

# OCF Core Specification

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612		

## 613 1 Scope

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

- 615 • Core Specification documents: The Core Specification documents specify the Framework, i.e.,  
616 the OCF core architecture, interfaces, protocols and services to enable OCF profiles  
617 implementation for Internet of Things (IoT) usages and ecosystems.
- 618 • Vertical Domain Specification documents: The Vertical Domain Specification documents  
619 specify OCF Device profiles to enable IoT usages for different vertical market segments such  
620 as smart home, industrial, healthcare, and automotive. They also specify Resource definitions  
621 to enable vertical services and use case. Such specifications include the Device Specification  
622 which is built upon the interfaces and network security of the OCF core architecture defined in  
623 the Core Specification.

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

625

## 626 2 Normative references

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

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### 746 **3 Terms, definitions, symbols and abbreviations**

#### 747 **3.1 Terms and definitions**

##### 748 **3.1.1**

##### 749 **Atomic Measurement**

750 a design pattern that ensures that the Client can only access the Properties of linked Resources  
751 atomically, that is as a single group

##### 752 **3.1.2**

##### 753 **Client**

754 a logical entity that accesses a Resource on a Server

##### 755 **3.1.3**

##### 756 **Collection**

757 a Resource that contains zero or more Links

##### 758 **3.1.4**

##### 759 **Common Properties**

760 Properties specified for all Resources

##### 761 **3.1.5**

##### 762 **Composite Device**

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

##### 765 **3.1.6**

##### 766 **Configuration Source**

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

##### 769 **3.1.7**

##### 770 **Core Resources**

771 those Resources that are defined in this specification

##### 772 **3.1.8**

##### 773 **Default Interface**

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

##### 775 **3.1.9**

##### 776 **Device**

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

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

779 **3.1.10**  
780 **Device Type**  
781 a uniquely named definition indicating a minimum set of Resource Types that a Device supports

782 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  
783 Resource discovery.

784 **3.1.11**  
785 **Discoverable Resource**  
786 a Resource that is listed in “/oic/res”

787 **3.1.12**  
788 **Endpoint**  
789 the source or destination of a request and response messages for a given Transport Protocol Suite

790 Note 1 to entry: Example of a Transport Protocol Suite would be CoAP over UDP over IPv6.

791 **3.1.13**  
792 **Entity**  
793 an aspect of the physical world that is exposed through a Device

794 Note 1 to entry: Example of an entity is an LED.

795 **3.1.14**  
796 **Framework**  
797 a set of related functionalities and interactions defined in this specification, which enable  
798 interoperability across a wide range of networked devices, including IoT

799 **3.1.15**  
800 **Interface**  
801 provides a view and permissible responses on a Resource

802 **3.1.16**  
803 **Introspection**  
804 mechanism to determine the capabilities of the hosted Resources of a Device

805 **3.1.17**  
806 **Introspection Device Data (IDD)**  
807 data that describes the payloads per implemented method of the Resources that make up the  
808 Device

809 Note 1 to entry: See section 11.8 for all requirements and exceptions

810 **3.1.18**  
811 **Links**  
812 extends typed web links according to IETF RFC 5988

813 **3.1.19**  
814 **Non-Discoverable Resource**  
815 A Resource that is not listed in “/oic/res”. The Resource can be reached by a Link which is  
816 conveyed by another resource. For example a Resource linked in a Collection Resource does not  
817 have to be listed in “/oic/res”, since traversing the Collection Resource would discover the  
818 Resource implemented on the device.

819 **3.1.20**  
820 **Non-OCF Device**  
821 A device which does not comply with the OCF Device requirements

822 **3.1.21**  
823 **Notification**  
824 the mechanism to make a Client aware of resource state changes in a Resource

825 **3.1.22**  
826 **Observe**  
827 the act of monitoring a Resource by sending a RETRIEVE request which is cached by the Server  
828 hosting the Resource and reprocessed on every change to that Resource

829 **3.1.23**  
830 **Parameter**  
831 an element that provides metadata about a Resource referenced by the target URI of a Link

832 **3.1.24**  
833 **Partial UPDATE**  
834 an UPDATE request to a Resource that includes a subset of the Properties that are visible via the  
835 Interface being applied for the Resource Type

836 **3.1.25**  
837 **Physical Device**  
838 the physical thing on which a Device(s) is exposed

839 **3.1.26**  
840 **Platform**  
841 a physical device containing one or more Devices

842 **3.1.27**  
843 **Resource**  
844 represents an Entity modelled and exposed by the Framework

845 **3.1.28**  
846 **Resource Directory**  
847 a set of descriptions of Resources where the actual Resources are held on Servers external to the  
848 Device hosting the Resource Directory, allowing lookups to be performed for those resources

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

851 **3.1.29**  
852 **Resource Interface**  
853 a qualification of the permitted requests on a Resource

854 **3.1.30**  
855 **Property**  
856 a significant aspect or parameter of a resource, including metadata, that is exposed through the  
857 Resource

858 **3.1.31**  
859 **Resource Type**  
860 a uniquely named definition of a class of Properties and the interactions that are supported by that  
861 class

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

863 **3.1.32**  
864 **Scene**  
865 a static entity that stores a set of defined Property values for a collection of Resources

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

868 **3.1.33**  
869 **Scene Collection**  
870 a collection Resource that contains an enumeration of possible Scene Values and the current  
871 Scene Value

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

873 **3.1.34**  
874 **Scene Member**  
875 a Resource that contains mappings of Scene Values to values of a property in the resource

876 **3.1.35**  
877 **Scene Value**  
878 a Scene enumerator representing the state in which a Resource can be

879 **3.1.36**  
880 **Secure Endpoint**  
881 an Endpoint with a secure connection (e.g., CoAPS)

882 **3.1.37**  
883 **Server**  
884 a Device with the role of providing resource state information and facilitating remote interaction  
885 with its resources

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

887 **3.1.38**  
888 **Unsecure Endpoint**  
889 an Endpoint with an unsecure connection (e.g., CoAP)

890 **3.1.39**  
891 **Vertical Resource Type**  
892 a Resource Type in a vertical domain specification

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

## 894 **3.2 Symbols and abbreviations**

895 **3.2.1**  
896 **ACL**  
897 Access Control List

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

899 **3.2.2**  
900 **BLE**  
901 Bluetooth Low Energy

902 **3.2.3**  
903 **CBOR**  
904 Concise Binary Object Representation

905 **3.2.4**  
906 **CoAP**  
907 Constrained Application Protocol

908 **3.2.5**  
909 **CoAPS**  
910 Secure Constrained Application Protocol



911 **3.2.6**  
912 **DTLS**  
913 Datagram Transport Layer Security

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

915 **3.2.7**  
916 **EXI**  
917 Efficient XML Interchange

918 **3.2.8**  
919 **IP**  
920 Internet Protocol

921 **3.2.9**  
922 **IRI**  
923 Internationalized Resource Identifiers

924 **3.2.10**  
925 **ISP**  
926 Internet Service Provider

927 **3.2.11**  
928 **JSON**  
929 JavaScript Object Notation

930 **3.2.12**  
931 **mDNS**  
932 Multicast Domain Name Service

933 **3.2.13**  
934 **MTU**  
935 Maximum Transmission Unit

936 **3.2.14**  
937 **NAT**  
938 Network Address Translation

939 **3.2.15**  
940 **OCF**  
941 Open Connectivity Foundation

942 the organization that created this specification

943 **3.2.16**  
944 **RAML**  
945 RESTful API Modeling Language

946 **3.2.17**  
947 **REST**  
948 Representational State Transfer

949 **3.2.18**  
950 **RESTful**  
951 REST-compliant Web services

952 **3.2.19**  
953 **UDP**  
954 User Datagram Protocol

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

956 **3.2.20**  
957 **URI**  
958 Uniform Resource Identifier

959 **3.2.21**  
960 **URN**  
961 Uniform Resource Name

962 **3.2.22**  
963 **UTC**  
964 Coordinated Universal Time

965 **3.2.23**  
966 **UUID**  
967 Universal Unique Identifier

968 **3.2.24**  
969 **XML**  
970 Extensible Markup Language

### 971 **3.3 Conventions**

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

### 976 **3.4 Data types**

977 Resources are defined using data types derived from JSON values as defined in IETF RFC 7159.  
978 However, a Resource can overload a JSON defined value to specify a particular subset of the  
979 JSON value, using validation keywords defined in JSON Schema Validation.

980  
981 Among other validation keywords, section 7 in JSON Schema Validation defines a “format”  
982 keyword with a number of format attributes such as “uri” and “date-time”, and a “pattern” keyword  
983 with a regular expression that can be used to validate a string. This section defines patterns that  
984 are available for use in describing OCF Resources. The pattern names can be used in specification  
985 text where JSON format names can occur. The actual JSON schemas shall use the JSON type  
986 and pattern instead.

987

988 For all rows defined in Table 1 below, the JSON type is string.

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(?:!\$)([0-9]+Y)?([0-9]+M)?([0-9]+W)?([0-9]+D)?(T(?:=[0-9]+[HMS])([0-9]+H)?([0-9]+M)?([0-9]+S)?))?)\$^(P[0-9]+W)\$^(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, and 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.
int64	^0 (-?[1-9][0-9]{0,18})\$	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	^[A-Za-z]{1,8}(-[A-Za-z0-9]{1,8})*\$	An IETF language tag formatted according to IETF RFC 5646 section 2.1.
uint64	^0 ([1-9][0-9]{0,19})\$	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	^[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}\$	A UUID string representation formatted according to IETF RFC 4122 section 3.

990

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

992

993 In a JSON schema, “maxLength” for a string indicates the maximum number of characters not  
 994 octets. However, “maxLength” shall also indicate the maximum number of octets. If no “maxLength”  
 995 is defined for a string, then the maximum length shall be 64 octets.

#### 996 4 Document conventions and organization

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

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

- 1000 • These basic features shall be implemented to comply with Core Architecture. The phrases  
 1001 “shall not”, and “PROHIBITED” indicate behaviour that is prohibited, i.e. that if performed  
 1002 means the implementation is not in compliance.

1003 Recommended (or should)(S).

- 1004 • These features add functionality supported by Core Architecture and should be implemented.  
1005 Recommended features take advantage of the capabilities Core Architecture, usually without  
1006 imposing major increase of complexity. Notice that for compliance testing, if a recommended  
1007 feature is implemented, it shall meet the specified requirements to be in compliance with these  
1008 guidelines. Some recommended features could become requirements in the future. The phrase  
1009 “should not” indicates behaviour that is permitted but not recommended.

1010 Allowed (may or allowed)(O).

- 1011 • These features are neither required nor recommended by Core Architecture, but if the feature  
1012 is implemented, it shall meet the specified requirements to be in compliance with these  
1013 guidelines.

1014 DEPRECATED.

- 1015 • Although these features are still described in this specification, they should not be implemented  
1016 except for backward compatibility. The occurrence of a deprecated feature during operation of  
1017 an implementation compliant with the current specification has no effect on the  
1018 implementation’s operation and does not produce any error conditions. Backward compatibility  
1019 may require that a feature is implemented and functions as specified but it shall never be used  
1020 by implementations compliant with this specification.

1021 Conditionally allowed (CA)

- 1022 • The definition or behaviour depends on a condition. If the specified condition is met, then the  
1023 definition or behaviour is allowed, otherwise it is not allowed.

1024 Conditionally required (CR)

- 1025 • The definition or behaviour depends on a condition. If the specified condition is met, then the  
1026 definition or behaviour is required. Otherwise the definition or behaviour is allowed as default  
1027 unless specifically defined as not allowed.

1028

1029 Strings that are to be taken literally are enclosed in “double quotes”.

1030 Words that are emphasized are printed in italic.

1031 In all of the Property and Resource Definition Tables that are included throughout this document  
1032 the “Mandatory” column indicates that the item detailed is mandatory to implement; the mandating  
1033 of inclusion of the item in a Resource Payload associated with a CRUDN action is dependent on  
1034 the applicable schema for that action.

## 1035 **5 Architecture**

### 1036 **5.1 Overview**

1037 The architecture enables resource based interactions among IoT artefacts, i.e. physical devices  
1038 or applications. The architecture leverages existing industry standards and technologies and  
1039 provides solutions for establishing connections (either wireless or wired) and managing the flow of  
1040 information among devices, regardless of their form factors, operating systems or service providers.

1041 Specifically, the architecture provides:

- 1042 • A communication and interoperability framework for multiple market segments (Consumer,  
1043 Enterprise, Industrial, Automotive, Health, etc.), OSs, platforms, modes of communication,  
1044 transports and use cases

- 1045 • A common and consistent model for describing the environment and enabling information  
1046 and semantic interoperability
- 1047 • Common communication protocols for discovery and connectivity
- 1048 • Common security and identification mechanisms
- 1049 • Opportunity for innovation and product differentiation
- 1050 • A scalable solution addressing different device capabilities, applicable to smart devices as  
1051 well as the smallest connected things and wearable devices

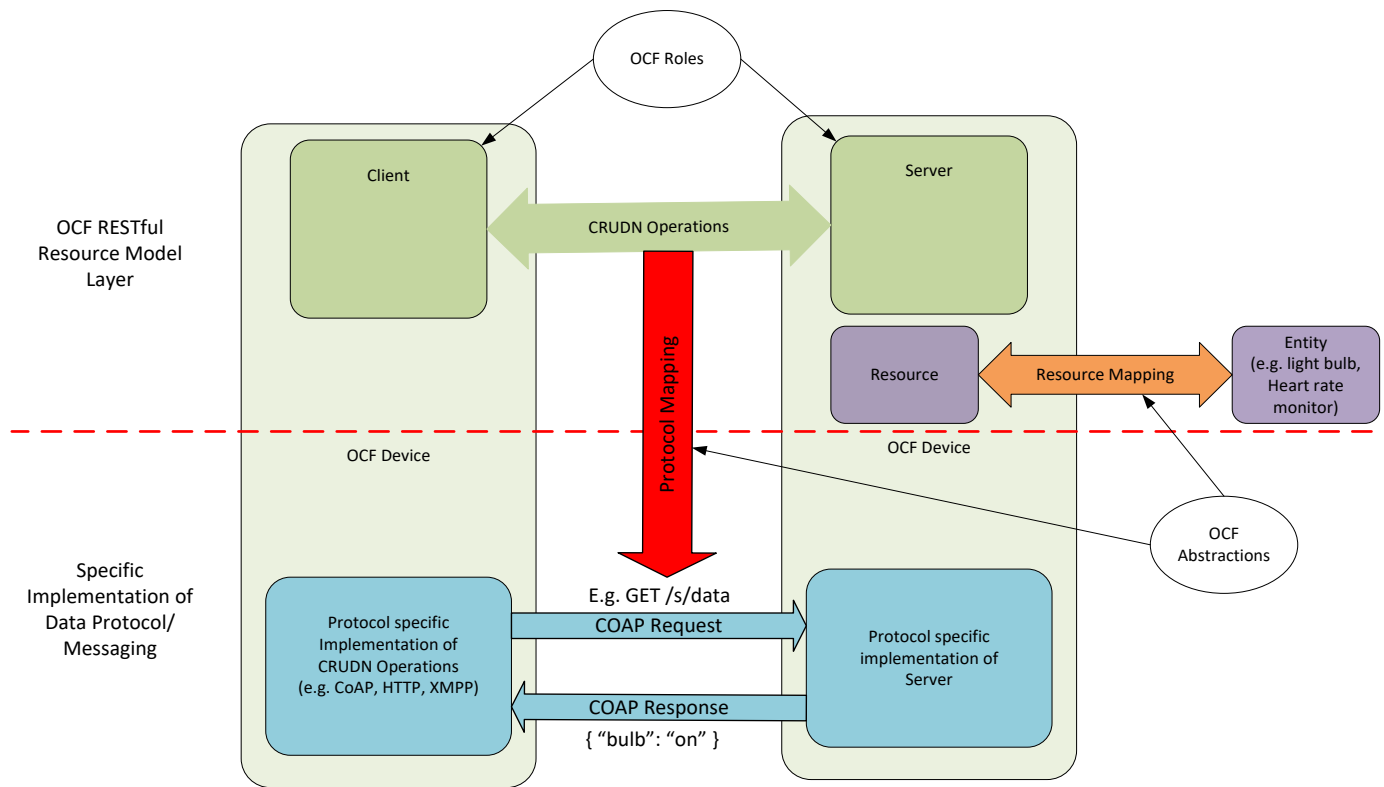
1052 The architecture is based on the Resource Oriented Architecture design principles and described  
1053 in the sections 5.2 through 5.6 respectively. Section 5.2 presents the guiding principles for OCF  
1054 operations. Section 5.3 defines the functional block diagram and Framework. Section 5.5 provides  
1055 an example scenario with roles. Section 5.6 provides an example scenario of bridging to non- OCF  
1056 ecosystem.

## 1057 **5.2 Principle**

1058 In the architecture, Entities in the physical world (e.g., temperature sensor, an electric light or a  
1059 home appliance) are represented as resources. Interactions with an Entity are achieved through  
1060 its resource representations (section 7.7) using operations that adhere to Representational State  
1061 Transfer (REST) architectural style, i.e., RESTful interactions.

1062 The architecture defines the overall structure of the Framework as an information system and the  
1063 interrelationships of the Entities that make up OCF. Entities are exposed as Resources, with their  
1064 unique identifiers (URIs) and support interfaces that enable RESTful operations on the Resources.  
1065 Every RESTful operation has an initiator of the operation (the client) and a responder to the  
1066 operation (the server). In the Framework, the notion of the client and server is realized through  
1067 roles (section 5.5). Any Device can act as a Client and initiate a RESTful operation on any Device  
1068 acting as a Server. Likewise, any Device that exposes Entities as Resources acts as a Server.  
1069 Conformant to the REST architectural style, each RESTful operation contains all the information  
1070 necessary to understand the context of the interaction and is driven using a small set of generic  
1071 operations, i.e., CREATE, RETRIEVE, UPDATE, DELETE and NOTIFY (CRUDN) defined in  
1072 section 8, which include representations of Resources.

1073 Figure 1 depicts the architecture.



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**Figure 1: Architecture - concepts**

1078 The architecture is organized conceptually into three major aspects that provide overall separation  
1079 of concern: resource model, RESTful operations and abstractions.

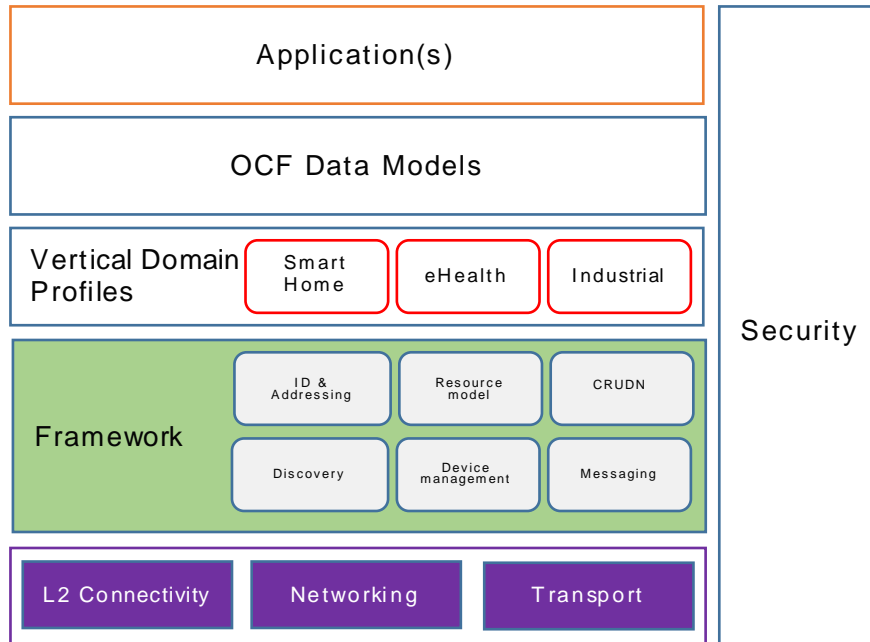
- 1080
- 1081 • Resource model: The resource model provides the abstractions and concepts required to  
1082 logically model, and logically operate on the application and its environment. The core resource  
1083 model is common and agnostic to any specific application domain such as smart home,  
1084 industrial or automotive. For example, the resource model defines a Resource which abstracts  
1085 an Entity and the representation of a Resource maps the Entity's state. Other resource model  
concepts can be used to model other aspects, for example behaviour.
  - 1086 • RESTful operations: The generic CRUDN operations are defined using the RESTful paradigm  
1087 to model the interactions with a Resource in a protocol and technology agnostic way. The  
1088 specific communication or messaging protocols are part of the protocol abstraction and  
1089 mapping of Resources to specific protocols is provided in section 11.8.
  - 1090 • Abstraction: The abstractions in the resource model and the RESTful operations are mapped  
1091 to concrete elements using abstraction primitives. An entity handler is used to map an Entity  
1092 to a Resource and connectivity abstraction primitives are used to map logical RESTful  
1093 operations to data connectivity protocols or technologies. Entity handlers may also be used to  
1094 map Resources to Entities that are reached over protocols that are not natively supported by  
1095 OCF.

1096

1097 **5.3 Functional block diagram**

1098 The functional block diagram encompasses all the functionalities required for operation. These  
1099 functionalities are categorized as L2 connectivity, networking, transport, Framework, and  
1100 application profiles. The functional blocks are depicted in Figure 2 and listed below.

1101

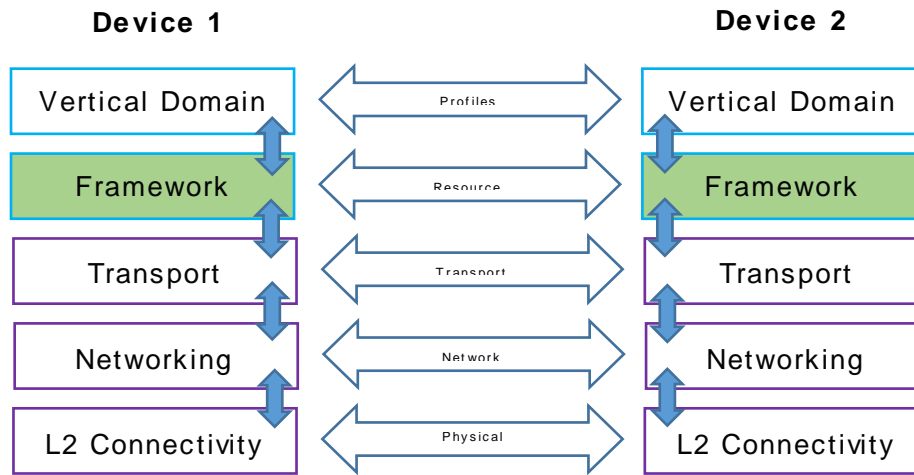


1102

**Figure 2: Functional block diagram**

- 1103 • **L2 connectivity:** Provides the functionalities required for establishing physical and data  
1104 link layer connections (e.g., Wi-Fi™ or Bluetooth® connection) to the network.
- 1105 • **Networking:** Provides functionalities required for Devices to exchange data among  
1106 themselves over the network (e.g., Internet).
- 1107 • **Transport:** Provides end-to-end flow transport with specific QoS constraints. Examples of  
1108 a transport protocol include TCP and UDP or new Transport protocols under development  
1109 in the IETF, e.g., Delay Tolerant Networking (DTN).
- 1110 • **Framework:** Provides the core functionalities as defined in this specification. The  
1111 functional block is the source of requests and responses that are the content of the  
1112 communication between two Devices.
- 1113 • **Vertical Domain profile:** Provides market segment specific functionalities, e.g., functions  
1114 for the smart home market segment.

1115 When two Devices communicate with each other, each functional block in a Device interacts with  
1116 its counterpart in the peer Device as shown in Figure 3.



1118

**Figure 3: Communication layering model**

#### 1119 5.4 Framework

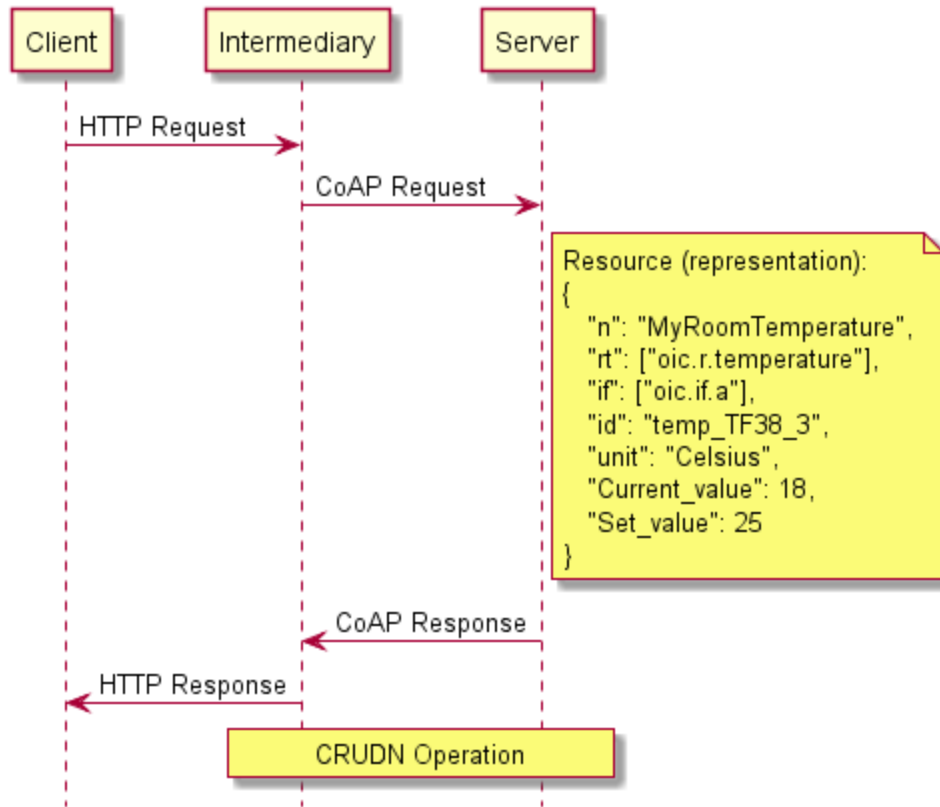
1120 Framework consists of functions which provide core functionalities for operation.

- 1121 1) **Identification and addressing.** Defines the identifier and addressing capability. The  
1122 Identification and addressing function is defined in section 6.
- 1123 2) **Discovery.** Defines the process for discovering available  
1124 a) Devices (Endpoint Discovery in section 10) and  
1125 b) Resources (Resource discovery in section 11.3)
- 1126 3) **Resource model.** Specifies the capability for representation of Entities in terms of resources  
1127 and defines mechanisms for manipulating the resources. The resource model function is  
1128 defined in section 7.
- 1129 4) **CRUDN.** Provides a generic scheme for the interactions between a Client and Server as  
1130 defined in section 8.
- 1131 5) **Messaging.** Provides specific message protocols for RESTful operation, i.e. CRUDN. For  
1132 example, CoAP is a primary messaging protocol. The messaging function is defined in section  
1133 11.8.
- 1134 6) **Device management.** Specifies the discipline of managing the capabilities of a Device, and  
1135 includes device provisioning and initial setup as well as device monitoring and diagnostics.  
1136 The device management function is defined in section 11.5.
- 1137 7) **Security.** Includes authentication, authorization, and access control mechanisms required for  
1138 secure access to Entities. The security function is defined in section 13.

#### 1139 5.5 Example Scenario with roles

1140 Interactions are defined between logical entities known as Roles. Three roles are defined: Client,  
1141 Server and Intermediary.



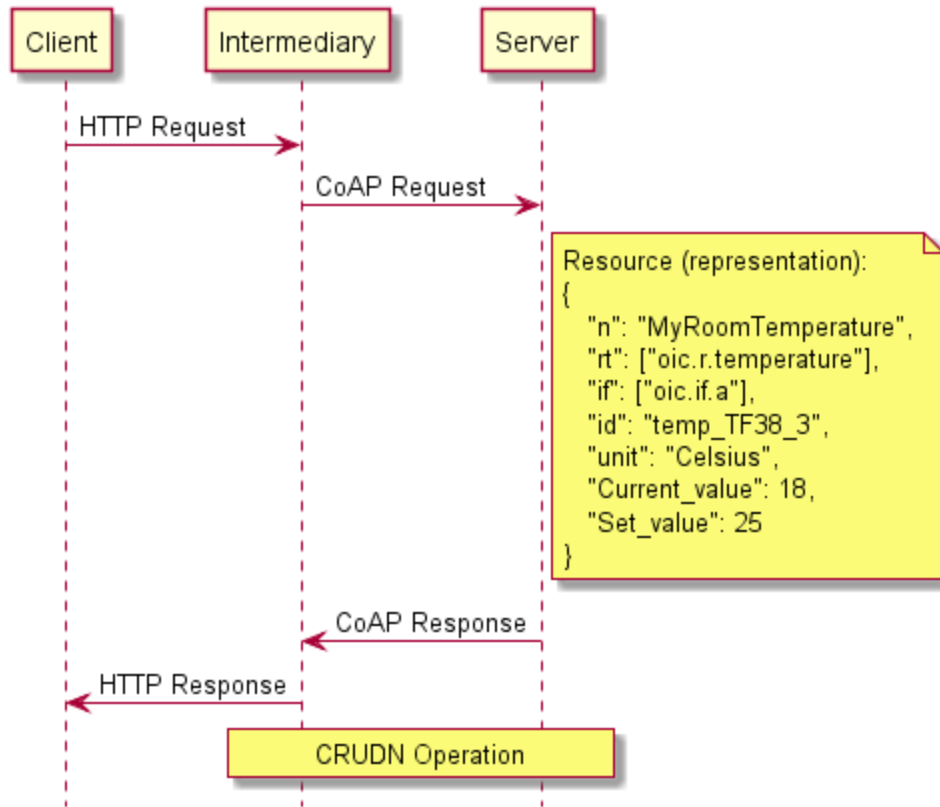


1142  
1143

1144 Figure 4 illustrates an example of the Roles in a scenario where a smart phone sends a request  
 1145 message to a thermostat; the original request is sent over HTTP, but is translated into a CoAP  
 1146 request message by a gateway in between, and then delivered to the thermostat. In this  
 1147 example, the smart phone takes the role of a Client, the gateway takes the role of an  
 1148 Intermediary and the thermostat takes the role of a Server.



1149



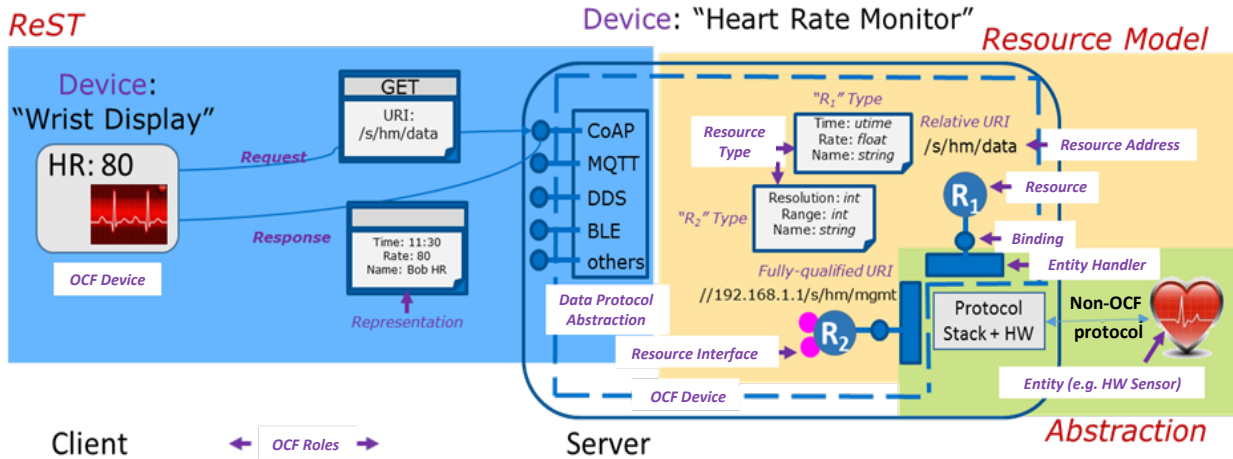
1150  
1151

1152 **Figure 4: Example illustrating the Roles**

1153 **5.6 Example Scenario: Bridging to Non- OCF ecosystem**

1154 The use case for this scenario is a display (like a wrist watch) that is used to monitor a heart rate  
1155 sensor that implements a protocol that is not OCF supported.

1156 Figure 5 provides a detailed logical view of the concepts described in Figure 1.

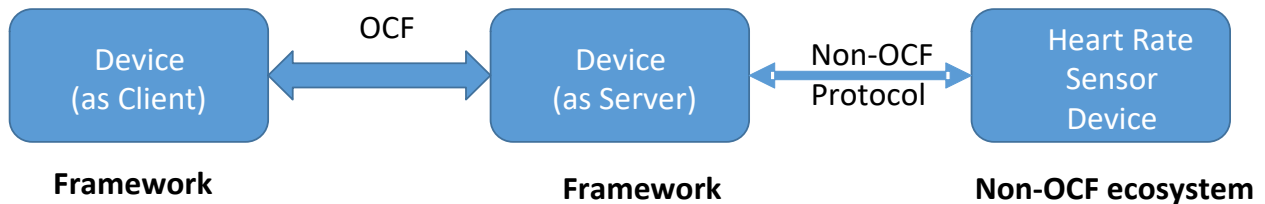


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Figure 5: Framework - Architecture Detail

1159  
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1161 The details may be implemented in many ways, for example, by using a Server with an entity  
1162 handler to interface directly to a non- OCF device as shown in Figure 6.



1163  
1164

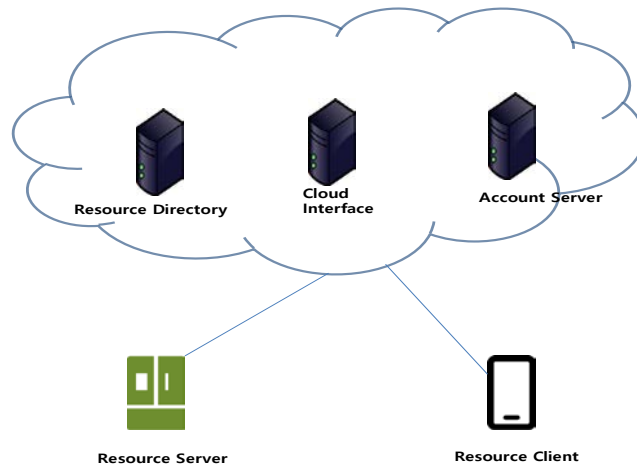
Figure 6: Server bridging to Non- OCF device

1166 On start-up the Server runs the entity handlers which discover the non- OCF systems (e.g., Heart  
1167 Rate Sensor Device) and create resources for each device or functionality discovered. The entity  
1168 handler creates a Resource for each discovered device or functionality and binds itself to that  
1169 Resource. These resources are made discoverable by the Server.

1170 Once the resources are created and made discoverable, then the Display Device can discover  
1171 these resources and operate on them using the mechanisms described in this specification. The  
1172 requests to a resource on the Server are then interpreted by the entity handler and forwarded to  
1173 the non- OCF device using the protocol supported by the non-OCF device. The returned  
1174 information from the non- OCF device is then mapped to the appropriate response for that resource.

## 1175 5.7 OCF Cloud architecture

1176 This section describes the architecture of OCF Cloud in Figure 7:



1177

1178

**Figure 7: OCF Cloud deployment architecture**

1179

The Cloud architecture comprises of following three network entities:

1180

- *Cloud Interface Server* – A logical entity to which an OCF Device primarily. It encapsulates Account Server and Resource Directory features. The Cloud Interface routes the packet between OCF Devices based on the request URI in the packet header. The Client needs to keep the persistent connection alive to the Server

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1182

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- *Account Server* – A logical entity that handles Device registration, Auth Token validation and handles sign-in and token-refresh requests from the Device.

1185

1186

- *Resource Directory* – A logical entity holding resource information published by Servers. A Client when looking for a Resource receives a response from the Resource Directory on behalf of the Server. Then with information included in the response form the Resource Directory, the Client directly connects to the Server.

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

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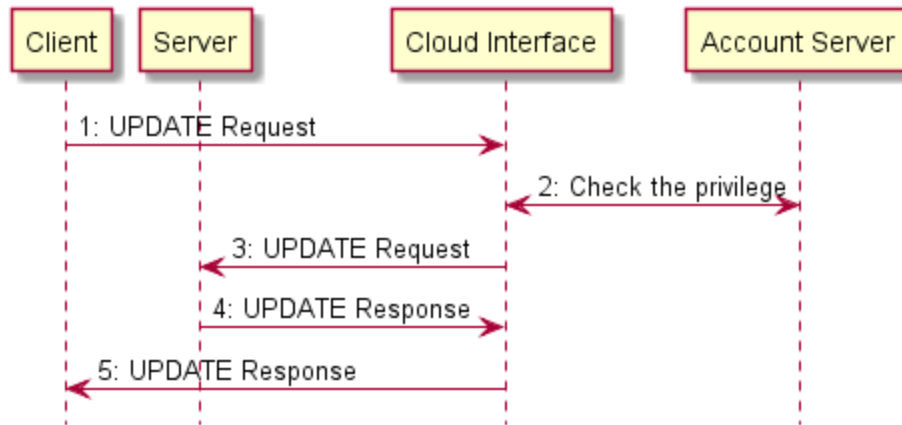


Figure 8: Endpoint routing

## 6 Identification and addressing

### 6.1 Introduction

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

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

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

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

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

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

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

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

### 6.2 Identification

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

1225 are guaranteed to be unambiguous across all contexts and domains both spatially and temporally.  
1226 The context-specific identifiers could be defined by simple schemes like monotonic enumeration  
1227 or may be defined by overloading an address or name, for example an IP address may be an  
1228 identifier within the private domain behind a gateway in a smart home. On the other hand, context-  
1229 independent identifiers require a stronger scheme that derives universally unique identities, for  
1230 example any one of the versions of Universally Unique Identifiers (UUIDs). Context independent  
1231 identifier may also be generated using hierarchy of domains where the root of the hierarchy is  
1232 identified with a UUID and sub-domains may generate context independent identifier by  
1233 concatenating context-specific identifiers for that domain to the context-independent identifier of  
1234 their parent.

### 1235 **6.2.1 Resource identification and addressing**

1236 A resource may be identified using a URI and addressed by the same URI if the URI is a URL. In  
1237 some cases a resource may need an identifier that is different from a URI; in this case, the resource  
1238 may have a property whose value is the identifier. When the URI is in the form of a URL, then the  
1239 URI may be used to address the resource.

1240 An OCF URI is based on the general form of a URI as defined in IETF RFC 3986 as follows:

1241 **<scheme>://<authority>/<path>?<query>**

1242 Specifically the OCF URI is specified in the following form:

1243 **ocf://<authority>/<path>?<query>**

1244 A description of values that each component takes is given below.

1245 The *scheme* for the URI is 'ocf'. The 'ocf' scheme represents the semantics, definitions and use  
1246 as defined in this document. If a URI has the portion preceding the '/' (double slash) omitted, then  
1247 the 'ocf' scheme shall be assumed.

1248 Each transport binding is responsible for specifying how an OCF URI is converted to a transport  
1249 protocol URI before sending over the network by the requestor. Similarly on the receiver side, each  
1250 transport binding is responsible for specifying how an OCF URI is converted from a transport  
1251 protocol URI before handing over to the resource model layer on the receiver.

1252 The authority of an OCF URI shall be the Device ID ("di") value, as defined in [OCF Security], of  
1253 the Server.

1254 The *path* is a string that unambiguously identifies or references a resource within the context of  
1255 the Server. In this version of the specification, a path shall not include pct-encoded non-ASCII  
1256 characters or NUL characters. A *path* shall be preceded by a '/' (slash). The *path* may have '/'  
1257 (slash) separated segments for human readability reasons. In the OCF context, the '/' (slash)  
1258 separated segments are treated as a single string that directly references the resources (i.e. a flat  
1259 structure) and not parsed as a hierarchy. On the Server, the path or some substring in the path  
1260 may be shortened by using hashing or some other scheme provided the resulting reference is  
1261 unique within the context of the host.

1262 Once a path is generated, a Client accessing the resource or recipient of the URI should use that  
1263 path as an opaque string and should not parse to infer a structure, organization or semantic.

1264 A query string shall contain a list of <name>=<value> segments (aka "name-value pair") each  
1265 separated by a '&' (ampersand). The query string will be mapped to the appropriate syntax of the  
1266 protocol used for messaging. (e.g., CoAP).

1267 A URI may be either

1268       • Fully qualified or

1269       • Relative

1270    *Generation of URI:*

1271    A URI may be defined by the Client which is the creator of that resource. Such a URI may be  
1272    relative or absolute (fully qualified). A relative URI shall be relative to the Device on which it is  
1273    hosted. Alternatively, a URI may be generated by the Server of that resource automatically based  
1274    on a pre-defined convention or organization of the resources, based on an interface, based on  
1275    some rules or with respect to different roots or bases.

1276    *Use of URI:*

1277    The absolute path reference of a URI is to be treated as an opaque string and a Client should not  
1278    infer any explicit or implied structure in the URI – the URI is simply an address. It is also  
1279    recommended that Devices hosting a resource treat the URI of each resource as an opaque string  
1280    that addresses only that resource. (e.g., URI's /a and /a/b are considered as distinct addresses  
1281    and resource b cannot be construed as a child of resource a).

### 1282    **6.3    Namespace:**

1283    The relative URI prefix “/oic/” is reserved as a namespace for URIs defined in OCF specifications  
1284    and shall not be used for URIs that are not defined in OCF specifications.

### 1285    **6.4    Network addressing**

1286    The following are the addresses used in this specification:

1287       • **IP address**

1288    An IP address is used when the device is using an IP configured interface.

1289    When a Device only has the identity information of its peer, a resolution mechanism is needed to  
1290    map the identifier to the corresponding address.

## 1291    **7    Resource model**

### 1292    **7.1    Introduction**

1293    The Resource Model defines concepts and mechanisms that provide consistency and core  
1294    interoperability between devices in the OCF ecosystems. The Resource Model concepts and  
1295    mechanisms are then mapped to the transport protocols to enable communication between the  
1296    devices – each transport provides the communication protocol interoperability. The Resource  
1297    Model, therefore, allows for interoperability to be defined independent of the transports.

1298    In addition, the concepts in the Resource Model support modelling of the primary artefacts and  
1299    their relationships to one and another and capture the semantic information required for  
1300    interoperability in a context. In this way, OCF goes beyond simple protocol interoperability to  
1301    capture the rich semantics required for true interoperability in Wearable and Internet of Things  
1302    ecosystems.

1303    The primary concepts in the Resource Model are: Entity, Resources, Uniform Resource Identifiers  
1304    (URI), Resource Types, Properties, Representations, Interfaces, Collections and Links. In addition,  
1305    the general mechanisms are CREATE, RETRIEVE, UPDATE, DELETE and NOTIFY. These  
1306    concepts and mechanisms may be composed in various ways to define the rich semantics and  
1307    interoperability needed for a diverse set of use cases that the OCF framework is applied to.

1308 In the OCF Resource Model framework, an Entity needs to be visible, interacted with or  
1309 manipulated, it is represented by an abstraction called a Resource. A Resource encapsulates and  
1310 represents the state of an Entity. A Resource is identified, addressed and named using URIs.

1311 Properties are "key=value" pairs and represent state of the Resource. A snapshot of these  
1312 Properties is the Representation of the Resource. A specific view of the Representation and the  
1313 mechanisms applicable in that view are specified as Interfaces. Interactions with a Resource are  
1314 done as Requests and Responses containing Representations.

1315 A resource instance is derived from a Resource Type. The uni-directional relationship between  
1316 one Resource and another Resource is defined as a Link. A Resource that has Properties and  
1317 Links is a Collection.

1318 A set of Properties can be used to define a state of a Resource. This state may be retrieved or  
1319 updated using appropriate Representations respectively in the response from and request to that  
1320 Resource.

1321 A Resource (and Resource Type) could represent and be used to expose a capability. Interactions  
1322 with that Resource can be used to exercise or use that capability. Such capabilities can be used  
1323 to define processes like discovery, management, advertisement etc. For example: "discovery of  
1324 resources on a device" can be defined as the retrieval of a representation of a specific resource  
1325 where a property or properties have values that describe or reference the resources on the device.

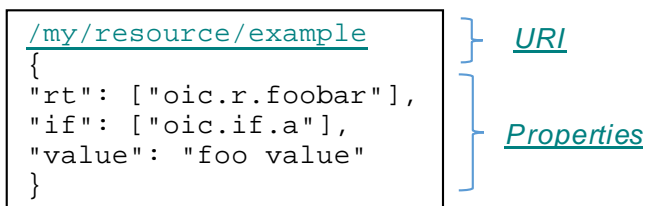
1326 The information for Request or Response with the Representation may be communicated "on the  
1327 wire" by serializing using a transfer protocol or encapsulated in the payload of the transport  
1328 protocol – the specific method is determined by the normative mapping of the Request or Response  
1329 to the transport protocol. See section 11.8 for transport protocols supported.

1330 The RAML definitions used in this document are normative. This also includes that all defined  
1331 JSON payloads shall comply with the indicated JSON schema. See Annex D for Resource Types  
1332 defined in this specification.

## 1333 7.2 Resource

1334 A Resource shall be defined by one or more Resource Type(s) – see Annex D for Resource Type.  
1335 A request to CREATE a Resource shall specify one or more Resource Types that define that  
1336 Resource.

1337 A Resource is hosted in a Device. A Resource shall have a URI as defined in section 6. The URI  
1338 may be assigned by the Authority at the creation of the Resource or may be pre-defined by the  
1339 specification of the Resource Type.



1340  
1341 Core Resources are the Resources defined in this specification to enable functional interactions  
1342 as defined in section 10 (e.g., Discovery, Device Management, etc). Among the Core Resources,  
1343 "/oic/res", "/oic/p", and "/oic/d" shall be supported on all Devices. Devices may support other Core  
1344 Resources depending on the functional interactions they support.



## 1345 7.3 Property

### 1346 7.3.1 Introduction

1347 A Property describes an aspect that is exposed through a Resource including meta-information  
1348 related to that Resource.

1349 A Property shall have a name i.e. Property Name and a value i.e. Property Value. The Property is  
1350 expressed as a key-value pair where key is the Property Name and value the Property Value like  
1351 <Property Name> = <Property Value>. For example if the “temperature” Property has a Property  
1352 Name “temp” and a Property Value “30F”, then the Property is expressed as “temp=30F”. The  
1353 specific format of the Property depends on the encoding scheme. For example, in JSON, Property  
1354 is represented as "key": value (e.g., "temp": 30).

1355 In addition, the Property definition shall have a

- 1356 • **Value Type** – the Value Type defines the values that a Property Value may take. The Value  
1357 Type may be a simple data type (e.g. string, Boolean) as defined in section 3.4 or may be a  
1358 complex data type defined with a schema. The Value Type may define
  - 1359 ○ Value Rules define the rules for the set of values that the Property Value may take.  
1360 Such rules may define the range of values, the min-max, formulas, the set of  
1361 enumerated values, patterns, conditional values, and even dependencies on values  
1362 of other Properties. The rules may be used to validate the specific values in a  
1363 Property Value and flag errors.
- 1364 • **Mandatory** – specifies if the Property is mandatory or not for a given Resource Type.
- 1365 • **Access modes** – specifies whether the Property may be read, written or both. Updates are  
1366 equivalent to a write. “r” is used for read and “w” is used for write – both may be specified.  
1367 Write does not automatically imply read.

1368 The definition of a Property may include the following additional information – these items are  
1369 informative:

- 1370 • **Property Title** - a human-friendly name to designate the Property; usually not sent over the  
1371 wire
- 1372 • **Description** – descriptive text defining the purpose and expected use of this Property.

1373 In general, a Property is meaningful only within the Resource to which it is associated. However a  
1374 base set of Properties that may be supported by all Resources, known as Common Properties,  
1375 keep their semantics intact across Resources i.e. their “key=value” pair means the same in any  
1376 Resource. Detailed tables with the above fields for all Common Properties are defined in section  
1377 7.3.2.

## 1378 7.3.2 Common Properties

### 1379 7.3.2.1 Introduction

1380 The Common Properties defined in this section may be specified for all Resources. The following  
1381 Properties are defined as Common Properties: “Resource Type”, “Resource Interface”, “Name”,  
1382 and “Resource Identity”.

1383 The name of a Common Property shall be unique and shall not be used by other properties. When  
1384 defining a new Resource Type, its non-common properties shall not use the name of existing  
1385 Common Properties (e.g., “rt”, “if”, “n”, “id”). When defining a new “Common Property”, it should  
1386 be ensured that its name has not been used by any other properties. The uniqueness of a new  
1387 Common Property name can be verified by checking all the Properties of all the existing OCF  
1388 defined Resource Types. However, this may become cumbersome as the number of Resource  
1389 Types grow. To prevent such name conflicts in the future, OCF may reserve a certain name space  
1390 for common property. Potential approaches are (1) a specific prefix (e.g. “oic”) may be designated

1391 and the name preceded by the prefix (e.g. "oic.psize") is only for Common Property; (2) the names  
 1392 consisting of one or two letters are reserved for Common Property and all other Properties shall  
 1393 have the name with the length larger than the 2 letters; (3) Common Properties may be nested  
 1394 under specific object to distinguish themselves.

1395 The ability to UPDATE a Common Property (that supports write as an access mode) is restricted  
 1396 to the "oic.if.rw" (read-write) Interface; thus a Common Property shall be updatable using the read-  
 1397 write Interface if and only if the Property supports write access as defined by the Property definition  
 1398 and the associated schema for the read-write Interface.

1399 The following Common Properties for all Resources are specified in section 7.3.2.2 through section  
 1400 7.3.2.6 and summarized as follows:

- 1401 • Resource Type ("rt") – this Property is used to declare the Resource Type of that Resource.  
 1402 Since a Resource could be define by more than one Resource Type the Property Value of the  
 1403 Resource Type Property can be used to declare more than one Resource type. For example:  
 1404 "rt": ["oic.wk.d", "oic.d.airconditioner"] declares that the Resource containing this Property is  
 1405 defined by either the "oic.wk.d" Resource Type or the "oic.d.airconditioner" Resource Type.  
 1406 See section 7.3.2.3 for details.
- 1407 • Interface ("if") – this Property declares the Interfaces supported by the Resource. The Property  
 1408 Value of the Interface Property can be multi-valued and lists all the Interfaces supported. See  
 1409 section 7.3.2.4 for details.
- 1410 • Name ("n") – the Property declares "human-readable" name assigned to the Resource. See  
 1411 section 7.3.2.5.
- 1412 • Resource Identity ("id"): its Property Value shall be a unique (across the scope of the host  
 1413 Server) instance identifier for a specific instance of the Resource. The encoding of this identifier  
 1414 is device and implementation dependent. See section 7.3.2.6 for details.

1415 **7.3.2.2 Property Name and Property Value definitions**

1416 The Property Name and Property Value as used in this specification:

- 1417 • **Property Name**– the key in "key=value" pair. Property Name is case sensitive and its data type  
 1418 is "string". Property names shall contain only letters A to Z, a to z, digits 0 to 9, hyphen, and  
 1419 dot, and shall not begin with a digit.
- 1420 • **Property Value** – the value in "key=value" pair. Property Value is case sensitive when its data  
 1421 type is "string".

1422 **7.3.2.3 Resource Type**

1423 Resource Type Property is specified in section 7.4.

1424 **7.3.2.4 Interface**

1425 Interface Property is specified in section 7.6.

1426 **7.3.2.5 Name**

1427 A human friendly name for the Resource, i.e. a specific resource instance name (e.g.,  
 1428 MyLivingRoomLight), The Name Property is as defined in Table 2

1429 **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.

1430 The 'Name' Property is read-write unless otherwise restricted by the Resource Type (i.e. the  
1431 Resource Type does not support UPDATE or does not support UPDATE using read-write).

### 1432 7.3.2.6 Resource Identity

1433 The Resource Identity Property shall be a unique (across the scope of the host Server) instance  
1434 identifier for a specific instance of the Resource. The encoding of this identifier is device and  
1435 implementation dependent as long as the uniqueness constraint is met, noting that an  
1436 implementation may use a uuid as defined in section 3.4. The Resource Identity Property is as  
1437 defined in Table 3.

1438 **Table 3. Resource Identity Property Definition**

1439

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)

1440

## 1441 7.4 Resource Type

### 1442 7.4.1 Introduction

1443 Resource Type is a class or category of Resources and a Resource is an instance of one or more  
1444 Resource Types.

1445 The Resource Types of a Resource is declared using the Resource Type Common Property as  
1446 described in section 7.3.2.3 or in a Link using the Resource Type Parameter.

1447 A Resource Type may either be pre-defined by OCF or in custom definitions by manufacturers,  
1448 end users, or developers of Devices (vendor-defined Resource Types). Resource Types and their  
1449 definition details may be communicated out of band (i.e. in documentation) or be defined explicitly  
1450 using a meta-language which may be downloaded and used by APIs or applications. OCF has  
1451 adopted RAML and JSON Schema as the specification method for OCF's RESTful interfaces and  
1452 Resource definitions.

1453 Every Resource Type shall be identified with a Resource Type ID which shall be represented using  
1454 the requirements and ABNF governing the Resource Type attribute in IETF RFC 6690(section 2  
1455 for ABNF and section 3.1 for requirements) with the caveat that segments are separated by a "."  
1456 (period). The entire string represents the Resource Type ID. When defining the ID each segment  
1457 may represent any semantics that are appropriate to the Resource Type. For example, each  
1458 segment could represent a namespace. Once the ID has been defined, the ID should be used  
1459 opaquely and an implementations should not infer any information from the individual segments.  
1460 The string "oic", when used as the first segment in the definition of the Resource Type ID, is  
1461 reserved for OCF-defined Resource Types. All OCF defined Resource Types are to be registered  
1462 with the IANA Core Parameters registry as described also in IETF RFC 6690.

### 1463 7.4.2 Resource Type Property

1464 A Resource when instantiated or created shall have one or more Resource Types that are the  
1465 template for that Resource. The Resource Types that the Resource conforms to shall be declared  
1466 using the "rt" Common Property for the Resource. The Property Value for the "rt" Common Property  
1467 shall be the list of Resource Type IDs for the Resource Types used as templates (i.e., "rt"=<list of  
1468 Resource Type IDs>).

**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

1470 Resource Types may be explicitly discovered or implicitly shared between the user (i.e. Client) and  
 1471 the host (i.e. Server) of the Resource.

### 1472 7.4.3 Resource Type definition

1473 Resource Type is specified as follows:

- 1474 • **Pre-defined URI** (optional) – a pre-defined URI may be specified for a specific Resource Type  
 1475 in an OCF specification. When a Resource Type has a pre-defined URI, all instances of that  
 1476 Resource Type shall use only the pre-defined URI. An instance of a different Resource Type  
 1477 shall not use the pre-defined URI.
- 1478 • **Resource Type Title (optional)** – a human friendly name to designate the Resource Type.
- 1479 • **Resource Type ID** – the value of "rt" Property which identifies the Resource Type, (e.g.,  
 1480 "oic.wk.p").
- 1481 • **Resource Interfaces** – list of the interfaces that may be supported by the Resource Type.
- 1482 • **Properties** – definition of all the Properties that apply to the Resource Type. The Resource  
 1483 Type definition shall define whether a property is mandatory, conditional mandatory, or optional.
- 1484 • **Related Resource Types** (optional) – the specification of other Resource Types that may be  
 1485 referenced as part of the Resource Type, applicable to collections.
- 1486 • **Mime Types** (optional) – mime types supported by the resource including serializations (e.g.,  
 1487 application/cbor, application/json, application/xml).

1488 Table 5 and Table 6 provide an example description of an illustrative foobar Resource Type and  
 1489 its associated Properties.

1490

**Table 5. Example foobar Resource Type**

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

1491

**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

1492

1493 An instance of the foobar Resource Type is as shown below

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

1494

1495 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"]
  }
}
```

1496

#### 1497 7.4.4 Multi-value "rt" Resource

1498 Multi-value "rt" Resource means a Resource with multiple Resource Types where none of the  
1499 included Resource Types denote a well-known Resource Type (i.e. "oic.wk.<thing>"). Such a  
1500 Resource is associated with multiple Resource Types and so has an "rt" Property Value of multiple  
1501 Resource Type IDs (e.g. "rt": ["oic.r.switch.binary", "oic.r.light.brightness"]). The order of the  
1502 Resource Type IDs in the "rt" Property Value is meaningless. For example, "rt":  
1503 ["oic.r.switch.binary", "oic.r.light.brightness"] and "rt": ["oic.r.light.brightness", "oic.r.switch.binary"]  
1504 have the same meaning.

1505 Resource Types for multi-value "rt" Resources shall satisfy the following conditions.

- 1506 • **Property Name** – Property Names for each Resource Type shall be unique (within the scope  
1507 of the multi-value "rt" Resource) with the exception of Common Properties, otherwise there will  
1508 be conflicting Property semantics. If two Resource Types have a Property with the same  
1509 Property Name, a multi-value "rt" Resource shall not be composed of these Resource Types.

1510 A multi-value "rt" Resource satisfies all the requirements for each Resource Type and conforms to  
1511 the RAML/JSON definitions for each component Resource Type. Thus the mandatory Properties

1512 of a multi-value "rt" Resource shall be the union of all the mandatory Properties of each Resource  
1513 Type. For example, mandatory Properties of a Resource with "rt": ["oic.r.switch.binary",  
1514 "oic.r.light.brightness"] are "value" and "brightness", where the former is mandatory for  
1515 "oic.r.switch.binary" and the latter for "oic.r.light.brightness".

1516 The multi-value "rt" Resource Interface set shall be the union of the sets of interfaces from the  
1517 component Resource Types. The Resource Representation in response to a CRUDN action on an  
1518 Interface shall be the union of the schemas that are defined for that Interface. The Default Interface  
1519 for a multi-value "rt" Resource shall be the baseline Interface ("oic.if.baseline") as that is the only  
1520 guaranteed common Interface between the Resource Types.

1521 For clarity if each Resource Type supports the same set of Interfaces, then the resultant multi-  
1522 value "rt" Resource has that same set of Interfaces with a Default Interface of baseline  
1523 ("oic.if.baseline").

1524 See section 7.10.3 for the handling of query parameters as applied to a multi-value "rt" Resource.

## 1525 **7.5 Device Type**

1526 A Device Type is a class of Device. Each Device Type defined will include a list of minimum  
1527 Resource Types that a device shall implement for that Device Type. A device may expose  
1528 additional standard and vendor defined Resource Types beyond the minimum list. The Device  
1529 Type is used in Resource discovery as specified in section 11.3.4.

1530 Like a Resource Type, a Device Type can be used in the Resource Type Common Property or in  
1531 a Link using the Resource Type Parameter.

1532 A Device Type may either be pre-defined (in the OCF Device specification) or in custom definitions  
1533 by manufacturers, end users, or developers of Devices (vendor-defined Device Types). Device  
1534 Types and their definition details may be communicated out of band (like in documentation).

1535 Every Device Type shall be identified with a Resource Type ID using the same syntax constraints  
1536 as a Resource Type.

## 1537 **7.6 Interface**

### 1538 **7.6.1 Introduction**

1539 An Interface provides first a view into the Resource and then defines the requests and responses  
1540 permissible on that view of the Resource. So this view provided by an Interface defines the context  
1541 for requests and responses on a Resource. Therefore, the same request to a Resource when  
1542 targeted to different Interfaces may result in different responses.

1543 An Interface may be defined by either this specification (a Core Interface), the OCF Device  
1544 specifications (a "vertical Interface") or manufacturers, end users or developers of Devices (a  
1545 "vendor-defined Interface").

1546 The Interface Property lists all the Interfaces the Resource support. All resources shall have at  
1547 least one Interface. The Default Interface shall be defined by an OCF specification and inherited  
1548 from the Resource Type definition. The Default Interface associated with all Resource Types  
1549 defined in this specification shall be the supported Interface listed first within the applicable  
1550 enumeration in the definition of the Resource Type (see Annex D). All Default Interfaces specified  
1551 in an OCF specification shall be mandatory.

1552 In addition to any OCF specification defined interface, all Resources shall support the Baseline  
1553 Interface ("oic.if.baseline") as defined in section 7.6.3.2.

1554 See section 7.10.4 for the use of queries to enable selection of a specific interface in a request.

1555 An Interface may accept more than one media type. An Interface may respond with more than one  
 1556 media type. The accepted media types may be different from the response media types. The media  
 1557 types are specified with the appropriate header parameters in the transfer protocol. (NOTE: This  
 1558 feature has to be used judiciously and is allowed to optimize representations on the wire) Each  
 1559 Interface shall have at least one media type.

1560

1561 **7.6.2 Interface Property**

1562 **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.

1563 The Interfaces supported by a Resource shall be declared using the Interface Common Property  
 1564 (Table 7) as "if=<array of Interfaces>". The Property Value of an Interface Property shall be a  
 1565 lower case string with segments separated by a "." (dot). The string "oic", when used as the first  
 1566 segment in the Interface Property Value, is reserved for OCF-defined Interfaces. The Interface  
 1567 Property Value may also be a reference to an authority similar to IANA that may be used to find  
 1568 the definition of an Interface. A Resource Type shall support one or more of the Interfaces defined  
 1569 in section 7.6.3.

1570 **7.6.3 Interface methods**

1571 **7.6.3.1 Overview**

1572 The OCF-defined Interfaces are listed in the table below:

1573 **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 or 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.

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.

1574

### 1575 7.6.3.2 Baseline Interface

#### 1576 7.6.3.2.1 Overview

1577 The Representation that is visible using the "baseline" Interface includes all the Properties of the  
1578 Resource including the Common Properties. The "baseline" Interface shall be defined for all  
1579 Resource Types. All Resources shall support the "baseline" Interface.

#### 1580 7.6.3.2.2 Use of RETRIEVE

1581 The "baseline" Interface is used when a Client wants to retrieve all Properties of a Resource; that  
1582 is the Server shall respond with a Resource representation that includes all of the implemented  
1583 Properties of the Resource. When the Server is unable to send back the whole Resource  
1584 representation, it shall reply with an error message. The Server shall not return a partial Resource  
1585 representation.

1586 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]
}
```

1587

#### 1588 7.6.3.2.3 Use of UPDATE

1589 Using the baseline Interface, all Properties of a Resource with the exception of Common Properties  
1590 may be modified using an UPDATE request with a list of Properties and their desired values if a  
1591 Resource Type has an associated schema for UPDATE using baseline. If the Interfaces exposed  
1592 by a Resource in addition to the baseline Interface do not support the UPDATE semantic then  
1593 UPDATE using the baseline Interface is also not supported.

