["oic.r.temperature"],
8879                 "if": ["oic.if.s"]
8880             }
8881         ]
8882     ]
8883 }
8884 ]

```

E.5.5 Property Definition

Property name	Value type	Mandatory	Access mode	Description
links	array: see schema	yes	Read Write	
di	multiple types: see schema	yes	Read Only	Unique identifier for device (UUID) as indicated by the /oic/d resource of the device
rt	array: see schema	yes	Read Write	Resource Type
di	multiple types: see schema		Read Write	Unique identifier for device (UUID)
title	string		Read Write	A title for the link relation. Can be used by the UI to provide a context
buri	string		Read Write	The base URI used to fully qualify a Relative Reference in the

				href parameter. Use the OCF Schema for URI	
ins	multiple types: see schema		Read Write	The instance identifier for this web link in an array of web links - used in collections	
p	object: see schema		Read Write	Specifies the framework policies on the Resource referenced by the target URI	
href	string	yes	Read Write	This is the target URI, it can be specified as a Relative Reference or fully-qualified URI. Relative Reference should be used along with the di parameter to make it unique.	
rel	multiple types: see schema		Read Write	The relation of the target URI referenced by the link to the context URI	
type	array: see schema		Read Write	A hint at the representation of the resource referenced by the target URI. This represents the media types that are used for both accepting and emitting	
anchor	string		Read Write	This is used to override the context URI e.g. override the URI of the containing collection	
if	array: see schema	yes	Read Write	The interface set supported by this resource	

8886

E.5.6 CRUDN behavior

Resource	Create	Read	Update	Delete	Notify
/oic/res		get			

```

8887          E.5.7 Referenced JSON schemas
8888          E.5.8 oic.oic-link-schema.json
8889
8890  {
8891      "$schema": "http://json-schema.org/draft-04/schema#",
8892      "description" : "Copyright (c) 2016 Open Connectivity Foundation, Inc. All rights reserved.",
8893      "id": "http://www.openconnectivity.org.ocf-apis/core/schemas/oic.oic-link-schema.json#",
8894      "definitions": {
8895          "oic.oic-link": {
8896              "type": "object",
8897              "properties": {
8898                  "href": {
8899                      "type": "string",
8900                      "maxLength": 256,
8901                      "description": "This is the target URI, it can be specified as a Relative Reference or
8902                      fully-qualified URI. Relative Reference should be used along with the di parameter to make it
8903                      unique.",
8904                      "format": "uri"
8905                  },
8906                  "rel": {
8907                      "oneOf": [
8908                          {
8909                              "type": "array",
8910                              "items": {
8911                                  "type": "string",
8912                                  "maxLength": 64
8913                              },
8914                              "minItems": 1,
8915                              "default": ["hosts"]
8916                          },
8917                          {
8918                              "type": "string",
8919                              "maxLength": 64,
8920                              "default": "hosts"
8921                          }
8922                      ],
8923                      "description": "The relation of the target URI referenced by the link to the context URI"
8924                  },
8925                  "rt": {
8926                      "type": "array",
8927                      "items" : {
8928                          "type" : "string",
8929                          "maxLength": 64
8930                      },
8931                      "minItems" : 1,
8932                      "description": "Resource Type"
8933                  },
8934                  "if": {
8935                      "type": "array",
8936                      "items": {
8937                          "type" : "string",
8938                          "enum" : ["oic.if.baseline", "oic.if.ll", "oic.if.b", "oic.if.rw", "oic.if.r",
8939                          "oic.if.a", "oic.if.s" ]
8940                      },
8941                      "minItems": 1,
8942                      "description": "The interface set supported by this resource"
8943                  },
8944                  "di": {
8945                      "$ref": "oic.types-schema.json#/definitions/uuid",
8946                      "description": "Unique identifier for device (UUID)"
8947                  },
8948                  "buri": {
8949                      "type": "string",
8950                      "description": "The base URI used to fully qualify a Relative Reference in the href
parameter. Use the OCF Schema for URI",
8951                      "maxLength": 256,
8952                      "format": "uri"
8953                  },
8954                  "p": {
8955                      "description": "Specifies the framework policies on the Resource referenced by the target
}

```

```

8956     "URI",
8957         "type": "object",
8958         "properties": {
8959             "bm": {
8960                 "description": "Specifies the framework policies on the Resource referenced by the target URI for e.g. observable and discoverable",
8961                 "type": "integer"
8962             },
8963             "sec": {
8964                 "description": "Specifies if security needs to be turned on when looking to interact with the Resource",
8965                 "default": false,
8966                 "type": "boolean"
8967             },
8968             "port": {
8969                 "description": "Secure port to be used for connection",
8970                 "type": "integer"
8971             }
8972         },
8973         "required": ["bm"]
8974     },
8975     "title": {
8976         "type": "string",
8977         "maxLength": 64,
8978         "description": "A title for the link relation. Can be used by the UI to provide a context"
8979     },
8980     "anchor": {
8981         "type": "string",
8982         "maxLength": 256,
8983         "description": "This is used to override the context URI e.g. override the URI of the containing collection",
8984         "format": "uri"
8985     },
8986     "ins": {
8987         "oneOf": [
8988             {
8989                 "type": "integer",
8990                 "description": "An ordinal number that is not repeated - must be unique in the collection context"
8991             },
8992             {
8993                 "type": "string",
8994                 "maxLength": 256,
8995                 "format": "uri",
8996                 "description": "Any unique string including a URI"
8997             },
8998             {
8999                 "$ref": "oic.types-schema.json#/definitions/uuid",
9000                 "description": "Unique identifier (UUID)"
9001             }
9002         ],
9003         "description": "The instance identifier for this web link in an array of web links - used in collections"
9004     },
9005     "type": {
9006         "type": "array",
9007         "description": "A hint at the representation of the resource referenced by the target URI. This represents the media types that are used for both accepting and emitting",
9008         "items": {
9009             "type": "string",
9010             "maxLength": 64
9011         },
9012         "minItems": 1,
9013         "default": "application/cbor"
9014     }
9015 },
9016     "required": [ "href", "rt", "if" ]
9017 },
9018 },
9019 },
9020 },
9021 },
9022 },
9023 },
9024 },
9025 },
9026 }

```

```
9027     "allOf": [
9028       { "$ref": "#/definitions/oic.oic-link" }
9029     ]
9030   }
9031
9032
```

Annex F (informative)

Swagger2.0 definitions

F.1 Icon

F.1.1 Introduction

This resource describes the attributes associated with an icon. Retrieves the current icon properties.

F.1.2 Example URI

/IconResURI

F.1.3 Resource Type

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

F.1.4 **Swagger2.0 Definition**

```

{
  "swagger": "2.0",
  "info": {
    "title": "Icon",
    "version": "v1.1.0-20161107",
    "license": {
      "name": "copyright 2016-2017 Open Connectivity Foundation, Inc. All rights reserved.",
      "x-description": "Redistribution and use in source and binary forms, with or without
modification, are permitted provided that the following conditions are met:\n          1.
Redistributions of source code must retain the above copyright notice, this list of conditions and the
following disclaimer.\n          2. Redistributions in binary form must reproduce the above
copyright notice, this list of conditions and the following disclaimer in the documentation and/or
other materials provided with the distribution.\n\n          THIS SOFTWARE IS PROVIDED BY THE Open
Connectivity Foundation, INC. \"AS IS\" AND ANY EXPRESS OR IMPLIED WARRANTIES, INCLUDING, BUT NOT
LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE OR
WARRANTIES OF NON-INFRINGEMENT, ARE DISCLAIMED.\n          IN NO EVENT SHALL THE Open Connectivity
Foundation, INC. OR CONTRIBUTORS BE LIABLE FOR ANY DIRECT, INDIRECT, INCIDENTAL, SPECIAL,
EXEMPLARY, OR CONSEQUENTIAL DAMAGES (INCLUDING, BUT NOT LIMITED TO, PROCUREMENT OF SUBSTITUTE GOODS
OR SERVICES; LOSS OF USE, DATA, OR PROFITS; OR BUSINESS INTERRUPTION)\n          HOWEVER CAUSED AND
ON ANY THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT (INCLUDING NEGLIGENCE OR
OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OF THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY
OF SUCH DAMAGE.\n"
    }
  },
  "schemes": ["http"],
  "consumes": ["application/json"],
  "produces": ["application/json"],
  "paths": {
    "/IconResURI" : {
      "get": {
        "description": "This resource describes the attributes associated with an Icon.\nRetrieves
the current icon properties.\n",
        "parameters": [
        ],
        "responses": {
          "200": {
            "description" : "",
            "x-example":
            {
              "rt": ["oic.r.icon"],
              "id": "unique_example_id",
              "mimetype": "image/png",
              "width": 256,
              "height": 256,
              "media": "http://findbetter.ru/public/uploads/1481662800/2043.png"
            }
          }
        }
      }
    }
  }
}

```

```

9093           ,
9094           "schema": { "$ref": "#/definitions/Icon" }
9095       }
9096   }
9097 }
9098 },
9099 "parameters": {
9100   "interface" : {
9101     "in" : "query",
9102     "name" : "if",
9103     "type" : "string",
9104     "enum" : ["oic.if.r", "oic.if.baseline"]
9105   }
9106 },
9107 "definitions": {
9108   "Icon" : {
9109     "properties": {
9110       "mimetype" :
9111         {
9112           "description": "The Media Type of the icon",
9113           "maxLength": 64,
9114           "readOnly": true,
9115           "type": "string"
9116         },
9117     },
9118     "rt" :
9119       {
9120         "description": "Resource Type of the Resource",
9121         "items": {
9122           "maxLength": 64,
9123           "type": "string"
9124         },
9125         "minItems": 1,
9126         "readOnly": true,
9127         "type": "array"
9128       },
9129     "media" :
9130       {
9131         "description": "Specifies the URI to the icon",
9132         "format": "uri",
9133         "maxLength": 256,
9134         "readOnly": true,
9135         "type": "string"
9136       },
9137     "n" :
9138       {
9139         "description": "Friendly name of the resource",
9140         "maxLength": 64,
9141         "readOnly": true,
9142         "type": "string"
9143       },
9144     "width" :
9145       {
9146         "description": "The width in pixels",
9147         "minimum": 1,
9148         "readOnly": true,
9149         "type": "integer"
9150       },
9151     "height" :
9152       {
9153         "description": "The height in pixels",
9154         "minimum": 1,
9155         "readOnly": true,
9156         "type": "integer"
9157       },
9158       {
9159         "description": "The height in pixels",
9160         "minimum": 1,
9161         "readOnly": true,
9162         "type": "integer"
9163       },
9164

```

```

9164     "id" :
9165         {
9166             "description": "Instance ID of this specific resource",
9167             "maxLength": 64,
9168             "readOnly": true,
9169             "type": "string"
9170         },
9171
9172     "if" :
9173         {
9174             "description": "The interface set supported by this resource",
9175             "items": {
9176                 "enum": [
9177                     "oic.if.baseline",
9178                     "oic.if.ll",
9179                     "oic.if.b",
9180                     "oic.if.lb",
9181                     "oic.if.rw",
9182                     "oic.if.r",
9183                     "oic.if.a",
9184                     "oic.if.s"
9185                 ],
9186                 "type": "string"
9187             },
9188             "minItems": 1,
9189             "readOnly": true,
9190             "type": "array"
9191         }
9192     },
9193 },
9194     "required": ["mimetype", "width", "height", "media"]
9195
9196 }
9197
9198 }

```

F.1.5 Property Definition

Property name	Value type	Mandatory	Access mode	Description
if	array: schema	see schema	Read Only	The interface set supported by this resource
media	string	yes	Read Only	Specifies the URI to the icon
height	integer	yes	Read Only	The height in pixels
width	integer	yes	Read Only	The width in pixels
id	string		Read Only	Instance ID of this specific resource
mimetype	string	yes	Read Only	The Media Type of the icon
n	string		Read Only	Friendly name of the resource
rt	array: schema	see schema	Read Only	Resource Type of the Resource

F.1.6 CRUDN behaviour

Resource	Create	Read	Update	Delete	Notify
/IconResURI		get			

```

9201 F.2 Introspection Resource
9202 F.2.1 Introduction
9203 This resource provides the means to get the device introspection data specifying all the endpoints
9204 of the device.
9205 The url hosted by this resource is either a local or an external url.
9206
9207 F.2.2 Wellknown URI
9208 /IntrospectionResURI
9209 F.2.3 Resource Type
9210 The resource type (rt) is defined as: ['oic.wk.introspection'].
9211 F.2.4 Swagger2.0 Definition
9212 {
9213     "swagger": "2.0",
9214     "info": {
9215         "title": "Introspection Resource",
9216         "version": "v1.0.0-20160707",
9217         "license": {
9218             "name": "copyright 2016-2017 Open Connectivity Foundation, Inc. All rights reserved.",
9219             "x-description": "Redistribution and use in source and binary forms, with or without
9220 modification, are permitted provided that the following conditions are met:\n        1.
9221 Redistributions of source code must retain the above copyright notice, this list of conditions and
9222 the following disclaimer.\n        2. Redistributions in binary form must reproduce the above
9223 copyright notice, this list of conditions and the following disclaimer in the documentation and/or
9224 other materials provided with the distribution.\n\n        THIS SOFTWARE IS PROVIDED BY THE Open
9225 Connectivity Foundation, INC. \"AS IS\" AND ANY EXPRESS OR IMPLIED WARRANTIES, INCLUDING, BUT NOT
9226 LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE OR
9227 WARRANTIES OF NON-INFRINGEMENT, ARE DISCLAIMED.\n        IN NO EVENT SHALL THE Open Connectivity
9228 Foundation, INC. OR CONTRIBUTORS BE LIABLE FOR ANY DIRECT, INDIRECT, INCIDENTAL, SPECIAL,
9229 EXEMPLARY, OR CONSEQUENTIAL DAMAGES (INCLUDING, BUT NOT LIMITED TO, PROCUREMENT OF SUBSTITUTE GOODS
9230 OR SERVICES; LOSS OF USE, DATA, OR PROFITS; OR BUSINESS INTERRUPTION)\n        HOWEVER CAUSED AND
9231 ON ANY THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT (INCLUDING NEGLIGENCE OR
9232 OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OF THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY
9233 OF SUCH DAMAGE.\n"
9234     },
9235     "schemes": ["http"],
9236     "consumes": ["application/json"],
9237     "produces": ["application/json"],
9238     "paths": {
9239         "/IntrospectionResURI" : {
9240             "get": {
9241                 "description": "This resource provides the means to get the device introspection data
9242 specifying all the endpoints of the device.\nThe url hosted by this resource is either a local or
9243 an external url.\n",
9244                 "parameters": [
9245                     ],
9246                 "responses": {
9247                     "200": {
9248                         "description" : "",
9249                         "x-example": {
9250                             "rt" : ["oic.wk.introspection"],
9251                             "urlInfo" : [
9252                                 {
9253                                     "content-type" : "application/cbor",
9254                                     "protocol" : "coap",
9255                                     "url" : "coap://[fe80::1]:1234/IntrospectionExampleURI"
9256                                 }
9257                             ]
9258                         }
9259                     }
9260                 },
9261                 "schema": { "$ref": "#/definitions/oic.wk.introspectionInfo" }
9262             }
9263         }
9264     }
9265 }
```

```

9264         }
9265     }
9266   }
9267 },
9268 "parameters": {
9269   "interface": {
9270     "in": "query",
9271     "name": "if",
9272     "type": "string",
9273     "enum": ["oic.if.r", "oic.if.baseline"]
9274   }
9275 },
9276 "definitions": {
9277   "oic.wk.introspectionInfo" : {
9278     "properties": {
9279       "rt" :
9280         {
9281           "description": "Resource Type of the Resource",
9282           "items": {
9283             "maxLength": 64,
9284             "type": "string"
9285           },
9286           "minItems": 1,
9287           "readonly": true,
9288           "type": "array"
9289         },
9290       "n" :
9291         {
9292           "description": "Friendly name of the resource",
9293           "maxLength": 64,
9294           "readonly": true,
9295           "type": "string"
9296         },
9297       "urlInfo" :
9298         {
9299           "description": "Information on the location of the introspection data.",
9300           "items": {
9301             "properties": {
9302               "content-type": {
9303                 "default": "application/cbor",
9304                 "description": "content-type of the introspection data",
9305                 "enum": [
9306                   "application/json",
9307                   "application/cbor"
9308                 ],
9309                 "type": "string"
9310               },
9311               "protocol": {
9312                 "description": "Identifier for the protocol to be used to obtain the introspection
9313 information",
9314                 "enum": [
9315                   "coap",
9316                   "coaps",
9317                   "http",
9318                   "https",
9319                   "coap+tcp",
9320                   "coaps+tcp"
9321                 ],
9322                 "type": "string"
9323               },
9324               "url" : {
9325                 "description": "The URL of the introspection information.",
9326                 "format": "uri",
9327                 "type": "string"
9328               },
9329               "version": {
9330                 "default": 1,
9331                 "description": "The version of the introspection data that can be downloaded",
9332                 "enum": [
9333

```

```

9335           1
9336           ],
9337           "type": "integer"
9338       }
9339     },
9340     "required": [
9341       "url",
9342       "protocol"
9343     ],
9344     "type": "object"
9345   },
9346   "minItems": 1,
9347   "readOnly": true,
9348   "type": "array"
9349 },
9350
9351   "id" :
9352     {
9353       "description": "Instance ID of this specific resource",
9354       "maxLength": 64,
9355       "readOnly": true,
9356       "type": "string"
9357     },
9358
9359   "if" :
9360     {
9361       "description": "The interface set supported by this resource",
9362       "items": {
9363         "enum": [
9364           "oic.if.baseline",
9365           "oic.if.ll",
9366           "oic.if.b",
9367           "oic.if.lb",
9368           "oic.if.rw",
9369           "oic.if.r",
9370           "oic.if.a",
9371           "oic.if.s"
9372         ],
9373         "type": "string"
9374       },
9375       "minItems": 1,
9376       "readOnly": true,
9377       "type": "array"
9378     }
9379   }
9380 }
9381 }
9382 }
9383 }
9384 }
```

9385 F.2.5 Property Definition

Property name	Value type	Mandatory	Access mode	Description
n	string		Read Only	Friendly name of the resource
id	string		Read Only	Instance ID of this specific resource
urlInfo	array: schema	see	Read Only	Information on the location of the introspection data.
rt	array: schema	see	Read Only	Resource Type of the Resource

if	array: schema	see		Read Only	The interface set supported by this resource
----	------------------	-----	--	-----------	--

9386 F.2.6 CRUDN behaviour

Resource	Create	Read	Update	Delete	Notify
/IntrospectionResURI		get			

9387 F.3 OCF Collection

9388 F.3.1 Introduction

9389 OCF Collection Resource Type contains properties and links.
 9390 The oic.if.baseline interface exposes a representation of
 9391 the links and the properties of the collection resource itself.
 9392

9393 F.3.2 Example URI

9394 /CollectionBaselineInterfaceURI

9395 F.3.3 Resource Type

9396 The resource type (rt) is defined as: ['oic.wk.col'].

9397 F.3.4 Swagger2.0 Definition

```

9398 {
9399   "swagger": "2.0",
9400   "info": {
9401     "title": "OCF Collection",
9402     "version": "1.0",
9403     "license": {
9404       "name": "copyright 2016-2017 Open Connectivity Foundation, Inc. All rights reserved.",
9405       "x-description": "Redistribution and use in source and binary forms, with or without
9406 modification, are permitted provided that the following conditions are met:\n          1.
9407 Redistributions of source code must retain the above copyright notice, this list of conditions and
9408 the following disclaimer.\n          2. Redistributions in binary form must reproduce the above
9409 copyright notice, this list of conditions and the following disclaimer in the documentation and/or
9410 other materials provided with the distribution.\n\n          THIS SOFTWARE IS PROVIDED BY THE Open
9411 Connectivity Foundation, INC. \"AS IS\" AND ANY EXPRESS OR IMPLIED WARRANTIES, INCLUDING, BUT NOT
9412 LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE OR
9413 WARRANTIES OF NON-INFRINGEMENT, ARE DISCLAIMED.\n          IN NO EVENT SHALL THE Open Connectivity
9414 Foundation, INC. OR CONTRIBUTORS BE LIABLE FOR ANY DIRECT, INDIRECT, INCIDENTAL, SPECIAL,
9415 EXEMPLARY, OR CONSEQUENTIAL DAMAGES (INCLUDING, BUT NOT LIMITED TO, PROCUREMENT OF SUBSTITUTE GOODS
9416 OR SERVICES; LOSS OF USE, DATA, OR PROFITS; OR BUSINESS INTERRUPTION)\n          HOWEVER CAUSED AND
9417 ON ANY THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT (INCLUDING NEGLIGENCE OR
9418 OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OF THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY
9419 OF SUCH DAMAGE.\n"
9420   }
9421 },
9422   "schemes": ["http"],
9423   "consumes": ["application/json"],
9424   "produces": ["application/json"],
9425   "paths": {
9426     "/CollectionBaselineInterfaceURI" : {
9427       "get": {
9428         "description": "OCF Collection Resource Type contains properties and links.\nThe
9429 oic.if.baseline interface exposes a representation of\nthe links and the properties of the
9430 collection resource itself\nRetrieve on Baseline Interface\n",
9431         "parameters": [
9432           ],
9433         "responses": {
9434           "200": {
9435             "description": "",
9436             "x-example": {
9437               "rt": ["oic.wk.col"],
9438               "id": "unique_example_id",
9439             }
9440           }
9441         }
9442       }
9443     }
9444   }
9445 }
```

```

9440         "rts": [ "oic.r.switch.binary", "oic.r.airflow" ],
9441         "links": [
9442             {
9443                 "href": "switch",
9444                 "rt": [ "oic.r.switch.binary" ],
9445                 "if": [ "oic.if.a", "oic.if.baseline" ],
9446                 "eps": [
9447                     {"ep": "coap://[fe80::b1d6]:1111", "pri": 2},
9448                     {"ep": "coaps://[fe80::b1d6]:1122"},
9449                     {"ep": "coaptcp://[2001:db8:a::123]:2222", "pri": 3}
9450                 ]
9451             },
9452             {
9453                 "href": "airFlow",
9454                 "rt": [ "oic.r.airflow" ],
9455                 "if": [ "oic.if.a", "oic.if.baseline" ],
9456                 "eps": [
9457                     {"ep": "coap://[fe80::b1d6]:1111", "pri": 2},
9458                     {"ep": "coaps://[fe80::b1d6]:1122"},
9459                     {"ep": "coaptcp://[2001:db8:a::123]:2222", "pri": 3}
9460                 ]
9461             }
9462         ]
9463     },
9464     "schema": { "$ref": "#/definitions/sbaseline" }
9465   }
9466 },
9467 },
9468 "post": {
9469     "description": "Update on Baseline Interface\n",
9470     "parameters": [
9471         {
9472             "name": "body",
9473             "in": "body",
9474             "required": true,
9475             "schema": { "$ref": "#/definitions/sbaseline" }
9476         }
9477     ],
9478     "responses": {
9479         "200": {
9480             "description": "",
9481             "schema": { "$ref": "#/definitions/sbaseline" }
9482         }
9483     }
9484   }
9485 },
9486 },
9487 "/CollectionBatchInterfaceURI" : {
9488     "get": {
9489         "description": "OCF Collection Resource Type contains properties and links.\nThe oic.if.b
9490         interface exposed a composite representation of the\nresources pointed to by the links\nRetrieve
9491         on Batch Interface\n",
9492         "parameters": [
9493         ],
9494         "responses": {
9495             "200": {
9496                 "description" : "All targets returned OK status (HTTP 200 or CoAP 2.05 Content)",
9497                 "x-example":
9498                 [
9499                     {
9500                         "href": "switch",
9501                         "rep":
9502                             {
9503                                 "value": true
9504                             }
9505                     },
9506                     {
9507                         "href": "airFlow",
9508                         "rep":
9509                             {
9510                                 "direction": "floor",

```

```

9511             "speed":      3
9512         }
9513     ]
9514   ]
9515   ,
9516   "schema": { "$ref": "#/definitions/sbatch-retrieve" }
9517 },
9518 "404": {
9519   "description" : "One or more targets did not return an OK status, return a
9520 representation containing returned properties from the targets that returned OK",
9521   "x-example":
9522   [
9523     [
9524       {
9525         "href": "switch",
9526         "rep":
9527           {
9528             "value": true
9529           }
9530       ]
9531     ,
9532     "schema": { "$ref": "#/definitions/sbatch-retrieve" }
9533   }
9534 }
9535 },
9536 "post": {
9537   "description": "Update on Batch Interface\n",
9538   "parameters": [
9539     {
9540       "name": "body",
9541       "in": "body",
9542       "required": true,
9543       "schema": { "$ref": "#/definitions/sbatch-update" },
9544     "x-example":
9545     [
9546       [
9547         {
9548           "href": "switch",
9549           "rep":
9550             {
9551               "value": true
9552             }
9553         ,
9554         {
9555           "href": "airFlow",
9556           "rep":
9557             {
9558               "direction": "floor",
9559               "speed": 3
9560             }
9561         ]
9562       ]
9563     ],
9564   "responses": {
9565     "200": {
9566       "description" : "all targets returned OK status (HTTP 200 or CoAP 2.04 Changed)
9567 return a representation of the current state of all targets",
9568     "x-example":
9569     [
9570       [
9571         {
9572           "href": "switch",
9573           "rep":
9574             {
9575               "value": true
9576             }
9577         ,
9578         {
9579           "href": "airFlow",
9580           "rep":
9581             {
9582               "direction": "demist",

```

```

9582         "speed": 5
9583     }
9584   ]
9585   ,
9586   "schema": { "$ref": "#/definitions/sbatch-retrieve" }
9587 },
9588 "403": {
9589   "description" : "one or more targets did not return OK status; return a retrieve
9590 representation of the current state of all targets in the batch",
9591   "x-example":
9592   [
9593     [
9594       {
9595         "href": "switch",
9596         "rep":
9597         {
9598           "value": true
9599         }
9600       },
9601       {
9602         "href": "airFlow",
9603         "rep":
9604         {
9605           "direction": "floor",
9606           "speed": 3
9607         }
9608       }
9609     ]
9610   ,
9611   "schema": { "$ref": "#/definitions/sbatch-retrieve" }
9612 }
9613 }
9614 }
9615 "/CollectionLinkListInterfaceURI" :
9616   "get": {
9617     "description": "OCF Collection Resource Type contains properties and links.\n\nThe oic.if.ll
9618 interface exposes a representation of the links\n\nRetrieve on Link List Interface\n",
9619     "parameters": [
9620     ],
9621     "responses": {
9622       "200": {
9623         "description" : "",
9624         "x-example":
9625         [
9626           [
9627             {
9628               "href": "switch",
9629               "rt": [ "oic.r.switch.binary" ],
9630               "if": [ "oic.if.a", "oic.if.baseline" ],
9631               "eps": [
9632                 {"ep": "coap://[fe80::bld6]:1111", "pri": 2},
9633                 {"ep": "coaps://[fe80::bld6]:1122"},
9634                 {"ep": "coapt+tcp://[2001:db8:a::123]:2222", "pri": 3}
9635               ]
9636             },
9637             {
9638               "href": "airFlow",
9639               "rt": [ "oic.r.airflow" ],
9640               "if": [ "oic.if.a", "oic.if.baseline" ],
9641               "eps": [
9642                 {"ep": "coap://[fe80::bld6]:1111", "pri": 2},
9643                 {"ep": "coaps://[fe80::bld6]:1122"},
9644                 {"ep": "coapt+tcp://[2001:db8:a::123]:2222", "pri": 3}
9645               ]
9646             }
9647           ]
9648         ,
9649         "schema": { "$ref": "#/definitions/slinks" }
9650       }
9651     }
9652   }

```

```

9653     }
9654   },
9655   "parameters": {
9656     "interface-ll" : {
9657       "in" : "query",
9658       "name" : "if",
9659       "type" : "string",
9660       "enum" : ["oic.if.ll"]
9661     },
9662     "interface-b" : {
9663       "in" : "query",
9664       "name" : "if",
9665       "type" : "string",
9666       "enum" : ["oic.if.b"]
9667     },
9668     "interface-baseline" : {
9669       "in" : "query",
9670       "name" : "if",
9671       "type" : "string",
9672       "enum" : ["oic.if.baseline"]
9673     },
9674     "interface-all" : {
9675       "in" : "query",
9676       "name" : "if",
9677       "type" : "string",
9678       "enum" : ["oic.if.ll", "oic.if.baseline", "oic.if.b"]
9679     }
9680   },
9681   "definitions": {
9682     "sbaseline" : {
9683       "properties": {
9684         "links" :
9685           {
9686             "description": "A set of simple or individual OIC Links.",
9687             "items": {
9688               "$ref": "#/definitions/oic.oic-link"
9689             },
9690             "type": "array"
9691           }
9692         }
9693       }
9694     }
9695   },
9696   "sbatch-retrieve" : {
9697     "title" :
9698       "Collection Batch Retrieve Format (auto merged)"
9699     ,
9700     "minItems" :
9701       1
9702     ,
9703     "items" :
9704       {
9705         "additionalProperties": true,
9706         "properties": {
9707           "href" :
9708             "description": "URI of the target resource relative assuming the collection URI as
anchor",
9709             "format": "uri",
9710             "maxLength": 256,
9711             "type": "string"
9712           },
9713           "rep" :
9714             {
9715               "oneOf": [
9716                 {
9717                   "description": "The response payload from a single resource",
9718                   "type": "object"
9719                 },
9720                 {
9721                   "description": "The response payload from a collection (batch) resource",
9722                   "items": {
9723                     "properties": {

```

```

9724         "anchor": {
9725             "description": "This is used to override the context URI e.g. override the
9726             URI of the containing collection.",
9727             "format": "uri",
9728             "maxLength": 256,
9729             "type": "string"
9730         },
9731         "di": {
9732             "allOf": [
9733                 {
9734                     "description": "Format pattern according to IETF RFC 4122.",
9735                     "pattern": "^{a-fA-F0-9}{8}-{a-fA-F0-9}{4}-{a-fA-F0-9}{4}-[a-fA-F0-9]{12}$",
9736                 }
9737             ],
9738             "type": "string"
9739         },
9740         {
9741             "description": "The device ID"
9742         }
9743     ],
9744     "eps": {
9745         "description": "the Endpoint information of the target Resource",
9746         "items": {
9747             "properties": {
9748                 "ep": {
9749                     "description": "Transport Protocol Suite + Endpoint Locator",
9750                     "format": "uri",
9751                     "type": "string"
9752                 },
9753                 "pri": {
9754                     "description": "The priority among multiple Endpoints",
9755                     "minimum": 1,
9756                     "type": "integer"
9757                 }
9758             },
9759             "type": "object"
9760         },
9761         "type": "array"
9762     },
9763     "href": {
9764         "description": "This is the target URI, it can be specified as a Relative
9765         Reference or fully-qualified URI.",
9766         "format": "uri",
9767         "maxLength": 256,
9768         "type": "string"
9769     },
9770     "if": {
9771         "description": "The interface set supported by this resource",
9772         "items": {
9773             "enum": [
9774                 "oic.if.baseline",
9775                 "oic.if.ll",
9776                 "oic.if.b",
9777                 "oic.if.rw",
9778                 "oic.if.r",
9779                 "oic.if.a",
9780                 "oic.if.s"
9781             ],
9782             "type": "string"
9783         },
9784         "minItems": 1,
9785         "type": "array"
9786     },
9787     "ins": {
9788         "description": "The instance identifier for this web link in an array of web
9789         links - used in collections",
9790         "type": "integer"
9791     },
9792     "p": {
9793         "description": "Specifies the framework policies on the Resource referenced
9794         by the target URI",

```

```

9795     "properties": {
9796         "bm": {
9797             "description": "Specifies the framework policies on the Resource
9798             referenced by the target URI for e.g. observable and discoverable",
9799             "type": "integer"
9800         }
9801     },
9802     "required": [
9803         "bm"
9804     ],
9805     "type": "object"
9806 },
9807     "rel": {
9808         "description": "The relation of the target URI referenced by the link to the
9809         context URI",
9810         "oneOf": [
9811             {
9812                 "default": [
9813                     "hosts"
9814                 ],
9815                 "items": {
9816                     "maxLength": 64,
9817                     "type": "string"
9818                 },
9819                 "minItems": 1,
9820                 "type": "array"
9821             },
9822             {
9823                 "default": "hosts",
9824                 "maxLength": 64,
9825                 "type": "string"
9826             }
9827         ]
9828     },
9829     "rt": {
9830         "description": "Resource Type of the Resource",
9831         "items": {
9832             "maxLength": 64,
9833             "type": "string"
9834         },
9835         "minItems": 1,
9836         "type": "array"
9837     },
9838     "title": {
9839         "description": "A title for the link relation. Can be used by the UI to
9840         provide a context.",
9841         "maxLength": 64,
9842         "type": "string"
9843     },
9844     "type": {
9845         "default": "application/cbor",
9846         "description": "A hint at the representation of the resource referenced by
9847         the target URI. This represents the media types that are used for both accepting and emitting.",
9848         "items": {
9849             "maxLength": 64,
9850             "type": "string"
9851         },
9852         "minItems": 1,
9853         "type": "array"
9854     }
9855 },
9856     "required": [
9857         "href",
9858         "rt",
9859         "if"
9860     ],
9861     "type": "object"
9862 },
9863     "type": "array"
9864 }
9865 ]

```

```

9866         }
9867     },
9868     "required": [
9869       "href",
9870       "rep"
9871     ],
9872     "type": "object"
9873   }
9874 
9875   , "type" :
9876     "array"
9877 
9878 }
9879 
9880   "sbatch-update" : {
9881     "title" :
9882       "Collection Batch Update Format (auto merged)"
9883 
9884     , "minItems" :
9885       1
9886 
9887     , "items" :
9888       [
9889         {
9890           "$ref": "#/definitions/oic.batch-update.item"
9891         }
9892       , "type" :
9893         "array"
9894 
9895     }
9896 
9897   "slinks" : {
9898     "type" :
9899       "array"
9900 
9901     , "items" :
9902       [
9903         {
9904           "$ref": "#/definitions/oic.oic-link"
9905         }
9906 
9907   , "oic.wk.col-batch-update" :
9908     {
9909       "description": "array of resource representations to apply to the batch collection, using href to indicate which resource(s) in the batch to update. If the href property is empty, effectively making the URI reference to the collection itself, the representation is to be applied to all resources in the batch",
9910       "items": [
9911         {
9912           "$ref": "#/definitions/oic.batch-update.item"
9913         },
9914         "minItems": 1,
9915         "type": "array"
9916     }
9917 
9918   , "uuid" :
9919     {
9920       "description": "Format pattern according to IETF RFC 4122.",
9921       "pattern": "^[a-fA-F0-9]{8}-[a-fA-F0-9]{4}-[a-fA-F0-9]{4}-[a-fA-F0-9]{4}-[a-fA-F0-9]{12}$",
9922       "type": "string"
9923     }
9924 
9925 
9926   , "oic.collection.properties" :
9927     {
9928       "description": "A collection is a set of links along with additional properties to describe the collection itself",
9929       "properties": {
9930         "rts": {
9931           "$ref": "#/definitions/oic.core/properties/rt",
9932           "description": "The list of allowable resource types (for Target and anchors) in links included in the collection"
9933         }
9934       }
9935 
9936

```