### 1594 7.6.3.3 Link List Interface

#### 1595 7.6.3.3.1 Overview

1596 The links list Interface provides a view into the list of Links in a Collection (Resource). The  
1597 Representation visible through this Interface has only the Links exposed as Property(-ies) that  
1598 is(are) an array (or arrays) of Links by the Resource – so this Interface is used to manipulate or  
1599 interact with the list of Links in a Collection. The Links list may be RETRIEVED using this Interface.

1600 The Interface definition and semantics are given as follows:

- 1601 • The links list Interface name shall be "oic.if.ll".
- 1602 • In response to a RETRIEVE request on the "links list" Interface, the URIs of the referenced  
1603 Resources shall be returned as a URI reference.
- 1604 • If there are no links present in a Resource, then an empty list shall be returned.



- 1605 • The Representation determined by this Interface depends on the requesting Client. For a Client  
1606 that includes an OCF-Accept-Content-Format-Version option as defined in section 12.2.5 in  
1607 the request the response only includes the Property value(s) of the Property(-ies) that are  
1608 arrays of Links, hence a Collection or /oic/res response with oic.if.ll is an array of Links. For a  
1609 Client that does not include an OCF-Accept-Content-Format-Version option the response is as  
1610 defined in E.5.

### 1611 7.6.3.3.2 Example: “links list” Interface

#### 1612 Example: Request to a Collection

<p><b>Request to RETRIEVE the Links in room</b></p> <p>(the Links could be referencing lights, fans, electric sockets etc)</p>	<pre>GET ocf://&lt;devID&gt;/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"}]   } ]</pre>
--	--

	<pre> "href": "/his/fan/2", "rt": ["oic.r.switch.binary"], "if": ["oic.if.a", "oic.if.baseline"], "eps": [   { "ep": "coaps://[2001:db8:a::b1d4]:5555" } ] </pre>
--	---

1613

### 1614 7.6.3.4 Batch Interface

#### 1615 7.6.3.4.1 Overview

1616 The batch Interface is used to interact with a collection of Resources using a single/same Request.  
 1617 The batch Interface can be used to RETRIEVE or UPDATE the Properties of the linked Resources  
 1618 with a single request.

1619 The batch Interface is defined as follows:

- 1620 • The batch Interface name is " oic.if.b "
- 1621 • A Collection Resource has linked Resources that are represented as URIs. In the "href"  
 1622 Property of the batch payload the URI shall be fully qualified for remote Resources and a  
 1623 relative reference for local Resources.
- 1624 • The original request is modified to create new requests targeting each of the linked Resources  
 1625 in the Collection by substituting the URI in the original request with the URI of the linked  
 1626 Resource. The payload in the original request is replicated in the payload of the new requests.
- 1627 • The requests shall be forwarded assuming use of the Default Interface of the linked Resources.
- 1628 • Requests shall only be forwarded to linked Resources that are identified by relation types "item"  
 1629 or "hosts" ("hosts" is the default relation type value should the " rel " Link Parameter not be  
 1630 present). Requests shall not be forwarded to linked Resources that do not contain the "item"  
 1631 or "hosts" relation type values.
- 1632 • Properties of the Collection Resource itself may be included in payloads using " oic.if.b"  
 1633 Interface by exposing a single Link with the link relation "self" along with "item" within the  
 1634 Collection, and ensuring that Link resolution cannot become an infinite loop due to recursive  
 1635 references. For example, if the Default Interface of the Collection is "oic.if.b", then the Server  
 1636 might recursively include its batch representation within its batch representation, in an endless  
 1637 loop. See 7.6.3.4.2 for an example of use of a Link containing "rel": ["self","item"] to include  
 1638 Properties of the Collection Resource, along with linked Resources, in "oic.if.b" payloads.
- 1639 • If the Default Interface of a Collection Resource is exposed using the Link relation "self", and  
 1640 the Default Interface contains Properties that expose any Links, those Properties shall not be  
 1641 included in a batch representation which includes the "self" Link.
- 1642 • Any request forwarded to a linked Resource that is a Collection (including a "self" Link  
 1643 reference) shall have the Default Interface of the linked Collection Resource applied.
- 1644 • All the responses from the linked Resources shall be aggregated into a single Response to the  
 1645 Client. The Server may timeout the response to a time window, the Server may choose any  
 1646 appropriate window based on conditions.

- 1647 • If a linked Resource cannot process the request, an empty response, i.e. a JSON object with  
1648 no content ("{}") as the representation for the "rep" Property, or error response should the  
1649 linked Resource Type provide an error schema or diagnostic payload, shall be returned by the  
1650 linked Resource. These empty or error responses for all linked Resources that exhibit an error  
1651 shall be included in the aggregated response to the original Client request. See the example  
1652 in section 7.6.3.4.2.
- 1653 • If any of the linked Resources returns an error response, the aggregated response sent to the  
1654 Client shall also indicate an error (e.g. 4.xx in CoAP). If all of the linked Resources return  
1655 successful responses, the aggregated response shall include the success response code.
- 1656 • The aggregated response shall be an array of objects representing the responses from each  
1657 linked Resource. Each object in the response shall include at least two items: (1) the URI of  
1658 the linked Resource (fully qualified for remote Resources, or a relative reference for local  
1659 Resources) as "href": <URI> and (2) the individual response object or array of objects if the  
1660 linked Resource is itself a Collection using "rep" as the key, e.g. "rep": { < representation of  
1661 individual response> }.
- 1662 • If the Collection Resource is marked as Observable, linked Resources referenced in the  
1663 Collection may be observed using the batch Interface. If the Collection Resource is not marked  
1664 as Observable then the Collection cannot be observed and Observe requests to the Collection  
1665 are rejected. The observe mechanism shall work as defined in 11.4.2 with the observe request  
1666 forwarded to each of the linked Resources. All responses to the request shall be aggregated  
1667 into a single response to the Client using the same representations and status codes as for  
1668 RETRIEVE operations using the batch Interface.
- 1669 • Should any one of the observable linked Resources fail to honour the observe request the  
1670 response to the batch observe request shall also indicate that the entire request was not  
1671 honoured using the mechanism described in section 11.4.2.3.
- 1672 • If any of the Observable Resources in a request to a Collection using the batch Interface replies  
1673 with an error or Observe Cancel, the Observations of all other linked Resources shall be  
1674 cancelled and the error or Observe Cancel status shall be returned to the Observing Client.  
1675  
1676 Note: Behavior may be different for Links that do network requests vs. local Resources
- 1677 • All notifications to the Client that initiated an observe request using the batch Interface shall  
1678 use the batch representation for the Collection. This is the aggregation of any individual  
1679 observe notifications received by the Device hosting the Collection from the individual observe  
1680 requests that were forwarded to the linked Resources.
- 1681 • Linked Resources which are not marked Observable in the Links of a Collection shall not trigger  
1682 Notifications, but may be included in the response to, and subsequent Notifications resulting  
1683 from, an Observe request to the batch Interface of a Collection.
- 1684 • Each notification shall contain the most current values for all of the Linked Resources that  
1685 would be included if the original Observe request were processed again. The Server hosting  
1686 the Collection may choose to RETRIEVE all of the linked Resources each time, or may choose  
1687 to employ caching to avoid retrieving linked Resources on each Notification.
- 1688 • If a Linked Resource is Observable and has responded with a successful Observe response,  
1689 the most recently reported value of that Resource is considered to be the most current value  
1690 and may be reported in all subsequent Notifications.
- 1691 • Links in the Collection should be observed by using the "oic.if.ll" Interface. A notification shall  
1692 be sent any time the contents of the "oic.if.ll" Interface representation are changed; that is, if a  
1693 Link is added, if a Link is removed, or if a Link is updated. Notifications on the "oic.if.ll" Interface  
1694 shall contain all of the Links in the "oic.if.ll" Interface representation.
- 1695 • Other Properties of the Collection Resource, if present, may be observed by using the  
1696 Interfaces defined in the definition for the Resource Type, including using the "oic.if.baseline"  
1697 Interface.

- 1698 • The Client may choose to restrict the linked Resources to which the request is forwarded by  
1699 including additional query parameters in the request. The Server should process any additional  
1700 query parameters in a request that includes "oic.if.b" as selectors for linked Resources that are  
1701 to be processed by the request.
- 1702 • A Client shall perform UPDATE operations using the batch Interface by creating a payload that  
1703 is similar to a RETRIEVE response payload from a batch Interface request. The Server shall  
1704 send a separate UPDATE request to each of the linked Resources according to each "href"  
1705 Property and the corresponding value of the "rep" Property.
- 1706 • If the "href" value is empty, denoted by a zero length string or "" in JSON, the "rep" Property  
1707 shall be applied to linked Resources in the Collection.
- 1708 • Items with the empty "href" and link-specific "href" shall not be mixed in the same UPDATE  
1709 request.
- 1710 • All of the Properties in the UPDATE request may not be supported by the linked Resource. In  
1711 such cases, writable Properties in the UPDATE request that are supported by the linked  
1712 Resource shall be modified and Properties that are not supported shall be silently ignored.
- 1713 • The UPDATE response shall contain the updated values using the same payload schema as  
1714 RETRIEVE operations if provided by the linked Resource, along with the appropriate status  
1715 code. The aggregated response payload shall reflect the known state of the updated Properties  
1716 after the batch update was completed. If no payload is provided by the updated Resource then  
1717 an empty response (i.e. "rep": {}) shall be provided for that Resource.
- 1718 • A Collection shall not support the use of the UPDATE operation to add, modify or remove Links  
1719 in an existing Collection using the "oic.if.baseline" or "oic.if.rw" or "oic.if.a" Interfaces.

1720 **7.6.3.4.2 Examples: Batch Interface**

1721 Note that the examples provided are illustrative and do not include all mandatory schema elements  
1722 in all cases. It is assumed that the Default Interface for the Resource Type "x.org.example.rt.room"  
1723 is specified in its Resource Type definition file as "oic.if.rw", which exposes the Properties  
1724 "x.org.example.colour" and "x.org.example.size".

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} }, </pre>
-----------	---

```

        {"href": "/the/light/2", "rel": ["item"], "rt":
["oic.r.switch.binary"], "if": ["oic.if.a", "oic.if.baseline"],
"ins": "22222", "p": {"bm": 2} },

        {"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>
<p>Use of batch, successful response</p>	<p>Request: GET /a/room/1?if=oic.if.b</p> <p>Becomes the following individual request messages issued by the Device in the Client role</p>

```
GET /a/room/1 (NOTE: uses the Default Interface as specified for
the Collection Resource, in this example oic.if.rw)
```

```
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",
```

	<pre> "rep": {"value": false} }, {   "href": "/the/switches/1",   "rep": [     {"href": "/switch-1a",       "rep": {"value": "true"}},     {"href": "/switch-1b",       "rep": {"value": "false"}}   ] } ] </pre>
<p>Use of batch, error response</p>	<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"}   },   {     "href": "/the/light/1",     "rep": {"value": false}   },   {     "href": "/the/light/2",     "rep": {"value": true}   },   { </pre>



	<pre> "href": "/my/fan/1", "rep": {} }, { "href": "/his/fan/2", "rep": {"value": false} }, { "href": "/the/switches/1", "rep": {} } ] </pre>
<p>Use of batch</p> <p>(UPDATE has POST semantics)</p>	<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>
<p>Use of batch</p>	<pre> UPDATE /a/room/1?if=oic.if.b [ { "href": "/the/light/1", "rep": { "value": false } } ] </pre>

(UPDATE has POST semantics)

```
},
{
  "href": "/the/light/2",
  "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
    }
  }
]
```

1725

### 1726 7.6.3.5 Actuator Interface

1727 The actuator Interface is the Interface for viewing Resources that may be actuated i.e. changes  
1728 some value within or the state of the entity abstracted by the Resource:

- 1729 • The actuator Interface name shall be "oic.if.a"
- 1730 • The actuator Interface shall expose in the Resource Representation all mandatory Properties  
1731 as defined by the applicable JSON; the actuator interface may also expose in the Resource  
1732 Representation optional Properties as defined by the applicable JSON schema that are  
1733 implemented by the target Device.

1734 "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
}
```

1735

1736 "Actuator" interface in respect to "Heater" Resource (for illustration only):

1737

#### 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
  }

```

1738

- 1739 • A RETRIEVE request using this Interface shall return the Representation for this Resource
- 1740 subject to any query and filter parameters that may also exist
- 1741 • An UPDATE request using this Interface shall provide a payload or body that contains the
- 1742 Properties that will be updated on the target Resource.

1743 **7.6.3.6 Sensor Interface**

1744 The sensor Interface is the Interface for retrieving measured, sensed or capability specific  
 1745 information from a Resource that senses:

- 1746 • The sensor Interface name shall be “oic.if.s”
- 1747 • The sensor Interface shall expose in the Resource Representation all mandatory Properties as
- 1748 defined by the applicable JSON; the sensor interface may also expose in the Resource
- 1749 Representation optional Properties as defined by the applicable JSON schema that are
- 1750 implemented by the target Device.
- 1751 • A RETRIEVE request using this Interface shall return this Representation for the Resource
- 1752 subject to any query and filter parameters that may also exist
- 1753 •

**NOTE: The example here is with respect to**

```

1. Retrieving values of sensor

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

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
    }

```

1754

1755 **7.6.3.7 Read-only Interface**

1756 The read-only Interface exposes only the Properties that may be “read”. This includes Properties  
1757 that may be “read-only”, “read-write” but not Properties that are “write-only” or “set-only”. The  
1758 applicable methods that can be applied to a Resource is RETRIEVE only. An attempt by a Client  
1759 to apply a method other than RETRIEVE to a Resource shall be rejected with an error response  
1760 code.

1761 **7.6.3.8 Read-write Interface**

1762 The read-write Interface exposes only the Properties that may be “read” and “written”. The “read-  
1763 only” Properties shall not be included in Representation for the “read-write” Interface. This is a  
1764 generic Interface to support “reading” and “setting” Properties in a Resource. The applicable  
1765 methods that can be applied to a Resource are RETRIEVE and UPDATE only. An attempt by a  
1766 Client to apply a method other than RETRIEVE or UPDATE to a Resource shall be rejected with  
1767 an error response code.

1768 **7.7 Resource representation**

1769 Resource representation captures the state of a Resource at a particular time. The resource  
1770 representation is exchanged in the request and response interactions with a Resource. A Resource  
1771 representation may be used to retrieve or update the state of a resource.

1772 The resource representation shall not be manipulated by the data connectivity protocols and  
1773 technologies (e.g., CoAP, UDP/IP or BLE).

## 1774 7.8 Structure

### 1775 7.8.1 Introduction

1776 In many scenarios and contexts, the Resources may have either an implicit or explicit structure  
1777 between them. A structure can, for example, be a tree, a mesh, a fan-out or a fan-in. The  
1778 Framework provides the means to model and map these structures and the relationships among  
1779 Resources. The primary building block for resource structures in Framework is the collection. A  
1780 collection represents a container, which is extensible to model complex structures.

### 1781 7.8.2 Resource Relationships

1782 Resource relationships are expressed as Links. A Link embraces and extends typed web links  
1783 concept as a means of expressing relationships between Resources. A Link consists of a set of  
1784 Parameters that define:

- 1785 • a context URI,
- 1786 • a target URI,
- 1787 • a relation from the context URI to the target URI
- 1788 • elements that provide metadata about the target URI, the relationship or the context of the Link.

1789 The target URI is mandatory and the other items in a Link are optional. Additional items in the Link  
1790 may be made mandatory based on the use of the links in different contexts (e.g. in collections, in  
1791 discovery, in bridging etc.). Schema for the Link payload is provided in Annex D.

1792 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" }
```

1793 Two Links are distinct from each other when at least one parameter is different. For example the  
1794 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} }
```

1795 The specification may mandate Parameters and Parameter values as required for certain  
1796 capabilities. For all Links returned in a response to a RETRIEVE on "/oic/res", if a Link does not  
1797 explicitly include the "rel" Parameter, a value of "rel"="hosts" shall be assumed. The relation value  
1798 of "hosts" is defined by IETF RFC 6690, the value of "item" by IETF RFC 6573, and the value of  
1799 "self" by IETF RFC 4287 and all are registered in the IANA Registry for Link Relations defined in  
1800 IANA Link Relations.

1801 As shown in D.2.8 the relation between the context URI and target URI in a Link is specified using  
1802 the "rel" JSON element and the value of this element specifies the particular relation.

1803 The context URI of the Link shall implicitly be the URI of the Resource (or specifically a Collection)  
1804 that contains the Link unless the Link specifies the anchor parameter. The anchor parameter is  
1805 used to change the context URI of a Link – the relationship with the target URI is based off the  
1806 anchor URI when the anchor is specified. Anchor parameter uses transfer protocol URI for OIC 1.1  
1807 Link (e.g. "anchor": "coaps://[fe80::b1d6]:44444") and OCF URI defined in Sec 6 for OCF 1.0 Links  
1808 (e.g. "anchor": "ocf://dc70373c-1e8d-4fb3-962e-017eaa863989").

1809 An example of using anchors in the context of Collections – a floor has rooms and rooms have  
 1810 lights – the lights may be defined in floor as Links but the Links will have the anchor set to the URI  
 1811 of the rooms that contain the lights (the relation is contains). This allows all lights in a floor to be  
 1812 turned on or off together while still having the lights defined with respect to the rooms that contain  
 1813 them (lights may also be turned on by using the room URI too). See example use of anchor in  
 1814 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"
    }
  ]
}

```

1815

1816 **7.8.2.1 Parameters**

1817 **7.8.2.1.1 “ins” or Link Instance Parameter**

1818 The “ins” parameter identifies a particular Link instance in a list of Links. The "ins" parameter may  
 1819 be used to modify or delete a specific Link in a list of Links. The value of the “ins” parameter is set  
 1820 at instantiation of the Link by the OCF Device (Server) that is hosting the list of Links – once it has  
 1821 been set, the “ins” parameter shall not be modified for as long as the Link is a member of that list.

1822 **7.8.2.1.2 “p” or Policy Parameter**

1823 The Policy Parameter defines various rules for correctly accessing a Resource referenced by a  
 1824 target URI. The Policy rules are configured by a set of key-value pairs as defined below.

1825 The policy Parameter "p" is defined by:

- 1826 • “bm” key: The “bm” key corresponds to an integer value that is interpreted as an 8-bit bitmask.  
 1827 Each bit in the bitmask corresponds to a specific Policy rule. The following rules are specified  
 1828 for “bm”:  
 1829

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"> <li>• 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.</li> <li>• 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.</li> </ul>
Bit 1 (2 <sup>nd</sup> 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"> <li>• If the Resource supports the NOTIFY operation, then "p" shall include the “bm” key and set the observable bit to value 1.</li> <li>• 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.</li> </ul>
Bits 2-7	--	Reserved for future use. All reserved bits in “bm” shall be set to value 0.

1830

1831 Note that if all the bits in “bm” are defined to value 0, then the “bm” key may be omitted entirely  
1832 from “p” as an efficiency measure. However, if any bit is set to value 1, then “bm” shall be  
1833 included in “p” and all the bits shall be defined appropriately.

1834 • "sec" and "port" in the remaining bullets shall be used only in a response payload when the  
1835 request does not include an OCF-Accept-Content-Format-Version option as defined in section  
1836 12.2.5. In a payload sent in response to a request that includes an OCF-Accept-Content-  
1837 Format-Version option "sec" and "port" shall not be used and instead the "eps" Parameter shall  
1838 provide the information for an encrypted connection. See E.2.8 for the schema for the "p"  
1839 Parameter that includes "sec" and "port".

1840 • "sec" key: The “sec” key corresponds to a Boolean value that indicates whether the Resource  
1841 referenced by the target URI is accessed via an encrypted connection. If “sec” is true, the  
1842 resource is accessed via an encrypted connection, using the “port” specified (see below). If  
1843 “sec” is false, the resource is accessed via an unencrypted connection, or via an encrypted  
1844 connection (if such a connection is made using the “port” settings for another Resource, for  
1845 which “sec” is true).

1846 • "port" key: The “port” key corresponds to an integer value that is used to indicate the port  
1847 number where the Resource referenced by the target URI may be accessed via an encrypted  
1848 connection.

1849 • If the Resource is only available via an encrypted connection (i.e. DTLS over IP), then  
1850 ○ "p" shall include the "sec" key and its value shall be true.  
1851 ○ "p" shall include the "port" key and its value shall be the port number where the  
1852 encrypted connection may be established.



- 1853 • If the Resource is only available via an unencrypted connection, then
  - 1854 ○ "p" shall include the "sec" key and its value shall be false or "p" shall omit the "sec"
  - 1855 key; the default value of "sec" is false.
  - 1856 ○ "p" shall omit the "port" key.
- 1857 • • If the Resource is available via both an encrypted and unencrypted connection, then
  - 1858 ○ "p" shall include the "sec" key and its value shall be false or "p" shall omit the "sec"
  - 1859 key; the default value of "sec" is false.
  - 1860 ○ "p" may omit the "port" key. If the "port" key is omitted, the Resource shall be
  - 1861 available using the same "port" information as another Resource on the Device for
  - 1862 which "sec" is true.
- 1863 • Access to the Resource on the port specified by the "port" key shall be made by an encrypted
- 1864 connection (e.g. coaps://). (Note that unencrypted connection to the Resource may be possible
- 1865 on a separate port discovered thru multicast discovery).
- 1866 • Note that access to the Resource is controlled by the ACL for the Resource. A successful
- 1867 encrypted connection does not ensure that the requested action will succeed. See
- 1868 OCF Security – Access Control section for more information.

1869 Example 1: below shows the Policy Parameter for a Resource that is discoverable but not  
 1870 observable, and for which authenticated accesses shall be done via CoAPS port 33275:

```
1871 "p": { "bm": 1 }
```

1873 Example 2: below shows a self-link, i.e. the "/oic/res" Link in itself that is discoverable and  
 1874 observable.

```
1875 {
1876   "href": "/oic/res",
1877   "rel": "self",
1878   "rt": ["oic.wk.res"],
1879   "if": ["oic.if.ll", "oic.if.baseline"],
1880   "p": { "bm": 3 }
1881 }
```

1882 **7.8.2.1.3 “type” or Media Type Parameter**

1883 The “type” Parameter may be used to specify the various media types that are supported by a  
 1884 specific target Resource. The default type of "application/cbor" shall be used when the “type”  
 1885 element is omitted. Once a Client discovers this information for each Resource, it may use one of  
 1886 the available representations in the appropriate header field of the Request or Response.

1887 **7.8.2.1.4 “di” or Device ID parameter**

1888 The “di” Parameter specifies the device ID of the Device that hosts the target Resource defined in  
 1889 the in the “href” Parameter.

1890 The device ID may be used to qualify a relative reference used in the “href” or to lookup endpoint  
 1891 information for the relative reference.

1892 **7.8.2.1.5 “eps” Parameter**

1893 The "eps" Parameter indicates the Endpoint information of the target Resource.

1894 "eps" shall have as its value an array of items and each item represents Endpoint information with  
1895 "ep" and "pri" as specified in 10.2. "ep" is mandatory but "pri" is optional.

1896 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 }  
]
```

1897

1898 When "eps" is present in a link, the Endpoint information in "eps" can be used to access the target  
1899 Resource referred by the "href" Parameter.

1900 Note that the type of Endpoint – Secure or Unsecure – that a Resource exposes merely determines  
1901 the connection type(s) guaranteed to be available for sending requests to the Resource. For  
1902 example, if a Resource only exposes a single CoAP “ep”, it does not guarantee that the Resource  
1903 cannot also be accessed via a Secure Endpoint (e.g. via a CoAPS “ep” from another Resource’s  
1904 “eps” information). Nor does exposing a given type of Endpoint ensure that access to the Resource  
1905 will be granted using the “ep” information. Whether requests to the Resource are granted or denied  
1906 by the Access Control layer is separate from the “eps” information, and is determined by the  
1907 configuration of the /acl2 Resource (see OCF Security specification section 13.4.2 for details).

1908 When present, max-age information (e.g. Max-Age option for CoAP defined in IETF RFC 7252)  
1909 determines the maximum time "eps" values may be cached before they are considered stale.

### 1910 7.8.2.2 Formatting

1911 When formatting in JSON, the list of Links shall be an array.

### 1912 7.8.2.3 List of Links in a Collection

1913 A Resource that exposes one or more Properties that are defined to be an array of Links where  
1914 each Link can be discretely accessed is a Collection. The Property Name “links” is recommended  
1915 for such an array of Links.

1916 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}  
    }  
  ]  
}
```

```

    },
    {
      "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 }
    }
  ]
}

```

1917

1918 **7.8.2.4 Properties describing an array of Links**

1919 If a Resource that exposes an array of Links (e.g. Collections, Atomic Measurements) has restrictions on  
 1920 the Resource Types that can be within the array, it shall define the “rts” Property as defined in  
 1921 Table 9, which shall include all Resource Types allowed for all Links in the array. If “rts” is not  
 1922 defined or is an empty array, then any Resource Type is permitted in the array.

1923 **Table 9. Resource Types Property definition**

Property title	Property name	Value type	Value rule	Unit	Access mode	Mandatory	Description
<b>Resource Types</b>	rts	array	Array of strings, conveying resource Type IDs		R	no	An array of Resource Types that are supported within an array of Links exposed by a Resource.

1924

1925 If a Resource that exposes an array of Links contains Resource Types which are mandatory in the  
 1926 array, it shall define the “rts-m” Property as defined in Table 10, which lists the mandatory  
 1927 Resource Types that are contained in the array. If “rts-m” is defined, and “rts” is defined and is not  
 1928 an empty array, then the Resource Types present in “rts-m” shall be part of the values present in  
 1929 “rts”. Moreover, if the “rts-m” Property is defined, it shall be mandated (i.e. included in the “required”  
 1930 field of a JSON definition) in the Resource definition and Introspection Device Data (see section  
 1931 11.8).

1932 **Table 10. Mandatory Resource Types Property definition**

Property title	Property name	Value type	Value rule	Unit	Access mode	Mandatory	Description
<b>Mandatory Resource Types</b>	rts-m	array	Array of strings, conveying resource Type IDs		R	no	An array of Resource Types that are mandatory to be exposed within an array of Links exposed by a Resource.

1933

1934 **7.8.3 Collections**

1935 **7.8.3.1 Overview**

1936 A Resource that contains one or more references (specified as Links) to other resources is a  
1937 Collection. These reference may be related to each other or just be a list; the Collection provides  
1938 a means to refer to this set of references with a single handle (i.e. the URI). A simple resource is  
1939 kept distinct from a collection. Any Resource may be turned into a Collection by binding resource  
1940 references as Links. Collections may be used for creating, defining or specifying hierarchies,  
1941 indexes, groups, and so on.

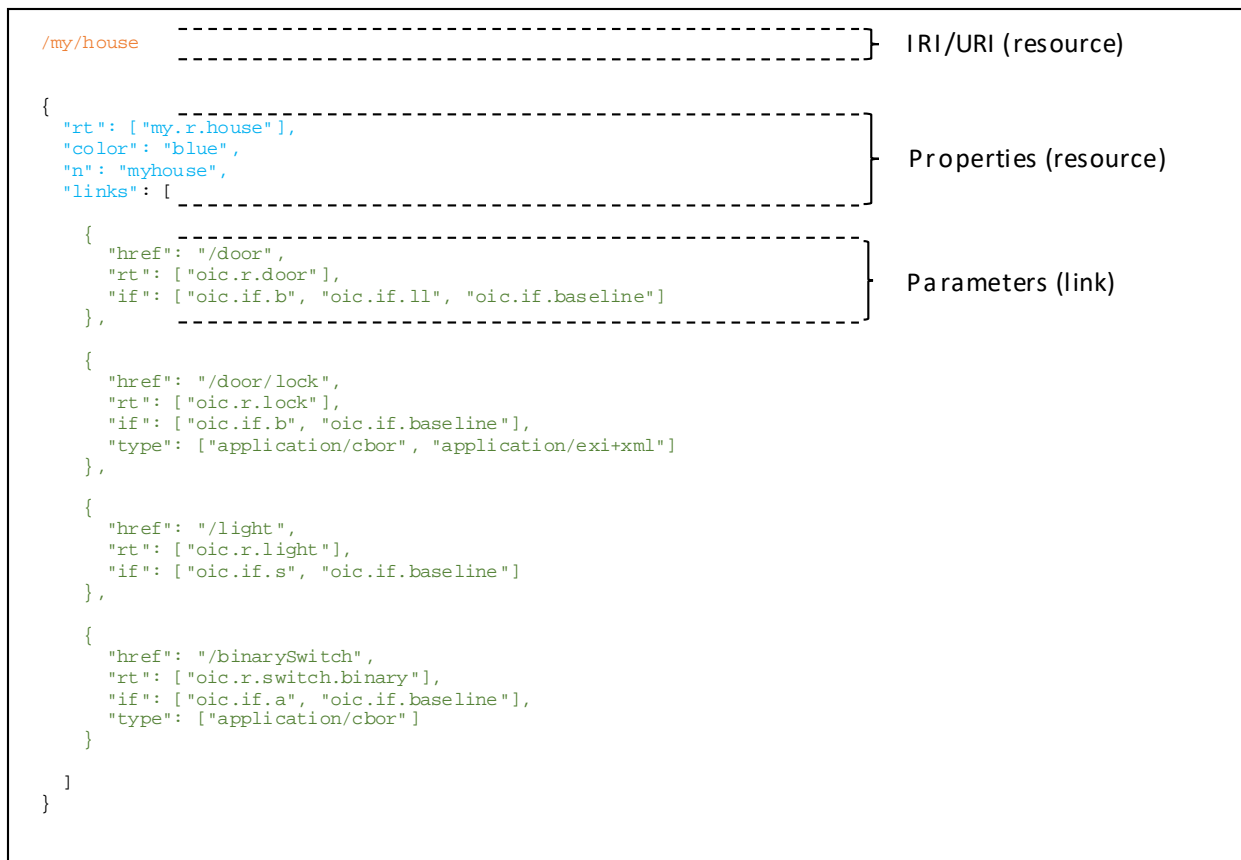
1942 A Collection shall have at least one Resource Type and at least one Interface bound at all times  
1943 during its lifetime. During creation time of a collection the Resource Type and interfaces are  
1944 specified. The initial defined Resource Types and interfaces may be updated during its life time.  
1945 These initial values may be overridden using mechanism used for overriding in the case of a  
1946 Resource. Additional Resource Types and Interfaces may be bound to the Collection at creation  
1947 or later during the lifecycle of the Collection.

1948 A Collection shall define a Property that is an array with zero or more Links. The target URIs in  
1949 the Links may reference another Collection or another Resource. The referenced Collection or  
1950 Resource may reside on the same Device as the Collection that includes that Link (called a local  
1951 reference) or may reside on another Device (called a remote reference). The context URI of the  
1952 Links in the array shall (implicitly) be the Collection that contains that Property. The (implicit)  
1953 context URI may be overridden with explicit specification of the “anchor” parameter in the Link  
1954 where the value of “anchor” is the new base of the Link.

1955 A Resource may be referenced in more than one Collection, therefore, a unique parent-child  
1956 relationship is not guaranteed. There is no pre-defined relationship between a Collection and the  
1957 Resource referenced in the Collection, i.e., the application may use Collections to represent a  
1958 relationship but none is automatically implied or defined. The lifecycles of the Collection and the  
1959 referenced Resource are also independent of one another.

1960 If the “drel” property is defined for the Collection then all Links that don’t explicitly specify a  
1961 relationship shall inherit this default relationship in the context of that Collection. The default  
1962 relationship defines the implicit relationship between the Collection and the target URI in the Link.

1963 In the example below a Property "links" represents the list of Links in a Collection. The "links"  
1964 Property has, as its value, an array of items and each item is a Link:



1965

1966

1967 A Collection may be:

- 1968 • A pre-defined Collection where the Collection has been defined a priori and the Collection is  
1969 static over its lifetime. Such Collections may be used to model, for example, an appliance that  
1970 is composed of other devices or fixed set of resource representing fixed functions.
- 1971 • A Device local Collection where the Collection is used only on the Device that hosts the  
1972 Collection. Such collections may be used as a short-hand on a client for referring to many  
1973 Servers as one.
- 1974 • A centralized Collection where the Collection is hosted on an Device but other Devices may  
1975 access or update the Collection
- 1976 • A hosted Collection where the collection is centralized but is managed by an authorized agent  
1977 or party.

1978 **7.8.3.2 Collection Properties**

1979 A Collection shall define a Property that is an array of Links (the Property Name "links" is  
1980 recommended). In addition, other Properties may be defined for the Collection by the Resource  
1981 Type. The mandatory and recommended Common Properties for a Collection are shown in Table  
1982 11. This list of Common Properties is in addition to those defined for Resources in section 7.3.2.

1983  
1984

**Table 11. Common Properties for Collections (in addition to Common Properties defined in section 7.3.2)**

Property	Description	Property Name	Value Type	Mandatory
<b>Links</b>	The array of Links in the Collection	Per Resource Type definition	json Array of Links	Yes
<b>Resource Types</b>	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	As defined in Table 9	As defined in Table 9	No
<b>Mandatory Resource Types</b>	The list of Resource Types for Links that are mandatory in the Collection.	As defined in Table 10	As defined in Table 10	No

1985

**7.8.3.3 Default Resource Type**

1986 A default Resource Type, “oic.wk.col”, is available for Collections. This Resource Type shall be  
1987 used only when another type has not been defined on the Collection or when no Resource Type  
1988 has been specified at the creation of the Collection.

1989 The default Resource Type provides support for the Common Properties including an array of Links  
1990 with the Property Name “links”.

1991 **7.8.3.4 Default Interface**

1992 All instances of a Collection shall support the links list (“oic.if.ll”) Interface in addition to the  
1993 baseline (“oic.if.baseline”) Interface. An instance of a Collection may optionally support additional  
1994 Interfaces that are defined within this Specification. The Default Interface for a Collection shall be  
1995 links list (“oic.if.ll”) unless otherwise specified by the Resource Type definition.

1996 **7.8.4 Atomic Measurement**

1997 **7.8.4.1 Overview**

1998 Certain use cases require that the Properties of multiple Resources are only accessible as a group  
1999 and individual access to those Properties of each Resource by a Client is prohibited. The Atomic  
2000 Measurement Resource Type is defined to meet this requirement. This is accomplished through  
2001 the use of the Batch Interface.

2002 **7.8.4.2 Atomic Measurement Properties**

2003 An Atomic Measurement shall define a Property that is an array of Links (the Property Name “links”  
2004 is recommended). In addition, other Properties may be defined for the Atomic Measurement by the  
2005 Resource Type. The mandatory and recommended Common Properties for an Atomic  
2006 Measurement are shown in Table 12. This list of Common Properties is in addition to those defined  
2007 for Resources in section 7.3.2.

2008 **Table 12. Common Properties for Atomic Measurement (in addition to Common Properties**  
2009 **defined in section 7.3.2)**

Property	Description	Property Name	Value Type	Mandatory
<b>Links</b>	The array of Links in the Atomic Measurement	Per Resource Type definition	json Array of Links	Yes
<b>Resource Types</b>	The list of allowed Resource Types for Links in the Atomic Measurement.	As defined in Table 9	As defined in Table 9	No

	If this property is not defined or is null string then any Resource Type is permitted			
<b>Mandatory Resource Types</b>	The list of Resource Types for Links that are mandatory in the Atomic Measurement.	As defined in Table 10	As defined in Table 10	No

2010

2011 **7.8.4.3 Normative behaviour**

2012 The normative behaviour of an Atomic Measurement is as follows:

- 2013 1) The behaviour of the Batch Interface (“oic.if.b”) on the Atomic Measurement is defined as  
2014 follows:
- 2015 a) Only RETRIEVE and NOTIFY operations are supported, for Batch Interface, on Atomic  
2016 Measurement; the behavior of the RETRIEVE and NOTIFY operations shall be the same as  
2017 specified in 7.6.3.4, with exceptions as provided for in 7.8.4.3.
  - 2018 b) The UPDATE operation is not allowed, for Batch Interface, on Atomic Measurement; if an  
2019 UPDATE operation is received, it shall result in a method not allowed error code.
  - 2020 c) An error response shall not include any representation of a linked Resource (i.e. empty  
2021 response for all linked Resources).
- 2022 2) Any linked Resource within an Atomic Measurement (i.e. the target Resource of a Link in an  
2023 Atomic Measurement) is subject to the following conditions:
- 2024 a) Linked Resources within an Atomic Measurement and the Atomic Measurement itself shall  
2025 exist on a single Server.
  - 2026 b) CRUDN operations shall not be allowed on linked Resources and shall result in a forbidden  
2027 error code.
  - 2028 c) Linked Resources shall not expose the “oic.if.ll” Interface. Since CRUDN operations are not  
2029 allowed on linked Resources, the “oic.if.ll” Interface would never be accessible.
- 2030 3) Links to linked Resources in an Atomic Measurement shall only be accessible through the  
2031 “oic.if.ll” or the “oic.if.baseline” Interfaces of an Atomic Measurement.
- 2032 a) The linked Resources shall not be listed in “/oic/res”.
- 2033 4) A linked Resource in an Atomic Measurement shall have defined one of “oic.if.a”, “oic.if.s”,  
2034 “oic.if.r”, or “oic.if.rw” as its Default Interface.
- 2035 5) Not all linked Resources in an Atomic Measurement are required to be Observable. If an Atomic  
2036 Measurement is being Observed using the “oic.if.b” Interface, notification responses shall not  
2037 be generated when the linked Resources which are not marked Observable are updated or  
2038 change state.
- 2039 6) All linked Resources in an Atomic Measurement shall be included in every RETRIEVE and  
2040 Observe response when using the “oic.if.b” Interface.
- 2041 7) An Atomic Measurement shall support the “oic.if.b” and the “oic.if.ll” Interfaces.
- 2042 8) Filtering of linked Resources in an Atomic Measurement is not allowed. Query parameters that  
2043 select one or more individual linked Resources in a request to an Atomic Measurement shall  
2044 result in a “forbidden” error code.
- 2045 9) If the “rel” Link Parameter is included in a Link contained in an Atomic Measurement, it shall  
2046 have either the “hosts” or the “item” value.
- 2047 10) The Default Interface of an Atomic Measurement is “oic.if.b”.

2048 **7.8.4.4 Security considerations**

2049 Access rights to an Atomic Measurement shall guarantee access rights to the linked Resources  
 2050 (See section 12.2.6.2 of OCF Security).

2051 **7.8.4.5 Default Resource Type**

2052 The Resource Type is defined as “oic.wk.atomicmeasurement”.

2053 **Table 13. Atomic Measurement Resource Type**

Pre-defined URI	Resource Type Title	Resource Type ID interfaces (“rt” value)	Description	Related Functional Interaction	M/CR/O
none	Atomic Measurement	“oic.wk.atomicmeasurement”	“oic.if.ll” “oic.if.baseline” “oic.if.b”	A specialisation of the Collection pattern to ensure atomic RETRIEVAL of its referred Resources	RETRIEVE, NOTIFY O

2054  
 2055 **Table 14. Properties for Atomic Measurement (in addition to Common Properties defined in**  
 2056 **section 7.3.2)**

Property	Description	Property name	Value Type	Mandatory
Links	The set of links that point to the linked Resources	Per Resource Type definition	json Array of Links	Yes

2057  
 2058  
 2059 **7.9 Third (3<sup>rd</sup>) party specified extensions**

2060 This section describes how a 3<sup>rd</sup> party may add Device Types, Resource Types, 3<sup>rd</sup> party defined  
 2061 Properties to an existing or 3<sup>rd</sup> party defined Resource Type, 3<sup>rd</sup> party defined enumeration values  
 2062 to an existing enumeration and 3<sup>rd</sup> party defined parameters to an existing defined Property.

2063 A 3<sup>rd</sup> party may specify additional (non-OCF) Resources within an OCF Device. A 3<sup>rd</sup> party may  
 2064 also specify additional Properties within an existing OCF defined Resource Type. Further a 3<sup>rd</sup>  
 2065 party may extend an OCF defined enumeration with 3<sup>rd</sup> party defined values.

2066 A 3<sup>rd</sup> party defined Device Type may expose both 3<sup>rd</sup> party and OCF defined Resource Types. A  
 2067 3<sup>rd</sup> party defined Device Type must expose the mandatory Resources for all OCF Devices defined  
 2068 within this specification.

2069 A 3<sup>rd</sup> party defined Resource Type shall include any mandatory Properties defined in this  
 2070 specification and also any vertical specified mandatory Properties. All Properties defined within a  
 2071 3<sup>rd</sup> party defined Resource Type that are part of the OCF namespace that are not Common  
 2072 Properties as defined in this specification shall follow the 3<sup>rd</sup> party defined Property rules in Table  
 2073 15.

2074 The following table defines the syntax rules for 3<sup>rd</sup> party defined Resource Type elements. Within  
 2075 the table the term “Domain\_Name” refers to a domain name that is owned by the 3<sup>rd</sup> party that is  
 2076 defining the new element.



**Table 15. 3rd party defined Resource elements**

	Resource Element	Vendor Definition Rules
New 3 <sup>rd</sup> party defined Device Type	"rt" Property Value of "/oic/d"	x.<Domain_Name>.<resource identification>
New 3 <sup>rd</sup> party defined Resource Type	"rt" Property Value	x.<Domain_Name>.<resource identification>
New 3 <sup>rd</sup> party defined Property within the OCF namespace	Property Name	x.<Domain_Name>.<property>
Additional 3 <sup>rd</sup> party defined values in an OCF specified enumeration	Enumeration Property Value	x.<Domain_Name>.<enum value>
Additional 3 <sup>rd</sup> party defined parameter in an OCF specified Property	Parameter key word	x.<Domain_Name>.<parameter keyword>

2078

2079 With respect to the use of the Domain\_Name in this scheme the labels are reversed from how they  
 2080 appear in DNS or other resolution mechanisms. The 3<sup>rd</sup> party defined Device Type and Resource  
 2081 Type otherwise follow the rules defined in section 7.4.2 Resource Type Property. 3<sup>rd</sup> party defined  
 2082 Resource Types should be registered in the IANA Constrained RESTful Environments (CoRE)  
 2083 Parameters registry.

2084 For example:

2085 x.com.samsung.galaxyphone.accelerator

2086 x.com.cisco.ciscorouterport

2087 x.com.hp.printerhead

2088 x.org.allseen.newinterface.newproperty

## 2089 7.10 Query Parameters

### 2090 7.10.1 Introduction

2091 Properties and Parameters (including those that are part of a Link) may be used in the query part  
 2092 of a URI (see section 6.2.1) as one criterion for selection of a particular Resource. This is done by  
 2093 declaring the Property (i.e. <Property Name> = <desired Property Value>) as one of the segments  
 2094 of the query. Only ASCII strings are permitted in query filters, and NULL characters are disallowed  
 2095 in query filters. This means that only Property Values with ASCII characters may be matched in a  
 2096 query filter.

2097 The Resource is selected when all the declared Properties or Link Parameters in the query match  
 2098 the corresponding Properties or Link Parameters in the target.

### 2099 7.10.2 Use of multiple parameters within a query

2100 When a query contains multiple separate query parameters these are delimited by an "&" as  
 2101 described in section 6.2.1.

2102 A Client may apply multiple separate query parameters, for  
 2103 example "?ins=11111&rt=oic.r.switch.binary". If such queries are supported by the Server this  
 2104 shall be accomplished by matching "all of" the different query parameter types ("rt", "ins", "ip", etc)  
 2105 against the target of the query. In the example, this resolves to an instance of oic.r.switch.binary  
 2106 that also has an "ins" populated as "11111". There is no significance applied to the order of the  
 2107 query parameters.

2108

2109 A Client may select more than one Resource Type using repeated query parameters, for example  
2110 "?rt=oic.r.switch.binary&rt=oic.r.ramptime". If such queries are supported by the Server this shall  
2111 be accomplished by matching "any of" the repeated query parameters against the target of the  
2112 query. In the example, any instances of "oic.r.switch.binary" and/or "oic.r.ramptime" that may exist  
2113 are selected.

2114  
2115 A Client may combine both multiple repeated parameters and multiple separate parameters in a  
2116 single query, for example "?if=oic.if.b&ins=11111&rt=oic.r.switch.binary&rt=oic.r.ramptime". If  
2117 such queries are supported by the Server this shall be accomplished by matching "any of" the  
2118 repeated query parameters and then matching "all of" the different query parameter types. In the  
2119 example any instances of "oic.r.switch.binary" and/or "oic.r.ramptime" that also have an "ins" of  
2120 "11111" that may exist are selected in a batch response.  
2121

2122 Note that the parameters within a query string are represented within the actual messaging  
2123 protocol as defined in section 12.

### 2124 **7.10.3 Application to multi-value "rt" Resources**

2125 An "rt" query for a multi-value "rt" Resource with the Default Interface of "oic.if.a", "oic.if.s", "oic.if.r",  
2126 "oic.if.rw" or "oic.if.baseline" is an extension of a generic "rt" query. When a Server receives a  
2127 RETRIEVE request for a multi-value "rt" Resource with an "rt" query, (i.e. GET  
2128 /ResExample?rt=oic.r.foo), the Server should respond only when the query value is an item of the  
2129 "rt" Property Value of the target Resource and should send back only the Properties associated  
2130 with the query value(s). For example, upon receiving GET /ResExample?rt=oic.r.switch.binary  
2131 targeting a Resource with "rt": ["oic.r.switch.binary", "oic.r.light.brightness"], the Server responds  
2132 with only the Properties of oic.r.switch.binary.

### 2133 **7.10.4 Interface specific considerations for queries**

#### 2134 **7.10.4.1 Interface selection**

2135 When an Interface is to be selected for a request, it shall be specified as a query parameter in the  
2136 URI of the Resource in the request message. If no query parameter is specified, then the Default  
2137 Interface shall be used. If the selected Interface is not one of the permitted Interfaces on the  
2138 Resource then selecting that Interface is an error and the Server shall respond with an error  
2139 response code.

2140 For example, the baseline Interface may be selected by adding "if=oic.if.baseline" to the list of  
2141 query parameters in the URI of the target Resource. For example: "GET /oic/res?if=oic.if.baseline".

#### 2142 **7.10.4.2 Batch Interface**

2143 See section 7.6.3.4 for details on the batch Interface itself. Query parameters may be used with  
2144 the batch Interface in order to select particular Resources in a Collection for retrieval or update;  
2145 these parameters are used to select items in the Collection by matching Link Parameter Values.

2146 When Link selection query parameters are used with RETRIEVE operations applied using the  
2147 batch Interface, only the Resources in the Collection with matching Link Parameters should be  
2148 returned.

2149 When Link selection query parameters are used with UPDATE operations applied using the batch  
2150 Interface, only the Resources having matching Link Parameters should be updated.

2151 See 7.6.3.4.2 for examples of RETRIEVE and UPDATE operations that use Link selection query  
2152 parameters.

2153 **8 CRUDN**

2154 **8.1 Overview**

2155 CREATE, RETRIEVE, UPDATE, DELETE, and NOTIFY (CRUDN) are operations defined for  
 2156 manipulating Resources. These operations are performed by a Client on the resources contained  
 2157 in n Server.

2158 On reception of a valid CRUDN operation n Server hosting the Resource that is the target of the  
 2159 request shall generate a response depending on the Interface included in the request; or based  
 2160 on the Default Interface for the Resource Type if no Interface is included.

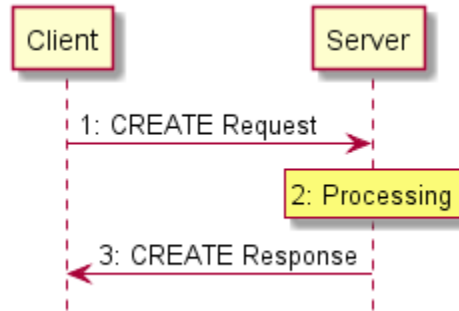
2161 CRUDN operations utilize a set of parameters that are carried in the messages and are defined in  
 2162 Table 16. A Device shall use CBOR as the default payload (content) encoding scheme for resource  
 2163 representations included in CRUDN operations and operation responses; a Device may negotiate  
 2164 a different payload encoding scheme (e.g, see in section 12.2.4 for CoAP messaging). The  
 2165 following subsections specify the CRUDN operations and use of the parameters. The type  
 2166 definitions for these terms will be mapped in the messaging section for each protocol.

2167 **Table 16. 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.

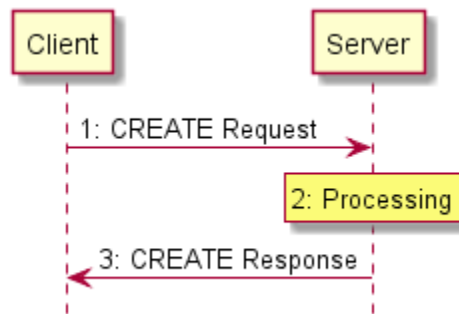
2168 **8.2 CREATE**

2169 The CREATE operation is used to request the creation of new Resources on the Server. The  
2170 CREATE operation is initiated by the Client and consists of three steps, as depicted in



2171  
2172 Figure 9 and described below.

2173



2174  
2175 **Figure 9. CREATE operation**

2176 **8.2.1 CREATE request**

2177 The CREATE request message is transmitted by the Client to the Server to create a new Resource  
2178 by the Server. The CREATE request message will carry the following parameters:

- 2179
- 2180 • *fr*: Unique identifier of the Client
  - 2181 • *to*: URI of the target resource responsible for creation of the new resource.
  - 2182 • *ri*: Identifier of the CREATE request
  - 2183 • *cn*: Information of the resource to be created by the Server
  - 2184     i) *cn* will include the URI and Resource Type property of the resource to be created.
  - 2185     ii) *cn* may include additional properties of the resource to be created.
  - 2186 • *op*: CREATE

2187 **8.2.2 Processing by the Server**

2188 Following the receipt of a CREATE request, the Server may validate if the Client has the  
2189 appropriate rights for creating the requested resource. If the validation is successful, the Server  
2190 creates the requested resource. The Server caches the value of *ri* parameter in the CREATE  
request for inclusion in the CREATE response message.

2191 **8.2.3 CREATE response**

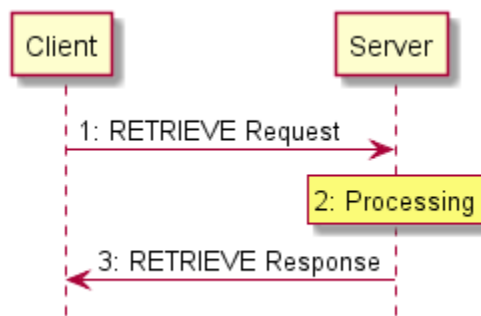
2192 The Server shall transmit a CREATE response message in response to a CREATE request  
2193 message from a Client. The CREATE response message will include the following parameters.

- 2194 • *fr*: Unique identifier of the Server
- 2195 • *to*: Unique identifier of the Client
- 2196 • *ri*: Identifier included in the CREATE request
- 2197 • *cn*: Information of the resource as created by the Server.
  - 2198 i) *cn* will include the URI of the created resource.
  - 2199 ii) *cn* will include the resource representation of the created resource.
- 2200 • *rs*: The result of the CREATE operation

2201 **8.3 RETRIEVE**

2202 The RETRIEVE operation is used to request the current state or representation of a Resource.  
2203 The RETRIEVE operation is initiated by the Client and consists of three steps, as depicted in  
2204 Figure 10 and described below.

2205



2206

2207 **Figure 10. RETRIEVE operation**

2208 **8.3.1 RETRIEVE request**

2209 RETRIEVE request message is transmitted by the Client to the Server to request the  
2210 representation of a Resource from a Server. The RETRIEVE request message will carry the  
2211 following parameters.

- 2212 • *fr*: Unique identifier of the Client
- 2213 • *to*: URI of the resource the Client is targeting
- 2214 • *ri*: Identifier of the RETRIEVE request
- 2215 • *op*: RETRIEVE

2216 **8.3.2 Processing by the Server**

2217 Following the receipt of a RETRIEVE request, the Server may validate if the Client has the  
2218 appropriate rights for retrieving the requested data and the properties are readable. The Server  
2219 caches the value of *ri* parameter in the RETRIEVE request for use in the response.

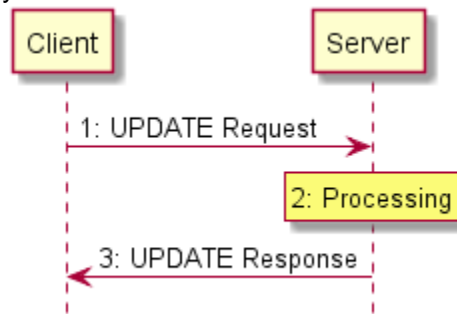
2220 **8.3.3 RETRIEVE response**

2221 The Server shall transmit a RETRIEVE response message in response to a RETRIEVE request  
2222 message from a Client. The RETRIEVE response message will include the following parameters.

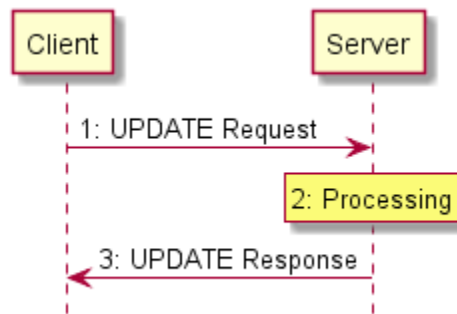
- 2223 • *fr*: Unique identifier of the Server
- 2224 • *to*: Unique identifier of the Client
- 2225 • *ri*: Identifier included in the RETRIEVE request
- 2226 • *cn*: Information of the resource as requested by the Client
- 2227     i) *cn* should include the URI of the resource targeted in the RETRIEVE request
- 2228
- 2229 • *rs*: The result of the RETRIEVE operation

## 8.4 UPDATE

2231 The UPDATE operation is either a Partial UPDATE or a complete replacement of the information  
 2232 in a Resource in conjunction with the interface that is also applied to the operation. The UPDATE  
 2233 operation is initiated by the Client and consists of three steps, as depicted in



2234  
 2235 Figure 11 and described below.



2237  
 2238 **Figure 11. UPDATE operation**

### 8.4.1 UPDATE request

2240 The UPDATE request message is transmitted by the Client to the Server to request the update of  
 2241 information of a Resource on the Server. The UPDATE request message will carry the following  
 2242 parameters.

- 2243 • *fr*: Unique identifier of the Client
- 2244 • *to*: URI of the resource targeted for the information update
- 2245 • *ri*: Identifier of the UPDATE request
- 2246 • *op*: UPDATE
- 2247 • *cn*: Information, including properties, of the resource to be updated at the target resource

2248 **8.4.2 Processing by the Server**

2249 Following the receipt of an UPDATE request, the Server may validate if the Client has the  
2250 appropriate rights for updating the requested data. If the validation is successful the Server  
2251 updates the target Resource information according to the information carried in *cn* parameter of  
2252 the UPDATE request message. The Server caches the value of *ri* parameter in the UPDATE  
2253 request for use in the response.

2254 An UPDATE request that includes Properties that are read-only shall be rejected by the Server  
2255 with an *rs* indicating a bad request.

2256 An UPDATE request shall be applied only to the Properties in the target resource visible via the  
2257 applied interface that support the operation. An UPDATE of non-existent Properties is ignored.

2258 An UPDATE request shall be applied to the Properties in the target resource even if those Property  
2259 Values are the same as the values currently exposed by the target resource.

2260 **8.4.2.1 Resource monitoring by the Server**

2261 The Server shall monitor the state the Resource identified in the observe request from the Client.  
2262 Anytime there is a change in the state of the observed resource or an UPDATE operation applied  
2263 to the Resource, the Server sends another RETRIEVE response with the observe indication. The  
2264 mechanism does not allow the Client to specify any bounds or limits which trigger a notification,  
2265 the decision is left entirely to the Server.

2266 **8.4.2.2 Additional RETRIEVE responses with observe indication**

2267 The Server shall transmit updated RETRIEVE response messages following observed changes in  
2268 the state of the Resources requested by the Client. The RETRIEVE response message shall  
2269 include the parameters listed in section 11.4.2.3.

2270

2271 **8.4.3 UPDATE response**

2272 The UPDATE response message will include the following parameters:

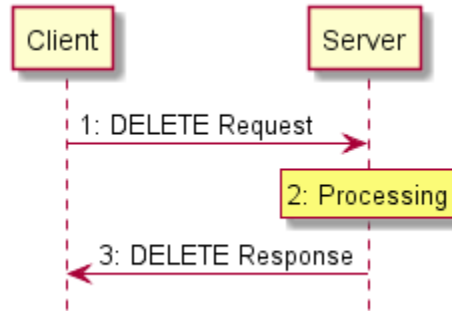
- 2273 • *fr*: Unique identifier of the Server
- 2274 • *to*: Unique identifier of the Client
- 2275 • *ri*: Identifier included in the UPDATE request
- 2276 • *rs*: The result of the UPDATE request

2277 The UPDATE response message may also include the following parameters:

- 2278 • *cn*: The Resource representation following processing of the UPDATE request

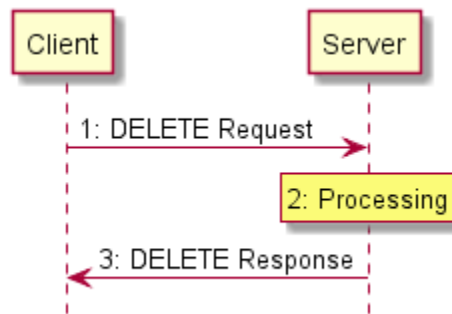
2279 **8.5 DELETE**

2280 The DELETE operation is used to request the removal of a Resource. The DELETE operation is  
2281 initiated by the Client and consists of three steps, as depicted in



2282  
2283 Figure 12 and described below.

2284



2285

2286 **Figure 12. DELETE operation**

2287 **8.5.1 DELETE request**

2288 DELETE request message is transmitted by the Client to the Server to delete a Resource on the  
2289 Server. The DELETE request message will carry the following parameters:

- 2290 • *fr*: Unique identifier of the Client
- 2291 • *to*: URI of the target resource which is the target of deletion
- 2292 • *ri*: Identifier of the DELETE request
- 2293 • *op*: DELETE

2294 **8.5.2 Processing by the Server**

2295 Following the receipt of a DELETE request, the Server may validate if the Client has the  
2296 appropriate rights for deleting the identified resource, and whether the identified resource exists.  
2297 If the validation is successful, the Server removes the requested resource and deletes all the  
2298 associated information. The Server caches the value of *ri* parameter in the DELETE request for  
2299 use in the response.

2300 **8.5.3 DELETE response**

2301 The Server shall transmit a DELETE response message in response to a DELETE request  
2302 message from a Client. The DELETE response message will include the following parameters.

- 2303 • *fr*: Unique identifier of the Server



- 2304 • *to*: Unique identifier of the Client
- 2305 • *ri*: Identifier included in the DELETE request
- 2306 • *rs*: The result of the DELETE operation

## 2307 **8.6 NOTIFY**

2308 The NOTIFY operation is used to request asynchronous notification of state changes. Complete  
2309 description of the NOTIFY operation is provided in section 11.4. The NOTIFY operation uses the  
2310 NOTIFICATION response message which is defined here.

### 2311 **8.6.1 NOTIFICATION response**

2312 The NOTIFICATION response message is sent by a Server to notify the URLs identified by the  
2313 Client of a state change. The NOTIFICATION response message carries the following parameters.

- 2314 • *fr*: Unique identifier of the Server
- 2315 • *to*: URI of the Resource target of the NOTIFICATION message
- 2316 • *ri*: Identifier included in the CREATE request
- 2317 • *op*: NOTIFY
- 2318 • *cn*: The updated state of the resource

## 2319 **9 Network and connectivity**

### 2320 **9.1 Introduction**

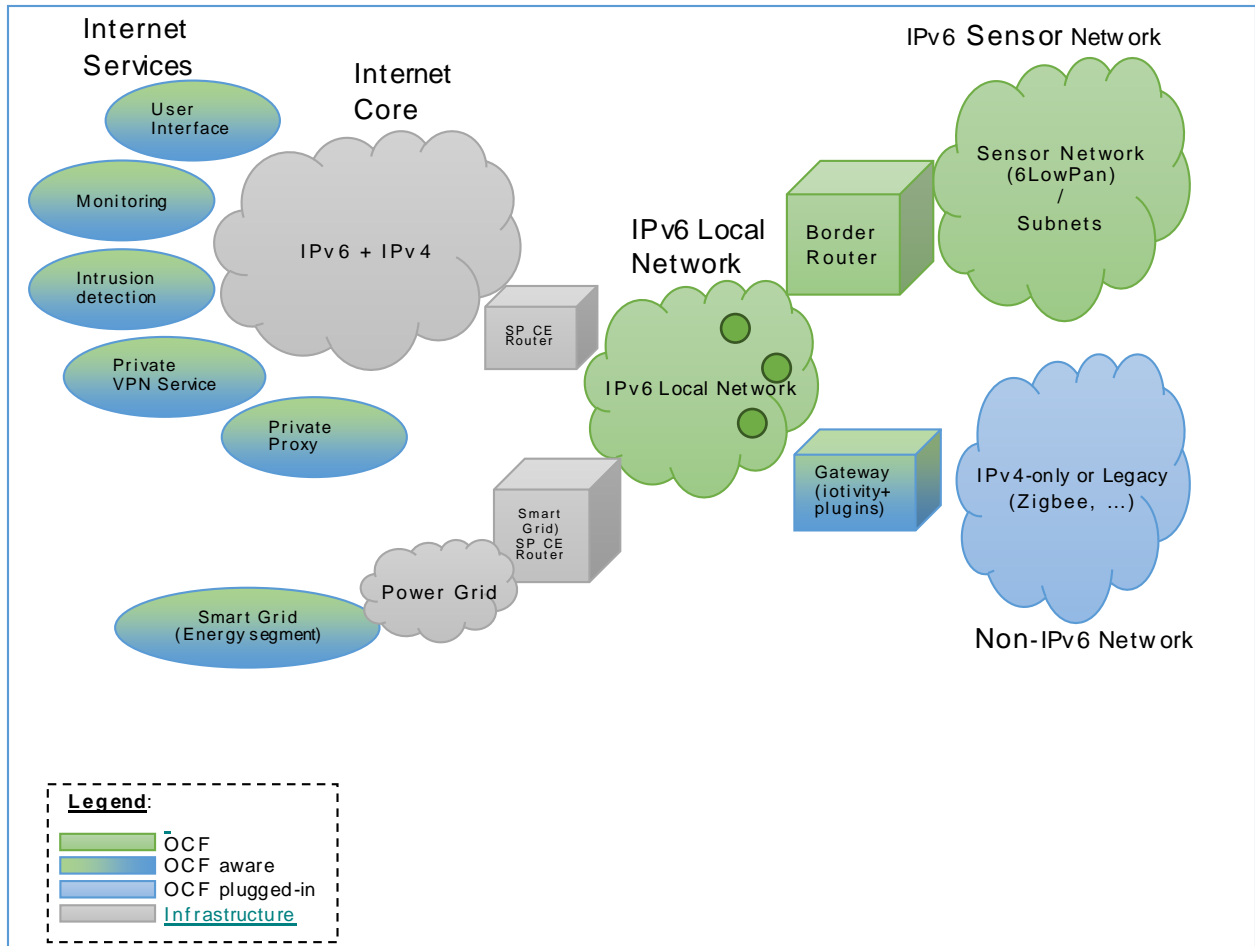
2321 The Internet of Things is comprised of a wide range of applications which sense and actuate the  
2322 physical world with a broad spectrum of device and network capabilities: from battery powered  
2323 nodes transmitting 100 bytes per day and able to last 10 years on a coin cell battery, to mains  
2324 powered nodes able to maintain Megabit video streams. It is estimated that many 10s of billions  
2325 of IoT devices will be deployed over the coming years.

2326 It is desirable that the connectivity options be adapted to the IP layer. To that end, IETF has  
2327 completed considerable work to adapt Bluetooth®, Wi-Fi, 802.15.4, LPWAN, etc. to IPv6. These  
2328 adaptations, plus the larger address space and improved address management capabilities, make  
2329 IPv6 the clear choice for the OCF network layer technology.

### 2330 **9.2 Architecture**

2331 While the aging IPv4 centric network has evolved to support complex topologies, its deployment  
2332 was primarily provisioned by a single Internet Service Provider (ISP) as a single network. More  
2333 complex network topologies, often seen in residential home, are mostly introduced through the  
2334 acquisition of additional home network devices, which rely on technologies like private Network  
2335 Address Translation (NAT). These technologies require expert assistance to set up correctly and  
2336 should be avoided in a home network as they most often result in breakage of constructs like  
2337 routing, naming and discovery services.

2338 The multi-segment ecosystem OCF addresses will not only cause a proliferation of new devices  
2339 and associated routers, but also new services introducing additional edge routers. All these new  
2340 requirements require advance architectural constructs to address complex network topologies like  
2341 the one shown in Figure 13.



2342

2343

**Figure 13. High Level Network & Connectivity Architecture**

2344 In terms of IETF RFC 6434, IPv6 nodes assume either a router or host role. Nodes may further  
 2345 implement various specializations of those roles:

- 2346 • A Router may implement Customer Edge Router capabilities as defined in IETF RFC 7084.
- 2347 • Nodes limited in processing power, memory, non-volatile storage or transmission capacity  
 2348 requires special IP adaptation layers (6LoWPAN) and/or dedicated routing protocols (RPL).  
 2349 Examples include devices transmitting over low power physical layer like IEEE 802.14.5, ITU  
 2350 G9959, Bluetooth Low Energy, DECT Ultra Low Energy, and Near Field Communication (NFC).
- 2351 • A node may translate and route messaging between IPv6 and non-IPv6 networks.

2352 **9.3 IPv6 network layer requirements**

2353 **9.3.1 Introduction**

2354 Projections indicate that many 10s of billions of new IoT endpoints and related services will be  
 2355 brought online in the next few years. These endpoint's capabilities will span from battery powered  
 2356 nodes with limited compute, storage, and bandwidth to more richly resourced devices operating  
 2357 over Ethernet and WiFi links.

2358 Internet Protocol version 4 (IPv4), deployed some 30 years ago, has matured to support a wide  
 2359 variety of applications such as Web browsing, email, voice, video, and critical system monitoring  
 2360 and control. However, the capabilities of IPv4 are at the point of exhaustion, not the least of which  
 2361 is that available address space has been consumed.

2362 The IETF long ago saw the need for a successor to IPv4, thus the development of IPv6. OCF  
2363 recommends IPv6 at the network layer. Amongst the reasons for IPv6 recommendations are:

- 2364 • Larger address space. Side-effect: greatly reduce the need for NATs.
- 2365 • More flexible addressing architecture. Multiple addresses and types per interface: Link-local,  
2366 ULA, GUA, variously scoped Multicast addresses, etc. Better ability to support multi-homed  
2367 networks, better re-numbering capability, etc.
- 2368 • More capable auto configuration capabilities: DHCPv6, SLAAC, Router Discovery, etc.
- 2369 • Technologies enabling IP connectivity on constrained nodes are based upon IPv6.
- 2370 • All major consumer operating systems (IoS, Android, Windows, Linux) are already IPv6 enabled.
- 2371 • Major Service Providers around the globe are deploying IPv6.

## 2372 **9.3.2 IPv6 node requirements**

### 2373 **9.3.2.1 Introduction**

2374 In order to ensure network layer services interoperability from node to node, mandating a common  
2375 network layer across all nodes is vital. The protocol should enable the network to be: secure,  
2376 manageable, and scalable and to include constrained and self-organizing meshed nodes. OCF  
2377 mandates IPv6 as the common network layer protocol to ensure interoperability across all Devices.  
2378 More capable devices may also include additional protocols creating multiple-stack devices. The  
2379 remainder of this section will focus on interoperability requirements for IPv6 hosts, IPv6  
2380 constrained hosts and IPv6 routers. The various protocol translation permutations included in  
2381 multi-stack gateway devices may be addresses in subsequent addendums of this specification.

### 2382 **9.3.2.2 IP Layer**

2383 An IPv6 node shall support IPv6 and it shall conform to the requirements as specified in  
2384 IETF RFC 6434.

2385

## 2386 **10 Endpoint**

### 2387 **10.1 Endpoint definition**

2388 The specific definition of an Endpoint depends on the Transport Protocol Suite being used. For the  
2389 example of CoAP over UDP over IPv6, the Endpoint is identified by an IPv6 address and UDP port  
2390 number.

2391 Each OCF Device shall associate with at least one Endpoint with which it can exchange request  
2392 and response messages. When a message is sent to an Endpoint, it shall be delivered to the OCF  
2393 Device which is associated with the Endpoint. When a request message is delivered to an Endpoint,  
2394 path component is enough to locate the target Resource.

2395 OCF Device can be associated with multiple Endpoints. For example, an OCF Device can have  
2396 several IP addresses or port numbers or support both CoAP and HTTP transfer protocol. Different  
2397 Resources in an OCF Device may be accessed with the same Endpoint or need different ones.  
2398 Some Resources may use one Endpoint and others a different one. It depends on an  
2399 implementation.

2400 On the other hand, an Endpoint can be shared among multiple OCF Devices, only when there is a  
2401 way to clearly designate the target Resource with request URI. For example, when multiple CoAP  
2402 servers use uniquely different URI paths for all their hosted Resources, and the CoAP  
2403 implementation demultiplexes by path, they can share the same CoAP Endpoint. However, this is  
2404 not possible in this version of the specification, because a pre-determined URI (e.g. "/oic/d") is  
2405 mandatory for some mandatory Resources (e.g. "oic.wk.d").

2406 **10.2 Endpoint information**

2407 **10.2.1 Introduction**

2408 Endpoint is represented by Endpoint information which consists of two items of key-value pair,  
2409 "ep" and "pri".

2410 **10.2.2 “ep”**

2411 "ep" represents Transport Protocol Suite and Endpoint Locator specified as follows:

- 2412 • **Transport Protocol Suite** - a combination of protocols (e.g. CoAP + UDP + IPv6) with which  
2413 request and response messages can be exchanged for RESTful transaction (i.e. CRUDN). A  
2414 Transport Protocol Suite shall be indicated by a URI scheme name. All scheme names  
2415 supported by this specification are IANA registered, these are listed in Table 17. A vendor may  
2416 also make use of a non-IANA registered scheme name for their own use (e.g.  
2417 “com.example.foo”), this shall follow the syntax for such scheme names defined by  
2418 IETF RFC 7595. The behaviour of a vendor-defined scheme name is undefined by this  
2419 specification. All OCF defined Resource Types when exposing Endpoint Information in an “eps”  
2420 (see section 10.2.4) shall include at least one “ep” with a Transport Protocol Suite as defined  
2421 in Table 17.
- 2422 • **Endpoint Locator** – an address (e.g. IPv6 address + Port number) through which a message  
2423 can be sent to the Endpoint and in turn associated OCF Device. The Endpoint Locator for  
2424 "coap", "coaps", "coap+tcp", "coaps+tcp", "http", and "https" shall be specified as "IP address:  
2425 port number". Temporary addresses should not be used because Endpoint Locators are for the  
2426 purpose of accepting incoming sessions, whereas temporary addresses are for initiating  
2427 outgoing sessions (IETF RFC 4941). Moreover its inclusion in “/oic/res” can cause a privacy  
2428 concern (IETF RFC 7721).

2429 "ep" shall have as its value a URI (as specified in IETF RFC 3986) with the scheme component  
2430 indicating Transport Protocol Suite and the authority component indicating the Endpoint Locator:

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

2431

2432 The current list of "ep" with corresponding Transport Protocol Suite is shown in Table 17:

2433 **Table 17. “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

2434 **10.2.3 “pri”**

2435 When there are multiple Endpoints, "pri" indicates the priority among them.

2436 "pri" shall be represented as a positive integer (e.g. "pri": 1) and the lower the value, the higher  
2437 the priority.

2438 The default "pri" value is 1, i.e. when "pri" is not present, it shall be equivalent to "pri": 1.

#### 2439 **10.2.4 Endpoint information in "eps" Parameter**

2440 To carry Endpoint information, a new Link Parameter "eps" is defined in 7.8.2.1.5. "eps" has an  
2441 array of items as its value and each item represents Endpoint information with two key-value pairs,  
2442 "ep" and "pri", of which "ep" is mandatory and "pri" is optional.

2443 Endpoint Information in an "eps" Parameter is valid for the target Resource of the Link, i.e., the  
2444 Resource referred by "href" Parameter. Endpoint information in an "eps" Parameter may be used  
2445 to access other Resources on the Device, but such access is not guaranteed.

2446 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": {"bm": 3},
  "eps": [{"ep": "coap://[fe80::b1d6]:1111", "pri": 2}, {"ep":
"coaps://[fe80::b1d6]:1122"}]
}
```

2447 In the previous example, "anchor" represents the hosting OCF Device, "href", target Resource and  
2448 "eps" the two Endpoints for the target Resource.

2449 If the target Resource of a Link requires a secure connection (e.g. CoAPS), "eps" Parameter shall  
2450 be used to indicate the necessary information (e.g. port number) in OCF 1.0 payload, because  
2451 "sec" and "port" shall be used only in OIC 1.1 payload.

### 2452 **10.3 Endpoint discovery**

#### 2453 **10.3.1 Introduction**

2454 "Endpoint discovery" is defined as the process for a Client to acquire the Endpoint information for  
2455 OCF Device or Resource.

#### 2456 **10.3.2 Implicit discovery**

2457 If a Device is the source of a CoAP message (e.g. "/oic/res" response), the source IP address and  
2458 port number may be combined to form the Endpoint Locator for the Device. Along with a "coap"  
2459 scheme and default "pri" value, Endpoint information for the Device may be constructed.

2460 In other words, an "/oic/res" response message with CoAP may implicitly carry the Endpoint  
2461 information of the responding Device and in turn all the hosted Resources, which may be accessed  
2462 with the same transfer protocol of CoAP.

#### 2463 **10.3.3 Explicit discovery with "/oic/res" response**

2464 Endpoint information may be explicitly indicated with the "eps" Parameter of the Links in "/oic/res".

2465 As in 10.3.2, an "/oic/res" response may implicitly indicate the Endpoint information for some  
2466 Resources hosted by the responding Device. However implicit discovery, i.e., inference of  
2467 Endpoint information from CoAP response message, may not work for some Resources on the  
2468 same Device. For example, some Resources may allow only secure access via CoAPS which  
2469 requires the "eps" Parameter to indicate the port number. Moreover "/oic/res" may expose a target  
2470 Resource which belongs to another Device.

2471 When the Endpoint for a target Resource of a Link cannot be implicitly inferred, the "eps"  
2472 Parameter shall be included to provide explicit Endpoint information with which a Client can access  
2473 the target Resource. To access the target Resource of a Link, a Client may use the "eps" Parameter  
2474 in the Link, if it is present and fall back on implicit discovery if not.

2475 This applies to the case of "/oic/res" for a Resource Directory or Bridge Device which usually  
2476 carries the Links for Resources which another Device hosts.

2477 An "/oic/res" response from a Bridge Device with two Bridged Devices, having the "eps" Parameter  
2478 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"],
```

```

    "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"}]
  }

```

```

},
{
  "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]:7777"},
        {"ep": "coaps://[2001:db8:a::b1d4]:3333"}]
},
{
"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]:3333"}]
},
{
"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]:7777"},
        {"ep": "coaps://[2001:db8:a::b1d4]:3333"}]
},
{
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"href": "/oic/sec/pstat",
"rt": ["oic.r.pstat"],
"if": ["oic.if.baseline"],
"p": {"bm": 1},
"eps": [{"ep": "coaps://[2001:db8:a::b1d4]:3333"}]
},
{
"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]:3333"}]
},
{
"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]:3333"}]
},
{
"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]:3333"}]
}
]

```

2479

2480 The exact format of the “/oic/res” response and a way for a Client to acquire a “/oic/res” response  
2481 message is specified in D.9 and 11.3.5 respectively.

2482 **10.4 CoAP based Endpoint discovery**

2483 The following describes CoAP based Endpoint discovery:

- 2484 a) Devices shall join the ‘All OCF Nodes’ multicast groups (as defined in [IANA IPv6 Multicast  
2485 Address Space Registry]) with scopes 2, 3, and 5 (i. e., ff02::158, ff03::158 and ff05::158) and  
2486 shall listen on the port 5683. For compliance to IETF RFC 7252 a Device may additionally join  
2487 the ‘All CoAP Nodes’ multicast groups.
- 2488 b) Clients intending to discover resources shall join the multicast groups as defined in a).
- 2489 c) Devices shall expose “/oic/res” via an unsecured endpoint.
- 2490 d) Clients shall send discovery requests (GET request) to the 'All OCF Nodes' multicast group  
2491 address with scope 2 (ff02::158) at port 5683. The requested URI shall be “/oic/res”. For  
2492 compliance to IETF RFC 7252 a Client may additionally send to the ‘All CoAP Nodes’ multicast  
2493 groups.
- 2494 e) If the discovery request is intended for a specific Resource Type, the Query parameter "rt" shall  
2495 be included in the request (section 6.2.1) with its value set to the desired Resource Type. Only  
2496 Devices hosting the Resource Type shall respond to the discovery request.
- 2497 f) When the “rt” Query parameter is omitted, all Devices shall respond to the discovery request.
- 2498 g) Handling of multicast requests shall be as described in section 8 of IETF RFC 7252 and section  
2499 4.1 in IETF RFC 6690.
- 2500 h) Devices which receive the request shall respond using CBOR payload encoding. A Device shall  
2501 indicate support for CBOR payload encoding for multicast discovery as described in section  
2502 12.4.

2503 **11 Functional interactions**

2504 **11.1 Introduction**

2505 The functional interactions between a Client and a Server are described in section 11.2 through  
2506 section 11.6 respectively. The functional interactions use CRUDN messages (section 8) and  
2507 include Discovery, Notification, and Device management. These functions require support of core  
2508 defined resources as defined in Table 18. More details about these resources are provided later  
2509 in this section.

2510 **Table 18. 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

2511

2512 **11.2 Onboarding, Provisioning and Configuration**

2513 Onboarding and Provisioning are fully defined by the OCF Security Specification.

2514

2515 Should a Device support Client update of configurable information it shall do so via exposing an  
 2516 oic.wk.con Core Resource (Table 19) in "/oic/res";

2517

2518

**Table 19. 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 <b>resource properties</b> exposed in "oic.wk.con" are listed in Table 20.	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 21.	Configuration

2519

2520 Table 20 defines the "oic.wk.con" resource type.

2521

2522

**Table 20. "oic.wk.con" Resource Type definition**

Property title	Property name	Value type	Value rule	Unit	Access mode	Mandatory	Description
<b>(Device) Name</b>	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.
<b>Location</b>	loc	array of float (has two elements, the first is latitude, the second is longitude)		Degrees	R, W	no	Provides location information where available.
<b>Location Name</b>	locn	string			R, W	no	Human friendly name for location. For example, "Living Room".
<b>Currency</b>	c	string			R, W	no	Indicates the currency that is used for any monetary transactions

<b>Region</b>	r	string			R,W	no	Free form text Indicating the current region in which the device is located geographically.
<b>Localized Names</b>	ln	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.
<b>Default Language</b>	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.

2523

2524 Table 21 defines the “oic.wk.con.p” resource type.

2525

**Table 21. “oic.wk.con.p” Resource Type definition**

Property title	Property name	Value type	Value rule	Unit	Access mode	Mandatory	Description
<b>Platform Names</b>	mnpn	array			R,W	no	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.  For example, [{"language": "en", "value": "Dave's Laptop"}]

2526

2527

2528 **11.3 Resource discovery**

2529 **11.3.1 Introduction**

2530 Discovery is a function which enables endpoint discovery as well as resource based discovery.  
2531 Endpoint discovery is described in detail in section 10. This section mainly describes the resource  
2532 based discovery.

2533 **11.3.2 Resource based discovery: mechanisms**

2534 **11.3.2.1 Overview**

2535 As part of discovery, a Client may find appropriate information about other OCF peers. This  
2536 information could be instances of Resources, Resource Types or any other information  
2537 represented in the resource model that an OCF peer would want another OCF peer to discover.

2538 At the minimum, Resource based discovery uses the following:

- 2539 1) A resource to enable discovery shall be defined. The representation of that resource shall  
2540 contain the information that can be discovered.
- 2541 2) The resource to enable discovery shall be specified and commonly known a-priori. A Device  
2542 for hosting the resource to enable discovery shall be identified.
- 2543 3) A mechanism and process to publish the information that needs to be discovered with the  
2544 resource to enable discovery.
- 2545 4) A mechanism and process to access and obtain the information from the resource to enable  
2546 discovery. A query may be used in the request to limit the returned information.
- 2547 5) A scope for the publication
- 2548 6) A scope for the access.
- 2549 7) A policy for visibility of the information.

2550

2551 Depending on the choice of the base aspects defined above, the Framework defines three resource  
2552 based discovery mechanisms:

- 2553 • Direct discovery, where the Resources are published locally at the Device hosting the  
2554 resources and are discovered through peer inquiry.
- 2555 • Indirect discovery, where Resources are published at a third party assisting with the  
2556 discovery and peers publish and perform discovery against the resource to enable  
2557 discovery on the assisting 3<sup>rd</sup> party.
- 2558 • Advertisement discovery, where the resource to enable discovery is hosted local to the  
2559 initiator of the discovery inquiry but remote to the Devices that are publishing discovery  
2560 information.

2561 A Device shall support direct discovery.

2562 **11.3.2.2 Direct discovery**

2563 In direct discovery,

- 2564 1) The Device that is providing the information shall host the resource to enable discovery.
- 2565 2) The Device publishes the information available for discovery with the local resource to  
2566 enable discovery (i.e. local scope).
- 2567 3) Clients interested in discovering information about this Device shall issue RETRIEVE  
2568 requests directly to the resource. The request may be made as a unicast or multicast.  
2569 The request may be generic or may be qualified or limited by using appropriate queries in  
2570 the request.

- 2571 4) The “server” Device that receives the request shall send a response with the discovered  
2572 information directly back to the requesting “client” Device.  
2573 5) The information that is included in the request is determined by the policies set for the  
2574 resource to be discovered locally on the responding Device.  
2575

### 2576 **11.3.2.3 Indirect discovery of Resources (resource directory based discovery)**

2577 In indirect discovery the information about the resource to be discovered is hosted on a Server  
2578 that is not hosting the resource. See section 11.3.6 for details on resource directory based  
2579 discovery.

2580 In indirect discovery:

- 2581 a) The resource to be discovered is hosted on a Device that is neither the client initiating  
2582 the discovery nor the Device that is providing or publishing the information to be  
2583 discovered. This Device may use the same resource to provide discovery for multiple  
2584 agents looking to discover and for multiple agents with information to be discovered.  
2585 b) The Device to be discovered or with information to discover, publishes that information  
2586 with resource to be discovered on a different Device. The policies on the information  
2587 shared including the lifetime/validity are specified by the publishing Device. The  
2588 publishing Device may modify these policies as required.  
2589 c) The client doing the discovery may send a unicast discovery request to the Device  
2590 hosting the discovery information or send a multicast request that shall be monitored and  
2591 responded to by the Device. In both cases, the Device hosting the discovery information  
2592 is acting on behalf of the publishing Device.  
2593 d) The discovery policies may be set by the Device hosting the discovery information or by  
2594 the party that is publishing the information to be discovered. The discovery information  
2595 that is returned in the discovery response shall adhere to the policies that are in effect at  
2596 the time of the request.  
2597

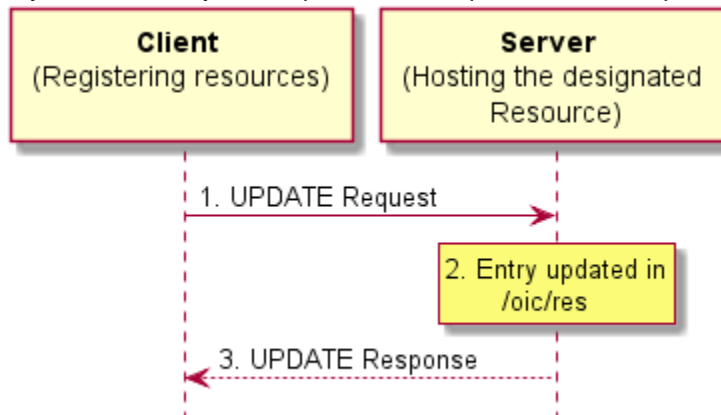
### 2598 **11.3.2.4 Advertisement Discovery**

2599 In advertisement discovery:

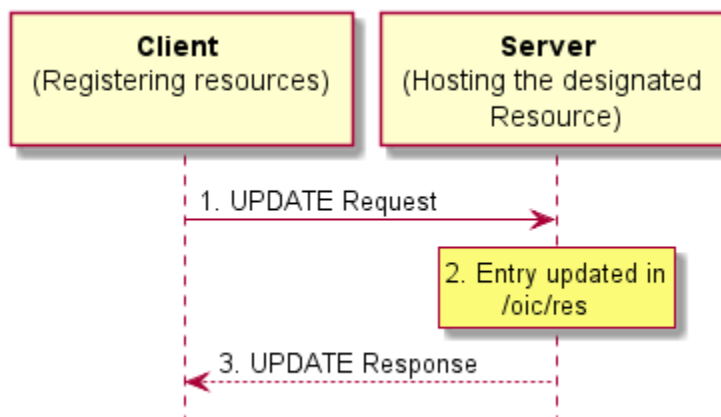
- 2600 a) The resource to enable discovery is hosted local to the Device that is initiating the discovery  
2601 request (client). The resource to enable discovery may be a Core Resource or discovered  
2602 as part of a bootstrap.  
2603 b) The request could be an implementation dependent lookup or be a local RETRIEVE request  
2604 against the resource that enables discovery.  
2605 c) The Device with information to be discovered shall publish the appropriate information to  
2606 the resource that enables discovery.  
2607 d) The publishing Device is responsible for the published information. The publishing Device  
2608 may UPDATE the information at the resource to enable discovery based on its needs by  
2609 sending additional publication requests. The policies on the information that is discovered  
2610 including lifetime is determined by the publishing Device.  
2611

2612 **11.3.3 Resource based discovery: Information publication process**

2613 The mechanism to publish information with the resource to enable discovery can be done either  
2614 locally or remotely. The publication process is depicted in



2615  
2616 Figure 14. The Device which has discovery information to publish shall a) either update the  
2617 resource that enables discovery if hosted locally or b) issue an UPDATE request with the  
2618 information to the Device which hosts the resource that enables discovery. The Device hosting the  
2619 resource to enable discovery adds/updates the resource to enable discovery with the provided  
2620 information and then responds to the Device which has requested the publication of the resource  
2621 with an UPDATE response.

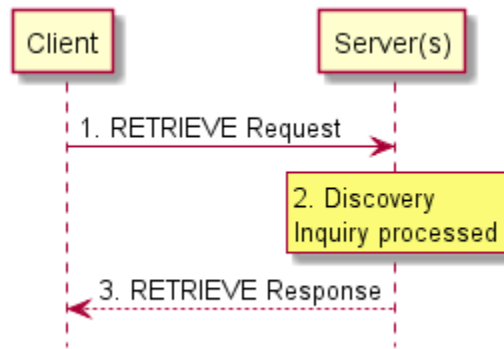


2622  
2623 **Figure 14. Resource based discovery: Information publication process**

2624 **11.3.4 Resource based discovery: Finding information**

2625 The discovery process (Figure 15) is initiated as a RETRIEVE request to the resource to enable  
2626 discovery. The request may be sent to a single Device (as in a Unicast) or to multiple Devices (as  
2627 in Multicast). The specific mechanisms used to do Unicast or Multicast are determined by the  
2628 support in the data connectivity layer. The response to the request has the information to be  
2629 discovered based on the policies for that information. The policies can determine which information  
2630 is shared, when and to which requesting agent. The information that can be discovered can be  
2631 resources, types, configuration and many other standards or custom aspects depending on the  
2632 request to appropriate resource and the form of request. Optionally the requester may narrow the  
2633 information to be returned in the request using query parameters in the URI query.

2634



2635

2636

**Figure 15. Resource based discovery: Finding information**

2637

### 2638 **Discovery Resources**

2639 The following Core Resources shall be implemented on all Devices to support discovery:

- 2640 ● “/oic/res” for discovery of resources
- 2641 ● “/oic/p” for discovery of platform
- 2642 ● “/oic/d” for discovery of device information

2643 Devices shall expose each of “/oic/res”, “/oic/d”, and “/oic/p” via an unsecured endpoint. Further  
2644 details for these mandatory Core Resources are described in Table 22

#### 2645 Platform resource –

2646 The OCF recognizes that more than one instance of Device may be hosted on a single platform.  
2647 Clients need a way to discover and access the information on the platform. The core resource,  
2648 “/oic/p” exposes platform specific Properties. All instances of Device on the same Platform shall  
2649 have the same values of any Properties exposed (i.e. a Device may choose to expose optional  
2650 Properties within “/oic/p” but when exposed the value of that Property should be the same as the  
2651 value of that Property on all other Devices on that Platform)

#### 2652 Device resource

2653 The device resource shall have the pre-defined URI “/oic/d”. The resource “/oic/d” exposes the  
2654 Properties pertaining to a Device as defined in Table 22. The Properties exposed are determined  
2655 by the specific instance of Device and defined by the Resource Type(s) of “/oic/d” on that Device.  
2656 Since all the Resource Types of “/oic/d” are not known a priori, the Resource Type(s) of “/oic/d”  
2657 shall be determined by discovery through the core resource “/oic/res”. The device resource “/oic/d”  
2658 shall have a default Resource Type that helps in bootstrapping the interactions with this device  
2659 (the default type is described in Table 22.)

#### 2660 Protocol indication

2661 A Device may need to support different messaging protocols depending on requirements for  
2662 different vertical domain profiles. For example, a Smart Home profile may use CoAP and an  
2663 Industrial profile may use DDS. To enable interoperability, a Device uses the protocol indication  
2664 to indicate the transport protocols they support and can communicate over.  
2665  
2666

2667



**Table 22. Mandatory discovery Core Resources**

Pre-define d 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 23.	Discovery
“/oic/p”	Platform	“oic.wk.p”	“oic.if.r”	The discoverable resource through which platform specific information is discovered. The <b>Properties</b> exposed by “/oic/p” are listed in Table 26	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 <b>Properties</b> exposed by “/oic/d” are listed in Table 25 “/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

2669

2670 Table 23 defines “oic.wk.res” Resource Type.

2671

**Table 23. “oic.wk.res” Resource Type definition**

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

2672 A Device shall support CoAP based discovery as the baseline discovery mechanism (see section  
2673 10.4).2674 The “/oic/res” shall list all Resources that are indicated as discoverable (see section 11.3). Also  
2675 the following architecture Resource Types shall be listed:

- 2676 • Introspection resource indicated with an “rt” value of “oic.wk.introspection”
- 2677 • “/oic/p” indicated with an “rt” value of “oic.wk.p”

- 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 24 provides an OCF registry for protocol schemes.

2694 **Table 24. 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 25.
- 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 25 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

2714 manner is defined to be an instance of a Collection in accordance with section 7.8.3 then the  
 2715 Resources that are part of that Collection shall at a minimum include the Resource Types  
 2716 mandated for the Device Type. For example, if a Collection Resource has an "rt" value of  
 2717 ["oic.d.light"], the Collection includes an instance of "oic.r.switch.binary" which is mandatory  
 2718 for an "oic.d.light" as per the OCF Device specification.

2719 Table 25 "oic.wk.d" Resource Type definition defines the base Resource Type for the "/oic/d"  
 2720 resource.

2721

2722

**Table 25. "oic.wk.d" Resource Type definition**

Property title	Property name	Value type	Value rule	Unit	Access mode	Mandatory	Description
<b>(Device) Name</b>	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".
<b>Spec Version</b>	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.2.0.0".
<b>Dev ice ID</b>	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.
<b>Data Model Version</b>	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

							(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.
<b>Protocol Independent ID</b>	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.
<b>Localized Descriptions</b>	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.
<b>Software Version</b>	sv	string			R	no	Version of the device software.
<b>Manufacturer Name</b>	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.
<b>Model Number</b>	dmno	string			R	no	Model number as designated by manufacturer.

2723

2724 The additional Resource Type(s) of the "/oic/d" resource are defined by the OCF Device  
2725 specification.

2726

2727 Table 26 defines "oic.wk.p" Resource Type.  
2728

2729

**Table 26. "oic.wk.p" Resource Type definition**

Property title	Property name	Value type	Value rule	Unit	Access mode	Mandatory	Description
<b>Platform ID</b>	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.
<b>Manufacturer Name</b>	mnmn	string			R	yes	Name of manufacturer
<b>Manufacturer Details Link</b>	mnml	uri			R	no	Reference to manufacturer, represented as a URI
<b>Model Number</b>	mnmo	string			R	no	Model number as designated by manufacturer
<b>Date of Manufacture</b>	mndt	date		Time	R	no	Manufacturing date of Platform.
<b>Serial number</b>	mnsel	string			R	no	Serial number of the Platform, may be unique for each Platform of the same model number.
<b>Platform Version</b>	mpv	string			R	no	Version of platform – string (defined by manufacturer)
<b>OS Version</b>	mnos	string			R	no	Version of platform resident OS – string (defined by manufacturer)
<b>Hardware Version</b>	mnhw	string			R	no	Version of platform hardware
<b>Firmware version</b>	mnfv	string			R	no	Version of Platform firmware
<b>Support link</b>	mnsi	uri			R	no	URI that points to support information from manufacturer
<b>SystemTime</b>	st	date-time			R	no	Reference time for the Platform.
<b>Vendor ID</b>	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.

2730

2731

2732

2733

### 2734 11.3.5 Resource discovery using “/oic/res”

2735 Discovery using “/oic/res” is the default discovery mechanism that shall be supported by all Devices  
2736 as follows:

- 2737 a) Every Device updates its local “/oic/res” with the resources that are discoverable (see section  
2738 7.3.2.2). Every time a new resource is instantiated on the Device and if that resource is  
2739 discoverable by a remote Device then that resource is published with the “/oic/res” resource  
2740 that is local to the Device (as the instantiated resource).
- 2741 b) A Device wanting to discover resources or Resource Types on one or more remote Devices  
2742 makes a RETRIEVE request to the “/oic/res” on the remote Devices. This request may be sent  
2743 multicast (default) or unicast if only a specific host is to be probed. The RETRIEVE request  
2744 may optionally be restricted using appropriate clauses in the query portion of the request.  
2745 Queries may select based on Resource Types, interfaces, or properties.
- 2746 c) The query applies to the representation of the resources. “/oic/res” is the only resource whose  
2747 representation has “rt”. So “/oic/res” is the only resource that can be used for Multicast  
2748 discovery at the transport protocol layer.
- 2749 d) The Device receiving the RETRIEVE request responds with a list of resources, the Resource  
2750 Type of each of the resources and the interfaces that each resource supports. Additionally,  
2751 information on the policies active on the resource can also be sent. The policy supported  
2752 includes observability and discoverability. (More details below)
- 2753 e) The receiving Device may do a deeper discovery based on the resources returned in the  
2754 request to “/oic/res”.

2755

2756 The information that is returned on discovery against “/oic/res” is at the minimum:

- 2757 • The URI (relative or fully qualified URL) of the resource
- 2758 • The Resource Type(s) of each resource. More than one Resource Type may be returned if the  
2759 resource enables more than one type. To access resources of multiple types, the specific  
2760 Resource Type that is targeted shall be specified in the request.
- 2761 • The Interfaces supported by that Resource. Multiple interfaces may be returned. To access a  
2762 specific interface that interface shall be specified in the request. If the interface is not specified,  
2763 then the Default Interface is assumed.

2764 Different “/oic/res” responses are returned according to requesting Clients, which indicate their  
2765 preference via inclusion or otherwise of an OCF-Accept-Content-Format-Version option.

2766 For Clients that do not include the OCF-Accept-Content-Format-Version option, an “/oic/res”  
2767 response shall use “sec” and “port” to provide the information for an encrypted connection. See  
2768 E.2.8 for the schema for the Link.

2769 For Clients that do include the OCF-Accept-Content-Format-Version option, an “/oic/res” response  
2770 includes an “array of Links” to conform to IETF RFC 6690. Each Link shall use an “eps” Parameter  
2771 to provide the information for an encrypted connection and carry “anchor” of the value OCF URI  
2772 where the authority component of <deviceId> indicates the Device hosting the target Resource.

2773 The JSON schema for discovery using “/oic/res” is described in D.9, the schema that is applicable  
2774 to requesting Clients that do not include an OCF-Accept-Content-Format-Version option is  
2775 described in E.4 and E.5. Also refer to section 10 (Endpoint Discovery) for details of Multicast  
2776 discovery using “/oic/res” on a CoAP transport.

2777 For example, a Light device might return the following to OIC 1.1 clients:

```

2778 [
2779   {
2780     "di": "e61c3e6b-9c54-4b81-8ce5-f9039c1d04d9",
2781     "links": [
2782       {
2783         "href": "coaps://[fe80::b1d6]:44444/oic/res",
2784         "rel": "self",
2785         "rt": ["oic.wk.res"],
2786         "if": ["oic.if.ll", "oic.if.baseline"],
2787         "p": {"bm": 3}
2788       },
2789       {
2790         "href": "/oic/p",
2791         "rt": ["oic.wk.p"],
2792         "if": ["oic.if.r", "oic.if.baseline"],
2793         "p": {"bm": 3, "sec": true, "port": 11111}
2794       },
2795       {
2796         "href": "/oic/d",
2797         "rt": ["oic.wk.d", "oic.d.light"],
2798         "if": ["oic.if.r", "oic.if.baseline"],
2799         "p": {"bm": 3, "sec": true, "port": 11111}
2800       },
2801       {
2802         "href": "/myLight",
2803         "rt": ["oic.r.switch.binary"],
2804         "if": ["oic.if.a", "oic.if.baseline"],
2805         "p": {"bm": 3, "sec": true, "port": 11111}
2806       }
2807     ]
2808   }
2809 ]

```

2810 The light device might return the following to clients that request with the Content Format of  
2811 "application/vnd.ocf+cbor" in Accept Option:

```

2812 [
2813   {
2814     "href": "/oic/res",
2815     "anchor": "ocf://dc70373c-1e8d-4fb3-962e-017eaa863989/oic/res",
2816     "rel": "self",
2817     "rt": ["oic.wk.res"],
2818     "if": ["oic.if.ll", "oic.if.baseline"],
2819     "p": {"bm": 3},
2820     "eps": [{"ep": "coap://[fe80::b1d6]:44444"}]
2821   },
2822   {
2823     "href": "/oic/p",
2824     "anchor": "ocf://dc70373c-1e8d-4fb3-962e-017eaa863989",
2825     "rt": ["oic.wk.p"],
2826     "if": ["oic.if.r", "oic.if.baseline"],
2827     "p": {"bm": 3},
2828     "eps": [{"ep": "coap://[fe80::b1d6]:44444"},
2829             {"ep": "coaps://[fe80::b1d6]:11111"}]
2830   },
2831   {
2832     "href": "/oic/d",
2833     "anchor": "ocf://dc70373c-1e8d-4fb3-962e-017eaa863989",
2834     "rt": ["oic.wk.d", "oic.d.light"],
2835     "if": ["oic.if.r", "oic.if.baseline"],
2836     "p": {"bm": 3},
2837   }

```

2838  
2839  
2840  
2841  
2842  
2843  
2844  
2845  
2846  
2847  
2848  
2849  
2850  
2851  
2852

```
"eps": [{"ep": "coap://[fe80::b1d6]:44444"},
          {"ep": "coaps://[fe80::b1d6]:11111"}
],
{
  "href": "/myLight",
  "anchor": "ocf://dc70373c-1e8d-4fb3-962e-017eaa863989",
  "rt": ["oic.r.switch.binary"],
  "if": ["oic.if.a", "oic.if.baseline"],
  "p": {"bm": 3},
  "eps": [{"ep": "coap://[fe80::b1d6]:44444"},
          {"ep": "coaps://[fe80::b1d6]:11111"}
]
}
```

2853 After performing discovery using “/oic/res”, Clients may discover additional details about Server  
2854 by performing discovery using “/oic/p”, /oic/rts etc. If a Client already knows about Server it may  
2855 discover using other resources without going through the discovery of “/oic/res”.

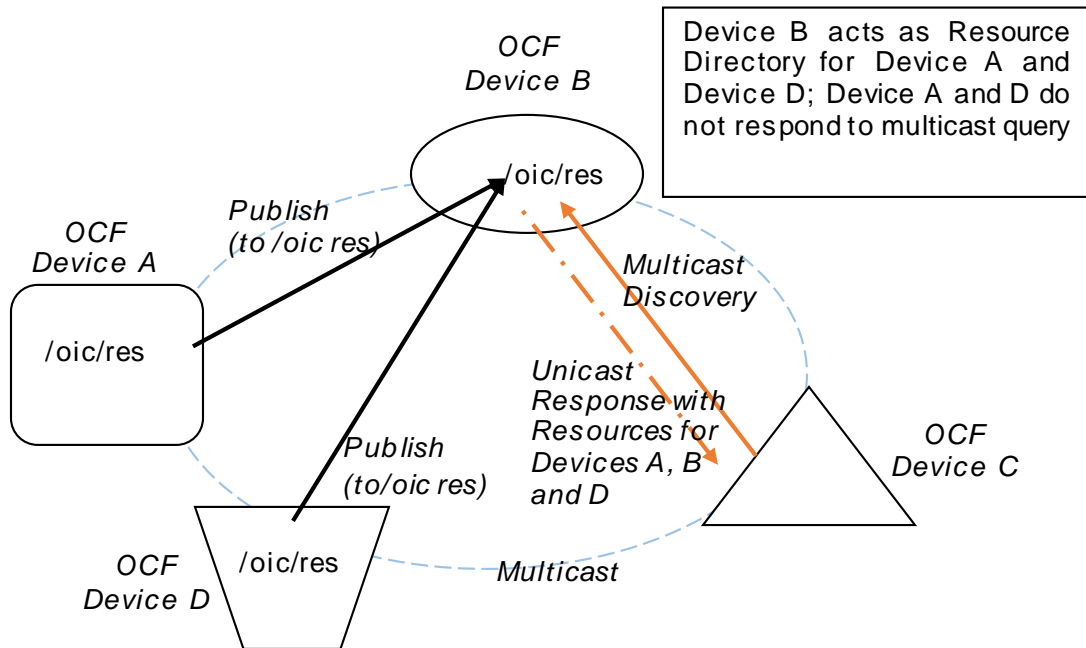
2856 **11.3.6 Resource directory (RD) based discovery**

2857 **11.3.6.1 Introduction**

2858 **11.3.6.1.1 Indirect discovery for lookup of the Resources**

2859 Direct discovery is the mechanism used currently to find Resources in the network. When needed,  
2860 Resources are queried at a particular Device directly or a multicast packet is sent to all Devices.  
2861 Each queried Device responds directly with its Resources to the discovering Device. Resources  
2862 available locally are registered on the same Device.

2863 In some situations, one of the other mechanisms described in section 11.3.2.3, called indirect  
2864 discovery, may be required. Indirect discovery is when a 3rd party Device, other than the  
2865 discovering Device and the discovered Device, assists with the discovery process. The 3rd party  
2866 Device, called Resource Directory (RD), only provides information on Resources on behalf of  
2867 another Device but does not host Resources on part of that Device.



2868



2869

### Figure 16. Indirect discovery of Resources by via an RD

2870 In Figure 16, Device B acts as Resource Directory for Device A and Device D. Device A and Device  
2871 D publish their Resource information to Device B. Device C may query Deice B to acquire the  
2872 Resource information of Device A and Device D. Device A and Device D may not respond to a  
2873 multicast query when Device B, as a Resource Directory, responds to the query on their behalf.

2874 Indirect discovery is useful for a constrained Device that needs to sleep to manage power and  
2875 cannot process every discovery request, or when Devices may not be on the same network and  
2876 requires optimization for discovery. Once Resources are discovered using indirect discovery, i.e.,  
2877 RD query, then the access to the Resource is done by a request sent directly to the Device that  
2878 hosts that Resource.

#### 2879 11.3.6.1.2 Resource directory

2880 A Resource Directory (RD) is a Device that assists with indirect discovery. A Device which acts as  
2881 an RD will be involved in the following operations.

- 2882 • **RD discovery** – the procedure with which publishing Devices discover an RD and acquire the  
2883 criteria to select from among multiple detected RDs.
- 2884 • **Resource publish** – the procedures with which Devices publish their Resource information,  
2885 i.e. Links. Future revision of this specification will allow modifying RD entries with UPDATE  
2886 and DELETE operations. Any UPDATE or DELETE operations performed on an RD in this  
2887 specification should be either silently ignored or generate an error.
- 2888 • **Resource exposure** – the feature with which RDs expose the Links hosted by the 3<sup>rd</sup> party  
2889 Devices via their own "/oic/res".

2890 For the above, RDs make use of Resource Type "oic.wk.rd" defined in Table 27 and Table 28. A  
2891 Device that supports the capability to host indirect discovery shall expose an instance of "oic.wk.rd"  
2892 in its "/oic/res" to announce that it serves as an RD. The discoverable instance of "oic.wk.rd" shall  
2893 allow only secure connections (e.g. endpoint with a scheme of "coaps" or "coaps+tcp"). A  
2894 publishing Device may send a RETRIEVE request to "/oic/rd" to acquire the selection criteria  
2895 among multiple RDs. Then it may send an UPDATE request to "/oic/rd" with its Links in the payload  
2896 to publish the Links in "/oic/res" of the RD. A publishing Device is responsible to insure an RD has  
2897 the correct published Links to expose via its "/oic/res".

2898 **Table 27. "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

2899

2900

**Table 28. "oic.wk.rd" Properties**

Property title	Property name	Value type	Value rule	Unit	Access mode	Mandatory	Description
<b>Selector</b>	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

2901

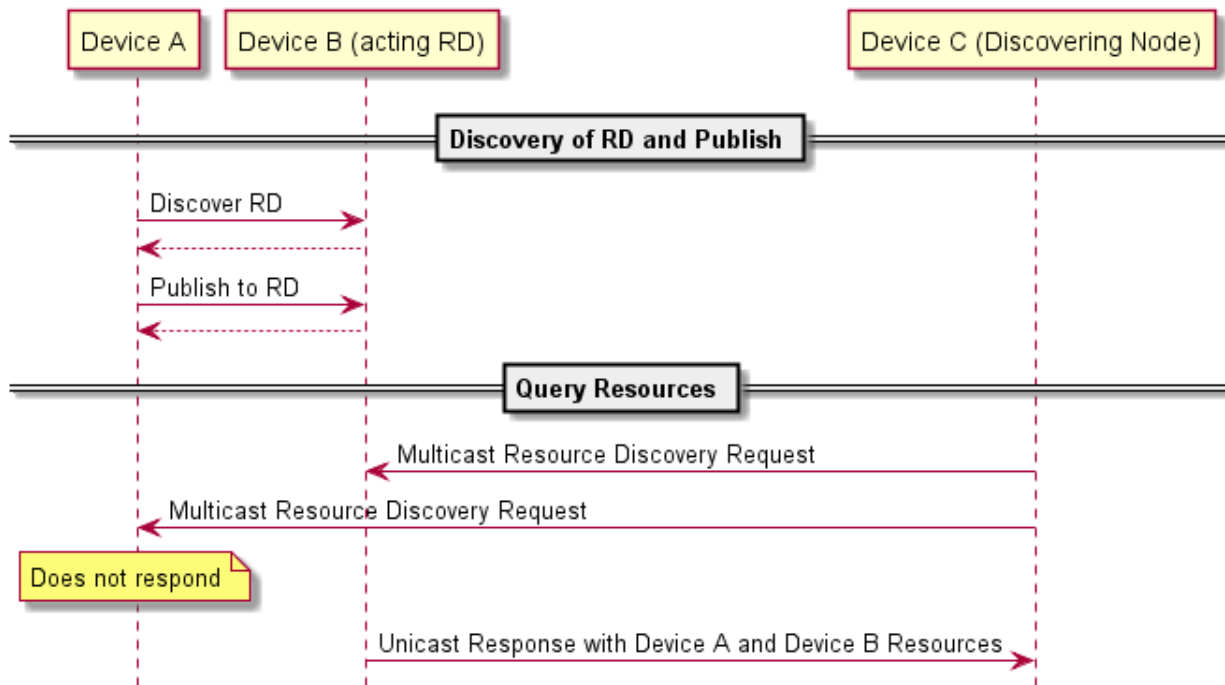
2902 An RD may be queried at its "/oic/res" Resource to find Resources hosted on other Devices. These  
 2903 Devices can be sleepy nodes or any other device that cannot or may not respond to discovery  
 2904 requests. A publishing Device may publish all or a partial list of Resources they host to an RD.  
 2905 The RD then responds to queries for Resource discovery on behalf of the publishing Device (for  
 2906 example: when a Device may go to sleep). For general Resource discovery, the RD behaves like  
 2907 any other Server in responding to requests to "/oic/res".

2908 The remainder of section 11.3.6 is divided into three parts. The first part covers "RD Discovery"  
 2909 (section 11.3.6.2), i.e., discovering and selecting of an RD. The second part covers "Resource  
 2910 publish" (section 11.3.6.3), i.e., publishing of Resources. The third part covers "Resource  
 2911 exposure" (section 11.3.6.4) where the RD replies to queries from Devices looking to discover  
 2912 Resources.

2913 **11.3.6.2 RD discovery**

2914 **11.3.6.2.1 Discovering an RD**

2915 An RD shall support RD discovery.

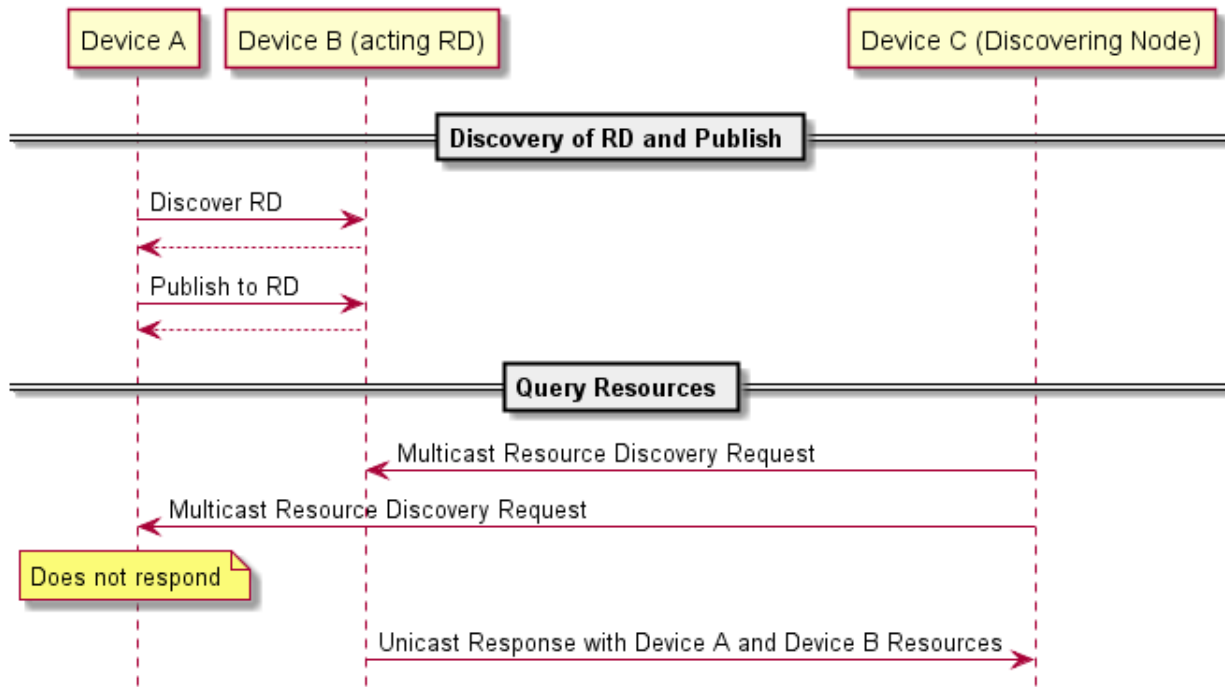


2916

2917 **Figure 17. RD discovery and RD supported query of Resources support**

2918

As shown in



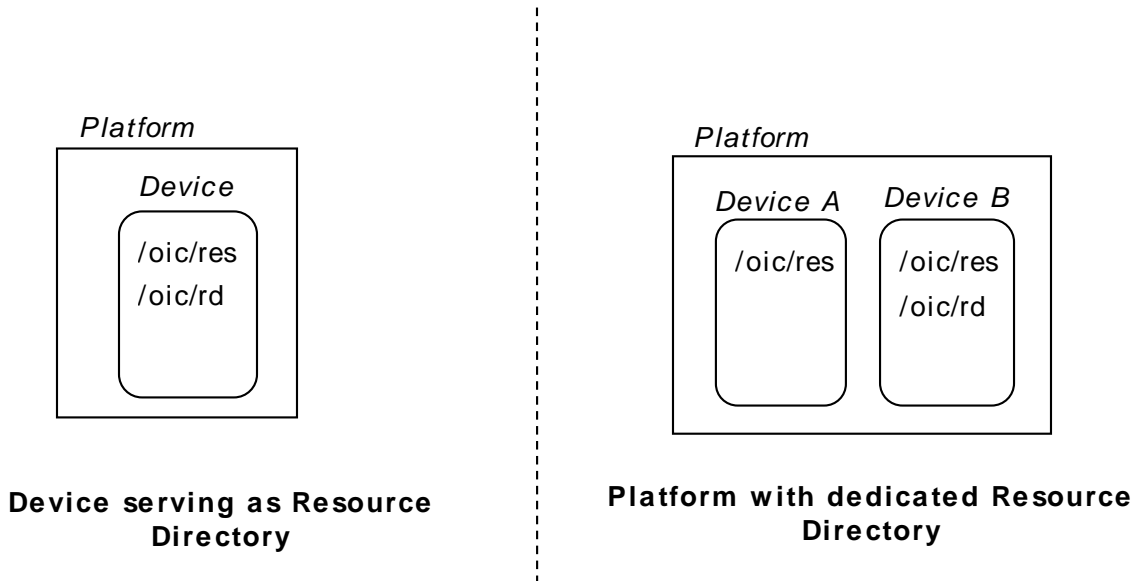
2919

2920 Figure 17, a Device that wishes to publish its Resources first discovers an RD and then publishes  
 2921 the desired Resource information. Once a set of Resources have been published to an RD then  
 2922 the publishing Device should not respond to multicast Resource discovery queries for those  
 2923 published Resources when the RD is on the same multicast domain. In that case, only the RD  
 2924 should respond to multicast Resource discovery requests on the Resource published to it.

2925 It is allowed for more than one Device to act as an RD. The reason to have multiple RD support is  
 2926 to make networks scalable, handle network failures and prevent centralized Device failure  
 2927 bottlenecks. This does not preclude a scenario where a use case or deployment environment may  
 2928 require a single Device in the environment to be deployed as the only RD (e.g. gateway model).

2929 Discovering an RD may result in responses from more than one RD. If more than one RD responds,  
 2930 the discovering Device may select one of them based on the weighting parameter(s) provided in  
 2931 the response from the RD.

2932 A Client that performs Resource discovery uses an RD just like it uses any other Server for  
 2933 discovery. It may send a unicast request to the RD when it needs only the Resources published  
 2934 on the RD or do a multicast query when it does not require or have explicit knowledge of an RD.



2935  
2936 **Figure 18. Resource Direction Deployment Scenarios**

2937 RDs may also be discovered in the following ways:

- 2938 • Pre-configuration: Devices wishing to publish Resource information may be configured a priori  
2939 with the information (e.g. IP address, port, transport etc.) of a specific RD. This pre-  
2940 configuration may be done at onboarding or may be updated on the Device using an out-of-  
2941 band method. This pre-configuration may be done by the manufacturer.
- 2942 • Query-oriented: A publishing Device wanting to discover resource directories using query-  
2943 oriented discovery may issue a multicast Resource discovery request for "/oic/res?rt=oic.wk.rd".  
2944 Only and all Devices that can be an RD shall respond to this query. The "/oic/rd" response shall  
2945 include information about the RD i.e., the presence of "oic.wk.rd" Link (as defined by the  
2946 Resource Type) and a subsequent query to "/oic/rd" would produce weighting parameters to  
2947 allow the discovering Device to select between RDs (see details in RD selection section  
2948 11.3.6.2.2). The "oic.wk.rd" resource shall be instantiated on the Devices acting as RDs. The  
2949 "oic.wk.rd" schema is as defined in D.13.

2950 **11.3.6.2.2 RD selection process**

2951 The Device that wants to use an RD will find zero or more RDs on the network. There may not be  
2952 an RD within the network. When discovering RDs, the Device needs to select an RD of all RDs  
2953 found on the network. The Device may send a RETRIEVE request to "/oic/rd" of a specific RD, the  
2954 RD shall respond with the representation of "/oic/rd/" containing selection criteria as defined by  
2955 the "sel" Property. The lower the "sel" Property value is, the more preferable the responding RD  
2956 is. The creation of the "sel" value is vendor defined.

2957 For example an "/oic/rd" response may return the following.

```
2958 {
2959   "rt": ["oic.wk.rd"],
2960   "if": ["oic.if.baseline"],
2961   "sel": 50
2962 }
```

2962 The selection based on the "sel" Property value will ensure that a Device can judge if the found  
2963 RD is suitable for its needs.

2964 The following situations may occur during the selection of an RD:

2965 1) A single or multiple RDs are present in the network

2966 2) No RD is present in the network

2967 3) an additional RD arrives on the network

2968 In the first scenario, the RDs are already present. If a single RD is detected then that RD may be  
2969 used. When multiple RDs are detected the Device may use the "sel" Property value to select the  
2970 RD.

2971 In the second scenario, the publishing Device may continue looking for an RD until one is found  
2972 or give up using an RD altogether.

2973 In the third scenario, the Device has already published its resources to an existing RD, then  
2974 discovers a new RD on the network. After judging the "sel" Property value, the Device may choose  
2975 to move to the new RD. The Device should delete its Resource information from the currently used  
2976 RD and publish the information to the new RD.

### 2977 **11.3.6.3 Resource publish**

#### 2978 **11.3.6.3.1 Overview**

2979 An RD shall provide the facility to allow Devices to publish their Resource information to an RD.

#### 2980 **11.3.6.3.2 Publish resources**

##### 2981 **11.3.6.3.2.1 Overview**

2982 After the selection process of an RD, a device may push its Resource information to the selected  
2983 RD, i.e., publish the Links in its "/oic/res" to the "/oic/res" of the RD.

2984 The publishing Device may decide to publish all Resources or just a few of the Resources on the  
2985 RD. The publishing Device should only publish Resources that are otherwise published to its own  
2986 "/oic/res"; a publishing Device should not publish non-discoverable Resources or Resources  
2987 hosted by some other Device. A publishing Device shall respond to discovery requests on its  
2988 "/oic/res" resource unless all its discoverable Resources have been published in an RD.

##### 2989 **11.3.6.3.2.2 Publish: Push Resource information**

2990 Resource information may be published using an UPDATE request sent to "/oic/rd".

2991 A Device which hosts a Resource may publish the Resource information, i.e. the Link targeting the  
2992 Resource, to an RD by sending an UPDATE request with the Link in the payload. The published  
2993 Link shall be exposed through the "/oic/res" of the RD.

2994 When a Device first publishes a Link or Links, it shall send an UPDATE request to the "/oic/rd"  
2995 Resource of the RD including the following key-value pairs in the payload:

- 2996 • **di** –its value shall be the Device ID of the publishing Device, i.e. the "di" value of "/oic/d".
- 2997 • **links** –its value shall be the array of Links to be published. Links may omit the "ins" parameter  
2998 in which case the RD will assign a value for each Link. The supplied "ins" parameter by the  
2999 Client is allowed to be overruled by the RD, e.g. an RD can ignore the supplied "ins" value.
- 3000 • **tll** –its value indicates how long (in seconds) the publishing Device requests the RD to keep  
3001 this published Link.