```

9937     },
9938     "type": "object"
9939   }
9940 
9941   , "oic.core" :
9942   {
9943     "properties": {
9944       "rt": {
9945         "description": "Resource Type of the Resource",
9946         "items": {
9947           "maxLength": 64,
9948           "type": "string"
9949         },
9950         "minItems": 1,
9951         "readOnly": true,
9952         "type": "array"
9953       }
9954     },
9955     "type": "object"
9956   }
9957 
9958   , "oic.batch-update.item" :
9959   {
9960     "additionalProperties": true,
9961     "description": "array of resource representations to apply to the batch collection, using
9962 href to indicate which resource(s) in the batch to update. If the href property is empty,
9963 effectively making the URI reference to the collection itself, the representation is to be applied
9964 to all resources in the batch",
9965     "properties": {
9966       "href": {
9967         "description": "URI of the target resource relative assuming the collection URI as
anchor",
9968         "format": "uri",
9969         "maxLength": 256,
9970         "type": "string"
9971       },
9972       "rep": {
9973         "oneOf": [
9974           {
9975             "description": "The response payload from a single resource",
9976             "type": "object"
9977           },
9978           {
9979             "description": "The response payload from a collection (batch) resource",
9980             "items": {
9981               "$ref": "#/definitions/oic.oic-link"
9982             },
9983             "type": "array"
9984           }
9985         ]
9986       }
9987     },
9988     "required": [
9989       "href",
9990       "rep"
9991     ],
9992     "type": "object"
9993   }
9994 
9995   , "oic.collection.linksexpanded" :
9996   {
9997     "properties": {
9998       "links": {
9999         "description": "A set of simple or individual OIC Links.",
10000        "items": {
10001          "properties": {
10002            "anchor": {
10003              "description": "This is used to override the context URI e.g. override the URI of
the containing collection.",
10004              "format": "uri",
10005              "maxLength": 256,
10006            }
10007          }
10008        }
10009      }
10010    }
10011  }

```

```

1008         "type": "string"
1009     },
1010     "di": {
1011         "description": "Format pattern according to IETF RFC 4122.",
1012         "pattern": "^[a-fA-F0-9]{8}-[a-fA-F0-9]{4}-[a-fA-F0-9]{4}-[a-fA-F0-
1013         9]{12}$",
1014         "type": "string"
1015     },
1016     "eps": {
1017         "description": "the Endpoint information of the target Resource",
1018         "items": {
1019             "properties": {
1020                 "ep": {
1021                     "description": "Transport Protocol Suite + Endpoint Locator",
1022                     "format": "uri",
1023                     "type": "string"
1024                 },
1025                 "pri": {
1026                     "description": "The priority among multiple Endpoints",
1027                     "minimum": 1,
1028                     "type": "integer"
1029                 }
1030             },
1031             "type": "object"
1032         },
1033         "type": "array"
1034     },
1035     "href": {
1036         "description": "This is the target URI, it can be specified as a Relative Reference
or fully-qualified URI."
1037         "format": "uri",
1038         "maxLength": 256,
1039         "type": "string"
1040     },
1041     "if": {
1042         "description": "The interface set supported by this resource",
1043         "items": {
1044             "enum": [
1045                 "oic.if.baseline",
1046                 "oic.if.ll",
1047                 "oic.if.b",
1048                 "oic.if.rw",
1049                 "oic.if.r",
1050                 "oic.if.a",
1051                 "oic.if.s"
1052             ],
1053             "type": "string"
1054         },
1055         "minItems": 1,
1056         "type": "array"
1057     },
1058     "ins": {
1059         "description": "The instance identifier for this web link in an array of web links
- used in collections",
1060         "type": "integer"
1061     },
1062     "p": {
1063         "description": "Specifies the framework policies on the Resource referenced by the
target URI",
1064         "properties": {
1065             "bm": {
1066                 "description": "Specifies the framework policies on the Resource referenced by
the target URI for e.g. observable and discoverable",
1067                 "type": "integer"
1068             }
1069         },
1070         "required": [
1071             "bm"
1072         ],
1073         "type": "object"
1074     },
1075     "type": "object"
1076 },
1077 },
1078

```

```

10079      "rel": {
10080        "description": "The relation of the target URI referenced by the link to the
10081 context URI",
10082        "oneOf": [
10083          {
10084            "default": [
10085              "hosts"
10086            ],
10087            "items": [
10088              "maxLength": 64,
10089              "type": "string"
10090            ],
10091            "minItems": 1,
10092            "type": "array"
10093          },
10094          {
10095            "default": "hosts",
10096            "maxLength": 64,
10097            "type": "string"
10098          }
10099        ]
10100      },
10101      "rt": {
10102        "description": "Resource Type of the Resource",
10103        "items": [
10104          "maxLength": 64,
10105          "type": "string"
10106        ],
10107        "minItems": 1,
10108        "type": "array"
10109      },
10110      "title": {
10111        "description": "A title for the link relation. Can be used by the UI to provide a
10112 context.",
10113        "maxLength": 64,
10114        "type": "string"
10115      },
10116      "type": {
10117        "default": "application/cbor",
10118        "description": "A hint at the representation of the resource referenced by the
10119 target URI. This represents the media types that are used for both accepting and emitting.",
10120        "items": [
10121          "maxLength": 64,
10122          "type": "string"
10123        ],
10124        "minItems": 1,
10125        "type": "array"
10126      }
10127    },
10128    "required": [
10129      "href",
10130      "rt",
10131      "if"
10132    ],
10133    "type": "object"
10134  },
10135  "type": "array"
10136 }
10137 },
10138 "type": "object"
10139 }
10140 ,
10141 "oic.collection.links" :
10142   {
10143     "properties": {
10144       "links": {
10145         "description": "A set of simple or individual OIC Links.",
10146         "items": [
10147           "$ref": "#/definitions/oic.oic-link"
10148         ],
10149         "type": "array"

```

```

10150      }
10151  },
10152  "type": "object"
10153 }
10154
10155  "oic.oic-link" :
10156  {
10157    "properties": {
10158      "anchor": {
10159        "description": "This is used to override the context URI e.g. override the URI of the
10160        containing collection.",
10161        "format": "uri",
10162        "maxLength": 256,
10163        "type": "string"
10164      },
10165      "di": {
10166        "$ref": "#/definitions/uuid",
10167        "description": "The device ID"
10168      },
10169      "eps": {
10170        "description": "the Endpoint information of the target Resource",
10171        "items": {
10172          "properties": {
10173            "ep": {
10174              "description": "Transport Protocol Suite + Endpoint Locator",
10175              "format": "uri",
10176              "type": "string"
10177            },
10178            "pri": {
10179              "description": "The priority among multiple Endpoints",
10180              "minimum": 1,
10181              "type": "integer"
10182            }
10183          },
10184          "type": "object"
10185        },
10186        "type": "array"
10187      },
10188      "href": {
10189        "description": "This is the target URI, it can be specified as a Relative Reference or
10190        fully-qualified URI.",
10191        "format": "uri",
10192        "maxLength": 256,
10193        "type": "string"
10194      },
10195      "if": {
10196        "description": "The interface set supported by this resource",
10197        "items": {
10198          "enum": [
10199            "oic.if.baseline",
10200            "oic.if.ll",
10201            "oic.if.b",
10202            "oic.if.rw",
10203            "oic.if.r",
10204            "oic.if.a",
10205            "oic.if.s"
10206          ],
10207          "type": "string"
10208        },
10209        "minItems": 1,
10210        "type": "array"
10211      },
10212      "ins": {
10213        "description": "The instance identifier for this web link in an array of web links - used
10214        in collections",
10215        "type": "integer"
10216      },
10217      "p": {
10218        "description": "Specifies the framework policies on the Resource referenced by the target
10219        URI",
10220        "properties": {

```

```

10221      "bm": {
10222        "description": "Specifies the framework policies on the Resource referenced by the
10223 target URI for e.g. observable and discoverable",
10224        "type": "integer"
10225      }
10226    },
10227    "required": [
10228      "bm"
10229    ],
10230    "type": "object"
10231  },
10232  "rel": {
10233    "description": "The relation of the target URI referenced by the link to the context
10234 URI",
10235    "oneOf": [
10236      {
10237        "default": [
10238          "hosts"
10239        ],
10240        "items": {
10241          "maxLength": 64,
10242          "type": "string"
10243        },
10244        "minItems": 1,
10245        "type": "array"
10246      },
10247      {
10248        "default": "hosts",
10249        "maxLength": 64,
10250        "type": "string"
10251      }
10252    ]
10253  },
10254  "rt": {
10255    "description": "Resource Type of the Resource",
10256    "items": {
10257      "maxLength": 64,
10258      "type": "string"
10259    },
10260    "minItems": 1,
10261    "type": "array"
10262  },
10263  "title": {
10264    "description": "A title for the link relation. Can be used by the UI to provide a
10265 context.",
10266    "maxLength": 64,
10267    "type": "string"
10268  },
10269  "type": {
10270    "default": "application/cbor",
10271    "description": "A hint at the representation of the resource referenced by the target
10272 URI. This represents the media types that are used for both accepting and emitting.",
10273    "items": {
10274      "maxLength": 64,
10275      "type": "string"
10276    },
10277    "minItems": 1,
10278    "type": "array"
10279  }
10280 },
10281 "required": [
10282   "href",
10283   "rt",
10284   "if"
10285 ],
10286 "type": "object"
10287 }
10288 }
10289 }
10290 }
10291

```

10292 F.3.5 Property Definition

Property name	Value type see schema	Mandatory	Access mode	Description
rt	array: see schema		Read Only	Resource Type of the Resource
anchor	string			This is used to override the context URI e.g. override the URI of the containing collection.
if	array: see schema	yes		The interface set supported by this resource
rt	array: see schema	yes		Resource Type of the Resource
di	multiple types: see schema			The device ID
href	string	yes		This is the target URI, it can be specified as a Relative Reference or fully-qualified URI.
eps	array: see schema			the Endpoint information of the target Resource
rel	multiple types: see schema			The relation of the target URI referenced by the link to the context URI
title	string			A title for the link relation. Can be used by the UI to provide a context.
p	object: see schema			Specifies the framework policies on the Resource referenced by the target URI
ins	integer			The instance identifier for this web link in an array of web links - used in collections
type	array: see schema			A hint at the representation of the resource referenced by the target URI.

				This represents the media types that are used for both accepting and emitting.
rep	multiple types: see schema	yes		
href	string	yes		URI of the target resource relative assuming the collection URI as anchor
links	array: see schema			A set of simple or individual OIC Links.
rep	multiple types: see schema	yes		
href	string	yes		URI of the target resource relative assuming the collection URI as anchor
links	array: see schema			A set of simple or individual OIC Links.
links	array: see schema			A set of simple or individual OIC Links.
rts	multiple types: see schema			The list of allowable resource types (for Target and anchors) in links included in the collection

10293 **F.3.6 CRUDN behaviour**

Resource	Create	Read	Update	Delete	Notify
/CollectionBaselineInterfaceURI		get	post		

10294 **F.4 Platform Configuration**

10295 **F.4.1 Introduction**

10296 Resource that allows for platform specific information to be configured.
10297

10298 **F.4.2 Example URI**

10299 /examplePlatformConfigurationResURI

10300 **F.4.3 Resource Type**

10301 The resource type (rt) is defined as: ['oic.wk.con.p'].

10302 **F.4.4 Swagger2.0 Definition**

```
10303 {  
10304   "swagger": "2.0",  
10305   "info": {
```

```

10306     "title": "Platform Configuration",
10307     "version": "v1-20160622",
10308     "license": {
10309       "name": "copyright 2016-2017 Open Connectivity Foundation, Inc. All rights reserved.",
10310       "x-description": "Redistribution and use in source and binary forms, with or without
10311       modification, are permitted provided that the following conditions are met:\n          1.
10312       Redistributions of source code must retain the above copyright notice, this list of conditions and
10313       the following disclaimer.\n          2. Redistributions in binary form must reproduce the above
10314       copyright notice, this list of conditions and the following disclaimer in the documentation and/or
10315       other materials provided with the distribution.\n\n      THIS SOFTWARE IS PROVIDED BY THE Open
10316       Connectivity Foundation, INC. \"AS IS\" AND ANY EXPRESS OR IMPLIED WARRANTIES, INCLUDING, BUT NOT
10317       LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE OR
10318       WARRANTIES OF NON-INFRINGEMENT, ARE DISCLAIMED.\n      IN NO EVENT SHALL THE Open Connectivity
10319       Foundation, INC. OR CONTRIBUTORS BE LIABLE FOR ANY DIRECT, INDIRECT, INCIDENTAL, SPECIAL,
10320       EXEMPLARY, OR CONSEQUENTIAL DAMAGES (INCLUDING, BUT NOT LIMITED TO, PROCUREMENT OF SUBSTITUTE GOODS
10321       OR SERVICES; LOSS OF USE, DATA, OR PROFITS; OR BUSINESS INTERRUPTION)\n      HOWEVER CAUSED AND
10322       ON ANY THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT (INCLUDING NEGLIGENCE OR
10323       OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OF THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY
10324       OF SUCH DAMAGE.\n"
10325     }
10326   },
10327   "schemes": ["http"],
10328   "consumes": ["application/json"],
10329   "produces": ["application/json"],
10330   "paths": {
10331     "/examplePlatformConfigurationResURI" : {
10332       "get": {
10333         "description": "Resource that allows for platform specific information to be
10334         configured.\nRetrieves the current platform configuration settings\n",
10335         "parameters": [
10336           {"$ref": "#/parameters/interface-all"}
10337         ],
10338         "responses": {
10339           "200": {
10340             "description" : "",
10341             "x-example":
10342               {
10343                 "rt": ["oic.wk.con.p"],
10344                 "mnpn": [ { "language": "en", "value": "My Friendly Device Name" } ]
10345               }
10346             ,
10347             "schema": { "$ref": "#/definitions/Conf_Platform" }
10348           }
10349         }
10350       },
10351       "post": {
10352         "description": "Update the information about the platform\n",
10353         "parameters": [
10354           {"$ref": "#/parameters/interface-rw"},

10355           {
10356             "name": "body",
10357             "in": "body",
10358             "required": true,
10359             "schema": { "$ref": "#/definitions/Update_Platform" },
10360             "x-example":
10361               {
10362                 "n": "Nuevo nombre",
10363                 "mnpn": [ { "language": "es", "value": "Nuevo nombre de Plataforma Amigable" } ]
10364               }
10365           }
10366         ],
10367         "responses": {
10368           "200": {
10369             "description" : "",
10370             "x-example":
10371               {
10372                 "n": "Nuevo nombre",
10373                 "mnpn": [ { "language": "es", "value": "Nuevo nombre de Plataforma Amigable" } ]
10374               }
10375             ,
10376             "schema": { "$ref": "#/definitions/Update_Platform" }
10377           }
10378         }
10379       }
10380     }
10381   }
10382 }
```

```

10377         }
10378     }
10379   }
10380 },
10381 "parameters": {
10382   "interface-rw" : {
10383     "in" : "query",
10384     "name" : "if",
10385     "type" : "string",
10386     "enum" : ["oic.if.rw"]
10387   },
10388   "interface-all" : {
10389     "in" : "query",
10390     "name" : "if",
10391     "type" : "string",
10392     "enum" : ["oic.if.rw", "oic.if.baseline"]
10393   }
10394 },
10395 },
10396 "definitions": {
10397   "Conf_Platform" : {
10398     "properties": {
10399       "rt" : {
10400         "description": "Resource Type of the Resource",
10401         "items": {
10402           "maxLength": 64,
10403           "type": "string"
10404         },
10405         "minItems": 1,
10406         "readOnly": true,
10407         "type": "array"
10408       },
10409     },
10410   },
10411   "n" :
10412     {
10413       "description": "Friendly name of the resource",
10414       "maxLength": 64,
10415       "readonly": true,
10416       "type": "string"
10417     },
10418 },
10419 "mnpn" :
10420   {
10421     "description": "Platform names",
10422     "items": {
10423       "properties": {
10424         "language": {
10425           "allOf": [
10426             {
10427               "description": "Format pattern according to IETF RFC 5646 (language tag).",
10428               "pattern": "[A-Za-z]{1,8}(-[A-Za-z0-9]{1,8})*$",
10429               "type": "string"
10430             },
10431             {
10432               "description": "An RFC 5646 language tag."
10433             }
10434           ]
10435         },
10436         "value": {
10437           "description": "The Platform description in the indicated language.",
10438           "maxLength": 64,
10439           "type": "string"
10440         }
10441       },
10442       "type": "object"
10443     },
10444     "minItems": 1,
10445     "type": "array"
10446   },
10447

```

```

10448     "id" :
10449         {
10450             "description": "Instance ID of this specific resource",
10451             "maxLength": 64,
10452             "readOnly": true,
10453             "type": "string"
10454         },
10455
10456     "if" :
10457         {
10458             "description": "The interface set supported by this resource",
10459             "items": {
10460                 "enum": [
10461                     "oic.if.baseline",
10462                     "oic.if.ll",
10463                     "oic.if.b",
10464                     "oic.if.lb",
10465                     "oic.if.rw",
10466                     "oic.if.r",
10467                     "oic.if.a",
10468                     "oic.if.s"
10469                 ],
10470                 "type": "string"
10471             },
10472             "minItems": 1,
10473             "readOnly": true,
10474             "type": "array"
10475         }
10476     }
10477 }
10478
10479     "Update_Platform" : {
10480         "properties": {
10481             "rt" :
10482                 {
10483                     "description": "Resource Type of the Resource",
10484                     "items": {
10485                         "maxLength": 64,
10486                         "type": "string"
10487                     },
10488                     "minItems": 1,
10489                     "readOnly": true,
10490                     "type": "array"
10491                 },
10492             "n" :
10493                 {
10494                     "description": "Friendly name of the resource",
10495                     "maxLength": 64,
10496                     "type": "string"
10497                 },
10498             "mnpn" :
10499                 {
10500                     "description": "platform names",
10501                     "items": {
10502                         "properties": {
10503                             "language": {
10504                                 "allOf": [
10505                                     {
10506                                         "description": "Format pattern according to IETF RFC 5646 (language tag).",
10507                                         "pattern": "[A-Za-z]{1,8}(-[A-Za-z0-9]{1,8})*$",
10508                                         "type": "string"
10509                                     },
10510                                     {
10511                                         "description": "An RFC 5646 language tag."
10512                                     }
10513                                 ]
10514                             },
10515                         },
10516                     },
10517                     "value": {
10518

```

```

10519         "description": "The Platform description in the indicated language.",
10520         "maxLength": 64,
10521         "type": "string"
10522     },
10523     "type": "object"
10524   },
10525   "minItems": 1,
10526   "type": "array"
10527 },
10528 },
10529
10530   "id" :
10531   {
10532     "anyOf": [
10533       {
10534         "maxLength": 64,
10535         "type": "string"
10536       },
10537       {
10538         "description": "Format pattern according to IETF RFC 4122.",
10539         "pattern": "^[a-fA-F0-9]{8}-[a-fA-F0-9]{4}-[a-fA-F0-9]{4}-[a-fA-F0-9]{12}$",
10540       },
10541         "type": "string"
10542     }
10543   ],
10544   "description": "Instance ID of this specific resource",
10545   "readOnly": true
10546 },
10547
10548   "if" :
10549   {
10550     "description": "The interface set supported by this resource",
10551     "items": {
10552       "enum": [
10553         "oic.if.baseline",
10554         "oic.if.ll",
10555         "oic.if.b",
10556         "oic.if.lb",
10557         "oic.if.rw",
10558         "oic.if.r",
10559         "oic.if.a",
10560         "oic.if.s"
10561       ],
10562         "type": "string"
10563     },
10564     "minItems": 1,
10565     "readOnly": true,
10566     "type": "array"
10567   }
10568
10569   },
10570   "required": ["mnppn"]
10571 }
10572 }
10573 }
10574 }
```

F.4.5 Property Definition

Property name	Value type	Mandatory	Access mode	Description
rt	array: see schema		Read Only	Resource Type of the Resource
id	string		Read Only	Instance ID of this specific resource
if	array: see schema		Read Only	The interface set supported by this resource

mnpn	array: schema	see			Platform names
n	string		Read Only	Friendly name of the resource	
rt	array: schema	see	Read Only	Resource Type of the Resource	
id	multiple types: see schema		Read Only	Instance ID of this specific resource	
if	array: schema	see	Read Only	The interface set supported by this resource	
mnpn	array: schema	yes		Platform names	
n	string			Friendly name of the resource	

10576 F.4.6 CRUDN behaviour

Resource	Create	Read	Update	Delete	Notify
/examplePlatformConfigurationResURI		get	post		

10577 F.5 Platform Configuration

10578 F.5.1 Introduction

10579 Resource that allows for platform specific information to be configured.
 10580 Retrieves the current platform configuration settings
 10581

10582 F.5.2 Wellknown URI

10583 /examplePlatformConfigurationResURI

10584 F.5.3 Resource Type

10585 The resource type (rt) is defined as: ['oic.wk.con.p'].

10586 F.5.4 Swagger2.0 Definition

```

10587 {
10588   "swagger": "2.0",
10589   "info": {
10590     "title": "Platform Configuration",
10591     "version": "v1-20160622",
10592     "license": {
10593       "name": "copyright 2016-2017 Open Connectivity Foundation, Inc. All rights reserved.",
10594       "x-description": "Redistribution and use in source and binary forms, with or without
10595 modification, are permitted provided that the following conditions are met:\n          1.
10596 Redistributions of source code must retain the above copyright notice, this list of conditions and
10597 the following disclaimer.\n          2. Redistributions in binary form must reproduce the above
10598 copyright notice, this list of conditions and the following disclaimer in the documentation and/or
10599 other materials provided with the distribution.\n\n          THIS SOFTWARE IS PROVIDED BY THE Open
10600 Connectivity Foundation, INC. \\"AS IS\\" AND ANY EXPRESS OR IMPLIED WARRANTIES, INCLUDING, BUT NOT
10601 LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE OR
10602 WARRANTIES OF NON-INFRINGEMENT, ARE DISCLAIMED.\n          IN NO EVENT SHALL THE Open Connectivity
10603 Foundation, INC. OR CONTRIBUTORS BE LIABLE FOR ANY DIRECT, INDIRECT, INCIDENTAL, SPECIAL,
10604 EXEMPLARY, OR CONSEQUENTIAL DAMAGES (INCLUDING, BUT NOT LIMITED TO, PROCUREMENT OF SUBSTITUTE GOODS
10605 OR SERVICES; LOSS OF USE, DATA, OR PROFITS; OR BUSINESS INTERRUPTION)\n          HOWEVER CAUSED AND
10606 ON ANY THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT (INCLUDING NEGLIGENCE OR
10607 OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OF THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY
10608 OF SUCH DAMAGE.\n"
10609   }
10610 },
10611   "schemes": ["http"],
10612   "consumes": ["application/json"],
```

```

10613     "produces": ["application/json"],
10614     "paths": {
10615       "/examplePlatformConfigurationResURI" : {
10616         "get": {
10617           "description": "Resource that allows for platform specific information to be
10618           configured.\nRetrieves the current platform configuration settings\n",
10619           "parameters": [
10620             {"$ref": "#/parameters/interface-all"}
10621           ],
10622           "responses": {
10623             "200": {
10624               "description" : "",
10625               "x-example":
10626               {
10627                 "rt": [ "oic.wk.con.p" ],
10628                 "mnpn": [ { "language": "en", "value": "My Friendly Device Name" } ]
10629               }
10630             ,
10631               "schema": { "$ref": "#/definitions/Conf_Platform" }
10632             }
10633           }
10634         },
10635         "post": {
10636           "description": "Update the information about the platform\n",
10637           "parameters": [
10638             {"$ref": "#/parameters/interface-rw"},
10639             {
10640               "name": "body",
10641               "in": "body",
10642               "required": true,
10643               "schema": { "$ref": "#/definitions/Update_Platform" },
10644               "x-example":
10645               {
10646                 "n": "Nuevo nombre",
10647                 "mnpn": [ { "language": "es", "value": "Nuevo nombre de Plataforma Amigable" } ]
10648               }
10649             },
10650           ],
10651           "responses": {
10652             "200": {
10653               "description" : "",
10654               "x-example":
10655               {
10656                 "n": "Nuevo nombre",
10657                 "mnpn": [ { "language": "es", "value": "Nuevo nombre de Plataforma Amigable" } ]
10658               }
10659             ,
10660               "schema": { "$ref": "#/definitions/Update_Platform" }
10661             }
10662           }
10663         }
10664       }
10665     },
10666     "parameters": {
10667       "interface-rw" : {
10668         "in" : "query",
10669         "name" : "if",
10670         "type" : "string",
10671         "enum" : [ "oic.if.rw" ]
10672       },
10673       "interface-all" : {
10674         "in" : "query",
10675         "name" : "if",
10676         "type" : "string",
10677         "enum" : [ "oic.if.rw", "oic.if.baseline" ]
10678       }
10679     },
10680     "definitions": {
10681       "Conf_Platform" : {
10682         "properties": {
10683           "rt" :

```

```

10684      {
10685        "description": "Resource Type of the Resource",
10686        "items": {
10687          "maxLength": 64,
10688          "type": "string"
10689        },
10690        "minItems": 1,
10691        "readOnly": true,
10692        "type": "array"
10693      },
10694
10695      "n" :
10696        {
10697          "description": "Friendly name of the resource",
10698          "maxLength": 64,
10699          "readOnly": true,
10700          "type": "string"
10701        },
10702
10703      "mnpn" :
10704        {
10705          "description": "Platform names",
10706          "items": {
10707            "properties": {
10708              "language": {
10709                "allof": [
10710                  {
10711                    "description": "Format pattern according to IETF RFC 5646 (language tag).",
10712                    "pattern": "[A-Za-z]{1,8}(-[A-Za-z0-9]{1,8})*$",
10713                    "type": "string"
10714                  },
10715                  {
10716                    "description": "An RFC 5646 language tag."
10717                  }
10718                ]
10719              },
10720              "value": {
10721                "description": "The Platform description in the indicated language.",
10722                "maxLength": 64,
10723                "type": "string"
10724              }
10725            },
10726            "type": "object"
10727          },
10728          "minItems": 1,
10729          "type": "array"
10730        },
10731
10732      "id" :
10733        {
10734          "description": "Instance ID of this specific resource",
10735          "maxLength": 64,
10736          "readOnly": true,
10737          "type": "string"
10738        },
10739
10740      "if" :
10741        {
10742          "description": "The interface set supported by this resource",
10743          "items": {
10744            "enum": [
10745              "oic.if.baseline",
10746              "oic.if.ll",
10747              "oic.if.b",
10748              "oic.if.lb",
10749              "oic.if.rw",
10750              "oic.if.r",
10751              "oic.if.a",
10752              "oic.if.s"
10753            ],
10754            "type": "string"

```

```

10755     },
10756     "minItems": 1,
10757     "readOnly": true,
10758     "type": "array"
10759   }
10760 }
10761 }
10762 }
10763
10764 "Update_Platform" : {
10765   "properties": {
10766     "rt" :
10767       {
10768         "description": "Resource Type of the Resource",
10769         "items": {
10770           "maxLength": 64,
10771           "type": "string"
10772         },
10773         "minItems": 1,
10774         "readOnly": true,
10775         "type": "array"
10776     },
10777
10778     "n" :
10779       {
10780         "description": "Friendly name of the resource",
10781         "maxLength": 64,
10782         "type": "string"
10783     },
10784
10785     "mnpn" :
10786       {
10787         "description": "Platform names",
10788         "items": {
10789           "properties": {
10790             "language": {
10791               "allOf": [
10792                 {
10793                   "description": "Format pattern according to IETF RFC 5646 (language tag).",
10794                   "pattern": "^([A-Za-z]{1,8}(-[A-Za-z0-9]{1,8})*)$",
10795                   "type": "string"
10796                 },
10797                 {
10798                   "description": "An RFC 5646 language tag."
10799                 }
10800               ]
10801             },
10802             "value": {
10803               "description": "The Platform description in the indicated language.",
10804               "maxLength": 64,
10805               "type": "string"
10806             }
10807           },
10808           "type": "object"
10809         },
10810         "minItems": 1,
10811         "type": "array"
10812     },
10813
10814     "id" :
10815       {
10816         "anyOf": [
10817           {
10818             "maxLength": 64,
10819             "type": "string"
10820           },
10821           {
10822             "description": "Format pattern according to IETF RFC 4122.",
10823             "pattern": "^[a-fA-F0-9]{8}-[a-fA-F0-9]{4}-[a-fA-F0-9]{4}-[a-fA-F0-9]{12}$",
10824             "type": "string"
10825         }
10826       }
10827     }
10828   }
10829 }
10830 }
```

```

10826
10827     },
10828     "description": "Instance ID of this specific resource",
10829     "readOnly": true
10830   },
10831
10832   "if" :
10833   {
10834     "description": "The interface set supported by this resource",
10835     "items": {
10836       "enum": [
10837         "oic.if.baseline",
10838         "oic.if.ll",
10839         "oic.if.b",
10840         "oic.if.lb",
10841         "oic.if.rw",
10842         "oic.if.r",
10843         "oic.if.a",
10844         "oic.if.s"
10845       ],
10846       "type": "string"
10847     },
10848     "minItems": 1,
10849     "readonly": true,
10850     "type": "array"
10851   }
10852
10853 },
10854   "required": ["mnpn"]
10855 }
10856
10857
10858

```

F.5.5 Property Definition

Property name	Value type	Mandatory	Access mode	Description
rt	array: see schema		Read Only	Resource Type of the Resource
n	string			Friendly name of the resource
if	array: see schema		Read Only	The interface set supported by this resource
id	multiple types: see schema		Read Only	Instance ID of this specific resource
mnpn	array: see schema	yes		Platform names
rt	array: see schema		Read Only	Resource Type of the Resource
n	string		Read Only	Friendly name of the resource
if	array: see schema		Read Only	The interface set supported by this resource
id	string		Read Only	Instance ID of this specific resource
mnpn	array: see schema			Platform names

10860 **F.5.6 CRUDN behaviour**

Resource	Create	Read	Update	Delete	Notify
/examplePlatformConfigurationResURI		get	post		

10861 **F.6 Device Configuration**10862 **F.6.1 Introduction**

10863 Resource that allows for Device specific information to be configured.
 10864

10865 **F.6.2 Example URI**

10866 /exampleDeviceConfigurationResURI

10867 **F.6.3 Resource Type**

10868 The resource type (rt) is defined as: ['oic.wk.con'].

10869 **F.6.4 Swagger2.0 Definition**

```

10870 (
10871   "swagger": "2.0",
10872   "info": {
10873     "title": "Device Configuration",
10874     "version": "v1-20160622",
10875     "license": {
10876       "name": "copyright 2016-2017 Open Connectivity Foundation, Inc. All rights reserved.",
10877       "x-description": "Redistribution and use in source and binary forms, with or without
10878 modification, are permitted provided that the following conditions are met:\n          1.
10879 Redistributions of source code must retain the above copyright notice, this list of conditions and
10880 the following disclaimer.\n          2. Redistributions in binary form must reproduce the above
10881 copyright notice, this list of conditions and the following disclaimer in the documentation and/or
10882 other materials provided with the distribution.\n\n          THIS SOFTWARE IS PROVIDED BY THE Open
10883 Connectivity Foundation, INC. \"AS IS\" AND ANY EXPRESS OR IMPLIED WARRANTIES, INCLUDING, BUT NOT
10884 LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE OR
10885 WARRANTIES OF NON-INFRINGEMENT, ARE DISCLAIMED.\n          IN NO EVENT SHALL THE Open Connectivity
10886 Foundation, INC. OR CONTRIBUTORS BE LIABLE FOR ANY DIRECT, INDIRECT, INCIDENTAL, SPECIAL,
10887 EXEMPLARY, OR CONSEQUENTIAL DAMAGES (INCLUDING, BUT NOT LIMITED TO, PROCUREMENT OF SUBSTITUTE GOODS
10888 OR SERVICES; LOSS OF USE, DATA, OR PROFITS; OR BUSINESS INTERRUPTION)\n          HOWEVER CAUSED AND
10889 ON ANY THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT (INCLUDING NEGLIGENCE OR
10890 OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OF THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY
10891 OF SUCH DAMAGE.\n"
10892   },
10893   "schemes": ["http"],
10894   "consumes": ["application/json"],
10895   "produces": ["application/json"],
10896   "paths": {
10897     "/exampleDeviceConfigurationResURI" : {
10898       "get": {
10899         "description": "Resource that allows for Device specific information to be
10900 configured.\nRetrieves the current Device configuration settings\n",
10901         "parameters": [
10902           {"$ref": "#/parameters/interface-all"}
10903         ],
10904       },
10905       "responses": {
10906         "200": {
10907           "description" : "",
10908           "x-example": {
10909             {
10910               "n": "My Friendly Device Name",
10911               "rt": ["oic.wk.con"],
10912               "loc": [32.777,-96.797],
10913               "locn": "My Location Name",
10914               "c": "USD",
10915               "r": "MyRegion",
10916               "dl": "en"
10917             }
10918           ,
10919         }
10920       }
10921     }
10922   }
10923 }
```

```

10919         "schema": { "$ref": "#/definitions/Configuration" }
10920     }
10921   }
10922 },
10923 "post": {
10924   "description": "Update the information about the Device\n",
10925   "parameters": [
10926     {"$ref": "#/parameters/interface-rw"},
10927     {
10928       "name": "body",
10929       "in": "body",
10930       "required": true,
10931       "schema": { "$ref": "#/definitions/Update" },
10932       "x-example":
10933       {
10934         "n": "Nuevo Nombre Amistoso",
10935         "r": "MyNewRegion",
10936         "ln": [ { "language": "es", "value": "Nuevo Nombre Amistoso" } ],
10937         "dl": "es"
10938       }
10939     }
10940   ],
10941   "responses": {
10942     "200": {
10943       "description" : "",
10944       "x-example":
10945       {
10946         "n": "Nuevo Nombre Amistoso",
10947         "r": "MyNewRegion",
10948         "ln": [ { "language": "es", "value": "Nuevo Nombre Amistoso" } ],
10949         "dl": "es"
10950       }
10951     }
10952     "schema": { "$ref": "#/definitions/Update" }
10953   }
10954 }
10955 }
10956 }
10957 },
10958 "parameters": {
10959   "interface-rw" : {
10960     "in" : "query",
10961     "name" : "if",
10962     "type" : "string",
10963     "enum" : ["oic.if.rw"]
10964   },
10965   "interface-all" : {
10966     "in" : "query",
10967     "name" : "if",
10968     "type" : "string",
10969     "enum" : ["oic.if.rw", "oic.if.baseline"]
10970   }
10971 },
10972 "definitions": {
10973   "Configuration" : {
10974     "properties": {
10975       "rt" :
10976       {
10977         "description": "Resource Type of the Resource",
10978         "items": {
10979           "maxLength": 64,
10980           "type": "string"
10981         },
10982         "minItems": 1,
10983         "readOnly": true,
10984         "type": "array"
10985       },
10986       "loc" :
10987       {
10988         "description": "Location information (lat, long)",
10989

```

```

10990     "items": {
10991         "type": "number"
10992     },
10993     "maxItems": 2,
10994     "minItems": 2,
10995     "type": "array"
10996 },
10997
10998     "c" :
10999     {
11000         "description": "Currency",
11001         "maxLength": 64,
11002         "type": "string"
11003     },
11004
11005     "ln" :
11006     {
11007         "description": "Localized names",
11008         "items": {
11009             "properties": {
11010                 "language": {
11011                     "allOf": [
11012                         {
11013                             "description": "Format pattern according to IETF RFC 5646 (language tag).",
11014                             "pattern": "[A-Za-z]{1,8}(-[A-Za-z0-9]{1,8})*$",
11015                             "type": "string"
11016                         },
11017                         {
11018                             "description": "An RFC 5646 language tag."
11019                         }
11020                     ],
11021                 },
11022                 "value": {
11023                     "description": "The Device name in the indicated language.",
11024                     "maxLength": 64,
11025                     "type": "string"
11026                 }
11027             },
11028             "type": "object"
11029         },
11030         "minItems": 1,
11031         "type": "array"
11032     },
11033
11034     "locn" :
11035     {
11036         "description": "Human Friendly Name for location",
11037         "maxLength": 64,
11038         "type": "string"
11039     },
11040
11041     "dl" :
11042     {
11043         "allOf": [
11044             {
11045                 "description": "Format pattern according to IETF RFC 5646 (language tag).",
11046                 "pattern": "[A-Za-z]{1,8}(-[A-Za-z0-9]{1,8})*$",
11047                 "type": "string"
11048             },
11049             {
11050                 "description": "Default Language as an RFC 5646 language tag."
11051             }
11052         ],
11053     },
11054
11055     "n" :
11056     {
11057         "description": "Friendly name of the resource",
11058         "maxLength": 64,
11059         "readOnly": true,
11060         "type": "string"

```