3002 Take notice that the payload shall carry the appropriate Content-Format of  
3003 "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
}
```

3004  
3005 When an RD receives this initial UPDATE request, it determines whether to grant the request or  
3006 not. Upon granting the request, the RD shall send back an UPDATE response to the publishing  
3007 Device. The response shall include a payload with the same information as the original UPDATE  
3008 request with the following possible differences:

- 3009 • For each Link, an "ins" Parameter shall be included in the response. The RD shall assign a  
3010 unique "ins" value identifying the Link among all the Links it advertises. If the publishing Device  
3011 included an "ins" value in the UPDATE request, the RD may use it as long as it doesn't match  
3012 any existing "ins" value in the published Links.
- 3013 • The "ttl" Property Value shall be assigned by the RD and it shall be included in the response.  
3014 The RD should use the value included in the UPDATE request but may assign a value that is  
3015 lower if it is not able to honour the requested "ttl" value. After this time elapses, the RD shall

3016 remove the Links. To keep a Link alive the publishing Device may update the "ttl" using the  
3017 UPDATE schema.

3018 The RD shall add the new Links to its "/oic/res" and expose them to a valid discovery query, i.e.  
3019 RETRIEVE request:

3020

```
{
  "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": 112358
    }
  ],
  "ttl": 600
}
```

3021

3022 Once a publishing Device has published Resources to an RD, it may choose not respond to the  
3023 multicast discovery queries for the same Resources against its own "/oic/res", especially when on  
3024 the same multicast domain as the RD. After publishing Resources, primarily it is the RDs  
3025 responsibility to reply to the queries for the published Resources.

3026 There is another possibility that the RD and the publishing Device both respond to the multicast  
3027 query from the discovering Device. This will create a duplication of the information but is an  
3028 alternative that may be used for non-robust networks. It is not a recommended option but for  
3029 industrial scenarios, this is one of the possibilities. Either way, discovering Clients need to always  
3030 be prepared to process duplicate information in responses to multicast discovery request. The  
3031 `"/oic/rd"` schema is as defined in D.13 to specify publishing to the `"/oic/rd"` Resource.

### 3032 **11.3.6.4 Resource exposure**

#### 3033 **11.3.6.4.1 `"/oic/res"` and retrieving of the Resources**

3034 The `"/oic/res"` based discovery process remains the same as that in the absence of an RD.  
3035 Resources may be discovered by retrieving the `"/oic/res"` Resource by sending a multicast or  
3036 unicast request. In the case of a multicast discovery request, an RD shall include in its response  
3037 any published Resources on behalf of the Device that hosts the Resources. Clients should be  
3038 prepared to process duplicate Resource information from more than one RD responding with the  
3039 same information or from an RD and the hosting Device (publishing the Resource information) both  
3040 responding to the request. Interaction with Resources discovered using the RD is done using the  
3041 same mechanism and methods as with Resources discovered by retrieving the `"/oic/res"` Resource  
3042 of the Device hosting the Resources (e.g., connect to the hosting Device and perform CRUDN  
3043 operations on the Resource).

3044 Resource Directories provide different `"/oic/res"` responses according to the requesting Clients,  
3045 which indicate their preference with content format. OCF 1.0 Clients request with a "Content  
3046 Format of `"application/vnd.ocf+cbor"` in the Accept Option, whereas the Content-Format  
3047 `"application/cbor"` in the Accept Option indicates OIC 1.1 Clients. For OIC 1.1 Clients, the `"/oic/res"`  
3048 response includes Links conforming to OIC 1.1 specification, which OIC 1.1 Clients can understand.  
3049 In this case the Resources hosted by the same Device shall be grouped together within a single  
3050 JSON Object with `"di"` indicating the hosting Device. For a 3rd party Resource, i.e., a Resource  
3051 which doesn't belong to the responding RD, its `"href"` value shall be a fully qualified transfer  
3052 protocol URI with an IP address and port number as its authority component (e.g.,  
3053 `coaps://[2001:db8:b::c2e5]:22222/myLightSwitch`).

3054 For example, an RD might return the following to an OIC 1.1 Clients:

```
3055 [
3056   {
3057     "di": "88b7c7f0-4b51-4e0a-9faa-cfb439fd7f49",
3058     "links": [
3059       {
3060         "href": "/oic/res",
3061         "rel": "self",
3062         "rt": ["oic.wk.res"],
3063         "if": ["oic.if.ll", "oic.if.baseline"],
3064         "p": {"bm": 3, "sec": false}
3065       },
3066       {
3067         "href": "/oic/d",
3068         "rt": ["oic.wk.d", "oic.d.fan"],
3069         "if": ["oic.if.r", "oic.if.baseline"],
3070         "p": {"bm": 3, "sec": false}
3071       },
3072       {
3073         "href": "/oic/p",
3074         "rt": ["oic.wk.p"],
3075         "if": ["oic.if.r", "oic.if.baseline"],
3076         "p": {"bm": 3, "sec": true, "port": 33333}
3077       },
3078       {
3079         "href": "/myFanIntrospection",
```



```

3080     "rt": ["oic.wk.introspection"],
3081     "if": ["oic.if.r", "oic.if.baseline"],
3082     "p": {"bm": 3, "sec": true, "port": 33333}
3083   },
3084   {
3085     "href": "/oic/rd",
3086     "rt": ["oic.wk.rd"],
3087     "if": ["oic.if.baseline"],
3088     "p": {"bm": 3, "sec": true, "port": 33333}
3089   },
3090   {
3091     "href": "/myFanSwitch",
3092     "rt": ["oic.r.switch.binary"],
3093     "if": ["oic.if.a", "oic.if.baseline"],
3094     "p": {"bm": 3, "sec": true, "port": 33333}
3095   },
3096   {
3097     "href": "/oic/sec/doxm",
3098     "rt": ["oic.r.doxm"],
3099     "if": ["oic.if.baseline"],
3100     "p": {"bm": 1, "sec": false}
3101   },
3102   {
3103     "href": "/oic/sec/pstat",
3104     "rt": ["oic.r.pstat"],
3105     "if": ["oic.if.baseline"],
3106     "p": {"bm": 1, "sec": true, "port": 33333}
3107   },
3108   {
3109     "href": "/oic/sec/cred",
3110     "rt": ["oic.r.cred"],
3111     "if": ["oic.if.baseline"],
3112     "p": {"bm": 1, "sec": true, "port": 33333}
3113   },
3114   {
3115     "href": "/oic/sec/acl2",
3116     "rt": ["oic.r.acl2"],
3117     "if": ["oic.if.baseline"],
3118     "p": {"bm": 1, "sec": true, "port": 33333}
3119   }
3120 ]
3121 },
3122 {
3123   "di": "dc70373c-1e8d-4fb3-962e-017eaa863989",
3124   "links": [
3125     {
3126       "href": "coap://[2001:db8:b::c2e5]:66666/oic/d",
3127       "rt": ["oic.wk.d", "oic.d.light", "oic.d.virtual"],
3128       "if": ["oic.if.r", "oic.if.baseline"],
3129       "p": {"bm": 3, "sec": false}
3130     },
3131     {
3132       "href": "coaps://[2001:db8:b::c2e5]:22222/oic/p",
3133       "rt": ["oic.wk.p"],
3134       "if": ["oic.if.r", "oic.if.baseline"],
3135       "p": {"bm": 3, "sec": true, "port": 22222}
3136     },
3137     {
3138       "href": "coaps://[2001:db8:b::c2e5]:22222/myLightSwitch",
3139       "rt": ["oic.r.switch.binary"],
3140       "if": ["oic.if.a", "oic.if.baseline"],
3141       "p": {"bm": 3, "sec": true, "port": 22222}
3142     }
3143   ]
3144 }

```

3143  
3144  
3145  
3146  
3147  
3148  
3149  
3150  
3151  
3152

```
    {
      "href": "coaps://[2001:db8:b::c2e5]:22222/myLightBrightness",
      "rt": ["oic.r.brightness"],
      "if": ["oic.if.a", "oic.if.baseline"],
      "p": {"bm": 3, "sec": true, "port": 22222}
    }
  ]
}
```

3153  
3154  
3155  
3156

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.

3157

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

3158  
3159  
3160  
3161  
3162  
3163  
3164  
3165  
3166  
3167  
3168  
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3170  
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3184  
3185  
3186  
3187  
3188  
3189  
3190  
3191  
3192  
3193  
3194  
3195  
3196  
3197  
3198  
3199  
3200  
3201

```
[
  {
    "anchor": "ocf://88b7c7f0-4b51-4e0a-9faa-cfb439fd7f49",
    "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]:7777"},
            {"ep": "coaps://[2001:db8:a::b1d4]:33333"}]
  },
  {
    "anchor": "ocf://88b7c7f0-4b51-4e0a-9faa-cfb439fd7f49",
    "href": "/oic/d",
    "rt": ["oic.wk.d", "oic.d.fan"],
    "if": ["oic.if.r", "oic.if.baseline"],
    "p": {"bm": 3},
    "eps": [{"ep": "coap://[2001:db8:a::b1d4]:7777"},
            {"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": "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"}]
  },
  {
    "anchor": "ocf://88b7c7f0-4b51-4e0a-9faa-cfb439fd7f49",
    "href": "/oic/rd",
    "rt": ["oic.wk.rd"],
    "if": ["oic.if.baseline"],
    "p": {"bm": 3},
    "eps": [{"ep": "coaps://[2001:db8:a::b1d4]:33333"}]
  },
]
```

```

3202 {
3203   "anchor": "ocf://88b7c7f0-4b51-4e0a-9faa-cfb439fd7f49",
3204   "href": "/myFanSwitch",
3205   "rt": ["oic.r.switch.binary"],
3206   "if": ["oic.if.a", "oic.if.baseline"],
3207   "p": {"bm": 3},
3208   "eps": [{"ep": "coaps://[2001:db8:a::b1d4]:33333"}]
3209 },
3210 {
3211   "anchor": "ocf://88b7c7f0-4b51-4e0a-9faa-cfb439fd7f49",
3212   "href": "/oic/sec/doxm",
3213   "rt": ["oic.r.doxm"],
3214   "if": ["oic.if.baseline"],
3215   "p": {"bm": 1},
3216   "eps": [{"ep": "coap://[2001:db8:a::b1d4]:77777"},
3217             {"ep": "coaps://[2001:db8:a::b1d4]:33333"}]
3218 },
3219 {
3220   "anchor": "ocf://88b7c7f0-4b51-4e0a-9faa-cfb439fd7f49",
3221   "href": "/oic/sec/pstat",
3222   "rt": ["oic.r.pstat"],
3223   "if": ["oic.if.baseline"],
3224   "p": {"bm": 1},
3225   "eps": [{"ep": "coaps://[2001:db8:a::b1d4]:33333"}]
3226 },
3227 {
3228   "anchor": "ocf://88b7c7f0-4b51-4e0a-9faa-cfb439fd7f49",
3229   "href": "/oic/sec/cred",
3230   "rt": ["oic.r.cred"],
3231   "if": ["oic.if.baseline"],
3232   "p": {"bm": 1},
3233   "eps": [{"ep": "coaps://[2001:db8:a::b1d4]:33333"}]
3234 },
3235 {
3236   "anchor": "ocf://88b7c7f0-4b51-4e0a-9faa-cfb439fd7f49",
3237   "href": "/oic/sec/acl2",
3238   "rt": ["oic.r.acl2"],
3239   "if": ["oic.if.baseline"],
3240   "p": {"bm": 1},
3241   "eps": [{"ep": "coaps://[2001:db8:a::b1d4]:33333"}]
3242 },
3243 {
3244   "anchor": "ocf://dc70373c-1e8d-4fb3-962e-017eaa863989",
3245   "href": "/oic/d",
3246   "rt": ["oic.wk.d", "oic.d.light"],
3247   "if": ["oic.if.r", "oic.if.baseline"],
3248   "p": {"bm": 3},
3249   "eps": [{"ep": "coap://[2001:db8:b::c2e5]:66666"},
3250             {"ep": "coaps://[2001:db8:b::c2e5]:22222"}]
3251 },
3252 {
3253   "anchor": "ocf://dc70373c-1e8d-4fb3-962e-017eaa863989",
3254   "href": "/oic/p",
3255   "rt": ["oic.wk.p"],
3256   "if": ["oic.if.r", "oic.if.baseline"],
3257   "p": {"bm": 3},
3258   "eps": [{"ep": "coaps://[2001:db8:b::c2e5]:22222"}]
3259 },
3260 {
3261   "anchor": "ocf://dc70373c-1e8d-4fb3-962e-017eaa863989",
3262   "href": "/myLightSwitch",
3263   "rt": ["oic.r.switch.binary"],
3264

```

```

3265     "if": ["oic.if.a", "oic.if.baseline"],
3266     "p": {"bm": 3},
3267     "eps": [{"ep": "coaps://[2001:db8:b:c2e5]:22222"}]
3268   },
3269   {
3270     "anchor": "ocf://dc70373c-1e8d-4fb3-962e-017eaa863989",
3271     "href": "/myLightBrightness",
3272     "rt": ["oic.r.brightness"],
3273     "if": ["oic.if.a", "oic.if.baseline"],
3274     "p": {"bm": 3},
3275     "eps": [{"ep": "coaps://[2001:db8:b:c2e5]:22222"}]
3276   }
3277 ]

```

3278

## 3279 11.4 Notification

### 3280 11.4.1 Overview

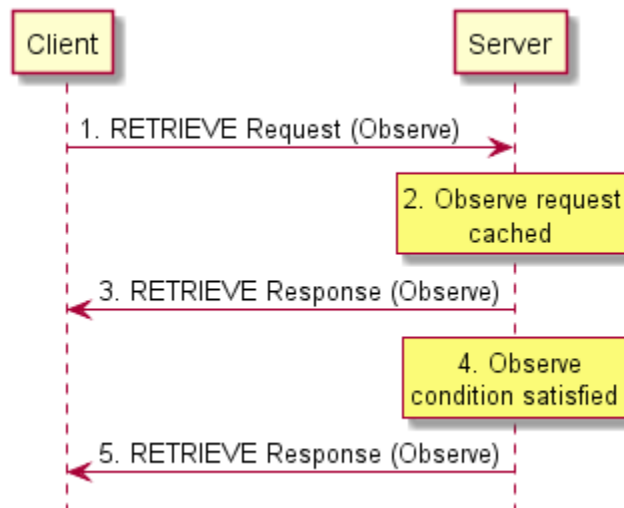
3281 A Server shall support NOTIFY operation to enable a Client to request and be notified of desired  
 3282 states of one or more Resources in an asynchronous manner. Section 11.4.2 specifies the observe  
 3283 mechanism in which updates are delivered to the requester.

### 3284 11.4.2 Observe

3285 In observe mechanism the Client utilizes the RETRIEVE operation to require the Server for updates  
 3286 in case of Resource state changes. The Observe mechanism consists of five steps which are  
 3287 depicted in Figure 19 and described below.

3288 Note: the observe mechanism can only be used for a resource with a property of observable  
 3289 (section 7.3.2.2).

3290



3291

3292

3293

**Figure 19. Observe Mechanism**

3294 **11.4.2.1 RETRIEVE request with observe indication**

3295 The Client transmits a RETRIEVE request message to the Server to request updates for the  
3296 Resource on the Server if there is a state change. The RETRIEVE request message carries the  
3297 following parameters:

- 3298 • *fr*: Unique identifier of the Client
- 3299 • *to*: Resource that the Client is requesting to observe
- 3300 • *ri*: Identifier of the RETRIEVE request
- 3301 • *op*: RETRIEVE
- 3302 • *obs*: Indication for observe request

3303 **11.4.2.2 Processing by the Server**

3304 Following the receipt of the RETRIEVE request, the Server may validate if the Client has the  
3305 appropriate rights for the requested operation and the properties are readable and observable. If  
3306 the validation is successful, the Server caches the information related to the observe request. The  
3307 Server caches the value of the *ri* parameter from the RETRIEVE request for use in the initial  
3308 response and future responses in case of a change of state.

3309 **11.4.2.3 RETRIEVE response with observe indication**

3310 The Server shall transmit a RETRIEVE response message in response to a RETRIEVE request  
3311 message from a Client. The RETRIEVE response message shall include the following parameters.  
3312 If validation succeeded, the response includes an observe indication. If not, the observe indication  
3313 is omitted from the response which signals to the requesting client that registration for notification  
3314 was not allowed.

3315 The RETRIEVE response message shall include the following parameters:

- 3316 • *fr*: Unique identifier of the Server
- 3317 • *to*: Unique identifier of the Client
- 3318 • *ri*: Identifier included in the RETRIEVE request
- 3319 • *cn*: Information resource representation as requested by the Client
- 3320 • *rs*: The result of the RETRIEVE operation
- 3321 • *obs*: Indication that the response is made to an observe request

3322 **11.4.2.4 Resource monitoring by the Server**

3323 The Server shall monitor the state the Resource identified in the observe request from the Client.  
3324 Anytime there is a change in the state of the observed resource, the Server sends another  
3325 RETRIEVE response with the observe indication. The mechanism does not allow the client to  
3326 specify any bounds or limits which trigger a notification, the decision is left entirely to the server.

3327 **11.4.2.5 Additional RETRIEVE responses with observe indication**

3328 The Server shall transmit updated RETRIEVE response messages following observed changes in  
3329 the state of the Resources indicated by the Client. The RETRIEVE response message shall include  
3330 the parameters listed in section 11.4.2.3.

3331 **11.4.2.6 Cancelling Observe**

3332 The Client can explicitly cancel observe by sending a RETRIEVE request without the observe  
3333 indication field to the same resource on Server which it was observing. For certain protocol  
3334 mappings, the client may also be able to cancel an observe by ceasing to respond to the  
3335 RETRIEVE responses.

3336 **11.5 Device management**

3337 **11.5.1 Overview**

3338 The Device Management includes the following functions:

- 3339 • Diagnostics and maintenance

3340 The device management functionalities specified in this version of specification are intended to  
 3341 address the basic device management features. Addition of new device management features in  
 3342 the future versions of the specification is expected.

3343 **11.5.2 Diagnostics and maintenance**

3344 The Diagnostics and Maintenance function is intended for use by administrators to resolve issues  
 3345 encountered with the Devices while operating in the field. If diagnostics and maintenance is  
 3346 supported by a Device, the Core Resource “/oic/mnt” shall be supported as described in Table 29.

3347 **Table 29. 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 <b>Properties</b> exposed by “/oic/mnt” are listed in Table 30.	Device Management

3348  
 3349 Table 30 defines the “oic.wk.mnt” Resource Type. At least one of the Factory Reset, Reboot or  
 3350 last error Properties shall be implemented.

3351 **Table 30. “oic.wk.mnt” Resource Type definition**

Property title	Property name	Value type	Value rule	Unit	Access mode	Mandatory	Description
<b>Factory_Reset</b>	fr	boolean			R, W	no	When writing to this Property: false – No action (Default*) true – Start Factory Reset After factory reset all configuration and state data will be lost. 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.
<b>Reboot</b>	rb	boolean			R, W	no	When writing to this Property: false – No action (Default) true – Start Reboot After Reboot, this value shall be changed back to the default value (i.e., false)
<b>Last error</b>	err	integer	HTTP error code		R	no	Last occurred error code, shall be cleared to 503 (service unavailable), when

							doing a Factory Reset or Reboot. All HTTP errors outside the 100, 200 or 300 range shall be stored.
--	--	--	--	--	--	--	--

3352

3353 Note: \* - Default indicates the value of this property as soon as the device is rebooted or factory reset

3354 **11.5.3 Network monitoring**

3355 Network monitoring is used for monitoring the current network state of the Device.

3356 The network monitoring Resource Type is "oic.wk.nmon" and is described in Table 31. The  
 3357 Resource Type may occur multiple times if more than 1 network interface is implemented. The  
 3358 Common Property "n" may be used to distinguish the different network interfaces, like distinguish  
 3359 the 2.4 and 5G Wi-Fi network interfaces.

3360 **Table 31. 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.baseline"	The Resource through which the Device is monitored.  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 32	Device Management

3361

3362 Table 32 defines oic.wk.nmon resource type.

3363 **Table 32. "oic.wk.nmon" Resource Type definition**

Property title	Property name	Value type	Value rule	Unit	Access mode	Mandatory	Description
<b>Network indicator</b>	ianaifType	integer	The integer value of the ianaifType		R	yes	The network type this Resource is collecting information from as defined by: <a href="https://www.iana.org/assignments/ianaiftype-mib/ianaiftype-mib">https://www.iana.org/assignments/ianaiftype-mib/ianaiftype-mib</a>
<b>reset</b>	reset	boolean	True, all collected values should be reset. The server should reset the value automatically to false after the reset occurred.		RW	yes	Reset of the collected values
<b>Collecting status indication</b>	col	boolean	True: collecting data. False: not collecting data		RW	yes	Boolean to start/stop collecting data.
<b>Transmission bytes</b>	tx	integer		kilo bytes	R	no	Amount of transmitted kilo bytes from the collection

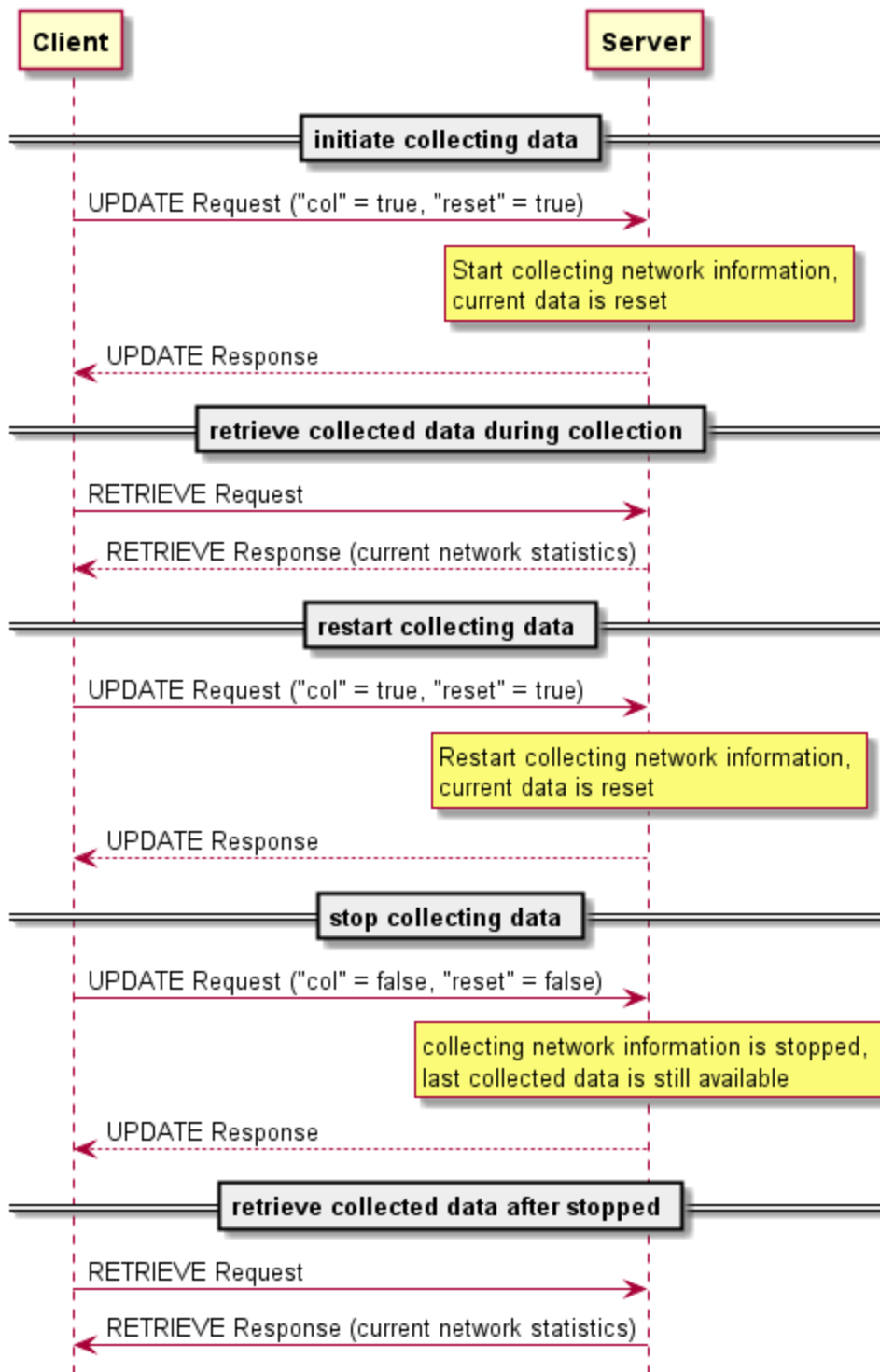
<b>Reception bytes</b>	rx	integer		kilo bytes	R	no	Amount of received kilo bytes from the collection'.
<b>Maximum message size tx</b>	m mstx	integer	bytes	bytes	R	no	Maximum transmitted message, e.g. Max(tx) in the collection period
<b>Maximum message size rx</b>	m msrx	integer	bytes	bytes	R	no	Maximum received message, e.g. Max(rx) in the collection period
<b>Average message size -tx</b>	am stx	integer	bytes	bytes	R	no	Average transmitted message size, e.g AVG(tx) in the collection period.
<b>Average message size -rx</b>	am srx	integer	bytes	bytes	R	no	Average received message size e.g AVT ( rx) in the collection period.

3364

3365 Examples of typical used values for ianaifType are 71 (ieee80211) for Wi-Fi and 6  
3366 (ethernetCsmacd) for Ethernet.

3367 A Device should start collecting network monitoring data when receiving an UPDATE operation  
3368 with the parameter "col" = true. A Device should stop collecting network data when receiving an  
3369 UPDATE operation with parameter "col" = false. The collected network data should be reset when  
3370 an UPDATE operation with parameter "reset" = true is received, if the parameter "reset" is false  
3371 then the values should not be reset. Figure 20 illustrates the interactions with the network  
3372 monitoring Resource

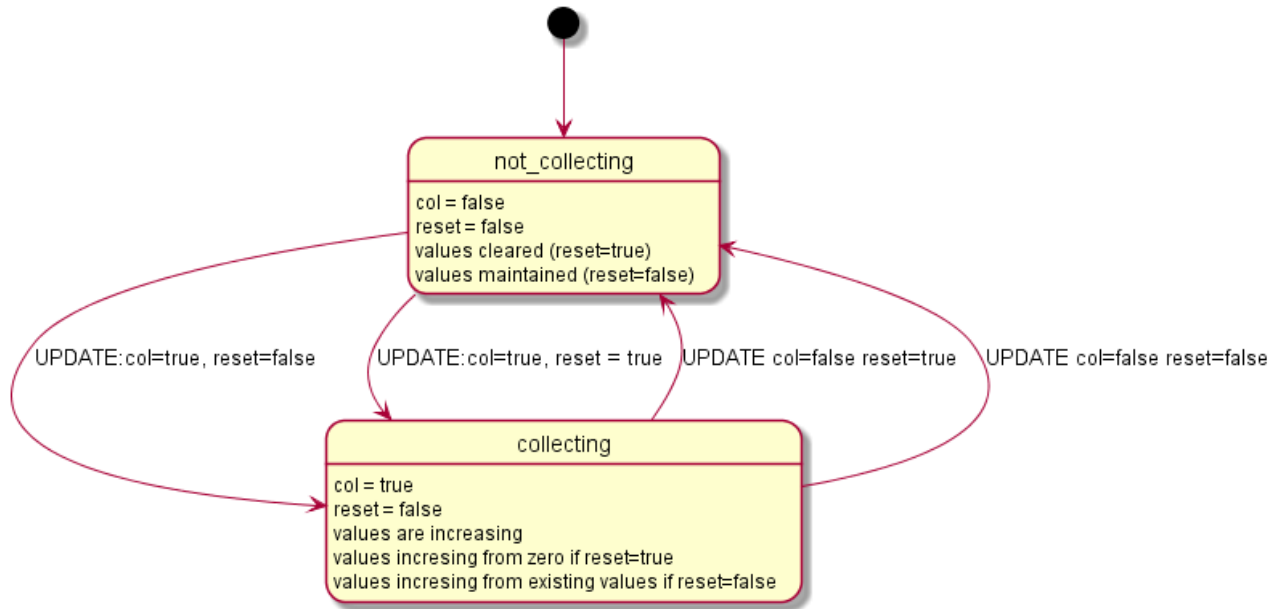




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3374

**Figure 20. Interactions with the network monitoring Resource**

3375 The state transition diagram for collecting or not collecting network information is described by  
3376 Figure 21.



3377  
3378

**Figure 21. State transition diagram of collecting network information**

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3380

## 11.6 Scenes

3381

### 11.6.1 Introduction

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Scenes are a mechanism for automating certain operations.

3383

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.

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3385  
3386

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

3387

In short, Scenes are bundled user settings.

3388

### 11.6.2 Scenes

3389

#### 11.6.2.1 Introduction

3390

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.

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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.

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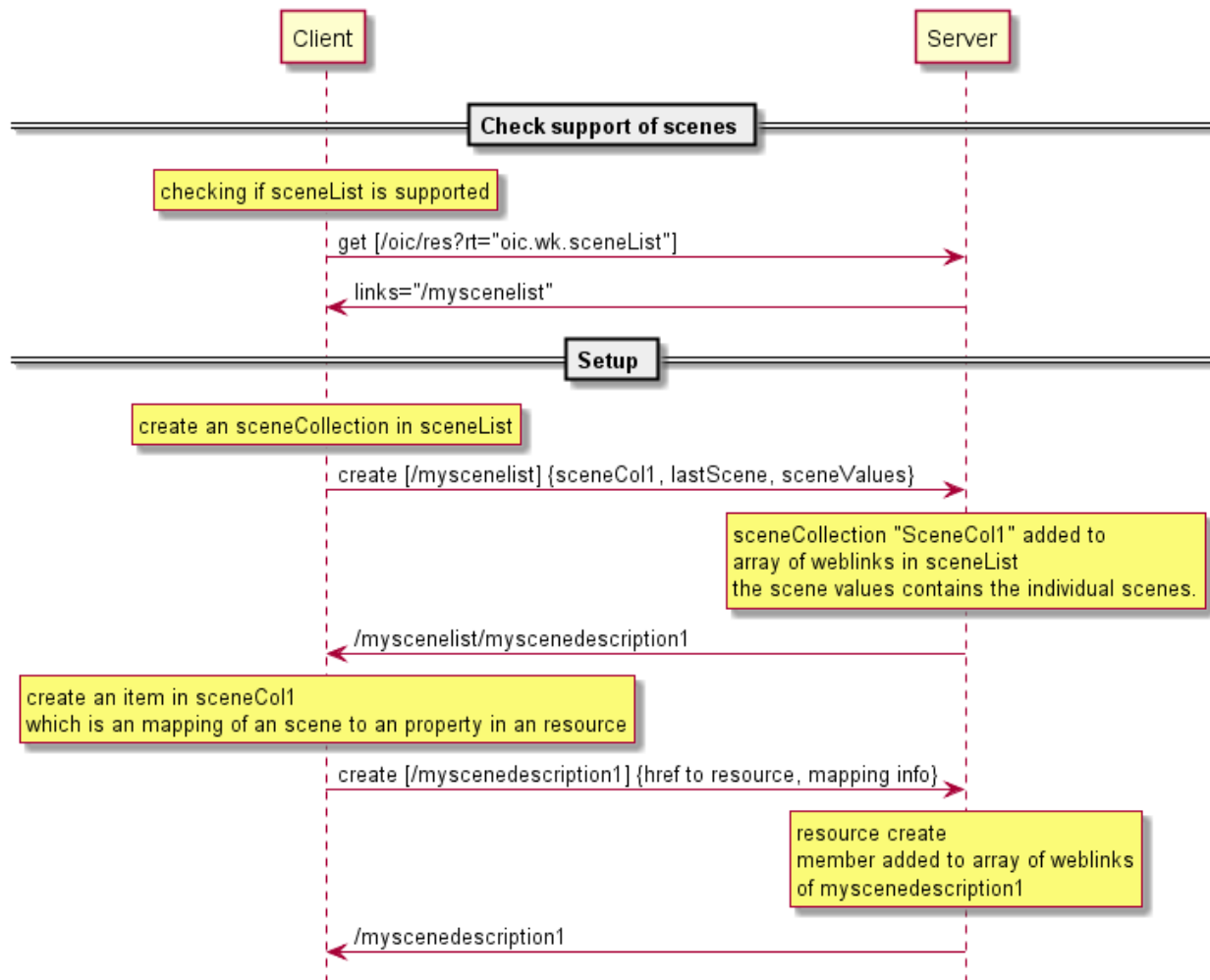
3401

3402

**Figure 22 Generic Scene Resource structure**

3403 **11.6.2.2 Scene creation**

3404 A Client desiring to interact with Scenes needs to first determine if the Server supports the Scene  
 3405 feature; the sceneMembers of a Scene that are Resources of end Device being updated by the  
 3406 Scene change do not have to be co-located on the Server supporting the Scene feature. This can  
 3407 be done by checking if "/oic/res" contains the "rt" of the sceneList Resource. This is depicted in  
 3408 first steps of Figure 23. The sceneCollection Resource is created by the Server using some out of  
 3409 bound mechanism, Client creation of Scenes is not supported at this time. This will entail defining  
 3410 the Scene with an applicable list of Scene Values and the mappings for each Resource being part  
 3411 of the Scene. The mapping for each Resource being part of the sceneCollection Resource is  
 3412 described by a Resource called sceneMember. The sceneMember Resource contains the link to a  
 3413 Resource and the mapping between the Scene listed in the "sceneValues" Property and the actual  
 3414 Property value of the Resource indicated by the Link.



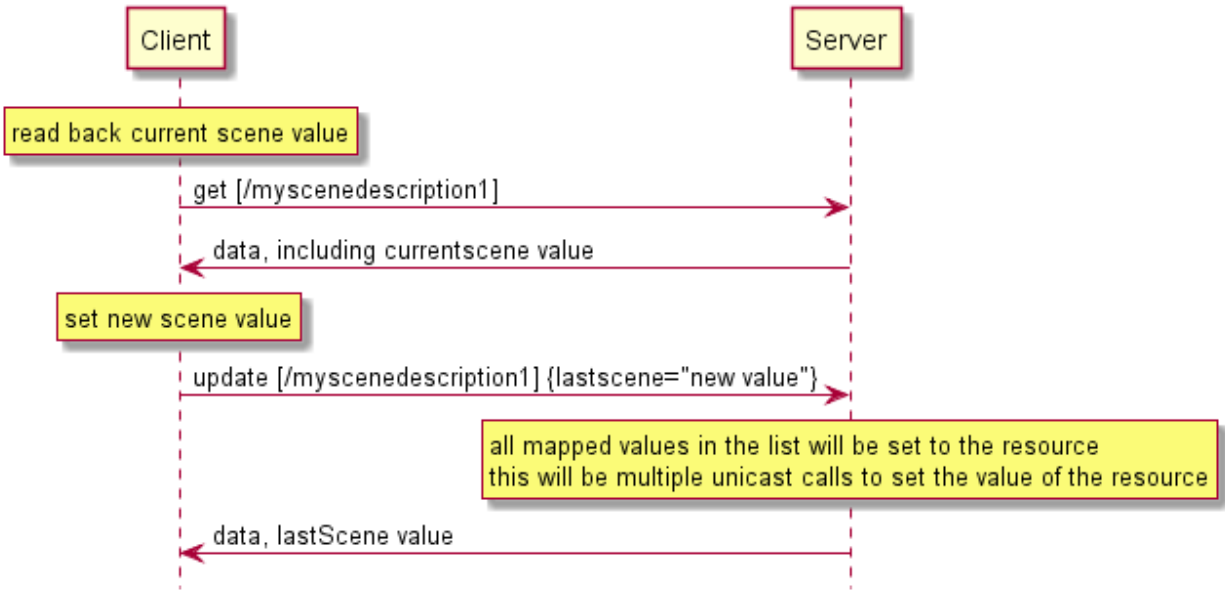
3415

3416

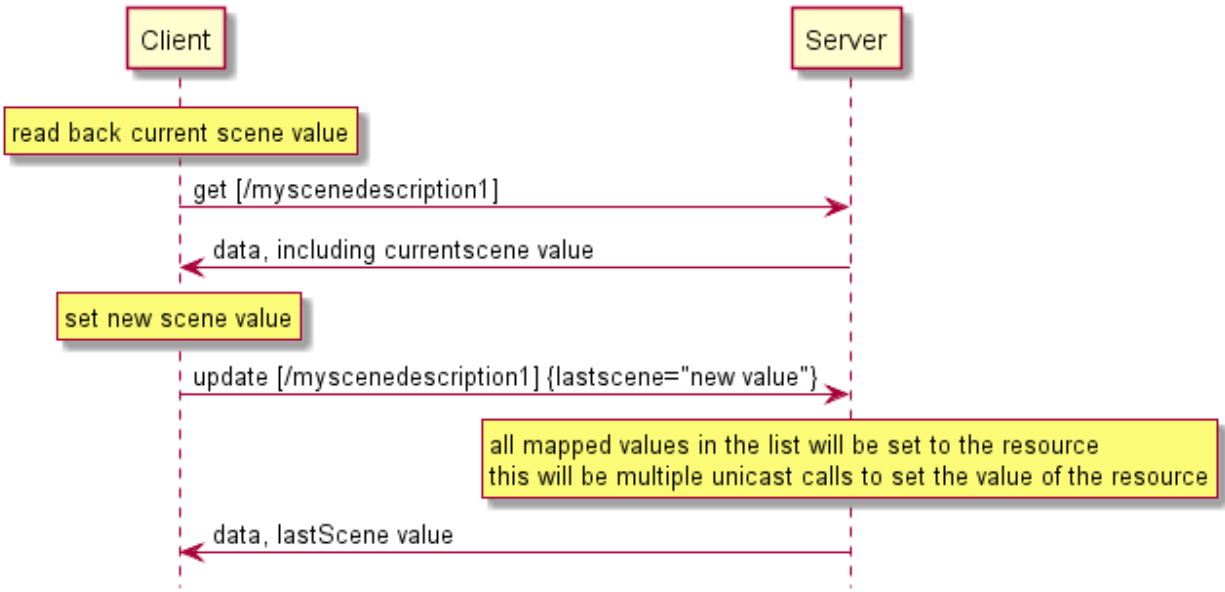
3417 **Figure 23 Interactions to check Scene support and setup of specific Scenes**

3418 **11.6.2.3 Interacting with Scenes**

3419 All capable Clients can interact with Scenes. The allowed Scene Values and the last applied Scene  
 3420 Value can be retrieved from the Server hosting the Scene. The Scene Value shall be changed by  
 3421 issuing an UPDATE operation with a payload that sets the "lastScene" Property to one of the listed  
 3422 allowed Scene Values. These steps are depicted in Figure 24. Note that the "lastScene" Property  
 3423 value does not imply that the current state of all Resources that are part of the Scene will be at  
 3424 the mapped value. This is due to that the setting the Scene Values are not modelled as actual  
 3425 states of the system. This means that another Client can change just one Resource being part of  
 3426 the Scene without having feedback that the state of the Scene is changed.



3427

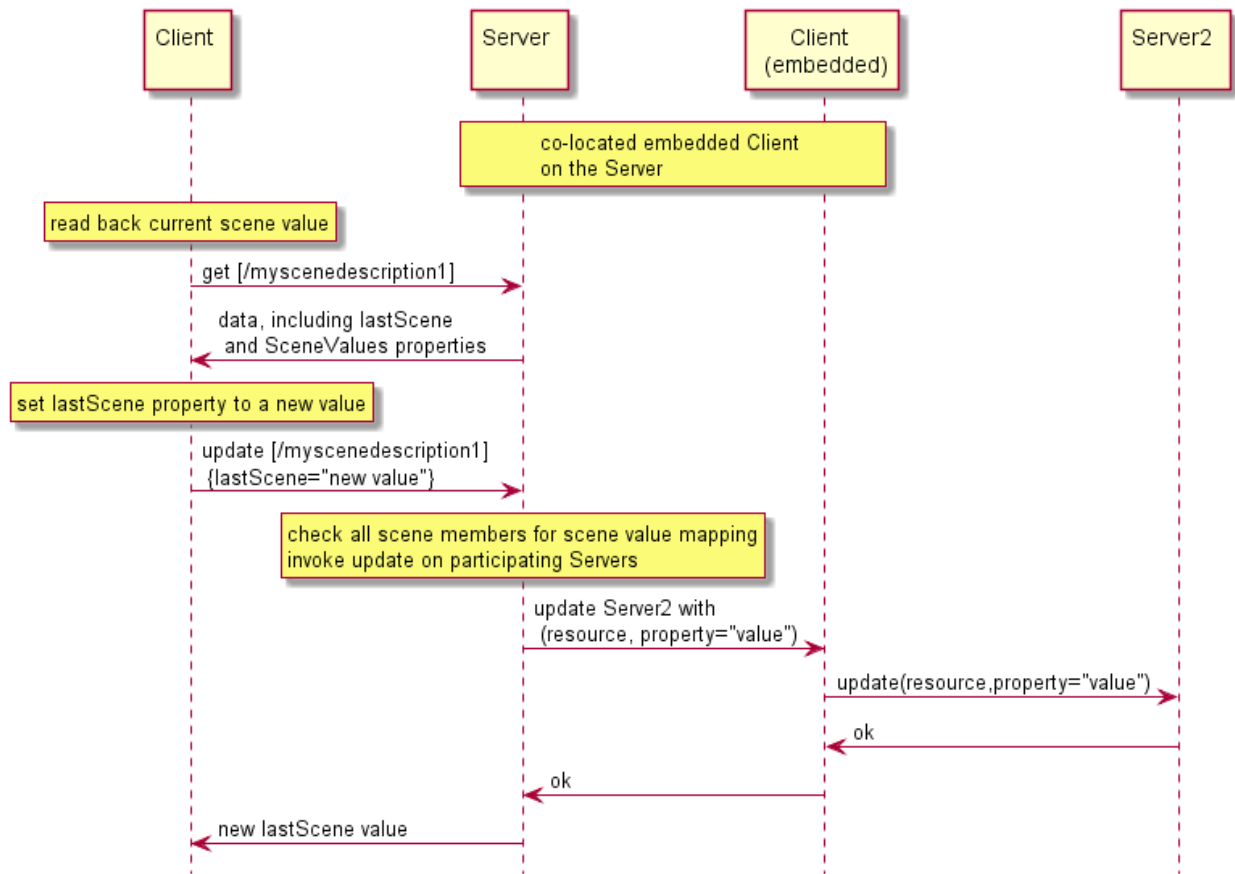


3428

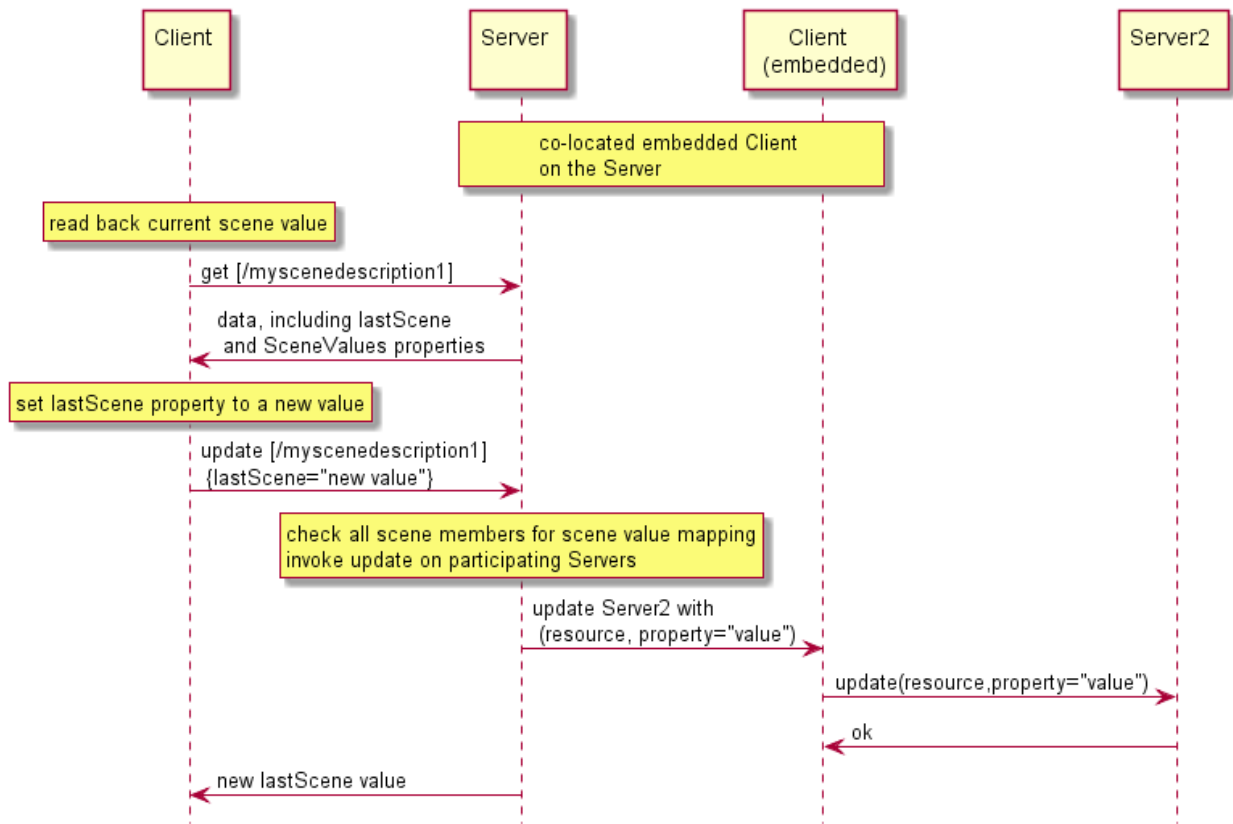
3429

**Figure 24 Client interactions on a specific Scene**

3430 As described previously, a Scene can reference one or more Resources (i.e., sceneMembers) that  
 3431 are present on one or more Servers. The Scene Members are re-evaluated each time a Scene  
 3432 change takes place. This evaluation is triggered by a Client that is either embedded as part of the  
 3433 Server hosting the Scene, or separate to the Server having knowledge of the Scene via a  
 3434 RETRIEVE operation, observing the referenced Resources using the mechanism described in  
 3435 section 11.4.2. The embedded Client located in the same Device with the Server is a general Client  
 3436 but interacts only with Scene functionalities. During the evaluation the mappings for the new Scene  
 3437 Value will be applied to the Servers which contain sceneMembers from the Scene that is being  
 3438 updated. This behaviour is depicted in Figure 25.



3439



3440

3441

**Figure 25 Interaction overview due to a Scene change**

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#### 11.6.2.4 Summary of Resource Types defined for Scene functionality

3443

Table 33 summarizes the list of Resource Types that are part of Scenes.

3444

**Table 33 list of Resource Types for Scenes**

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

3445

#### 11.6.3 Security considerations

3446

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.

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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.

3452

3453

3454 **11.7 Icons**

3455 **11.7.1 Overview**

3456 Icons are a primitive that are needed by various OCF subsystems, such as bridging. An optional  
 3457 Resource Type of “oic.r.icon” has been defined to provide a common representation of an icon  
 3458 Resource that can be used by Devices.

3459 **11.7.2 Resource**

3460 The icon Resource is as defined in Table 34.

3461 **Table 34. 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 35.	Icon

3462

3463 Table 35 defines the details for the “oic.r.icon” Resource Type.

3464 **Table 35. “oic.r.icon” Resource Type definition**

Property title	Property name	Value type	Value rule	Unit	Access mode	Mandatory	Description
<b>Mime Type</b>	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
<b>Width</b>	width	integer	>= 1	pixels	R	yes	Width of the icon in pixels greater than or equal to 1.
<b>Height</b>	height	integer	>= 1	pixels	R	yes	Height of the icon in pixels greater than or equal to 1.
<b>Icon</b>	media	uri			R	yes	URI to the location of the icon image.

3465

3466 **11.8 Introspection**

3467 **11.8.1 Overview**

3468 Introspection is a mechanism to announce the capabilities of Resources hosted on the Device.

3469 The intended usage of the Introspection Device Data (IDD) is to enable dynamic Clients e.g. Clients  
 3470 that can use the IDD) to generate dynamically a UI or dynamically create translations of the hosted  
 3471 Resources to another eco-system. Other usages of Introspection is that the information can be  
 3472 used to generate Client code. The IDD is designed to augment the existing data already on the  
 3473 wire. This means that existing mechanisms need to be used to get a full overview of what is  
 3474 implemented in the Device. For example, the IDD does not convey information about observability,  
 3475 since that is already conveyed with the “p” Property on the Links in “/oic/res” (see section 7.8.2.1.2).

3476 The IDD is recommended to be conveyed as static data. Meaning that the data does not change  
 3477 during the uptime of a Device. However, when the IDD is not static, the Introspection Resource



3478 shall be observable and the url Property Value of "oic.wk.introspection" Resource shall change to  
3479 indicate that the IDD is changed.

3480 The IDD describes the Resources that make up the Device. For the complete list of included  
3481 Resources Table 18. The IDD is described as a Swagger2.0 in JSON format file. The text below  
3482 contains also Swagger2.0 terms, like paths, methods etc. The Swagger2.0 file shall contain the  
3483 description of the Resources as defined below:

- 3484 • The IDD will use the HTTP syntax, e.g., define the CRUDN operation as HTTP methods and  
3485 use the HTTP status codes.
- 3486 • The IDD does not have to define all the status codes that indicate an error situation.
- 3487 • The IDD does not have to define a schema when the status code indicates that there is no  
3488 payload (see HTTP status code 204 as an example)
- 3489 • The paths (URLs) of the Resources in the IDD shall be without the Endpoint description, e.g.  
3490 it shall not be a fully-qualified URL but only the relative path from the Endpoint, aka the "href".  
3491 The relative path shall be the same as being conveyed by "/oic/res".
- 3492 • The following Resources shall be excluded in the IDD:
  - 3493 ○ Resource with Resource Type: "oic.wk.res" unless 3<sup>rd</sup> party defined or optional  
3494 Properties are implemented.
  - 3495 ○ Resource with Resource Type: "oic.wk.introspection".
  - 3496 ○ Resources that handle Wi-Fi Easy Setup, see OCF Wi-Fi Easy Setup specification.
- 3497 • The following Resources shall be included in the IDD when optional or 3<sup>rd</sup> party defined  
3498 Properties are implemented:
  - 3499 ○ Resources with type: "oic.wk.p" and "oic.wk.d" (e.g. discovery related Resources).
  - 3500 ○ Security Virtual Resources from the OCF Security specification.
- 3501 • When the Device does not expose instances of Vertical Resource Types, and does not have  
3502 any 3<sup>rd</sup> party defined Resources (see section 7.8.4.4), and does not need to include Resources  
3503 in the IDD due to other clauses in this section, then the IDD shall be an empty Swagger2.0 file.  
3504 An example of an empty Swagger2.0 file can be found in found in Annex G.2:
- 3505 • All other Resources shall be listed in the IDD.
- 3506 • Per Resource the IDD shall include:
  - 3507 ○ All implemented methods
    - 3508 ■ For an OCF defined Resource, only the methods that are standardized are  
3509 allowed to exist in the IDD. The supported methods shall comply with the  
3510 listed Interfaces. For example, if an Interface is listed that allows updates,  
3511 then the update method shall be listed. It is not allowed to have methods  
3512 listed for OCF defined Resources that does not have this method defined.
  - 3513 ○ Per supported method:
    - 3514 ■ Implemented query Parameters per method.
      - 3515 • This includes the supported Interfaces ("if") as enum values.
    - 3516 ■ Schemas of the payload for the request and response bodies of the method
    - 3517 ■ The schema data shall be conveyed by the swagger schema object as  
3518 defined in the parameters section.
    - 3519 ■ The swagger2.0 schema object shall comply with:
      - 3520 • The schemas shall be fully resolved, e.g. no references shall exist  
3521 outside the swagger file.

- 3522 • The schemas shall list which Interfaces are supported on the method.
- 3523 • The schemas shall list if a Property is optional or required.
- 3524 • The schemas shall include all Property validation keywords. Where
- 3525 an enum is defined the enum shall contain the values supported by
- 3526 the Device. When vendor defined extensions exist to the enum
- 3527 (defined in accordance to section 7.8.4.4) these shall be included in
- 3528 the enum.
- 3529 • The schemas shall indicate if an Property is read only or read-write
  - 3530 ○ By means of the readOnly schema tag belonging to the
  - 3531 Property
  - 3532 ○ Default value of readOnly is false as defined by Swagger2.0.
- 3533 • The default value of the “rt” Property shall be used to indicate the
- 3534 supported Resource Types.
- 3535 • oneOf and anyOf constructs are allowed to be used as part of a
- 3536 Swagger2.0 schema object. The Swagger2.0 schema with oneOf
- 3537 and anyOf constructs can be found in Annex G.1G.1.

3538 Dynamic Resources (e.g. Resources that can be created on a request by a Client) shall have a  
 3539 URL definition which contains a URL identifier (e.g. using the {} syntax). A URL with {} identifies  
 3540 that the Resource definition applies to the whole group of Resources that may be created. The  
 3541 actual path may contain the collection node that links to the Resource.

3542 Example of a URL with identifiers:

3543 /SceneListResURI/{SceneCollectionResURI}/{SceneMemberResURI}:

3544 When different Resource Types are allowed to be created in a Collection, then the different  
 3545 schemas for the CREATE method shall define all possible Resource Types that may be created.  
 3546 The schema construct oneOf allows the definition of a schema with selectable Resources. The  
 3547 oneOf construct allows the integration of all schemas and that only one existing sub schema shall  
 3548 be used to indicate the definition of the Resource that may be created.

3549 Example usage of oneOf JSON schema construct is shown in Figure 26. Example usage of oneOf  
 3550 JSON schema:

```

3551 {
3552   "oneOf": [
3553     { <<subschema 1 definition>> },
3554     { <<sub schema 2 definition >> }
3555     ...
3556   ]
3557 }
```

3558 **Figure 26. Example usage of oneOf JSON schema**

3559 A Client using the IDD of a Device should check the version of the supported IDD of the Device.  
 3560 The swagger version is indicated in each file with the tag "swagger". Example of the 2.0 supported  
 3561 version of the tag is: "swagger": "2.0". Later versions of the specification may reference newer  
 3562 versions of the OpenAPI specification (swagger specification), for example 3.0.

3563 A Device shall support one Resource with a Resource Type of “oic.wk.introspection” as defined in  
 3564 Table 36. The Resource with a Resource Type of “oic.wk.introspection” shall be included in the  
 3565 Resource “/oic/res”.

3566 An empty IDD file, e.g. no URLs are exposed, shall still have the mandatory Swagger2.0 fields.  
 3567 See OpenAPI specification (swagger specification). An example of an empty Swagger2.0 file can  
 3568 be found in found in Annex G.2.

3569 **Table 36. 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

3570  
 3571 Table 37 defines “oic.wk.introspection” Resource Type.

3572 **Table 37. “oic.wk.introspection” Resource Type definition**

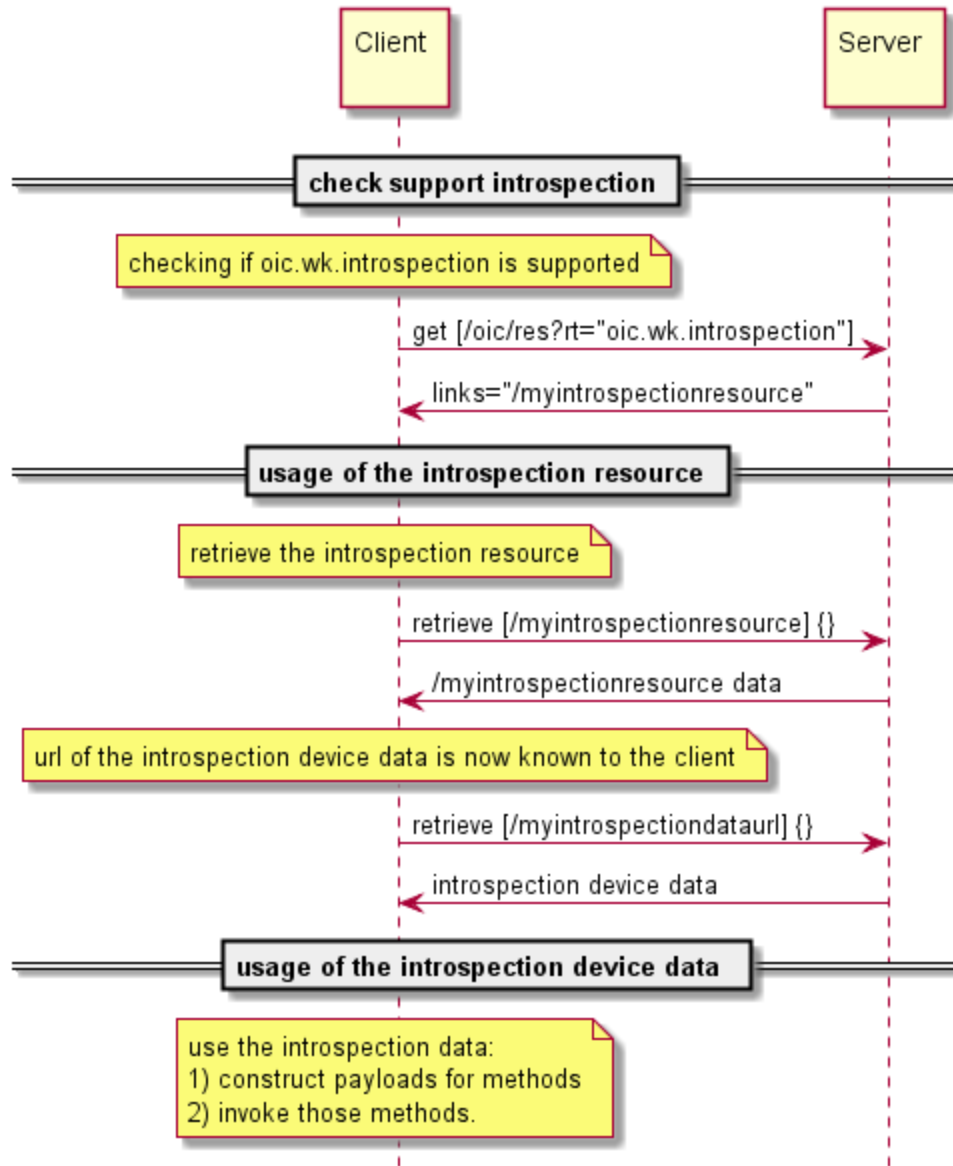
Property title	Property name	Value type	Value rule	Unit	Access mode	Mandatory	Description
urlInfo	urlInfo	array			R	yes	array of objects
url	url	string	uri		R	yes	URL to the hosted payload
protocol	protocol	string	enum		R	yes	Protocol definition to retrieve the Introspection Device Data from the url.
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.

3573 **11.8.2 Usage of introspection**

3574 The Introspection Device Data is retrieved in the following steps:

- 3575 1) Check if the Introspection Resource is supported and retrieve the URL of the Resource.
- 3576 2) Retrieve the contents of the Introspection Resource
- 3577 3) Download the Introspection Device Data from the URL specified the Introspection Resource.
- 3578 4) Usage of the Introspection Device Data by the Client

3579



3580

3581 **Figure 27 Interactions to check Introspection support and download the Introspection**  
 3582 **Device Data.**

3583 **12 Messaging**

3584 **12.1 Introduction**

3585 This section specifies the protocol messaging mapping to the CRUDN messaging operations  
 3586 (section 8) for each messaging protocol specified (e.g., CoAP.). Mapping to additional protocols is  
 3587 expected in later version of this specification. All the property information from the resource model  
 3588 shall be carried within the message payload. This payload shall be generated in the resource  
 3589 model layer and shall be encapsulated in the data connectivity layer. The message header shall  
 3590 only be used to describe the message payload (e.g., verb, mime-type, message payload format),  
 3591 in addition to the mandatory header fields defined in messaging protocol (e.g., CoAP) specification.  
 3592 If the message header does not support this, then this information shall also be carried in the  
 3593 message payload. Resource model information shall not be included in the message header  
 3594 structure unless the message header field is mandatory in the messaging protocol specification.

3595 When a Resource is specified with a restful description language like RAML or Swagger2.0 then  
 3596 the HTTP syntax definitions are used in the description (e.g., HTTP syntax for the CRUDN  
 3597 operations, status codes, etc). The HTTP syntax will be mapped to the actual used web transfer  
 3598 protocol (e.g., CoAP).

## 3599 12.2 Mapping of CRUDN to CoAP

### 3600 12.2.1 Overview

3601 A Device implementing CoAP shall conform to IETF RFC 7252 for the methods specified in section  
 3602 12.2.3. A Device implementing CoAP shall conform to IETF RFC 7641 to implement the CoAP  
 3603 Observe option. Support for CoAP block transfer when the payload is larger than the MTU is  
 3604 defined in section 12.2.8.

### 3605 12.2.2 URIs

3606 An OCF: URI is mapped to a coap: URI by replacing the scheme name "ocf" with "coap" if unsecure  
 3607 or 'coaps' if secure before sending over the network by the requestor. Similarly on the receiver  
 3608 side, the scheme name is replaced with "ocf".

3609 Any query string that is present within the URI is encoded as one or more URI-Query Options as  
 3610 defined in IETF RFC 7252 section 6.4.

3611

### 3612 12.2.3 CoAP method with request and response

#### 3613 12.2.3.1 Overview

3614 Every request has a CoAP method that realizes the request. The primary methods and their  
 3615 meanings are shown in Table 38, which provides the mapping of GET/PUT/POST/DELETE  
 3616 methods to CREATE, RETRIEVE, UPDATE, and DELETE operations. The associated text provides  
 3617 the generic behaviours when using these methods, however resource interfaces may modify these  
 3618 generic semantics. The HTTP codes in the restful descriptions will be translated as described in  
 3619 IETF RFC 8075 section 7 Response Code Mapping.

3620

3621

**Table 38. CoAP request and response**

Method for CRUDN	(mandatory) Request data	(mandatory) Response data
GET for RETRIEVE	<ul style="list-style-type: none"> <li>- <b>Method code:</b> GET (0.01)</li> <li>- <b>Request URI:</b> an existing URI for the Resource to be retrieved</li> </ul>	<ul style="list-style-type: none"> <li>- <b>Response code:</b> success (2.xx) or error (4.xx or 5.xx)</li> <li>- <b>Payload:</b> Resource representation of the target Resource (when successful)</li> </ul>
POST for CREATE	<ul style="list-style-type: none"> <li>- <b>Method code:</b> POST (0.02)</li> <li>- <b>Request URI:</b> an existing URI for the Resource responsible for the creation</li> <li>- <b>Payload:</b> Resource presentation of the Resource to be created</li> </ul>	<ul style="list-style-type: none"> <li>- <b>Response code:</b> success (2.xx) or error (4.xx or 5.xx)</li> <li>- <b>Payload:</b> the URI of the newly created Resource (when successful).</li> </ul>
PUT for CREATE	<ul style="list-style-type: none"> <li>- <b>Method code:</b> PUT (0.03)</li> <li>- <b>Request URI:</b> a new URI for the Resource to be created.</li> <li>- <b>Payload:</b> Resource presentation of the Resource to be created.</li> </ul>	<ul style="list-style-type: none"> <li>- <b>Response code:</b> success (2.xx) or error (4.xx or 5.xx)</li> </ul>
POST for UPDATE	<ul style="list-style-type: none"> <li>- <b>Method code:</b> POST (0.02)</li> <li>- <b>Request URI:</b> an existing URI for the Resource to be updated.</li> <li>- <b>Payload:</b> representation of the Resource to be updated.</li> </ul>	<ul style="list-style-type: none"> <li>- <b>Response Code:</b> success (2.xx) or error (4.xx or 5.xx)</li> </ul>

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

3622

3623 **12.2.3.2 CREATE with POST or PUT**

3624 **12.2.3.2.1 With POST**

3625 POST shall be used only in situations where the request URI is valid, that is it is the URI of an  
3626 existing Resource on the Server that is processing the request. If no such Resource is present,  
3627 the Server shall respond with an error response code of 4.xx. The use of POST for CREATE shall  
3628 use an existing request URI which identifies the Resource on the Server responsible for creation.  
3629 The URI of the created Resource is determined by the Server and provided to the Client in the  
3630 response.

3631 A Client shall include the representation of the new Resource in the request payload. The new  
3632 resource representation in the payload shall have all the necessary properties to create a valid  
3633 Resource instance, i.e. the created Resource should be able to properly respond to the valid  
3634 Request with mandatory Interface (e.g., "GET with ?if=ouc.if.baseline").

3635 Upon receiving the POST request, the Server shall either

3636 

- create the new Resource with a new URI, respond with the new URI for the newly created  
3637 Resource and a success response code (2.xx); or

3638 

- respond with an error response code (4.xx or 5.xx).

3639 POST is unsafe and is the supported method when idempotent behaviour cannot be expected or  
3640 guaranteed.

3641 **12.2.3.2.2 With PUT**

3642 PUT shall be used to create a new Resource or completely replace the entire representation of an  
3643 existing Resource. The resource representation in the payload of the PUT request shall be the  
3644 complete representation. PUT for CREATE shall use a new request URI identifying the new  
3645 Resource to be created.

3646 The new resource representation in the payload shall have all the necessary properties to create  
3647 a valid Resource instance, i.e. the created Resource should be able to properly respond to the  
3648 valid Request with mandatory Interface (e.g. "GET with ?if=ouc.if.baseline").

3649 Upon receiving the PUT request, the Server shall either

3650 

- create the new Resource with the request URI provided in the PUT request and send back a  
3651 response with a success response code (2.xx); or

3652 

- respond with an error response code (4.xx or 5.xx).

3653 PUT is an unsafe method but it is idempotent, thus when a PUT request is repeated the outcome  
3654 is the same each time.

3655 **12.2.3.3 RETRIEVE with GET**

3656 GET shall be used for the RETRIEVE operation. The GET method retrieves the representation of  
3657 the target Resource identified by the request URI.

3658 Upon receiving the GET request, the Server shall either

3659 • send back the response with the representation of the target Resource with a success response  
3660 code (2.xx); or

3661 • respond with an error response code (4.xx or 5.xx) or ignore it (e.g. non-applicable multicast  
3662 GET).

3663 GET is a safe method and is idempotent.

#### 3664 12.2.3.4 UPDATE with POST

3665 POST shall be used only in situations where the request URI is valid, that is it is the URI of an  
3666 existing Resource on the Server that is processing the request. If no such Resource is present,  
3667 the Server shall respond with an error response code of 4.xx. A client shall use POST to UPDATE  
3668 Property values of an existing Resource (see sections 3.1.32 and 8.4.2).

3669 Upon receiving the request, the Server shall either

3670 • apply the request to the Resource identified by the request URI in accordance with the applied  
3671 interface (i.e. POST for non-existent Properties is ignored) and send back a response with a  
3672 success response code (2.xx); or

3673 • respond with an error response code (4.xx or 5.xx). Note that if the representation in the  
3674 payload is incompatible with the target Resource for POST using the applied interface (i.e. the  
3675 "overwrite" semantic cannot be honored because of read-only property in the payload), then  
3676 the error response code 4.xx shall be returned.

3677 POST is unsafe and is the supported method when idempotent behaviour cannot be expected or  
3678 guaranteed.

#### 3679 12.2.3.5 DELETE with DELETE

3680 DELETE shall be used for DELETE operation. The DELETE method requests that the resource  
3681 identified by the request URI be deleted.

3682 Upon receiving the DELETE request, the Server shall either

3683 • delete the target Resource and send back a response with a success response code (2.xx); or

3684 • respond with an error response code (4.xx or 5.xx).

3685 DELETE is unsafe but idempotent (unless URIs are recycled for new instances).

3686  
3687

#### 3688 12.2.4 Content-Format negotiation

3689 The OCF Framework mandates support of CBOR, however it allows for negotiation of the payload  
3690 body if more than one Content-Format (e.g. CBOR and JSON) is supported by an implementation.  
3691 In this case the Accept Option defined in section 5.10.4 of IETF RFC 7252 shall be used to indicate  
3692 which Content-Format (e.g. JSON) is requested by the Client.

3693 The Content-Formats supported are shown in Table 39.

3694

**Table 39. OCF Content-Formats**

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

3695 Clients shall include a Content-Format Option in every message that contains a payload. Servers  
 3696 shall include a Content-Format Option for all success (2.xx) responses with a payload body. Per  
 3697 IETF RFC 7252 section 5.5.1, Servers shall include a Content-Format Option for all error (4.xx or  
 3698 5.xx) responses with a payload body unless they include a Diagnostic Payload; error responses  
 3699 with a Diagnostic Payload do not include a Content-Format Option. The Content-Format Option  
 3700 shall use the ID column numeric value from Table 39. An OCF vertical may mandate a specific  
 3701 Content-Format Option.

3702 Clients shall also include an Accept Option in every request message. The Accept Option shall  
 3703 indicate the required Content-Format as defined in Table 39 for response messages. The Server  
 3704 shall return the required Content-Format if available. If the required Content-Format cannot be  
 3705 returned, then the Server shall respond with an appropriate error message.

3706 **12.2.5 OCF-Content-Format-Version information**

3707 Servers and Clients shall include the OCF-Content-Format-Version Option in both request and  
 3708 response messages with a payload. Clients shall include the OCF-Accept-Content-Format-Version  
 3709 Option in request messages. The OCF-Content-Format-Version Option and OCF-Accept-Content-  
 3710 Format-Version Option are specified as Option Numbers in the CoAP header as shown in Table  
 3711 40.

3712 **Table 40. OCF-Content-Format-Version and OCF-Accept-Content-Format-Version Option**  
 3713 **Numbers**

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

3714 The value of both the OCF-Accept-Content-Format-Version Option and the OCF-Content-Format-  
 3715 Version Option is a two-byte unsigned integer that is used to define the major, minor and sub  
 3716 versions. The major and minor versions are represented by 5 bits and the sub version is  
 3717 represented by 6 bits as shown in Table 41.

3718 **Table 41. OCF-Accept-Content-Format-Version and OCF-Content-Format-Version**  
 3719 **Representation**

Major Version					Minor Version					Sub Version						
Bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0

3720 Table 42 illustrates several examples:

3721 **Table 42. Examples of OCF-Content-Format-Version and OCF-Accept-Content-Format-**  
 3722 **Version Representation**

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

3723 The OCF-Accept-Content-Format-Version Option and OCF-Content-Format-Version Option for this  
 3724 version of the specification shall be 1.0.0 (i.e. 0b0000 1000 0000 0000).

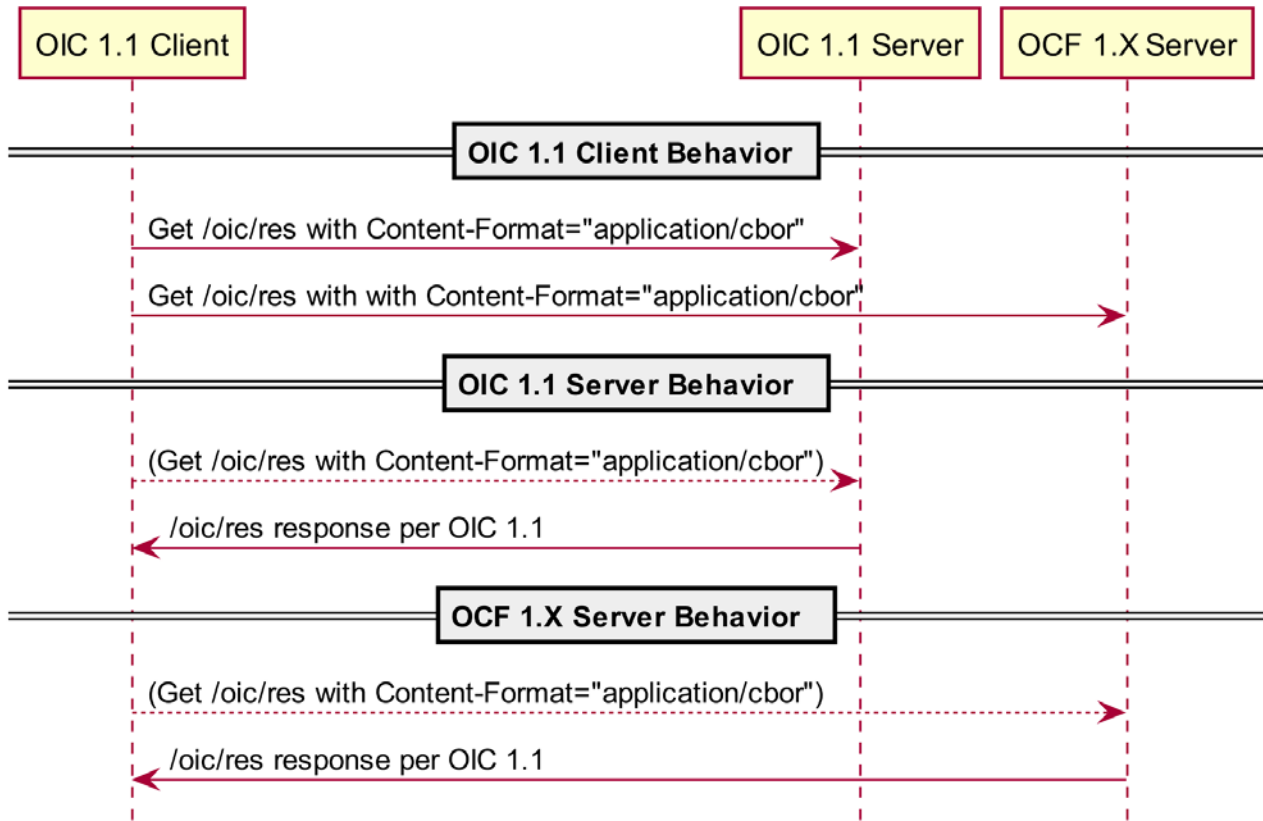
3725 **12.2.6 Content-Format policy**

3726 To maintain compatibility between devices implemented to different versions of this specification,  
 3727 Devices should follow the policy as described in Figure 28, Figure 29 and Figure 30.

3728



3729



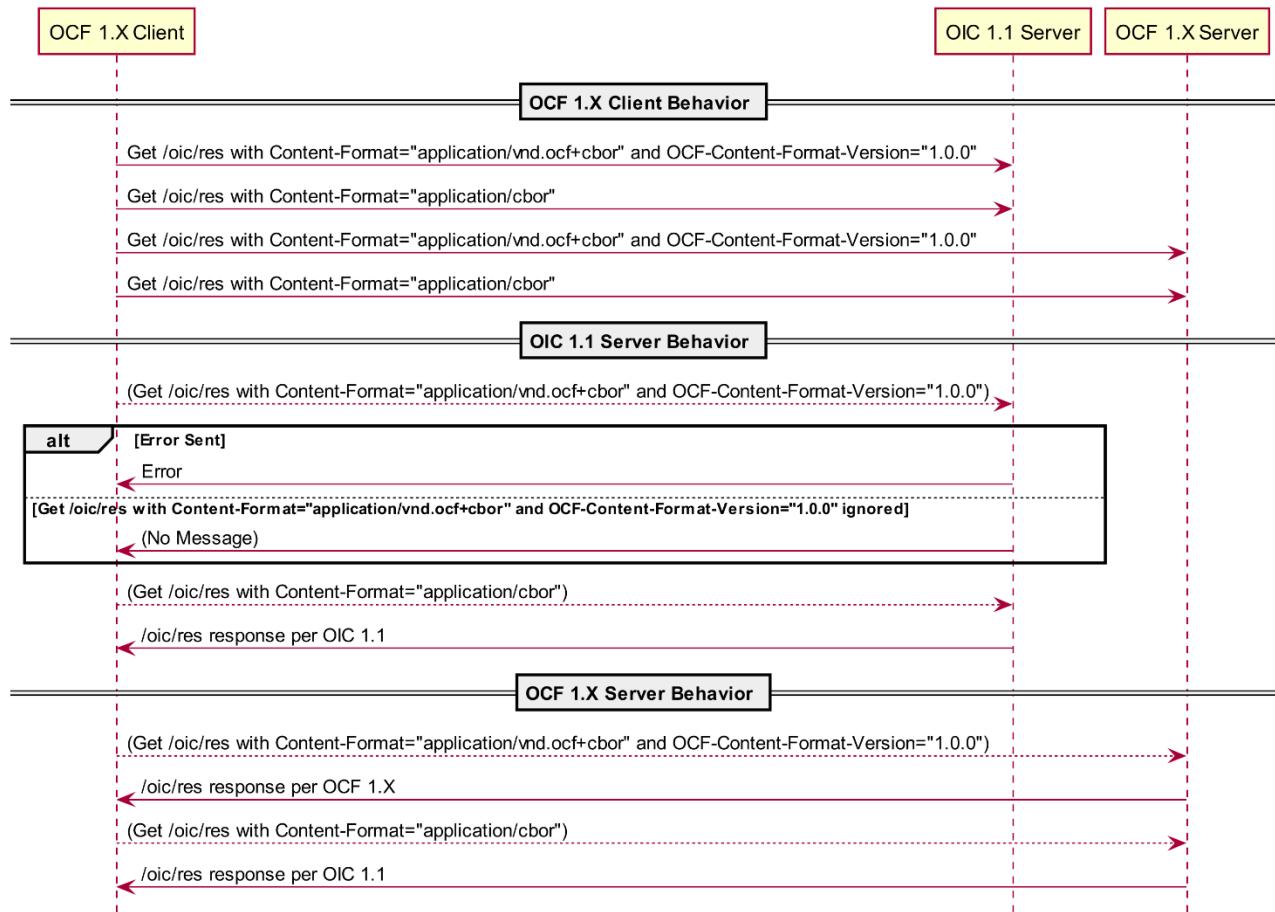
3730

3731

**Figure 28 Content-Format Policy for OIC 1.1 Client and OIC 1.1 Server**

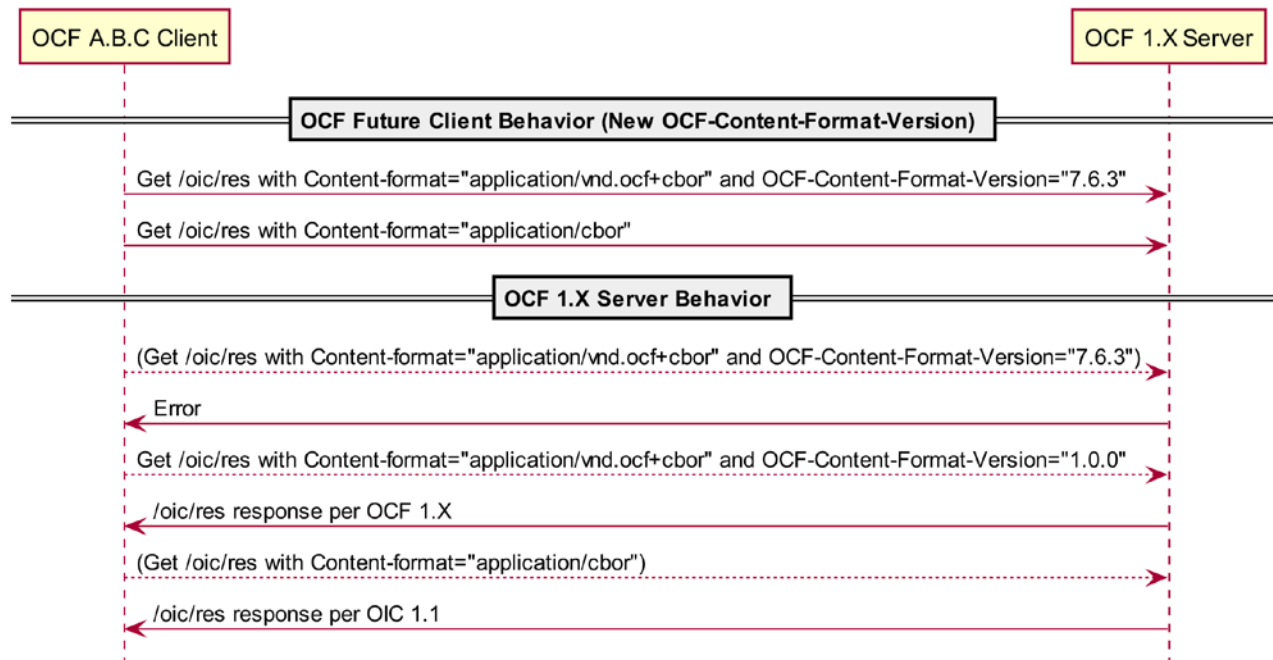
3732

3733



3734  
 3735  
 3736  
 3737

**Figure 29 Content-Format Policy for OCF 1.X Client with OIC 1.1 and OCF 1.X Servers (Content-Format Mismatch)**



**Figure 30 Content-Format Policy for Future OCF Client with OCF 1.X Servers (Content-Format-Version Mismatch)**

3738  
3739  
3740

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.

### 3744 12.2.7 CRUDN to CoAP response codes

3745 The mapping of CRUDN operations response codes to CoAP response codes are identical to the  
3746 response codes defined in IETF RFC 7252.

### 3747 12.2.8 CoAP block transfer

3748 Basic CoAP messages work well for the small payloads typical of light-weight, constrained IoT  
3749 devices. However scenarios can be envisioned in which an application needs to transfer larger  
3750 payloads.

3751 CoAP block-wise transfer as defined in IETF RFC 7959 shall be used by all Servers which  
3752 generate a content payload that would exceed the size of a CoAP datagram as the result of  
3753 handling any defined CRUDN operation.

3754 Similarly, CoAP block-wise transfer as defined in IETF RFC 7959 shall be supported by all  
3755 Clients. The use of block-wise transfer is applied to both the reception of payloads as well as  
3756 transmission of payloads that would exceed the size of a CoAP datagram.

3757 All blocks that are sent using this mechanism for a single instance of a transfer shall all have the  
3758 same reliability setting (i.e. all confirmable or all non-confirmable).

3759 A Client may support both the block1 (as descriptive) and block2 (as control) options as  
3760 described by IETF RFC 7959. A Server may support both the block1 (as control) and block2 (as  
3761 descriptive) options as described by IETF RFC 7959.

3762 **12.3 Mapping of CRUDN to CoAP serialization over TCP**

3763 **12.3.1 Overview**

3764 In environments where TCP is already available, CoAP can take advantage of it to provide  
3765 reliability. Also in some environments UDP traffic is blocked, so deployments may use TCP. For  
3766 example, consider a cloud application acting as a Client and the Server is located at the user's  
3767 home. A Server which already support CoAP as a messaging protocol could easily support CoAP  
3768 serialization over TCP rather than utilizing another messaging protocol. A Device implementing  
3769 CoAP Serialization over TCP shall conform to IETF RFC 8323.

3770 **12.3.2 URIs**

3771 When UDP is blocked, Clients are dependent on pre-configured details of the Device to determine  
3772 if the Device supports CoAP serialization over TCP. When UDP is not-blocked, a Device which  
3773 supports CoAP serialization over TCP shall populate the "eps" Parameter in the "/oic/res" response,  
3774 as defined in section 10.2, with the URI scheme(s) as defined in section 8.1 or 8.2 of  
3775 IETF RFC 8323. For the "coaps+tcp" URI scheme, as defined in section 8.2 of IETF RFC 8323,  
3776 IETF RFC 7301 shall be used. In addition, the URIs used for CoAP serialization over TCP shall  
3777 conform to section 12.2.2 by substituting the scheme names with the scheme names defined in  
3778 sections 8.1 and 8.2 of IETF RFC 8323 respectively.

3779 **12.3.3 CoAP method with request and response**

3780 The CoAP methods used for CoAP serialization over TCP shall conform to section 12.2.3.

3781 **12.3.4 Content-Format negotiation**

3782 The Content Format negotiation used for CoAP serialization over TCP shall conform to section  
3783 12.2.4.

3784 **12.3.5 OCF-Content-Format-Version information**

3785 The OCF Content Format Version information used for CoAP serialization over TCP shall conform  
3786 to section 12.2.5.

3787 **12.3.6 Content-Format policy**

3788 The Content Format policy used for CoAP serialization over TCP shall conform to section 12.2.6.

3789 **12.3.7 CRUDN to CoAP response codes**

3790 The CRUDN to CoAP response codes for CoAP serialization over TCP shall conform to section  
3791 12.2.7.

3792 **12.3.8 CoAP block transfer**

3793 The CoAP block transfer for CoAP serialization over TCP shall conform to section 6 of  
3794 IETF RFC 8323.

3795 **12.3.9 Keep alive (connection health)**

3796 Devices supporting CoAP over TCP shall use Ping and Pong messages as described in section  
3797 5.4 in IETF RFC 8323.

3798 **12.4 Payload Encoding in CBOR**

3799 OCF implementations shall perform the conversion to CBOR from JSON defined schemas and to  
3800 JSON from CBOR in accordance with IETF RFC 7049 section 4 unless otherwise specified in this  
3801 section.

3802 Properties defined as a JSON integer shall be encoded in CBOR as an integer (CBOR major types  
3803 0 and 1). Properties defined as a JSON number shall be encoded as an integer, single- or double-

3804 precision floating point (CBOR major type 7, sub-types 26 and 27); the choice is implementation  
3805 dependent. Half-precision floating point (CBOR major 7, sub-type 25) shall not be used. Integer  
3806 numbers shall be within the closed interval  $[-2^{53}, 2^{53}]$ . Properties defined as a JSON number  
3807 should be encoded as integers whenever possible; if this is not possible Properties defined as a  
3808 JSON number should use single-precision if the loss of precision does not affect the quality of  
3809 service, otherwise the Property shall use double-precision.

3810  
3811 On receipt of a CBOR payload, an implementation shall be able to interpret CBOR integer values  
3812 in any position. If a property defined as a JSON integer is received encoded other than as an  
3813 integer, the implementation may reject this encoding using a final response as appropriate for the  
3814 underlying transport (e.g. 4.00 for CoAP) and thus optimise for the integer case. If a property is  
3815 defined as a JSON number an implementation shall accept integers, single- and double-precision  
3816 floating point.

### 3817 **13 Security**

3818 The details for handling security and privacy are specified in [OCF Security].

3819

**Annex A**  
(informative)

**Operation Examples**

**A.1 Introduction**

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

rt=oc.example.light with Resource Type definition as illustration in Table 43.

**Table 43. oc.example.light Resource Type definition**

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

rt=oc.example.garagedoor with Resource Type definition as illustration in Table 44.

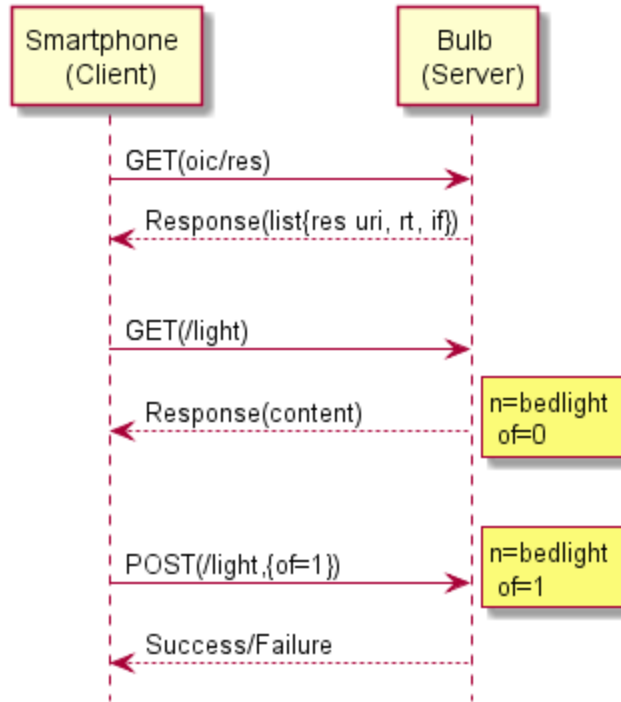
**Table 44. oc.example.garagedoor Resource Type definition**

Property title	Property name	Value type	Value rule	Unit	Access mode	Mandatory	Description
<b>Name</b>	n	string			R, W	no	
<b>open-close</b>	oc	boolean			R, W	yes	Open/Close Control: 0 = Open 1 = Close

“/oc/mt” (“rt=oc.wk.mnt”) used in below examples is defined in section 11.5.2.

**A.2 When at home: From smartphone turn on a single light**

This sequence highlights (Figure 31) the discovery and control of an OCF light resource from an OCF smartphone.



3840

3841

**Figure 31. When at home: from smartphone turn on a single light**

3842 Discovery request can be sent to “All OCF Nodes” Multicast address FF0X::158 or can be sent  
3843 directly to the IP address of device hosting the light resource.

3844 1) Smartphone sends a GET request to “/oic/res” resource to discover all resources hosted on  
3845 targeted endpoint

3846 5) The endpoint (bulb) responds with the list of Resource URI, Resource Type and  
3847 Interfaces supported on the endpoint (one of the resource is ‘/light’ whose  
3848 rt=oic.example.light)

3849 6) Smartphone sends a GET request to ‘/light’ resource to know its current state

3850 7) The endpoint responds with representation of light resource ({n=bedlight;of=0})

3851 8) Smartphone changes the ‘of’ property of the light resource by sending a POST  
3852 request to ‘/light’ resource ({of=1})

3853 9) On Successful execution of the request, the endpoint responds with the changed  
3854 resource representation. Else, error code is returned. Details of the error codes are defined  
3855 in section 12.2.7.

### 3856 **A.3 GroupAction execution**

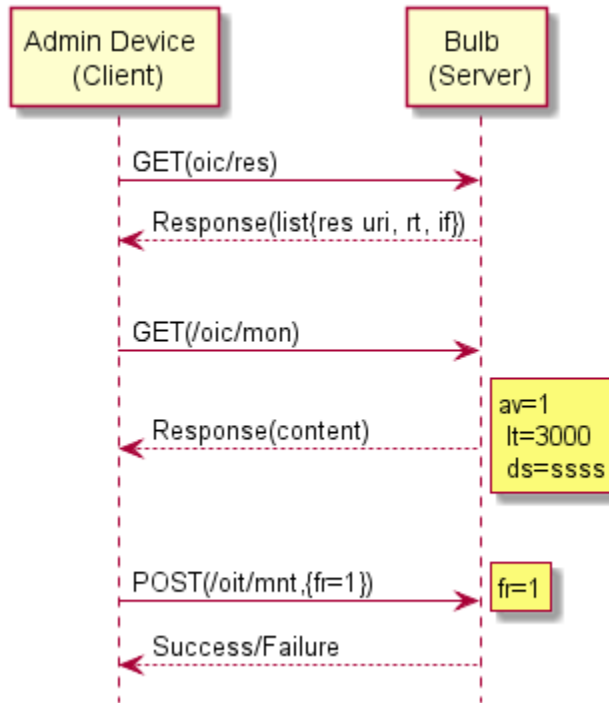
3857 This example will be added when groups feature is added in later version of specification

### 3858 **A.4 When garage door opens, turn on lights in hall; also notify smartphone**

3859 This example will be added when scripts feature is added in later version of specification

### 3860 **A.5 Device management**

3861 This sequence highlights (Figure 32) the device management function of maintenance.



3863

3864

**Figure 32. Device management (maintenance)**

3865 **Pre-Condition:** Admin device has different security permissions and hence can perform device  
3866 management operations on the Device

3867 1) Admin device sends a GET request to `/oic/res` resource to discover all resources hosted on  
3868 a targeted end point (in this case Bulb)

3869 10) The end point (bulb) responds with the list of Resource URI, Resource Type and Interfaces  
3870 supported on the end point (one of the resources is `/oic/mnt` whose `rt=oic.wk.mnt`)

3871 11) Admin Device changes the 'fr' property of the maintenance resource by  
3872 sending a POST request to `/oic/mnt` resource (`{fr=1}`). This triggers a factory reset of the  
3873 end point (bulb)

3874 12) On successful execution of the request, the end point responds with the changed  
3875 resource representation. Else, error code is returned. Details of the error codes are defined  
3876 in section 12.2.7.



3877  
3878  
3879  
3880

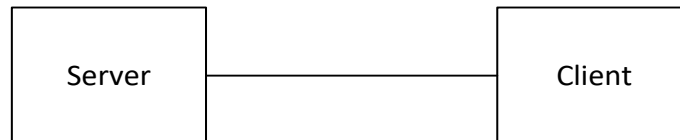
## Annex B (informative)

### OCF interaction scenarios and deployment models

#### 3881 B.1 OCF interaction scenarios

3882 A Client connects to one or multiple Servers in order to access the resources provided by those  
3883 Servers. The following are scenarios representing possible interactions among Roles:

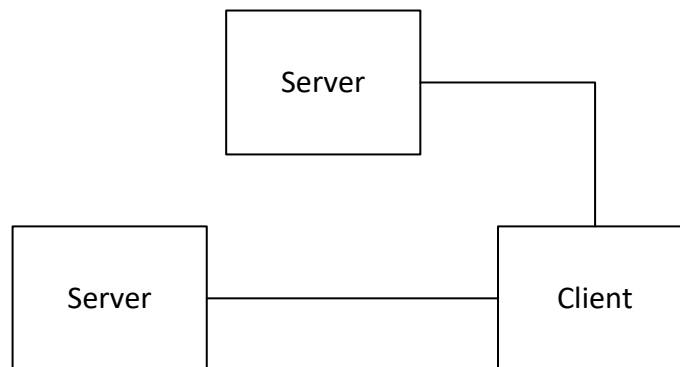
- 3884 • Direct interaction between Client and Server (Figure 33). In this scenario the Client and the  
3885 Server directly communicate without involvement of any other Device. A smartphone which  
3886 controls an actuator directly uses this scenario.



3887

3888 **Figure 33. Direct interaction between Server and Client**

- 3889 • Interaction between Client and Server using another server (Figure 34). In this scenario,  
3890 another Server provides the support needed for the Client to directly access the desired  
3891 resource on a specific Server. This scenario is used for example, when a smartphone first  
3892 accesses a discovery server to find the addressing information of a specific appliance, and  
3893 then directly accesses the appliance to control it.



3894

3895 **Figure 34. Interaction between Client and Server using another Server**

- 3896 • Interaction between Client and Server using Intermediary (Figure 35). In this scenario an  
3897 Intermediary facilitates the interaction between the Client and the Server. A smartphone which  
3898 controls appliances in a smart home via MQTT broker uses this scenario.

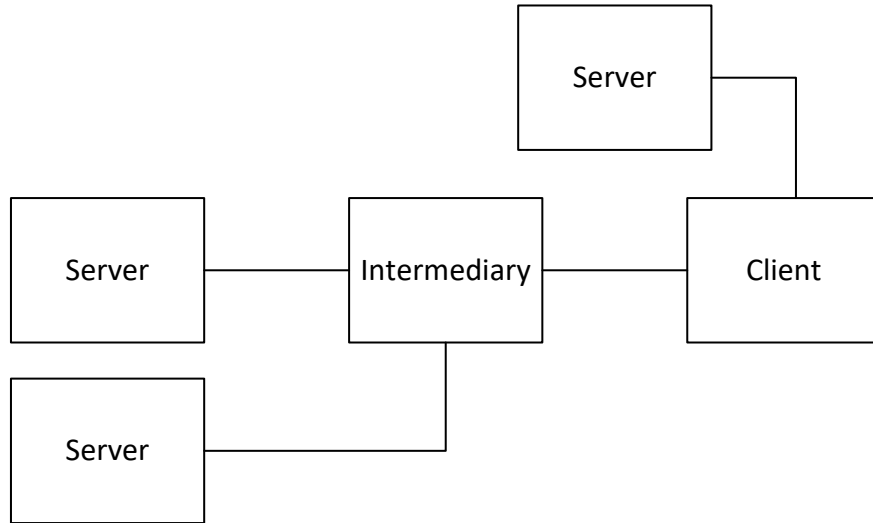


3899

3900 **Figure 35. Interaction between Client and Server using Intermediary**

- 3901 • Interaction between Client and Server using support from multiple Servers and intermediary  
3902 (Figure 36). In this scenario, both Server and Intermediary roles are present to facilitate the  
3903 transaction between the Client and a specific Server. An example scenario is when a

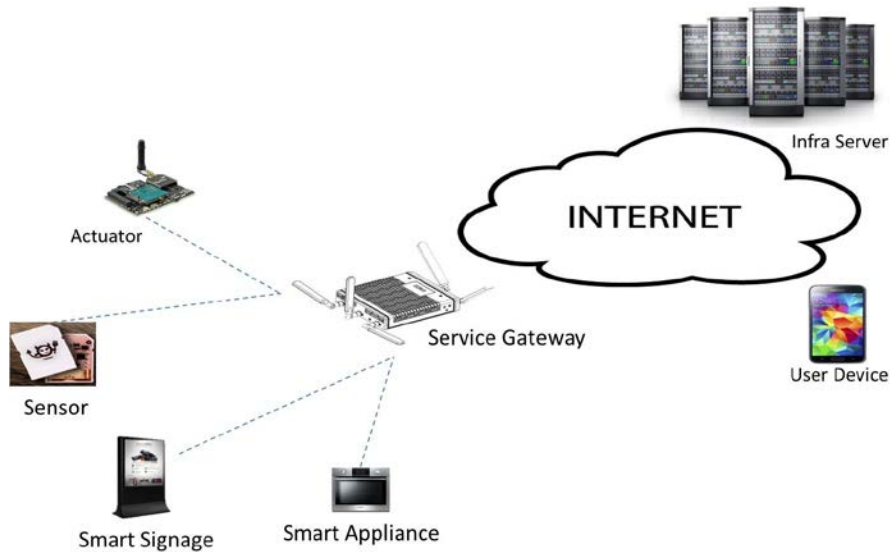
3904 smartphone first accesses a Resource Directory (RD) server to find the address to a specific  
 3905 appliance, then utilizes MQTT broker to deliver a command message to the appliance. The  
 3906 smartphone can utilize the mechanisms defined in CoRE Resource Directory such as default  
 3907 location, anycast address or DHCP to discover the Resource Directory information.



3908  
 3909 **Figure 36. Interaction between Client and Server using support from multiple Servers and**  
 3910 **Intermediary**

3911 **B.2 Deployment model**

3912 In deployment, Devices are deployed and interact via either wired or wireless connections. Devices  
 3913 are the physical entities that may host resources and play one or more Roles. There is no constraint  
 3914 on the structure of a deployment or number of Devices in it. Architecture is flexible and scalable  
 3915 and capable of addressing large number of devices with different device capabilities, including  
 3916 constrained devices which have limited memory and capabilities. Constrained devices are defined  
 3917 and categorized in [TCNN].



3918  
 3919 **Figure 37. Example of Devices**

3920 Figure 37 depicts a typical deployment and set of Devices, which may be divided in the following  
3921 categories:

- 3922 • **Things:** Networked devices which are able to interface with physical environments. Things are  
3923 the devices which are primarily controlled and monitored. Examples include smart appliances,  
3924 sensors, and actuators. Things mostly take the role of Server but they may also take the role of  
3925 Client, for example in machine-to-machine communications.
- 3926 • **User Devices:** Devices employed by the users enabling the users to access resources and  
3927 services. Examples include smart phones, tablets, and wearable devices. User Devices mainly  
3928 take the role of Client, but may also take the role of Server or Intermediary.
- 3929 • **Service Gateways:** Network equipment which take the role of Intermediary. Examples are  
3930 home gateways.
- 3931 • **Infra Servers:** Data centers residing in cloud infrastructure, which facilitate the interaction  
3932 among Devices by providing network services such as AAA, NAT traversal or discovery. It can  
3933 also play the role of Client or Intermediary

## Annex C (informative)

### Other Resource Models and OCF Mapping

#### C.1 Multiple resource models

RESTful interactions are defined dependent on the resource model; hence, Devices require a common understanding of the resource model for interoperability.

There are multiple resource models defined by different organizations including OCF, IPSO Alliance and oneM2M, and used in the industry, which may restrict interoperability among respective ecosystems. The main differences from Resource model are as follows:

- **Resource structure:** Resources may be defined to have properties (e.g., oneM2M defined resources), or may be defined as an atomic entity and not be decomposable into properties (e.g., IPSO alliance defined resources). For example, a smart light may be represented as a resource with an on-off property or a resource collection containing an on-off resource. In the former, on-off property doesn't have a URI of its own and can only be accessed indirectly via the resource. In the latter, being a resource itself, on-off resource is assigned its own URI and can be directly manipulated.
- **Resource name & type:** Resources may be allowed to be named freely and have their characteristics indicated using a Resource Type property (e.g., as defined in oneM2M). Alternatively, the name of resources may be defined a priori in a way that the name by itself is indicative of its characteristic (e.g., as defined by IPSO alliance). For example, in oneM2M resource model, a smart light can be named with no restrictions, such as 'LivingRoomLight\_1' but in IPSO alliance resource model it is required to have the fixed Object name with numerical Object ID of "IPSO Light Control (3311)". Consequently, it's likely that in the former case the data path in URI is freely defined and in the latter case it is predetermined.
- **Resource hierarchy:** Resources may be allowed to be organized in hierarchy where a resource contains another resource with a parent-child relationship (e.g., in oneM2M definition of resource model). Resources may also be required to have a flat structure and associate with other resources only by referencing their links.

In addition to the above, different organizations use different syntax and define different features (e.g., resource interface), which preclude interoperability.

#### C.2 OCF approach for support of multiple resource models

In order to expand the IoT ecosystem the Framework takes an inclusive approach for interworking with existing resource models. Specifically, the Framework defines a resource model while providing a mechanism to easily map to other models. By embracing existing resource models OCF is inclusive of existing ecosystems while allowing for the transition toward definition of a comprehensive resource model integrating all ecosystems.

The following OCF characteristics enable support of other resource models:

- **resource model is the superset of multiple models:** the resource model is defined as the superset of existing resource models. In other words, any existing resource model can be mapped to a subset of resource model concepts.
- **Framework may allow for resource model negotiation:** the Client and Server exchange the information about what resource model(s) each supports. Based on the exchanged information, the Client and Server choose a resource model to perform RESTful interactions or to perform translation. This feature is out of scope of the current version of this specification, however, the following is a high level description for resource model negotiation.

### 3980 C.3 Resource model indication

3981 The Client and server exchange the information about what resource model(s) each supports.  
3982 Based on the exchanged information, the Client and Server choose a resource model to perform  
3983 RESTful interactions or to perform translation. The exchange could be part of discovery and  
3984 negotiation. Based on the exchange, the Client and Server follow a procedure to ensure  
3985 interoperability among them. They may choose a common resource model or execute translation  
3986 between resource models.

3987 • **Resource model schema exchange:** The Client and Server may share the resource model  
3988 information when they initiate a RESTful interaction. They may exchange the information about  
3989 which resource model they support as part of session establishment procedures. Alternatively,  
3990 each request or response message may carry the indication of which resource model it is using.  
3991 For example, [COAP] defines “Content-Format option” to indicate the “representation format”  
3992 such as “application/json”. It’s possible to extend the Content-Format Option to indicate the  
3993 resource model used with the representation format such as “application/ipsso-json”.

3994 • **Ensuing procedures:** After the Client and Server exchange the resource model information,  
3995 they perform a suitable procedure to ensure interoperability among them. The simplest way is  
3996 to choose a resource model supported by both the Client and Server. In case there is no  
3997 common resource model, the Client and Server may interact through a 3rd party.

3998 In addition to translation which can be resource intensive, a method based on profiles can be used  
3999 in which an OCF implementation can accommodate multiple profiles and hence multiple  
4000 ecosystems.

4001 • **Resource Model Profile:** the Framework defines resource model profiles and implementers or  
4002 users choose the active profile. The chosen profile constraints the Device to strict rules in how  
4003 resources are defined, instantiated and interacted with. This would allow for interoperation with  
4004 devices from the ecosystem identified by the profile (e.g., IPSO, OneM2M etc.). Although this  
4005 enables a Device to participate in and be part of any given ecosystem, this scheme does not  
4006 allow for generic interoperability at runtime. While this approach may be suitable for resource  
4007 constrained devices, more resource capable devices are expected to support more than one  
4008 profile.

### 4009 C.4 An Example Profile (IPSO profile)

4010 IPSO defines smart objects that have specific resources and they take values determined by the  
4011 data type of that resource. The smart object specification defines a category of such objects. Each  
4012 resource represents a characteristic of the smart object being modelled.

4013 While the terms may be different, there are equivalent concepts in OCF to represent these terms.  
4014 This section provides the equivalent OCF terms and then frames the IPSO smart object in OCF  
4015 terms.

4016 The IPSO object Light Control defined in section 16 of the IPSO Smart Objects 1.0 is used as the  
4017 reference example.

#### 4018 C.4.1 Conceptual equivalence

4019 The IPSO smart object definition is equivalent to a Resource Type definition which defines the  
4020 relevant characteristics of an entity being modelled. The specific IPSO Resource is equivalent to  
4021 a Property that like an IPSO Resource has a defined data type, enumeration of acceptable values,  
4022 units, a general description and access modes (based on the Interface).

4023 The general method for developing the equivalent Resource Type from an IPSO Smart Object  
4024 definition is to ignore the Object ID and replace the Object URN with an OCF ‘.’ (dot) separated  
4025 name that incorporates the IPSO object. Alternatively the Object URN can be used as the Resource

4026 Type ID as is (as long as the URN does not contain any '.' (dots)) – using the same Object URN  
 4027 as the Resource Type ID allows for compatibility when interacting with an IPSO compliant device.  
 4028 The object URN based naming does not have any bearing for OCF to OCF interoperability and so  
 4029 the OCF format is preferred – for OCF to OCF interoperability only the data model consistency is  
 4030 required.

4031 Two models are available to render IPSO objects into OCF.

4032 1) One is where the IPSO Smart Object represents a Resource. In this case, the IP Smart Object  
 4033 is regarded as a resource with the Resource Type matching the description of the Smart Object.  
 4034 Furthermore, each resource in the IPSO definition is represented as a Property in the Resource  
 4035 Type (the IPSO Resource ID is replaced with a string representing the Property). This is the  
 4036 preferred approach when the IPSO Data Model is expressed in the Resource Model.

4037 13) The other approach is to model an IPSO Smart Object as a Collection. Each IPSO  
 4038 Resource is then modelled as a Resource with a Resource Type that matches the definition  
 4039 of the IPSO Resource. Each of these resource instances are then bound to the Collection  
 4040 that represents this IPSO Smart Object.

4041

4042 Below is an example showing how an IPSO LightControl Object is modelled as a Resource.

4043 **Resource Type: Light Control**

4044 Description: This Object is used to control a light source, such as a LED or other light. It allows a  
 4045 light to be turned on or off and its dimmer setting to be controlled as a percentage value between  
 4046 0 and 100. An optional colour setting enables a string to be used to indicate the desired colour.  
 4047 Table 45 and Table 46 define the Resource Type and its properties, respectively.

4048 **Table 45. Light control Resource Type definition**

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

4049

4050 **Table 46. Light control Resource Type definition**

Property title	Property name	Value type	Value rule	Unit	Access mode	Mandatory	Description
<b>On/Off</b>	"on-off"	boolean			R, W	yes	On/Of Control: 0 = Off 1 = On
<b>Dimmer</b>	"dim"	integer		%	R, W	no	Proportional Control, integer value between 0 and 100 as percentage
<b>Color</b>	"color"	string	0 – 100	Defined by "units" property	R, W	no	String representing some value in color space
<b>Units</b>	"units"	string			R	no	Measurement Units Definition e.g., "Cel" for Temperature in Celsius.
<b>On Time</b>	"ontime"	integer		s	R, W	no	The time in seconds that the light has been on.

							Writing a value of 0 resets the counter
<b>Cumulative active power</b>	"cumap"	float		Wh	R	no	The cumulative active power since the last cumulative energy reset or device start
<b>Power Factor</b>	"powfact"	float			R	no	The power factor of the load

4051  
4052

4053  
4054  
4055  
4056

## Annex D (normative)

### Resource Type definitions

#### 4057 D.1 List of Resource Type definitions

4058 All the sections in Annex D, Annex E and Annex F describe the Resource Types with a restful API  
4059 definition language. The Resource Type definitions presented in Annex D, Annex E and Annex F  
4060 are formatted for readability, and so may appear to have extra line breaks. The contents of the  
4061 Resource Types without the extra line breaks are available in OCF Resource Type Definitions.

4062 Table 47 contains the list of defined core resources in this specification.

4063

**Table 47. Alphabetized list of core resources**

<b>Friendly Name (informative)</b>	<b>Resource Type (rt)</b>	<b>Section</b>
<b>Atomic Measurement</b>	"oic.wk.atomicmeasurement"	D.17
<b>Collections</b>	"oic.wk.col"	D.2
<b>Device Configuration</b>	"oic.wk.con"	D.3
<b>Platform Configuration</b>	"oic.wk.con.p"	D.4
<b>Device</b>	"oic.wk.d"	D.5
<b>Discoverable Resources, baseline interface</b>	"oic.wk.res"	D.8
<b>Discoverable Resources, link list interface</b>	"oic.wk.res"	D.9
<b>Icon</b>	"oic.r.icon"	D.14
<b>Introspection</b>	"oic.wk.introspection"	D.15
<b>Maintenance</b>	"oic.wk.mnt"	D.6
<b>Network Monitoring</b>	"oic.wk.nmon"	D.16
<b>Platform</b>	"oic.wk.p"	D.7
<b>Resource Directory</b>	"oic.wk.rd"	D.13



<b>Scenes (Top Level)</b>	“oic.wk.scenelist”	D.10
<b>Scenes Collections</b>	“oic.wk.scenecollection”	D.11
<b>Scene Member</b>	“oic.wk.scenemember”	D.12

## 4064 D.2 OCF Collection

### 4065 D.2.1 Introduction

4066 OCF Collection Resource Type contains properties and links. The oic.if.baseline interface exposes  
4067 a representation of the links and the properties of the collection resource itself

### 4068 D.2.2 Example URI

4069 /CollectionResURI

### 4070 D.2.3 Resource Type

4071 The resource type (rt) is defined as: oic.wk.col.

### 4072 D.2.4 RAML Definition

```
4073 #%RAML 0.8
4074 title: Collections
4075 version: 1.0
4076 traits:
4077   - interface-ll :
4078     queryParameters:
4079       if:
4080         enum: ["oic.if.ll"]
4081   - interface-b :
4082     queryParameters:
4083       if:
4084         enum: ["oic.if.b"]
4085   - interface-baseline :
4086     queryParameters:
4087       if:
4088         enum: ["oic.if.baseline"]
4089   - interface-all :
4090     queryParameters:
4091       if:
4092         enum: ["oic.if.ll", "oic.if.baseline", "oic.if.b"]
4093
4094 /CollectionResURI?if=oic.if.baseline:
4095   description: |
4096     OCF Collection Resource Type contains properties and links.
4097     The oic.if.baseline interface exposes a representation of
4098     the links and the properties of the collection resource itself
4099
4100   is : ['interface-baseline']
4101   get:
4102     description: |
4103       Retrieve on Baseline Interface
4104
4105   responses :
4106     200:
```

```

4107     body:
4108         application/json:
4109             schema: /
4110                 {
4111                     "$schema": "http://json-schema.org/draft-04/schema#",
4112                     "description": "Copyright (c) 2016,2018 Open Connectivity Foundation, Inc. All
4113 rights reserved.",
4114                     "id": "http://openconnectivityfoundation.github.io/core/schemas/oic.collection-
4115 schema.json#",
4116                     "title": "Collection",
4117                     "definitions": {
4118                         "oic.oic-link": {
4119                             "type": "object",
4120                             "properties": {
4121                                 "href": {
4122                                     "type": "string",
4123                                     "maxLength": 256,
4124                                     "description": "This is the target URI, it can be specified as a Relative
4125 Reference or fully-qualified URI.",
4126                                     "format": "uri"
4127                                 },
4128                                 "rel": {
4129                                     "oneOf": [
4130                                         {
4131                                             "type": "array",
4132                                             "items": {
4133                                                 "type": "string",
4134                                                 "maxLength": 64
4135                                             },
4136                                             "minItems": 1,
4137                                             "default": ["hosts"]
4138                                         },
4139                                         {
4140                                             "type": "string",
4141                                             "maxLength": 64,
4142                                             "default": "hosts"
4143                                         }
4144                                     ],
4145                                     "description": "The relation of the target URI referenced by the link to
4146 the context URI"
4147                                 },
4148                                 "rt": {
4149                                     "type": "array",
4150                                     "items": {
4151                                         "type": "string",
4152                                         "maxLength": 64
4153                                     },
4154                                     "minItems": 1,
4155                                     "description": "Resource Type of the Resource"
4156                                 },
4157                                 "if": {
4158                                     "type": "array",
4159                                     "items": {
4160                                         "type": "string",
4161                                         "enum": ["oic.if.baseline", "oic.if.ll", "oic.if.b", "oic.if.rw",
4162 "oic.if.r", "oic.if.a", "oic.if.s" ]
4163                                     },
4164                                     "minItems": 1,
4165                                     "description": "The interface set supported by this resource"
4166                                 },
4167                                 "di": {
4168                                     "description": "The Device ID formatted according to IETF RFC 4122.",
4169                                     "type": "string",
4170                                     "pattern": "^[a-fA-F0-9]{8}-[a-fA-F0-9]{4}-[a-fA-F0-9]{4}-[a-fA-F0-9]{4}-
4171 [a-fA-F0-9]{12}$"
4172                                 },
4173                                 "p": {
4174                                     "description": "Specifies the framework policies on the Resource referenced
4175 by the target URI",
4176                                     "type": "object",

```

```

4177         "properties": {
4178             "bm": {
4179                 "description": "Specifies the framework policies on the Resource
4180 referenced by the target URI for e.g. observable and discoverable",
4181                 "type": "integer"
4182             }
4183         },
4184         "required" : ["bm"]
4185     },
4186     "title": {
4187         "type": "string",
4188         "maxLength": 64,
4189         "description": "A title for the link relation. Can be used by the UI to
4190 provide a context."
4191     },
4192     "anchor": {
4193         "type": "string",
4194         "maxLength": 256,
4195         "description": "This is used to override the context URI e.g. override the
4196 URI of the containing collection.",
4197         "format": "uri"
4198     },
4199     "ins": {
4200         "type": "integer",
4201         "description": "The instance identifier for this web link in an array of
4202 web links - used in collections"
4203     },
4204     "type": {
4205         "type": "array",
4206         "description": "A hint at the representation of the resource referenced by
4207 the target URI. This represents the media types that are used for both accepting and emitting.",
4208         "items" : {
4209             "type": "string",
4210             "maxLength": 64
4211         },
4212         "minItems": 1,
4213         "default": "application/cbor"
4214     },
4215     "eps": {
4216         "type": "array",
4217         "description": "the Endpoint information of the target Resource",
4218         "items": {
4219             "type": "object",
4220             "properties": {
4221                 "ep": {
4222                     "type": "string",
4223                     "format": "uri",
4224                     "description": "Transport Protocol Suite + Endpoint Locator"
4225                 },
4226                 "pri": {
4227                     "type": "integer",
4228                     "minimum": 1,
4229                     "description": "The priority among multiple Endpoints"
4230                 }
4231             }
4232         }
4233     },
4234     },
4235     "required": [ "href", "rt", "if" ]
4236 },
4237 "oic.collection.links.arrayoflinks": {
4238     "properties": {
4239         "links": {
4240             "description": "A set of simple or individual OIC Links.",
4241             "type": "array",
4242             "items": {
4243                 "type": "object",
4244                 "properties": {
4245                     "href": {
4246                         "type": "string",
4247                         "maxLength": 256,

```

```

4248         "description": "This is the target URI, it can be specified as a
4249 Relative Reference or fully-qualified URI.",
4250         "format": "uri"
4251     },
4252     "rel": {
4253         "oneOf": [
4254             {
4255                 "type": "array",
4256                 "items": {
4257                     "type": "string",
4258                     "maxLength": 64
4259                 },
4260                 "minItems": 1,
4261                 "default": ["hosts"]
4262             },
4263             {
4264                 "type": "string",
4265                 "maxLength": 64,
4266                 "default": "hosts"
4267             }
4268         ],
4269         "description": "The relation of the target URI referenced by the link
4270 to the context URI"
4271     },
4272     "rt": {
4273         "type": "array",
4274         "items": {
4275             "type": "string",
4276             "maxLength": 64
4277         },
4278         "minItems": 1,
4279         "description": "Resource Type of the Resource"
4280     },
4281     "if": {
4282         "type": "array",
4283         "items": {
4284             "type": "string",
4285             "enum": ["oic.if.baseline", "oic.if.ll", "oic.if.b", "oic.if.rw",
4286 "oic.if.r", "oic.if.a", "oic.if.s"]
4287         },
4288         "minItems": 1,
4289         "description": "The interface set supported by this resource"
4290     },
4291     "di": {
4292         "description": "The Device ID formatted according to IETF RFC 4122.",
4293         "type": "string",
4294         "pattern": "^[a-fA-F0-9]{8}-[a-fA-F0-9]{4}-[a-fA-F0-9]{4}-[a-fA-F0-
4295 9]{4}-[a-fA-F0-9]{12}$"
4296     },
4297     "p": {
4298         "description": "Specifies the framework policies on the Resource
4299 referenced by the target URI",
4300         "type": "object",
4301         "properties": {
4302             "bm": {
4303                 "description": "Specifies the framework policies on the Resource
4304 referenced by the target URI for e.g. observable and discoverable",
4305                 "type": "integer"
4306             }
4307         },
4308         "required": ["bm"]
4309     },
4310     "title": {
4311         "type": "string",
4312         "maxLength": 64,
4313         "description": "A title for the link relation. Can be used by the UI
4314 to provide a context."
4315     },
4316     "anchor": {
4317         "type": "string",
4318         "maxLength": 256,

```

```

4319         "description": "This is used to override the context URI e.g.
4320 override the URI of the containing collection.",
4321         "format": "uri"
4322     },
4323     "ins": {
4324         "type": "integer",
4325         "description": "The instance identifier for this web link in an array
4326 of web links - used in collections"
4327     },
4328     "type": {
4329         "type": "array",
4330         "description": "A hint at the representation of the resource
4331 referenced by the target URI. This represents the media types that are used for both accepting and
4332 emitting.",
4333         "items": {
4334             "type": "string",
4335             "maxLength": 64
4336         },
4337         "minItems": 1,
4338         "default": "application/cbor"
4339     },
4340     "eps": {
4341         "type": "array",
4342         "description": "the Endpoint information of the target Resource",
4343         "items": {
4344             "type": "object",
4345             "properties": {
4346                 "ep": {
4347                     "type": "string",
4348                     "format": "uri",
4349                     "description": "Transport Protocol Suite + Endpoint Locator"
4350                 },
4351                 "pri": {
4352                     "type": "integer",
4353                     "minimum": 1,
4354                     "description": "The priority among multiple Endpoints"
4355                 }
4356             }
4357         }
4358     },
4359     },
4360     "required": [ "href", "rt", "if" ]
4361 }
4362 }
4363 },
4364 },
4365 "oic.core": {
4366     "type": "object",
4367     "properties": {
4368         "rt": {
4369             "type": "array",
4370             "items": {
4371                 "type": "string",
4372                 "maxLength": 64
4373             },
4374             "minItems": 1,
4375             "readOnly": true,
4376             "description": "Resource Type of the Resource"
4377         }
4378     }
4379 },
4380 "uuid": {
4381     "description": "Format pattern according to IETF RFC 4122.",
4382     "type": "string",
4383     "pattern": "^[a-fA-F0-9]{8}-[a-fA-F0-9]{4}-[a-fA-F0-9]{4}-[a-fA-F0-9]{4}-[a-fA-
4384 F0-9]{12}$"
4385 },
4386 "oic.collection.links": {
4387     "properties": {
4388         "links": {
4389             "description": "A set of simple or individual OIC Links.",

```

```

4390         "type": "array",
4391         "items": {
4392             "$ref": "#/definitions/oic.oic-link"
4393         }
4394     }
4395 }
4396 },
4397 "oic.collection.properties": {
4398     "type": "object",
4399     "description": "A collection is a set of links along with additional properties
4400 to describe the collection itself",
4401     "properties": {
4402         "rts": {
4403             "$ref": "#/definitions/oic.core/properties/rt",
4404             "description": "The list of allowable resource types (for Target and
4405 anchors) in links included in the collection"
4406         },
4407         "rts-m": {
4408             "$ref": "#/definitions/oic.core/properties/rt",
4409             "description": "The list of mandatory resources if any in links included in
4410 the collection"
4411         }
4412     }
4413 }
4414 },
4415 "type": "object",
4416 "allof": [
4417     {"$ref": "http://openconnectivityfoundation.github.io/core/schemas/oic.core-
4418 schema.json#/definitions/oic.core"},
4419     {"$ref": "#/definitions/oic.collection.properties"},
4420     {"$ref": "#/definitions/oic.collection.links"}
4421 ]
4422 }
4423
4424 example: /
4425 {
4426     "rt": ["oic.wk.col"],
4427     "id": "unique_example_id",
4428     "rts": [ "oic.r.switch.binary", "oic.r.airflow" ],
4429     "rts-m": [ "oic.r.switch.binary" ],
4430     "links": [
4431         {
4432             "href": "switch",
4433             "rt": [ "oic.r.switch.binary" ],
4434             "if": [ "oic.if.a", "oic.if.baseline" ],
4435             "eps": [
4436                 { "ep": "coap://[fe80::b1d6]:1111", "pri": 2 },
4437                 { "ep": "coaps://[fe80::b1d6]:1122" },
4438                 { "ep": "coap+tcp://[2001:db8:a::123]:2222", "pri": 3 }
4439             ]
4440         },
4441         {
4442             "href": "airFlow",
4443             "rt": [ "oic.r.airflow" ],
4444             "if": [ "oic.if.a", "oic.if.baseline" ],
4445             "eps": [
4446                 { "ep": "coap://[fe80::b1d6]:1111", "pri": 2 },
4447                 { "ep": "coaps://[fe80::b1d6]:1122" },
4448                 { "ep": "coap+tcp://[2001:db8:a::123]:2222", "pri": 3 }
4449             ]
4450         }
4451     ]
4452 }
4453
4454 post:
4455     description: |
4456     Update on Baseline Interface
4457

```

```

4458     body:
4459     application/json:
4460         schema: /
4461         {
4462             "$schema": "http://json-schema.org/draft-04/schema#",
4463             "description": "Copyright (c) 2016,2018 Open Connectivity Foundation, Inc. All rights
4464 reserved.",
4465             "id": "http://openconnectivityfoundation.github.io/core/schemas/oic.collection-
4466 schema.json#",
4467             "title": "Collection",
4468             "definitions": {
4469                 "oic.oic-link": {
4470                     "type": "object",
4471                     "properties": {
4472                         "href": {
4473                             "type": "string",
4474                             "maxLength": 256,
4475                             "description": "This is the target URI, it can be specified as a Relative
4476 Reference or fully-qualified URI.",
4477                             "format": "uri"
4478                         },
4479                         "rel": {
4480                             "oneOf": [
4481                                 {
4482                                     "type": "array",
4483                                     "items": {
4484                                         "type": "string",
4485                                         "maxLength": 64
4486                                     },
4487                                     "minItems": 1,
4488                                     "default": ["hosts"]
4489                                 },
4490                                 {
4491                                     "type": "string",
4492                                     "maxLength": 64,
4493                                     "default": "hosts"
4494                                 }
4495                             ],
4496                             "description": "The relation of the target URI referenced by the link to the
4497 context URI"
4498                         },
4499                         "rt": {
4500                             "type": "array",
4501                             "items": {
4502                                 "type": "string",
4503                                 "maxLength": 64
4504                             },
4505                             "minItems": 1,
4506                             "description": "Resource Type of the Resource"
4507                         },
4508                         "if": {
4509                             "type": "array",
4510                             "items": {
4511                                 "type": "string",
4512                                 "enum": ["oic.if.baseline", "oic.if.ll", "oic.if.b", "oic.if.rw",
4513 "oic.if.r", "oic.if.a", "oic.if.s"]
4514                             },
4515                             "minItems": 1,
4516                             "description": "The interface set supported by this resource"
4517                         },
4518                         "di": {
4519                             "description": "The Device ID formatted according to IETF RFC 4122.",
4520                             "type": "string",
4521                             "pattern": "^[a-fA-F0-9]{8}-[a-fA-F0-9]{4}-[a-fA-F0-9]{4}-[a-fA-F0-9]{4}-[a-fA-
4522 F0-9]{12}$"
4523                         },
4524                         "p": {
4525                             "description": "Specifies the framework policies on the Resource referenced by
4526 the target URI",
4527                             "type": "object",

```