```

11061     },
11062
11063     "r" :
11064     {
11065         "description": "Region",
11066         "maxLength": 64,
11067         "type": "string"
11068     },
11069
11070     "id" :
11071     {
11072         "description": "Instance ID of this specific resource",
11073         "maxLength": 64,
11074         "readOnly": true,
11075         "type": "string"
11076     },
11077
11078     "if" :
11079     {
11080         "description": "The interface set supported by this resource",
11081         "items": {
11082             "enum": [
11083                 "oic.if.baseline",
11084                 "oic.if.ll",
11085                 "oic.if.b",
11086                 "oic.if.lb",
11087                 "oic.if.rw",
11088                 "oic.if.r",
11089                 "oic.if.a",
11090                 "oic.if.s"
11091             ],
11092             "type": "string"
11093         },
11094         "minItems": 1,
11095         "readOnly": true,
11096         "type": "array"
11097     }
11098
11099 },
11100     "required": ["n"]
11101 }
11102
11103     "Update" : {
11104         "properties": {
11105             "rt" :
11106             {
11107                 "description": "Resource Type of the Resource",
11108                 "items": {
11109                     "maxLength": 64,
11110                     "type": "string"
11111                 },
11112                 "minItems": 1,
11113                 "readOnly": true,
11114                 "type": "array"
11115             },
11116
11117             "loc" :
11118             {
11119                 "description": "Location information (lat, long)",
11120                 "items": {
11121                     "type": "number"
11122                 },
11123                 "maxItems": 2,
11124                 "minItems": 2,
11125                 "type": "array"
11126             },
11127
11128             "c" :
11129             {
11130                 "description": "Currency",
11131                 "maxLength": 64,

```

```

11132     "type": "string"
11133 },
11134
11135 "ln" :
11136     {
11137         "description": "Localized names",
11138         "items": [
11139             "properties": [
11140                 "language": [
11141                     "allOf": [
11142                         {
11143                             "description": "Format pattern according to IETF RFC 5646 (language tag).",
11144                             "pattern": "[A-Za-z]{1,8}(-[A-Za-z0-9]{1,8})*$",
11145                             "type": "string"
11146                         },
11147                         {
11148                             "description": "An RFC 5646 language tag."
11149                         }
11150                     ],
11151                 ],
11152                 "value": [
11153                     "description": "The Device name in the indicated language.",
11154                     "maxLength": 64,
11155                     "type": "string"
11156                 ]
11157             },
11158             "type": "object"
11159         ],
11160         "minItems": 1,
11161         "type": "array"
11162     },
11163
11164 "locn" :
11165     {
11166         "description": "Human Friendly Name for location",
11167         "maxLength": 64,
11168         "type": "string"
11169     },
11170
11171 "dl" :
11172     {
11173         "allOf": [
11174             {
11175                 "description": "Format pattern according to IETF RFC 5646 (language tag).",
11176                 "pattern": "[A-Za-z]{1,8}(-[A-Za-z0-9]{1,8})*$",
11177                 "type": "string"
11178             },
11179             {
11180                 "description": "Default Language as an RFC 5646 language tag."
11181             }
11182         ],
11183     },
11184
11185 "n" :
11186     {
11187         "description": "Friendly name of the resource",
11188         "maxLength": 64,
11189         "type": "string"
11190     },
11191
11192 "r" :
11193     {
11194         "description": "Region",
11195         "maxLength": 64,
11196         "type": "string"
11197     },
11198
11199 "id" :
11200     {
11201         "anyOf": [
11202             {

```

```

11203      "maxLength": 64,
11204      "type": "string"
11205    },
11206    {
11207      "description": "Format pattern according to IETF RFC 4122.",
11208      "pattern": "^[a-fA-F0-9]{8}-[a-fA-F0-9]{4}-[a-fA-F0-9]{4}-[a-fA-F0-
11209      9]{12}$",
11210      "type": "string"
11211    }
11212  ],
11213  "description": "Instance ID of this specific resource",
11214  "readOnly": true
11215 },
11216
11217  "if" :
11218  {
11219    "description": "The interface set supported by this resource",
11220    "items": {
11221      "enum": [
11222        "oic.if.baseline",
11223        "oic.if.ll",
11224        "oic.if.b",
11225        "oic.if.lb",
11226        "oic.if.rw",
11227        "oic.if.r",
11228        "oic.if.a",
11229        "oic.if.s"
11230      ],
11231      "type": "string"
11232    },
11233    "minItems": 1,
11234    "readonly": true,
11235    "type": "array"
11236  }
11237}
11238}
11239}
11240}
11241}
11242}

```

F.6.5 Property Definition

Property name	Value type	Mandatory	Access mode	Description
n	string			Friendly name of the resource
loc	array: schema	see		Location information (lat, long)
if	array: schema	see	Read Only	The interface set supported by this resource
rt	array: schema	see	Read Only	Resource Type of the Resource
ln	array: schema	see		Localized names
c	string			Currency
r	string			Region
locn	string			Human Friendly Name for location
dl	multiple types: see schema			

<code>id</code>	multiple types: see schema		Read Only	Instance ID of this specific resource
<code>n</code>	string	yes	Read Only	Friendly name of the resource
<code>loc</code>	array: see schema			Location information (lat, long)
<code>if</code>	array: see schema		Read Only	The interface set supported by this resource
<code>rt</code>	array: see schema		Read Only	Resource Type of the Resource
<code>ln</code>	array: see schema			Localized names
<code>c</code>	string			Currency
<code>r</code>	string			Region
<code>locn</code>	string			Human Friendly Name for location
<code>dl</code>	multiple types: see schema			
<code>id</code>	string		Read Only	Instance ID of this specific resource

11244 **F.6.6 CRUDN behaviour**

Resource	Create	Read	Update	Delete	Notify
<code>/exampleDeviceConfigurationResURI</code>		get	post		

11245 **F.7 Device**

11246 **F.7.1 Introduction**

11247 Known resource that is hosted by every Server.
 11248 Allows for logical device specific information to be discovered.
 11249

11250 **F.7.2 Wellknown URI**

11251 `/oic/d`

11252 **F.7.3 Resource Type**

11253 The resource type (rt) is defined as: ['oic.wk.d'].

11254 **F.7.4 Swagger2.0 Definition**

```

11255 {
11256   "swagger": "2.0",
11257   "info": {
11258     "title": "Device",
11259     "version": "v1-20160622",
11260     "license": {
11261       "name": "copyright 2016-2017 Open Connectivity Foundation, Inc. All rights reserved.",
11262       "x-description": "Redistribution and use in source and binary forms, with or without
11263 modification, are permitted provided that the following conditions are met:\n          1.
11264 Redistributions of source code must retain the above copyright notice, this list of conditions and
11265 the following disclaimer.\n          2. Redistributions in binary form must reproduce the above
11266 copyright notice, this list of conditions and the following disclaimer in the documentation and/or
11267 other materials provided with the distribution.\n\n      THIS SOFTWARE IS PROVIDED BY THE Open
11268 Connectivity Foundation, INC. \\"AS IS\\" AND ANY EXPRESS OR IMPLIED WARRANTIES, INCLUDING, BUT NOT
11269 LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE OR

```

```

11270 WARRANTIES OF NON-INFRINGEMENT, ARE DISCLAIMED.\n      IN NO EVENT SHALL THE Open Connectivity
11271 Foundation, INC. OR CONTRIBUTORS BE LIABLE FOR ANY DIRECT, INDIRECT, INCIDENTAL, SPECIAL,
11272 EXEMPLARY, OR CONSEQUENTIAL DAMAGES (INCLUDING, BUT NOT LIMITED TO, PROCUREMENT OF SUBSTITUTE GOODS
11273 OR SERVICES; LOSS OF USE, DATA, OR PROFITS; OR BUSINESS INTERRUPTION)\n      HOWEVER CAUSED AND
11274 ON ANY THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT (INCLUDING NEGLIGENCE OR
11275 OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OF THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY
11276 OF SUCH DAMAGE.\n"
11277     }
11278   },
11279   "schemes": ["http"],
11280   "consumes": ["application/json"],
11281   "produces": ["application/json"],
11282   "paths": {
11283     "/oic/d" : {
11284       "get": {
11285         "description": "Known resource that is hosted by every Server.\nAllows for logical device
11286 specific information to be discovered.\nRetrieve the information about the Device\n",
11287         "parameters": [
11288           ],
11289         "responses": {
11290           "200": {
11291             "description" : "",
11292             "x-example": {
11293               "n": "Device 1",
11294               "rt": ["oic.wk.d"],
11295               "di": "54919CA5-4101-4AE4-595B-353C51AA983C",
11296               "icv": "ocf.1.0.0",
11297               "dmv": "ocf.res.1.0.0, ocf.sh.1.0.0",
11298               "piid": "6FOAAC04-2BB0-468D-B57C-16570A26AE48"
11299             }
11300           },
11301           ,
11302           "schema": { "$ref": "#/definitions/Device" }
11303         }
11304       }
11305     }
11306   },
11307 },
11308   "parameters": {
11309     "interface" : {
11310       "in" : "query",
11311       "name" : "if",
11312       "type" : "string",
11313       "enum" : ["oic.if.r", "oic.if.baseline"]
11314     }
11315 },
11316   "definitions": {
11317     "Device" : {
11318       "properties": {
11319         "rt" :
11320           {
11321             "description": "Resource Type of the Resource",
11322             "items": {
11323               "maxLength": 64,
11324               "type": "string"
11325             },
11326             "minItems": 1,
11327             "readOnly": true,
11328             "type": "array"
11329           },
11330         "ld" :
11331           {
11332             "description": "Localized Descriptions.",
11333             "items": {
11334               "properties": {
11335                 "language": {
11336                   "allOf": [
11337                     {
11338                       "description": "Format pattern according to IETF RFC 5646 (language tag).",
11339                       "pattern": "[A-Za-z]{1,8}(-[A-Za-z0-9]{1,8})*${"
11340

```

```

11341         "type": "string"
11342     },
11343     {
11344         "description": "An RFC 5646 language tag.",
11345         "readOnly": true
11346     }
11347 ],
11348 },
11349 "value": {
11350     "description": "Device description in the indicated language.",
11351     "maxLength": 64,
11352     "readonly": true,
11353     "type": "string"
11354   }
11355 },
11356   "type": "object"
11357 },
11358   "minItems": 1,
11359   "readOnly": true,
11360   "type": "array"
11361 },
11362
11363 "piid" :
11364   {
11365     "allOf": [
11366       {
11367         "description": "Format pattern according to IETF RFC 4122.",
11368         "pattern": "^{a-fA-F0-9}{8}-{a-fA-F0-9}{4}-{a-fA-F0-9}{4}-{a-fA-F0-9}{12}$",
11369         "type": "string"
11370       },
11371       {
11372         "description": "Protocol independent unique identifier for device that is
11373 immutable.",
11374         "readOnly": true
11375       }
11376     ]
11377   },
11378 },
11379
11380 "di" :
11381   {
11382     "allOf": [
11383       {
11384         "description": "Format pattern according to IETF RFC 4122.",
11385         "pattern": "^{a-fA-F0-9}{8}-{a-fA-F0-9}{4}-{a-fA-F0-9}{4}-{a-fA-F0-9}{12}$",
11386         "type": "string"
11387       },
11388       {
11389         "description": "Unique identifier for device",
11390         "readOnly": true
11391       }
11392     ]
11393   },
11394 },
11395
11396 "dmno" :
11397   {
11398     "description": "Model number as designated by manufacturer.",
11399     "maxLength": 64,
11400     "readOnly": true,
11401     "type": "string"
11402   },
11403
11404 "sv" :
11405   {
11406     "description": "Software version.",
11407     "maxLength": 64,
11408     "readOnly": true,
11409     "type": "string"
11410   },
11411

```

```

11412 "dmn" :
11413     {
11414         "description": "Manufacturer Name.",
11415         "items": [
11416             "properties": [
11417                 "language": {
11418                     "allof": [
11419                         {
11420                             "description": "Format pattern according to IETF RFC 5646 (language tag).",
11421                             "pattern": "^[A-Za-z]{1,8}(-[A-Za-z0-9]{1,8})*$",
11422                             "type": "string"
11423                         },
11424                         {
11425                             "description": "An RFC 5646 language tag.",
11426                             "readOnly": true
11427                         }
11428                     ],
11429                 },
11430                 "value": [
11431                     "description": "Manufacturer name in the indicated language.",
11432                     "maxLength": 64,
11433                     "readonly": true,
11434                     "type": "string"
11435                 ],
11436             },
11437             "type": "object"
11438         ],
11439         "minItems": 1,
11440         "readOnly": true,
11441         "type": "array"
11442     },
11443
11444     "icv" :
11445         {
11446             "description": "The version of the OIC Server",
11447             "maxLength": 64,
11448             "readonly": true,
11449             "type": "string"
11450         },
11451
11452     "dmv" :
11453         {
11454             "description": "Spec versions of the Resource and Device Specifications to which this
device data model is implemented",
11455             "maxLength": 256,
11456             "readonly": true,
11457             "type": "string"
11458         },
11459
11460     "n" :
11461         {
11462             "description": "Friendly name of the resource",
11463             "maxLength": 64,
11464             "readonly": true,
11465             "type": "string"
11466         },
11467
11468     "id" :
11469         {
11470             "description": "Instance ID of this specific resource",
11471             "maxLength": 64,
11472             "readonly": true,
11473             "type": "string"
11474         },
11475
11476     "if" :
11477         {
11478             "description": "The interface set supported by this resource",
11479             "items": [
11480                 "enum": [
11481                     "oic.if.baseline",
11482

```

```

11483         "oic.if.ll",
11484         "oic.if.b",
11485         "oic.if.lb",
11486         "oic.if.rw",
11487         "oic.if.r",
11488         "oic.if.a",
11489         "oic.if.s"
11490     ],
11491     "type": "string"
11492   },
11493   "minItems": 1,
11494   "readonly": true,
11495   "type": "array"
11496 }
11497
11498 },
11499 "required": ["n", "di", "icv", "dmv", "piid"]
11500 }
11501
11502
11503

```

11504 F.7.5 Property Definition

Property name	Value type	Mandatory	Access mode	Description
dmno	string		Read Only	Model number as designated by manufacturer.
dmv	string	yes	Read Only	Spec versions of the Resource and Device Specifications to which this device data model is implemented
if	array: see schema		Read Only	The interface set supported by this resource
sv	string		Read Only	Software version.
icv	string	yes	Read Only	The version of the OIC Server
piid	multiple types: see schema	yes		
di	multiple types: see schema	yes		
id	string		Read Only	Instance ID of this specific resource
n	string	yes	Read Only	Friendly name of the resource
ld	array: see schema		Read Only	Localized Descriptions.
rt	array: see schema		Read Only	Resource Type of the Resource
dmn	array: schema	see	Read Only	Manufacturer Name.

11505 F.7.6 CRUDN behaviour

Resource	Create	Read	Update	Delete	Notify
/oic/d		get			

11506 **F.8 Maintenance**

11507 **F.8.1 Introduction**

11508 The resource through which a Device is maintained and can be used for diagnostic purposes.

11509 fr (Factory Reset) is a boolean.

11510 The value 0 means No action (Default), the value 1 means Start Factory Reset

11511 After factory reset, this value shall be changed back to the default value

11512 rb (Reboot) is a boolean.

11513 The value 0 means No action (Default), the value 1 means Start Reboot

11514 After Reboot, this value shall be changed back to the default value

11515

11516 **F.8.2 Wellknown URI**

11517 /oic/mnt

11518 **F.8.3 Resource Type**

11519 The resource type (rt) is defined as: ['oic.wk.mnt'].

11520 **F.8.4 Swagger2.0 Definition**

```

11521 {
11522   "swagger": "2.0",
11523   "info": {
11524     "title": "Maintenance",
11525     "version": "v1-20160622",
11526     "license": {
11527       "name": "copyright 2016-2017 Open Connectivity Foundation, Inc. All rights reserved.",
11528       "x-description": "Redistribution and use in source and binary forms, with or without
11529 modification, are permitted provided that the following conditions are met:\n          1.
11530 Redistributions of source code must retain the above copyright notice, this list of conditions and
11531 the following disclaimer.\n          2. Redistributions in binary form must reproduce the above
11532 copyright notice, this list of conditions and the following disclaimer in the documentation and/or
11533 other materials provided with the distribution.\n\n          THIS SOFTWARE IS PROVIDED BY THE Open
11534 Connectivity Foundation, INC. \\"AS IS\\" AND ANY EXPRESS OR IMPLIED WARRANTIES, INCLUDING, BUT NOT
11535 LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE OR
11536 WARRANTIES OF NON-INFRINGEMENT, ARE DISCLAIMED.\n          IN NO EVENT SHALL THE Open Connectivity
11537 Foundation, INC. OR CONTRIBUTORS BE LIABLE FOR ANY DIRECT, INDIRECT, INCIDENTAL, SPECIAL,
11538 EXEMPLARY, OR CONSEQUENTIAL DAMAGES (INCLUDING, BUT NOT LIMITED TO, PROCUREMENT OF SUBSTITUTE GOODS
11539 OR SERVICES; LOSS OF USE, DATA, OR PROFITS; OR BUSINESS INTERRUPTION)\n          HOWEVER CAUSED AND
11540 ON ANY THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT (INCLUDING NEGLIGENCE OR
11541 OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OF THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY
11542 OF SUCH DAMAGE.\n"
11543   }
11544 },
11545   "schemes": ["http"],
11546   "consumes": ["application/json"],
11547   "produces": ["application/json"],
11548   "paths": {
11549     "/oic/mnt": {
11550       "get": {
11551         "description": "The resource through which a Device is maintained and can be used for
11552 diagnostic purposes.\nfr (Factory Reset) is a boolean.\n          The value 0 means No action (Default),
11553 the value 1 means Start Factory Reset\nAfter factory reset, this value shall be changed back to the
11554 default value\nrb (Reboot) is a boolean.\n          The value 0 means No action (Default), the value 1
11555 means Start Reboot\nAfter Reboot, this value shall be changed back to the default value\nRetrieve
11556 the maintenance action status",
11557         "parameters": [
11558           {"$ref": "#/parameters/interface-all"}
11559         ],
11560         "responses": {
11561           "200": {
11562             "description": "",
11563             "x-example": {
11564               "rt": ["oic.wk.mnt"],
11565               "fr": false,
11566               "rb": false
11567             }
11568           }
11569         }
11570       }
11571     }
11572   }
11573 }
```

```

11568         }
11569     ,
11570     "schema": { "$ref": "#/definitions/MNT" }
11571   }
11572 },
11573 "post": {
11574   "description": "Set the maintenance action(s)\n",
11575   "parameters": [
11576     {"$ref": "#/parameters/interface-rw"},  

11577     {
11578       "name": "body",
11579       "in": "body",
11580       "required": true,
11581       "schema": { "$ref": "#/definitions/MNT" },
11582       "x-example":  

11583       {
11584         "fr": false,
11585         "rb": false
11586       }
11587     }
11588   ],
11589   "responses": {
11590     "200": {
11591       "description" : "",  

11592       "x-example":  

11593       {
11594         "fr": false,
11595         "rb": false
11596       }
11597       ,
11598       "schema": { "$ref": "#/definitions/MNT" }
11599     }
11600   }
11601 }
11602 }
11603 }
11604 },
11605 "parameters": {
11606   "interface-rw" : {
11607     "in" : "query",
11608     "name" : "if",
11609     "type" : "string",
11610     "enum" : ["oic.if.rw", "oic.if.baseline"]
11611   },
11612   "interface-all" : {
11613     "in" : "query",
11614     "name" : "if",
11615     "type" : "string",
11616     "enum" : ["oic.if.rw", "oic.if.r", "oic.if.baseline"]
11617   }
11618 },
11619 "definitions": {
11620   "MNT" : {
11621     "properties": {
11622       "rt" :
11623         {
11624           "description": "Resource Type of the Resource",
11625           "items": {
11626             "maxLength": 64,
11627             "type": "string"
11628           },
11629           "minItems": 1,
11630           "readOnly": true,
11631           "type": "array"
11632         },
11633       "fr" :
11634         {
11635           "description": "Factory Reset",
11636           "type": "boolean"
11637         }
11638   },

```

```

11639
11640     "n" :
11641         {
11642             "description": "Friendly name of the resource",
11643             "maxLength": 64,
11644             "readOnly": true,
11645             "type": "string"
11646         },
11647
11648     "rb" :
11649         {
11650             "description": "Reboot Action",
11651             "type": "boolean"
11652         },
11653
11654     "id" :
11655         {
11656             "description": "Instance ID of this specific resource",
11657             "maxLength": 64,
11658             "readOnly": true,
11659             "type": "string"
11660         },
11661
11662     "if" :
11663         {
11664             "description": "The interface set supported by this resource",
11665             "items": {
11666                 "enum": [
11667                     "oic.if.baseline",
11668                     "oic.if.ll",
11669                     "oic.if.b",
11670                     "oic.if.lb",
11671                     "oic.if.rw",
11672                     "oic.if.r",
11673                     "oic.if.a",
11674                     "oic.if.s"
11675                 ],
11676                 "type": "string"
11677             },
11678             "minItems": 1,
11679             "readOnly": true,
11680             "type": "array"
11681         }
11682
11683     }
11684 }
11685 }
11686 }
11687

```

F.8.5 Property Definition

Property name	Value type	Mandatory	Access mode	Description
n	string		Read Only	Friendly name of the resource
fr	boolean			Factory Reset
if	array: see schema		Read Only	The interface set supported by this resource
rb	boolean			Reboot Action
id	string		Read Only	Instance ID of this specific resource
rt	array: see schema		Read Only	Resource Type of the Resource

11689 **F.8.6 CRUDN behaviour**

Resource	Create	Read	Update	Delete	Notify
/oic/mnt		get	post		

11690 **F.9 Platform**11691 **F.9.1 Introduction**

11692 Known resource that is defines the platform on which a Server is hosted.
 11693 Allows for platform specific information to be discovered.
 11694

11695 **F.9.2 Wellknown URI**

11696 /oic/p

11697 **F.9.3 Resource Type**

11698 The resource type (rt) is defined as: ['oic.wk.p'].

11699 **F.9.4 Swagger2.0 Definition**

```

11700 {
11701   "swagger": "2.0",
11702   "info": {
11703     "title": "Platform",
11704     "version": "v1-20160622",
11705     "license": {
11706       "name": "copyright 2016-2017 Open Connectivity Foundation, Inc. All rights reserved.",
11707       "x-description": "Redistribution and use in source and binary forms, with or without
11708 modification, are permitted provided that the following conditions are met:\n      1.
11709 Redistributions of source code must retain the above copyright notice, this list of conditions and
11710 the following disclaimer.\n      2. Redistributions in binary form must reproduce the above
11711 copyright notice, this list of conditions and the following disclaimer in the documentation and/or
11712 other materials provided with the distribution.\n\n      THIS SOFTWARE IS PROVIDED BY THE Open
11713 Connectivity Foundation, INC. \"AS IS\" AND ANY EXPRESS OR IMPLIED WARRANTIES, INCLUDING, BUT NOT
11714 LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE OR
11715 WARRANTIES OF NON-INFRINGEMENT, ARE DISCLAIMED.\n      IN NO EVENT SHALL THE Open Connectivity
11716 Foundation, INC. OR CONTRIBUTORS BE LIABLE FOR ANY DIRECT, INDIRECT, INCIDENTAL, SPECIAL,
11717 EXEMPLARY, OR CONSEQUENTIAL DAMAGES (INCLUDING, BUT NOT LIMITED TO, PROCUREMENT OF SUBSTITUTE GOODS
11718 OR SERVICES; LOSS OF USE, DATA, OR PROFITS; OR BUSINESS INTERRUPTION)\n      HOWEVER CAUSED AND
11719 ON ANY THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT (INCLUDING NEGLIGENCE OR
11720 OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OF THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY
11721 OF SUCH DAMAGE.\n"
11722   }
11723 },
11724   "schemes": ["http"],
11725   "consumes": ["application/json"],
11726   "produces": ["application/json"],
11727   "paths": {
11728     "/oic/p" : {
11729       "get": {
11730         "description": "Known resource that is defines the platform on which an Server is
11731 hosted.\nAllows for platform specific information to be discovered.\nRetrieve the information about
11732 the Platform\n",
11733         "parameters": [
11734           ],
11735         "responses": {
11736           "200": {
11737             "description" : "",
11738             "x-example": {
11739               "pi":    "54919CA5-4101-4AE4-595B-353C51AA983C",
11740               "rt":    ["oic.wk.p"],
11741               "mnnm": "Acme, Inc"
11742             }
11743           ,
11744           "schema": { "$ref": "#/definitions/Platform" }
11745         }
11746       }
11747     }
11748   }
11749 }
```

```

11748     }
11749   }
11750 },
11751 "parameters": {
11752   "interface" : {
11753     "in" : "query",
11754     "name" : "if",
11755     "type" : "string",
11756     "enum" : ["oic.if.r", "oic.if.baseline"]
11757   }
11758 },
11759 "definitions": {
11760   "Platform" : {
11761     "properties": {
11762       "rt" :
11763         {
11764           "description": "Resource Type of the Resource",
11765           "items": {
11766             "maxLength": 64,
11767             "type": "string"
11768           },
11769           "minItems": 1,
11770           "readOnly": true,
11771           "type": "array"
11772         },
11773       "pi" :
11774         {
11775           "allOf": [
11776             {
11777               "description": "Format pattern according to IETF RFC 4122.",
11778               "pattern": "^{a-fA-F0-9}{8}-{a-fA-F0-9}{4}-{a-fA-F0-9}{4}-{a-fA-F0-9}{12}$",
11779               "type": "string"
11780             },
11781             {
11782               "description": "Platform Identifier",
11783               "readOnly": true
11784             }
11785           ],
11786         },
11787       "mnfv" :
11788         {
11789           "description": "Manufacturer's firmware version",
11790           "maxLength": 64,
11791           "readonly": true,
11792           "type": "string"
11793         },
11794       "vid" :
11795         {
11796           "description": "Manufacturer's defined information for the platform. The content is
11797           freeform, with population rules up to the manufacturer",
11798           "maxLength": 64,
11799           "readOnly": true,
11800           "type": "string"
11801         },
11802       "mnnm" :
11803         {
11804           "description": "Manufacturer Name",
11805           "maxLength": 64,
11806           "readOnly": true,
11807           "type": "string"
11808         },
11809       "mnmo" :
11810         {
11811           "description": "Model number as designated by the manufacturer",
11812           "maxLength": 64,
11813
11814
11815
11816
11817
11818

```

```

11819      "readOnly": true,
11820      "type": "string"
11821    },
11822
11823    "mnhw" :
11824      {
11825        "description": "Platform Hardware Version",
11826        "maxLength": 64,
11827        "readOnly": true,
11828        "type": "string"
11829      },
11830
11831    "mnos" :
11832      {
11833        "description": "Platform Resident OS Version",
11834        "maxLength": 64,
11835        "readOnly": true,
11836        "type": "string"
11837      },
11838
11839    "mndt" :
11840      {
11841        "allOf": [
11842          {
11843            "description": "Format pattern as defined in ISO 8601. The format is [yyyy]-[mm]-
11844 [dd].",
11845            "pattern": "^([0-9]{4})-(1[0-2]|0[1-9])-(3[0-1]|2[0-9]|1[0-9]|0[1-9])$",
11846            "type": "string"
11847          },
11848          {
11849            "description": "Manufacturing Date in ISO8601 format.",
11850            "readOnly": true
11851          }
11852        ]
11853      },
11854
11855    "id" :
11856      {
11857        "description": "Instance ID of this specific resource",
11858        "maxLength": 64,
11859        "readOnly": true,
11860        "type": "string"
11861      },
11862
11863    "mnsl" :
11864      {
11865        "description": "Manufacturer's Support Information URL",
11866        "format": "uri",
11867        "maxLength": 256,
11868        "readOnly": true,
11869        "type": "string"
11870      },
11871
11872    "mnpv" :
11873      {
11874        "description": "Platform Version",
11875        "maxLength": 64,
11876        "readOnly": true,
11877        "type": "string"
11878      },
11879
11880    "st" :
11881      {
11882        "description": "Reference time for the device in ISO8601 format.",
11883        "format": "date-time",
11884        "readOnly": true,
11885        "type": "string"
11886      },
11887
11888    "n" :
11889  {

```

```

11890     "description": "Friendly name of the resource",
11891     "maxLength": 64,
11892     "readOnly": true,
11893     "type": "string"
11894   },
11895
11896   "mnml" :
11897   {
11898     "description": "Manufacturer's URL",
11899     "format": "uri",
11900     "maxLength": 256,
11901     "readOnly": true,
11902     "type": "string"
11903   },
11904
11905   "if" :
11906   {
11907     "description": "The interface set supported by this resource",
11908     "items": [
11909       "enum": [
11910         "oic.if.baseline",
11911         "oic.if.ll",
11912         "oic.if.b",
11913         "oic.if.lb",
11914         "oic.if.rw",
11915         "oic.if.r",
11916         "oic.if.a",
11917         "oic.if.s"
11918       ],
11919       "type": "string"
11920     },
11921     "minItems": 1,
11922     "readOnly": true,
11923     "type": "array"
11924   }
11925
11926 },
11927   "required": ["pi", "mnml"]
11928 }
11929
11930 }
11931

```

F.9.5 Property Definition

Property name	Value type	Mandatory	Access mode	Description
mnpv	string		Read Only	Platform Version
rt	array: see schema		Read Only	Resource Type of the Resource
mnos	string		Read Only	Platform Resident OS Version
mnmn	string	yes	Read Only	Manufacturer Name
mnmo	string		Read Only	Model number as designated by the manufacturer
st	string		Read Only	Reference time for the device in ISO8601 format.
mnsl	string		Read Only	Manufacturer's Support Information URL
vid	string		Read Only	Manufacturer's defined

				information for the platform. The content is freeform, with population rules up to the manufacturer
mnnfv	string		Read Only	Manufacturer's firmware version
mnhw	string		Read Only	Platform Hardware Version
mnml	string		Read Only	Manufacturer's URL
if	array: see schema		Read Only	The interface set supported by this resource
mndt	multiple types: see schema			
n	string		Read Only	Friendly name of the resource
pi	multiple types: see schema	yes		
id	string		Read Only	Instance ID of this specific resource

11933 F.9.6 CRUDN behaviour

Resource	Create	Read	Update	Delete	Notify
/oic/p		get			

11934 F.10 Resource directory resource

11935 F.10.1 Introduction

11936 Resource to be exposed by any Device that can act as a Resource Directory.
11937 1) Provides selector criteria (e.g., integer) with GET request
11938 2) Publish a Link in /oic/res with POST request.
11939

11940 F.10.2 Wellknown URI

11941 /oic/rd

11942 F.10.3 Resource Type

11943 The resource type (rt) is defined as: ['oic.wk.rd'].

11944 F.10.4 Swagger2.0 Definition

```
1945 {
1946     "swagger": "2.0",
1947     "info": {
1948         "title": "Resource directory resource",
1949         "version": "v1-20160622",
1950         "license": {
1951             "name": "copyright 2016-2017 Open Connectivity Foundation, Inc. All rights reserved.",
1952             "x-description": "Redistribution and use in source and binary forms, with or without
1953 modification, are permitted provided that the following conditions are met:\n                1.
1954 Redistributions of source code must retain the above copyright notice, this list of conditions and
1955 the following disclaimer.\n                2. Redistributions in binary form must reproduce the above
1956 copyright notice, this list of conditions and the following disclaimer in the documentation and/or
```

```

11957 other materials provided with the distribution.\n\n      THIS SOFTWARE IS PROVIDED BY THE Open
11958 Connectivity Foundation, INC. \"AS IS\" AND ANY EXPRESS OR IMPLIED WARRANTIES, INCLUDING, BUT NOT
11959 LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE OR
11960 WARRANTIES OF NON-INFRINGEMENT, ARE DISCLAIMED.\n      IN NO EVENT SHALL THE Open Connectivity
11961 Foundation, INC. OR CONTRIBUTORS BE LIABLE FOR ANY DIRECT, INDIRECT, INCIDENTAL, SPECIAL,
11962 EXEMPLARY, OR CONSEQUENTIAL DAMAGES (INCLUDING, BUT NOT LIMITED TO, PROCUREMENT OF SUBSTITUTE GOODS
11963 OR SERVICES; LOSS OF USE, DATA, OR PROFITS; OR BUSINESS INTERRUPTION)\n      HOWEVER CAUSED AND
11964 ON ANY THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT (INCLUDING NEGLIGENCE OR
11965 OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OF THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY
11966 OF SUCH DAMAGE.\n"
11967 }
11968 },
11969 "schemes": ["http"],
11970 "consumes": ["application/json"],
11971 "produces": ["application/json"],
11972 "paths": {
11973   "/oic/rd" : {
11974     "get": {
11975       "description": "Resource to be exposed by any Device that can act as a Resource
11976 Directory.\n1) Provides selector criteria (e.g., integer) with GET request\n2) Publish a Link in
11977 /oic/res with POST request\nGet the attributes of the Resource Directory for selection
11978 purposes.\n",
11979       "parameters": [
11980         {"$ref": "#/parameters/rdgetinterface"}
11981       ],
11982       "responses": {
11983         "200": {
11984           "description" : "Respond with the selector criteria - either the set of attributes or
11985 the bias factor\n",
11986           "x-example":
11987             {
11988               "rt": ["oic.wk.rd"],
11989               "if": ["oic.if.baseline"],
11990               "sel": 50
11991             }
11992       },
11993       "schema": { "$ref": "#/definitions/rdSelection" }
11994     }
11995   }
11996 },
11997 },
11998 "post": {
11999   "description": "Publish the resource information for the first time in /oic/res. Updates to
12000 existing entries are not allowed.\nAppropriate parts of the information, i.e., Links of the
12001 published Resources will be discovered through /oic/res.\n1) When a Device first publishes a Link,
12002 the request payload to RD may include the Links without an \"ins\" Parameter.\n2) Upon granting the
12003 request, the RD assigns a unique instance value identifying the Link among all the Links it
12004 advertises\n and sends back the instance value in the \"ins\" Parameter in the Link to the
12005 publishing Device.\n",
12006   "parameters": [
12007     {"$ref": "#/parameters/rdpublishinterface"},
12008     {
12009       "name": "body",
12010       "in": "body",
12011       "required": true,
12012       "schema": { "$ref": "#/definitions/rdPublish" },
12013       "x-example":
12014         {
12015           "di": "e61c3e6b-9c54-4b81-8ce5-f9039c1d04d9",
12016           "links": [
12017             {
12018               "anchor": "ocf://e61c3e6b-9c54-4b81-8ce5-f9039c1d04d9",
12019               "href": "/myLightSwitch",
12020               "rt": ["oic.r.switch.binary"],
12021               "if": ["oic.if.a", "oic.if.baseline"],
12022               "p": {"bm": 3},
12023               "eps": [
12024                 {"ep": "coaps://[2001:db8:a::b1d6]:1111", "pri": 2},
12025                 {"ep": "coaps://[2001:db8:a::b1d6]:1122"},
12026                 {"ep": "coaps+tcp://[2001:db8:a::123]:2222", "pri": 3}
12027               ],
12028             }
12029           }
12030         }
12031     }
12032   }
12033 }
```