```

4528         "properties": {
4529             "bm": {
4530                 "description": "Specifies the framework policies on the Resource referenced
4531 by the target URI for e.g. observable and discoverable",
4532                 "type": "integer"
4533             }
4534         },
4535         "required" : ["bm"]
4536     },
4537     "title": {
4538         "type": "string",
4539         "maxLength": 64,
4540         "description": "A title for the link relation. Can be used by the UI to provide
4541 a context."
4542     },
4543     "anchor": {
4544         "type": "string",
4545         "maxLength": 256,
4546         "description": "This is used to override the context URI e.g. override the URI
4547 of the containing collection.",
4548         "format": "uri"
4549     },
4550     "ins": {
4551         "type": "integer",
4552         "description": "The instance identifier for this web link in an array of web
4553 links - used in collections"
4554     },
4555     "type": {
4556         "type": "array",
4557         "description": "A hint at the representation of the resource referenced by the
4558 target URI. This represents the media types that are used for both accepting and emitting.",
4559         "items" : {
4560             "type": "string",
4561             "maxLength": 64
4562         },
4563         "minItems": 1,
4564         "default": "application/cbor"
4565     },
4566     "eps": {
4567         "type": "array",
4568         "description": "the Endpoint information of the target Resource",
4569         "items": {
4570             "type": "object",
4571             "properties": {
4572                 "ep": {
4573                     "type": "string",
4574                     "format": "uri",
4575                     "description": "Transport Protocol Suite + Endpoint Locator"
4576                 },
4577                 "pri": {
4578                     "type": "integer",
4579                     "minimum": 1,
4580                     "description": "The priority among multiple Endpoints"
4581                 }
4582             }
4583         }
4584     },
4585     "required": [ "href", "rt", "if" ]
4586 },
4587 "oic.collection.links.arrayoflinks": {
4588     "properties": {
4589         "links": {
4590             "description": "A set of simple or individual OIC Links.",
4591             "type": "array",
4592             "items": {
4593                 "type": "object",
4594                 "properties": {
4595                     "href": {
4596                         "type": "string",
4597                         "maxLength": 256,

```



```

4599         "description": "This is the target URI, it can be specified as a Relative
4600 Reference or fully-qualified URI.",
4601         "format": "uri"
4602     },
4603     "rel": {
4604         "oneOf": [
4605             {
4606                 "type": "array",
4607                 "items": {
4608                     "type": "string",
4609                     "maxLength": 64
4610                 },
4611                 "minItems": 1,
4612                 "default": ["hosts"]
4613             },
4614             {
4615                 "type": "string",
4616                 "maxLength": 64,
4617                 "default": "hosts"
4618             }
4619         ],
4620         "description": "The relation of the target URI referenced by the link to
4621 the context URI"
4622     },
4623     "rt": {
4624         "type": "array",
4625         "items": {
4626             "type": "string",
4627             "maxLength": 64
4628         },
4629         "minItems": 1,
4630         "description": "Resource Type of the Resource"
4631     },
4632     "if": {
4633         "type": "array",
4634         "items": {
4635             "type": "string",
4636             "enum": ["oic.if.baseline", "oic.if.ll", "oic.if.b", "oic.if.rw",
4637 "oic.if.r", "oic.if.a", "oic.if.s"]
4638         },
4639         "minItems": 1,
4640         "description": "The interface set supported by this resource"
4641     },
4642     "di": {
4643         "description": "The Device ID formatted according to IETF RFC 4122.",
4644         "type": "string",
4645         "pattern": "^[a-fA-F0-9]{8}-[a-fA-F0-9]{4}-[a-fA-F0-9]{4}-[a-fA-F0-9]{4}-
4646 [a-fA-F0-9]{12}$"
4647     },
4648     "p": {
4649         "description": "Specifies the framework policies on the Resource
4650 referenced by the target URI",
4651         "type": "object",
4652         "properties": {
4653             "bm": {
4654                 "description": "Specifies the framework policies on the Resource
4655 referenced by the target URI for e.g. observable and discoverable",
4656                 "type": "integer"
4657             }
4658         },
4659         "required": ["bm"]
4660     },
4661     "title": {
4662         "type": "string",
4663         "maxLength": 64,
4664         "description": "A title for the link relation. Can be used by the UI to
4665 provide a context."
4666     },
4667     "anchor": {
4668         "type": "string",
4669         "maxLength": 256,

```

```

4670         "description": "This is used to override the context URI e.g. override
4671 the URI of the containing collection.",
4672         "format": "uri"
4673     },
4674     "ins": {
4675         "type": "integer",
4676         "description": "The instance identifier for this web link in an array of
4677 web links - used in collections"
4678     },
4679     "type": {
4680         "type": "array",
4681         "description": "A hint at the representation of the resource referenced
4682 by the target URI. This represents the media types that are used for both accepting and emitting.",
4683         "items": {
4684             "type": "string",
4685             "maxLength": 64
4686         },
4687         "minItems": 1,
4688         "default": "application/cbor"
4689     },
4690     "eps": {
4691         "type": "array",
4692         "description": "the Endpoint information of the target Resource",
4693         "items": {
4694             "type": "object",
4695             "properties": {
4696                 "ep": {
4697                     "type": "string",
4698                     "format": "uri",
4699                     "description": "Transport Protocol Suite + Endpoint Locator"
4700                 },
4701                 "pri": {
4702                     "type": "integer",
4703                     "minimum": 1,
4704                     "description": "The priority among multiple Endpoints"
4705                 }
4706             }
4707         }
4708     },
4709     "required": [ "href", "rt", "if" ]
4710 }
4711 }
4712 }
4713 }
4714 },
4715 "oic.core": {
4716     "type": "object",
4717     "properties": {
4718         "rt": {
4719             "type": "array",
4720             "items": {
4721                 "type": "string",
4722                 "maxLength": 64
4723             },
4724             "minItems": 1,
4725             "readOnly": true,
4726             "description": "Resource Type of the Resource"
4727         }
4728     }
4729 },
4730 "uuid": {
4731     "description": "Format pattern according to IETF RFC 4122.",
4732     "type": "string",
4733     "pattern": "^[a-fA-F0-9]{8}-[a-fA-F0-9]{4}-[a-fA-F0-9]{4}-[a-fA-F0-9]{4}-[a-fA-F0-
4734 9]{12}$"
4735 },
4736 "oic.collection.links": {
4737     "properties": {
4738         "links": {
4739             "description": "A set of simple or individual OIC Links.",
4740             "type": "array",

```

```

4741         "items": {
4742             "$ref": "#/definitions/oic.oic-link"
4743         }
4744     }
4745 },
4746     "oic.collection.properties": {
4747         "type": "object",
4748         "description": "A collection is a set of links along with additional properties to
4749 describe the collection itself",
4750         "properties": {
4751             "rts": {
4752                 "$ref": "#/definitions/oic.core.properties/rt",
4753                 "description": "The list of allowable resource types (for Target and
4754 anchors) in links included in the collection"
4755             },
4756             "rts-m": {
4757                 "$ref": "#/definitions/oic.core.properties/rt",
4758                 "description": "The list of mandatory resources if any in links included in the
4759 collection"
4760             }
4761         }
4762     }
4763 },
4764     "type": "object",
4765     "allOf": [
4766         {"$ref": "http://openconnectivityfoundation.github.io/core/schemas/oic.core-
4767 schema.json#/definitions/oic.core"},
4768         {"$ref": "#/definitions/oic.collection.properties"},
4769         {"$ref": "#/definitions/oic.collection.links"}
4770     ]
4771 }
4772 }
4773
4774 responses :
4775     200:
4776         body:
4777             application/json:
4778                 schema: /
4779                 {
4780                     "$schema": "http://json-schema.org/draft-04/schema#",
4781                     "description": "Copyright (c) 2016,2018 Open Connectivity Foundation, Inc. All
4782 rights reserved.",
4783                     "id": "http://openconnectivityfoundation.github.io/core/schemas/oic.collection-
4784 schema.json#",
4785                     "title": "Collection",
4786                     "definitions": {
4787                         "oic.oic-link": {
4788                             "type": "object",
4789                             "properties": {
4790                                 "href": {
4791                                     "type": "string",
4792                                     "maxLength": 256,
4793                                     "description": "This is the target URI, it can be specified as a Relative
4794 Reference or fully-qualified URI.",
4795                                     "format": "uri"
4796                                 },
4797                                 "rel": {
4798                                     "oneOf": [
4799                                         {
4800                                             "type": "array",
4801                                             "items": {
4802                                                 "type": "string",
4803                                                 "maxLength": 64
4804                                             },
4805                                             "minItems": 1,
4806                                             "default": ["hosts"]
4807                                         },
4808                                         {

```

```

4809         "type": "string",
4810         "maxLength": 64,
4811         "default": "hosts"
4812     },
4813 ],
4814     "description": "The relation of the target URI referenced by the link to
4815 the context URI"
4816 },
4817     "rt": {
4818         "type": "array",
4819         "items": {
4820             "type": "string",
4821             "maxLength": 64
4822         },
4823         "minItems": 1,
4824         "description": "Resource Type of the Resource"
4825     },
4826     "if": {
4827         "type": "array",
4828         "items": {
4829             "type": "string",
4830             "enum": ["oic.if.baseline", "oic.if.ll", "oic.if.b", "oic.if.rw",
4831 "oic.if.r", "oic.if.a", "oic.if.s" ]
4832         },
4833         "minItems": 1,
4834         "description": "The interface set supported by this resource"
4835     },
4836     "di": {
4837         "description": "The Device ID formatted according to IETF RFC 4122.",
4838         "type": "string",
4839         "pattern": "^[a-fA-F0-9]{8}-[a-fA-F0-9]{4}-[a-fA-F0-9]{4}-[a-fA-F0-9]{4}-
4840 [a-fA-F0-9]{12}$"
4841     },
4842     "p": {
4843         "description": "Specifies the framework policies on the Resource referenced
4844 by the target URI",
4845         "type": "object",
4846         "properties": {
4847             "bm": {
4848                 "description": "Specifies the framework policies on the Resource
4849 referenced by the target URI for e.g. observable and discoverable",
4850                 "type": "integer"
4851             }
4852         },
4853         "required": ["bm"]
4854     },
4855     "title": {
4856         "type": "string",
4857         "maxLength": 64,
4858         "description": "A title for the link relation. Can be used by the UI to
4859 provide a context."
4860     },
4861     "anchor": {
4862         "type": "string",
4863         "maxLength": 256,
4864         "description": "This is used to override the context URI e.g. override the
4865 URI of the containing collection.",
4866         "format": "uri"
4867     },
4868     "ins": {
4869         "type": "integer",
4870         "description": "The instance identifier for this web link in an array of
4871 web links - used in collections"
4872     },
4873     "type": {
4874         "type": "array",
4875         "description": "A hint at the representation of the resource referenced by
4876 the target URI. This represents the media types that are used for both accepting and emitting.",
4877         "items": {
4878             "type": "string",
4879             "maxLength": 64

```

```

4880     },
4881     "minItems": 1,
4882     "default": "application/cbor"
4883   },
4884   "eps": {
4885     "type": "array",
4886     "description": "the Endpoint information of the target Resource",
4887     "items": {
4888       "type": "object",
4889       "properties": {
4890         "ep": {
4891           "type": "string",
4892           "format": "uri",
4893           "description": "Transport Protocol Suite + Endpoint Locator"
4894         },
4895         "pri": {
4896           "type": "integer",
4897           "minimum": 1,
4898           "description": "The priority among multiple Endpoints"
4899         }
4900       }
4901     }
4902   },
4903   },
4904   "required": [ "href", "rt", "if" ]
4905 },
4906 "oic.collection.links.arrayoflinks": {
4907   "properties": {
4908     "links": {
4909       "description": "A set of simple or individual OIC Links.",
4910       "type": "array",
4911       "items": {
4912         "type": "object",
4913         "properties": {
4914           "href": {
4915             "type": "string",
4916             "maxLength": 256,
4917             "description": "This is the target URI, it can be specified as a
4918 Relative Reference or fully-qualified URI.",
4919             "format": "uri"
4920           },
4921           "rel": {
4922             "oneOf": [
4923               {
4924                 "type": "array",
4925                 "items": {
4926                   "type": "string",
4927                   "maxLength": 64
4928                 },
4929                 "minItems": 1,
4930                 "default": ["hosts"]
4931               },
4932               {
4933                 "type": "string",
4934                 "maxLength": 64,
4935                 "default": "hosts"
4936               }
4937             ],
4938             "description": "The relation of the target URI referenced by the link
4939 to the context URI"
4940           },
4941           "rt": {
4942             "type": "array",
4943             "items": {
4944               "type": "string",
4945               "maxLength": 64
4946             },
4947             "minItems": 1,
4948             "description": "Resource Type of the Resource"
4949           },
4950           "if": {

```

```

4951         "type": "array",
4952         "items": {
4953             "type": "string",
4954             "enum": ["oic.if.baseline", "oic.if.ll", "oic.if.b", "oic.if.rw",
4955 "oic.if.r", "oic.if.a", "oic.if.s" ]
4956         },
4957         "minItems": 1,
4958         "description": "The interface set supported by this resource"
4959     },
4960     "di": {
4961         "description": "The Device ID formatted according to IETF RFC 4122.",
4962         "type": "string",
4963         "pattern": "^[a-fA-F0-9]{8}-[a-fA-F0-9]{4}-[a-fA-F0-9]{4}-[a-fA-F0-
4964 9]{4}-[a-fA-F0-9]{12}$"
4965     },
4966     "p": {
4967         "description": "Specifies the framework policies on the Resource
4968 referenced by the target URI",
4969         "type": "object",
4970         "properties": {
4971             "bm": {
4972                 "description": "Specifies the framework policies on the Resource
4973 referenced by the target URI for e.g. observable and discoverable",
4974                 "type": "integer"
4975             }
4976         },
4977         "required": ["bm"]
4978     },
4979     "title": {
4980         "type": "string",
4981         "maxLength": 64,
4982         "description": "A title for the link relation. Can be used by the UI
4983 to provide a context."
4984     },
4985     "anchor": {
4986         "type": "string",
4987         "maxLength": 256,
4988         "description": "This is used to override the context URI e.g.
4989 override the URI of the containing collection.",
4990         "format": "uri"
4991     },
4992     "ins": {
4993         "type": "integer",
4994         "description": "The instance identifier for this web link in an array
4995 of web links - used in collections"
4996     },
4997     "type": {
4998         "type": "array",
4999         "description": "A hint at the representation of the resource
5000 referenced by the target URI. This represents the media types that are used for both accepting and
5001 emitting.",
5002         "items": {
5003             "type": "string",
5004             "maxLength": 64
5005         },
5006         "minItems": 1,
5007         "default": "application/cbor"
5008     },
5009     "eps": {
5010         "type": "array",
5011         "description": "the Endpoint information of the target Resource",
5012         "items": {
5013             "type": "object",
5014             "properties": {
5015                 "ep": {
5016                     "type": "string",
5017                     "format": "uri",
5018                     "description": "Transport Protocol Suite + Endpoint Locator"
5019                 },
5020                 "pri": {
5021                     "type": "integer",

```

```

5022             "minimum": 1,
5023             "description": "The priority among multiple Endpoints"
5024         }
5025     }
5026 }
5027 },
5028 },
5029     "required": [ "href", "rt", "if" ]
5030 }
5031 }
5032 }
5033 },
5034 "oic.core": {
5035     "type": "object",
5036     "properties": {
5037         "rt": {
5038             "type": "array",
5039             "items": {
5040                 "type": "string",
5041                 "maxLength": 64
5042             },
5043             "minItems": 1,
5044             "readOnly": true,
5045             "description": "Resource Type of the Resource"
5046         }
5047     }
5048 },
5049 "uuid": {
5050     "description": "Format pattern according to IETF RFC 4122.",
5051     "type": "string",
5052     "pattern": "^[a-fA-F0-9]{8}-[a-fA-F0-9]{4}-[a-fA-F0-9]{4}-[a-fA-
5053 F0-9]{12}$"
5054 },
5055 "oic.collection.links": {
5056     "properties": {
5057         "links": {
5058             "description": "A set of simple or individual OIC Links.",
5059             "type": "array",
5060             "items": {
5061                 "$ref": "#/definitions/oic.oic-link"
5062             }
5063         }
5064     }
5065 },
5066 "oic.collection.properties": {
5067     "type": "object",
5068     "description": "A collection is a set of links along with additional properties
5069 to describe the collection itself",
5070     "properties": {
5071         "rts": {
5072             "$ref": "#/definitions/oic.core/properties/rt",
5073             "description": "The list of allowable resource types (for Target and
5074 anchors) in links included in the collection"
5075         },
5076         "rts-m": {
5077             "$ref": "#/definitions/oic.core/properties/rt",
5078             "description": "The list of mandatory resources if any in links included in
5079 the collection"
5080         }
5081     }
5082 },
5083 },
5084 "type": "object",
5085 "allOf": [
5086     { "$ref": "http://openconnectivityfoundation.github.io/core/schemas/oic.core-
5087 schema.json#/definitions/oic.core" },
5088     { "$ref": "#/definitions/oic.collection.properties" },
5089     { "$ref": "#/definitions/oic.collection.links" }
5090 ]
5091 }
5092 }

```

Table 48 OCF Collection Property Definitions

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

5095 **D.2.6 CRUDN behaviour**

5096 **Table 49 OCF Collection CRUDN operations**

Resource	Create	Read	Update	Delete	Notify
/CollectionResURI		get	post		

5097 **D.2.7 Referenced JSON schemas**

5098 **D.2.8 oic.oic-link-schema.json**

```

5099 {
5100   "$schema": "http://json-schema.org/draft-04/schema#",
5101   "description": "Copyright (c) 2016, 2017 Open Connectivity Foundation, Inc. All rights
5102 reserved.",
5103   "id": "http://openconnectivityfoundation.github.io/core/schemas/oic.oic-link-schema.json#",
5104   "definitions": {
5105     "oic.oic-link": {
5106       "type": "object",
5107       "properties": {
5108         "href": {
5109           "type": "string",
5110           "maxLength": 256,
5111           "description": "This is the target URI, it can be specified as a Relative Reference or
5112 fully-qualified URI.",
5113           "format": "uri"
5114         },
5115         "rel": {
5116           "oneOf": [
5117             {
5118               "type": "array",
5119               "items": {
5120                 "type": "string",
5121                 "maxLength": 64
5122               },
5123               "minItems": 1,
5124               "default": ["hosts"]
5125             },
5126             {
5127               "type": "string",
5128               "maxLength": 64,
5129               "default": "hosts"
5130             }
5131           ],
5132           "description": "The relation of the target URI referenced by the link to the context URI"
5133         },

```

```

5134     "rt": {
5135         "type": "array",
5136         "items" : {
5137             "type": "string",
5138             "maxLength": 64
5139         },
5140         "minItems" : 1,
5141         "description": "Resource Type of the Resource"
5142     },
5143     "if": {
5144         "type": "array",
5145         "items": {
5146             "type" : "string",
5147             "enum" : ["oic.if.baseline", "oic.if.ll", "oic.if.b", "oic.if.rw", "oic.if.r",
5148 "oic.if.a", "oic.if.s" ]
5149         },
5150         "minItems": 1,
5151         "description": "The interface set supported by this resource"
5152     },
5153     "di": {
5154         "allOf": [
5155             {
5156                 "$ref": "oic.types-schema.json#/definitions/uuid"
5157             },
5158             {
5159                 "description": "The device ID"
5160             }
5161         ]
5162     },
5163     "p": {
5164         "description": "Specifies the framework policies on the Resource referenced by the target
5165 URI",
5166         "type": "object",
5167         "properties": {
5168             "bm": {
5169                 "description": "Specifies the framework policies on the Resource referenced by the
5170 target URI for e.g. observable and discoverable",
5171                 "type": "integer"
5172             }
5173         },
5174         "required" : ["bm"]
5175     },
5176     "title": {
5177         "type": "string",
5178         "maxLength": 64,
5179         "description": "A title for the link relation. Can be used by the UI to provide a
5180 context."
5181     },
5182     "anchor": {
5183         "type": "string",
5184         "maxLength": 256,
5185         "description": "This is used to override the context URI e.g. override the URI of the
5186 containing collection.",
5187         "format": "uri"
5188     },
5189     "ins": {
5190         "type": "integer",
5191         "description": "The instance identifier for this web link in an array of web links - used
5192 in collections"
5193     },
5194     "type": {
5195         "type": "array",
5196         "description": "A hint at the representation of the resource referenced by the target
5197 URI. This represents the media types that are used for both accepting and emitting.",
5198         "items" : {
5199             "type": "string",
5200             "maxLength": 64
5201         },
5202         "minItems": 1,
5203         "default": "application/cbor"
5204     },

```

```

5205     "eps": {
5206         "type": "array",
5207         "description": "the Endpoint information of the target Resource",
5208         "items": {
5209             "type": "object",
5210             "properties": {
5211                 "ep": {
5212                     "type": "string",
5213                     "format": "uri",
5214                     "description": "Transport Protocol Suite + Endpoint Locator"
5215                 },
5216                 "pri": {
5217                     "type": "integer",
5218                     "minimum": 1,
5219                     "description": "The priority among multiple Endpoints"
5220                 }
5221             }
5222         }
5223     },
5224     "required": [ "href", "rt", "if" ]
5225 },
5226 },
5227 },
5228 "type": "object",
5229 "allOf": [
5230     { "$ref": "#/definitions/oic.oic-link" }
5231 ]
5232 }
5233

```

## 5234 **D.3 Device Configuration**

### 5235 **D.3.1 Introduction**

5236 Resource that allows for Device specific information to be configured.

### 5237 **D.3.2 Example URI**

5238 /exampleDeviceConfigurationResURI

### 5239 **D.3.3 Resource Type**

5240 The resource type (rt) is defined as: oic.wk.con.

### 5241 **D.3.4 RAML Definition**

```

5242 #%RAML 0.8
5243 title: OCF Configuration
5244 version: v1-20160622
5245 traits:
5246   - interface-rw :
5247       queryParameters:
5248           if:
5249               enum: ["oic.if.rw"]
5250   - interface-all :
5251       queryParameters:
5252           if:
5253               enum: ["oic.if.rw", "oic.if.baseline"]
5254
5255 /exampleDeviceConfigurationResURI:
5256     description: |
5257         Resource that allows for Device specific information to be configured.
5258
5259     get:
5260         description: |

```

```

5261         Retrieves the current Device configuration settings
5262
5263         is : ['interface-all']
5264         responses :
5265             200:
5266                 body:
5267                     application/json:
5268                         schema: /
5269                             {
5270                                 "id": "http://openconnectivityfoundation.github.io/core/schemas/oic.wk.con-
5271 schema.json#",
5272                                 "$schema": "http://json-schema.org/draft-04/schema#",
5273                                 "description": "Copyright (c) 2016, 2017 Open Connectivity Foundation, Inc. All
5274 rights reserved.",
5275                                 "definitions": {
5276                                     "oic.wk.con": {
5277                                         "type": "object",
5278                                         "properties": {
5279                                             "loc": {
5280                                                 "type": "array",
5281                                                 "description": "Location information (lat, long)",
5282                                                 "items": {
5283                                                     "type": "number"
5284                                                 },
5285                                                 "minItems": 2,
5286                                                 "maxItems": 2
5287                                             },
5288                                             "locn": {
5289                                                 "type": "string",
5290                                                 "maxLength": 64,
5291                                                 "description": "Human Friendly Name for location"
5292                                             },
5293                                             "c": {
5294                                                 "type": "string",
5295                                                 "maxLength": 64,
5296                                                 "description": "Currency"
5297                                             },
5298                                             "r": {
5299                                                 "type": "string",
5300                                                 "maxLength": 64,
5301                                                 "description": "Region"
5302                                             },
5303                                             "ln": {
5304                                                 "type": "array",
5305                                                 "items" :
5306                                                 {
5307                                                     "type": "object",
5308                                                     "properties": {
5309                                                         "language": {
5310                                                             "allOf": [
5311                                                                 {
5312                                                                     "$ref": "oic.types-schema.json#/definitions/language-tag"
5313                                                                 },
5314                                                                 {
5315                                                                     "description": "An RFC 5646 language tag."
5316                                                                 }
5317                                                             ]
5318                                                         },
5319                                                         "value": {
5320                                                             "type": "string",
5321                                                             "maxLength": 64,
5322                                                             "description": "The Device name in the indicated language."
5323                                                         }
5324                                                     }
5325                                                 },
5326                                             "minItems" : 1,
5327                                             "description": "Localized names"
5328                                         },

```

```

5329         "dl": {
5330             "allOf": [
5331                 {
5332                     "$ref": "oic.types-schema.json#/definitions/language-tag"
5333                 },
5334                 {
5335                     "description": "Default Language as an RFC 5646 language tag."
5336                 }
5337             ]
5338         }
5339     }
5340 }
5341 },
5342 "type": "object",
5343 "allOf": [
5344     { "$ref": "http://openconnectivityfoundation.github.io/core/schemas/oic.core-
5345 schema.json#/definitions/oic.core"},
5346     { "$ref": "#/definitions/oic.wk.con" }
5347 ],
5348 "required": ["n"]
5349 }
5350
5351 example: /
5352 {
5353     "n": "My Friendly Device Name",
5354     "rt": ["oic.wk.con"],
5355     "loc": [32.777,-96.797],
5356     "locn": "My Location Name",
5357     "c": "USD",
5358     "r": "MyRegion",
5359     "dl": "en"
5360 }
5361
5362 post:
5363     description: |
5364         Update the information about the Device
5365
5366     is: ['interface-rw']
5367     body:
5368         application/json:
5369             schema: /
5370                 {
5371                     "id": "http://openconnectivityfoundation.github.io/core/schemas/oic.wk.con-Update-
5372 schema.json#",
5373                     "$schema": "http://json-schema.org/draft-04/schema#",
5374                     "description": "Copyright (c) 2016 Open Connectivity Foundation, Inc. All rights
5375 reserved.",
5376                     "definitions": {
5377                         "oic.wk.con": {
5378                             "type": "object",
5379                             "anyOf": [
5380                                 {"required": ["loc"]},
5381                                 {"required": ["locn"]},
5382                                 {"required": ["c"]},
5383                                 {"required": ["r"]},
5384                                 {"required": ["ln"]},
5385                                 {"required": ["dl"]},
5386                                 {"required": ["n"]}
5387                             ],
5388                             "properties": {
5389                                 "loc": {
5390                                     "type": "array",
5391                                     "description": "Location information (lat, long)",
5392                                     "items": {
5393                                         "type": "number"
5394                                     },
5395                                     "minItems": 2,

```

```

5396         "maxItems": 2
5397     },
5398     "locn": {
5399         "type": "string",
5400         "maxLength": 64,
5401         "description": "Human Friendly Name for location"
5402     },
5403     "c": {
5404         "type": "string",
5405         "maxLength": 64,
5406         "description": "Currency"
5407     },
5408     "r": {
5409         "type": "string",
5410         "maxLength": 64,
5411         "description": "Region"
5412     },
5413     "ln": {
5414         "type": "array",
5415         "items": [
5416             {
5417                 "type": "object",
5418                 "properties": {
5419                     "language": {
5420                         "allOf": [
5421                             {
5422                                 "$ref": "oic.types-schema.json#/definitions/language-tag"
5423                             },
5424                             {
5425                                 "description": "An RFC 5646 language tag."
5426                             }
5427                         ]
5428                     },
5429                     "value": {
5430                         "type": "string",
5431                         "maxLength": 64,
5432                         "description": "The Device name in the indicated language."
5433                     }
5434                 }
5435             },
5436             "minItems": 1,
5437             "description": "Localized names"
5438         ],
5439         "dl": {
5440             "allOf": [
5441                 {
5442                     "$ref":
5443 "http://openconnectivityfoundation.github.io/core/schemas/oic.types-
5444 schema.json#/definitions/language-tag"
5445                 },
5446                 {
5447                     "description": "Default Language as an RFC 5646 language tag."
5448                 }
5449             ]
5450         }
5451     }
5452 }
5453 },
5454 "type": "object",
5455 "allOf": [
5456     { "$ref": "http://openconnectivityfoundation.github.io/core/schemas/oic.core-
5457 schema.rw.json#/definitions/oic.core"},
5458     { "$ref": "#/definitions/oic.wk.con" }
5459 ]
5460 }
5461
5462 example: /
5463 {
5464     "n": "Nuevo Nombre Amistoso",
5465     "r": "MyNewRegion",

```

```

5466         "ln": [ { "language": "es", "value": "Nuevo Nombre Amistoso" } ],
5467         "dl": "es"
5468     }
5469
5470     responses :
5471         200:
5472             body:
5473                 application/json:
5474                     schema: /
5475                         {
5476                             "id": "http://openconnectivityfoundation.github.io/core/schemas/oic.wk.con-Update-
5477 schema.json#",
5478                             "$schema": "http://json-schema.org/draft-04/schema#",
5479                             "description" : "Copyright (c) 2016 Open Connectivity Foundation, Inc. All rights
5480 reserved.",
5481                             "definitions": {
5482                                 "oic.wk.con": {
5483                                     "type": "object",
5484                                     "anyOf": [
5485                                         { "required": ["loc"] },
5486                                         { "required": ["locn"] },
5487                                         { "required": ["c"] },
5488                                         { "required": ["r"] },
5489                                         { "required": ["ln"] },
5490                                         { "required": ["dl"] },
5491                                         { "required": ["n"] }
5492                                     ],
5493                                     "properties": {
5494                                         "loc": {
5495                                             "type": "array",
5496                                             "description": "Location information (lat, long)",
5497                                             "items": {
5498                                                 "type": "number"
5499                                             },
5500                                             "minItems": 2,
5501                                             "maxItems": 2
5502                                         },
5503                                         "locn": {
5504                                             "type": "string",
5505                                             "maxLength": 64,
5506                                             "description": "Human Friendly Name for location"
5507                                         },
5508                                         "c": {
5509                                             "type": "string",
5510                                             "maxLength": 64,
5511                                             "description": "Currency"
5512                                         },
5513                                         "r": {
5514                                             "type": "string",
5515                                             "maxLength": 64,
5516                                             "description": "Region"
5517                                         },
5518                                         "ln": {
5519                                             "type": "array",
5520                                             "items" :
5521                                             {
5522                                                 "type": "object",
5523                                                 "properties": {
5524                                                     "language": {
5525                                                         "allof": [
5526                                                             {
5527                                                                 "$ref": "oic.types-schema.json#/definitions/language-tag"
5528                                                             },
5529                                                             {
5530                                                                 "description": "An RFC 5646 language tag."
5531                                                             }
5532                                                         ]
5533                                                     }
5534                                                 }
5535                                             }
5536                                         }
5537                                     }
5538                                 }
5539                             }
5540                         }

```

```

5534         "value": {
5535             "type": "string",
5536             "maxLength": 64,
5537             "description": "The Device name in the indicated language."
5538         }
5539     },
5540 },
5541 "minItems" : 1,
5542 "description": "Localized names"
5543 },
5544 "dl": {
5545     "allOf": [
5546         {
5547             "$ref":
5548 "http://openconnectivityfoundation.github.io/core/schemas/oic.types-
5549 schema.json#/definitions/language-tag"
5550         },
5551         {
5552             "description": "Default Language as an RFC 5646 language tag."
5553         }
5554     ]
5555 }
5556 }
5557 },
5558 "type": "object",
5559 "allOf": [
5560     { "$ref": "http://openconnectivityfoundation.github.io/core/schemas/oic.core-
5561 schema.rw.json#/definitions/oic.core"},
5562     { "$ref": "#/definitions/oic.wk.con" }
5563 ]
5564 }
5565 }
5566
5567 example: /
5568 {
5569     "n": "Nuevo Nombre Amistoso",
5570     "r": "MyNewRegion",
5571     "ln": [ { "language": "es", "value": "Nuevo Nombre Amistoso" } ],
5572     "dl": "es"
5573 }
5574

```

### 5575 D.3.5 Property Definition

5576 **Table 50 Device Configuration Property Definitions**

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
---	--------	--	--	--------

5577 **D.3.6 CRUDN behaviour**

5578 **Table 51 Device Configuration CRUDN operations**

Resource	Create	Read	Update	Delete	Notify
/exampleDeviceConfigurationResURI		get	post		

5579 **D.4 Platform Configuration**

5580 **D.4.1 Introduction**

5581 Resource that allows for platform specific information to be configured.

5582 **D.4.2 Example URI**

5583 /examplePlatformConfigurationResURI

5584 **D.4.3 Resource Type**

5585 The resource type (rt) is defined as: oic.wk.con.p.

5586 **D.4.4 RAML Definition**

```

5587 #%RAML 0.8
5588 title: OCF Platform Configuration
5589 version: v1-20160622
5590 traits:
5591   - interface-rw :
5592     queryParameters:
5593       if:
5594         enum: ["oic.if.rw"]
5595   - interface-all :
5596     queryParameters:
5597       if:
5598         enum: ["oic.if.rw", "oic.if.baseline"]
5599
5600 /examplePlatformConfigurationResURI:
5601   description: |
5602     Resource that allows for platform specific information to be configured.
5603
5604   get:
5605     description: |
5606       Retrieves the current platform configuration settings
5607
5608     is : ['interface-all']
5609     responses :
5610       200:
5611         body:
5612           application/json:
5613             schema: /
5614             {
5615               "id": "http://openconnectivityfoundation.github.io/core/schemas/oic.wk.con.p-
5616 schema.json#",
5617               "$schema": "http://json-schema.org/draft-04/schema#",
5618               "description" : "Copyright (c) 2017 Open Connectivity Foundation, Inc. All rights
5619 reserved.",
5620               "definitions": {
5621                 "oic.wk.con.p": {
5622                   "type": "object",
5623                   "properties": {

```

```

5624         "mnpn": {
5625             "type": "array",
5626             "items" :
5627                 {
5628                     "type": "object",
5629                     "properties": {
5630                         "language": {
5631                             "allof": [
5632                                 {
5633                                     "$ref":
5634 "http://openconnectivityfoundation.github.io/core/schemas/oic.types-
5635 schema.json#/definitions/language-tag"
5636                                 },
5637                                 {
5638                                     "description": "An RFC 5646 language tag."
5639                                 }
5640                             ]
5641                         },
5642                         "value": {
5643                             "type": "string",
5644                             "maxLength": 64,
5645                             "description": "The Platform description in the indicated
5646 language."
5647                         }
5648                     }
5649                 },
5650             "minItems" : 1,
5651             "description": "Platform names"
5652         }
5653     }
5654 }
5655 },
5656 "type": "object",
5657 "allof": [
5658     { "$ref": "http://openconnectivityfoundation.github.io/core/schemas/oic.core-
5659 schema.json#/definitions/oic.core"},
5660     { "$ref": "#/definitions/oic.wk.con.p" }
5661 ]
5662 }
5663
5664     example: /
5665     {
5666         "rt":  ["oic.wk.con.p"],
5667         "mnpn": [ { "language": "en", "value": "My Friendly Device Name" } ]
5668     }
5669
5670 post:
5671     description: |
5672     Update the information about the platform
5673
5674     is : ['interface-rw']
5675     body:
5676     application/json:
5677     schema: /
5678     {
5679         "id": "http://openconnectivityfoundation.github.io/core/schemas/oic.wk.con.p-Update-
5680 schema.json#",
5681         "$schema": "http://json-schema.org/draft-04/schema#",
5682         "description" : "Copyright (c) 2017 Open Connectivity Foundation, Inc. All rights
5683 reserved.",
5684         "definitions": {
5685             "oic.wk.con.p": {
5686                 "type": "object",
5687                 "properties": {
5688                     "mnpn": {
5689                         "type": "array",
5690

```

```

5691         {
5692             "type": "object",
5693             "properties": {
5694                 "language": {
5695                     "allOf": [
5696                         {
5697                             "$ref":
5698 "http://openconnectivityfoundation.github.io/core/schemas/oic.types-
5699 schema.json#/definitions/language-tag"
5700                         },
5701                         {
5702                             "description": "An RFC 5646 language tag."
5703                         }
5704                     ]
5705                 },
5706                 "value": {
5707                     "type": "string",
5708                     "maxLength": 64,
5709                     "description": "The Platform description in the indicated language."
5710                 }
5711             }
5712         },
5713         "minItems" : 1,
5714         "description": "Platform names"
5715     }
5716 }
5717 },
5718 },
5719 "type": "object",
5720 "allOf": [
5721     { "$ref": "http://openconnectivityfoundation.github.io/core/schemas/oic.core-
5722 schema.rw.json#/definitions/oic.core"},
5723     { "$ref": "#/definitions/oic.wk.con.p" }
5724 ],
5725 "required": ["mpn"]
5726 }
5727
5728 example: /
5729     {
5730         "n": "Nuevo nombre",
5731         "mpn": [ { "language": "es", "value": "Nuevo nombre de Plataforma Amigable" } ]
5732     }
5733
5734 responses :
5735     200:
5736         body:
5737             application/json:
5738                 schema: /
5739                 {
5740                 "id": "http://openconnectivityfoundation.github.io/core/schemas/oic.wk.con.p-
5741 Update-schema.json#",
5742                 "$schema": "http://json-schema.org/draft-04/schema#",
5743                 "description" : "Copyright (c) 2017 Open Connectivity Foundation, Inc. All rights
5744 reserved.",
5745                 "definitions": {
5746                     "oic.wk.con.p": {
5747                         "type": "object",
5748                         "properties": {
5749                             "mpn": {
5750                                 "type": "array",
5751                                 "items" :
5752                                 {
5753                                     "type": "object",
5754                                     "properties": {
5755                                         "language": {
5756                                             "allOf": [
5757

```

```

5758         "$ref":
5759 "http://openconnectivityfoundation.github.io/core/schemas/oic.types-
5760 schema.json#/definitions/language-tag"
5761     },
5762     {
5763         "description": "An RFC 5646 language tag."
5764     }
5765 ]
5766 },
5767 "value": {
5768     "type": "string",
5769     "maxLength": 64,
5770     "description": "The Platform description in the indicated
5771 language."
5772 }
5773 },
5774 },
5775     "minItems" : 1,
5776     "description": "Platform names"
5777 }
5778 }
5779 },
5780 },
5781 "type": "object",
5782 "allof": [
5783     { "$ref": "http://openconnectivityfoundation.github.io/core/schemas/oic.core-
5784 schema.rw.json#/definitions/oic.core"},
5785     { "$ref": "#/definitions/oic.wk.con.p" }
5786 ],
5787 "required": ["mnpn"]
5788 }
5789
5790 example: /
5791 {
5792     "n": "Nuevo nombre",
5793     "mnpn": [ { "language": "es", "value": "Nuevo nombre de Plataforma Amigable" } ]
5794 }
5795

```

#### D.4.5 Property Definition

**Table 52 Platform Configuration Property Definitions**

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			

#### D.4.6 CRUDN behaviour

**Table 53 Platform Configuration CRUDN operations**

Resource	Create	Read	Update	Delete	Notify
/examplePlatformConfigurationResURI		get	post		

### D.5 Device

#### D.5.1 Introduction

5802 Known resource that is hosted by every Server. Allows for logical device specific information to be  
5803 discovered.

## 5804 D.5.2 Wellknown URI

5805 /oic/d

## 5806 D.5.3 Resource Type

5807 The resource type (rt) is defined as: oic.wk.d.

## 5808 D.5.4 RAML Definition

5809 `##RAML 0.8`

5810 `title: OIC Root Device`

5811 `version: v1-20160622`

5812 `traits:`

5813 `- interface :`

5814  `queryParameters:`

5815  `if:`

5816  `enum: ["oic.if.r", "oic.if.baseline"]`

5817

5818 `/oic/d:`

5819  `description: |`

5820  `Known resource that is hosted by every Server.`

5821  `Allows for logical device specific information to be discovered.`

5822

5823  `is : ['interface']`

5824  `get:`

5825  `description: |`

5826  `Retrieve the information about the Device`

5827

5828  `responses :`

5829  `200:`

5830  `body:`

5831  `application/json:`

5832  `schema: /`

5833  `{`

5834  `"$schema": "http://json-schemas.org/draft-04/schema#",`

5835  `"description" : "Copyright (c) 2016, 2017 Open Connectivity Foundation, Inc. All`

5836 `rights reserved.",`

5837  `"id": "http://openconnectivityfoundation.github.io/core/schemas/oic.wk.d-`

5838 `schema.json#",`

5839  `"definitions": {`

5840  `"oic.wk.d": {`

5841  `"type": "object",`

5842  `"properties": {`

5843  `"di": {`

5844  `"allOf": [`

5845  `{`

5846  `"$ref":`

5847 `"http://openconnectivityfoundation.github.io/core/schemas/oic.types-schema.json#/definitions/uuid"`

5848  `},`

5849  `{`

5850  `"readOnly": true,`

5851  `"description": "Unique identifier for device"`

5852  `}  
5853  ]`

5854  `},`

5855  `"icv": {`

5856  `"type": "string",`

5857  `"maxLength": 64,`

5858  `"readOnly": true,`

5859  `"description": "The version of the OIC Server"`

5860  `},`

5861  `"dmv": {`

5862  `"type": "string",`

```

5863         "maxLength": 256,
5864         "readOnly": true,
5865         "description": "Spec versions of the Resource and Device Specifications to
5866 which this device data model is implemented"
5867     },
5868     "ld": {
5869         "type": "array",
5870         "items" :
5871         {
5872             "type": "object",
5873             "properties": {
5874                 "language": {
5875                     "allOf": [
5876                         {
5877                             "$ref":
5878 "http://openconnectivityfoundation.github.io/core/schemas/oic.types-
5879 schema.json#/definitions/language-tag"
5880                         },
5881                         {
5882                             "readOnly": true,
5883                             "description": "An RFC 5646 language tag."
5884                         }
5885                     ]
5886                 },
5887                 "value": {
5888                     "type": "string",
5889                     "maxLength": 64,
5890                     "readOnly": true,
5891                     "description": "Device description in the indicated language."
5892                 }
5893             }
5894         },
5895         "minItems" : 1,
5896         "readOnly": true,
5897         "description": "Localized Descriptions."
5898     },
5899     "sv": {
5900         "type": "string",
5901         "maxLength": 64,
5902         "readOnly": true,
5903         "description": "Software version."
5904     },
5905     "dmn": {
5906         "type": "array",
5907         "items" :
5908         {
5909             "type": "object",
5910             "properties": {
5911                 "language": {
5912                     "allOf": [
5913                         {
5914                             "$ref":
5915 "http://openconnectivityfoundation.github.io/core/schemas/oic.types-
5916 schema.json#/definitions/language-tag"
5917                         },
5918                         {
5919                             "readOnly": true,
5920                             "description": "An RFC 5646 language tag."
5921                         }
5922                     ]
5923                 },
5924                 "value": {
5925                     "type": "string",
5926                     "maxLength": 64,
5927                     "readOnly": true,
5928                     "description": "Manufacturer name in the indicated language."
5929                 }
5930             }
5931         },
5932         "minItems" : 1,
5933         "readOnly": true,

```

```

5934         "description": "Manufacturer Name."
5935     },
5936     "dmno": {
5937         "type": "string",
5938         "maxLength": 64,
5939         "readOnly": true,
5940         "description": "Model number as designated by manufacturer."
5941     },
5942     "piid": {
5943         "allOf": [
5944             {
5945                 "$ref":
5946 "http://openconnectivityfoundation.github.io/core/schemas/oic.types-schema.json#/definitions/uuid"
5947             },
5948             {
5949                 "readOnly": true,
5950                 "description": "Protocol independent unique identifier for device that
5951 is immutable."
5952             }
5953         ]
5954     }
5955 }
5956 }
5957 },
5958 "type": "object",
5959 "allOf": [
5960     { "$ref": "http://openconnectivityfoundation.github.io/core/schemas/oic.core-
5961 schema.json#/definitions/oic.core"},
5962     { "$ref": "#/definitions/oic.wk.d" }
5963 ],
5964 "required": [ "n", "di", "icv", "dmv", "piid" ]
5965 }
5966
5967 example: /
5968 {
5969     "n": "Device 1",
5970     "rt": [ "oic.wk.d" ],
5971     "di": "54919CA5-4101-4AE4-595B-353C51AA983C",
5972     "icv": "ocf.1.0.0",
5973     "dmv": "ocf.res.1.0.0, ocf.sh.1.0.0",
5974     "piid": "6F0AAC04-2BB0-468D-B57C-16570A26AE48"
5975 }
5976

```

## D.5.5 Property Definition

**Table 54 Device Property Definitions**

Property name	Value type	Mandatory	Access mode	Description
Id	array: see schema		Read Only	Localized Descriptions.
value (Id)	string		Read Only	Device description in the indicated language.
language (Id)	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

5979 **D.5.6 CRUDN behaviour**

5980 **Table 55 Device CRUDN operations**

Resource	Create	Read	Update	Delete	Notify
/oic/d		get			

5981 **D.6 Maintenance**

5982 **D.6.1 Introduction**

5983 The resource through which a Device is maintained and can be used for diagnostic purposes. fr  
5984 (Factory Reset) is a boolean. The value 0 means No action (Default), the value 1 means Start  
5985 Factory Reset After factory reset, this value shall be changed back to the default value rb (Reboot)  
5986 is a boolean. The value 0 means No action (Default), the value 1 means Start Reboot After Reboot,  
5987 this value shall be changed back to the default value

5988 **D.6.2 Wellknown URI**

5989 /oic/mnt

5990 **D.6.3 Resource Type**

5991 The resource type (rt) is defined as: oic.wk.mnt.

5992 **D.6.4 RAML Definition**

```
5993 #%RAML 0.8
5994 title: Maintenance
5995 version: v1-20180313
5996 traits:
5997   - interface-rw :
5998     queryParameters:
5999       if:
6000         enum: ["oic.if.rw", "oic.if.baseline"]
6001   - interface-all :
6002     queryParameters:
6003       if:
6004         enum: ["oic.if.rw", "oic.if.baseline"]
6005
6006 /oic/mnt:
```



```

6007     description: |
6008         The resource through which a Device is maintained and can be used for diagnostic purposes.
6009         fr (Factory Reset) is a boolean.
6010         The value 0 means No action (Default), the value 1 means Start Factory Reset
6011         After factory reset, this value shall be changed back to the default value
6012         rb (Reboot) is a boolean.
6013         The value 0 means No action (Default), the value 1 means Start Reboot
6014         After Reboot, this value shall be changed back to the default value
6015
6016     get:
6017         description: |
6018             Retrieve the maintenance action status
6019
6020     is : ['interface-all']
6021     responses :
6022         200:
6023             body:
6024                 application/json:
6025                     schema: /
6026                         {
6027                             "$schema": "http://json-schemas.org/draft-04/schema#",
6028                             "description" : "Copyright (c) 2016, 2017, 2018 Open Connectivity Foundation, Inc.
6029 All rights reserved.",
6030                             "id": "http://openconnectivityfoundation.github.io/core/schemas/oic.wk.mnt-
6031 schema.json#",
6032                             "definitions": {
6033                                 "oic.wk.mnt": {
6034                                     "type": "object",
6035                                     "anyOf": [
6036                                         {"required": ["fr"]},
6037                                         {"required": ["rb"]},
6038                                         {"required": ["err"]}
6039                                     ],
6040                                     "properties": {
6041                                         "fr": {
6042                                             "type": "boolean",
6043                                             "description": "Factory Reset"
6044                                         },
6045                                         "rb": {
6046                                             "type": "boolean",
6047                                             "description": "Reboot Action"
6048                                         },
6049                                         "err": {
6050                                             "type": "integer",
6051                                             "readOnly" : true,
6052                                             "description": "last HTTP occurred error",
6053                                             "minimum" : 399,
6054                                             "maximum" : 599
6055                                         }
6056                                     }
6057                                 }
6058                             },
6059                             "type": "object",
6060                             "allOf": [
6061                                 { "$ref": "http://openconnectivityfoundation.github.io/core/schemas/oic.core-
6062 schema.json#/definitions/oic.core" },
6063                                 { "$ref": "#/definitions/oic.wk.mnt" }
6064                             ]
6065                         }
6066
6067         example: /
6068             {
6069                 "rt":    ["oic.wk.mnt"],
6070                 "fr":    false,
6071                 "rb":    false,

```

```

6072         "err" : 503
6073     }
6074
6075     post:
6076         description: |
6077             Set the maintenance action(s)
6078
6079         is : ['interface-rw']
6080         body:
6081             application/json:
6082                 schema: /
6083                 {
6084                     "$schema": "http://json-schemas.org/draft-04/schema#",
6085                     "description" : "Copyright (c) 2016, 2018 Open Connectivity Foundation, Inc. All rights
6086 reserved.",
6087                     "id": "http://openconnectivityfoundation.github.io/core/schemas/oic.wk.mnt-
6088 schema.json#",
6089                     "definitions": {
6090                         "oic.wk.mnt-update": {
6091                             "type": "object",
6092                             "anyOf": [
6093                                 {"required": ["fr"]},
6094                                 {"required": ["rb"]}
6095                             ],
6096                             "properties": {
6097                                 "fr": {
6098                                     "type": "boolean",
6099                                     "description": "Factory Reset"
6100                                 },
6101                                 "rb": {
6102                                     "type": "boolean",
6103                                     "description": "Reboot Action"
6104                                 }
6105                             }
6106                         },
6107                     },
6108                     "type": "object",
6109                     "allOf": [
6110                         { "$ref": "http://openconnectivityfoundation.github.io/core/schemas/oic.core-
6111 schema.json#/definitions/oic.core"},
6112                         { "$ref": "#/definitions/oic.wk.mnt-update" }
6113                     ]
6114                 }
6115
6116         example: /
6117         {
6118             "fr": false,
6119             "rb": false
6120         }
6121
6122     responses :
6123         200:
6124             body:
6125                 application/json:
6126                     schema: /
6127                     {
6128                         "$schema": "http://json-schemas.org/draft-04/schema#",
6129                         "description" : "Copyright (c) 2016, 2017, 2018 Open Connectivity Foundation, Inc.
6130 All rights reserved.",
6131                         "id": "http://openconnectivityfoundation.github.io/core/schemas/oic.wk.mnt-
6132 schema.json#",
6133                         "definitions": {
6134                             "oic.wk.mnt": {
6135                                 "type": "object",

```

```

6136         "anyOf": [
6137             {"required": ["fr"]},
6138             {"required": ["rb"]},
6139             {"required": ["err"]}
6140         ],
6141         "properties": {
6142             "fr": {
6143                 "type": "boolean",
6144                 "description": "Factory Reset"
6145             },
6146             "rb": {
6147                 "type": "boolean",
6148                 "description": "Reboot Action"
6149             },
6150             "err": {
6151                 "type": "integer",
6152                 "readOnly" : true,
6153                 "description": "last HTTP occurred error",
6154                 "minimum" : 399,
6155                 "maximum" : 599
6156             }
6157         }
6158     },
6159     "type": "object",
6160     "allOf": [
6161         {"$ref": "http://openconnectivityfoundation.github.io/core/schemas/oic.core-
6162 schema.json#/definitions/oic.core"},
6163         {"$ref": "#/definitions/oic.wk.mnt" }
6164     ]
6165 }
6166
6167
6168     example: /
6169     {
6170         "fr": false,
6171         "rb": false
6172     }
6173

```

## 6174 D.6.5 Property Definition

6175 **Table 56 Maintenance Property Definitions**

Property name	Value type	Mandatory	Access mode	Description
fr	boolean	yes		Factory Reset
err	integer	yes	Read Only	last HTTP occurred error
rb	boolean	yes		Reboot Action

## 6176 D.6.6 CRUDN behaviour

6177 **Table 57 Maintenance CRUDN operations**

Resource	Create	Read	Update	Delete	Notify
/oic/mnt		get	post		

## 6178 D.7 Platform

### 6179 D.7.1 Introduction

6180 Known resource that is defines the platform on which an Server is hosted. Allows for platform  
6181 specific information to be discovered.

### 6182 D.7.2 Wellknown URI

6183 /oic/p

### 6184 D.7.3 Resource Type

6185 The resource type (rt) is defined as: oic.wk.p.

### 6186 D.7.4 RAML Definition

```
6187 #%RAML 0.8
6188 title: Platform
6189 version: v1-20160622
6190 traits:
6191   - interface :
6192     queryParameters:
6193       if:
6194         enum: ["oic.if.r", "oic.if.baseline"]
6195
6196 /oic/p:
6197   description: |
6198     Known resource that is defines the platform on which an Server is hosted.
6199     Allows for platform specific information to be discovered.
6200
6201   is : ['interface']
6202   get:
6203     description: |
6204       Retrieve the information about the Platform
6205
6206   responses :
6207     200:
6208       body:
6209         application/json:
6210           schema: |
6211             {
6212               "$schema": "http://json-schemas.org/draft-04/schema#",
6213               "description" : "Copyright (c) 2016, 2017 Open Connectivity Foundation, Inc. All
6214 rights reserved.",
6215               "id": "http://openconnectivityfoundation.github.io/core/schemas/oic.wk.p-
6216 schema.json#",
6217               "definitions": {
6218                 "oic.wk.p": {
6219                   "type": "object",
6220                   "properties": {
6221                     "pi": {
6222                       "allOf": [
6223                         {
6224                           "$ref":
6225 "http://openconnectivityfoundation.github.io/core/schemas/oic.types-schema.json#/definitions/uuid"
6226                         },
6227                         {
6228                           "readOnly": true,
6229                           "description": "Platform Identifier"
6230                         }
6231                       ]
6232                     },
6233                     "mnmn": {
6234                       "type": "string",
6235                       "readOnly": true,
6236                       "description": "Manufacturer Name",
6237                       "maxLength": 64
6238                     },
6239                     "mmml": {
6240                       "type": "string",
6241                       "readOnly": true,
6242                       "description": "Manufacturer's URL",
6243                       "maxLength": 256,
6244                       "format": "uri"
```

```

6245     },
6246     "mnmo": {
6247         "type": "string",
6248         "maxLength": 64,
6249         "readOnly": true,
6250         "description": "Model number as designated by the manufacturer"
6251     },
6252     "mnsel": {
6253         "type": "string",
6254         "maxLength": 64,
6255         "readOnly": true,
6256         "description": "Serial number as designated by the manufacturer"
6257     },
6258     "mndt": {
6259         "allof": [
6260             {
6261                 "$ref":
6262                 "http://openconnectivityfoundation.github.io/core/schemas/oic.types-schema.json#/definitions/date"
6263             },
6264             {
6265                 "readOnly": true,
6266                 "description": "Manufacturing Date."
6267             }
6268         ]
6269     },
6270     "mpv": {
6271         "type": "string",
6272         "maxLength": 64,
6273         "readOnly": true,
6274         "description": "Platform Version"
6275     },
6276     "mos": {
6277         "type": "string",
6278         "maxLength": 64,
6279         "readOnly": true,
6280         "description": "Platform Resident OS Version"
6281     },
6282     "mnhw": {
6283         "type": "string",
6284         "maxLength": 64,
6285         "readOnly": true,
6286         "description": "Platform Hardware Version"
6287     },
6288     "mfv": {
6289         "type": "string",
6290         "maxLength": 64,
6291         "readOnly": true,
6292         "description": "Manufacturer's firmware version"
6293     },
6294     "msl": {
6295         "type": "string",
6296         "readOnly": true,
6297         "description": "Manufacturer's Support Information URL",
6298         "maxLength": 256,
6299         "format": "uri"
6300     },
6301     "st": {
6302         "type": "string",
6303         "readOnly": true,
6304         "description": "The date-time format pattern according to IETF RFC 3339.",
6305         "format": "date-time"
6306     },
6307     "vid": {
6308         "type": "string",
6309         "maxLength": 64,
6310         "readOnly": true,
6311         "description": "Manufacturer's defined information for the platform. The
6312 content is freeform, with population rules up to the manufacturer"
6313     }
6314 }
6315 }

```

```

6316     },
6317     "type": "object",
6318     "allof": [
6319       { "$ref": "http://openconnectivityfoundation.github.io/core/schemas/oic.core-
6320 schema.json#/definitions/oic.core"},
6321       { "$ref": "#/definitions/oic.wk.p" }
6322     ],
6323     "required": [ "pi", "mnmn" ]
6324   }
6325
6326   example: /
6327   {
6328     "pi": "54919CA5-4101-4AE4-595B-353C51AA983C",
6329     "rt": ["oic.wk.p"],
6330     "mnmn": "Acme, Inc"
6331   }
6332

```

## D.7.5 Property Definition

Table 58 Platform Property Definitions

Property name	Value type	Mandatory	Access mode	Description
mnfv	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
mndt	multiple types: see schema			
st	string		Read Only	The date-time format pattern according to IETF RFC 3339.
mnsi	string		Read Only	Manufacturer's Support Information URL
mpv	string		Read Only	Platform Version
pi	multiple types: see schema	yes		
mnhw	string		Read Only	Platform Hardware Version

mnsel	string		Read Only	Serial number as designated by the manufacturer
-------	--------	--	-----------	---

6335 **D.7.6 CRUDN behaviour**

6336 **Table 59 Platform CRUDN operations**

Resource	Create	Read	Update	Delete	Notify
/oic/p		get			

6337 **D.8 Discoverable Resources Baseline Interface**

6338 **D.8.1 Introduction**

6339 Baseline representation of /oic/res; list of discoverable resources

6340 **D.8.2 Wellknown URI**

6341 /oic/res

6342 **D.8.3 Resource Type**

6343 The resource type (rt) is defined as: oic.wk.res.

6344 **D.8.4 RAML Definition**

```

6345 #%RAML 0.8
6346 title: Discoverable Resources
6347 version: v1-20160622
6348 traits:
6349   - interface-11 :
6350     queryParameters:
6351       if:
6352         enum: ["oic.if.11"]
6353   - interface-baseline :
6354     queryParameters:
6355       if:
6356         enum: ["oic.if.baseline"]
6357   - interface-all :
6358     queryParameters:
6359       if:
6360         enum: ["oic.if.11", "oic.if.baseline"]
6361
6362 /oic/res?if=oic.if.baseline:
6363   description: |
6364     Baseline representation of /oic/res; list of discoverable resources
6365
6366   is : ['interface-baseline']
6367   get:
6368     description: |
6369       Retrieve the discoverable resource set, baseline interface
6370
6371   responses :
6372     200:
6373       body:
6374         application/json:
6375           schema: /
6376           {
6377             "$schema": "http://json-schema.org/draft-v4/schema#",

```

```

6378         "description" : "Copyright (c) 2016-2018 Open Connectivity Foundation, Inc. All
6379 rights reserved.",
6380         "id": "http://openconnectivityfoundation.github.io/core/schemas/oic.wk.res-
6381 schema.json#",
6382         "definitions": {
6383             "oic.res-baseline": {
6384                 "type": "object",
6385                 "properties": {
6386                     "rt": {
6387                         "type": "array",
6388                         "items" : {
6389                             "type" : "string",
6390                             "maxLength": 64
6391                         },
6392                     "minItems" : 1,
6393                     "readOnly": true,
6394                     "description": "Resource Type of the Resource"
6395                 },
6396                 "if": {
6397                     "type": "array",
6398                     "items": {
6399                         "type" : "string",
6400                         "enum" : ["oic.if.baseline", "oic.if.ll"]
6401                     },
6402                     "minItems": 1,
6403                     "readOnly": true,
6404                     "description": "The interface set supported by this resource"
6405                 },
6406                 "n": {
6407                     "type": "string",
6408                     "maxLength": 64,
6409                     "readOnly": true,
6410                     "description": "Human friendly name"
6411                 },
6412                 "links": {
6413                     "type": "array",
6414                     "items": {
6415                         "$ref":
6416 "http://openconnectivityfoundation.github.io/core/schemas/oic.collection-
6417 schema.json#/definitions/oic.oic-link"
6418                     }
6419                 }
6420             },
6421             "required": ["rt", "if", "links"]
6422         }
6423     },
6424     "description": "The list of resources expressed as Links",
6425     "type": "array",
6426     "items": {
6427         "$ref": "#/definitions/oic.res-baseline"
6428     }
6429 }
6430
6431 example: /
6432 [
6433     {
6434         "rt": ["oic.wk.res"],
6435         "if": ["oic.if.baseline", "oic.if.ll" ],
6436         "links":
6437         [
6438             {
6439                 "href": "/humidity",
6440                 "rt": ["oic.r.humidity"],
6441                 "if": ["oic.if.s"],
6442                 "p": {"bm": 3},
6443                 "eps": [
6444                     {"ep": "coaps://[fe80::b1d6]:1111", "pri": 2},
6445                     {"ep": "coaps://[fe80::b1d6]:1122"},
6446                     {"ep": "coap+tcp://[2001:db8:a::123]:2222", "pri": 3}
6447                 ]
6448             }
6449         ]
6450     }
6451 ]

```