```

12028      {
12029          "anchor": "ocf://e61c3e6b-9c54-4b81-8ce5-f9039c1d04d9",
12030          "href": "/myLightBrightness",
12031          "rt": ["oic.r.brightness"],
12032          "if": ["oic.if.a", "oic.if.baseline"],
12033          "p": {"bm": 3},
12034          "eps": [
12035              {"ep": "coaps://[2001:db8:a::123]:2222"}
12036          ]
12037      },
12038      ],
12039      "ttl": 600
12040  }
12041 },
12042 ],
12043 "responses": {
12044     "200": {
12045         "description" : "Respond with the same schema as publish with the additional \"ins\" Parameter in the Link.\n",
12046         "x-example":
12047             {
12048                 "di": "e61c3e6b-9c54-4b81-8ce5-f9039c1d04d9",
12049                 "links": [
12050                     {
12051                         "anchor": "ocf://e61c3e6b-9c54-4b81-8ce5-f9039c1d04d9",
12052                         "href": "/myLightSwitch",
12053                         "rt": ["oic.r.switch.binary"],
12054                         "if": ["oic.if.a", "oic.if.baseline"],
12055                         "p": {"bm": 3},
12056                         "eps": [
12057                             {"ep": "coaps://[2001:db8:a::b1d6]:1111", "pri": 2},
12058                             {"ep": "coaps://[2001:db8:a::b1d6]:1122"},
12059                             {"ep": "coaps+tcp://[2001:db8:a::123]:2222", "pri": 3}
12060                         ],
12061                         "ins": 11235
12062                     },
12063                     {
12064                         "anchor": "ocf://e61c3e6b-9c54-4b81-8ce5-f9039c1d04d9",
12065                         "href": "/myLightBrightness",
12066                         "rt": ["oic.r.brightness"],
12067                         "if": ["oic.if.a", "oic.if.baseline"],
12068                         "p": {"bm": 3},
12069                         "eps": [
12070                             {"ep": "coaps://[2001:db8:a::123]:2222"}
12071                         ],
12072                         "ins": 112358
12073                     }
12074                 }
12075             ],
12076             "ttl": 600
12077         }
12078     },
12079     "schema": { "$ref": "#/definitions/rdPublish" }
12080   }
12081 }
12082 }
12083 },
12084 "parameters": {
12085     "rdgetinterface" : {
12086         "in" : "query",
12087         "name" : "if",
12088         "type" : "string",
12089         "enum" : ["oic.if.baseline"],
12090         "description" : "enumdescription"
12091     },
12092     "rdpostinterface" : {
12093         "in" : "query",
12094         "name" : "if",
12095         "type" : "string",
12096         "enum" : ["oic.if.baseline"],
12097         "description" : "enumdescription"
12098     }

```

```

12099     }
12100   },
12101   "definitions": {
12102     "rdSelection" : {
12103       "properties": {
12104         "rt" :
12105           {
12106             "description": "Resource Type of the Resource",
12107             "items": {
12108               "maxLength": 64,
12109               "type": "string"
12110             },
12111             "minItems": 1,
12112             "readOnly": true,
12113             "type": "array"
12114           },
12115         "n" :
12116           {
12117             "description": "Friendly name of the resource",
12118             "maxLength": 64,
12119             "readOnly": true,
12120             "type": "string"
12121           },
12122         "sel" :
12123           {
12124             "description": "A bias factor calculated by the Resource directory",
12125             "maximum": 100,
12126             "minimum": 0,
12127             "readOnly": true,
12128             "type": "integer"
12129           },
12130         "id" :
12131           {
12132             "description": "Instance ID of this specific resource",
12133             "maxLength": 64,
12134             "readOnly": true,
12135             "type": "string"
12136           },
12137         "if" :
12138           {
12139             "description": "The interface set supported by this resource",
12140             "items": {
12141               "enum": [
12142                 "oic.if.baseline",
12143                 "oic.if.ll",
12144                 "oic.if.b",
12145                 "oic.if.lb",
12146                 "oic.if.rw",
12147                 "oic.if.r",
12148                 "oic.if.a",
12149                 "oic.if.s"
12150               ],
12151               "type": "string"
12152             },
12153             "minItems": 1,
12154             "readOnly": true,
12155             "type": "array"
12156           }
12157         }
12158       }
12159     }
12160   },
12161   "rdPublish" : {
12162     "properties": {
12163       "rt" :
12164         {
12165           "description": "Resource Type of the Resource",
12166

```

```

12170      "items": {
12171          "maxLength": 64,
12172          "type": "string"
12173      },
12174      "minItems": 1,
12175      "readOnly": true,
12176      "type": "array"
12177  },
12178
12179  "links" :
12180  {
12181      "description": "A set of simple or individual OIC Links.",
12182      "items": {
12183          "properties": {
12184              "anchor": {
12185                  "description": "This is used to override the context URI e.g. override the URI of
the containing collection.",
12186                  "format": "uri",
12187                  "maxLength": 256,
12188                  "type": "string"
12189              },
12190              "di": {
12191                  "description": "Format pattern according to IETF RFC 4122.",
12192                  "pattern": "^{a-fA-F0-9}{8}-[{a-fA-F0-9}{4}-[{a-fA-F0-9}{4}-[{a-fA-F0-
9]{12}$",
12193                  "type": "string"
12194              },
12195              "eps": {
12196                  "description": "the Endpoint information of the target Resource",
12197                  "items": {
12198                      "properties": {
12199                          "ep": {
12200                              "description": "Transport Protocol Suite + Endpoint Locator",
12201                              "format": "uri",
12202                              "type": "string"
12203                          },
12204                          "pri": {
12205                              "description": "The priority among multiple Endpoints",
12206                              "minimum": 1,
12207                              "type": "integer"
12208                          }
12209                      },
12210                      "type": "object"
12211                  },
12212                  "type": "array"
12213              },
12214              "href": {
12215                  "description": "This is the target URI, it can be specified as a Relative Reference
or fully-qualified URI.",
12216                  "format": "uri",
12217                  "maxLength": 256,
12218                  "type": "string"
12219              },
12220              "if": {
12221                  "description": "The interface set supported by this resource",
12222                  "items": {
12223                      "enum": [
12224                          "oic.if.baseline",
12225                          "oic.if.ll",
12226                          "oic.if.b",
12227                          "oic.if.rw",
12228                          "oic.if.r",
12229                          "oic.if.a",
12230                          "oic.if.s"
12231                      ],
12232                      "type": "string"
12233                  },
12234                  "minItems": 1,
12235                  "type": "array"
12236              },
12237              "ins": {
12238

```

```

12241         "description": "The instance identifier for this web link in an array of web links
12242 - used in collections",
12243         "type": "integer"
12244     },
12245     "p": {
12246         "description": "Specifies the framework policies on the Resource referenced by the
12247 target URI",
12248         "properties": {
12249             "bm": {
12250                 "description": "Specifies the framework policies on the Resource referenced by
12251 the target URI for e.g. observable and discoverable",
12252                 "type": "integer"
12253             }
12254         },
12255         "required": [
12256             "bm"
12257         ],
12258         "type": "object"
12259     },
12260     "rel": {
12261         "description": "The relation of the target URI referenced by the link to the
12262 context URI",
12263         "oneOf": [
12264             {
12265                 "default": [
12266                     "hosts"
12267                 ],
12268                 "items": {
12269                     "maxLength": 64,
12270                     "type": "string"
12271                 },
12272                     "minItems": 1,
12273                     "type": "array"
12274             },
12275             {
12276                 "default": "hosts",
12277                 "maxLength": 64,
12278                 "type": "string"
12279             }
12280         ]
12281     },
12282     "rt": {
12283         "description": "Resource Type of the Resource",
12284         "items": {
12285             "maxLength": 64,
12286             "type": "string"
12287         },
12288         "minItems": 1,
12289         "type": "array"
12290     },
12291     "title": {
12292         "description": "A title for the link relation. Can be used by the UI to provide a
12293 context.",
12294         "maxLength": 64,
12295         "type": "string"
12296     },
12297     "type": {
12298         "default": "application/cbor",
12299         "description": "A hint at the representation of the resource referenced by the
12300 target URI. This represents the media types that are used for both accepting and emitting.",
12301         "items": {
12302             "maxLength": 64,
12303             "type": "string"
12304         },
12305         "minItems": 1,
12306         "type": "array"
12307     }
12308 },
12309     "required": [
12310         "href",
12311         "rt",

```

```

12312         "if"
12313             [
12314                 "type": "object"
12315             },
12316                 "type": "array"
12317             },
12318
12319             "di" :
12320                 {
12321                     "$ref": "#/definitions/uuid",
12322                     "description": "A UUID that is the identifier for the publishing Device"
12323                 },
12324
12325             "n" :
12326                 {
12327                     "description": "Friendly name of the resource",
12328                     "maxLength": 64,
12329                     "readOnly": true,
12330                     "type": "string"
12331                 },
12332
12333             "ttl" :
12334                 {
12335                     "description": "Time to indicate a RD, i.e. how long to keep this published item.",
12336                     "type": "integer"
12337                 },
12338
12339             "id" :
12340                 {
12341                     "description": "Instance ID of this specific resource",
12342                     "maxLength": 64,
12343                     "readOnly": true,
12344                     "type": "string"
12345                 },
12346
12347             "if" :
12348                 {
12349                     "description": "The interface set supported by this resource",
12350                     "items": {
12351                         "enum": [
12352                             "oic.if.baseline",
12353                             "oic.if.ll",
12354                             "oic.if.b",
12355                             "oic.if.lb",
12356                             "oic.if.rw",
12357                             "oic.if.r",
12358                             "oic.if.a",
12359                             "oic.if.s"
12360                         ],
12361                         "type": "string"
12362                     },
12363                     "minItems": 1,
12364                     "readOnly": true,
12365                     "type": "array"
12366                 }
12367
12368             },
12369             "required": ["di", "links", "ttl"]
12370         }
12371     , "oic.rd.publish" :
12372         {
12373             "properties": {
12374                 "di": {
12375                     "$ref": "#/definitions/uuid",
12376                     "description": "A UUID that is the identifier for the publishing Device"
12377                 },
12378                 "ttl": {
12379                     "description": "Time to indicate a RD, i.e. how long to keep this published item.",
12380                     "type": "integer"
12381                 }
12382             }

```

```

12383     }
12384
12385     , "oic.collection.linkexpanded" :
12386     {
12387         "properties": {
12388             "links": {
12389                 "description": "A set of simple or individual OIC Links.",
12390                 "items": {
12391                     "properties": {
12392                         "anchor": {
12393                             "description": "This is used to override the context URI e.g. override the URI of
the containing collection.",
12394                             "format": "uri",
12395                             "maxLength": 256,
12396                             "type": "string"
12397                         },
12398                         "di": {
12399                             "description": "Format pattern according to IETF RFC 4122.",
12400                             "pattern": "^[a-fA-F0-9]{8}-[a-fA-F0-9]{4}-[a-fA-F0-9]{4}-[a-fA-F0-
9]{12}$",
12401                             "type": "string"
12402                         },
12403                         "epc": {
12404                             "description": "the Endpoint information of the target Resource",
12405                             "items": {
12406                                 "properties": {
12407                                     "ep": {
12408                                         "description": "Transport Protocol Suite + Endpoint Locator",
12409                                         "format": "uri",
12410                                         "type": "string"
12411                                     },
12412                                     "pri": {
12413                                         "description": "The priority among multiple Endpoints",
12414                                         "minimum": 1,
12415                                         "type": "integer"
12416                                     }
12417                                 },
12418                                 "type": "object"
12419                             },
12420                             "type": "array"
12421                         },
12422                         "href": {
12423                             "description": "This is the target URI, it can be specified as a Relative Reference
or fully-qualified URI.",
12424                             "format": "uri",
12425                             "maxLength": 256,
12426                             "type": "string"
12427                         },
12428                         "if": {
12429                             "description": "The interface set supported by this resource",
12430                             "items": {
12431                                 "enum": [
12432                                     "oic.if.baseline",
12433                                     "oic.if.ll",
12434                                     "oic.if.b",
12435                                     "oic.if.rw",
12436                                     "oic.if.r",
12437                                     "oic.if.a",
12438                                     "oic.if.s"
12439                                 ],
12440                                 "type": "string"
12441                             },
12442                             "minItems": 1,
12443                             "type": "array"
12444                         },
12445                         "ins": {
12446                             "description": "The instance identifier for this web link in an array of web links
- used in collections",
12447                             "type": "integer"
12448                         },
12449                         "p": {

```

```

12454         "description": "Specifies the framework policies on the Resource referenced by the
12455         target URI",
12456             "properties": {
12457                 "bm": {
12458                     "description": "Specifies the framework policies on the Resource referenced by
12459                     the target URI for e.g. observable and discoverable",
12460                     "type": "integer"
12461                 }
12462             },
12463             "required": [
12464                 "bm"
12465             ],
12466             "type": "object"
12467         },
12468         "rel": {
12469             "description": "The relation of the target URI referenced by the link to the
12470             context URI",
12471             "oneOf": [
12472                 {
12473                     "default": [
12474                         "hosts"
12475                     ],
12476                     "items": {
12477                         "maxLength": 64,
12478                         "type": "string"
12479                     },
12480                     "minItems": 1,
12481                     "type": "array"
12482                 },
12483                 {
12484                     "default": "hosts",
12485                     "maxLength": 64,
12486                     "type": "string"
12487                 }
12488             ],
12489         },
12490         "rt": {
12491             "description": "Resource Type of the Resource",
12492             "items": {
12493                 "maxLength": 64,
12494                 "type": "string"
12495             },
12496             "minItems": 1,
12497             "type": "array"
12498         },
12499         "title": {
12500             "description": "A title for the link relation. Can be used by the UI to provide a
12501             context.",
12502             "maxLength": 64,
12503             "type": "string"
12504         },
12505         "type": {
12506             "default": "application/cbor",
12507             "description": "A hint at the representation of the resource referenced by the
12508             target URI. This represents the media types that are used for both accepting and emitting.",
12509             "items": {
12510                 "maxLength": 64,
12511                 "type": "string"
12512             },
12513             "minItems": 1,
12514             "type": "array"
12515         }
12516     },
12517     "required": [
12518         "href",
12519         "rt",
12520         "if"
12521     ],
12522     "type": "object"
12523 },
12524 "type": "array"

```

```

12525     }
12526   },
12527   "type": "object"
12528 }
12529
12530   "uuid" :
12531   {
12532     "description": "Format pattern according to IETF RFC 4122.",
12533     "pattern": "[a-fA-F0-9]{8}-[a-fA-F0-9]{4}-[a-fA-F0-9]{4}-[a-fA-F0-9]{12}$",
12534     "type": "string"
12535   }
12536
12537   "oic.core" :
12538   {
12539     "properties": {
12540       "id": {
12541         "description": "Instance ID of this specific resource",
12542         "maxLength": 64,
12543         "readOnly": true,
12544         "type": "string"
12545       },
12546       "if": {
12547         "description": "The interface set supported by this resource",
12548         "items": {
12549           "enum": [
12550             "oic.if.baseline",
12551             "oic.if.ll",
12552             "oic.if.b",
12553             "oic.if.lb",
12554             "oic.if.rw",
12555             "oic.if.r",
12556             "oic.if.a",
12557             "oic.if.s"
12558           ],
12559           "type": "string"
12560         },
12561         "minItems": 1,
12562         "readOnly": true,
12563         "type": "array"
12564       },
12565       "n": {
12566         "description": "Friendly name of the resource",
12567         "maxLength": 64,
12568         "readOnly": true,
12569         "type": "string"
12570       },
12571       "rt": {
12572         "description": "Resource Type of the Resource",
12573         "items": {
12574           "maxLength": 64,
12575           "type": "string"
12576         },
12577         "minItems": 1,
12578         "readOnly": true,
12579         "type": "array"
12580       }
12581     },
12582     "type": "object"
12583   }
12584
12585 }
12586
12587

```

F.10.5 Property Definition

Property name	Value type	Mandatory	Access mode	Description
ttl	integer			Time to indicate a RD, i.e. how

				long to keep this published item.
di	multiple types: see schema			A UUID that is the identifier for the publishing Device
links	array: see schema			A set of simple or individual OIC Links.
rt	array: see schema		Read Only	Resource Type of the Resource
sel	integer		Read Only	A bias factor calculated by the Resource directory
id	string		Read Only	Instance ID of this specific resource
if	array: see schema		Read Only	The interface set supported by this resource
n	string		Read Only	Friendly name of the resource
id	string		Read Only	Instance ID of this specific resource
rt	array: see schema		Read Only	Resource Type of the Resource
if	array: see schema		Read Only	The interface set supported by this resource
n	string		Read Only	Friendly name of the resource
rt	array: see schema		Read Only	Resource Type of the Resource
id	string		Read Only	Instance ID of this specific resource
ttl	integer	yes		Time to indicate a RD, i.e. how long to keep this published item.
if	array: see schema		Read Only	The interface set supported by this resource
links	array: see schema	yes		A set of simple or individual OIC Links.
n	string		Read Only	Friendly name of the resource
di	multiple types: see schema	yes		A UUID that is the identifier for the publishing Device

12589 **F.10.6 CRUDN behaviour**

Resource	Create	Read	Update	Delete	Notify
/oic/rd		get	post		

12590 **F.11 Discoverable Resources**12591 **F.11.1 Introduction**

12592 Baseline representation of /oic/res; list of discoverable resources
 12593

12594 **F.11.2 Wellknown URI**

12595 /oic/res

12596 **F.11.3 Resource Type**12597 **F.11.4 Swagger2.0 Definition**

```

12598 {
12599   "swagger": "2.0",
12600   "info": {
12601     "title": "Discoverable Resources Link List interface",
12602     "version": "v1-20160622",
12603     "license": {
12604       "name": "copyright 2016-2017 Open Connectivity Foundation, Inc. All rights reserved.",
12605       "x-description": "Redistribution and use in source and binary forms, with or without
12606 modification, are permitted provided that the following conditions are met:\n      1.
12607 Redistributions of source code must retain the above copyright notice, this list of conditions and
12608 the following disclaimer.\n      2. Redistributions in binary form must reproduce the above
12609 copyright notice, this list of conditions and the following disclaimer in the documentation and/or
12610 other materials provided with the distribution.\n\n      THIS SOFTWARE IS PROVIDED BY THE Open
12611 Connectivity Foundation, INC. \\"AS IS\\" AND ANY EXPRESS OR IMPLIED WARRANTIES, INCLUDING, BUT NOT
12612 LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE OR
12613 WARRANTIES OF NON-INFRINGEMENT, ARE DISCLAIMED.\n      IN NO EVENT SHALL THE Open Connectivity
12614 Foundation, INC. OR CONTRIBUTORS BE LIABLE FOR ANY DIRECT, INDIRECT, INCIDENTAL, SPECIAL,
12615 EXEMPLARY, OR CONSEQUENTIAL DAMAGES (INCLUDING, BUT NOT LIMITED TO, PROCUREMENT OF SUBSTITUTE GOODS
12616 OR SERVICES; LOSS OF USE, DATA, OR PROFITS; OR BUSINESS INTERRUPTION)\n      HOWEVER CAUSED AND
12617 ON ANY THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT (INCLUDING NEGLIGENCE OR
12618 OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OF THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY
12619 OF SUCH DAMAGE.\n"
12620   }
12621 },
12622   "schemes": ["http"],
12623   "consumes": ["application/json"],
12624   "produces": ["application/json"],
12625   "paths": {
12626     "/oic/res?if=oic.if.ll" : {
12627       "get": {
12628         "description": "Link list representation of /oic/res; list of discoverable
12629 resources\nRetrieve the discoverable resource set, link list interface\n",
12630         "parameters": [
12631           ],
12632         "responses": {
12633           "200": {
12634             "description" : "",
12635             "x-example":
12636             [
12637               {
12638                 "href": "/humidity",
12639                 "rt": ["oic.r.humidity"],
12640                 "if": ["oic.if.s"],
12641                 "p": {"bm": 3},
12642                 "eps": [
12643                   {"ep": "coaps://[fe80::b1d6]:1111", "pri": 2},
12644                   {"ep": "coaps://[fe80::b1d6]:1122"},
12645                   {"ep": "coaps+tcp://[2001:db8:a::123]:2222", "pri": 3}
12646                 ],
12647               },
12648             ]
12649           }
12650         }
12651       }
12652     }
12653   }
12654 }
```

```

12649         "href": "/temperature",
12650         "rt": ["oic.r.temperature"],
12651         "if": ["oic.if.s"],
12652         "p": {"bm": 3},
12653         "eps": [
12654             {"ep": "coaps://[[2001:db8:a::123]:2222}"}
12655         ]
12656     }
12657   ]
12658   ,
12659   "schema": { "$ref": "#/definitions/slinklist" }
12660 }
12661 }
12662 }
12663 ,
12664 "/oic/res?if=oic.if.baseline" :
12665   "get": {
12666     "description": "Baseline representation of /oic/res; list of discoverable
resources\nRetrieve the discoverable resource set, baseline interface\n",
12667     "parameters": [
12668     ],
12669     "responses": {
12670       "200": {
12671         "description" : "",
12672         "x-example": [
12673           [
12674             {
12675               "rt": ["oic.wk.res"],
12676               "if": ["oic.if.baseline", "oic.if.ll"],
12677               "links": [
12678                 [
12679                   {
12680                     "href": "/humidity",
12681                     "rt": ["oic.r.humidity"],
12682                     "if": ["oic.if.s"],
12683                     "p": {"bm": 3},
12684                     "eps": [
12685                       {"ep": "coaps://[fe80::b1d6]:1111", "pri": 2},
12686                       {"ep": "coaps://[fe80::b1d6]:1122"},

12687                       {"ep": "coap+tcp://[[2001:db8:a::123]:2222]", "pri": 3}
12688                     ]
12689                   },
12690                   {
12691                     "href": "/temperature",
12692                     "rt": ["oic.r.temperature"],
12693                     "if": ["oic.if.s"],
12694                     "p": {"bm": 3},
12695                     "eps": [
12696                       {"ep": "coaps://[[2001:db8:a::123]:2222}"}
12697                     ]
12698                   }
12699                 ]
12700               ]
12701             }
12702           ]
12703         ,
12704         "schema": { "$ref": "#/definitions/sbaseline" }
12705       }
12706     }
12707   }
12708 }
12709 },
12710   "parameters": {
12711     "interface-ll" : {
12712       "in" : "query",
12713       "name" : "if",
12714       "type" : "string",
12715       "enum" : ["oic.if.ll"]
12716     },
12717     "interface-baseline" : {
12718       "in" : "query",
12719       "name" : "if",
12720     }
12721   }
12722 }
```

```

12720     "type" : "string",
12721     "enum" : ["oic.if.baseline"]
12722   },
12723   "interface-all" : {
12724     "in" : "query",
12725     "name" : "if",
12726     "type" : "string",
12727     "enum" : ["oic.if.ll", "oic.if.baseline"]
12728   }
12729 },
12730 "definitions": {
12731   "slinklist" : {
12732     "items" :
12733       {
12734         "properties": {
12735           "anchor": {
12736             "description": "This is used to override the context URI e.g. override the URI of the
containing collection.",
12737             "format": "uri",
12738             "maxLength": 256,
12739             "type": "string"
12740           },
12741           "di": {
12742             "allOr": [
12743               {
12744                 "description": "Format pattern according to IETF RFC 4122.",
12745                 "pattern": "^[a-fA-F0-9]{8}-[a-fA-F0-9]{4}-[a-fA-F0-9]{4}-[a-fA-F0-
12746 9]{12}$",
12747                 "type": "string"
12748               },
12749               {
12750                 "description": "The device ID"
12751               }
12752             ]
12753           },
12754           "eps": {
12755             "description": "the Endpoint information of the target Resource",
12756             "items": {
12757               "properties": {
12758                 "ep": {
12759                   "description": "Transport Protocol Suite + Endpoint Locator",
12760                   "format": "uri",
12761                   "type": "string"
12762                 },
12763                 "pri": {
12764                   "description": "The priority among multiple Endpoints",
12765                   "minimum": 1,
12766                   "type": "integer"
12767                 }
12768               },
12769               "type": "object"
12770             },
12771             "type": "array"
12772           },
12773           "href": {
12774             "description": "This is the target URI, it can be specified as a Relative Reference or
fully-qualified URL.",
12775             "format": "uri",
12776             "maxLength": 256,
12777             "type": "string"
12778           },
12779           "if": {
12780             "description": "The interface set supported by this resource",
12781             "items": {
12782               "enum": [
12783                 "oic.if.baseline",
12784                 "oic.if.ll",
12785                 "oic.if.b",
12786                 "oic.if.rw",
12787                 "oic.if.r",
12788                 "oic.if.a",
12789               ]
12790             }
12791           }
12792         }
12793       }
12794     }
12795   }
12796 }

```

```

12791         "oic.if.s"
12792         ],
12793         "type": "string"
12794     },
12795     "minItems": 1,
12796     "type": "array"
12797   },
12798   "ins": {
12799     "description": "The instance identifier for this web link in an array of web links - used in collections",
12800     "type": "integer"
12801   },
12802   "p": {
12803     "description": "Specifies the framework policies on the Resource referenced by the target URI",
12804     "properties": {
12805       "bm": {
12806         "description": "Specifies the framework policies on the Resource referenced by the target URI for e.g. observable and discoverable",
12807         "type": "integer"
12808       }
12809     },
12810     "required": [
12811       "bm"
12812     ],
12813     "type": "object"
12814   },
12815   "rel": {
12816     "description": "The relation of the target URI referenced by the link to the context
12817 URI",
12818     "oneOf": [
12819       {
12820         "default": [
12821           "hosts"
12822         ],
12823         "items": {
12824           "maxLength": 64,
12825           "type": "string"
12826         },
12827         "minItems": 1,
12828         "type": "array"
12829       },
12830       {
12831         "default": "hosts",
12832         "maxLength": 64,
12833         "type": "string"
12834       }
12835     ],
12836   },
12837   "rt": {
12838     "description": "Resource Type of the Resource",
12839     "items": {
12840       "maxLength": 64,
12841       "type": "string"
12842     },
12843     "minItems": 1,
12844     "type": "array"
12845   },
12846   "title": {
12847     "description": "A title for the link relation. Can be used by the UI to provide a
12848 context.",
12849     "maxLength": 64,
12850     "type": "string"
12851   },
12852   "type": {
12853     "default": "application/cbor",
12854     "description": "A hint at the representation of the resource referenced by the target
12855 URI. This represents the media types that are used for both accepting and emitting.",
12856     "items": {
12857       "maxLength": 64,
12858       "type": "string"
12859     }
12860   }
12861 }
```

```

12862      },
12863      "minItems": 1,
12864      "type": "array"
12865    },
12866    "required": [
12867      "href",
12868      "rt",
12869      "if"
12870    ],
12871    "type": "object"
12872  }
12873  ,
12874  "type" :
12875    "array"
12876  ,
12877}
12878
12879  "sbaseline" : {
12880    "items" :
12881      {
12882        "properties": {
12883          "if": {
12884            "description": "The interface set supported by this resource",
12885            "items": {
12886              "enum": [
12887                "oic.if.baseline",
12888                "oic.if.ll"
12889              ],
12890              "type": "string"
12891            },
12892            "minItems": 1,
12893            "readOnly": true,
12894            "type": "array"
12895          },
12896        "links": {
12897          "items": {
12898            "properties": {
12899              "anchor": {
12900                "description": "This is used to override the context URI e.g. override the URI of
the containing collection.",
12901                "format": "uri",
12902                "maxLength": 256,
12903                "type": "string"
12904              },
12905              "di": {
12906                "allof": [
12907                  {
12908                    "description": "Format pattern according to IETF RFC 4122.",
12909                    "pattern": "[a-fA-F0-9]{8}-[a-fA-F0-9]{4}-[a-fA-F0-9]{4}-[a-fA-F0-9]{4}-[a-
12910 fA-F0-9]{12}$",
12911                    "type": "string"
12912                  },
12913                  {
12914                    "description": "The device ID"
12915                  }
12916                ]
12917              },
12918            "eps": {
12919              "description": "the Endpoint information of the target Resource",
12920              "items": {
12921                "properties": {
12922                  "ep": {
12923                    "description": "Transport Protocol Suite + Endpoint Locator",
12924                    "format": "uri",
12925                    "type": "string"
12926                  },
12927                  "pri": {
12928                    "description": "The priority among multiple Endpoints",
12929                    "minimum": 1,
12930                    "type": "integer"
12931                }
12932              }
12933            }
12934          }
12935        }
12936      }
12937    }
12938  }
12939
```

```

12933         }
12934     },
12935     "type": "object"
12936   },
12937   "type": "array"
12938 },
12939   "href": {
12940     "description": "This is the target URI, it can be specified as a Relative
Reference or fully-qualified URI."
12941   },
12942   "format": "uri",
12943   "maxLength": 256,
12944   "type": "string"
12945 },
12946   "if": {
12947     "description": "The interface set supported by this resource",
12948     "items": {
12949       "enum": [
12950         "oic.if.baseline",
12951         "oic.if.ll",
12952         "oic.if.b",
12953         "oic.if.rw",
12954         "oic.if.r",
12955         "oic.if.a",
12956         "oic.if.s"
12957       ],
12958       "type": "string"
12959     },
12960     "minItems": 1,
12961     "type": "array"
12962   },
12963   "ins": {
12964     "description": "The instance identifier for this web link in an array of web
links - used in collections",
12965     "type": "integer"
12966   },
12967   "p": {
12968     "description": "Specifies the framework policies on the Resource referenced by
the target URI",
12969     "properties": {
12970       "bm": {
12971         "description": "Specifies the framework policies on the Resource referenced
by the target URI for e.g. observable and discoverable",
12972         "type": "integer"
12973       }
12974     },
12975     "required": [
12976       "bm"
12977     ],
12978     "type": "object"
12979   },
12980   "rel": {
12981     "description": "The relation of the target URI referenced by the link to the
context URI",
12982     "oneOf": [
12983       {
12984         "default": [
12985           "hosts"
12986         ],
12987         "items": [
12988           "maxLength": 64,
12989           "type": "string"
12990         ],
12991         "minItems": 1,
12992         "type": "array"
12993       },
12994       {
12995         "default": "hosts",
12996         "maxLength": 64,
12997         "type": "string"
12998       }
12999     ]
13000   }
13001 }
13002 ]
13003

```

```

13004      },
13005      "rt": {
13006          "description": "Resource Type of the Resource",
13007          "items": {
13008              "maxLength": 64,
13009              "type": "string"
13010          },
13011          "minItems": 1,
13012          "type": "array"
13013      },
13014      "title": {
13015          "description": "A title for the link relation. Can be used by the UI to provide a
13016 context.",
13017          "maxLength": 64,
13018          "type": "string"
13019      },
13020      "type": {
13021          "default": "application/cbor",
13022          "description": "A hint at the representation of the resource referenced by the
13023 target URI. This represents the media types that are used for both accepting and emitting.",
13024          "items": {
13025              "maxLength": 64,
13026              "type": "string"
13027          },
13028          "minItems": 1,
13029          "type": "array"
13030      }
13031  },
13032  "required": [
13033      "href",
13034      "rt",
13035      "if"
13036  ],
13037  "type": "object"
13038 },
13039  "type": "array"
13040 },
13041  "n": {
13042      "description": "Human friendly name",
13043      "maxLength": 64,
13044      "readOnly": true,
13045      "type": "string"
13046  },
13047  "rt": {
13048      "description": "Resource Type of the Resource",
13049      "items": {
13050          "maxLength": 64,
13051          "type": "string"
13052      },
13053      "minItems": 1,
13054      "readOnly": true,
13055      "type": "array"
13056  },
13057  },
13058  "required": [
13059      "rt",
13060      "if",
13061      "links"
13062  ],
13063  "type": "object"
13064 },
13065  "type" :
13066      "array"
13067  }
13068 }
13069 }
13070 }
13071 }
13072 }

```

Deleted:

```

        "mpro": {
            "description": "Supported
messaging protocols",
            "maxLength": 64,
            "readOnly": true,
            "type": "string"
        },
    }

```

F.11.5 Property Definition

Property name	Value type	Mandatory	Access mode	Description
rt	array: schema see	yes	Read Only	Resource Type of the Resource
links	array: schema see	yes		
if	array: schema see	yes	Read Only	The interface set supported by this resource
n	string		Read Only	Human friendly name
rel	multiple types: see schema			The relation of the target URI referenced by the link to the context URI
title	string			A title for the link relation. Can be used by the UI to provide a context.
anchor	string			This is used to override the context URI e.g. override the URI of the containing collection.
di	multiple types: see schema			
if	array: schema see	yes		The interface set supported by this resource
type	array: schema see			A hint at the representation of the resource referenced by the target URI. This represents the media types that are used for both accepting and emitting.
ins	integer			The instance identifier for this web link in an array of web links - used in collections
href	string	yes		This is the target URI, it can be specified as a Relative Reference or fully-qualified URI.

Comment [BRA121]: [Editorial] BZ #2372

Deleted: mpro

... [16]

p	object: schema	see			Specifies the framework policies on the Resource referenced by the target URI
rt	array: schema	see	yes		Resource Type of the Resource
eps	array: schema	see			the Endpoint information of the target Resource

13082 **F.11.6 CRUDN behaviour**

Resource	Create	Read	Update	Delete	Notify
/oic/res		get			

13083 **F.12 Scene List**

13084 **F.12.1 Introduction**

13085 Toplevel Scene resource. This resource is a generic collection resource.
 13086 This resource shall contain oic.wk.scenecollection resource types.
 13087 The rts value shall contain oic.wk.scenecollection resource types.
 13088

13089 **F.12.2 Example URI**

13090 /SceneListResURI

13091 **F.12.3 Resource Type**

13092 The resource type (rt) is defined as: ['oic.wk.scenelist'].

13093 **F.12.4 Swagger2.0 Definition**

```
13094 {
  "swagger": "2.0",
  "info": {
    "title": "Scenes (Top level)",
    "version": "v1-20160622",
    "license": {
      "name": "copyright 2016-2017 Open Connectivity Foundation, Inc. All rights reserved.",
      "x-description": "Redistribution and use in source and binary forms, with or without
modification, are permitted provided that the following conditions are met:\n          1.
Redistributions of source code must retain the above copyright notice, this list of conditions and
the following disclaimer.\n          2. Redistributions in binary form must reproduce the above
copyright notice, this list of conditions and the following disclaimer in the documentation and/or
other materials provided with the distribution.\n\n          THIS SOFTWARE IS PROVIDED BY THE Open
Connectivity Foundation, INC. \"AS IS\" AND ANY EXPRESS OR IMPLIED WARRANTIES, INCLUDING, BUT NOT
LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE OR
WARRANTIES OF NON-INFRINGEMENT, ARE DISCLAIMED.\n          IN NO EVENT SHALL THE Open Connectivity
Foundation, INC. OR CONTRIBUTORS BE LIABLE FOR ANY DIRECT, INDIRECT, INCIDENTAL, SPECIAL,
EXEMPLARY, OR CONSEQUENTIAL DAMAGES (INCLUDING, BUT NOT LIMITED TO, PROCUREMENT OF SUBSTITUTE GOODS
OR SERVICES; LOSS OF USE, DATA, OR PROFITS; OR BUSINESS INTERRUPTION)\n          HOWEVER CAUSED AND
ON ANY THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT (INCLUDING NEGLIGENCE OR
OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OF THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY
OF SUCH DAMAGE.\n"
    }
  },
  "schemes": ["http"],
  "consumes": ["application/json"],
  "produces": ["application/json"],
  "paths": {
    "/SceneListResURI" : {
      "get": {
        "tags": [
          "Scene"
        ],
        "summary": "Get a list of scenes",
        "description": "This endpoint returns a list of scene resources. The response is a JSON object containing an array of scene objects. Each scene object has a 'name' field and a 'value' field. The 'value' field contains a list of scene types. The response also includes standard HTTP headers like 'Content-Type: application/json'. The response body is a JSON object with the following structure: {\n          'scenes': [\n            {\n              'name': 'Scene 1',\n              'value': [\n                'oic.wk.scene'\n              ]\n            },\n            {\n              'name': 'Scene 2',\n              'value': [\n                'oic.wk.scene'\n              ]\n            }\n          ]\n        }",
        "responses": {
          "200": {
            "description": "Success"
          }
        }
      }
    }
  }
}
```

```

13124     "description": "Toplevel Scene resource.\nThis resource is a generic collection
13125     resource.\n\nThe rts value shall contain oic.wk.scenecollection resource types.\nProvides the current
13126     list of web links pointing to scenes\n",
13127     "parameters": [
13128     ],
13129     "responses": {
13130         "200": {
13131             "description" : "",
13132             "x-example":
13133             {
13134                 "rt":      ["oic.wk.scenelist"],
13135                 "n":       "list of scene Collections",
13136                 "rts":    ["oic.wk.scenecollection"],
13137                 "links":  [
13138                     ]
13139                 }
13140             ,
13141             "schema": { "$ref": "#/definitions/Collection" }
13142         }
13143     }
13144   },
13145   "/SceneMemberResURI" : {
13146     "get": {
13147       "description": "Collection that models a scene member.\nProvides the scene member\n",
13148       "parameters": [
13149       ],
13150       "responses": {
13151           "200": {
13152               "description" : "",
13153               "x-example":
13154               {
13155                   "rt":  ["oic.wk.scenemember"],
13156                   "id":  "0685B960-FFFF-46F7-BEC0-9E6234671ADC1",
13157                   "n":   "my binary switch (for light bulb) mappings",
13158                   "link": {
13159                     "href": "binarySwitch",
13160                     "rt":  ["oic.r.switch.binary"],
13161                     "if":   ["oic.if.a", "oic.if.baseline"],
13162                     "eps": [
13163                         {"ep": "coap://[fe80::b1d6]:1111", "pri": 2},
13164                         {"ep": "coaps://[fe80::b1d6]:1122"},
13165                         {"ep": "coap+tcp://[2001:db8:a::123]:2222", "pri": 3}
13166                     ]
13167                 },
13168                 "sceneMappings": [
13169                 {
13170                     "scene":      "off",
13171                     "memberProperty": "value",
13172                     "memberValue":   true
13173                 },
13174                 {
13175                     "scene":      "Reading",
13176                     "memberProperty": "value",
13177                     "memberValue":   false
13178                 },
13179                 {
13180                     "scene":      "TVWatching",
13181                     "memberProperty": "value",
13182                     "memberValue":   true
13183                 }
13184             ]
13185         }
13186     },
13187     "schema": { "$ref": "#/definitions/SceneMember" }
13188   }
13189 }
13190 }
13191 }
13192   "/SceneCollectionResURI" : {
13193     "get": {

```

```

13195     "description": "Collection that models a set of Scenes.\nThis resource is a generic
13196 collection resource with additional parameters.\n\nThe rts value shall contain oic.scenemember
13197 resource types.\n\nThe additional parameters are\n  lastScene, this is the scene value last set by
13198 any OCF Client\n  sceneValues, this is the list of available scenes\n  lastScene shall be listed in
13199 sceneValues.\n\nProvides the current list of web links pointing to scenes\n",
13200     "parameters": [
13201     ],
13202     "responses": {
13203       "200": {
13204         "description": "",
13205         "x-example": {
13206           {
13207             "lastScene": "off",
13208             "sceneValues": ["off", "Reading", "TVWatching"],
13209             "rt": ["oic.wk.scenecollection"],
13210             "n": "My Scenes for my living room",
13211             "id": "0685B960-736F-46F7-BEC0-9E6CBD671ADCl",
13212             "rts": ["oic.wk.scenemember"],
13213             "links": [
13214               ]
13215             }
13216           ,
13217           "schema": { "$ref": "#/definitions/SceneCollection" }
13218         }
13219       }
13220     },
13221     "post": {
13222       "description": "Provides the action to change the last set scene selection.\nCalling this
13223 method shall update all scene members to the prescribed membervalue.\nWhen this method is called
13224 with the same value as the current lastScene value\nthen all scene members shall be updated.\n",
13225       "parameters": [
13226         {
13227           "name": "body",
13228           "in": "body",
13229           "required": true,
13230           "schema": { "$ref": "#/definitions/SceneCollectionUpdate" },
13231           "x-example": {
13232             {
13233               "lastScene": "Reading"
13234             }
13235           },
13236         ],
13237       "responses": {
13238         "200": {
13239           "description": "Indicates that the value is changed.\n\nThe changed properties are
13240 provided in the response.\n",
13241           "x-example": {
13242             {
13243               "lastScene": "Reading"
13244             }
13245           ,
13246           "schema": { "$ref": "#/definitions/SceneCollectionUpdate" }
13247         }
13248       }
13249     }
13250   },
13251   "parameters": {
13252     "interface" : {
13253       "in" : "query",
13254       "name" : "if",
13255       "type" : "string",
13256       "enum" : ["oic.if.a", "oic.if.ll", "oic.if.baseline"]
13257     }
13258   },
13259   "definitions": {
13260     "Collection" : {
13261       "properties": {
13262         "links" :
13263           {
13264             "description": "A set of simple or individual OIC Links."
13265           }
13266         }
13267       }
13268     }
13269   }
13270 }
```

```

13266     "items": {
13267         "$ref": "#/definitions/oic.oic-link"
13268     },
13269     "type": "array"
13270 }
13271 }
13272 }
13273 }
13274
13275 "SceneMember" : {
13276     "properties": {
13277         "rt" :
13278             {
13279                 "description": "Resource Type of the Resource",
13280                 "items": {
13281                     "maxLength": 64,
13282                     "type": "string"
13283                 },
13284                 "minItems": 1,
13285                 "readOnly": true,
13286                 "type": "array"
13287             },
13288
13289         "SceneMappings" :
13290             {
13291                 "description": "array of mappings per scene, can be one(1)",
13292                 "items": {
13293                     "properties": {
13294                         "memberProperty": {
13295                             "description": "property name that will be mapped",
13296                             "readOnly": true,
13297                             "type": "string"
13298                         },
13299                         "memberValue": {
13300                             "description": "value of the Member Property",
13301                             "readOnly": true,
13302                             "type": "string"
13303                         },
13304                         "scene": {
13305                             "description": "Specifies a scene value that will be acted upon",
13306                             "type": "string"
13307                         }
13308                     },
13309                     "required": [
13310                         "scene",
13311                         "memberProperty",
13312                         "memberValue"
13313                     ],
13314                     "type": "object"
13315                 },
13316                     "type": "array"
13317             },
13318
13319         "n" :
13320             {
13321                 "description": "Friendly name of the resource",
13322                 "maxLength": 64,
13323                 "readOnly": true,
13324                 "type": "string"
13325             },
13326
13327         "link" :
13328             {
13329                 "allOf": [
13330                     {
13331                         "properties": {
13332                             "anchor": {
13333                                 "description": "This is used to override the context URI e.g. override the URI of
the containing collection.",
13334                                     "format": "uri",
13335                                     "maxLength": 256,
13336

```

```

13337         "type": "string"
13338     },
13339     "di": {
13340         "allOf": [
13341             {
13342                 "description": "Format pattern according to IETF RFC 4122.",
13343                 "pattern": "[a-fA-F0-9]{8}-[a-fA-F0-9]{4}-[a-fA-F0-9]{4}-[a-fA-F0-9]{4}-[a-fA-F0-9]{12}$",
13344             },
13345             {
13346                 "type": "string"
13347             },
13348             {
13349                 "description": "The device ID"
13350             }
13351         ],
13352     },
13353     "eps": {
13354         "description": "the Endpoint information of the target Resource",
13355         "items": {
13356             "properties": {
13357                 "ep": {
13358                     "description": "Transport Protocol Suite + Endpoint Locator",
13359                     "format": "uri",
13360                     "type": "string"
13361                 },
13362                 "pri": {
13363                     "description": "The priority among multiple Endpoints",
13364                     "minimum": 1,
13365                     "type": "integer"
13366                 },
13367                 "type": "object"
13368             },
13369             "type": "array"
13370         },
13371         "href": {
13372             "description": "This is the target URI, it can be specified as a Relative
13373             Reference or fully-qualified URI."
13374             "format": "uri",
13375             "maxLength": 256,
13376             "type": "string"
13377         },
13378         "if": {
13379             "description": "The interface set supported by this resource",
13380             "items": {
13381                 "enum": [
13382                     "oic.if.baseline",
13383                     "oic.if.ll",
13384                     "oic.if.b",
13385                     "oic.if.rw",
13386                     "oic.if.r",
13387                     "oic.if.a",
13388                     "oic.if.s"
13389                 ],
13390                 "type": "string"
13391             },
13392             "minItems": 1,
13393             "type": "array"
13394         },
13395         "ins": {
13396             "description": "The instance identifier for this web link in an array of web
13397             links - used in collections",
13398             "type": "integer"
13399         },
13400         "p": {
13401             "description": "Specifies the framework policies on the Resource referenced by
13402             the target URI",
13403             "properties": {
13404                 "bm": {
13405                     "description": "Specifies the framework policies on the Resource referenced
13406                     by the target URI for e.g. observable and discoverable",
13407                     "type": "integer"
13408                 }
13409             }
13410         }
13411     }
13412 }
```

```

13408         }
13409     },
13410     "required": [
13411       "bm"
13412     ],
13413     "type": "object"
13414   },
13415   "rel": {
13416     "description": "The relation of the target URI referenced by the link to the
13417     context URI",
13418     "oneOf": [
13419       {
13420         "default": [
13421           "hosts"
13422         ],
13423         "items": {
13424           "maxLength": 64,
13425           "type": "string"
13426         },
13427         "minItems": 1,
13428         "type": "array"
13429       },
13430       {
13431         "default": "hosts",
13432         "maxLength": 64,
13433         "type": "string"
13434       }
13435     ]
13436   },
13437   "rt": {
13438     "description": "Resource Type of the Resource",
13439     "items": {
13440       "maxLength": 64,
13441       "type": "string"
13442     },
13443     "minItems": 1,
13444     "type": "array"
13445   },
13446   "title": {
13447     "description": "A title for the link relation. Can be used by the UI to provide a
13448     context.",
13449     "maxLength": 64,
13450     "type": "string"
13451   },
13452   "type": {
13453     "default": "application/cbor",
13454     "description": "A hint at the representation of the resource referenced by the
13455     target URI. This represents the media types that are used for both accepting and emitting.",
13456     "items": {
13457       "maxLength": 64,
13458       "type": "string"
13459     },
13460     "minItems": 1,
13461     "type": "array"
13462   }
13463 },
13464   "required": [
13465     "href",
13466     "rt",
13467     "if"
13468   ],
13469   "type": "object"
13470 },
13471   {
13472     "description": "OCF link that points to a resource"
13473   }
13474 ],
13475 },
13476 "id" :
13477   {

```

```

13479     "description": "Instance ID of this specific resource",
13480     "maxLength": 64,
13481     "readOnly": true,
13482     "type": "string"
13483   },
13484
13485   "if" :
13486   {
13487     "description": "The interface set supported by this resource",
13488     "items": {
13489       "enum": [
13490         "oic.if.baseline",
13491         "oic.if.ll",
13492         "oic.if.b",
13493         "oic.if.lb",
13494         "oic.if.rw",
13495         "oic.if.r",
13496         "oic.if.a",
13497         "oic.if.s"
13498       ],
13499       "type": "string"
13500     },
13501     "minItems": 1,
13502     "readOnly": true,
13503     "type": "array"
13504   }
13505
13506 }
13507
13508
13509   "SceneCollection" : {
13510     "properties": {
13511       "rt" :
13512       {
13513         "description": "Resource Type of the Resource",
13514         "items": {
13515           "maxLength": 64,
13516           "type": "string"
13517         },
13518         "minItems": 1,
13519         "readOnly": true,
13520         "type": "array"
13521       },
13522
13523       "lastScene" :
13524       {
13525         "description": "Last selected Scene from the set of sceneValues",
13526         "type": "string"
13527       },
13528
13529       "links" :
13530       {
13531         "description": "A set of simple or individual OIC Links.",
13532         "items": {
13533           "properties": {
13534             "anchor": {
13535               "description": "This is used to override the context URI e.g. override the URI of
the containing collection.",
13536               "format": "uri",
13537               "maxLength": 256,
13538               "type": "string"
13539             },
13540             "di": {
13541               "description": "Format pattern according to IETF RFC 4122.",
13542               "pattern": "[a-fA-F0-9]{8}-[a-fA-F0-9]{4}-[a-fA-F0-9]{4}-[a-fA-F0-9]{12}$",
13543               "type": "string"
13544             },
13545             "eps": {
13546               "description": "the Endpoint information of the target Resource",
13547               "items": {
13548
13549

```

```

13550
13551     "properties": {
13552         "ep": {
13553             "description": "Transport Protocol Suite + Endpoint Locator",
13554             "format": "uri",
13555             "type": "string"
13556         },
13557         "pri": {
13558             "description": "The priority among multiple Endpoints",
13559             "minimum": 1,
13560             "type": "integer"
13561         },
13562         "type": "object"
13563     },
13564     "type": "array"
13565 },
13566     "href": {
13567         "description": "This is the target URI, it can be specified as a Relative Reference
or fully-qualified URI.",
13568         "format": "uri",
13569         "maxLength": 256,
13570         "type": "string"
13571     },
13572     "if": {
13573         "description": "The interface set supported by this resource",
13574         "items": {
13575             "enum": [
13576                 "oic.if.baseline",
13577                 "oic.if.ll",
13578                 "oic.if.b",
13579                 "oic.if.rw",
13580                 "oic.if.r",
13581                 "oic.if.a",
13582                 "oic.if.s"
13583             ],
13584             "type": "string"
13585         },
13586         "minItems": 1,
13587         "type": "array"
13588     },
13589     "ins": {
13590         "description": "The instance identifier for this web link in an array of web links
- used in collections",
13591         "type": "integer"
13592     },
13593     "p": {
13594         "description": "Specifies the framework policies on the Resource referenced by the
target URI",
13595         "properties": {
13596             "bm": {
13597                 "description": "Specifies the framework policies on the Resource referenced by
the target URI for e.g. observable and discoverable",
13598                 "type": "integer"
13599             }
13600         },
13601         "required": [
13602             "bm"
13603         ],
13604         "type": "object"
13605     },
13606     "rel": {
13607         "description": "The relation of the target URI referenced by the link to the
context URI",
13608         "oneof": [
13609             {
13610                 "default": [
13611                     "hosts"
13612                 ],
13613                 "items": [
13614                     {
13615                         "maxLength": 64,
13616                         "type": "string"
13617                 }
13618             ]
13619         }
13620     }
13621 }
13622 }
```

```

13621
13622
13623
13624
13625
13626
13627
13628
13629
13630
13631
13632
13633
13634
13635
13636
13637
13638
13639
13640
13641
13642
13643
13644
13645
13646
13647
13648
13649
13650
13651
13652
13653
13654
13655
13656
13657
13658
13659
13660
13661
13662
13663
13664
13665
13666
13667
13668
13669
13670
13671
13672
13673
13674
13675
13676
13677
13678
13679
13680
13681
13682
13683
13684
13685
13686
13687
13688
13689
13690
13691
    },
    "minItems": 1,
    "type": "array"
  },
  {
    "default": "hosts",
    "maxLength": 64,
    "type": "string"
  }
],
},
"rt": {
  "description": "Resource Type of the Resource",
  "items": {
    "maxLength": 64,
    "type": "string"
  },
  "minItems": 1,
  "type": "array"
},
"title": {
  "description": "A title for the link relation. Can be used by the UI to provide a context.",
  "maxLength": 64,
  "type": "string"
},
"type": {
  "default": "application/cbor",
  "description": "A hint at the representation of the resource referenced by the target URI. This represents the media types that are used for both accepting and emitting.",
  "items": {
    "maxLength": 64,
    "type": "string"
  },
  "minItems": 1,
  "type": "array"
},
"required": [
  "href",
  "rt",
  "if"
],
  "type": "object"
},
  "type": "array"
},
"sceneValues" :
  [
    {
      "description": "All available scene values",
      "items": {
        "type": "string"
      },
      "readOnly": true,
      "type": "array"
    },
    "n" :
      {
        "description": "Friendly name of the resource",
        "maxLength": 64,
        "readOnly": true,
        "type": "string"
      },
    "rts" :
      [
        {
          "description": "Resource Type of the Resource",
          "items": {
            "maxLength": 64,

```

```

13692         "type": "string"
13693     },
13694     "minItems": 1,
13695     "readOnly": true,
13696     "type": "array"
13697   },
13698
13699   "id" :
13700   {
13701     "description": "Instance ID of this specific resource",
13702     "maxLength": 64,
13703     "readonly": true,
13704     "type": "string"
13705   },
13706
13707   "if" :
13708   {
13709     "description": "The interface set supported by this resource",
13710     "items": [
13711       "enum": [
13712         "oic.if.baseline",
13713         "oic.if.ll",
13714         "oic.if.b",
13715         "oic.if.lb",
13716         "oic.if.rw",
13717         "oic.if.r",
13718         "oic.if.a",
13719         "oic.if.s"
13720       ],
13721       "type": "string"
13722     },
13723     "minItems": 1,
13724     "readOnly": true,
13725     "type": "array"
13726   }
13727
13728 }
13729
13730
13731 "SceneCollectionUpdate" : {
13732   "properties": {
13733     "rt" :
13734     {
13735       "description": "Resource Type of the Resource",
13736       "items": [
13737         "maxLength": 64,
13738         "type": "string"
13739       ],
13740       "minItems": 1,
13741       "readOnly": true,
13742       "type": "array"
13743     },
13744
13745     "lastScene" :
13746     {
13747       "description": "last selected Scene from the set of sceneValues",
13748       "type": "string"
13749     },
13750
13751     "n" :
13752     {
13753       "description": "Friendly name of the resource",
13754       "maxLength": 64,
13755       "readOnly": true,
13756       "type": "string"
13757     },
13758
13759     "id" :
13760     {
13761       "description": "Instance ID of this specific resource",
13762       "maxLength": 64,

```

```

13763     "readOnly": true,
13764     "type": "string"
13765   },
13766
13767   "if" :
13768   {
13769     "description": "The interface set supported by this resource",
13770     "items": {
13771       "enum": [
13772         "oic.if.baseline",
13773         "oic.if.ll",
13774         "oic.if.b",
13775         "oic.if.lb",
13776         "oic.if.rw",
13777         "oic.if.r",
13778         "oic.if.a",
13779         "oic.if.s"
13780       ],
13781       "type": "string"
13782     },
13783     "minItems": 1,
13784     "readOnly": true,
13785     "type": "array"
13786   }
13787
13788 }
13789
13790   "uuid" :
13791   {
13792     "description": "Format pattern according to IETF RFC 4122.",
13793     "pattern": "^[a-fA-F0-9]{8}-[a-fA-F0-9]{4}-[a-fA-F0-9]{4}-[a-fA-F0-9]{12}$",
13794     "type": "string"
13795   }
13796
13797   "oic.collection.properties" :
13798   {
13799     "description": "A collection is a set of links along with additional properties to describe
the collection itself",
13800     "properties": {
13801       "rts": {
13802         "$ref": "#/definitions/oic.core/properties/rt",
13803         "description": "The list of allowable resource types (for Target and anchors) in links
included in the collection"
13804       }
13805     },
13806     "type": "object"
13807   }
13808
13809
13810   "oic.core" :
13811   {
13812     "properties": {
13813       "rt": {
13814         "description": "Resource Type of the Resource",
13815         "items": {
13816           "maxLength": 64,
13817           "type": "string"
13818         },
13819         "minItems": 1,
13820         "readOnly": true,
13821         "type": "array"
13822       }
13823     },
13824     "type": "object"
13825   }
13826
13827
13828   "oic.collection.linksexpanded" :
13829   {
13830     "properties": {
13831       "links": {
13832         "description": "A set of simple or individual OIC Links.",
13833         "items": {

```

```

13834     "properties": {
13835         "anchor": {
13836             "description": "This is used to override the context URI e.g. override the URI of
13837             the containing collection.",
13838             "format": "uri",
13839             "maxLength": 256,
13840             "type": "string"
13841         },
13842         "di": {
13843             "description": "Format pattern according to IETF RFC 4122.",
13844             "pattern": "^{a-fA-F0-9}{8}-{a-fA-F0-9}{4}-{a-fA-F0-9}{4}-{a-fA-F0-9}{4}-{a-fA-F0-
13845 9}{12}$",
13846             "type": "string"
13847         },
13848         "eps": {
13849             "description": "the Endpoint information of the target Resource",
13850             "items": {
13851                 "properties": {
13852                     "ep": {
13853                         "description": "Transport Protocol Suite + Endpoint Locator",
13854                         "format": "uri",
13855                         "type": "string"
13856                     },
13857                     "pri": {
13858                         "description": "The priority among multiple Endpoints",
13859                         "minimum": 1,
13860                         "type": "integer"
13861                     }
13862                 },
13863                 "type": "object"
13864             },
13865             "type": "array"
13866         },
13867         "href": {
13868             "description": "This is the target URI, it can be specified as a Relative Reference
13869             or fully-qualified URI.",
13870             "format": "uri",
13871             "maxLength": 256,
13872             "type": "string"
13873         },
13874         "if": {
13875             "description": "The interface set supported by this resource",
13876             "items": {
13877                 "enum": [
13878                     "oic.if.baseline",
13879                     "oic.if.ll",
13880                     "oic.if.b",
13881                     "oic.if.rw",
13882                     "oic.if.r",
13883                     "oic.if.a",
13884                     "oic.if.s"
13885                 ],
13886                 "type": "string"
13887             },
13888             "minItems": 1,
13889             "type": "array"
13890         },
13891         "ins": {
13892             "description": "The instance identifier for this web link in an array of web links
13893             - used in collections",
13894             "type": "integer"
13895         },
13896         "p": {
13897             "description": "Specifies the framework policies on the Resource referenced by the
13898             target URI",
13899             "properties": {
13900                 "bm": {
13901                     "description": "Specifies the framework policies on the Resource referenced by
13902                     the target URI for e.g. observable and discoverable",
13903                     "type": "integer"
13904                 }
13905             }
13906         }
13907     }
13908 }
```

```

13905      },
13906      "required": [
13907          "bm"
13908      ],
13909      "type": "object"
13910  },
13911  "rel": {
13912      "description": "The relation of the target URI referenced by the link to the
context URI",
13913  },
13914  "oneOf": [
13915      {
13916          "default": [
13917              "hosts"
13918          ],
13919          "items": {
13920              "maxLength": 64,
13921              "type": "string"
13922          },
13923          "minItems": 1,
13924          "type": "array"
13925      },
13926      {
13927          "default": "hosts",
13928          "maxLength": 64,
13929          "type": "string"
13930      }
13931  ],
13932 },
13933 "rt": {
13934     "description": "Resource Type of the Resource",
13935     "items": {
13936         "maxLength": 64,
13937         "type": "string"
13938     },
13939     "minItems": 1,
13940     "type": "array"
13941 },
13942 "title": {
13943     "description": "A title for the link relation. Can be used by the UI to provide a
context.",
13944     "maxLength": 64,
13945     "type": "string"
13946 },
13947 },
13948 "type": {
13949     "default": "application/cbor",
13950     "description": "A hint at the representation of the resource referenced by the
target URI. This represents the media types that are used for both accepting and emitting.",
13951     "items": {
13952         "maxLength": 64,
13953         "type": "string"
13954     },
13955     "minItems": 1,
13956     "type": "array"
13957 },
13958 },
13959 },
13960 "required": [
13961     "href",
13962     "rt",
13963     "if"
13964 ],
13965     "type": "object"
13966 },
13967     "type": "array"
13968 },
13969 },
13970     "type": "object"
13971 },
13972 },
13973     "oic.collection.links" :
13974     {
13975         "properties": {

```

```

13976     "links": {
13977         "description": "A set of simple or individual OIC Links.",
13978         "items": {
13979             "$ref": "#/definitions/oic.oic-link"
13980         },
13981         "type": "array"
13982     }
13983 },
13984     "type": "object"
13985 }
13986
13987     "oic.oic-link" :
13988     {
13989         "properties": {
13990             "anchor": {
13991                 "description": "This is used to override the context URI e.g. override the URI of the
containing collection.",
13992                 "format": "uri",
13993                 "maxLength": 256,
13994                 "type": "string"
13995             },
13996             "di": {
13997                 "$ref": "#/definitions/uuid",
13998                 "description": "The device ID"
13999             },
14000             "eps": {
14001                 "description": "the Endpoint information of the target Resource",
14002                 "items": {
14003                     "properties": {
14004                         "ep": {
14005                             "description": "Transport Protocol Suite + Endpoint Locator",
14006                             "format": "uri",
14007                             "type": "string"
14008                         },
14009                         "pri": {
14010                             "description": "The priority among multiple Endpoints",
14011                             "minimum": 1,
14012                             "type": "integer"
14013                         }
14014                     },
14015                 },
14016                 "type": "object"
14017             },
14018             "type": "array"
14019         },
14020             "href": {
14021                 "description": "This is the target URI, it can be specified as a Relative Reference or
fully-qualified URI.",
14022                 "format": "uri",
14023                 "maxLength": 256,
14024                 "type": "string"
14025             },
14026             "if": {
14027                 "description": "The interface set supported by this resource",
14028                 "items": {
14029                     "enum": [
14030                         "oic.if.baseline",
14031                         "oic.if.ll",
14032                         "oic.if.b",
14033                         "oic.if.rw",
14034                         "oic.if.r",
14035                         "oic.if.a",
14036                         "oic.if.s"
14037                     ],
14038                     "type": "string"
14039                 },
14040                 "minItems": 1,
14041                 "type": "array"
14042             },
14043             "ins": {
14044                 "description": "The instance identifier for this web link in an array of web links - used
in collections",
14045             }
14046

```

```

14047      "type": "integer"
14048    },
14049    "p": {
14050      "description": "Specifies the framework policies on the Resource referenced by the target
14051      URI",
14052      "properties": {
14053        "bm": {
14054          "description": "Specifies the framework policies on the Resource referenced by the target
14055          URI for e.g. observable and discoverable",
14056          "type": "integer"
14057        }
14058      },
14059      "required": [
14060        "bm"
14061      ],
14062      "type": "object"
14063    },
14064    "rel": {
14065      "description": "The relation of the target URI referenced by the link to the context
14066      URI",
14067      "oneOf": [
14068        {
14069          "default": [
14070            "hosts"
14071          ],
14072          "items": {
14073            "maxLength": 64,
14074            "type": "string"
14075          },
14076          "minItems": 1,
14077          "type": "array"
14078        },
14079        {
14080          "default": "hosts",
14081          "maxLength": 64,
14082          "type": "string"
14083        }
14084      ],
14085    },
14086    "rt": {
14087      "description": "Resource Type of the Resource",
14088      "items": {
14089        "maxLength": 64,
14090        "type": "string"
14091      },
14092      "minItems": 1,
14093      "type": "array"
14094    },
14095    "title": {
14096      "description": "A title for the link relation. Can be used by the UI to provide a
14097      context.",
14098      "maxLength": 64,
14099      "type": "string"
14100    },
14101    "type": {
14102      "default": "application/cbor",
14103      "description": "A hint at the representation of the resource referenced by the target
14104      URI. This represents the media types that are used for both accepting and emitting.",
14105      "items": {
14106        "maxLength": 64,
14107        "type": "string"
14108      },
14109      "minItems": 1,
14110      "type": "array"
14111    }
14112  },
14113  "required": [
14114    "href",
14115    "rt",
14116    "if"
14117  ],

```

```

14118     "type": "object"
14119   }
14120 }
14121 }
14122 }
14123 }
```

F.12.5 Property Definition

Property name	Value type	Mandatory	Access mode	Description
n	string		Read Only	Friendly name of the resource
if	array: see schema		Read Only	The interface set supported by this resource
id	string		Read Only	Instance ID of this specific resource
lastScene	string			Last selected Scene from the set of sceneValues
rt	array: see schema		Read Only	Resource Type of the Resource
rts	multiple types: see schema			The list of allowable resource types (for Target and anchors) in links included in the collection
rel	multiple types: see schema			The relation of the target URI referenced by the link to the context URI
eps	array: see schema			the Endpoint information of the target Resource
p	object: see schema			Specifies the framework policies on the Resource referenced by the target URI
di	multiple types: see schema			The device ID
rt	array: see schema	yes		Resource Type of the Resource
ins	integer			The instance identifier for this web link in an array of web links - used in collections
type	array: see schema			A hint at the representation of

				the resource referenced by the target URI. This represents the media types that are used for both accepting and emitting.
title	string			A title for the link relation. Can be used by the UI to provide a context.
if	array: schema	see	yes	The interface set supported by this resource
anchor	string			This is used to override the context URI e.g. override the URI of the containing collection.
href	string	yes		This is the target URI, it can be specified as a Relative Reference or fully-qualified URI.
links	array: schema	see		A set of simple or individual OIC Links.
rt	array: schema	see	Read Only	Resource Type of the Resource
links	array: schema	see		A set of simple or individual OIC Links.
n	string		Read Only	Friendly name of the resource
if	array: schema	see	yes	The interface set supported by this resource
lastScene	string			Last selected Scene from the set of sceneValues
rt	array: schema	see	yes	Resource Type of the Resource
id	string		Read Only	Instance ID of this specific resource
rts	array: schema	see	Read Only	Resource Type of the Resource
sceneValues	array: schema	see	Read Only	All available scene values

n	string		Read Only	Friendly name of the resource
SceneMappings	array: see schema			array of mappings per scene, can be one(1)
rt	array: see schema		Read Only	Resource Type of the Resource
link	multiple types: see schema			
id	string		Read Only	Instance ID of this specific resource
if	array: see schema		Read Only	The interface set supported by this resource
links	array: see schema			A set of simple or individual OIC Links.
links	array: see schema			A set of simple or individual OIC Links.

14125

F.12.6 CRUDN behaviour

Resource	Create	Read	Update	Delete	Notify
/SceneListResURI		get			

14126

F.13 Scene Collection

14127

F.13.1 Introduction

14128
14129
14130
14131
14132
14133
14134
14135

Collection that models a set of Scenes. This resource is a generic collection resource with additional parameters. The rts value shall contain oic.scenemember resource types. The additional parameters are lastScene, this is the scene value last set by any OCF Client sceneValues, this is the list of available scenes lastScene shall be listed in sceneValues.

14136

F.13.2 Example URI

14137

/SceneCollectionResURI

14138

F.13.3 Resource Type

14139

The resource type (rt) is defined as: ['oic.wk.scenecollection'].

14140

F.13.4 Swagger2.0 Definition

14141
14142
14143
14144
14145
14146
14147
14148
14149
14150
14151
14152

```
{
  "swagger": "2.0",
  "info": {
    "title": "Scenes (Top level)",
    "version": "v1-20160622",
    "license": {
      "name": "copyright 2016-2017 Open Connectivity Foundation, Inc. All rights reserved.",
      "x-description": "Redistribution and use in source and binary forms, with or without modification, are permitted provided that the following conditions are met:\n        1. Redistributions of source code must retain the above copyright notice, this list of conditions and the following disclaimer.\n        2. Redistributions in binary form must reproduce the above copyright notice, this list of conditions and the following disclaimer in the documentation and/or
```

```

14153 other materials provided with the distribution.\n\n      THIS SOFTWARE IS PROVIDED BY THE Open
14154 Connectivity Foundation, INC. \"AS IS\" AND ANY EXPRESS OR IMPLIED WARRANTIES, INCLUDING, BUT NOT
14155 LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE OR
14156 WARRANTIES OF NON-INFRINGEMENT, ARE DISCLAIMED.\n      IN NO EVENT SHALL THE Open Connectivity
14157 Foundation, INC. OR CONTRIBUTORS BE LIABLE FOR ANY DIRECT, INDIRECT, INCIDENTAL, SPECIAL,
14158 EXEMPLARY, OR CONSEQUENTIAL DAMAGES (INCLUDING, BUT NOT LIMITED TO, PROCUREMENT OF SUBSTITUTE GOODS
14159 OR SERVICES; LOSS OF USE, DATA, OR PROFITS; OR BUSINESS INTERRUPTION)\n      HOWEVER CAUSED AND
14160 ON ANY THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT (INCLUDING NEGLIGENCE OR
14161 OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OF THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY
14162 OF SUCH DAMAGE.\n"
14163     }
14164   },
14165   "schemes": ["http"],
14166   "consumes": ["application/json"],
14167   "produces": ["application/json"],
14168   "paths": {
14169     "/SceneListResURI" : {
14170       "get": {
14171         "description": "Toplevel Scene resource.\nThis resource is a generic collection
14172         resource.\n\nThe rts value shall contain oic.wk.scenecollection resource types.\n\nProvides the current
14173         list of web links pointing to scenes\n",
14174         "parameters": [
14175           ],
14176         "responses": {
14177           "200": {
14178             "description" : "",
14179             "x-example":
14180               {
14181                 "rt":      ["oic.wk.scenelist"],
14182                 "n":       "list of scene Collections",
14183                 "rts":    ["oic.wk.scenecollection"],
14184                 "links": [
14185                   ]
14186                 }
14187               ,
14188             "schema": { "$ref": "#/definitions/Collection" }
14189           }
14190         }
14191       }
14192     },
14193     "/SceneMemberResURI" : {
14194       "get": {
14195         "description": "Collection that models a scene member.\nProvides the scene member\n",
14196         "parameters": [
14197           ],
14198         "responses": {
14199           "200": {
14200             "description" : "",
14201             "x-example":
14202               {
14203                 "rt": ["oic.wk.scenemember"],
14204                 "id": "06858960-FFFF-46F7-BEC0-9E6234671ADC1",
14205                 "n": "my binary switch (for light bulb) mappings",
14206                 "link": [
14207                   "href": "binarySwitch",
14208                   "rt":  ["oic.r.switch.binary"],
14209                   "if":  ["oic.if.a", "oic.if.baseline"],
14210                   "eps": [
14211                     {"ep": "coap://[fe80::b1d6]:1111", "pri": 2},
14212                     {"ep": "coaps://[fe80::b1d6]:1122"},
14213                     {"ep": "coap+tcp://[2001:db8:a::123]:2222", "pri": 3}
14214                   ]
14215                 },
14216                 "sceneMappings": [
14217                   {
14218                     "scene":          "off",
14219                     "memberProperty": "value",
14220                     "memberValue":    true
14221                   },
14222                   {
14223                     "scene":          "Reading",

```