```

6448     },
6449     {
6450       "href": "/temperature",
6451       "rt": ["oic.r.temperature"],
6452       "if": ["oic.if.s"],
6453       "p": {"bm": 3},
6454       "eps": [
6455         {"ep": "coaps://[[2001:db8:a::123]:2222"}
6456       ]
6457     }
6458   ]
6459 }
6460 ]
6461

```

## D.8.5 Property Definition

**Table 60 Discoverable Resources Baseline Interface Property Definitions**

Property name	Value type	Mandatory	Access mode	Description
rt	array: see schema	yes	Read Only	Resource Type of the Resource
n	string		Read Only	Human friendly name
links	array: see schema	yes		
if	array: see schema	yes	Read Only	The interface set supported by this resource

## D.8.6 CRUDN behaviour

**Table 61 Discoverable Resources Baseline Interface CRUDN operations**

Resource	Create	Read	Update	Delete	Notify
/oic/res		get			

## D.9 Discoverable Resources Link List interface

### D.9.1 Introduction

Link list representation of /oic/res; list of discoverable resources

### D.9.2 Wellknown URI

/oic/res

### D.9.3 Resource Type

The resource type (rt) is defined as: oic.wk.res.

### D.9.4 RAML Definition

```

6474 #%RAML 0.8
6475 title: Discoverable Resources
6476 version: v1-20160622
6477 traits:
6478   - interface-ll :
6479     queryParameters:
6480       if:
6481         enum: ["oic.if.ll"]
6482   - interface-baseline :
6483     queryParameters:
6484       if:
6485         enum: ["oic.if.baseline"]

```

```

6486 - interface-all :
6487   queryParameters:
6488     if:
6489       enum: ["oic.if.ll", "oic.if.baseline"]
6490
6491 /oic/res?if=oic.if.ll:
6492   description: |
6493     Link list representation of /oic/res; list of discoverable resources
6494
6495   is : ['interface-ll']
6496   get:
6497     description: |
6498       Retrieve the discoverable resource set, link list interface
6499
6500   responses :
6501     200:
6502       body:
6503         application/json:
6504           schema: /
6505             {
6506               "$schema": "http://json-schema.org/draft-v4/schema#",
6507               "description" : "Copyright (c) 2016-2018 Open Connectivity Foundation, Inc. All
rights reserved.",
6508               "id": "http://openconnectivityfoundation.github.io/core/schemas/oic.wk.res-schema-
6509 ll.json#",
6510               "description": "The list of resources expressed as Links",
6511               "type": "array",
6512               "items": {
6513                 "$ref": "http://openconnectivityfoundation.github.io/core/schemas/oic.collection-
6514 schema.json#/definitions/oic.oic-link"
6515               }
6516             }
6517
6518           example: /
6519             [
6520               {
6521                 "href": "/humidity",
6522                 "rt": ["oic.r.humidity"],
6523                 "if": ["oic.if.s"],
6524                 "p": {"bm": 3},
6525                 "eps": [
6526                   {"ep": "coaps://[fe80::bld6]:1111", "pri": 2},
6527                   {"ep": "coaps://[fe80::bld6]:1122"},
6528                   {"ep": "coaps+tcp://[2001:db8:a::123]:2222", "pri": 3}
6529                 ]
6530               },
6531               {
6532                 "href": "/temperature",
6533                 "rt": ["oic.r.temperature"],
6534                 "if": ["oic.if.s"],
6535                 "p": {"bm": 3},
6536                 "eps": [
6537                   {"ep": "coaps://[[2001:db8:a::123]:2222"}
6538                 ]
6539               }
6540             ]
6541
6542

```

## 6543 D.9.5 Property Definition

6544 Table 62 Discoverable Resources Link List interface Property Definitions

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

6545 **D.9.6 CRUDN behaviour**

6546 **Table 63 Discoverable Resources Link List interface CRUDN operations**

Resource	Create	Read	Update	Delete	Notify
/oic/res		get			

6547 **D.9.7 Referenced JSON schemas**

6548 **D.9.8 oic.oic-link-schema.json**

```

6549 {
6550   "$schema": "http://json-schema.org/draft-04/schema#",
6551   "description": "Copyright (c) 2016, 2017 Open Connectivity Foundation, Inc. All rights
6552 reserved.",
6553   "id": "http://openconnectivityfoundation.github.io/core/schemas/oic.oic-link-schema.json#",
6554   "definitions": {
6555     "oic.oic-link": {
6556       "type": "object",
6557       "properties": {
6558         "href": {
6559           "type": "string",
6560           "maxLength": 256,
6561           "description": "This is the target URI, it can be specified as a Relative Reference or
6562 fully-qualified URI.",
6563           "format": "uri"
6564         },
6565         "rel": {
6566           "oneOf": [
6567             {
6568               "type": "array",
6569               "items": {
6570                 "type": "string",
6571                 "maxLength": 64
6572               },
6573               "minItems": 1,
6574               "default": ["hosts"]
6575             },
6576             {
6577               "type": "string",
6578               "maxLength": 64,
6579               "default": "hosts"
6580             }
6581           ],
6582           "description": "The relation of the target URI referenced by the link to the context URI"
6583         },
6584         "rt": {
6585           "type": "array",
6586           "items": {
6587             "type": "string",
6588             "maxLength": 64

```

```

6589         },
6590         "minItems" : 1,
6591         "description": "Resource Type of the Resource"
6592     },
6593     "if": {
6594         "type": "array",
6595         "items": {
6596             "type" : "string",
6597             "enum" : ["oic.if.baseline", "oic.if.ll", "oic.if.b", "oic.if.rw", "oic.if.r",
6598 "oic.if.a", "oic.if.s" ]
6599         },
6600         "minItems": 1,
6601         "description": "The interface set supported by this resource"
6602     },
6603     "di": {
6604         "allOf": [
6605             {
6606                 "$ref": "oic.types-schema.json#/definitions/uuid"
6607             },
6608             {
6609                 "description": "The device ID"
6610             }
6611         ]
6612     },
6613     "p": {
6614         "description": "Specifies the framework policies on the Resource referenced by the target
6615 URI",
6616         "type": "object",
6617         "properties": {
6618             "bm": {
6619                 "description": "Specifies the framework policies on the Resource referenced by the
6620 target URI for e.g. observable and discoverable",
6621                 "type": "integer"
6622             }
6623         },
6624         "required" : ["bm"]
6625     },
6626     "title": {
6627         "type": "string",
6628         "maxLength": 64,
6629         "description": "A title for the link relation. Can be used by the UI to provide a
6630 context."
6631     },
6632     "anchor": {
6633         "type": "string",
6634         "maxLength": 256,
6635         "description": "This is used to override the context URI e.g. override the URI of the
6636 containing collection.",
6637         "format": "uri"
6638     },
6639     "ins": {
6640         "type": "integer",
6641         "description": "The instance identifier for this web link in an array of web links - used
6642 in collections"
6643     },
6644     "type": {
6645         "type": "array",
6646         "description": "A hint at the representation of the resource referenced by the target
6647 URI. This represents the media types that are used for both accepting and emitting.",
6648         "items" : {
6649             "type": "string",
6650             "maxLength": 64
6651         },
6652         "minItems": 1,
6653         "default": "application/cbor"
6654     },
6655     "eps": {
6656         "type": "array",
6657         "description": "the Endpoint information of the target Resource",
6658         "items": {
6659             "type": "object",

```

```

6660         "properties": {
6661             "ep": {
6662                 "type": "string",
6663                 "format": "uri",
6664                 "description": "Transport Protocol Suite + Endpoint Locator"
6665             },
6666             "pri": {
6667                 "type": "integer",
6668                 "minimum": 1,
6669                 "description": "The priority among multiple Endpoints"
6670             }
6671         }
6672     }
6673 }
6674 },
6675 "required": [ "href", "rt", "if" ]
6676 }
6677 },
6678 "type": "object",
6679 "allOf": [
6680     { "$ref": "#/definitions/oic.oic-link" }
6681 ]
6682 }
6683

```

## 6684 **D.10 Scenes (Top level)**

### 6685 **D.10.1 Introduction**

6686 Toplevel Scene resource. This resource is a generic collection resource. The rts value shall contain  
6687 oic.wk.scenecollection resource types.

### 6688 **D.10.2 Example URI**

6689 /SceneListResURI

### 6690 **D.10.3 Resource Type**

6691 The resource type (rt) is defined as: oic.wk.scenelist.

### 6692 **D.10.4 RAML Definition**

```

6693 #%RAML 0.8
6694 title: Scene
6695 version: v1-20160622
6696 traits:
6697   - interface-update :
6698       queryParameters:
6699           if:
6700               enum: ["oic.if.a"]
6701   - interface-baseline :
6702       queryParameters:
6703           if:
6704               enum: ["oic.if.baseline"]
6705   - interface-all :
6706       queryParameters:
6707           if:
6708               enum: ["oic.if.a", "oic.if.ll", "oic.if.baseline"]
6709
6710 /SceneListResURI:
6711   description: |
6712     Toplevel Scene resource.
6713     This resource is a generic collection resource.
6714     The rts value shall contain oic.wk.scenecollection resource types.
6715

```

```

6716     is : ['interface-baseline']
6717     get:
6718         description: |
6719             Provides the current list of web links pointing to scenes
6720
6721     responses :
6722         200:
6723             body:
6724                 application/json:
6725                     schema: /
6726
6727                     {
6728                         "$schema": "http://json-schema.org/draft-04/schema#",
6729                         "description" : "Copyright (c) 2016,2018 Open Connectivity Foundation, Inc. All
rights reserved.",
6730                         "id": "http://openconnectivityfoundation.github.io/core/schemas/oic.collection-
6731 schema.json#",
6732                         "title": "Collection",
6733                         "definitions": {
6734                             "oic.oic-link": {
6735                                 "type": "object",
6736                                 "properties": {
6737                                     "href": {
6738                                         "type": "string",
6739                                         "maxLength": 256,
6740                                         "description": "This is the target URI, it can be specified as a Relative
6741 Reference or fully-qualified URI.",
6742                                         "format": "uri"
6743                                     },
6744                                     "rel": {
6745                                         "oneOf": [
6746                                             {
6747                                                 "type": "array",
6748                                                 "items": {
6749                                                     "type": "string",
6750                                                     "maxLength": 64
6751                                                 },
6752                                                 "minItems": 1,
6753                                                 "default": ["hosts"]
6754                                             },
6755                                             {
6756                                                 "type": "string",
6757                                                 "maxLength": 64,
6758                                                 "default": "hosts"
6759                                             }
6760                                         ],
6761                                         "description": "The relation of the target URI referenced by the link to
6762 the context URI"
6763                                     },
6764                                     "rt": {
6765                                         "type": "array",
6766                                         "items" : {
6767                                             "type" : "string",
6768                                             "maxLength": 64
6769                                         },
6770                                         "minItems" : 1,
6771                                         "description": "Resource Type of the Resource"
6772                                     },
6773                                     "if": {
6774                                         "type": "array",
6775                                         "items": {
6776                                             "type": "string",
6777                                             "enum": ["oic.if.baseline", "oic.if.ll", "oic.if.b", "oic.if.rw",
6778 "oic.if.r", "oic.if.a", "oic.if.s"]
6779                                         },
6780                                         "minItems": 1,
6781                                         "description": "The interface set supported by this resource"
6782                                     }
6783                                 }
6784                             }
6785                         }
6786                     }

```

```

6783         "di": {
6784             "description": "The Device ID formatted according to IETF RFC 4122.",
6785             "type": "string",
6786             "pattern": "^[a-fA-F0-9]{8}-[a-fA-F0-9]{4}-[a-fA-F0-9]{4}-[a-fA-F0-9]{4}-
6787 [a-fA-F0-9]{12}$"
6788         },
6789         "p": {
6790             "description": "Specifies the framework policies on the Resource referenced
6791 by the target URI",
6792             "type": "object",
6793             "properties": {
6794                 "bm": {
6795                     "description": "Specifies the framework policies on the Resource
6796 referenced by the target URI for e.g. observable and discoverable",
6797                     "type": "integer"
6798                 },
6799             },
6800             "required" : ["bm"]
6801         },
6802         "title": {
6803             "type": "string",
6804             "maxLength": 64,
6805             "description": "A title for the link relation. Can be used by the UI to
6806 provide a context."
6807         },
6808         "anchor": {
6809             "type": "string",
6810             "maxLength": 256,
6811             "description": "This is used to override the context URI e.g. override the
6812 URI of the containing collection.",
6813             "format": "uri"
6814         },
6815         "ins": {
6816             "type": "integer",
6817             "description": "The instance identifier for this web link in an array of
6818 web links - used in collections"
6819         },
6820         "type": {
6821             "type": "array",
6822             "description": "A hint at the representation of the resource referenced by
6823 the target URI. This represents the media types that are used for both accepting and emitting.",
6824             "items" : {
6825                 "type": "string",
6826                 "maxLength": 64
6827             },
6828             "minItems": 1,
6829             "default": "application/cbor"
6830         },
6831         "eps": {
6832             "type": "array",
6833             "description": "the Endpoint information of the target Resource",
6834             "items": {
6835                 "type": "object",
6836                 "properties": {
6837                     "ep": {
6838                         "type": "string",
6839                         "format": "uri",
6840                         "description": "Transport Protocol Suite + Endpoint Locator"
6841                     },
6842                     "pri": {
6843                         "type": "integer",
6844                         "minimum": 1,
6845                         "description": "The priority among multiple Endpoints"
6846                     }
6847                 }
6848             }
6849         },
6850     },
6851     "required": [ "href", "rt", "if" ]
6852 },
6853 "oic.collection.links.arrayoflinks": {

```



```

6854         "properties": {
6855             "links": {
6856                 "description": "A set of simple or individual OIC Links.",
6857                 "type": "array",
6858                 "items": {
6859                     "type": "object",
6860                     "properties": {
6861                         "href": {
6862                             "type": "string",
6863                             "maxLength": 256,
6864                             "description": "This is the target URI, it can be specified as a
6865 Relative Reference or fully-qualified URI.",
6866                             "format": "uri"
6867                         },
6868                         "rel": {
6869                             "oneOf": [
6870                                 {
6871                                     "type": "array",
6872                                     "items": {
6873                                         "type": "string",
6874                                         "maxLength": 64
6875                                     },
6876                                     "minItems": 1,
6877                                     "default": ["hosts"]
6878                                 },
6879                                 {
6880                                     "type": "string",
6881                                     "maxLength": 64,
6882                                     "default": "hosts"
6883                                 }
6884                             ],
6885                             "description": "The relation of the target URI referenced by the link
6886 to the context URI"
6887                         },
6888                         "rt": {
6889                             "type": "array",
6890                             "items": {
6891                                 "type": "string",
6892                                 "maxLength": 64
6893                             },
6894                             "minItems": 1,
6895                             "description": "Resource Type of the Resource"
6896                         },
6897                         "if": {
6898                             "type": "array",
6899                             "items": {
6900                                 "type": "string",
6901                                 "enum": ["oic.if.baseline", "oic.if.ll", "oic.if.b", "oic.if.rw",
6902 "oic.if.r", "oic.if.a", "oic.if.s"]
6903                             },
6904                             "minItems": 1,
6905                             "description": "The interface set supported by this resource"
6906                         },
6907                         "di": {
6908                             "description": "The Device ID formatted according to IETF RFC 4122.",
6909                             "type": "string",
6910                             "pattern": "^[a-fA-F0-9]{8}-[a-fA-F0-9]{4}-[a-fA-F0-9]{4}-[a-fA-F0-
6911 9]{4}-[a-fA-F0-9]{12}$"
6912                         },
6913                         "p": {
6914                             "description": "Specifies the framework policies on the Resource
6915 referenced by the target URI",
6916                             "type": "object",
6917                             "properties": {
6918                                 "bm": {
6919                                     "description": "Specifies the framework policies on the Resource
6920 referenced by the target URI for e.g. observable and discoverable",
6921                                     "type": "integer"
6922                                 }
6923                             },
6924                             "required": ["bm"]

```

```

6925         },
6926         "title": {
6927             "type": "string",
6928             "maxLength": 64,
6929             "description": "A title for the link relation. Can be used by the UI
6930 to provide a context."
6931         },
6932         "anchor": {
6933             "type": "string",
6934             "maxLength": 256,
6935             "description": "This is used to override the context URI e.g.
6936 override the URI of the containing collection.",
6937             "format": "uri"
6938         },
6939         "ins": {
6940             "type": "integer",
6941             "description": "The instance identifier for this web link in an array
6942 of web links - used in collections"
6943         },
6944         "type": {
6945             "type": "array",
6946             "description": "A hint at the representation of the resource
6947 referenced by the target URI. This represents the media types that are used for both accepting and
6948 emitting.",
6949             "items": {
6950                 "type": "string",
6951                 "maxLength": 64
6952             },
6953             "minItems": 1,
6954             "default": "application/cbor"
6955         },
6956         "eps": {
6957             "type": "array",
6958             "description": "the Endpoint information of the target Resource",
6959             "items": {
6960                 "type": "object",
6961                 "properties": {
6962                     "ep": {
6963                         "type": "string",
6964                         "format": "uri",
6965                         "description": "Transport Protocol Suite + Endpoint Locator"
6966                     },
6967                     "pri": {
6968                         "type": "integer",
6969                         "minimum": 1,
6970                         "description": "The priority among multiple Endpoints"
6971                     }
6972                 }
6973             }
6974         },
6975         "required": [ "href", "rt", "if" ]
6976     }
6977 }
6978 }
6979 },
6980 },
6981 "oic.core": {
6982     "type": "object",
6983     "properties": {
6984         "rt": {
6985             "type": "array",
6986             "items": {
6987                 "type": "string",
6988                 "maxLength": 64
6989             },
6990             "minItems": 1,
6991             "readOnly": true,
6992             "description": "Resource Type of the Resource"
6993         }
6994     }
6995 },

```

```

6996         "uuid": {
6997             "description": "Format pattern according to IETF RFC 4122.",
6998             "type": "string",
6999             "pattern": "^[a-fA-F0-9]{8}-[a-fA-F0-9]{4}-[a-fA-F0-9]{4}-[a-fA-F0-9]{4}-[a-fA-
7000 F0-9]{12}$"
7001         },
7002         "oic.collection.links": {
7003             "properties": {
7004                 "links": {
7005                     "description": "A set of simple or individual OIC Links.",
7006                     "type": "array",
7007                     "items": {
7008                         "$ref": "#/definitions/oic.oic-link"
7009                     }
7010                 }
7011             }
7012         },
7013         "oic.collection.properties": {
7014             "type": "object",
7015             "description": "A collection is a set of links along with additional properties
7016 to describe the collection itself",
7017             "properties": {
7018                 "rts": {
7019                     "$ref": "#/definitions/oic.core/properties/rt",
7020                     "description": "The list of allowable resource types (for Target and
7021 anchors) in links included in the collection"
7022                 },
7023                 "rts-m": {
7024                     "$ref": "#/definitions/oic.core/properties/rt",
7025                     "description": "The list of mandatory resources if any in links included in
7026 the collection"
7027                 }
7028             }
7029         },
7030     },
7031     "type": "object",
7032     "allOf": [
7033         {"$ref": "http://openconnectivityfoundation.github.io/core/schemas/oic.core-
7034 schema.json#/definitions/oic.core"},
7035         {"$ref": "#/definitions/oic.collection.properties"},
7036         {"$ref": "#/definitions/oic.collection.links"}
7037     ]
7038 }
7039
7040 example: /
7041 {
7042     "rt":         ["oic.wk.scenelist"],
7043     "n":         "list of scene Collections",
7044     "rts":       ["oic.wk.scenecollection"],
7045     "links":    [
7046     ]
7047 }
7048

```

## D.10.5 Property Definition

**Table 64 Scenes (Top level) Property Definitions**

Property name	Value type	Mandatory	Access mode	Description
links	array: see schema			A set of simple or individual OIC Links.
rt (links)	array: see schema	yes		Resource Type of the Resource
di (links)	string			The Device ID formatted

				according to IETF RFC 4122.
title (links)	string			A title for the link relation. Can be used by the UI to provide a context.
eps (links)	array: see schema			the Endpoint information of the target Resource
ins (links)	integer			The instance identifier for this web link in an array of web links - used in collections
p (links)	object: see schema			Specifies the framework policies on the Resource referenced by the target URI
href (links)	string	yes		This is the target URI, it can be specified as a Relative Reference or fully-qualified URI.
rel (links)	multiple types: see schema			The relation of the target URI referenced by the link to the context URI
type (links)	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 (links)	string			This is used to override the context URI e.g. override the URI of the containing collection.
if (links)	array: see schema	yes		The interface set supported by this resource

7051 **D.10.6 CRUDN behaviour**

7052 **Table 65 Scenes (Top level) CRUDN operations**

Resource	Create	Read	Update	Delete	Notify
/SceneListResURI		get			

7053 **D.11 Scene Collections**

7054 **D.11.1 Introduction**

7055 Collection that models a set of Scenes. This resource is a generic collection resource with  
 7056 additional parameters. The rts value shall contain oic.scenemember resource types. The additional  
 7057 parameters are lastScene, this is the scene value last set by any OCF Client sceneValues, this  
 7058 is the list of available scenes lastScene shall be listed in sceneValues.

7059 **D.11.2 Example URI**

7060 /SceneCollectionResURI

7061 **D.11.3 Resource Type**

7062 The resource type (rt) is defined as: oic.wk.scenecollection.

7063 **D.11.4 RAML Definition**

```

7064 #%RAML 0.8
7065 title: Scene
7066 version: v1-20160622
7067 traits:
7068   - interface-update :
7069     queryParameters:
7070       if:
7071         enum: ["oic.if.a"]
7072   - interface-baseline :
7073     queryParameters:
7074       if:
7075         enum: ["oic.if.baseline"]
7076   - interface-all :
7077     queryParameters:
7078       if:
7079         enum: ["oic.if.a", "oic.if.ll", "oic.if.baseline"]
7080
7081 /SceneCollectionResURI:
7082   description: |
7083     Collection that models a set of Scenes.
7084     This resource is a generic collection resource with additional parameters.
7085     The rts value shall contain oic.scenemember resource types.
7086     The additional parameters are
7087     lastScene, this is the scene value last set by any OCF Client
7088     sceneValues, this is the list of available scenes
7089     lastScene shall be listed in sceneValues.
7090
7091   get:
7092     description: |
7093       Provides the current list of web links pointing to scenes
7094
7095     is : ['interface-baseline']
7096     responses :
7097       200:
7098         body:
  
```

```

7099     application/json:
7100         schema: /
7101             {
7102                 "$schema": "http://json-schema.org/draft-04/schema#",
7103                 "description" : "Copyright (c) 2016-2018 Open Connectivity Foundation, Inc. All
7104 rights reserved.",
7105                 "id":
7106 "http://openconnectivityfoundation.github.io/core/schemas/oic.sceneCollection-schema.json#",
7107                 "title" : "Scene Collection",
7108                 "definitions": {
7109                     "oic.sceneCollection": {
7110                         "type": "object",
7111                         "properties": {
7112                             "lastScene": {
7113                                 "type": "string",
7114                                 "description": "Last selected Scene from the set of sceneValues"
7115                             },
7116                             "sceneValues": {
7117                                 "type": "array",
7118                                 "readOnly": true,
7119                                 "description": "All available scene values",
7120                                 "items": {
7121                                     "type": "string"
7122                                 }
7123                             }
7124                         },
7125                         "required": [ "lastScene","sceneValues","rts","id" ]
7126                     }
7127                 },
7128                 "type": "object",
7129                 "allOf" : [
7130                     { "$ref": "http://openconnectivityfoundation.github.io/core/schemas/oic.core-
7131 schema.json#/definitions/oic.core" },
7132                     { "$ref":
7133 "http://openconnectivityfoundation.github.io/core/schemas/oic.collection-
7134 schema.json#/definitions/oic.collection.properties"},
7135                     { "$ref":
7136 "http://openconnectivityfoundation.github.io/core/schemas/oic.collection-
7137 schema.json#/definitions/oic.collection.links.arrayoflinks"},
7138                     { "$ref": "#/definitions/oic.sceneCollection" }
7139                 ]
7140             }
7141
7142         example: /
7143             {
7144                 "lastScene": "off",
7145                 "sceneValues": ["off","Reading","TVWatching"],
7146                 "rt": ["oic.wk.scenecollection"],
7147                 "n": "My Scenes for my living room",
7148                 "id": "0685B960-736F-46F7-BEC0-9E6CBD671ADC1",
7149                 "rts": ["oic.wk.scenemember"],
7150                 "links": [
7151                     ]
7152             }
7153
7154     post:
7155         description: |
7156             Provides the action to change the last set scene selection.
7157             Calling this method shall update all scene members to the prescribed membervalue.
7158             When this method is called with the same value as the current lastScene value
7159             then all scene members shall be updated.
7160
7161     is : ['interface-update']
7162     body:
7163         application/json:
7164             schema: /

```

```

7165     {
7166         "$schema": "http://json-schema.org/draft-04/schema#",
7167         "description": "Copyright (c) 2016, 2017 Open Connectivity Foundation, Inc. All rights
7168 reserved.",
7169         "id": "http://openconnectivityfoundation.github.io/core/schemas/oic.sceneCollection-
7170 Update-schema.json#",
7171         "title": "Scene Collection",
7172         "definitions": {
7173             "oic.sceneCollection-Update": {
7174                 "type": "object",
7175                 "properties": {
7176                     "lastScene": {
7177                         "type": "string",
7178                         "description": "Last selected Scene from the set of sceneValues"
7179                     }
7180                 },
7181                 "required": [ "lastScene" ]
7182             }
7183         },
7184         "type": "object",
7185         "allOf": [
7186             { "$ref": "http://openconnectivityfoundation.github.io/core/schemas/oic.core-
7187 schema.json#/definitions/oic.core" },
7188             { "$ref": "#/definitions/oic.sceneCollection-Update" }
7189         ]
7190     }
7191
7192     example: /
7193     {
7194         "lastScene": "Reading"
7195     }
7196
7197     responses :
7198     200:
7199         description: |
7200             Indicates that the value is changed.
7201             The changed properties are provided in the response.
7202
7203     body:
7204     application/json:
7205         schema: /
7206         {
7207             "$schema": "http://json-schema.org/draft-04/schema#",
7208             "description": "Copyright (c) 2016, 2017 Open Connectivity Foundation, Inc. All
7209 rights reserved.",
7210             "id":
7211 "http://openconnectivityfoundation.github.io/core/schemas/oic.sceneCollection-Update-schema.json#",
7212             "title": "Scene Collection",
7213             "definitions": {
7214                 "oic.sceneCollection-Update": {
7215                     "type": "object",
7216                     "properties": {
7217                         "lastScene": {
7218                             "type": "string",
7219                             "description": "Last selected Scene from the set of sceneValues"
7220                         }
7221                     },
7222                     "required": [ "lastScene" ]
7223                 }
7224             },
7225             "type": "object",
7226             "allOf": [
7227                 { "$ref": "http://openconnectivityfoundation.github.io/core/schemas/oic.core-
7228 schema.json#/definitions/oic.core" },
7229                 { "$ref": "#/definitions/oic.sceneCollection-Update" }
7230             ]

```

```

7231     }
7232
7233     example: /
7234     {
7235     "lastScene": "Reading"
7236     }
7237

```

### 7238 D.11.5 Property Definition

7239 **Table 66 Scene Collections Property Definitions**

Property name	Value type	Mandatory	Access mode	Description
lastScene	string	yes		Last selected Scene from the set of sceneValues
sceneValues	array: see schema	yes	Read Only	All available scene values

### 7240 D.11.6 CRUDN behaviour

7241 **Table 67 Scene Collections CRUDN operations**

Resource	Create	Read	Update	Delete	Notify
/SceneCollectionResURI		get	post		

## 7242 D.12 Scene Member

### 7243 D.12.1 Introduction

7244 Collection that models a scene member.

### 7245 D.12.2 Example URI

7246 /SceneMemberResURI

### 7247 D.12.3 Resource Type

7248 The resource type (rt) is defined as: oic.wk.scenemember.

### 7249 D.12.4 RAML Definition

```

7250 #%RAML 0.8
7251 title: Scene
7252 version: v1-20160622
7253 traits:
7254   - interface-update :
7255     queryParameters:
7256       if:
7257         enum: ["oic.if.a"]
7258   - interface-baseline :
7259     queryParameters:
7260       if:
7261         enum: ["oic.if.baseline"]
7262   - interface-all :
7263     queryParameters:
7264       if:
7265         enum: ["oic.if.a", "oic.if.ll", "oic.if.baseline"]
7266
7267 /SceneMemberResURI:
7268   description: |

```



```

7269     Collection that models a scene member.
7270
7271     is : ['interface-baseline']
7272     get:
7273         description: |
7274             Provides the scene member
7275
7276     responses :
7277         200:
7278             body:
7279                 application/json:
7280                     schema: /
7281                         {
7282                             "$schema": "http://json-schema.org/draft-04/schema#",
7283                             "description" : "Copyright (c) 2016, 2017 Open Connectivity Foundation, Inc. All
rights reserved.",
7284                             "id": "http://openconnectivityfoundation.github.io/core/schemas/oic.sceneMember-
7285                             schema.json#",
7286                             "title" : "Scene Member",
7287                             "definitions": {
7288                                 "oic.sceneMember": {
7289                                     "type": "object",
7290                                     "properties": {
7291                                         "SceneMappings" : {
7292                                             "type": "array",
7293                                             "description": "array of mappings per scene, can be one(1)",
7294                                             "items": {
7295                                                 "type": "object",
7296                                                 "properties": {
7297                                                     "scene": {
7298                                                         "type": "string",
7299                                                         "description": "Specifies a scene value that will be acted upon"
7300                                                     },
7301                                                     "memberProperty": {
7302                                                         "type": "string",
7303                                                         "readOnly": true,
7304                                                         "description": "property name that will be mapped"
7305                                                     },
7306                                                     "memberValue": {
7307                                                         "type": "string",
7308                                                         "readOnly": true,
7309                                                         "description": "value of the Member Property"
7310                                                     }
7311                                                 }
7312                                             },
7313                                             "required": [ "scene", "memberProperty", "memberValue" ]
7314                                         }
7315                                     },
7316                                     "link": {
7317                                         "allof": [
7318                                             {
7319                                                 "$ref": "oic.oic-link-schema.json#/definitions/oic.oic-link"
7320                                             },
7321                                             {
7322                                                 "description": "OCF link that points to a resource"
7323                                             }
7324                                         ]
7325                                     }
7326                                 },
7327                                 "required": [ "link" ]
7328                             }
7329                         },
7330                     "type": "object",
7331                     "allof" : [
7332                         { "$ref": "http://openconnectivityfoundation.github.io/core/schemas/oic.core-
7333                         schema.json#/definitions/oic.core" },
7334                         { "$ref": "#/definitions/oic.sceneMember" }
7335

```

```

7336     ]
7337   }
7338
7339   example: /
7340   {
7341     "rt": ["oic.wk.scenemember"],
7342     "id": "0685B960-FFFF-46F7-BEC0-9E6234671ADC1",
7343     "n": "my binary switch (for light bulb) mappings",
7344     "link": {
7345       "href": "binarySwitch",
7346       "rt": ["oic.r.switch.binary"],
7347       "if": ["oic.if.a", "oic.if.baseline"],
7348       "eps": [
7349         {"ep": "coap://[fe80::b1d6]:1111", "pri": 2},
7350         {"ep": "coaps://[fe80::b1d6]:1122"},
7351         {"ep": "coap+tcp://[2001:db8:a::123]:2222", "pri": 3}
7352       ]
7353     },
7354     "SceneMappings": [
7355       {
7356         "scene": "off",
7357         "memberProperty": "value",
7358         "memberValue": "true"
7359       },
7360       {
7361         "scene": "Reading",
7362         "memberProperty": "value",
7363         "memberValue": "false"
7364       },
7365       {
7366         "scene": "TVWatching",
7367         "memberProperty": "value",
7368         "memberValue": "true"
7369       }
7370     ]
7371   }
7372

```

## D.12.5 Property Definition

Table 68 Scene Member Property Definitions

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		

## D.12.6 CRUDN behaviour

Table 69 Scene Member CRUDN operations

Resource	Create	Read	Update	Delete	Notify
/SceneMemberResURI		get			

## 7377 **D.13 Resource directory resource**

### 7378 **D.13.1 Introduction**

7379 Resource to be exposed by any Device that can act as a Resource Directory. 1) Provides selector  
7380 criteria (e.g., integer) with GET request 2) Publish a Link in /oic/res with POST request

### 7381 **D.13.2 Wellknown URI**

7382 /oic/rd

### 7383 **D.13.3 Resource Type**

7384 The resource type (rt) is defined as: oic.wk.rd.

### 7385 **D.13.4 RAML Definition**

7386 `##RAML 0.8`

7387 `title: Resource Directory`

7388 `version: v1-20160622`

7389 `traits:`

7390 `- rdgetinterface :`

7391  `queryParameters:`

7392  `if:`

7393  `enum: ["oic.if.baseline"]`

7394  `description: Interface is optional since there is only one interface supported for the`

7395 `Resource Type`

7396 `Both for RD selection and for publish.`

7397 `Example: GET /oic/rd?if=oic.if.baseline`

7398

7399 `- rdpostinterface :`

7400  `queryParameters:`

7401  `if:`

7402  `enum: ["oic.if.baseline"]`

7403  `description: Interface is optional since there is only one interface supported for the`

7404 `Resource Type`

7405 `Both for RD selection and for publish.`

7406 `Example: POST /oic/rd?if=oic.if.baseline`

7407

7408

7409 `/oic/rd:`

7410  `description: |`

7411  `Resource to be exposed by any Device that can act as a Resource Directory.`

7412  `1) Provides selector criteria (e.g., integer) with GET request`

7413  `2) Publish a Link in /oic/res with POST request`

7414

7415  `get:`

7416  `description: |`

7417  `Get the attributes of the Resource Directory for selection purposes.`

7418

7419  `is : ['rdgetinterface']`

7420  `responses :`

7421  `200:`

7422  `description: |`

7423  `Respond with the selector criteria - either the set of attributes or the bias factor`

7424

7425  `body:`

7426  `application/json:`

7427  `schema: |`

7428  `{`

7429  `"$schema": "http://json-schema.org/draft-04/schema#",`

7430  `"description" : "Copyright (c) 2016, 2017 Open Connectivity Foundation, Inc. All`

```

7431 rights reserved.",
7432     "id": "http://openconnectivityfoundation.github.io/core/schemas/oic.rd.selection-
7433 schema.json#",
7434     "title": "RD Selection",
7435     "definitions": {
7436       "oic.rd.attributes": {
7437         "type": "object",
7438         "properties": {
7439           "sel": {
7440             "type": "integer",
7441             "minimum": 0,
7442             "maximum": 100,
7443             "readOnly": true,
7444             "description": "A bias factor calculated by the Resource directory"
7445           }
7446         },
7447         "required": ["sel"]
7448       }
7449     },
7450     "type": "object",
7451     "allOf": [
7452       { "$ref": "http://openconnectivityfoundation.github.io/core/schemas/oic.core-
7453 schema.json#/definitions/oic.core" },
7454       { "$ref": "#/definitions/oic.rd.attributes" }
7455     ]
7456   }
7457
7458   example: /
7459   {
7460     "rt": ["oic.wk.rd"],
7461     "if": ["oic.if.baseline"],
7462     "sel": 50
7463   }
7464
7465   post:
7466     description: |
7467       Publish the resource information for the first time in /oic/res
7468       Updates to existing entries are not allowed.
7469       Appropriates parts of the information, i.e., Links of the published Resources will be
7470 discovered through /oic/res.
7471       1) When a Device first publishes a Link, the request payload to RD may include the Links
7472 without an "ins" Parameter.
7473       2) Upon granting the request, the RD assigns a unique instance value identifying the Link
7474 among all the Links it advertises
7475         and sends back the instance value in the "ins" Parameter in the Link to the publishing
7476 Device.
7477
7478   is: ['rdpostinterface']
7479   body:
7480     application/json:
7481       schema: /
7482       {
7483         "$schema": "http://json-schema.org/draft-04/schema#",
7484         "description": "Copyright (c) 2016-2018 Open Connectivity Foundation, Inc. All rights
7485 reserved.",
7486         "id": "http://openconnectivityfoundation.github.io/core/schemas/oic.rd.publish-
7487 schema.json#",
7488         "title": "RD Publish & Update",
7489         "definitions": {
7490           "oic.rd.publish": {
7491             "properties": {
7492               "di": {
7493                 "$ref": "oic.types-schema.json#/definitions/uuid",
7494                 "description": "A UUID that is the identifier for the publishing Device"
7495               },
7496               "ttl": {
7497                 "type": "integer",

```

```

7498         "description": "Time to indicate a RD, i.e. how long to keep this published
7499 item."
7500     }
7501 }
7502 },
7503 "type": "object",
7504 "allOf": [
7505     {"$ref": "http://openconnectivityfoundation.github.io/core/schemas/oic.core-
7506 schema.json#/definitions/oic.core"},
7507     {"$ref": "#/definitions/oic.rd.publish"},
7508     {"$ref": "http://openconnectivityfoundation.github.io/core/schemas/oic.collection-
7509 schema.json#/definitions/oic.collection.links.arrayoflinks"}
7510 ],
7511 "required": ["di", "links", "ttl"]
7512 }
7513
7514
7515 example: /
7516 {
7517     "di": "e61c3e6b-9c54-4b81-8ce5-f9039c1d04d9",
7518     "links": [
7519         {
7520             "anchor": "ocf://e61c3e6b-9c54-4b81-8ce5-f9039c1d04d9",
7521             "href": "/myLightSwitch",
7522             "rt": ["oic.r.switch.binary"],
7523             "if": ["oic.if.a", "oic.if.baseline"],
7524             "p": {"bm": 3},
7525             "eps": [
7526                 {"ep": "coaps://[2001:db8:a::b1d6]:1111", "pri": 2},
7527                 {"ep": "coaps://[2001:db8:a::b1d6]:1122"},
7528                 {"ep": "coaps+tcp://[2001:db8:a::123]:2222", "pri": 3}
7529             ]
7530         },
7531         {
7532             "anchor": "ocf://e61c3e6b-9c54-4b81-8ce5-f9039c1d04d9",
7533             "href": "/myLightBrightness",
7534             "rt": ["oic.r.brightness"],
7535             "if": ["oic.if.a", "oic.if.baseline"],
7536             "p": {"bm": 3},
7537             "eps": [
7538                 {"ep": "coaps://[2001:db8:a::123]:2222"}
7539             ]
7540         }
7541     ],
7542     "ttl": 600
7543 }
7544
7545 responses :
7546 200:
7547     description: |
7548         Respond with the same schema as publish with the additional "ins" Parameter in the Link.
7549
7550     body:
7551     application/json:
7552     schema: /
7553     {
7554         "$schema": "http://json-schema.org/draft-04/schema#",
7555         "description": "Copyright (c) 2016-2018 Open Connectivity Foundation, Inc. All
7556 rights reserved.",
7557         "id": "http://openconnectivityfoundation.github.io/core/schemas/oic.rd.publish-
7558 schema.json#",
7559         "title": "RD Publish & Update",
7560         "definitions": {
7561             "oic.rd.publish": {
7562                 "properties": {
7563                     "di": {
7564                         "$ref": "oic.types-schema.json#/definitions/uuid",

```

```

7565         "description": "A UUID that is the identifier for the publishing Device"
7566     },
7567     "ttl": {
7568         "type": "integer",
7569         "description": "Time to indicate a RD, i.e. how long to keep this published
7570 item."
7571     }
7572 }
7573 }
7574 },
7575 "type": "object",
7576 "allOf": [
7577     {"$ref": "http://openconnectivityfoundation.github.io/core/schemas/oic.core-
7578 schema.json#/definitions/oic.core"},
7579     {"$ref": "#/definitions/oic.rd.publish"},
7580     {"$ref":
7581 "http://openconnectivityfoundation.github.io/core/schemas/oic.collection-
7582 schema.json#/definitions/oic.collection.links.arrayoflinks"}
7583 ],
7584 "required": ["di", "links", "ttl"]
7585 }
7586
7587 example: /
7588 {
7589     "di": "e61c3e6b-9c54-4b81-8ce5-f9039c1d04d9",
7590     "links": [
7591         {
7592             "anchor": "ocf://e61c3e6b-9c54-4b81-8ce5-f9039c1d04d9",
7593             "href": "/myLightSwitch",
7594             "rt": ["oic.r.switch.binary"],
7595             "if": ["oic.if.a", "oic.if.baseline"],
7596             "p": {"bm": 3},
7597             "eps": [
7598                 {"ep": "coaps://[2001:db8:a::b1d6]:1111", "pri": 2},
7599                 {"ep": "coaps://[2001:db8:a::b1d6]:1122"},
7600                 {"ep": "coaps+tcp://[2001:db8:a::123]:2222", "pri": 3}
7601             ],
7602             "ins": 11235
7603         },
7604         {
7605             "anchor": "ocf://e61c3e6b-9c54-4b81-8ce5-f9039c1d04d9",
7606             "href": "/myLightBrightness",
7607             "rt": ["oic.r.brightness"],
7608             "if": ["oic.if.a", "oic.if.baseline"],
7609             "p": {"bm": 3},
7610             "eps": [
7611                 {"ep": "coaps://[2001:db8:a::123]:2222"}
7612             ],
7613             "ins": 112358
7614         }
7615     ],
7616     "ttl": 600
7617 }

```

### D.13.5 Property Definition

**Table 70 Resource directory resource Property Definitions**

Property name	Value type	Mandatory	Access mode	Description
sel	integer	yes	Read Only	A bias factor calculated by the Resource directory

7621 **D.13.6 CRUDN behaviour**

7622 **Table 71 Resource directory resource CRUDN operations**

Resource	Create	Read	Update	Delete	Notify
/oic/rd		get	post		

7623 **D.14 Icon**

7624 **D.14.1 Introduction**

7625 This resource describes the attributes associated with an Icon.

7626 **D.14.2 Example URI**

7627 /IconResURI

7628 **D.14.3 Resource Type**

7629 The resource type (rt) is defined as: oic.r.icon.

7630 **D.14.4 RAML Definition**

```
7631 #%RAML 0.8
7632 title: OICIcon
7633 version: v1.1.0-20161107
7634 traits:
7635   - interface :
7636     queryParameters:
7637       if:
7638         enum: ["oic.if.r", "oic.if.baseline"]
7639
7640 /IconResURI:
7641   description: |
7642     This resource describes the attributes associated with an Icon.
7643
7644   is : ['interface']
7645   get:
7646     description: |
7647       Retrieves the current icon properties.
7648
7649   responses :
7650     200:
7651       body:
7652         application/json:
7653           schema: /
7654             {
7655               "id": "http://openconnectivityfoundation.github.io/core/schemas/oic.r.icon.json#",
7656               "$schema": "http://json-schema.org/draft-04/schema#",
7657               "description" : "Copyright (c) 2017 Open Connectivity Foundation, Inc. All rights
7658 reserved.",
7659               "title": "Icon",
7660               "definitions": {
7661                 "oic.r.icon": {
7662                   "properties": {
7663                     "mimetype": {
7664                       "type": "string",
7665                       "maxLength": 64,
7666                       "readOnly": true,
7667                       "description": "The Media Type of the icon"
7668                     },
7669                     "width": {
7670                       "type": "integer",
```

```

7671         "minimum": 1,
7672         "readOnly": true,
7673         "description": "The width in pixels"
7674     },
7675     "height": {
7676         "type": "integer",
7677         "minimum": 1,
7678         "readOnly": true,
7679         "description": "The height in pixels"
7680     },
7681     "media": {
7682         "type": "string",
7683         "maxLength": 256,
7684         "format": "uri",
7685         "readOnly": true,
7686         "description": "Specifies the URI to the icon"
7687     }
7688 }
7689 },
7690 },
7691 "type": "object",
7692 "allOf": [
7693     { "$ref": "http://openconnectivityfoundation.github.io/core/schemas/oic.core-
7694 schema.json#/definitions/oic.core"},
7695     { "$ref": "#/definitions/oic.r.icon"}
7696 ],
7697 "required": ["mimetype", "width", "height", "media"]
7698 }
7699

```

```

7700 example: /
7701 {
7702     "rt": ["oic.r.icon"],
7703     "id": "unique_example_id",
7704     "mimetype": "image/png",
7705     "width": 256,
7706     "height": 256,
7707     "media": "http://findbetter.ru/public/uploads/1481662800/2043.png"
7708 }
7709

```

7710 **D.14.5 Property Definition**

7711 **Table 72 Icon Property Definitions**

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

7712 **D.14.6 CRUDN behaviour**

7713 **Table 73 Icon CRUDN operations**

Resource	Create	Read	Update	Delete	Notify
/IconResURI		get			



## 7714 D.15 Introspection Resource

### 7715 D.15.1 Introduction

7716 This resource provides the means to get the device introspection data specifying all the endpoints  
7717 of the device. The url hosted by this resource is either a local or an external url.

### 7718 D.15.2 Example URI

7719 /IntrospectionResURI

### 7720 D.15.3 Resource Type

7721 The resource type (rt) is defined as: oic.wk.introspection.

### 7722 D.15.4 RAML Definition

7723 `##RAML 0.8`

7724 `title: OICIntrospection`

7725 `version: v1.0.0-20160707`

7726 `traits:`

7727 `- interface :`

7728  `queryParameters:`

7729  `if:`

7730  `enum: ["oic.if.r", "oic.if.baseline"]`

7731

7732 `/IntrospectionResURI:`

7733  `description: |`

7734  `This resource provides the means to get the device introspection data specifying all the`  
7735 `endpoints of the device.`

7736  `The url hosted by this resource is either a local or an external url.`

7737

7738  `is : ['interface']`

7739  `get:`

7740  `responses :`

7741  `200:`

7742  `body:`

7743  `application/json:`

7744  `schema: |`

```
7745 {
7746   "id":
7747 "http://openconnectivityfoundation.github.io/core/schemas/oic.wk.introspectionInfo.json#",
7748   "$schema": "http://json-schema.org/draft-04/schema#",
7749   "description" : "Copyright (c) 2017 Open Interconnect Consortium, Inc. All rights
7750 reserved.",
7751   "title": "introspection resource",
7752   "definitions": {
7753     "oic.wk.introspectionInfo": {
7754       "type": "object",
7755       "properties": {
7756         "urlInfo": {
7757           "type": "array",
7758           "description": "Information on the location of the introspection data.",
7759           "readOnly": true,
7760           "minItems": 1,
7761           "items": {
7762             "type" : "object",
7763             "properties": {
7764               "url": {
7765                 "type": "string",
7766                 "format": "uri",
7767                 "description" : "The URL of the introspection information."
7768               },
7769               "protocol": {
7770                 "type": "string",
```

```

7771         "enum": [ "coap", "coaps", "http", "https", "coap+tcp",
7772 "coaps+tcp" ],
7773         "description" : "Identifier for the protocol to be used to obtain the
7774 introspection information"
7775     },
7776     "content-type": {
7777         "type": "string",
7778         "enum": [ "application/json", "application/cbor" ],
7779         "default" : "application/cbor",
7780         "description" : "content-type of the introspection data"
7781     },
7782     "version": {
7783         "type": "integer",
7784         "enum": [ 1 ],
7785         "default" : 1,
7786         "description" : "The version of the introspection data that can be
7787 downloaded"
7788     },
7789     "required" : [ "url","protocol"]
7790 },
7791 }
7792 },
7793 },
7794     "required" : ["urlInfo"]
7795 }
7796 },
7797     "type": "object",
7798     "allOf": [
7799         { "$ref": "#/definitions/oic.wk.introspectionInfo" },
7800         { "$ref": "http://openconnectivityfoundation.github.io/core/schemas/oic.core-
7801 schema.json#/definitions/oic.core" }
7802     ]
7803 }
7804
7805     example: /
7806     {
7807         "rt" : ["oic.wk.introspection"],
7808         "urlInfo" : [
7809             {
7810                 "content-type" : "application/cbor",
7811                 "protocol" : "coap",
7812                 "url" : "coap://[fe80::1]:1234/IntrospectionExampleURI"
7813             }
7814         ]
7815     }
7816

```

### 7817 D.15.5 Property Definition

7818 **Table 74 Introspection Resource Property Definitions**

Property name	Value type	Mandatory	Access mode	Description
urlInfo	array: see schema	yes	Read Only	Information on the location of the introspection data.
url (urlInfo)	string	yes		The URL of the introspection information.
content-type (urlInfo)	string			content-type of the introspection data
version (urlInfo)	integer			The version of the introspection data that can be downloaded

protocol (urlInfo)	string	yes		Identifier for the protocol to be used to obtain the introspection information
--------------------	--------	-----	--	--

7819 **D.15.6 CRUDN behaviour**

7820 **Table 75 Introspection Resource CRUDN operations**

Resource	Create	Read	Update	Delete	Notify
/IntrospectionResURI		get			

7821 **D.16 Network Monitoring**

7822 **D.16.1 Introduction**

7823 The resource through which a Device can monitor network traffic.

7824 **D.16.2 Example URI**

7825 /nmonResURI

7826 **D.16.3 Resource Type**

7827 The resource type (rt) is defined as: oic.wk.nmon.

7828 **D.16.4 RAML Definition**

```
7829 #%RAML 0.8
7830 title: Network Monitoring
7831 version: v1-20180306
7832 traits:
7833   - interface-rw :
7834     queryParameters:
7835       if:
7836         enum: ["oic.if.rw"]
7837   - interface-all :
7838     queryParameters:
7839       if:
7840         enum: ["oic.if.rw", "oic.if.baseline"]
7841
7842 /nmonResURI:
7843   description: |
7844     The resource through which a Device can monitor network traffic.
7845
7846   get:
7847     description: |
7848       Retrieve the network monitor action status
7849
7850   is : ['interface-all']
7851   responses :
7852     200:
7853       body:
7854         application/json:
7855           schema: /
7856           {
7857             "id": "http://openconnectivityfoundation.github.io/core/schemas/oic.wk.nmon#",
7858             "$schema": "http://json-schema.org/draft-04/schema#",
7859             "description" : "Copyright (c) 2017 Open Connectivity Foundation, Inc. All rights
7860 reserved.",
```

```

7861         "title": "network monitoring",
7862         "definitions": {
7863             "oic.wk.nmon": {
7864                 "type": "object",
7865                 "properties": {
7866                     "ianaifType":
7867                     {
7868                         "type" : "integer",
7869                         "description": "The type of the network connection, as defined by iana
7870 https://www.iana.org/assignments/ianaiftype-mib/ianaiftype-mib",
7871                         "readOnly" : true
7872                     },
7873                     "reset" :
7874                     {
7875                         "type" : "boolean",
7876                         "description": "True: reset the collected values",
7877                         "readOnly" : false
7878                     },
7879                     "col" :
7880                     {
7881                         "type" : "boolean",
7882                         "description": "True: Device is collecting values",
7883                         "readOnly" : false
7884                     },
7885                     "tx" :
7886                     {
7887                         "type" : "integer",
7888                         "description": "Amount of transmitted kilo bytes from the collection",
7889                         "readOnly" : true
7890                     },
7891                     "rx" :
7892                     {
7893                         "type" : "integer",
7894                         "description": "Amount of received kilo bytes from the collection",
7895                         "readOnly" : true
7896                     },
7897                     "mmstx" :
7898                     {
7899                         "type" : "integer",
7900                         "description": "Maximum transmitted message size in bytes (tx) in the
7901 collection period",
7902                         "readOnly" : true
7903                     },
7904                     "amstx" :
7905                     {
7906                         "type" : "integer",
7907                         "description": "Average transmitted message size in bytes (tx) in the
7908 collection period",
7909                         "readOnly" : true
7910                     },
7911                     "mmsrx" :
7912                     {
7913                         "type" : "integer",
7914                         "description": "Maximum received message size in bytes (rx) in the
7915 collection period",
7916                         "readOnly" : true
7917                     },
7918                     "amsrx" :
7919                     {
7920                         "type" : "integer",
7921                         "description": "Average received message size in bytes (rx) in the
7922 collection period",
7923                         "readOnly" : true
7924                     }
7925                 }
7926             },
7927         },
7928         "type": "object",
7929         "allOf": [
7930             {"$ref": "http://openconnectivityfoundation.github.io/core/schemas/oic.core-
7931 schema.json#/definitions/oic.core"},

```

```

7932         {"$ref": "#/definitions/oic.wk.nmon"}
7933     ],
7934     "required": ["reset", "col", "ianaifType"]
7935 }
7936
7937     example: /
7938     {
7939         "rt": ["oic.wk.nmon"],
7940         "ianaifType": 71,
7941         "reset": false,
7942         "col" : false,
7943         "tx" : 10,
7944         "rx" : 15,
7945         "mmstx" : 50,
7946         "amstx" : 35,
7947         "mmsrx" : 35,
7948         "amsrx" : 20
7949     }
7950
7951     post:
7952         description: |
7953             Start/Stop collecting and reset the networking monitor resource
7954
7955         is : ['interface-rw']
7956         body:
7957             application/json:
7958                 schema: /
7959                 {
7960                     "id": "http://openconnectivityfoundation.github.io/core/schemas/oic.wk.nmon-update#",
7961                     "$schema": "http://json-schema.org/draft-04/schema#",
7962                     "description" : "Copyright (c) 2017 Open Connectivity Foundation, Inc. All rights
7963 reserved.",
7964                     "title": "network monitoring",
7965                     "definitions": {
7966                         "oic.wk.nmon-update": {
7967                             "type": "object",
7968                             "properties": {
7969                                 "reset" :
7970                                 {
7971                                     {
7972                                         "type" : "boolean",
7973                                         "description": "True: reset the collected values",
7974                                         "readOnly" : false
7975                                     },
7976                                     "col" :
7977                                     {
7978                                         "type" : "boolean",
7979                                         "description": "True: Device is collecting values",
7980                                         "readOnly" : false
7981                                     }
7982                                 }
7983                             }
7984                         },
7985                         "type": "object",
7986                         "allOf": [
7987                             {"$ref": "http://openconnectivityfoundation.github.io/core/schemas/oic.core-
7988 schema.rw.json#/definitions/oic.core"},
7989                             {"$ref": "#/definitions/oic.wk.nmon-update"}
7990                         ],
7991                         "required": ["reset", "col"]
7992                     }
7993
7994                 example: /
7995                 {
7996                     "col": true,

```

```

7997         "reset": true
7998     }
7999
8000     responses :
8001         200:
8002             body:
8003                 application/json:
8004                     schema: /
8005                         {
8006                             "id": "http://openconnectivityfoundation.github.io/core/schemas/oic.wk.nmon#",
8007                             "$schema": "http://json-schema.org/draft-04/schema#",
8008                             "description": "Copyright (c) 2017 Open Connectivity Foundation, Inc. All rights
8009 reserved.",
8010                             "title": "network monitoring",
8011                             "definitions": {
8012                                 "oic.wk.nmon": {
8013                                     "type": "object",
8014                                     "properties": {
8015                                         "ianaifType":
8016                                             {
8017                                                 "type": "integer",
8018                                                 "description": "The type of the network connection, as defined by iana
8019 https://www.iana.org/assignments/ianaiftype-mib/ianaiftype-mib",
8020                                                 "readOnly" : true
8021                                             },
8022                                         "reset" :
8023                                             {
8024                                                 "type": "boolean",
8025                                                 "description": "True: reset the collected values",
8026                                                 "readOnly" : false
8027                                             },
8028                                         "col" :
8029                                             {
8030                                                 "type": "boolean",
8031                                                 "description": "True: Device is collecting values",
8032                                                 "readOnly" : false
8033                                             },
8034                                         "tx" :
8035                                             {
8036                                                 "type": "integer",
8037                                                 "description": "Amount of transmitted kilo bytes from the collection",
8038                                                 "readOnly" : true
8039                                             },
8040                                         "rx" :
8041                                             {
8042                                                 "type": "integer",
8043                                                 "description": "Amount of received kilo bytes from the collection",
8044                                                 "readOnly" : true
8045                                             },
8046                                         "mmstx" :
8047                                             {
8048                                                 "type": "integer",
8049                                                 "description": "Maximum transmitted message size in bytes (tx) in the
8050 collection period",
8051                                                 "readOnly" : true
8052                                             },
8053                                         "amstx" :
8054                                             {
8055                                                 "type": "integer",
8056                                                 "description": "Average transmitted message size in bytes (tx) in the
8057 collection period",
8058                                                 "readOnly" : true
8059                                             },
8060                                         "mmsrx" :
8061                                             {
8062                                                 "type": "integer",
8063                                                 "description": "Maximum received message size in bytes (rx) in the
8064 collection period",

```

```

8065         "readOnly" : true
8066     },
8067     "amsrx" :
8068     {
8069         "type" : "integer",
8070         "description": "Average received message size in bytes (rx) in the
collection period",
8071         "readOnly" : true
8072     }
8073     }
8074 }
8075 }
8076 },
8077 "type": "object",
8078 "allOf": [
8079     { "$ref": "http://openconnectivityfoundation.github.io/core/schemas/oic.core-
8080 schema.json#/definitions/oic.core"},
8081     { "$ref": "#/definitions/oic.wk.nmon" }
8082 ],
8083 "required": ["reset", "col", "ianaifType"]
8084 }
8085
8086 example: /
8087 {
8088     "rt": ["oic.wk.nmon"],
8089     "ianaifType": 71,
8090     "reset": false,
8091     "col" : true,
8092     "tx" : 0,
8093     "rx" : 0,
8094     "mms-tx" : 0,
8095     "ams-tx" : 0,
8096     "mms-rx" : 0,
8097     "ams-rx" : 0
8098 }
8099

```

## D.16.5 Property Definition

**Table 76 Network Monitoring Property Definitions**

Property name	Value type	Mandatory	Access mode	Description
reset	boolean	yes	Read Write	True: reset the collected values
amstx	integer		Read Only	Average transmitted message size in bytes (tx) in the collection period
mmsrx	integer		Read Only	Maximum received message size in bytes (rx) in the collection period
mmstx	integer		Read Only	Maximum transmitted message size in bytes (tx) in the collection period
tx	integer		Read Only	Amount of transmitted kilo bytes from the collection
ianaifType	integer	yes	Read Only	The type of the network connection, as defined by iana <a href="https://www.iana.org/assignments/ianaiftype-mib/ianaiftype-mib">https://www.iana.org/assignments/ianaiftype-mib/ianaiftype-mib</a>
rx	integer		Read Only	Amount of received kilo bytes from the collection
amsrx	integer		Read Only	Average received message size in bytes (rx) in the collection period
col	boolean	yes	Read Write	True: Device is collecting values

8102 **D.16.6 CRUDN behaviour**

8103 **Table 77 Network Monitoring CRUDN operations**

Resource	Create	Read	Update	Delete	Notify
/nmonResURI		get	post		

8104 **D.17 Atomic Measurement**

8105 **D.17.1 Introduction**

8106 The oic.if.baseline interface exposes a representation of the links and the common properties of  
8107 the Atomic Measurement resource.

8108 **D.17.2 Example URI**

8109 /AtomicMeasurementResURI

8110 **D.17.3 Resource Type**

8111 The resource type (rt) is defined as: oic.wk.atomicmeasurement.

8112 **D.17.4 RAML Definition**

```

8113 #%RAML 0.8
8114 title: Atomic Measurement
8115 version: 1.0
8116 traits:
8117   - interface-ll :
8118     queryParameters:
8119       if:
8120         enum: ["oic.if.ll"]
8121   - interface-b :
8122     queryParameters:
8123       if:
8124         enum: ["oic.if.b"]
8125   - interface-baseline :
8126     queryParameters:
8127       if:
8128         enum: ["oic.if.baseline"]
8129   - interface-all :
8130     queryParameters:
8131       if:
8132         enum: ["oic.if.b", "oic.if.ll", "oic.if.baseline"]
8133
8134 /AtomicMeasurementResURI?if=oic.if.baseline:
8135   description: |
8136     The oic.if.baseline interface exposes a representation of the links and
8137     the common properties of the Atomic Measurement resource.
8138
8139   is : ['interface-baseline']
8140   get:
8141     description: |
8142       Retrieve on Baseline Interface
8143
8144   responses :
8145     200:
8146       body:
8147         application/json:
8148           schema: /

```