```

14224         "memberProperty": "value",
14225         "memberValue": false
14226     },
14227     {
14228         "scene": "TVWatching",
14229         "memberProperty": "value",
14230         "memberValue": true
14231     }
14232   ]
14233 }
14234
14235   "schema": { "$ref": "#/definitions/SceneMember" }
14236 }
14237 }
14238 }
14239 },
14240 "/SceneCollectionResURI" :
14241   "get": {
14242     "description": "Collection that models a set of Scenes.\nThis resource is a generic
14243 collection resource with additional parameters.\nThe rts value shall contain oic.scenemember
14244 resource types.\nThe additional parameters are\n  lastScene, this is the scene value last set by
14245 any OCF Client\n  sceneValues, this is the list of available scenes\n  lastScene shall be listed in
14246 sceneValues.\nProvides the current list of web links pointing to scenes\n",
14247     "parameters": [
14248     ],
14249     "responses": {
14250       "200": {
14251         "description": "",
14252         "x-example": {
14253           "lastScene": "off",
14254           "sceneValues": ["off", "Reading", "TVWatching"],
14255           "rt": ["oic.wk.scenecollection"],
14256           "n": "My Scenes for my living room",
14257           "id": "0685B960-736F-46F7-BEC0-9E6CBD671ADC1",
14258           "rts": ["oic.wk.scenemember"],
14259           "links": [
14260             ...
14261           ]
14262         }
14263       }
14264     },
14265     "schema": { "$ref": "#/definitions/SceneCollection" }
14266   }
14267 }
14268 },
14269   "post": {
14270     "description": "Provides the action to change the last set scene selection.\nCalling this
14271 method shall update all scene members to the prescribed membervalue.\nWhen this method is called
14272 with the same value as the current lastScene value\nthen all scene members shall be updated.\n",
14273     "parameters": [
14274       {
14275         "name": "body",
14276         "in": "body",
14277         "required": true,
14278         "schema": { "$ref": "#/definitions/SceneCollectionUpdate" },
14279         "x-example": {
14280           "lastScene": "Reading"
14281         }
14282       }
14283     ],
14284     "responses": {
14285       "200": {
14286         "description": "Indicates that the value is changed.\nThe changed properties are
14287 provided in the response.\n",
14288         "x-example": {
14289           "lastScene": "Reading"
14290         }
14291       }
14292     },
14293     "schema": { "$ref": "#/definitions/SceneCollectionUpdate" }
14294   }

```

```

14295         }
14296     }
14297   }
14298 },
14299 "parameters": {
14300   "interface" : {
14301     "in" : "query",
14302     "name" : "if",
14303     "type" : "string",
14304     "enum" : ["oic.if.a", "oic.if.ll", "oic.if.baseline"]
14305   }
14306 },
14307 "definitions": {
14308   "Collection" : {
14309     "properties": {
14310       "links" :
14311         {
14312           "description": "A set of simple or individual OIC Links.",
14313           "items": {
14314             "$ref": "#/definitions/oic.oic-link"
14315           },
14316           "type": "array"
14317         }
14318       }
14319     }
14320   }
14321 ,
14322 "SceneMember" : {
14323   "properties": {
14324     "rt" :
14325       {
14326         "description": "Resource Type of the Resource",
14327         "items": {
14328           "maxLength": 64,
14329           "type": "string"
14330         },
14331           "minItems": 1,
14332           "readOnly": true,
14333           "type": "array"
14334         },
14335
14336     "SceneMappings" :
14337       {
14338         "description": "array of mappings per scene, can be one(1)",
14339         "items": {
14340           "properties": {
14341             "memberProperty": {
14342               "description": "property name that will be mapped",
14343               "readonly": true,
14344               "type": "string"
14345             },
14346             "memberValue": {
14347               "description": "value of the Member Property",
14348               "readOnly": true,
14349               "type": "string"
14350             },
14351             "scene": {
14352               "description": "Specifies a scene value that will be acted upon",
14353               "type": "string"
14354             }
14355           },
14356           "required": [
14357             "scene",
14358             "memberProperty",
14359             "memberValue"
14360           ],
14361           "type": "object"
14362         },
14363           "type": "array"
14364         },
14365

```

```

14366     "n" :
14367         {
14368             "description": "Friendly name of the resource",
14369             "maxLength": 64,
14370             "readOnly": true,
14371             "type": "string"
14372         },
14373
14374     "link" :
14375         {
14376             "allOf": [
14377                 {
14378                     "properties": {
14379                         "anchor": {
14380                             "description": "This is used to override the context URI e.g. override the URI of
the containing collection.",
14381                             "format": "uri",
14382                             "maxLength": 256,
14383                             "type": "string"
14384                         },
14385                         "di": {
14386                             "allOf": [
14387                                 {
14388                                     "description": "Format pattern according to IETF RFC 4122.",
14389                                     "pattern": "^{a-fA-F0-9}{8}-{a-fA-F0-9}{4}-{a-fA-F0-9}{4}-{a-fA-F0-9}{4}-[{a-
14390 fA-F0-9}{12}]$",
14391                                     "type": "string"
14392                                 },
14393                                 {
14394                                     "description": "The device ID"
14395                                 }
14396                             ],
14397                         },
14398                         "eps": {
14399                             "description": "the Endpoint information of the target Resource",
14400                             "items": {
14401                                 "properties": {
14402                                     "ep": {
14403                                         "description": "Transport Protocol Suite + Endpoint Locator",
14404                                         "format": "uri",
14405                                         "type": "string"
14406                                     },
14407                                     "pri": {
14408                                         "description": "The priority among multiple Endpoints",
14409                                         "minimum": 1,
14410                                         "type": "integer"
14411                                     }
14412                                 },
14413                                 "type": "object"
14414                             },
14415                             "type": "array"
14416                         },
14417                         "href": {
14418                             "description": "This is the target URI, it can be specified as a Relative
Reference or fully-qualified URI.",
14419                             "format": "uri",
14420                             "maxLength": 256,
14421                             "type": "string"
14422                         },
14423                         "if": {
14424                             "description": "The interface set supported by this resource",
14425                             "items": {
14426                                 "enum": [
14427                                     "oic.if.baseline",
14428                                     "oic.if.ll",
14429                                     "oic.if.b",
14430                                     "oic.if.rw",
14431                                     "oic.if.r",
14432                                     "oic.if.a",
14433                                     "oic.if.s"
14434                                 ],
14435                             }
14436                         }
14437                     }
14438                 ]
14439             }
14440         }
14441     ],
14442     "type": "array"
14443   }
14444 }
```

```

14437         "type": "string"
14438     },
14439     "minItems": 1,
14440     "type": "array"
14441   },
14442   "ins": {
14443     "description": "The instance identifier for this web link in an array of web
14444     links - used in collections",
14445     "type": "integer"
14446   },
14447   "p": {
14448     "description": "Specifies the framework policies on the Resource referenced by
14449     the target URI",
14450     "properties": {
14451       "bm": {
14452         "description": "Specifies the framework policies on the Resource referenced
14453         by the target URI for e.g. observable and discoverable",
14454         "type": "integer"
14455       }
14456     },
14457     "required": [
14458       "bm"
14459     ],
14460     "type": "object"
14461   },
14462   "rel": {
14463     "description": "The relation of the target URI referenced by the link to the
14464     context URI",
14465     "oneOf": [
14466       {
14467         "default": [
14468           "hosts"
14469         ],
14470         "items": {
14471           "maxLength": 64,
14472           "type": "string"
14473         },
14474         "minItems": 1,
14475         "type": "array"
14476       },
14477       {
14478         "default": "hosts",
14479         "maxLength": 64,
14480         "type": "string"
14481       }
14482     ]
14483   },
14484   "rt": {
14485     "description": "Resource Type of the Resource",
14486     "items": {
14487       "maxLength": 64,
14488       "type": "string"
14489     },
14490     "minItems": 1,
14491     "type": "array"
14492   },
14493   "title": {
14494     "description": "A title for the link relation. Can be used by the UI to provide a
14495     context.",
14496     "maxLength": 64,
14497     "type": "string"
14498   },
14499   "type": {
14500     "default": "application/cbor",
14501     "description": "A hint at the representation of the resource referenced by the
14502     target URI. This represents the media types that are used for both accepting and emitting.",
14503     "items": {
14504       "maxLength": 64,
14505       "type": "string"
14506     },
14507     "minItems": 1,

```

```

14508         "type": "array"
14509     }
14510   },
14511   "required": [
14512     "href",
14513     "rt",
14514     "if"
14515   ],
14516   "type": "object"
14517 },
14518 {
14519   "description": "OCF link that points to a resource"
14520 }
14521 ]
14522 },
14523
14524
14525   "id" :
14526     {
14527       "description": "Instance ID of this specific resource",
14528       "maxLength": 64,
14529       "readOnly": true,
14530       "type": "string"
14531     },
14532
14533   "if" :
14534     {
14535       "description": "The interface set supported by this resource",
14536       "items": {
14537         "enum": [
14538           "oic.if.baseline",
14539           "oic.if.ll",
14540           "oic.if.b",
14541           "oic.if.lb",
14542           "oic.if.rw",
14543           "oic.if.r",
14544           "oic.if.a",
14545           "oic.if.s"
14546         ],
14547         "type": "string"
14548       },
14549       "minItems": 1,
14550       "readOnly": true,
14551       "type": "array"
14552     }
14553   }
14554 }
14555
14556   "SceneCollection" : {
14557     "properties": {
14558       "rt" :
14559         {
14560           "description": "Resource Type of the Resource",
14561           "items": {
14562             "maxLength": 64,
14563             "type": "string"
14564           },
14565           "minItems": 1,
14566           "readOnly": true,
14567           "type": "array"
14568         },
14569
14570       "lastScene" :
14571         {
14572           "description": "Last selected Scene from the set of sceneValues",
14573           "type": "string"
14574         },
14575
14576       "links" :
14577         {
14578           "description": "A set of simple or individual OIC Links."

```

```

14579     "items": {
14580         "properties": {
14581             "anchor": {
14582                 "description": "This is used to override the context URI e.g. override the URI of
14583                 the containing collection.",
14584                 "format": "uri",
14585                 "maxLength": 256,
14586                 "type": "string"
14587             },
14588             "di": {
14589                 "description": "Format pattern according to IETF RFC 4122.",
14590                 "pattern": "^[a-fA-F0-9]{8}-[a-fA-F0-9]{4}-[a-fA-F0-9]{4}-[a-fA-F0-
14591 9]{12}$",
14592                 "type": "string"
14593             },
14594             "eps": {
14595                 "description": "the Endpoint information of the target Resource",
14596                 "items": {
14597                     "properties": {
14598                         "ep": {
14599                             "description": "Transport Protocol Suite + Endpoint Locator",
14600                             "format": "uri",
14601                             "type": "string"
14602                         },
14603                         "pri": {
14604                             "description": "The priority among multiple Endpoints",
14605                             "minimum": 1,
14606                             "type": "integer"
14607                         }
14608                     },
14609                     "type": "object"
14610                 },
14611                 "type": "array"
14612             },
14613             "href": {
14614                 "description": "This is the target URI, it can be specified as a Relative Reference
14615                 or fully-qualified URI.",
14616                 "format": "uri",
14617                 "maxLength": 256,
14618                 "type": "string"
14619             },
14620             "if": {
14621                 "description": "The interface set supported by this resource",
14622                 "items": {
14623                     "enum": [
14624                         "oic.if.baseline",
14625                         "oic.if.ll",
14626                         "oic.if.b",
14627                         "oic.if.rw",
14628                         "oic.if.r",
14629                         "oic.if.a",
14630                         "oic.if.s"
14631                     ],
14632                     "type": "string"
14633                 },
14634                 "minItems": 1,
14635                 "type": "array"
14636             },
14637             "ins": {
14638                 "description": "The instance identifier for this web link in an array of web links
14639                 - used in collections",
14640                 "type": "integer"
14641             },
14642             "p": {
14643                 "description": "Specifies the framework policies on the Resource referenced by the
14644                 target URI",
14645                 "properties": {
14646                     "bm": {
14647                         "description": "Specifies the framework policies on the Resource referenced by
14648                         the target URI for e.g. observable and discoverable",
14649                         "type": "integer"
14650                     }
14651                 }
14652             }
14653         }
14654     }
14655 }
```

```

14650         }
14651     },
14652     "required": [
14653       "bm"
14654     ],
14655     "type": "object"
14656   },
14657   "rel": {
14658     "description": "The relation of the target URI referenced by the link to the
context URI",
14659   "oneOf": [
14660     {
14661       "default": [
14662         "hosts"
14663       ],
14664       "items": {
14665         "maxLength": 64,
14666         "type": "string"
14667       },
14668       "minItems": 1,
14669       "type": "array"
14670     },
14671     {
14672       "default": "hosts",
14673       "maxLength": 64,
14674       "type": "string"
14675     }
14676   ]
14677 },
14678 },
14679 "rt": {
14680   "description": "Resource Type of the Resource",
14681   "items": {
14682     "maxLength": 64,
14683     "type": "string"
14684   },
14685   "minItems": 1,
14686   "type": "array"
14687 },
14688   "title": {
14689     "description": "A title for the link relation. Can be used by the UI to provide a
context.",
14690     "maxLength": 64,
14691     "type": "string"
14692   },
14693   "type": {
14694     "default": "application/cbor",
14695     "description": "A hint at the representation of the resource referenced by the
target URI. This represents the media types that are used for both accepting and emitting.",
14696     "items": {
14697       "maxLength": 64,
14698       "type": "string"
14699     },
14700     "minItems": 1,
14701     "type": "array"
14702   }
14703 },
14704 },
14705 },
14706 "required": [
14707   "href",
14708   "rt",
14709   "if"
14710 ],
14711   "type": "object"
14712 },
14713   "type": "array"
14714 },
14715 "sceneValues" :
14716   [
14717     {
14718       "description": "All available scene values",
14719       "items": {
14720         "type": "string"
14721       }
14722     }
14723   ]
14724 }

```

```

14721     },
14722     "readOnly": true,
14723     "type": "array"
14724   },
14725
14726   "n" :
14727   {
14728     "description": "Friendly name of the resource",
14729     "maxLength": 64,
14730     "readOnly": true,
14731     "type": "string"
14732   },
14733
14734   "rts" :
14735   {
14736     "description": "Resource Type of the Resource",
14737     "items": {
14738       "maxLength": 64,
14739       "type": "string"
14740     },
14741     "minItems": 1,
14742     "readOnly": true,
14743     "type": "array"
14744   },
14745
14746   "id" :
14747   {
14748     "description": "Instance ID of this specific resource",
14749     "maxLength": 64,
14750     "readOnly": true,
14751     "type": "string"
14752   },
14753
14754   "if" :
14755   {
14756     "description": "The interface set supported by this resource",
14757     "items": {
14758       "enum": [
14759         "oic.if.baseline",
14760         "oic.if.ll",
14761         "oic.if.b",
14762         "oic.if.lb",
14763         "oic.if.rw",
14764         "oic.if.r",
14765         "oic.if.a",
14766         "oic.if.s"
14767       ],
14768       "type": "string"
14769     },
14770     "minItems": 1,
14771     "readonly": true,
14772     "type": "array"
14773   }
14774
14775 }
14776
14777
14778   "SceneCollectionUpdate" : {
14779     "properties": {
14780       "rt" :
14781       {
14782         "description": "Resource Type of the Resource",
14783         "items": {
14784           "maxLength": 64,
14785           "type": "string"
14786         },
14787         "minItems": 1,
14788         "readOnly": true,
14789         "type": "array"
14790       },
14791

```

```

14792     "lastScene" :
14793         {
14794             "description": "Last selected Scene from the set of sceneValues",
14795             "type": "string"
14796         },
14797     "n" :
14798         {
14799             "description": "Friendly name of the resource",
14800             "maxLength": 64,
14801             "readOnly": true,
14802             "type": "string"
14803         },
14804     "id" :
14805         {
14806             "description": "Instance ID of this specific resource",
14807             "maxLength": 64,
14808             "readOnly": true,
14809             "type": "string"
14810         },
14811     "if" :
14812         {
14813             "description": "The interface set supported by this resource",
14814             "items": {
14815                 "enum": [
14816                     "oic.if.baseline",
14817                     "oic.if.ll",
14818                     "oic.if.b",
14819                     "oic.if.lb",
14820                     "oic.if.rw",
14821                     "oic.if.r",
14822                     "oic.if.a",
14823                     "oic.if.s"
14824                 ],
14825                 "type": "string"
14826             },
14827             "minItems": 1,
14828             "readOnly": true,
14829             "type": "array"
14830         }
14831     },
14832     "uuid" :
14833     {
14834         "description": "Format pattern according to IETF RFC 4122.",
14835         "pattern": "^[a-fA-F0-9]{8}-[a-fA-F0-9]{4}-[a-fA-F0-9]{4}-[a-fA-F0-9]{12}$",
14836         "type": "string"
14837     }
14838     ,
14839     "oic.collection.properties" :
14840     {
14841         "description": "A collection is a set of links along with additional properties to describe
the collection itself",
14842         "properties": {
14843             "rts" :
14844                 {
14845                     "$ref": "#/definitions/oic.core/properties/rt",
14846                     "description": "The list of allowable resource types (for Target and anchors) in links
included in the collection"
14847                 }
14848             },
14849             "type": "object"
14850         }
14851     ,
14852     "oic.core" :
14853     {
14854         "properties": {
14855             "rt" :
14856                 {
14857                     "description": "Resource Type of the Resource",
14858                 }
14859             }
14860         }
14861     }
14862 
```

```

14863     "items": {
14864         "maxLength": 64,
14865         "type": "string"
14866     },
14867     "minItems": 1,
14868     "readOnly": true,
14869     "type": "array"
14870 }
14871 },
14872 "type": "object"
14873 }
14874
14875 , "oic.collection.linksexpanded" :
14876 {
14877     "properties": {
14878         "links": {
14879             "description": "A set of simple or individual OIC Links.",
14880             "items": {
14881                 "properties": {
14882                     "anchor": {
14883                         "description": "This is used to override the context URI e.g. override the URI of
the containing collection.",
14884                         "format": "uri",
14885                         "maxLength": 256,
14886                         "type": "string"
14887                     },
14888                     "di": {
14889                         "description": "Format pattern according to IETF RFC 4122.",
14890                         "pattern": "^[a-fA-F0-9]{8}-[a-fA-F0-9]{4}-[a-fA-F0-9]{4}-[a-fA-F0-
14891 9]{12}$",
14892                     },
14893                     "type": "string"
14894                 },
14895                 "eps": {
14896                     "description": "the Endpoint information of the target Resource",
14897                     "items": {
14898                         "properties": {
14899                             "ep": {
14900                                 "description": "Transport Protocol Suite + Endpoint Locator",
14901                                 "format": "uri",
14902                                 "type": "string"
14903                             },
14904                             "pri": {
14905                                 "description": "The priority among multiple Endpoints",
14906                                 "minimum": 1,
14907                                 "type": "integer"
14908                             }
14909                         },
14910                         "type": "object"
14911                     },
14912                     "type": "array"
14913                 },
14914                 "href": {
14915                     "description": "This is the target URI, it can be specified as a Relative Reference
or fully-qualified URI.",
14916                     "format": "uri",
14917                     "maxLength": 256,
14918                     "type": "string"
14919                 },
14920                 "if": {
14921                     "description": "The interface set supported by this resource",
14922                     "items": {
14923                         "enum": [
14924                             "oic.if.baseline",
14925                             "oic.if.ll",
14926                             "oic.if.b",
14927                             "oic.if.rw",
14928                             "oic.if.r",
14929                             "oic.if.a",
14930                             "oic.if.s"
14931                         ],
14932                     },
14933                     "type": "string"

```

```

14934      },
14935      "minItems": 1,
14936      "type": "array"
14937    },
14938    "ins": {
14939      "description": "The instance identifier for this web link in an array of web links
14940      - used in collections",
14941      "type": "integer"
14942    },
14943    "p": {
14944      "description": "Specifies the framework policies on the Resource referenced by the
14945      target URI",
14946      "properties": {
14947        "bm": {
14948          "description": "Specifies the framework policies on the Resource referenced by
14949          the target URI for e.g. observable and discoverable",
14950          "type": "integer"
14951        }
14952      },
14953      "required": [
14954        "bm"
14955      ],
14956      "type": "object"
14957    },
14958    "rel": {
14959      "description": "The relation of the target URI referenced by the link to the
14960      context URI",
14961      "oneOf": [
14962        {
14963          "default": [
14964            "hosts"
14965          ],
14966          "items": [
14967            "maxLength": 64,
14968            "type": "string"
14969          ],
14970          "minItems": 1,
14971          "type": "array"
14972        },
14973        {
14974          "default": "hosts",
14975          "maxLength": 64,
14976          "type": "string"
14977        }
14978      ]
14979    },
14980    "rt": {
14981      "description": "Resource Type of the Resource",
14982      "items": [
14983        "maxLength": 64,
14984        "type": "string"
14985      ],
14986      "minItems": 1,
14987      "type": "array"
14988    },
14989    "title": {
14990      "description": "A title for the link relation. Can be used by the UI to provide a
14991      context.",
14992      "maxLength": 64,
14993      "type": "string"
14994    },
14995    "type": {
14996      "default": "application/cbor",
14997      "description": "A hint at the representation of the resource referenced by the
14998      target URI. This represents the media types that are used for both accepting and emitting.",
14999      "items": [
15000        "maxLength": 64,
15001        "type": "string"
15002      ],
15003      "minItems": 1,
15004      "type": "array"

```

```

15005         }
15006     },
15007     "required": [
15008       "href",
15009       "rt",
15010       "if"
15011     ],
15012     "type": "object"
15013   },
15014   "type": "array"
15015 }
15016 },
15017   "type": "object"
15018 }
15019
15020   "oic.collection.links" :
15021   {
15022     "properties": {
15023       "links": {
15024         "description": "A set of simple or individual OIC Links.",
15025         "items": {
15026           "$ref": "#/definitions/oic.oic-link"
15027         },
15028         "type": "array"
15029       }
15030     },
15031     "type": "object"
15032   }
15033
15034   "oic.oic-link" :
15035   {
15036     "properties": {
15037       "anchor": {
15038         "description": "This is used to override the context URI e.g. override the URI of the
containing collection.",
15039         "format": "uri",
15040         "maxLength": 256,
15041         "type": "string"
15042       },
15043       "di": {
15044         "$ref": "#/definitions/uuid",
15045         "description": "The device ID"
15046       },
15047       "eps": {
15048         "description": "the Endpoint information of the target Resource",
15049         "items": {
15050           "properties": {
15051             "ep": {
15052               "description": "Transport Protocol Suite + Endpoint Locator",
15053               "format": "uri",
15054               "type": "string"
15055             },
15056             "pri": {
15057               "description": "The priority among multiple Endpoints",
15058               "minimum": 1,
15059               "type": "integer"
15060             }
15061           }
15062         },
15063         "type": "object"
15064       },
15065       "type": "array"
15066     },
15067     "href": {
15068       "description": "This is the target URI, it can be specified as a Relative Reference or
fully-qualified URI.",
15069       "format": "uri",
15070       "maxLength": 256,
15071       "type": "string"
15072     },
15073     "if": {
15074       "description": "The interface set supported by this resource",
15075

```

```

15076
15077     "items": {
15078         "enum": [
15079             "oic.if.baseline",
15080             "oic.if.ll",
15081             "oic.if.b",
15082             "oic.if.rw",
15083             "oic.if.r",
15084             "oic.if.a",
15085             "oic.if.s"
15086         ],
15087         "type": "string"
15088     },
15089     "minItems": 1,
15090     "type": "array"
15091 },
15092     "ins": {
15093         "description": "The instance identifier for this web link in an array of web links - used
15094         in collections",
15095         "type": "integer"
15096     },
15097     "p": {
15098         "description": "Specifies the framework policies on the Resource referenced by the target
15099         URI",
15100         "properties": {
15101             "bm": {
15102                 "description": "Specifies the framework policies on the Resource referenced by the
15103                     target URI for e.g. observable and discoverable",
15104                 "type": "integer"
15105             },
15106             "required": [
15107                 "bm"
15108             ],
15109             "type": "object"
15110         },
15111         "rel": {
15112             "description": "The relation of the target URI referenced by the link to the context
15113         URI",
15114             "oneOf": [
15115                 {
15116                     "default": [
15117                         "hosts"
15118                     ],
15119                     "items": {
15120                         "maxLength": 64,
15121                         "type": "string"
15122                     },
15123                     "minItems": 1,
15124                     "type": "array"
15125                 },
15126                 {
15127                     "default": "hosts",
15128                     "maxLength": 64,
15129                     "type": "string"
15130                 }
15131             ],
15132         },
15133         "rt": {
15134             "description": "Resource Type of the Resource",
15135             "items": {
15136                 "maxLength": 64,
15137                 "type": "string"
15138             },
15139             "minItems": 1,
15140             "type": "array"
15141         },
15142         "title": {
15143             "description": "A title for the link relation. Can be used by the UI to provide a
15144             context.",
15145             "maxLength": 64,
15146             "type": "string"

```

```

15147     },
15148     "type": {
15149       "default": "application/cbor",
15150       "description": "A hint at the representation of the resource referenced by the target
15151   URI. This represents the media types that are used for both accepting and emitting.",
15152     "items": {
15153       "maxLength": 64,
15154       "type": "string"
15155     },
15156     "minItems": 1,
15157     "type": "array"
15158   }
15159 },
15160   "required": [
15161     "href",
15162     "rt",
15163     "if"
15164   ],
15165   "type": "object"
15166 }
15167 }
15168 }
15169 }
15170 }

```

F.13.5 Property Definition

Property name	Value type	Mandatory	Access mode	Description
id	string		Read Only	Instance ID of this specific resource
n	string		Read Only	Friendly name of the resource
SceneMappings	array: schema	see		array of mappings per scene, can be one(1)
if	array: schema	see	Read Only	The interface set supported by this resource
rt	array: schema	see	Read Only	Resource Type of the Resource
link	multiple types: see schema			
rt	array: schema	see	Read Only	Resource Type of the Resource
id	string		Read Only	Instance ID of this specific resource
links	array: schema	see		A set of simple or individual OIC Links.
sceneValues	array: schema	see	Read Only	All available scene values
n	string		Read Only	Friendly name of the resource
if	array: schema	see	yes	The interface set supported by this resource
rt	array: schema	see	yes	Resource Type of the Resource

lastScene	string			Last selected Scene from the set of sceneValues
rts	array: see schema		Read Only	Resource Type of the Resource
if	array: see schema	yes		The interface set supported by this resource
di	multiple types: see schema			The device ID
anchor	string			This is used to override the context URI e.g. override the URI of the containing collection.
href	string	yes		This is the target URI, it can be specified as a Relative Reference or fully-qualified URI.
rel	multiple types: see schema			The relation of the target URI referenced by the link to the context URI
eps	array: see schema			the Endpoint information of the target Resource
rt	array: see schema	yes		Resource Type of the Resource
type	array: see schema			A hint at the representation of the resource referenced by the target URI. This represents the media types that are used for both accepting and emitting.
title	string			A title for the link relation. Can be used by the UI to provide a context.
ins	integer			The instance identifier for this web link in an array of web links

				- used in collections
p	object: schema see			Specifies the framework policies on the Resource referenced by the target URI
links	array: schema see			A set of simple or individual OIC Links.
links	array: schema see			A set of simple or individual OIC Links.
id	string		Read Only	Instance ID of this specific resource
rt	array: schema see		Read Only	Resource Type of the Resource
if	array: schema see		Read Only	The interface set supported by this resource
lastScene	string			Last selected Scene from the set of sceneValues
n	string		Read Only	Friendly name of the resource
rts	multiple types: see schema			The list of allowable resource types (for Target and anchors) in links included in the collection
links	array: schema see			A set of simple or individual OIC Links.

15172 **F.13.6 CRUDN behaviour**

Resource	Create	Read	Update	Delete	Notify
/SceneCollectionResURI		get	post		

15173 **F.14 Scene Member**

15174 **F.14.1 Introduction**

15175 Collection that models a scene member.
15176

15177 **F.14.2 Example URI**

15178 /SceneMemberResURI

15179 **F.14.3 Resource Type**

15180 The resource type (rt) is defined as: ['oic.wk.scenemember'].

15181 **F.14.4 Swagger2.0 Definition**

```
15182 {
15183     "swagger": "2.0",
15184     "info": {
15185         "title": "Scenes (Top level)",
15186         "version": "v1-20160622",
15187         "license": {
15188             "name": "copyright 2016-2017 Open Connectivity Foundation, Inc. All rights reserved.",
15189             "x-description": "Redistribution and use in source and binary forms, with or without
15190 modification, are permitted provided that the following conditions are met:\n          1.
15191 Redistributions of source code must retain the above copyright notice, this list of conditions and
15192 the following disclaimer.\n          2. Redistributions in binary form must reproduce the above
15193 copyright notice, this list of conditions and the following disclaimer in the documentation and/or
15194 other materials provided with the distribution.\n\n          THIS SOFTWARE IS PROVIDED BY THE Open
15195 Connectivity Foundation, INC. \\"AS IS\\" AND ANY EXPRESS OR IMPLIED WARRANTIES, INCLUDING, BUT NOT
15196 LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE OR
15197 WARRANTIES OF NON-INFRINGEMENT, ARE DISCLAIMED.\n          IN NO EVENT SHALL THE Open Connectivity
15198 Foundation, INC. OR CONTRIBUTORS BE LIABLE FOR ANY DIRECT, INDIRECT, INCIDENTAL, SPECIAL,
15199 EXEMPLARY, OR CONSEQUENTIAL DAMAGES (INCLUDING, BUT NOT LIMITED TO, PROCUREMENT OF SUBSTITUTE GOODS
15200 OR SERVICES; LOSS OF USE, DATA, OR PROFITS; OR BUSINESS INTERRUPTION)\n          HOWEVER CAUSED AND
15201 ON ANY THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT (INCLUDING NEGLIGENCE OR
15202 OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OF THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY
15203 OF SUCH DAMAGE.\n"
15204     }
15205 },
15206     "schemes": ["http"],
15207     "consumes": ["application/json"],
15208     "produces": ["application/json"],
15209     "paths": {
15210         "/SceneListResURI" : {
15211             "get": {
15212                 "description": "Toplevel Scene resource.\nThis resource is a generic collection
15213 resource.\nThe rts value shall contain oic.wk.scenecollection resource types.\nProvides the current
15214 list of web links pointing to scenes\n",
15215                 "parameters": [
15216                     ],
15217                 "responses": {
15218                     "200": {
15219                         "description" : "",
15220                         "x-example":
15221                         {
15222                             "rt":      ["oic.wk.scenelist"],
15223                             "n":       "list of scene Collections",
15224                             "rts":    ["oic.wk.scenecollection"],
15225                             "links": [
15226                             ]
15227                         }
15228                     },
15229                     "schema": { "$ref": "#/definitions/Collection" }
15230                 }
15231             }
15232         },
15233     },
15234     "/SceneMemberResURI" : {
15235         "get": {
15236             "description": "Collection that models a scene member.\nProvides the scene member\n",
15237             "parameters": [
15238                 ],
15239             "responses": {
15240                 "200": {
15241                     "description" : "",
15242                     "x-example":
15243                     {
15244                         "rt":      ["oic.wk.scenemember"],
15245                         "id":    "0685B960-FFFF-46F7-BEC0-9E6234671ADC1",
15246                         "n":     "my binary switch (for light bulb) mappings",
15247                         "link": {
15248                             "href": "binarySwitch",
15249                             "rt":    ["oic.r.switch.binary"],
15250                             "if":    ["oic.if.a", "oic.if.baseLine"]
15250             
```

```

15251     "eps": [
15252         {"ep": "coap://[fe80::b1d6]:1111", "pri": 2},
15253         {"ep": "coaps://[fe80::b1d6]:1122"},
15254         {"ep": "coap+tcp://[2001:db8:a::123]:2222", "pri": 3}
15255     ]
15256 },
15257     "sceneMappings": [
15258     {
15259         "scene": "off",
15260         "memberProperty": "value",
15261         "memberValue": true
15262     },
15263     {
15264         "scene": "Reading",
15265         "memberProperty": "value",
15266         "memberValue": false
15267     },
15268     {
15269         "scene": "TVWatching",
15270         "memberProperty": "value",
15271         "memberValue": true
15272     }
15273   ]
15274 }
15275 ,
15276     "schema": { "$ref": "#/definitions/SceneMember" }
15277   }
15278 }
15279 }
15280 },
15281 "/SceneCollectionResURI" : {
15282     "get": {
15283         "description": "Collection that models a set of Scenes.\nThis resource is a generic
15284 collection resource with additional parameters.\nThe rts value shall contain oic.scenemember
15285 resource types.\nThe additional parameters are\n lastScene, this is the scene value last set by
15286 any OCF Client\n sceneValues, this is the list of available scenes\n lastScene shall be listed in
15287 sceneValues.\nProvides the current list of web links pointing to scenes\n",
15288         "parameters": [
15289         ],
15290         "responses": {
15291             "200": {
15292                 "description" : "",
15293                 "x-example":
15294                 {
15295                     "lastScene": "off",
15296                     "sceneValues": ["off", "Reading", "TVWatching"],
15297                     "rt": ["oic.wk.scenecollection"],
15298                     "n": "My Scenes for my living room",
15299                     "id": "0685B960-736F-46F7-BEC0-9E6CBD671ADCl",
15300                     "rts": ["oic.wk.scenemember"],
15301                     "links": [
15302                     ]
15303                 }
15304             }
15305         },
15306         "schema": { "$ref": "#/definitions/SceneCollection" }
15307     }
15308 },
15309     "post": {
15310         "description": "Provides the action to change the last set scene selection.\nCalling this
15311 method shall update all scene members to the prescribed membervalue.\nWhen this method is called
15312 with the same value as the current lastScene value\nthen all scene members shall be updated.\n",
15313         "parameters": [
15314             {
15315                 "name": "body",
15316                 "in": "body",
15317                 "required": true,
15318                 "schema": { "$ref": "#/definitions/SceneCollectionUpdate" },
15319                 "x-example":
15320                 {
15321                     "lastScene": "Reading"
15322                 }
15323             }
15324         ]
15325     }
15326 }
15327 }
15328 }
15329 }
15330 }
15331 }
15332 }
15333 }
15334 }
15335 }
15336 }
15337 }
15338 }
15339 }
15340 }
15341 }
15342 }
15343 }
15344 }
15345 }
15346 }
15347 }
15348 }
15349 }
15350 }
15351 }
15352 }
15353 }
15354 }
15355 }
15356 }
15357 }
15358 }
15359 }
15360 }
15361 }
15362 }
15363 }
15364 }
15365 }
15366 }
15367 }
15368 }
15369 }
15370 }
15371 }
15372 }
15373 }
15374 }
15375 }
15376 }
15377 }
15378 }
15379 }
15380 }
15381 }
15382 }
15383 }
15384 }
15385 }
15386 }
15387 }
15388 }
15389 }
15390 }
15391 }
15392 }
15393 }
15394 }
15395 }
15396 }
15397 }
15398 }
15399 }
15400 }
15401 }
15402 }
15403 }
15404 }
15405 }
15406 }
15407 }
15408 }
15409 }
15410 }
15411 }
15412 }
15413 }
15414 }
15415 }
15416 }
15417 }
15418 }
15419 }
15420 }
15421 }
15422 }
15423 }
15424 }
15425 }
15426 }
15427 }
15428 }
15429 }
15430 }
15431 }
15432 }
15433 }
15434 }
15435 }
15436 }
15437 }
15438 }
15439 }
15440 }
15441 }
15442 }
15443 }
15444 }
15445 }
15446 }
15447 }
15448 }
15449 }
15450 }
15451 }
15452 }
15453 }
15454 }
15455 }
15456 }
15457 }
15458 }
15459 }
15460 }
15461 }
15462 }
15463 }
15464 }
15465 }
15466 }
15467 }
15468 }
15469 }
15470 }
15471 }
15472 }
15473 }
15474 }
15475 }
15476 }
15477 }
15478 }
15479 }
15480 }
15481 }
15482 }
15483 }
15484 }
15485 }
15486 }
15487 }
15488 }
15489 }
15490 }
15491 }
15492 }
15493 }
15494 }
15495 }
15496 }
15497 }
15498 }
15499 }
15500 }
15501 }
15502 }
15503 }
15504 }
15505 }
15506 }
15507 }
15508 }
15509 }
15510 }
15511 }
15512 }
15513 }
15514 }
15515 }
15516 }
15517 }
15518 }
15519 }
15520 }
15521 }
15522 }
15523 }
15524 }
15525 }
15526 }
15527 }
15528 }
15529 }
15530 }
15531 }
15532 }
15533 }
15534 }
15535 }
15536 }
15537 }
15538 }
15539 }
15540 }
15541 }
15542 }
15543 }
15544 }
15545 }
15546 }
15547 }
15548 }
15549 }
15550 }
15551 }
15552 }
15553 }
15554 }
15555 }
15556 }
15557 }
15558 }
15559 }
15560 }
15561 }
15562 }
15563 }
15564 }
15565 }
15566 }
15567 }
15568 }
15569 }
15570 }
15571 }
15572 }
15573 }
15574 }
15575 }
15576 }
15577 }
15578 }
15579 }
15580 }
15581 }
15582 }
15583 }
15584 }
15585 }
15586 }
15587 }
15588 }
15589 }
15590 }
15591 }
15592 }
15593 }
15594 }
15595 }
15596 }
15597 }
15598 }
15599 }
15600 }
15601 }
15602 }
15603 }
15604 }
15605 }
15606 }
15607 }
15608 }
15609 }
15610 }
15611 }
15612 }
15613 }
15614 }
15615 }
15616 }
15617 }
15618 }
15619 }
15620 }
15621 }
15622 }
15623 }
15624 }
15625 }
15626 }
15627 }
15628 }
15629 }
15630 }
15631 }
15632 }
15633 }
15634 }
15635 }
15636 }
15637 }
15638 }
15639 }
15640 }
15641 }
15642 }
15643 }
15644 }
15645 }
15646 }
15647 }
15648 }
15649 }
15650 }
15651 }
15652 }
15653 }
15654 }
15655 }
15656 }
15657 }
15658 }
15659 }
15660 }
15661 }
15662 }
15663 }
15664 }
15665 }
15666 }
15667 }
15668 }
15669 }
15670 }
15671 }
15672 }
15673 }
15674 }
15675 }
15676 }
15677 }
15678 }
15679 }
15680 }
15681 }
15682 }
15683 }
15684 }
15685 }
15686 }
15687 }
15688 }
15689 }
15690 }
15691 }
15692 }
15693 }
15694 }
15695 }
15696 }
15697 }
15698 }
15699 }
15700 }
15701 }
15702 }
15703 }
15704 }
15705 }
15706 }
15707 }
15708 }
15709 }
15710 }
15711 }
15712 }
15713 }
15714 }
15715 }
15716 }
15717 }
15718 }
15719 }
15720 }
15721 }
15722 }
15723 }
15724 }
15725 }
15726 }
15727 }
15728 }
15729 }
15730 }
15731 }
15732 }
15733 }
15734 }
15735 }
15736 }
15737 }
15738 }
15739 }
15740 }
15741 }
15742 }
15743 }
15744 }
15745 }
15746 }
15747 }
15748 }
15749 }
15750 }
15751 }
15752 }
15753 }
15754 }
15755 }
15756 }
15757 }
15758 }
15759 }
15760 }
15761 }
15762 }
15763 }
15764 }
15765 }
15766 }
15767 }
15768 }
15769 }
15770 }
15771 }
15772 }
15773 }
15774 }
15775 }
15776 }
15777 }
15778 }
15779 }
15780 }
15781 }
15782 }
15783 }
15784 }
15785 }
15786 }
15787 }
15788 }
15789 }
15790 }
15791 }
15792 }
15793 }
15794 }
15795 }
15796 }
15797 }
15798 }
15799 }
15800 }
15801 }
15802 }
15803 }
15804 }
15805 }
15806 }
15807 }
15808 }
15809 }
15810 }
15811 }
15812 }
15813 }
15814 }
15815 }
15816 }
15817 }
15818 }
15819 }
15820 }
15821 }
15822 }
15823 }
15824 }
15825 }
15826 }
15827 }
15828 }
15829 }
15830 }
15831 }
15832 }
15833 }
15834 }
15835 }
15836 }
15837 }
15838 }
15839 }
15840 }
15841 }
15842 }
15843 }
15844 }
15845 }
15846 }
15847 }
15848 }
15849 }
15850 }
15851 }
15852 }
15853 }
15854 }
15855 }
15856 }
15857 }
15858 }
15859 }
15860 }
15861 }
15862 }
15863 }
15864 }
15865 }
15866 }
15867 }
15868 }
15869 }
15870 }
15871 }
15872 }
15873 }
15874 }
15875 }
15876 }
15877 }
15878 }
15879 }
15880 }
15881 }
15882 }
15883 }
15884 }
15885 }
15886 }
15887 }
15888 }
15889 }
15890 }
15891 }
15892 }
15893 }
15894 }
15895 }
15896 }
15897 }
15898 }
15899 }
15900 }
15901 }
15902 }
15903 }
15904 }
15905 }
15906 }
15907 }
15908 }
15909 }
15910 }
15911 }
15912 }
15913 }
15914 }
15915 }
15916 }
15917 }
15918 }
15919 }
15920 }
15921 }
15922 }
15923 }
15924 }
15925 }
15926 }
15927 }
15928 }
15929 }
15930 }
15931 }
15932 }
15933 }
15934 }
15935 }
15936 }
15937 }
15938 }
15939 }
15940 }
15941 }
15942 }
15943 }
15944 }
15945 }
15946 }
15947 }
15948 }
15949 }
15950 }
15951 }
15952 }
15953 }
15954 }
15955 }
15956 }
15957 }
15958 }
15959 }
15960 }
15961 }
15962 }
15963 }
15964 }
15965 }
15966 }
15967 }
15968 }
15969 }
15970 }
15971 }
15972 }
15973 }
15974 }
15975 }
15976 }
15977 }
15978 }
15979 }
15980 }
15981 }
15982 }
15983 }
15984 }
15985 }
15986 }
15987 }
15988 }
15989 }
15990 }
15991 }
15992 }
15993 }
15994 }
15995 }
15996 }
15997 }
15998 }
15999 }
159999 }

```

```

15322         }
15323     }
15324   ],
15325   "responses": {
15326     "200": {
15327       "description": "Indicates that the value is changed.\nThe changed properties are
15328       provided in the response.\n",
15329       "x-example": [
15330         {
15331           "lastScene": "Reading"
15332         }
15333       ],
15334       "schema": { "$ref": "#/definitions/SceneCollectionUpdate" }
15335     }
15336   }
15337 }
15338 }
15339 },
15340 "parameters": {
15341   "interface" : {
15342     "in" : "query",
15343     "name" : "if",
15344     "type" : "string",
15345     "enum" : ["oic.if.a", "oic.if.ll", "oic.if.baseline"]
15346   }
15347 },
15348 "definitions": {
15349   "Collection" : {
15350     "properties": {
15351       "links" :
15352         {
15353           "description": "A set of simple or individual OIC Links.",
15354           "items": {
15355             "$ref": "#/definitions/oic.oic-link"
15356           },
15357           "type": "array"
15358         }
15359     }
15360   }
15361 }
15362 ,
15363 "SceneMember" : {
15364   "properties": {
15365     "rt" :
15366       {
15367         "description": "Resource Type of the Resource",
15368         "items": {
15369           "maxLength": 64,
15370           "type": "string"
15371         },
15372           "minItems": 1,
15373           "readOnly": true,
15374           "type": "array"
15375         },
15376
15377     "SceneMappings" :
15378       {
15379         "description": "array of mappings per scene, can be one(1)",
15380         "items": {
15381           "properties": {
15382             "memberProperty": {
15383               "description": "property name that will be mapped",
15384               "readOnly": true,
15385               "type": "string"
15386             },
15387             "memberValue": {
15388               "description": "value of the Member Property",
15389               "readOnly": true,
15390               "type": "string"
15391             },
15392             "scene": {
15393

```

```

15393         "description": "Specifies a scene value that will be acted upon",
15394         "type": "string"
15395     },
15396     "required": [
15397         "scene",
15398         "memberProperty",
15399         "memberValue"
15400     ],
15401     "type": "object"
15402 },
15403     "type": "array"
15404 ),
15405
15406
15407 "n" :
15408     {
15409         "description": "Friendly name of the resource",
15410         "maxLength": 64,
15411         "readOnly": true,
15412         "type": "string"
15413     },
15414
15415 "link" :
15416     {
15417         "allOf": [
15418             {
15419                 "properties": {
15420                     "anchor": {
15421                         "description": "This is used to override the context URI e.g. override the URI of
the containing collection.",
15422                         "format": "uri",
15423                         "maxLength": 256,
15424                         "type": "string"
15425                     },
15426                     "di": {
15427                         "allOf": [
15428                             {
15429                                 "description": "Format pattern according to IETF RFC 4122.",
15430                                 "pattern": "[a-fA-F0-9]{8}-[a-fA-F0-9]{4}-[a-fA-F0-9]{4}-[a-fA-F0-9]{4}-[a-
15431 fA-F0-9]{12}$",
15432                                 "type": "string"
15433                             },
15434                             {
15435                                 "description": "The device ID"
15436                             }
15437                         ]
15438                     },
15439                     "eps": {
15440                         "description": "the Endpoint information of the target Resource",
15441                         "items": {
15442                             "properties": {
15443                                 "ep": {
15444                                     "description": "Transport Protocol Suite + Endpoint Locator",
15445                                     "format": "uri",
15446                                     "type": "string"
15447                                 },
15448                                 "pri": {
15449                                     "description": "The priority among multiple Endpoints",
15450                                     "minimum": 1,
15451                                     "type": "integer"
15452                                 }
15453                             },
15454                             "type": "object"
15455                         },
15456                         "type": "array"
15457                     },
15458                     "href": {
15459                         "description": "This is the target URI, it can be specified as a Relative
15460 Reference or fully-qualified URI.",
15461                         "format": "uri",
15462                         "maxLength": 256,
15463

```

```

15464         "type": "string"
15465     },
15466     "if": {
15467       "description": "The interface set supported by this resource",
15468       "items": {
15469         "enum": [
15470           "oic.if.baseline",
15471           "oic.if.ll",
15472           "oic.if.b",
15473           "oic.if.rw",
15474           "oic.if.r",
15475           "oic.if.a",
15476           "oic.if.s"
15477         ],
15478         "type": "string"
15479     },
15480     "minItems": 1,
15481     "type": "array"
15482   },
15483   "ins": {
15484     "description": "The instance identifier for this web link in an array of web
15485     links - used in collections",
15486     "type": "integer"
15487   },
15488   "p": {
15489     "description": "Specifies the framework policies on the Resource referenced by
the target URI",
15490     "properties": {
15491       "bm": {
15492         "description": "Specifies the framework policies on the Resource referenced
by the target URI for e.g. observable and discoverable",
15493         "type": "integer"
15494       }
15495     },
15496     "required": [
15497       "bm"
15498     ],
15499     "type": "object"
15500   },
15501   "rel": {
15502     "description": "The relation of the target URI referenced by the link to the
context URI",
15503     "oneOf": [
15504       {
15505         "default": [
15506           "hosts"
15507         ],
15508         "items": {
15509           "maxLength": 64,
15510           "type": "string"
15511         },
15512         "minItems": 1,
15513         "type": "array"
15514       },
15515       {
15516         "default": "hosts",
15517         "maxLength": 64,
15518         "type": "string"
15519       }
15520     ],
15521   },
15522   "rt": {
15523     "description": "Resource Type of the Resource",
15524     "items": {
15525       "maxLength": 64,
15526       "type": "string"
15527     },
15528     "minItems": 1,
15529     "type": "array"
15530   },
15531   "title": {
15532
15533
15534

```

```

15535         "description": "A title for the link relation. Can be used by the UI to provide a
15536 context.",
15537         "maxLength": 64,
15538         "type": "string"
15539     },
15540     "type": {
15541         "default": "application/cbor",
15542         "description": "A hint at the representation of the resource referenced by the
15543 target URI. This represents the media types that are used for both accepting and emitting.",
15544         "items": {
15545             "maxLength": 64,
15546             "type": "string"
15547         },
15548         "minItems": 1,
15549         "type": "array"
15550     }
15551 },
15552 "required": [
15553     "href",
15554     "rt",
15555     "if"
15556 ],
15557     "type": "object"
15558 },
15559 {
15560     "description": "OCF link that points to a resource"
15561 }
15562 ]
15563 },
15564 },
15565 "id" :
15566     {
15567         "description": "Instance ID of this specific resource",
15568         "maxLength": 64,
15569         "readOnly": true,
15570         "type": "string"
15571 },
15572 },
15573 "if" :
15574     {
15575         "description": "The interface set supported by this resource",
15576         "items": {
15577             "enum": [
15578                 "oic.if.baseline",
15579                 "oic.if.ll",
15580                 "oic.if.b",
15581                 "oic.if.lb",
15582                 "oic.if.rw",
15583                 "oic.if.r",
15584                 "oic.if.a",
15585                 "oic.if.s"
15586             ],
15587             "type": "string"
15588         },
15589         "minItems": 1,
15590         "readOnly": true,
15591         "type": "array"
15592     }
15593 },
15594 }
15595 }
15596 },
15597 "SceneCollection" : {
15598     "properties": {
15599         "rt" :
15600             {
15601                 "description": "Resource Type of the Resource",
15602                 "items": {
15603                     "maxLength": 64,
15604                     "type": "string"
15605                 },

```

```

15606     "minItems": 1,
15607     "readOnly": true,
15608     "type": "array"
15609   },
15610
15611   "lastScene" :
15612   {
15613     "description": "Last selected Scene from the set of sceneValues",
15614     "type": "string"
15615   },
15616
15617   "links" :
15618   {
15619     "description": "A set of simple or individual OIC Links.",
15620     "items": {
15621       "properties": {
15622         "anchor": {
15623           "description": "This is used to override the context URI e.g. override the URI of
the containing collection.",
15624           "format": "uri",
15625           "maxLength": 256,
15626           "type": "string"
15627         },
15628         "di": {
15629           "description": "Format pattern according to IETF RFC 4122.",
15630           "pattern": "^[a-fA-F0-9]{8}-[a-fA-F0-9]{4}-[a-fA-F0-9]{4}-[a-fA-F0-9]{4}-[a-fA-F0-
9]{12}$",
15631         },
15632         "type": "string"
15633       },
15634       "eps": {
15635         "description": "the Endpoint information of the target Resource",
15636         "items": {
15637           "properties": {
15638             "ep": {
15639               "description": "Transport Protocol Suite + Endpoint Locator",
15640               "format": "uri",
15641               "type": "string"
15642             },
15643             "pri": {
15644               "description": "The priority among multiple Endpoints",
15645               "minimum": 1,
15646               "type": "integer"
15647             }
15648           },
15649           "type": "object"
15650         },
15651         "type": "array"
15652       },
15653       "href": {
15654         "description": "This is the target URI, it can be specified as a Relative Reference
or fully-qualified URI.",
15655         "format": "uri",
15656         "maxLength": 256,
15657         "type": "string"
15658       },
15659       "if": {
15660         "description": "The interface set supported by this resource",
15661         "items": {
15662           "enum": [
15663             "oic.if.baseline",
15664             "oic.if.ll",
15665             "oic.if.b",
15666             "oic.if.rw",
15667             "oic.if.r",
15668             "oic.if.a",
15669             "oic.if.s"
15670           ],
15671           "type": "string"
15672         },
15673         "minItems": 1,
15674         "type": "array"
15675       }
15676     }
15677   }
15678 }
```

```

15677     },
15678     "ins": {
15679         "description": "The instance identifier for this web link in an array of web links
15680 - used in collections",
15681         "type": "integer"
15682     },
15683     "p": {
15684         "description": "Specifies the framework policies on the Resource referenced by the
15685 target URI",
15686         "properties": {
15687             "bm": {
15688                 "description": "Specifies the framework policies on the Resource referenced by
15689 the target URI for e.g. observable and discoverable",
15690                 "type": "integer"
15691             }
15692         },
15693         "required": [
15694             "bm"
15695         ],
15696         "type": "object"
15697     },
15698     "rel": {
15699         "description": "The relation of the target URI referenced by the link to the
15700 context URI",
15701         "oneOf": [
15702             {
15703                 "default": [
15704                     "hosts"
15705                 ],
15706                 "items": {
15707                     "maxLength": 64,
15708                     "type": "string"
15709                 },
15710                 "minItems": 1,
15711                 "type": "array"
15712             },
15713             {
15714                 "default": "hosts",
15715                 "maxLength": 64,
15716                 "type": "string"
15717             }
15718         ]
15719     },
15720     "rt": {
15721         "description": "Resource Type of the Resource",
15722         "items": {
15723             "maxLength": 64,
15724             "type": "string"
15725         },
15726         "minItems": 1,
15727         "type": "array"
15728     },
15729     "title": {
15730         "description": "A title for the link relation. Can be used by the UI to provide a
15731 context.",
15732         "maxLength": 64,
15733         "type": "string"
15734     },
15735     "type": {
15736         "default": "application/cbor",
15737         "description": "A hint at the representation of the resource referenced by the
15738 target URI. This represents the media types that are used for both accepting and emitting.",
15739         "items": {
15740             "maxLength": 64,
15741             "type": "string"
15742         },
15743         "minItems": 1,
15744         "type": "array"
15745     }
15746 },
15747 "required": [

```

```

15748      "href",
15749      "rt",
15750      "if"
15751      ],
15752      "type": "object"
15753    },
15754    "type": "array"
15755  },
15756
15757  "sceneValues" :
15758  {
15759    "description": "All available scene values",
15760    "items": {
15761      "type": "string"
15762    },
15763    "readOnly": true,
15764    "type": "array"
15765  },
15766
15767  "n" :
15768  {
15769    "description": "Friendly name of the resource",
15770    "maxLength": 64,
15771    "readonly": true,
15772    "type": "string"
15773  },
15774
15775  "rts" :
15776  {
15777    "description": "Resource Type of the Resource",
15778    "items": {
15779      "maxLength": 64,
15780      "type": "string"
15781    },
15782    "minItems": 1,
15783    "readOnly": true,
15784    "type": "array"
15785  },
15786
15787  "id" :
15788  {
15789    "description": "Instance ID of this specific resource",
15790    "maxLength": 64,
15791    "readonly": true,
15792    "type": "string"
15793  },
15794
15795  "if" :
15796  {
15797    "description": "The interface set supported by this resource",
15798    "items": {
15799      "enum": [
15800        "oic.if.baseline",
15801        "oic.if.ll",
15802        "oic.if.b",
15803        "oic.if.lb",
15804        "oic.if.rw",
15805        "oic.if.r",
15806        "oic.if.a",
15807        "oic.if.s"
15808        ],
15809        "type": "string"
15810    },
15811    "minItems": 1,
15812    "readOnly": true,
15813    "type": "array"
15814  }
15815
15816  }
15817}
15818
,
```

```

15819 "SceneCollectionUpdate" : {
15820   "properties": {
15821     "rt" :
15822       {
15823         "description": "Resource Type of the Resource",
15824         "items": {
15825           "maxLength": 64,
15826           "type": "string"
15827         },
15828         "minItems": 1,
15829         "readOnly": true,
15830         "type": "array"
15831       },
15832
15833     "lastScene" :
15834       {
15835         "description": "Last selected Scene from the set of sceneValues",
15836         "type": "string"
15837       },
15838
15839     "n" :
15840       {
15841         "description": "Friendly name of the resource",
15842         "maxLength": 64,
15843         "readOnly": true,
15844         "type": "string"
15845       },
15846
15847     "id" :
15848       {
15849         "description": "Instance ID of this specific resource",
15850         "maxLength": 64,
15851         "readOnly": true,
15852         "type": "string"
15853       },
15854
15855     "if" :
15856       {
15857         "description": "The interface set supported by this resource",
15858         "items": {
15859           "enum": [
15860             "oic.if.baseline",
15861             "oic.if.ll",
15862             "oic.if.b",
15863             "oic.if.lb",
15864             "oic.if.rw",
15865             "oic.if.r",
15866             "oic.if.a",
15867             "oic.if.s"
15868           ],
15869           "type": "string"
15870         },
15871         "minItems": 1,
15872         "readOnly": true,
15873         "type": "array"
15874       }
15875
15876     }
15877   }
15878   "uuid" :
15879     {
15880       "description": "Format pattern according to IETF RFC 4122.",
15881       "pattern": "[a-fA-F0-9]{8}-[a-fA-F0-9]{4}-[a-fA-F0-9]{4}-[a-fA-F0-9]{12}$",
15882       "type": "string"
15883     }
15884
15885   "oic.collection.properties" :
15886     {
15887       "description": "A collection is a set of links along with additional properties to describe
the collection itself",
15888       "properties": {
15889

```

```

15890     "rts": {
15891         "$ref": "#/definitions/oic.core/properties/rt",
15892         "description": "The list of allowable resource types (for Target and anchors) in links
15893 included in the collection"
15894     }
15895 },
15896     "type": "object"
15897 }
15898
15899     "oic.core" :
15900     {
15901         "properties": {
15902             "rt": {
15903                 "description": "Resource Type of the Resource",
15904                 "items": {
15905                     "maxLength": 64,
15906                     "type": "string"
15907                 },
15908                     "minItems": 1,
15909                     "readOnly": true,
15910                     "type": "array"
15911                 }
15912             },
15913             "type": "object"
15914         }
15915
15916     "oic.collection.linksexpanded" :
15917     {
15918         "properties": {
15919             "links": {
15920                 "description": "A set of simple or individual OIC Links.",
15921                 "items": {
15922                     "properties": {
15923                         "anchor": {
15924                             "description": "This is used to override the context URI e.g. override the URI of
the containing collection.",
15925                             "format": "uri",
15926                             "maxLength": 256,
15927                             "type": "string"
15928                         },
15929                         "di": {
15930                             "description": "Format pattern according to IETF RFC 4122.",
15931                             "pattern": "[a-fA-F0-9]{8}-[a-fA-F0-9]{4}-[a-fA-F0-9]{4}-[a-fA-F0-
15932 9]{12}$",
15933                             "type": "string"
15934                         },
15935                         "eps": {
15936                             "description": "the Endpoint information of the target Resource",
15937                             "items": {
15938                                 "properties": {
15939                                     "ep": {
15940                                         "description": "Transport Protocol Suite + Endpoint Locator",
15941                                         "format": "uri",
15942                                         "type": "string"
15943                                     },
15944                                     "pri": {
15945                                         "description": "The priority among multiple Endpoints",
15946                                         "minimum": 1,
15947                                         "type": "integer"
15948                                     }
15949                                 },
15950                                 "type": "object"
15951                             },
15952                             "type": "array"
15953                         },
15954                         "href": {
15955                             "description": "This is the target URI, it can be specified as a Relative Reference
or fully-qualified URI.",
15956                             "format": "uri",
15957                             "maxLength": 256,
15958                             "type": "string"
15959                         }
15960                     }
15961                 }
15962             }
15963         }
15964     }
15965 }
```

```

15961 },
15962 "if": {
15963   "description": "The interface set supported by this resource",
15964   "items": {
15965     "enum": [
15966       "oic.if.baseline",
15967       "oic.if.ll",
15968       "oic.if.b",
15969       "oic.if.rw",
15970       "oic.if.r",
15971       "oic.if.a",
15972       "oic.if.s"
15973     ],
15974     "type": "string"
15975   },
15976   "minItems": 1,
15977   "type": "array"
15978 },
15979   "ins": {
15980     "description": "The instance identifier for this web link in an array of web links
- used in collections",
15981     "type": "integer"
15982   },
15983   "p": {
15984     "description": "Specifies the framework policies on the Resource referenced by the
target URI",
15985     "properties": {
15986       "bm": {
15987         "description": "Specifies the framework policies on the Resource referenced by
the target URI for e.g. observable and discoverable",
15988         "type": "integer"
15989       }
15990     },
15991     "required": [
15992       "bm"
15993     ],
15994     "type": "object"
15995   },
15996   "rel": {
15997     "description": "The relation of the target URI referenced by the link to the
context URI",
15998     "oneOf": [
15999       {
16000         "default": [
16001           "hosts"
16002         ],
16003         "items": {
16004           "maxLength": 64,
16005           "type": "string"
16006         },
16007         "minItems": 1,
16008         "type": "array"
16009       },
16010       {
16011         "default": "hosts",
16012         "maxLength": 64,
16013         "type": "string"
16014       }
16015     ]
16016   },
16017   "rt": {
16018     "description": "Resource Type of the Resource",
16019     "items": {
16020       "maxLength": 64,
16021       "type": "string"
16022     },
16023     "minItems": 1,
16024     "type": "array"
16025   },
16026   "title": {
16027     "description": "A title for the link relation. Can be used by the UI to provide a

```

```

16032     "context.":
16033         "maxLength": 64,
16034         "type": "string"
16035     },
16036     "type": {
16037         "default": "application/cbor",
16038         "description": "A hint at the representation of the resource referenced by the
16039 target URI. This represents the media types that are used for both accepting and emitting.",
16040     "items": {
16041         "maxLength": 64,
16042         "type": "string"
16043     },
16044         "minItems": 1,
16045         "type": "array"
16046     }
16047 },
16048     "required": [
16049         "href",
16050         "rt",
16051         "if"
16052     ],
16053     "type": "object"
16054 },
16055     "type": "array"
16056 }
16057 },
16058     "type": "object"
16059 }
16060
16061     "oic.collection.links" :
16062     {
16063         "properties": {
16064             "links": {
16065                 "description": "A set of simple or individual OIC Links.",
16066                 "items": {
16067                     "$ref": "#/definitions/oic.oic-link"
16068                 },
16069                 "type": "array"
16070             }
16071         },
16072         "type": "object"
16073     }
16074
16075     "oic.oic-link" :
16076     {
16077         "properties": {
16078             "anchor": {
16079                 "description": "This is used to override the context URI e.g. override the URI of the
16080 containing collection.",
16081                 "format": "uri",
16082                 "maxLength": 256,
16083                 "type": "string"
16084             },
16085             "di": {
16086                 "$ref": "#/definitions/uuid",
16087                 "description": "The device ID"
16088             },
16089             "eps": {
16090                 "description": "the Endpoint information of the target Resource",
16091                 "items": {
16092                     "properties": {
16093                         "ep": {
16094                             "description": "Transport Protocol Suite + Endpoint Locator",
16095                             "format": "uri",
16096                             "type": "string"
16097                         },
16098                         "pri": {
16099                             "description": "The priority among multiple Endpoints",
16100                             "minimum": 1,
16101                             "type": "integer"
16102                         }
16103                     }
16104                 }
16105             }
16106         }
16107     }
16108 }
16109
16110     "oic.ep" :
16111     {
16112         "properties": {
16113             "format": "uri"
16114         }
16115     }
16116 }
16117
16118     "oic.if" :
16119     {
16120         "properties": {
16121             "format": "uri"
16122         }
16123     }
16124 }
16125
16126     "oic.if.a" :
16127     {
16128         "properties": {
16129             "format": "uri"
16130         }
16131     }
16132 }
16133
16134     "oic.if.b" :
16135     {
16136         "properties": {
16137             "format": "uri"
16138         }
16139     }
16140 }
16141
16142     "oic.if.s" :
16143     {
16144         "properties": {
16145             "format": "uri"
16146         }
16147     }
16148 }
16149
16150     "oic.if.v" :
16151     {
16152         "properties": {
16153             "format": "uri"
16154         }
16155     }
16156 }
16157
16158     "oic.if.w" :
16159     {
16160         "properties": {
16161             "format": "uri"
16162         }
16163     }
16164 }
16165
16166     "oic.if.x" :
16167     {
16168         "properties": {
16169             "format": "uri"
16170         }
16171     }
16172 }
16173
16174     "oic.if.y" :
16175     {
16176         "properties": {
16177             "format": "uri"
16178         }
16179     }
16180 }
16181
16182     "oic.if.z" :
16183     {
16184         "properties": {
16185             "format": "uri"
16186         }
16187     }
16188 }
16189
16190     "oic.if.0" :
16191     {
16192         "properties": {
16193             "format": "uri"
16194         }
16195     }
16196 }
16197
16198     "oic.if.1" :
16199     {
16200         "properties": {
16201             "format": "uri"
16202         }
16203     }
16204 }
16205
16206     "oic.if.2" :
16207     {
16208         "properties": {
16209             "format": "uri"
16210         }
16211     }
16212 }
16213
16214     "oic.if.3" :
16215     {
16216         "properties": {
16217             "format": "uri"
16218         }
16219     }
16220 }
16221
16222     "oic.if.4" :
16223     {
16224         "properties": {
16225             "format": "uri"
16226         }
16227     }
16228 }
16229
16230     "oic.if.5" :
16231     {
16232         "properties": {
16233             "format": "uri"
16234         }
16235     }
16236 }
16237
16238     "oic.if.6" :
16239     {
16240         "properties": {
16241             "format": "uri"
16242         }
16243     }
16244 }
16245
16246     "oic.if.7" :
16247     {
16248         "properties": {
16249             "format": "uri"
16250         }
16251     }
16252 }
16253
16254     "oic.if.8" :
16255     {
16256         "properties": {
16257             "format": "uri"
16258         }
16259     }
16260 }
16261
16262     "oic.if.9" :
16263     {
16264         "properties": {
16265             "format": "uri"
16266         }
16267     }
16268 }
16269
16270     "oic.if.10" :
16271     {
16272         "properties": {
16273             "format": "uri"
16274         }
16275     }
16276 }
16277
16278     "oic.if.11" :
16279     {
16280         "properties": {
16281             "format": "uri"
16282         }
16283     }
16284 }
16285
16286     "oic.if.12" :
16287     {
16288         "properties": {
16289             "format": "uri"
16290         }
16291     }
16292 }
16293
16294     "oic.if.13" :
16295     {
16296         "properties": {
16297             "format": "uri"
16298         }
16299     }
16300 }
16301
16302     "oic.if.14" :
16303     {
16304         "properties": {
16305             "format": "uri"
16306         }
16307     }
16308 }
16309
16310     "oic.if.15" :
16311     {
16312         "properties": {
16313             "format": "uri"
16314         }
16315     }
16316 }
16317
16318     "oic.if.16" :
16319     {
16320         "properties": {
16321             "format": "uri"
16322         }
16323     }
16324 }
16325
16326     "oic.if.17" :
16327     {
16328         "properties": {
16329             "format": "uri"
16330         }
16331     }
16332 }
16333
16334     "oic.if.18" :
16335     {
16336         "properties": {
16337             "format": "uri"
16338         }
16339     }
16340 }
16341
16342     "oic.if.19" :
16343     {
16344         "properties": {
16345             "format": "uri"
16346         }
16347     }
16348 }
16349
16350     "oic.if.20" :
16351     {
16352         "properties": {
16353             "format": "uri"
16354         }
16355     }
16356 }
16357
16358     "oic.if.21" :
16359     {
16360         "properties": {
16361             "format": "uri"
16362         }
16363     }
16364 }
16365
16366     "oic.if.22" :
16367     {
16368         "properties": {
16369             "format": "uri"
16370         }
16371     }
16372 }
16373
16374     "oic.if.23" :
16375     {
16376         "properties": {
16377             "format": "uri"
16378         }
16379     }
16380 }
16381
16382     "oic.if.24" :
16383     {
16384         "properties": {
16385             "format": "uri"
16386         }
16387     }
16388 }
16389
16390     "oic.if.25" :
16391     {
16392         "properties": {
16393             "format": "uri"
16394         }
16395     }
16396 }
16397
16398     "oic.if.26" :
16399     {
16400         "properties": {
16401             "format": "uri"
16402         }
16403     }
16404 }
16405
16406     "oic.if.27" :
16407     {
16408         "properties": {
16409             "format": "uri"
16410         }
16411     }
16412 }
16413
16414     "oic.if.28" :
16415     {
16416         "properties": {
16417             "format": "uri"
16418         }
16419     }
16420 }
16421
16422     "oic.if.29" :
16423     {
16424         "properties": {
16425             "format": "uri"
16426         }
16427     }
16428 }
16429
16430     "oic.if.30" :
16431     {
16432         "properties": {
16433             "format": "uri"
16434         }
16435     }
16436 }
16437
16438     "oic.if.31" :
16439     {
16440         "properties": {
16441             "format": "uri"
16442         }
16443     }
16444 }
16445
16446     "oic.if.32" :
16447     {
16448         "properties": {
16449             "format": "uri"
16450         }
16451     }
16452 }
16453
16454     "oic.if.33" :
16455     {
16456         "properties": {
16457             "format": "uri"
16458         }
16459     }
16460 }
16461
16462     "oic.if.34" :
16463     {
16464         "properties": {
16465             "format": "uri"
16466         }
16467     }
16468 }
16469
16470     "oic.if.35" :
16471     {
16472         "properties": {
16473             "format": "uri"
16474         }
16475     }
16476 }
16477
16478     "oic.if.36" :
16479     {
16480         "properties": {
16481             "format": "uri"
16482         }
16483     }
16484 }
16485
16486     "oic.if.37" :
16487     {
16488         "properties": {
16489             "format": "uri"
16490         }
16491     }
16492 }
16493
16494     "oic.if.38" :
16495     {
16496         "properties": {
16497             "format": "uri"
16498         }
16499     }
16500 }
16501
16502     "oic.if.39" :
16503     {
16504         "properties": {
16505             "format": "uri"
16506         }
16507     }
16508 }
16509
16510     "oic.if.40" :
16511     {
16512         "properties": {
16513             "format": "uri"
16514         }
16515     }
16516 }
16517
16518     "oic.if.41" :
16519     {
16520         "properties": {
16521             "format": "uri"
16522         }
16523     }
16524 }
16525
16526     "oic.if.42" :
16527     {
16528         "properties": {
16529             "format": "uri"
16530         }
16531     }
16532 }
16533
16534     "oic.if.43" :
16535     {
16536         "properties": {
16537             "format": "uri"
16538         }
16539     }
16540 }
16541
16542     "oic.if.44" :
16543     {
16544         "properties": {
16545             "format": "uri"
16546         }
16547     }
16548 }
16549
16550     "oic.if.45" :
16551     {
16552         "properties": {
16553             "format": "uri"
16554         }
16555     }
16556 }
16557
16558     "oic.if.46" :
16559     {
16560         "properties": {
16561             "format": "uri"
16562         }
16563     }
16564 }
16565
16566     "oic.if.47" :
16567     {
16568         "properties": {
16569             "format": "uri"
16570         }
16571     }
16572 }
16573
16574     "oic.if.48" :
16575     {
16576         "properties": {
16577             "format": "uri"
16578         }
16579     }
16580 }
16581
16582     "oic.if.49" :
16583     {
16584         "properties": {
16585             "format": "uri"
16586         }
16587     }
16588 }
16589
16590     "oic.if.50" :
16591     {
16592         "properties": {
16593             "format": "uri"
16594         }
16595     }
16596 }
16597
16598     "oic.if.51" :
16599     {
16600         "properties": {
16601             "format": "uri"
16602         }
16603     }
16604 }
16605
16606     "oic.if.52" :
16607     {
16608         "properties": {
16609             "format": "uri"
16610         }
16611     }
16612 }
16613
16614     "oic.if.53" :
16615     {
16616         "properties": {
16617             "format": "uri"
16618         }
16619     }
16620 }
16621
16622     "oic.if.54" :
16623     {
16624         "properties": {
16625             "format": "uri"
16626         }
16627     }
16628 }
16629
16630     "oic.if.55" :
16631     {
16632         "properties": {
16633             "format": "uri"
16634         }
16635     }
16636 }
16637
16638     "oic.if.56" :
16639     {
16640         "properties": {
16641             "format": "uri"
16642         }
16643     }
16644 }
16645
16646     "oic.if.57" :
16647     {
16648         "properties": {
16649             "format": "uri"
16650         }
16651     }
16652 }
16653
16654     "oic.if.58" :
16655     {
16656         "properties": {
16657             "format": "uri"
16658         }
16659     }
16660 }
16661
16662     "oic.if.59" :
16663     {
16664         "properties": {
16665             "format": "uri"
16666         }
16667     }
16668 }
16669
16670     "oic.if.60" :
16671     {
16672         "properties": {
16673             "format": "uri"
16674         }
16675     }
16676 }
16677
16678     "oic.if.61" :
16679     {
16680         "properties": {
16681             "format": "uri"
16682         }
16683     }
16684 }
16685
16686     "oic.if.62" :
16687     {
16688         "properties": {
16689             "format": "uri"
16690         }
16691     }
16692 }
16693
16694     "oic.if.63" :
16695     {
16696         "properties": {
16697             "format": "uri"
16698         }
16699     }
16700 }
16701
16702     "oic.if.64" :
16703     {
16704         "properties": {
16705             "format": "uri"
16706         }
16707     }
16708 }
16709
16710     "oic.if.65" :
16711     {
16712         "properties": {
16713             "format": "uri"
16714         }
16715     }
16716 }
16717
16718     "oic.if.66" :
16719     {
16720         "properties": {
16721             "format": "uri"
16722         }
16723     }
16724 }
16725
16726     "oic.if.67" :
16727     {
16728         "properties": {
16729             "format": "uri"
16730         }
16731     }
16732 }
16733
16734     "oic.if.68" :
16735     {
16736         "properties": {
16737             "format": "uri"
16738         }
16739     }
16740 }
16741
16742     "oic.if.69" :
16743     {
16744         "properties": {
16745             "format": "uri"
16746         }
16747     }
16748 }
16749
16750     "oic.if.70" :
16751     {
16752         "properties": {
16753             "format": "uri"
16754         }
16755     }
16756 }
16757
16758     "oic.if.71" :
16759     {
16760         "properties": {
16761             "format": "uri"
16762         }
16763     }
16764 }
16765
16766     "oic.if.72" :
16767     {
16768         "properties": {
16769             "format": "uri"
16770         }
16771     }
16772 }
16773
16774     "oic.if.73" :
16775     {
16776         "properties": {
16777             "format": "uri"
16778         }
16779     }
16780 }
16781
16782     "oic.if.74" :
16783     {
16784         "properties": {
16785             "format": "uri"
16786         }
16787     }
16788 }
16789
16790     "oic.if.75" :
16791     {
16792         "properties": {
16793             "format": "uri"
16794         }
16795     }
16796 }
16797
16798     "oic.if.76" :
16799     {
16800         "properties": {
16801             "format": "uri"
16802         }
16803     }
16804 }
16805
16806     "oic.if.77" :
16807     {
16808         "properties": {
16809             "format": "uri"
16810         }
16811     }
16812 }
16813
16814     "oic.if.78" :
16815     {
16816         "properties": {
16817             "format": "uri"
16818         }
16819     }
16820 }
16821
16822     "oic.if.79" :
16823     {
16824         "properties": {
16825             "format": "uri"
16826         }
16827     }
16828 }
16829
16830     "oic.if.80" :
16831     {
16832         "properties": {
16833             "format": "uri"
16834         }
16835     }
16836 }
16837
16838     "oic.if.81" :
16839     {
16840         "properties": {
16841             "format": "uri"
16842         }
16843     }
16844 }
16845
16846     "oic.if.82" :
16847     {
16848         "properties": {
16849             "format": "uri"
16850         }
16851     }
16852 }
16853
16854     "oic.if.83" :
16855     {
16856         "properties": {
16857             "format": "uri"
16858         }
16859     }
16860 }
16861
16862     "oic.if.84" :
16863     {
16864         "properties": {
16865             "format": "uri"
16866         }
16867     }
16868 }
16869
16870     "oic.if.85" :
16871     {
16872         "properties": {
16873             "format": "uri"
16874         }
16875     }
16876 }
16877
16878     "oic.if.86" :
16879     {
16880         "properties": {
16881             "format": "uri"
16882         }
16883     }
16884 }
16885
16886     "oic.if.87" :
16887     {
16888         "properties": {
16889             "format": "uri"
16890         }
16891     }
16892 }
16893
16894     "oic.if.88" :
16895     {
16896         "properties": {
16897             "format": "uri"
16898         }
16899     }
16900 }
16901
16902     "oic.if.89" :
16903     {
16904         "properties": {
16905             "format": "uri"
16906         }
16907     }
16908 }
16909
16910     "oic.if.90" :
16911     {
16912         "properties": {
16913             "format": "uri"
16914         }
16915     }
16916 }
16917
16918     "oic.if.91" :
16919     {
16920         "properties": {
16921             "format": "uri"
16922         }
16923     }
16924 }
16925
16926     "oic.if.92" :
16927     {
16928         "properties": {
16929             "format": "uri"
16930         }
16931     }
16932 }
16933
16934     "oic.if.93" :
16935     {
16936         "properties": {
16937             "format": "uri"
16938         }
16939     }
16940 }
16941
16942     "oic.if.94" :
16943     {
16944         "properties": {
16945             "format": "uri"
16946         }
16947     }
16948 }
16949
16950     "oic.if.95" :
16951     {
16952         "properties": {
16953             "format": "uri"
16954         }
16955     }
16956 }
16957
16958     "oic.if.96" :
16959     {
16960         "properties": {
16961             "format": "uri"
16962         }
16963     }
16964 }
16965
16966     "oic.if.97" :
16967     {
16968         "properties": {
16969             "format": "uri"
16970         }
16971     }
16972 }
16973
16974     "oic.if.98" :
16975     {
16976         "properties": {
16977             "format": "uri"
16978         }
16979     }
16980 }
16981
16982     "oic.if.99" :
16983     {
16984         "properties": {
16985             "format": "uri"
16986         }
16987     }
16988 }
16989
16990     "oic.if.100" :
16991     {
16992         "properties": {
16993             "format": "uri"
16994         }
16995     }
16996 }
16997
16998     "oic.if.101" :
16999     {
17000         "properties": {
17001             "format": "uri"
17002         }
17003     }
17004 }
17005
17006     "oic.if.102" :
17007     {
17008         "properties": {
17009             "format": "uri"
17010         }
17011     }
17012 }
17013
17014     "oic.if.103" :
17015     {
17016         "properties": {
17017             "format": "uri"
17018         }
17019     }
17020 }
17021
17022     "oic.if.104" :
17023     {
17024         "properties": {
17025             "format": "uri"
17026         }
17027     }
17028 }
17029
17030     "oic.if.105" :
17031     {
17032         "properties": {
17033             "format": "uri"
17034         }
17035     }
17036 }
17037
17038     "oic.if.106" :
17039     {
17040         "properties": {
17041             "format": "uri"
17042         }
17043     }
17044 }
17045
17046     "oic.if.107" :
17047     {
17048         "properties": {
17049             "format": "uri"
17050         }
17051     }
17052 }
17053
17054     "oic.if.108" :
17055     {
17056         "properties": {
17057             "format": "uri"
17058         }
17059     }
17060 }
17061
17062     "oic.if.109" :
17063     {
17064         "properties": {
17065             "format": "uri"
17066         }
17067     }
17068 }
17069
17070     "oic.if.110" :
17071     {
17072         "properties": {
17073             "format": "uri"
17074         }
17075     }
17076 }
17077
17078     "oic.if.111" :
17079     {
17080         "properties": {
17081             "format": "uri"
17082         }
17083     }
17084 }
17085
17086     "oic.if.112" :
17087     {
17088         "properties": {
17089             "format": "uri"
17090         }
17091     }
17092 }
17093
17094     "oic.if.113" :
17095     {
17096         "properties": {
17097             "format": "uri"
17098         }
17099     }
17100 }
17101
17102     "oic.if.114" :
17103     {
17104         "properties": {
17105             "format": "uri"
17106         }
17107     }
17108 }
17109
17110     "oic.if.115" :
17111     {
17112         "properties": {
17113             "format": "uri"
17114         }
17115     }
17116 }
17117
17118     "oic.if.116" :
17119     {
17120         "properties": {
17121             "format": "uri"
17122         }
17123     }
17124 }
17125
17126     "oic.if.117" :
17127     {
17128         "properties": {
17129             "format": "uri"
17130         }
17131     }
17132 }
17133
17134     "oic.if.118" :
17135     {
17136         "properties": {
17137             "format": "uri"
17138         }
17139     }
17140 }
17141
17142     "oic.if.119" :
17143     {
17144         "properties": {
17145             "format": "uri"
17146         }
17147     }
17148 }
17149
17150     "oic.if.120" :
17151     {
17152         "properties": {
17153             "format": "uri"
17154         }
17155     }
17156 }
17157
17158     "oic.if.121" :
17159     {
17160         "properties": {
17161             "format": "uri"
17162         }
17163     }
17164 }
17165
17166     "oic.if.122" :
17167     {
17168         "properties": {
17169             "format": "uri"
17170         }
17171     }
17172 }
17173
17174     "oic.if.123" :
17175     {
17176         "properties": {
17177             "format": "uri"
17178         }
17179     }
17180 }
17181
17182     "oic.if.124" :
17183     {
17184         "properties": {
17185             "format": "uri"
17186         }
17187     }
17188 }
17189
17190     "oic.if.125" :
17191     {
17192         "properties": {
17193             "format": "uri"
17194         }
17195     }
17196 }
17197
17198     "oic.if.126" :
17199     {
17200         "properties": {
17201             "format": "uri"
17202         }
17203     }
17204 }
17205
17206     "oic.if.127" :
17207     {
17208         "properties": {
17209             "format": "uri"
17210         }
17211     }
17212 }
17213
17214     "oic.if.128" :
17215     {
17216         "properties": {
17217             "format": "uri"
17218         }
17219     }
17220 }
17221
17222     "oic.if.129" :
17223     {
17224         "properties": {
17225             "format": "uri"
17226         }
17227     }
17228 }
17229
17230     "oic.if.130" :
17231     {
17232         "properties": {
17233             "format": "uri"
17234         }
17235     }
17236 }
17237
17238     "oic.if.131" :
17239     {
17240         "properties": {
17241             "format": "uri"
17242         }
17243     }
17244 }
17245
17246     "oic.if.132" :
17247     {
17248         "properties": {
17249             "format": "uri"
17250         }
17251     }
17252 }
17253
17254     "oic.if.133" :
17255     {
17256         "properties": {
17257             "format": "uri"
17258         }
17259     }
17260 }
17261
17262     "oic.if.134" :
17263     {
17264         "properties": {
17265             "format": "uri"
17266         }
17267     }
17268 }
17269
17270     "oic.if.135" :
17271     {
17272         "properties": {
17273             "format": "uri"
17274         }
17275     }
17276 }
17277
17278     "oic.if.136" :
17279     {
17280         "properties": {
17281             "format": "uri"
17282         }
17283     }
17284 }
17285
17286     "oic.if.137" :
17287     {
17288         "properties": {
17289             "format": "uri"
17290         }
17291     }
17292 }
17293
17294     "oic.if.138" :
17295     {
17296         "properties": {
17297             "format": "uri"
17298         }
17299     }
17300 }
17301
17302     "oic.if.139" :
17303     {
17304         "properties": {
17305             "format": "uri"
17306         }
17307     }
17308 }
17309
17310     "oic.if.140" :
17311     {
17312         "properties": {
1
```

```

16103      },
16104      "type": "object"
16105    },
16106    "type": "array"
16107  },
16108  "href": {
16109    "description": "This is the target URI, it can be specified as a Relative Reference or
16110    fully-qualified URI.",
16111    "format": "uri",
16112    "maxLength": 256,
16113    "type": "string"
16114  },
16115  "if": {
16116    "description": "The interface set supported by this resource",
16117    "items": {
16118      "enum": [
16119        "oic.if.baseline",
16120        "oic.if.ll",
16121        "oic.if.b",
16122        "oic.if.rw",
16123        "oic.if.r",
16124        "oic.if.a",
16125        "oic.if.s"
16126      ],
16127      "type": "string"
16128    },
16129    "minItems": 1,
16130    "type": "array"
16131  },
16132  "ins": {
16133    "description": "The instance identifier for this web link in an array of web links - used
16134    in collections",
16135    "type": "integer"
16136  },
16137  "p": {
16138    "description": "Specifies the framework policies on the Resource referenced by the target
16139    URI",
16140    "properties": {
16141      "bm": {
16142        "description": "Specifies the framework policies on the Resource referenced by the
16143        target URI for e.g. observable and discoverable",
16144        "type": "integer"
16145      }
16146    },
16147    "required": [
16148      "bm"
16149    ],
16150    "type": "object"
16151  },
16152  "rel": {
16153    "description": "The relation of the target URI referenced by the link to the context
16154    URI",
16155    "oneOf": [
16156      {
16157        "default": [
16158          "hosts"
16159        ],
16160        "items": {
16161          "maxLength": 64,
16162          "type": "string"
16163        },
16164        "minItems": 1,
16165        "type": "array"
16166      },
16167      {
16168        "default": "hosts",
16169        "maxLength": 64,
16170        "type": "string"
16171      }
16172    ],
16173  },

```

```

16174     "rt": {
16175         "description": "Resource Type of the Resource",
16176         "items": {
16177             "maxLength": 64,
16178             "type": "string"
16179         },
16180         "minItems": 1,
16181         "type": "array"
16182     },
16183     "title": {
16184         "description": "A title for the link relation. Can be used by the UI to provide a
16185         context.",
16186         "maxLength": 64,
16187         "type": "string"
16188     },
16189     "type": {
16190         "default": "application/cbor",
16191         "description": "A hint at the representation of the resource referenced by the target
16192         URI. This represents the media types that are used for both accepting and emitting.",
16193         "items": {
16194             "maxLength": 64,
16195             "type": "string"
16196         },
16197         "minItems": 1,
16198         "type": "array"
16199     }
16200 },
16201     "required": [
16202         "href",
16203         "rt",
16204         "if"
16205     ],
16206     "type": "object"
16207 }
16208
16209 }
16210
16211

```

F.14.5 Property Definition

Property name	Value type	Mandatory	Access mode	Description
rt	array: schema	see	Read Only	Resource Type of the Resource
lastScene	string			Last selected Scene from the set of sceneValues
rts	array: schema	see	Read Only	Resource Type of the Resource
links	array: schema	see		A set of simple or individual OIC Links.
if	array: schema	see	Read Only	The interface set supported by this resource
sceneValues	array: schema	see	Read Only	All available scene values
id	string		Read Only	Instance ID of this specific resource
n	string		Read Only	Friendly name of the resource
rt	array: schema	see	Read Only	Resource Type of the Resource

lastScene	string			Last selected Scene from the set of sceneValues
n	string		Read Only	Friendly name of the resource
id	string		Read Only	Instance ID of this specific resource
if	array: see schema		Read Only	The interface set supported by this resource
links	array: see schema			A set of simple or individual OIC Links.
links	array: see schema			A set of simple or individual OIC Links.
rts	multiple types: see schema			The list of allowable resource types (for Target and anchors) in links included in the collection
rt	array: see schema	yes		Resource Type of the Resource
di	multiple types: see schema			The device ID
anchor	string			This is used to override the context URI e.g. override the URI of the containing collection.
type	array: see schema			A hint at the representation of the resource referenced by the target URI. This represents the media types that are used for both accepting and emitting.
title	string			A title for the link relation. Can be used by the UI to provide a context.
ins	integer			The instance identifier for this web link in an array of web links

				- used in collections
href	string	yes		This is the target URI, it can be specified as a Relative Reference or fully-qualified URI.
eps	array: see schema			the Endpoint information of the target Resource
rel	multiple types: see schema			The relation of the target URI referenced by the link to the context URI
p	object: see schema			Specifies the framework policies on the Resource referenced by the target URI
if	array: see schema	yes		The interface set supported by this resource
rt	array: see schema	yes	Read Only	Resource Type of the Resource
link	multiple types: see schema			
SceneMappings	array: see schema			array of mappings per scene, can be one(1)
n	string		Read Only	Friendly name of the resource
id	string		Read Only	Instance ID of this specific resource
if	array: see schema	yes	Read Only	The interface set supported by this resource
rt	array: see schema		Read Only	Resource Type of the Resource
links	array: see schema			A set of simple or individual OIC Links.

16213

F.14.6 CRUDN behaviour

Resource	Create	Read	Update	Delete	Notify
/SceneMemberResURI		get			

16214

16215
16216
16217
16218

Annex G
(informative)

Swagger2.0 Schema Extension

16219

G.1 Swagger 2.0 Schema Reference

16220 Swagger 2.0 does not support allOf and anyOf JSON schema validation constructs; this
16221 specification has extended the underlying Swagger 2.0 schema to enable these, all Swagger 2.0
16222 files are valid against the extended schema. Please reference the following location for a copy of
16223 the extended schema:

16224 <https://github.com/openconnectivityfoundation/OCFswagger2.0-schema>

16225

G.2 Swagger 2.0 Introspection empty file

16226 Reference the following location for a copy of an empty Swagger2.0 file:

16227 <https://github.com/openconnectivityfoundation/DeviceBuilder/blob/master/examples/introspection-empty.txt>

16228

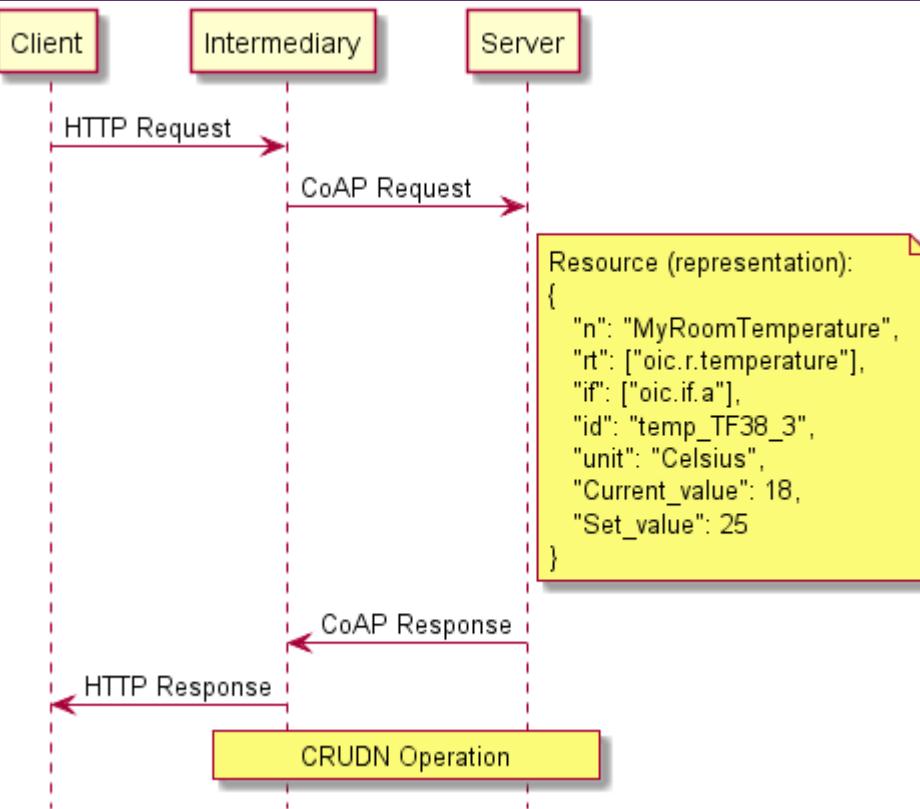


Figure 4

Request: GET /a/room/1?if=oic.if.b

Becomes the following individual request messages issued by the Device in the Client role

GET /a/room/1 (NOTE: uses the batch Interface as specified for batch requests sent to Collections)

GET /the/light/1 (NOTE: Uses the Default Interface as specified for this resource)

GET /the/light/2 (NOTE: Uses the Default Interface as specified for this resource)

GET /my/fan/1 (NOTE: Uses the Default Interface as specified for this resource)

GET /his/fan/2 (NOTE: Uses the Default Interface as specified for this resource)

GET /the/switches/1?rt=oic.if.b (NOTE: Uses the batch Interface for the Collection that is within the Collection)

Response:

```

    "rep": {"value": "false"} }

]
}

]

```

Page 65: [3] Deleted

Bardini, Richard A

3/19/18 6:22:00 AM

The Properties of a Collection may not be modified.

1.1.1.1

Page 65: [4] Deleted

Bardini, Richard A

3/19/18 6:27:00 AM

For the default Resource Type, the value of “links” shall be a simple array of Links.

The default Resource Type shall support the ‘baseline’ and ‘links list’ Interfaces. The default Interface shall be the ‘links list’ Interface.

Page 69: [5] Deleted

Michael Koster

4/24/18 3:47:00 PM

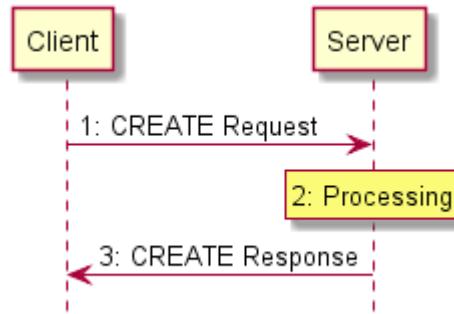


Figure 9

Page 71: [6] Deleted

Michael Koster

4/24/18 3:47:00 PM

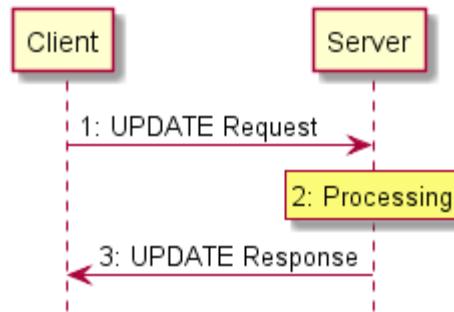


Figure 11

Page 73: [7] Deleted

Michael Koster

4/24/18 3:47:00 PM

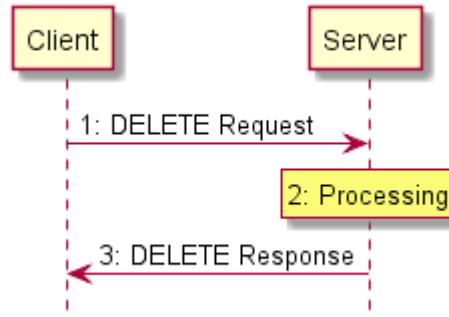


Figure 12

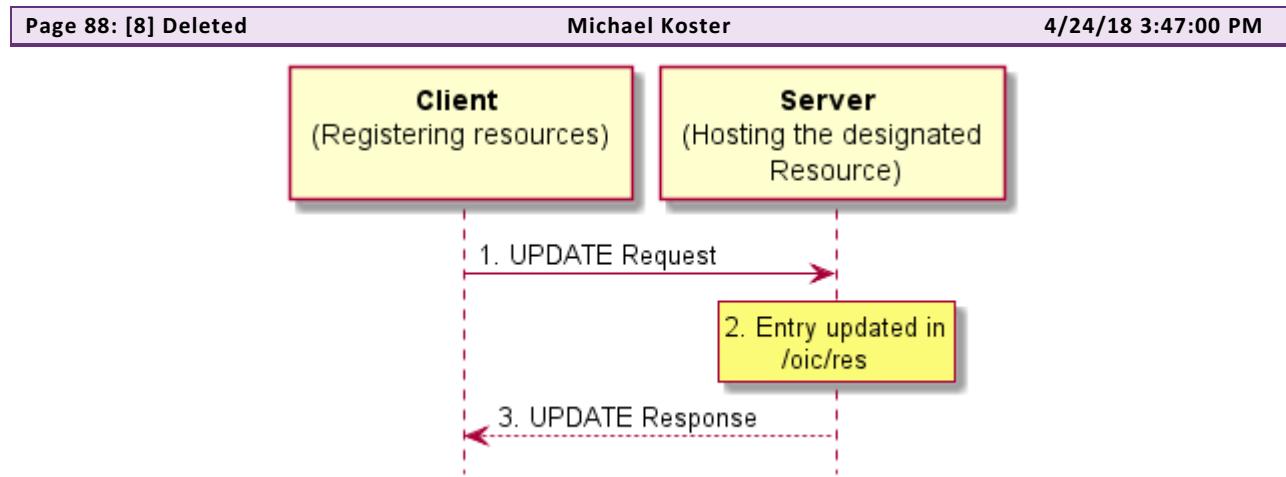


Figure 14

Page 90: [9] Deleted	Bardini, Richard A	3/16/18 3:15:00 PM
Messaging Protocol	mpro	SSV R No String with Space Separated Values (SSV) of messaging protocols supported as a SI Number from Table 19 For example, "1 and 3" indicates that the Device supports coap and http as messaging protocols.

A Device which wants to indicate its messaging protocol capabilities may add the property 'mpro' in response to a request on "/oic/res".

Page 100: [10] Deleted	Michael Koster	4/24/18 3:47:00 PM
------------------------	----------------	--------------------

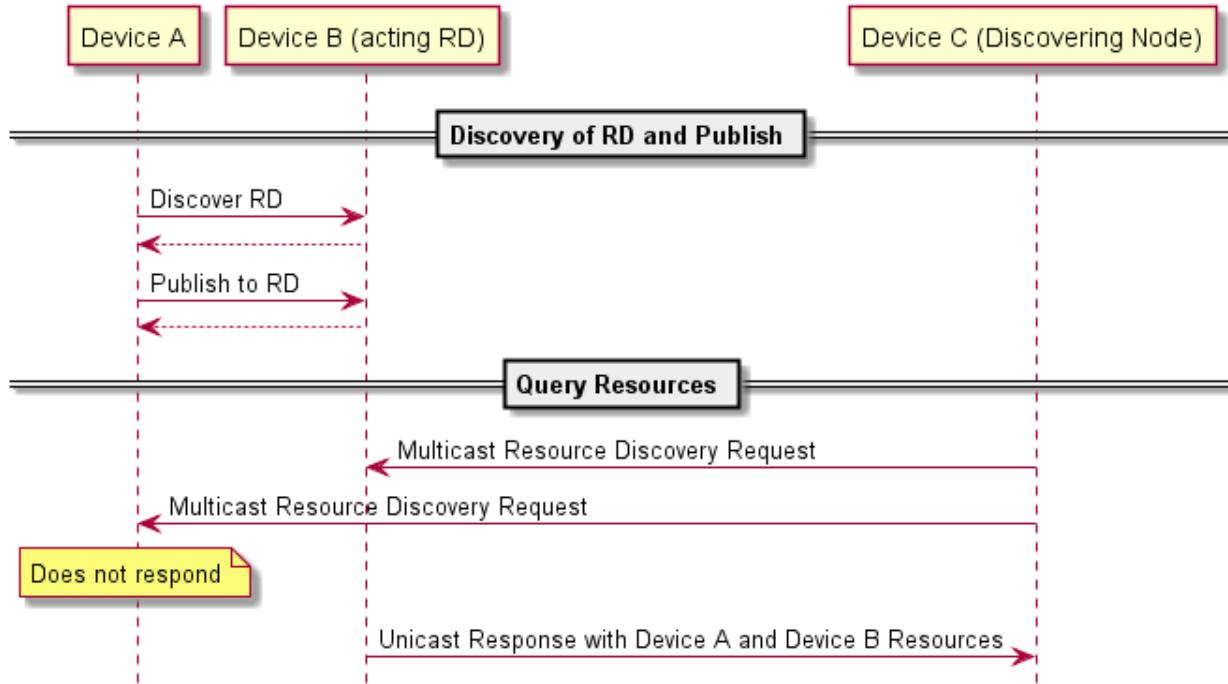


Figure 17

Page 122: [11] Deleted

Bardini, Richard A

3/19/18 1:24:00 PM

The Resources “/oic/d”, “/oic/p”, the Introspection Resource and the Security Virtual Resources may be included in the Introspection Device Data.

The “/oic/d”, “/oic/p”, “/oic/res” and the Security Virtual Resources shall be included when 3rd party defined or optional Properties are implemented. All other Core Specification defined Resources shall be included when 3rd party defined Properties are implemented.

Page 132: [12] Deleted

Bardini, Richard A

3/19/18 2:18:00 AM

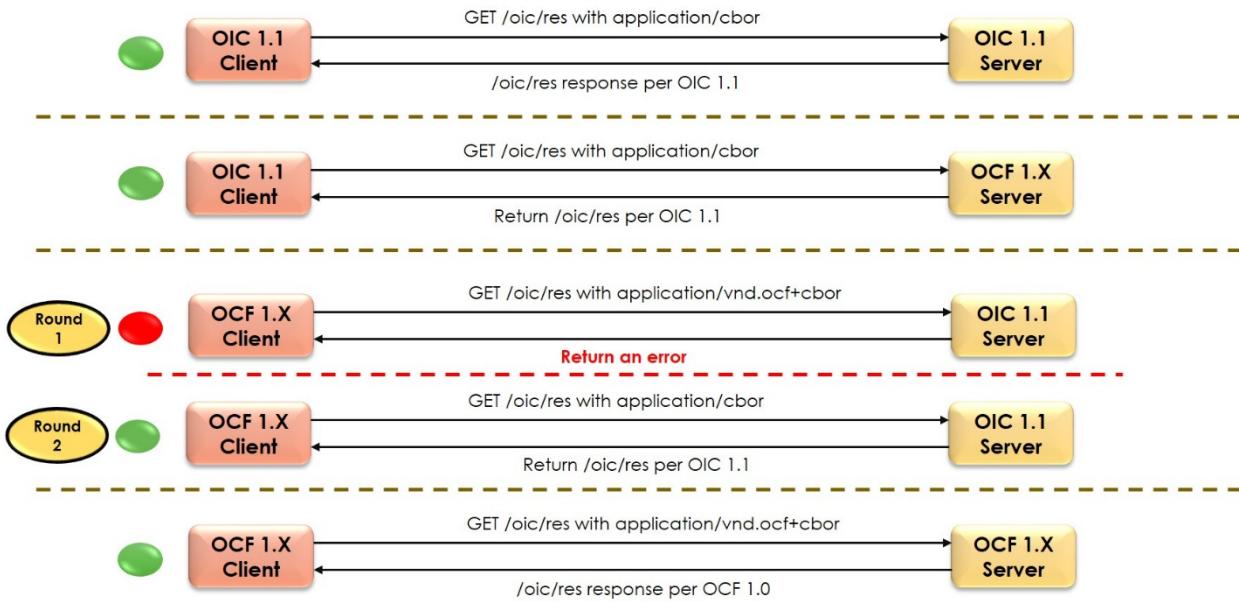


Figure 25 Content-Format Policy

Page 134: [13] Deleted

Michael Koster

4/24/18 3:47:00 PM

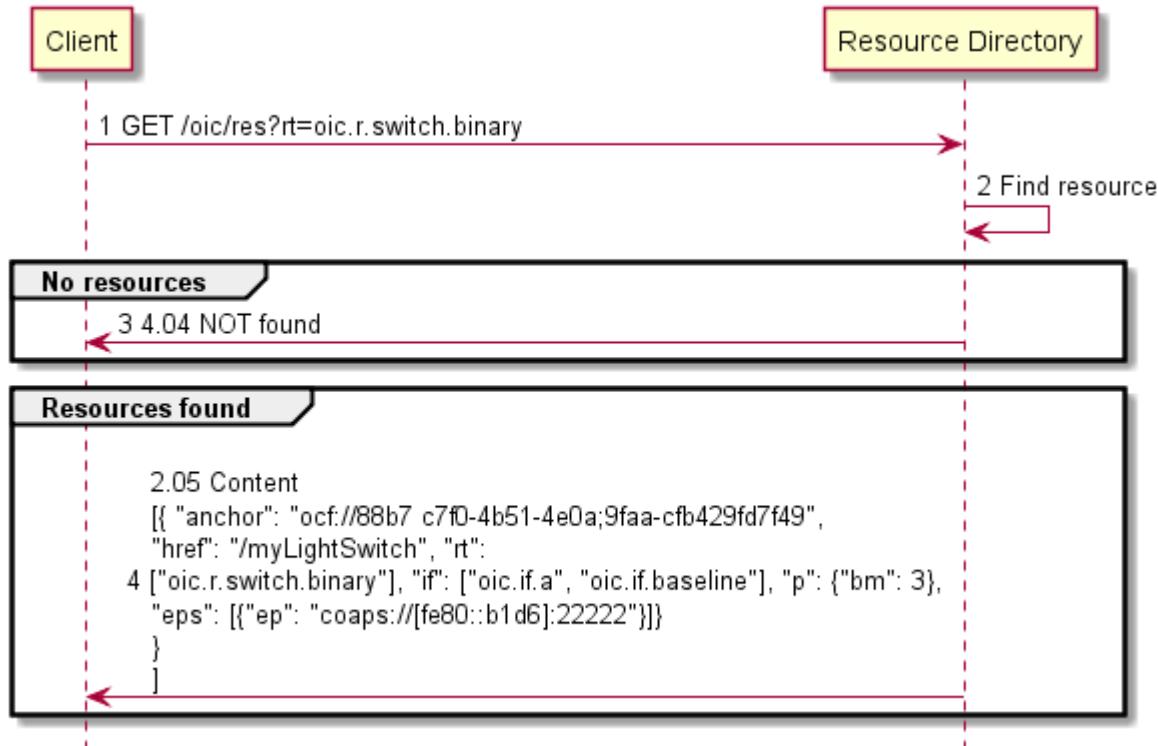


Figure 30

Page 135: [14] Deleted

Michael Koster

4/24/18 3:47:00 PM

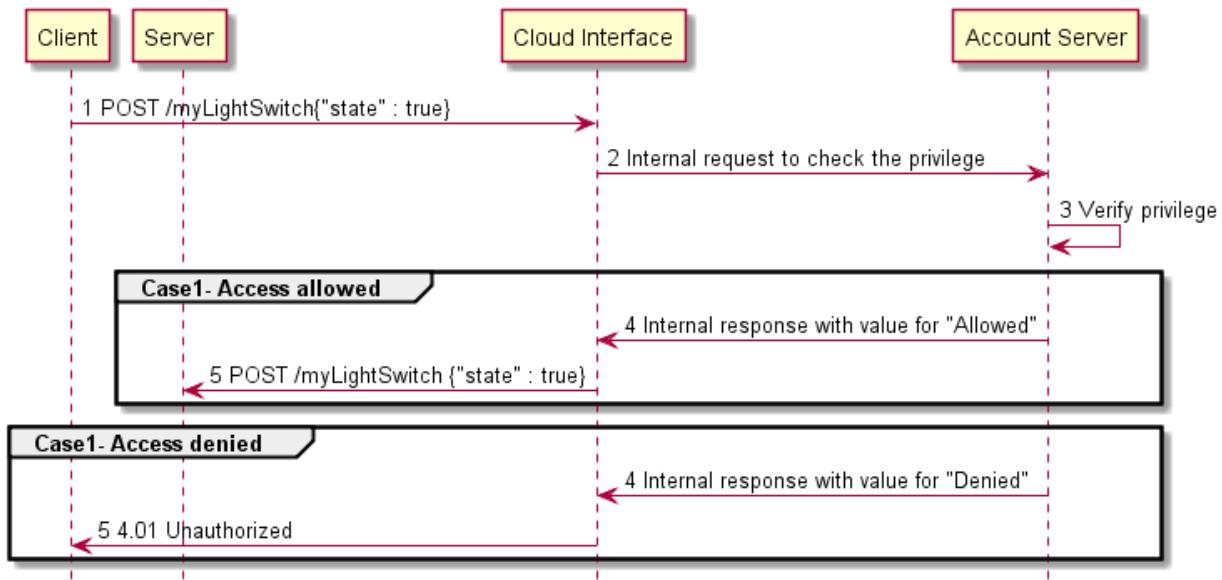


Figure 31

Page 186: [15] Deleted		Bardini, Richard A	3/16/18 3:20:00 PM	
mpro	string		Read Only	Supported messaging protocols[BRA1]
Page 299: [16] Deleted		Bardini, Richard A	3/16/18 3:21:00 PM	
mpro	string		Read Only	Supported messaging protocols[BRA2]