```

8149     {
8150         "$schema": "http://json-schema.org/draft-04/schema#",
8151         "description": "Copyright (c) 2016,2018 Open Connectivity Foundation, Inc. All
8152 rights reserved.",
8153         "id": "http://openconnectivityfoundation.github.io/core/schemas/oic.collection-
8154 schema.json#",
8155         "title": "Collection",
8156         "definitions": {
8157             "oic.oic-link": {
8158                 "type": "object",
8159                 "properties": {
8160                     "href": {
8161                         "type": "string",
8162                         "maxLength": 256,
8163                         "description": "This is the target URI, it can be specified as a Relative
8164 Reference or fully-qualified URI.",
8165                         "format": "uri"
8166                     },
8167                     "rel": {
8168                         "oneOf": [
8169                             {
8170                                 "type": "array",
8171                                 "items": {
8172                                     "type": "string",
8173                                     "maxLength": 64
8174                                 },
8175                                 "minItems": 1,
8176                                 "default": ["hosts"]
8177                             },
8178                             {
8179                                 "type": "string",
8180                                 "maxLength": 64,
8181                                 "default": "hosts"
8182                             }
8183                         ],
8184                         "description": "The relation of the target URI referenced by the link to
8185 the context URI"
8186                     },
8187                     "rt": {
8188                         "type": "array",
8189                         "items": {
8190                             "type": "string",
8191                             "maxLength": 64
8192                         },
8193                         "minItems": 1,
8194                         "description": "Resource Type of the Resource"
8195                     },
8196                     "if": {
8197                         "type": "array",
8198                         "items": {
8199                             "type": "string",
8200                             "enum": ["oic.if.baseline", "oic.if.ll", "oic.if.b", "oic.if.rw",
8201 "oic.if.r", "oic.if.a", "oic.if.s" ]
8202                         },
8203                         "minItems": 1,
8204                         "description": "The interface set supported by this resource"
8205                     },
8206                     "di": {
8207                         "description": "The Device ID formatted according to IETF RFC 4122.",
8208                         "type": "string",
8209                         "pattern": "^[a-fA-F0-9]{8}-[a-fA-F0-9]{4}-[a-fA-F0-9]{4}-[a-fA-F0-9]{4}-
8210 [a-fA-F0-9]{12}$"
8211                     },
8212                     "p": {
8213                         "description": "Specifies the framework policies on the Resource referenced
8214 by the target URI",
8215                         "type": "object",
8216                         "properties": {
8217                             "bm": {
8218                                 "description": "Specifies the framework policies on the Resource
8219 referenced by the target URI for e.g. observable and discoverable",

```

```

8220         "type": "integer"
8221     }
8222 },
8223     "required": ["bm"]
8224 },
8225     "title": {
8226         "type": "string",
8227         "maxLength": 64,
8228         "description": "A title for the link relation. Can be used by the UI to
8229 provide a context."
8230     },
8231     "anchor": {
8232         "type": "string",
8233         "maxLength": 256,
8234         "description": "This is used to override the context URI e.g. override the
8235 URI of the containing collection.",
8236         "format": "uri"
8237     },
8238     "ins": {
8239         "type": "integer",
8240         "description": "The instance identifier for this web link in an array of
8241 web links - used in collections"
8242     },
8243     "type": {
8244         "type": "array",
8245         "description": "A hint at the representation of the resource referenced by
8246 the target URI. This represents the media types that are used for both accepting and emitting.",
8247         "items": {
8248             "type": "string",
8249             "maxLength": 64
8250         },
8251         "minItems": 1,
8252         "default": "application/cbor"
8253     },
8254     "eps": {
8255         "type": "array",
8256         "description": "the Endpoint information of the target Resource",
8257         "items": {
8258             "type": "object",
8259             "properties": {
8260                 "ep": {
8261                     "type": "string",
8262                     "format": "uri",
8263                     "description": "Transport Protocol Suite + Endpoint Locator"
8264                 },
8265                 "pri": {
8266                     "type": "integer",
8267                     "minimum": 1,
8268                     "description": "The priority among multiple Endpoints"
8269                 }
8270             }
8271         }
8272     }
8273 },
8274     "required": [ "href", "rt", "if" ]
8275 },
8276 "oic.collection.links.arrayoflinks": {
8277     "properties": {
8278         "links": {
8279             "description": "A set of simple or individual OIC Links.",
8280             "type": "array",
8281             "items": {
8282                 "type": "object",
8283                 "properties": {
8284                     "href": {
8285                         "type": "string",
8286                         "maxLength": 256,
8287                         "description": "This is the target URI, it can be specified as a
8288 Relative Reference or fully-qualified URI.",
8289                         "format": "uri"
8290                     },

```

```

8291     "rel": {
8292         "oneOf": [
8293             {
8294                 "type": "array",
8295                 "items": {
8296                     "type": "string",
8297                     "maxLength": 64
8298                 },
8299                 "minItems": 1,
8300                 "default": ["hosts"]
8301             },
8302             {
8303                 "type": "string",
8304                 "maxLength": 64,
8305                 "default": "hosts"
8306             }
8307         ],
8308         "description": "The relation of the target URI referenced by the link
8309 to the context URI"
8310     },
8311     "rt": {
8312         "type": "array",
8313         "items": {
8314             "type": "string",
8315             "maxLength": 64
8316         },
8317         "minItems": 1,
8318         "description": "Resource Type of the Resource"
8319     },
8320     "if": {
8321         "type": "array",
8322         "items": {
8323             "type": "string",
8324             "enum": ["oic.if.baseline", "oic.if.ll", "oic.if.b", "oic.if.rw",
8325 "oic.if.r", "oic.if.a", "oic.if.s"]
8326         },
8327         "minItems": 1,
8328         "description": "The interface set supported by this resource"
8329     },
8330     "di": {
8331         "description": "The Device ID formatted according to IETF RFC 4122.",
8332         "type": "string",
8333         "pattern": "^[a-fA-F0-9]{8}-[a-fA-F0-9]{4}-[a-fA-F0-9]{4}-[a-fA-F0-
8334 9]{4}-[a-fA-F0-9]{12}$"
8335     },
8336     "p": {
8337         "description": "Specifies the framework policies on the Resource
8338 referenced by the target URI",
8339         "type": "object",
8340         "properties": {
8341             "bm": {
8342                 "description": "Specifies the framework policies on the Resource
8343 referenced by the target URI for e.g. observable and discoverable",
8344                 "type": "integer"
8345             }
8346         },
8347         "required": ["bm"]
8348     },
8349     "title": {
8350         "type": "string",
8351         "maxLength": 64,
8352         "description": "A title for the link relation. Can be used by the UI
8353 to provide a context."
8354     },
8355     "anchor": {
8356         "type": "string",
8357         "maxLength": 256,
8358         "description": "This is used to override the context URI e.g.
8359 override the URI of the containing collection.",
8360         "format": "uri"
8361     },

```

```

8362         "ins": {
8363             "type": "integer",
8364             "description": "The instance identifier for this web link in an array
8365 of web links - used in collections"
8366         },
8367         "type": {
8368             "type": "array",
8369             "description": "A hint at the representation of the resource
8370 referenced by the target URI. This represents the media types that are used for both accepting and
8371 emitting.",
8372             "items": {
8373                 "type": "string",
8374                 "maxLength": 64
8375             },
8376             "minItems": 1,
8377             "default": "application/cbor"
8378         },
8379         "eps": {
8380             "type": "array",
8381             "description": "the Endpoint information of the target Resource",
8382             "items": {
8383                 "type": "object",
8384                 "properties": {
8385                     "ep": {
8386                         "type": "string",
8387                         "format": "uri",
8388                         "description": "Transport Protocol Suite + Endpoint Locator"
8389                     },
8390                     "pri": {
8391                         "type": "integer",
8392                         "minimum": 1,
8393                         "description": "The priority among multiple Endpoints"
8394                     }
8395                 }
8396             }
8397         },
8398     },
8399     "required": [ "href", "rt", "if" ]
8400 }
8401 }
8402 },
8403 },
8404 "oic.core": {
8405     "type": "object",
8406     "properties": {
8407         "rt": {
8408             "type": "array",
8409             "items": {
8410                 "type": "string",
8411                 "maxLength": 64
8412             },
8413             "minItems": 1,
8414             "readOnly": true,
8415             "description": "Resource Type of the Resource"
8416         }
8417     }
8418 },
8419 "uid": {
8420     "description": "Format pattern according to IETF RFC 4122.",
8421     "type": "string",
8422     "pattern": "^[a-fA-F0-9]{8}-[a-fA-F0-9]{4}-[a-fA-F0-9]{4}-[a-fA-F0-9]{4}-[a-fA-
8423 F0-9]{12}$"
8424 },
8425 "oic.collection.links": {
8426     "properties": {
8427         "links": {
8428             "description": "A set of simple or individual OIC Links.",
8429             "type": "array",
8430             "items": {
8431                 "$ref": "#/definitions/oic.oic-link"
8432             }
8433         }
8434     }
8435 }

```

```

8433     }
8434   }
8435 },
8436   "oic.collection.properties": {
8437     "type": "object",
8438     "description": "A collection is a set of links along with additional properties
8439 to describe the collection itself",
8440     "properties": {
8441       "rts": {
8442         "$ref": "#/definitions/oic.core/properties/rt",
8443         "description": "The list of allowable resource types (for Target and
8444 anchors) in links included in the collection"
8445       },
8446       "rts-m": {
8447         "$ref": "#/definitions/oic.core/properties/rt",
8448         "description": "The list of mandatory resources if any in links included in
8449 the collection"
8450       }
8451     }
8452   },
8453   "type": "object",
8454   "allOf": [
8455     { "$ref": "http://openconnectivityfoundation.github.io/core/schemas/oic.core-
8456 schema.json#/definitions/oic.core" },
8457     { "$ref": "#/definitions/oic.collection.properties" },
8458     { "$ref": "#/definitions/oic.collection.links" }
8459   ]
8460 }
8461 }
8462
8463   example: /
8464   {
8465     "rt": ["oic.wk.atomicmeasurement"],
8466     "if": ["oic.if.b", "oic.if.ll", "oic.if.baseline"],
8467     "rts": [ "oic.r.temperature", "oic.r.body.location.temperature",
8468 "oic.r.time.stamp" ],
8469     "rts-m": [ "oic.r.temperature", "oic.r.body.location.temperature",
8470 "oic.r.time.stamp" ],
8471     "links": [
8472       {
8473         "href": "temperature",
8474         "rt": [ "oic.r.temperature" ],
8475         "if": [ "oic.if.s", "oic.if.baseline" ]
8476       },
8477       {
8478         "href": "bodylocation",
8479         "rt": [ "oic.r.body.location.temperature" ],
8480         "if": [ "oic.if.s", "oic.if.baseline" ]
8481       },
8482       {
8483         "href": "timestamp",
8484         "rt": [ "oic.r.time.stamp" ],
8485         "if": [ "oic.if.s", "oic.if.baseline" ]
8486       }
8487     ]
8488   }
8489

```

## 8490 D.17.5 Property Definition

8491 **Table 78 Atomic Measurement Property Definitions**

Property name	Value type	Mandatory	Access mode	Description
links	array: see schema			A set of simple or individual OIC Links.
rt (links)	array: see schema	yes		Resource Type of the Resource

di (links)	string			The Device ID formatted according to IETF RFC 4122.
title (links)	string			A title for the link relation. Can be used by the UI to provide a context.
eps (links)	array: see schema			the Endpoint information of the target Resource
ins (links)	integer			The instance identifier for this web link in an array of web links - used in collections
p (links)	object: see schema			Specifies the framework policies on the Resource referenced by the target URI
href (links)	string	yes		This is the target URI, it can be specified as a Relative Reference or fully-qualified URI.
rel (links)	multiple types: see schema			The relation of the target URI referenced by the link to the context URI
type (links)	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 (links)	string			This is used to override the context URI e.g. override the URI of the containing collection.

if (links)	array: schema	see	yes		The interface set supported by this resource
------------	---------------	-----	-----	--	--

8492 **D.17.6 CRUDN behaviour**

8493 **Table 79 Atomic Measurement CRUDN operations**

Resource	Create	Read	Update	Delete	Notify
/AtomicMeasurementResURI		get			

8494

**Annex E  
(normative)**

**OIC 1.1 Resource Type definitions**

**E.1 List of Resource Type Definitions**

Table 80 contains the list of OIC 1.1 defined core resources that are referenced in this specification 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.

**Table 80. 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

**E.2 Collection, baseline interface**

**E.2.1 Introduction**

OCF Collection Resource Type contains properties and links. The oic.if.baseline interface exposes a representation of the links and the properties of the collection resource itself

**E.2.2 Example URI**

/CollectionBaselineInterfaceURI

**E.2.3 Resource Type**

The resource type (rt) is defined as: oic.wk.col.

**E.2.4 RAML Definition**

```

#%RAML 0.8
title: Collections
version: 1.0

traits:
- interface-11 :
    queryParameters:

```



```

8520         if:
8521             enum: ["oic.if.ll"]
8522     - interface-b :
8523         queryParameters:
8524             if:
8525                 enum: ["oic.if.b"]
8526     - interface-baseline :
8527         queryParameters:
8528             if:
8529                 enum: ["oic.if.baseline"]
8530
8531 /CollectionBaselineInterfaceURI:
8532     description: |
8533         OCF Collection Resource Type contains properties and links.
8534         The oic.if.baseline interface exposes a representation of
8535         the links and the properties of the collection resource itself
8536
8537     is : ['interface-baseline']
8538     get:
8539         description: |
8540             Retrieve on Baseline Interface
8541
8542     responses :
8543         200:
8544             body:
8545                 application/json:
8546                 schema: /
8547                     {
8548                         "$schema": "http://json-schema.org/draft-04/schema#",
8549                         "description" : "Copyright (c) 2016 Open Connectivity Foundation, Inc. All rights
8550 reserved.",
8551                         "id": "http://www.openconnectivity.org/ocf-apis/core/schemas/oic.collection-
8552 schema.json#",
8553                         "title": "Collection",
8554                         "definitions": {
8555                             "oic.collection.setoflinks": {
8556                                 "description": "A set (array) of simple or individual OIC Links. In
8557 addition to properties required for an OIC Link, the identifier for that link in this set is also
8558 required",
8559                                 "type": "array",
8560                                 "items": {
8561                                     "$ref": "oic.oic-link-schema.json#/definitions/oic.oic-link"
8562                                 }
8563                             },
8564                             "oic.collection.alllinks": {
8565                                 "description": "All forms of links in a collection",
8566                                 "oneOf": [
8567                                     {
8568                                         "$ref": "#/definitions/oic.collection.setoflinks"
8569                                     }
8570                                 ]
8571                             },
8572                             "oic.collection": {
8573                                 "type": "object",
8574                                 "description": "A collection is a set (array) of tagged-link or set
8575 (array) of simple links along with additional properties to describe the collection itself",
8576                                 "properties": {
8577                                     "n": {
8578                                         "type": "string",
8579                                         "description": "User friendly name of the
8580 collection"
8581                                     },
8582                                     "id": {

```

```

8582         "anyOf": [
8583             {
8584                 "type": "integer",
8585                 "description": "A number that is unique to that
8586 collection; like an ordinal number that is not repeated"
8587             },
8588             {
8589                 "type": "string",
8590                 "description": "A unique string that could be a hash or
8591 similarly unique"
8592             },
8593             {
8594                 "$ref": "oic.types-schema.json#/definitions/uuid",
8595                 "description": "A unique string that could be a UUIDv4"
8596             }
8597         ],
8598         "description": "ID for the collection. Can be an value that is
8599 unique to the use context or a UUIDv4"
8600     },
8601     "di": {
8602         "$ref": "oic.types-schema.json#/definitions/uuid",
8603         "description": "The device ID which is an UUIDv4 string; used for
8604 backward compatibility with Spec A definition of /oic/res"
8605     },
8606     "rts": {
8607         "$ref": "oic.core-
8608 schema.json#/definitions/oic.core/properties/rt",
8609         "description": "Defines the list of allowable resource types (for
8610 Target and anchors) in links included in the collection; new links being created can only be from
8611 this list"
8612     },
8613     "drel": {
8614         "type": "string",
8615         "description": "When specified this is the default relationship
8616 to use when an OIC Link does not specify an explicit relationship with *rel* parameter"
8617     },
8618     "links": {
8619         "$ref": "#/definitions/oic.collection.alllinks"
8620     }
8621 }
8622 },
8623 "type": "object",
8624 "allOf": [
8625     {"$ref": "oic.core-schema.json#/definitions/oic.core"},
8626     {"$ref": "#/definitions/oic.collection"}
8627 ]
8628 }
8629
8630 example: /
8631 {
8632     "rt": ["oic.wk.col"],
8633     "id": "unique_example_id",
8634     "rts": [ "oic.r.switch.binary", "oic.r.airflow" ],
8635     "links": [
8636         {
8637             "href": "switch",
8638             "rt": [ "oic.r.switch.binary" ],
8639             "if": [ "oic.if.a", "oic.if.baseline" ]
8640         },
8641         {
8642             "href": "airFlow",
8643             "rt": [ "oic.r.airflow" ],
8644             "if": [ "oic.if.a", "oic.if.baseline" ]
8645         }
8646     ]
8647 }
8648
8649 post:
8650     description: |

```

8651 Update on Baseline Interface

8652

8653 body:

8654 application/json:

```
8655     schema: /
8656     {
8657         "$schema": "http://json-schema.org/draft-04/schema#",
8658         "description": "Copyright (c) 2016 Open Connectivity Foundation, Inc. All rights
8659 reserved.",
8660         "id": "http://www.openconnectivity.org/ocf-apis/core/schemas/oic.collection-
8661 schema.json#",
8662         "title": "Collection",
8663         "definitions": {
8664             "oic.collection.setoflinks": {
8665                 "description": "A set (array) of simple or individual OIC Links. In addition
8666 to properties required for an OIC Link, the identifier for that link in this set is also required",
8667                 "type": "array",
8668                 "items": {
8669                     "$ref": "oic.oic-link-schema.json#/definitions/oic.oic-link"
8670                 }
8671             },
8672             "oic.collection.alllinks": {
8673                 "description": "All forms of links in a collection",
8674                 "oneOf": [
8675                     {
8676                         "$ref": "#/definitions/oic.collection.setoflinks"
8677                     }
8678                 ]
8679             },
8680             "oic.collection": {
8681                 "type": "object",
8682                 "description": "A collection is a set (array) of tagged-link or set (array)
8683 of simple links along with additional properties to describe the collection itself",
8684                 "properties": {
8685                     "n": {
8686                         "type": "string",
8687                         "description": "User friendly name of the
8688 collection"
8689                     },
8690                     "id": {
8691                         "anyOf": [
8692                             {
8693                                 "type": "integer",
8694                                 "description": "A number that is unique to that collection;
8695 like an ordinal number that is not repeated"
8696                             },
8697                             {
8698                                 "type": "string",
8699                                 "description": "A unique string that could be a hash or
8700 similarly unique"
8701                             }
8702                         ],
8703                         "$ref": "oic.types-schema.json#/definitions/uuid",
8704                         "description": "A unique string that could be a UUIDv4"
8705                     },
8706                     "description": "ID for the collection. Can be an value that is unique
8707 to the use context or a UUIDv4"
8708                 },
8709                 "di": {
8710                     "$ref": "oic.types-schema.json#/definitions/uuid",
8711                     "description": "The device ID which is an UUIDv4 string; used for
8712 backward compatibility with Spec A definition of /oic/res"
8713                 },
8714                 "rts": {
8715                     "$ref": "oic.core-schema.json#/definitions/oic.core.properties/rt",
8716                     "description": "Defines the list of allowable resource types (for
8717 Target and anchors) in links included in the collection; new links being created can only be from
8718 this list"
8719                 },
8720                 "drel": {
```

```

8720         "type": "string",
8721         "description": "When specified this is the default relationship to
use when an OIC Link does not specify an explicit relationship with *rel* parameter"
8722     },
8723     "links": {
8724         "$ref": "#/definitions/oic.collection.alllinks"
8725     }
8726 },
8727 },
8728 },
8729 },
8730     "type": "object",
8731     "allOf": [
8732         {"$ref": "oic.core-schema.json#/definitions/oic.core"},
8733         {"$ref": "#/definitions/oic.collection"}
8734     ]
8735 }
8736
8737 responses :
8738     200:
8739         body:
8740             application/json:
8741                 schema: /
8742                 {
8743                     "$schema": "http://json-schema.org/draft-04/schema#",
8744                     "description" : "Copyright (c) 2016 Open Connectivity Foundation, Inc. All rights
reserved.",
8745                     "id": "http://www.openconnectivity.org/ocf-apis/core/schemas/oic.collection-
schema.json#",
8746                     "title": "Collection",
8747                     "definitions": {
8748                         "oic.collection.setoflinks": {
8749                             "description": "A set (array) of simple or individual OIC Links. In
addition to properties required for an OIC Link, the identifier for that link in this set is also
required",
8750                             "type": "array",
8751                             "items": {
8752                                 "$ref": "oic.oic-link-schema.json#/definitions/oic.oic-link"
8753                             }
8754                         },
8755                         "oic.collection.alllinks": {
8756                             "description": "All forms of links in a collection",
8757                             "oneOf": [
8758                                 {
8759                                     "$ref": "#/definitions/oic.collection.setoflinks"
8760                                 }
8761                             ]
8762                         },
8763                         "oic.collection": {
8764                             "type": "object",
8765                             "description": "A collection is a set (array) of tagged-link or set
(array) of simple links along with additional properties to describe the collection itself",
8766                             "properties": {
8767                                 "n": {
8768                                     "type": "string",
8769                                     "description": "User friendly name of the
collection"
8770                                 },
8771                                 "id": {
8772                                     "anyOf": [
8773                                         {
8774                                             "type": "integer",
8775                                             "description": "A number that is unique to that
collection; like an ordinal number that is not repeated"
8776                                         },
8777                                         {
8778                                             "type": "string",
8779                                             "description": "A unique string that could be a hash or
similarly unique"
8780                                         }
8781                                     ]
8782                                 }
8783                             }
8784                         }
8785                     }
8786                 }
8787

```

```

8788         {
8789             "$ref": "oic.types-schema.json#/definitions/uuid",
8790             "description": "A unique string that could be a UUIDv4"
8791         },
8792     ],
8793     "description": "ID for the collection. Can be an value that is
8794 unique to the use context or a UUIDv4"
8795 },
8796     "di": {
8797         "$ref": "oic.types-schema.json#/definitions/uuid",
8798         "description": "The device ID which is an UUIDv4 string; used for
8799 backward compatibility with Spec A definition of /oic/res"
8800     },
8801     "rts": {
8802         "$ref": "oic.core-
8803 schema.json#/definitions/oic.core/properties/rt",
8804         "description": "Defines the list of allowable resource types (for
8805 Target and anchors) in links included in the collection; new links being created can only be from
8806 this list"
8807     },
8808     "drel": {
8809         "type": "string",
8810         "description": "When specified this is the default relationship
8811 to use when an OIC Link does not specify an explicit relationship with *rel* parameter"
8812     },
8813     "links": {
8814         "$ref": "#/definitions/oic.collection.alllinks"
8815     }
8816 },
8817 },
8818 "type": "object",
8819 "allOf": [
8820     {"$ref": "oic.core-schema.json#/definitions/oic.core"},
8821     {"$ref": "#/definitions/oic.collection"}
8822 ]
8823 }
8824

```

## 8825 E.2.5 Property Definition

8826 **Table 81 OIC 1.1 Collection Baseline Interface Property Definitions.**

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: 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

8827 **E.2.6 CRUDN behavior**

8828 **Table 82 OIC 1.1 Collection Baseline Interface CRUDN Operations.**

Resource	Create	Read	Update	Delete	Notify
/CollectionBaselineInterfaceURI		get	post		

8829 **E.2.7 Referenced JSON schemas**

8830 **E.2.8 oic.oic-link-schema.json**

```
8831 {
8832   "$schema": "http://json-schema.org/draft-04/schema#",
8833   "description": "Copyright (c) 2016 Open Connectivity Foundation, Inc. All rights reserved.",
8834   "id": "http://www.openconnectivity.org/ocf-apis/core/schemas/oic.oic-link-schema.json#",
8835   "definitions": {
8836     "oic.oic-link": {
```

```

8837     "type": "object",
8838     "properties": {
8839         "href": {
8840             "type": "string",
8841             "maxLength": 256,
8842             "description": "This is the target URI, it can be specified as a Relative Reference or
8843 fully-qualified URI. Relative Reference should be used along with the di parameter to make it
8844 unique.",
8845             "format": "uri"
8846         },
8847         "rel": {
8848             "oneOf": [
8849                 {
8850                     "type": "array",
8851                     "items": {
8852                         "type": "string",
8853                         "maxLength": 64
8854                     },
8855                     "minItems": 1,
8856                     "default": ["hosts"]
8857                 },
8858                 {
8859                     "type": "string",
8860                     "maxLength": 64,
8861                     "default": "hosts"
8862                 }
8863             ],
8864             "description": "The relation of the target URI referenced by the link to the context URI"
8865         },
8866         "rt": {
8867             "type": "array",
8868             "items": {
8869                 "type": "string",
8870                 "maxLength": 64
8871             },
8872             "minItems": 1,
8873             "description": "Resource Type"
8874         },
8875         "if": {
8876             "type": "array",
8877             "items": {
8878                 "type": "string",
8879                 "enum": ["oic.if.baseline", "oic.if.ll", "oic.if.b", "oic.if.rw", "oic.if.r",
8880 "oic.if.a", "oic.if.s" ]
8881             },
8882             "minItems": 1,
8883             "description": "The interface set supported by this resource"
8884         },
8885         "di": {
8886             "$ref": "oic.types-schema.json#/definitions/uuid",
8887             "description": "Unique identifier for device (UUID)"
8888         },
8889         "buri": {
8890             "type": "string",
8891             "description": "The base URI used to fully qualify a Relative Reference in the href
8892 parameter. Use the OCF Schema for URI",
8893             "maxLength": 256,
8894             "format": "uri"
8895         },
8896         "p": {
8897             "description": "Specifies the framework policies on the Resource referenced by the target
8898 URI",
8899             "type": "object",
8900             "properties": {
8901                 "bm": {
8902                     "description": "Specifies the framework policies on the Resource referenced by the
8903 target URI for e.g. observable and discoverable",
8904                     "type": "integer"
8905                 },
8906                 "sec": {
8907                     "description": "Specifies if security needs to be turned on when looking to interact

```

```

8908 with the Resource",
8909     "default": false,
8910     "type": "boolean"
8911   },
8912   "port": {
8913     "description": "Secure port to be used for connection",
8914     "type": "integer"
8915   }
8916 },
8917 "required" : ["bm"]
8918 },
8919 "title": {
8920   "type": "string",
8921   "maxLength": 64,
8922   "description": "A title for the link relation. Can be used by the UI to provide a
8923 context"
8924 },
8925 "anchor": {
8926   "type": "string",
8927   "maxLength": 256,
8928   "description": "This is used to override the context URI e.g. override the URI of the
8929 containing collection",
8930   "format": "uri"
8931 },
8932 "ins": {
8933   "oneOf": [
8934     {
8935       "type": "integer",
8936       "description": "An ordinal number that is not repeated - must be unique in the
8937 collection context"
8938     },
8939     {
8940       "type": "string",
8941       "maxLength": 256,
8942       "format": "uri",
8943       "description": "Any unique string including a URI"
8944     },
8945     {
8946       "$ref": "oic.types-schema.json#/definitions/uuid",
8947       "description": "Unique identifier (UUID)"
8948     }
8949   ],
8950   "description": "The instance identifier for this web link in an array of web links - used
8951 in collections"
8952 },
8953 "type": {
8954   "type": "array",
8955   "description": "A hint at the representation of the resource referenced by the target
8956 URI. This represents the media types that are used for both accepting and emitting",
8957   "items": {
8958     "type": "string",
8959     "maxLength": 64
8960   },
8961   "minItems": 1,
8962   "default": "application/cbor"
8963 }
8964 },
8965 "required": [ "href", "rt", "if" ]
8966 }
8967 },
8968 "type": "object",
8969 "allOf": [
8970   { "$ref": "#/definitions/oic.oic-link" }
8971 ]
8972 }
8973
8974

```



## 8975 E.3 Collection, link list interface

### 8976 E.3.1 Introduction

8977 OCF Collection Resource Type contains properties and links. The oic.if.ll interface exposes a  
8978 representation of the links

### 8979 E.3.2 Example URI

8980 /CollectionLinkListInterfaceURI

### 8981 E.3.3 Resource Type

8982 The resource type (rt) is defined as: oic.wk.col.

### 8983 E.3.4 RAML Definition

8984 `##RAML 0.8`

8985 `title: Collections`

8986 `version: 1.0`

8987 `traits:`

8988 `- interface-ll :`

8989  `queryParameters:`

8990  `if:`

8991  `enum: ["oic.if.ll"]`

8992 `- interface-b :`

8993  `queryParameters:`

8994  `if:`

8995  `enum: ["oic.if.b"]`

8996 `- interface-baseline :`

8997  `queryParameters:`

8998  `if:`

8999  `enum: ["oic.if.baseline"]`

9000

9001 `/CollectionLinkListInterfaceURI:`

9002  `description: |`

9003  `OCF Collection Resource Type contains properties and links.`

9004  `The oic.if.ll interface exposes a representation of the links`

9005

9006  `is : ['interface-ll']`

9007  `get:`

9008  `description: |`

9009  `Retrieve on Link List Interface`

9010

9011  `responses :`

9012  `200:`

9013  `body:`

9014  `application/json:`

9015  `schema: |`

9016  `{`  
9017  `"$schema": "http://json-schema.org/draft-v4/schema#",`

9018  `"description" : "Copyright (c) 2016 Open Connectivity Foundation, Inc. All rights`  
9019 `reserved.",`

9020  `"id": "http://www.openconnectivity.org/ocf-`

9021 `apis/core/schemas/oic.collection.linkslist-schema.json#",`

9022  `"definitions": {`

9023  `"oic.collection.alllinks": {`

9024  `"$ref": "oic.collection-`

9025 `schema.json#/definitions/oic.collection.alllinks"`

9026  `}`

9027  `},`

```

9028     "type": "object",
9029     "properties": {
9030         "links": {
9031             "$ref": "#/definitions/oic.collection.alllinks"
9032         }
9033     }
9034 }
9035
9036 example: /
9037 {
9038     "links":
9039     [
9040         {
9041             "href": "switch",
9042             "rt": ["oic.r.switch.binary"],
9043             "if": ["oic.if.a", "oic.if.baseline"]
9044         },
9045         {
9046             "href": "airFlow",
9047             "rt": ["oic.r.airflow"],
9048             "if": ["oic.if.a", "oic.if.baseline"]
9049         }
9050     ]
9051 }
9052

```

### 9053 E.3.5 Property Definition

9054 **Table 83 OIC 1.1 Collection Link List Interface Property Definitions.**

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: 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

9055 **E.3.6 CRUDN behavior**

9056 **Table 84 OIC 1.1 Collection Link List Interface CRUDN Operations.**

Resource	Create	Read	Update	Delete	Notify
/CollectionLinkListInterfaceURI		get			

9057 **E.3.7 Referenced JSON schemas**

9058 **E.3.8 oic.oic-link-schema.json**

```

9059 {
9060   "$schema": "http://json-schema.org/draft-04/schema#",
9061   "description": "Copyright (c) 2016 Open Connectivity Foundation, Inc. All rights reserved.",
9062   "id": "http://www.openconnectivity.org/ocf-apis/core/schemas/oic.oic-link-schema.json#",
9063   "definitions": {
9064     "oic.oic-link": {
9065       "type": "object",
9066       "properties": {
9067         "href": {
9068           "type": "string",
9069           "maxLength": 256,
9070           "description": "This is the target URI, it can be specified as a Relative Reference or
9071 fully-qualified URI. Relative Reference should be used along with the di parameter to make it
9072 unique.",
9073           "format": "uri"
9074         },
9075         "rel": {

```

```

9076     "oneOf": [
9077         {
9078             "type": "array",
9079             "items": {
9080                 "type": "string",
9081                 "maxLength": 64
9082             },
9083             "minItems": 1,
9084             "default": ["hosts"]
9085         },
9086         {
9087             "type": "string",
9088             "maxLength": 64,
9089             "default": "hosts"
9090         }
9091     ],
9092     "description": "The relation of the target URI referenced by the link to the context URI"
9093 },
9094     "rt": {
9095         "type": "array",
9096         "items": {
9097             "type": "string",
9098             "maxLength": 64
9099         },
9100         "minItems": 1,
9101         "description": "Resource Type"
9102     },
9103     "if": {
9104         "type": "array",
9105         "items": {
9106             "type": "string",
9107             "enum": ["oic.if.baseline", "oic.if.ll", "oic.if.b", "oic.if.rw", "oic.if.r",
9108 "oic.if.a", "oic.if.s" ]
9109         },
9110         "minItems": 1,
9111         "description": "The interface set supported by this resource"
9112     },
9113     "di": {
9114         "$ref": "oic.types-schema.json#/definitions/uuid",
9115         "description": "Unique identifier for device (UUID)"
9116     },
9117     "buri": {
9118         "type": "string",
9119         "description": "The base URI used to fully qualify a Relative Reference in the href
9120 parameter. Use the OCF Schema for URI",
9121         "maxLength": 256,
9122         "format": "uri"
9123     },
9124     "p": {
9125         "description": "Specifies the framework policies on the Resource referenced by the target
9126 URI",
9127         "type": "object",
9128         "properties": {
9129             "bm": {
9130                 "description": "Specifies the framework policies on the Resource referenced by the
9131 target URI for e.g. observable and discoverable",
9132                 "type": "integer"
9133             },
9134             "sec": {
9135                 "description": "Specifies if security needs to be turned on when looking to interact
9136 with the Resource",
9137                 "default": false,
9138                 "type": "boolean"
9139             },
9140             "port": {
9141                 "description": "Secure port to be used for connection",
9142                 "type": "integer"
9143             }
9144         },
9145         "required": ["bm"]
9146     },

```

```

9147         "title": {
9148             "type": "string",
9149             "maxLength": 64,
9150             "description": "A title for the link relation. Can be used by the UI to provide a
9151 context"
9152         },
9153         "anchor": {
9154             "type": "string",
9155             "maxLength": 256,
9156             "description": "This is used to override the context URI e.g. override the URI of the
9157 containing collection",
9158             "format": "uri"
9159         },
9160         "ins": {
9161             "oneOf": [
9162                 {
9163                     "type": "integer",
9164                     "description": "An ordinal number that is not repeated - must be unique in the
9165 collection context"
9166                 },
9167                 {
9168                     "type": "string",
9169                     "maxLength": 256,
9170                     "format": "uri",
9171                     "description": "Any unique string including a URI"
9172                 },
9173                 {
9174                     "$ref": "oic.types-schema.json#/definitions/uuid",
9175                     "description": "Unique identifier (UUID)"
9176                 }
9177             ],
9178             "description": "The instance identifier for this web link in an array of web links - used
9179 in collections"
9180         },
9181         "type": {
9182             "type": "array",
9183             "description": "A hint at the representation of the resource referenced by the target
9184 URI. This represents the media types that are used for both accepting and emitting",
9185             "items": {
9186                 "type": "string",
9187                 "maxLength": 64
9188             },
9189             "minItems": 1,
9190             "default": "application/cbor"
9191         }
9192     },
9193     "required": [ "href", "rt", "if" ]
9194 }
9195 },
9196 "type": "object",
9197 "allof": [
9198     { "$ref": "#/definitions/oic.oic-link" }
9199 ]
9200 }
9201
9202

```

## 9203 E.4 Discoverable Resources, baseline interface

### 9204 E.4.1 Introduction

9205 Baseline representation of /oic/res; list of discoverable resources

### 9206 E.4.2 Wellknown URI

9207 /oic/res

### 9208 E.4.3 Resource Type

9209 The resource type (rt) is defined as: oic.wk.res.

```

9210 E.4.4 RAML Definition
9211 ##RAML 0.8
9212 title: Discoverable Resources
9213 version: v1-20160622
9214 traits:
9215   - interface-ll :
9216     queryParameters:
9217       if:
9218         enum: ["oic.if.ll"]
9219   - interface-baseline :
9220     queryParameters:
9221       if:
9222         enum: ["oic.if.baseline"]
9223
9224 /oic-res-baseline-URI:
9225   description: |
9226     Baseline representation of /oic/res; list of discoverable resources
9227
9228   is : ['interface-baseline']
9229   get:
9230     description: |
9231       Retrieve the discoverable resource set, baseline interface
9232
9233     responses :
9234       200:
9235         body:
9236           application/json:
9237             schema: |
9238               {
9239                 "$schema": "http://json-schema.org/draft-v4/schema#",
9240                 "description" : "Copyright (c) 2016 Open Connectivity Foundation, Inc. All rights
9241 reserved.",
9242                 "id": "http://www.openconnectivity.org/ocf-apis/core/schemas/oic.wk.res-
9243 schema.json#",
9244                 "definitions": {
9245                   "oic.res-baseline": {
9246                     "type": "object",
9247                     "properties": {
9248                       "rt": {
9249                         "type": "array",
9250                         "items" : {
9251                           "type" : "string",
9252                           "maxLength": 64
9253                         },
9254                         "minItems" : 1,
9255                         "readOnly": true,
9256                         "description": "Resource Type"
9257                       },
9258                       "if": {
9259                         "type": "array",
9260                         "items": {
9261                           "type" : "string",
9262                           "enum" : ["oic.if.baseline", "oic.if.ll"]
9263                         },
9264                         "minItems": 1,
9265                         "readOnly": true,
9266                         "description": "The interface set supported by this resource"
9267                       },
9268                       "n": {
9269                         "type": "string",
9270                         "maxLength": 64,

```

```

9271         "readOnly": true,
9272         "description": "Human friendly name"
9273     },
9274     "di": {
9275         "$ref": "oic.types-schema.json#/definitions/uuid",
9276         "readOnly": true,
9277         "description": "Unique identifier for device (UUID) as indicated by the
9278 /oic/d resource of the device"
9279     },
9280     "mpro": {
9281         "readOnly": true,
9282         "description": "Supported messaging protocols",
9283         "type": "string",
9284         "maxLength": 64
9285     },
9286     "links": {
9287         "type": "array",
9288         "items": {
9289             "$ref": "oic.oic-link-schema.json#/definitions/oic.oic-link"
9290         }
9291     }
9292 },
9293 "required": ["rt", "if", "di", "links"]
9294 }
9295 },
9296 "description": "The list of resources expressed as OIC links",
9297 "type": "array",
9298 "items": {
9299     "$ref": "#/definitions/oic.res-baseline"
9300 }
9301 }
9302
9303 example: /
9304 [
9305     {
9306         "rt": ["oic.wk.res"],
9307         "if": ["oic.if.baseline", "oic.if.ll" ],
9308         "di": "0685B960-736F-46F7-BEC0-9E6CBD61ADC1",
9309         "links":
9310         [
9311             {
9312                 "href": "/humidity",
9313                 "rt": ["oic.r.humidity"],
9314                 "if": ["oic.if.s"]
9315             },
9316             {
9317                 "href": "/temperature",
9318                 "rt": ["oic.r.temperature"],
9319                 "if": ["oic.if.s"]
9320             }
9321         ]
9322     }
9323 ]
9324

```

#### E.4.5 Property Definition

**Table 85 OIC 1.1 Discoverable Resources Baseline Interface Property Definitions.**

Property name	Value type	Mandatory	Access mode	Description
rt	array: see schema	yes	Read Only	Resource Type
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
mpro	string		Read Only	Supported messaging protocols
n	string		Read Only	Human friendly name
if	array: see schema	yes	Read Only	The interface set supported by this resource

9327 **E.4.6 CRUDN behavior**

9328 **Table 86 OIC 1.1 Discoverable Resources Baseline Interface CRUDN Operation.**

Resource	Create	Read	Update	Delete	Notify
/oic/res		get			

9329 **E.5 Discoverable Resources, link list interface**

9330 **E.5.1 Introduction**

9331 Link list representation of /oic/res; list of discoverable resources

9332 **E.5.2 Wellknown URI**

9333 /oic/res

9334 **E.5.3 Resource Type**

9335 The resource type (rt) is defined as: oic.wk.res.

9336 **E.5.4 RAML Definition**

9337 `##RAML 0.8`

9338 `title: Discoverable Resources`

9339 `version: v1-20160622`

9340 `traits:`

9341 `- interface-ll :`

9342  `queryParameters:`

9343  `if:`

9344  `enum: ["oic.if.ll"]`

9345 `- interface-baseline :`

9346  `queryParameters:`

9347  `if:`

9348  `enum: ["oic.if.baseline"]`

9349

9350 `/oic-res-ll-URI:`

9351  `description: |`

9352  `Link list representation of /oic/res; list of discoverable resources`

9353

9354  `is : ['interface-ll']`

9355  `get:`

9356  `description: |`

9357  `Retrieve the discoverable resource set, link list interface`

9358

9359  `responses :`

9360  `200:`

9361  `body:`



```

9362     application/json:
9363         schema: /
9364             {
9365                 "$schema": "http://json-schema.org/draft-v4/schema#",
9366                 "description" : "Copyright (c) 2016 Open Connectivity Foundation, Inc. All rights
9367 reserved.",
9368                 "id": "http://www.openconnectivity.org/ocf-apis/core/schemas/oic.wk.res-schema-
9369 ll.json#",
9370                 "definitions": {
9371                     "oic.res-ll": {
9372                         "type": "object",
9373                         "properties": {
9374                             "di": {
9375                                 "$ref": "oic.types-schema.json#/definitions/uuid",
9376                                 "readOnly": true,
9377                                 "description": "Unique identifier for device (UUID) as indicated by the
9378 /oic/d resource of the device"
9379                             },
9380                             "links": {
9381                                 "type": "array",
9382                                 "items": {
9383                                     "$ref": "oic.oic-link-schema.json#/definitions/oic.oic-link"
9384                                 }
9385                             }
9386                         },
9387                         "required": ["di", "links"]
9388                     }
9389                 },
9390                 "description": "The list of resources expressed as OIC links with di ",
9391                 "type": "array",
9392                 "items": {
9393                     "$ref": "#/definitions/oic.res-ll"
9394                 }
9395             }
9396
9397         example: /
9398             [
9399                 {
9400                     "di": "0685B960-736F-46F7-BEC0-9E6CBD61ADC1",
9401                     "links":
9402                         [
9403                             {
9404                                 "href": "/humidity",
9405                                 "rt": ["oic.r.humidity"],
9406                                 "if": ["oic.if.s"]
9407                             },
9408                             {
9409                                 "href": "/temperature",
9410                                 "rt": ["oic.r.temperature"],
9411                                 "if": ["oic.if.s"]
9412                             }
9413                         ]
9414                 }
9415             ]
9416

```

### E.5.5 Property Definition

**Table 87 OIC 1.1 Discoverable Resources Link List Interface Property Definitions.**

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
huri	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

9419 **E.5.6 CRUDN behavior**

9420 **Table 88 OIC 1.1 Discoverable Resources Link List Interface CRUDN Operations.**

Resource	Create	Read	Update	Delete	Notify
/oic/res		get			

9421 **E.5.7 Referenced JSON schemas**

9422 **E.5.8 oic.oic-link-schema.json**

```

9423 {
9424   "$schema": "http://json-schema.org/draft-04/schema#",
9425   "description": "Copyright (c) 2016 Open Connectivity Foundation, Inc. All rights reserved.",
9426   "id": "http://www.openconnectivity.org/ocf-apis/core/schemas/oic.oic-link-schema.json#",
9427   "definitions": {
9428     "oic.oic-link": {
9429       "type": "object",
9430       "properties": {
9431         "href": {
9432           "type": "string",
9433           "maxLength": 256,
9434           "description": "This is the target URI, it can be specified as a Relative Reference or
9435 fully-qualified URI. Relative Reference should be used along with the di parameter to make it
9436 unique.",
9437           "format": "uri"
9438         },
9439         "rel": {
9440           "oneOf": [
9441             {
9442               "type": "array",
9443               "items": {
9444                 "type": "string",
9445                 "maxLength": 64
9446               },
9447               "minItems": 1,
9448               "default": ["hosts"]
9449             },
9450             {
9451               "type": "string",
9452               "maxLength": 64,
9453               "default": "hosts"
9454             }
9455           ],
9456           "description": "The relation of the target URI referenced by the link to the context URI"
9457         },
9458         "rt": {
9459           "type": "array",
9460           "items": {
9461             "type": "string",
9462             "maxLength": 64
9463           },
9464           "minItems": 1,
9465           "description": "Resource Type"
9466         },
9467         "if": {

```

```

9468         "type": "array",
9469         "items": {
9470             "type": "string",
9471             "enum": ["oic.if.baseline", "oic.if.ll", "oic.if.b", "oic.if.rw", "oic.if.r",
9472 "oic.if.a", "oic.if.s" ]
9473         },
9474         "minItems": 1,
9475         "description": "The interface set supported by this resource"
9476     },
9477     "di": {
9478         "$ref": "oic.types-schema.json#/definitions/uuid",
9479         "description": "Unique identifier for device (UUID)"
9480     },
9481     "buri": {
9482         "type": "string",
9483         "description": "The base URI used to fully qualify a Relative Reference in the href
9484 parameter. Use the OCF Schema for URI",
9485         "maxLength": 256,
9486         "format": "uri"
9487     },
9488     "p": {
9489         "description": "Specifies the framework policies on the Resource referenced by the target
9490 URI",
9491         "type": "object",
9492         "properties": {
9493             "bm": {
9494                 "description": "Specifies the framework policies on the Resource referenced by the
9495 target URI for e.g. observable and discoverable",
9496                 "type": "integer"
9497             },
9498             "sec": {
9499                 "description": "Specifies if security needs to be turned on when looking to interact
9500 with the Resource",
9501                 "default": false,
9502                 "type": "boolean"
9503             },
9504             "port": {
9505                 "description": "Secure port to be used for connection",
9506                 "type": "integer"
9507             }
9508         },
9509         "required": ["bm"]
9510     },
9511     "title": {
9512         "type": "string",
9513         "maxLength": 64,
9514         "description": "A title for the link relation. Can be used by the UI to provide a
9515 context"
9516     },
9517     "anchor": {
9518         "type": "string",
9519         "maxLength": 256,
9520         "description": "This is used to override the context URI e.g. override the URI of the
9521 containing collection",
9522         "format": "uri"
9523     },
9524     "ins": {
9525         "oneOf": [
9526             {
9527                 "type": "integer",
9528                 "description": "An ordinal number that is not repeated - must be unique in the
9529 collection context"
9530             },
9531             {
9532                 "type": "string",
9533                 "maxLength": 256,
9534                 "format": "uri",
9535                 "description": "Any unique string including a URI"
9536             },
9537             {
9538                 "$ref": "oic.types-schema.json#/definitions/uuid",

```

```

9539         "description": "Unique identifier (UUID)"
9540     }
9541 ],
9542     "description": "The instance identifier for this web link in an array of web links - used
9543 in collections"
9544 },
9545     "type": {
9546         "type": "array",
9547         "description": "A hint at the representation of the resource referenced by the target
9548 URI. This represents the media types that are used for both accepting and emitting",
9549         "items" : {
9550             "type": "string",
9551             "maxLength": 64
9552         },
9553         "minItems": 1,
9554         "default": "application/cbor"
9555     }
9556 },
9557     "required": [ "href", "rt", "if" ]
9558 }
9559 },
9560     "type": "object",
9561     "allOf": [
9562         { "$ref": "#/definitions/oic.oic-link" }
9563     ]
9564 }
9565
9566

```

## Annex F (informative)

### Swagger2.0 definitions

9567  
9568  
9569  
9570

#### 9571 **F.1 Icon**

##### 9572 **F.1.1 Introduction**

9573 This resource describes the attributes associated with an Icon.  
9574

##### 9575 **F.1.2 Example URI**

9576 /IconResURI

##### 9577 **F.1.3 Resource Type**

9578 The resource type (rt) is defined as: ['oic.r.icon'].

##### 9579 **F.1.4 Swagger2.0 Definition**

```
9580 {  
9581   "swagger": "2.0",  
9582   "info": {  
9583     "title": "Icon",  
9584     "version": "v1.1.0-20161107",  
9585     "license": {  
9586       "name": "copyright 2016-2017 Open Connectivity Foundation, Inc. All rights reserved.",  
9587       "x-description": "Redistribution and use in source and binary forms, with or without  
9588 modification, are permitted provided that the following conditions are met:\n      1.  
9589 Redistributions of source code must retain the above copyright notice, this list of conditions and  
9590 the following disclaimer.\n      2. Redistributions in binary form must reproduce the above  
9591 copyright notice, this list of conditions and the following disclaimer in the documentation and/or  
9592 other materials provided with the distribution.\n\n      THIS SOFTWARE IS PROVIDED BY THE Open  
9593 Connectivity Foundation, INC. \AS IS\ AND ANY EXPRESS OR IMPLIED WARRANTIES, INCLUDING, BUT NOT  
9594 LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE OR  
9595 WARRANTIES OF NON-INFRINGEMENT, ARE DISCLAIMED.\n\n      IN NO EVENT SHALL THE Open Connectivity  
9596 Foundation, INC. OR CONTRIBUTORS BE LIABLE FOR ANY DIRECT, INDIRECT, INCIDENTAL, SPECIAL,  
9597 EXEMPLARY, OR CONSEQUENTIAL DAMAGES (INCLUDING, BUT NOT LIMITED TO, PROCUREMENT OF SUBSTITUTE GOODS  
9598 OR SERVICES; LOSS OF USE, DATA, OR PROFITS; OR BUSINESS INTERRUPTION)\n\n      HOWEVER CAUSED AND  
9599 ON ANY THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT (INCLUDING NEGLIGENCE OR  
9600 OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OF THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY  
9601 OF SUCH DAMAGE.\n\n    }  
9602   },  
9603 },  
9604 "schemes": ["http"],  
9605 "consumes": ["application/json"],  
9606 "produces": ["application/json"],  
9607 "paths": {  
9608   "/IconResURI" : {  
9609     "get": {  
9610       "description": "This resource describes the attributes associated with an Icon.\nRetrieves  
9611 the current icon properties.\n",  
9612       "parameters": [  
9613         {"$ref": "#/parameters/interface"}  
9614       ],  
9615       "responses": {  
9616         "200": {  
9617           "description": "",  
9618           "x-example":  
9619             {  
9620               "rt": ["oic.r.icon"],  
9621               "id": "unique_example_id",  
9622               "mimetype": "image/png",  
9623               "width": 256,  
9624               "height": 256,  
9625               "media": "http://findbetter.ru/public/uploads/1481662800/2043.png"  
9626             }  
9627         }  
9628       }  
9629     }  
9630   }  
9631 }
```

```

9627         ,
9628         "schema": { "$ref": "#/definitions/Icon" }
9629     }
9630 }
9631 }
9632 }
9633 },
9634 "parameters": {
9635     "interface" : {
9636         "in" : "query",
9637         "name" : "if",
9638         "type" : "string",
9639         "enum" : ["oic.if.r", "oic.if.baseline"]
9640     }
9641 },
9642 "definitions": {
9643     "Icon" : {
9644         "properties": {
9645             "mimetype" :
9646                 {
9647                 "description": "The Media Type of the icon",
9648                 "maxLength": 64,
9649                 "readOnly": true,
9650                 "type": "string"
9651             },
9652
9653             "rt" :
9654                 {
9655                 "description": "Resource Type of the Resource",
9656                 "items": {
9657                     "maxLength": 64,
9658                     "type": "string"
9659                 },
9660                 "minItems": 1,
9661                 "readOnly": true,
9662                 "type": "array"
9663             },
9664
9665             "media" :
9666                 {
9667                 "description": "Specifies the URI to the icon",
9668                 "format": "uri",
9669                 "maxLength": 256,
9670                 "readOnly": true,
9671                 "type": "string"
9672             },
9673
9674             "n" :
9675                 {
9676                 "description": "Friendly name of the resource",
9677                 "maxLength": 64,
9678                 "readOnly": true,
9679                 "type": "string"
9680             },
9681
9682             "width" :
9683                 {
9684                 "description": "The width in pixels",
9685                 "minimum": 1,
9686                 "readOnly": true,
9687                 "type": "integer"
9688             },
9689
9690             "height" :
9691                 {
9692                 "description": "The height in pixels",
9693                 "minimum": 1,
9694                 "readOnly": true,
9695                 "type": "integer"
9696             },
9697

```

```

9698     "id" :
9699         {
9700             "description": "Instance ID of this specific resource",
9701             "maxLength": 64,
9702             "readOnly": true,
9703             "type": "string"
9704         },
9705
9706     "if" :
9707         {
9708             "description": "The interface set supported by this resource",
9709             "items": {
9710                 "enum": [
9711                     "oic.if.baseline",
9712                     "oic.if.ll",
9713                     "oic.if.b",
9714                     "oic.if.lb",
9715                     "oic.if.rw",
9716                     "oic.if.r",
9717                     "oic.if.a",
9718                     "oic.if.s"
9719                 ],
9720                 "type": "string"
9721             },
9722             "minItems": 1,
9723             "readOnly": true,
9724             "type": "array"
9725         }
9726     }
9727     , "type" : "object"
9728     , "required": ["mimetype", "width", "height", "media"]
9729 }
9730 }
9731 }
9732 }
9733

```

### 9734 F.1.5 Property Definition

9735 **Table 89 The properties definitions of the resource**

Property name	Value type	Mandatory	Access mode	Description
mimetype	string	Yes	Read Only	The Media Type of the icon
n	string	No	Read Only	Friendly name of the resource
media	string	Yes	Read Only	Specifies the URI to the icon
width	integer	Yes	Read Only	The width in pixels
height	integer	Yes	Read Only	The height in pixels
id	string	No	Read Only	Instance ID of this specific resource
rt	array: see schema	No	Read Only	Resource Type of the Resource



if	array: schema	see	No	Read Only	The interface set supported by this resource
----	------------------	-----	----	-----------	--

9736 **F.1.6 CRUDN behaviour**

9737 **Table 90 The CRUDN operations of the resource**

Resource	Create	Read	Update	Delete	Notify
/IconResURI		get			observe

9738 **F.2 Introspection Resource**

9739 **F.2.1 Introduction**

9740 This resource provides the means to get the device introspection data specifying all the  
9741 endpoints of the device.  
9742

9743 **F.2.2 Wellknown URI**

9744 /IntrospectionResURI

9745 **F.2.3 Resource Type**

9746 The resource type (rt) is defined as: ['oic.wk.introspection'].

9747 **F.2.4 Swagger2.0 Definition**

```

9748 {
9749   "swagger": "2.0",
9750   "info": {
9751     "title": "Introspection Resource",
9752     "version": "v1.0.0-20160707",
9753     "license": {
9754       "name": "copyright 2016-2017 Open Connectivity Foundation, Inc. All rights reserved.",
9755       "x-description": "Redistribution and use in source and binary forms, with or without
9756 modification, are permitted provided that the following conditions are met:\n      1.
9757 Redistributions of source code must retain the above copyright notice, this list of conditions and
9758 the following disclaimer.\n      2. Redistributions in binary form must reproduce the above
9759 copyright notice, this list of conditions and the following disclaimer in the documentation and/or
9760 other materials provided with the distribution.\n\n      THIS SOFTWARE IS PROVIDED BY THE Open
9761 Connectivity Foundation, INC. \ "AS IS\ " AND ANY EXPRESS OR IMPLIED WARRANTIES, INCLUDING, BUT NOT
9762 LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE OR
9763 WARRANTIES OF NON-INFRINGEMENT, ARE DISCLAIMED.\n\n      IN NO EVENT SHALL THE Open Connectivity
9764 Foundation, INC. OR CONTRIBUTORS BE LIABLE FOR ANY DIRECT, INDIRECT, INCIDENTAL, SPECIAL,
9765 EXEMPLARY, OR CONSEQUENTIAL DAMAGES (INCLUDING, BUT NOT LIMITED TO, PROCUREMENT OF SUBSTITUTE GOODS
9766 OR SERVICES; LOSS OF USE, DATA, OR PROFITS; OR BUSINESS INTERRUPTION)\n\n      HOWEVER CAUSED AND
9767 ON ANY THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT (INCLUDING NEGLIGENCE OR
9768 OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OF THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY
9769 OF SUCH DAMAGE.\n"
9770     }
9771   },
9772   "schemes": ["http"],
9773   "consumes": ["application/json"],
9774   "produces": ["application/json"],
9775   "paths": {
9776     "/IntrospectionResURI" : {
9777       "get": {
9778         "description": "This resource provides the means to get the device introspection data
9779 specifying all the endpoints of the device.\nThe url hosted by this resource is either a local or
9780 an external url.\n",
9781         "parameters": [
9782           {"$ref": "#/parameters/interface"}
9783         ],
9784         "responses": {
9785           "200": {
9786             "description": "",

```

```

9787         "x-example":
9788             {
9789                 "rt" : ["oic.wk.introspection"],
9790                 "urlInfo" : [
9791                     {
9792                         "content-type" : "application/cbor",
9793                         "protocol" : "coap",
9794                         "url" : "coap://[fe80::1]:1234/IntrospectionExampleURI"
9795                     }
9796                 ]
9797             }
9798         ,
9799         "schema": { "$ref": "#/definitions/oic.wk.introspectionInfo" }
9800     }
9801 }
9802 }
9803 }
9804 },
9805 "parameters": {
9806     "interface" : {
9807         "in" : "query",
9808         "name" : "if",
9809         "type" : "string",
9810         "enum" : ["oic.if.r", "oic.if.baseline"]
9811     }
9812 },
9813 "definitions": {
9814     "oic.wk.introspectionInfo" : {
9815         "properties": {
9816             "rt" :
9817                 {
9818                     "description": "Resource Type of the Resource",
9819                     "items": {
9820                         "maxLength": 64,
9821                         "type": "string"
9822                     },
9823                     "minItems": 1,
9824                     "readOnly": true,
9825                     "type": "array"
9826                 },
9827             "n" :
9828                 {
9829                     "description": "Friendly name of the resource",
9830                     "maxLength": 64,
9831                     "readOnly": true,
9832                     "type": "string"
9833                 },
9834             "urlInfo" :
9835                 {
9836                     "description": "Information on the location of the introspection data.",
9837                     "items": {
9838                         "properties": {
9839                             "content-type": {
9840                                 "default": "application/cbor",
9841                                 "description": "content-type of the introspection data",
9842                                 "enum": [
9843                                     "application/json",
9844                                     "application/cbor"
9845                                 ],
9846                                 "type": "string"
9847                             },
9848                             "protocol": {
9849                                 "description": "Identifier for the protocol to be used to obtain the introspection
9850 information",
9851                                 "enum": [
9852                                     "coap",
9853                                     "coaps",
9854                                     "http",
9855                                     "https",

```

```

9858         "coap+tcp",
9859         "coaps+tcp"
9860     ],
9861     "type": "string"
9862 },
9863 "url": {
9864     "description": "The URL of the introspection information.",
9865     "format": "uri",
9866     "type": "string"
9867 },
9868 "version": {
9869     "default": 1,
9870     "description": "The version of the introspection data that can be downloaded",
9871     "enum": [
9872         1
9873     ],
9874     "type": "integer"
9875 }
9876 },
9877 "required": [
9878     "url",
9879     "protocol"
9880 ],
9881 "type": "object"
9882 },
9883 "minItems": 1,
9884 "readOnly": true,
9885 "type": "array"
9886 },
9887
9888 "id" :
9889     {
9890     "description": "Instance ID of this specific resource",
9891     "maxLength": 64,
9892     "readOnly": true,
9893     "type": "string"
9894     },
9895
9896 "if" :
9897     {
9898     "description": "The interface set supported by this resource",
9899     "items": {
9900         "enum": [
9901             "oic.if.baseline",
9902             "oic.if.ll",
9903             "oic.if.b",
9904             "oic.if.lb",
9905             "oic.if.rw",
9906             "oic.if.r",
9907             "oic.if.a",
9908             "oic.if.s"
9909         ],
9910         "type": "string"
9911     },
9912     "minItems": 1,
9913     "readOnly": true,
9914     "type": "array"
9915     }
9916 }
9917 }
9918 , "type" : "object"
9919 }
9920 }
9921 }
9922

```

## 9923 F.2.5 Property Definition

9924 Table 91 The properties definitions of the resource

Property name	Value type	Mandatory	Access mode	Description
---------------	------------	-----------	-------------	-------------

rt	array: schema	see	No	Read Only	Resource Type of the Resource
if	array: schema	see	No	Read Only	The interface set supported by this resource
urlInfo	array: schema	see	No	Read Only	Information on the location of the introspection data.
n	string		No	Read Only	Friendly name of the resource
id	string		No	Read Only	Instance ID of this specific resource

9925 **F.2.6 CRUDN behaviour**

9926 **Table 92 The CRUDN operations of the resource**

Resource	Create	Read	Update	Delete	Notify
/IntrospectionResURI		get			observe

9927 **F.3 Atomic Measurement**

9928 **F.3.1 Introduction**

9929 The oic.if.baseline interface exposes a representation of the links and the common properties of  
9930 the Atomic Measurement resource.  
9931

9932 **F.3.2 Example URI**

9933 /AtomicMeasurementResURI

9934 **F.3.3 Resource Type**

9935 The resource type (rt) is defined as: ['oic.wk.atomicmeasurement'].

9936 **F.3.4 Swagger2.0 Definition**

```
9937 {
9938   "swagger": "2.0",
9939   "info": {
9940     "title": "Link List Representation",
9941     "version": "1.0",
9942     "license": {
9943       "name": "copyright 2016-2017 Open Connectivity Foundation, Inc. All rights reserved.",
9944       "x-description": "Redistribution and use in source and binary forms, with or without
9945 modification, are permitted provided that the following conditions are met:\n      1.
9946 Redistributions of source code must retain the above copyright notice, this list of conditions and
9947 the following disclaimer.\n      2. Redistributions in binary form must reproduce the above
9948 copyright notice, this list of conditions and the following disclaimer in the documentation and/or
9949 other materials provided with the distribution.\n      THIS SOFTWARE IS PROVIDED BY THE Open
9950 Connectivity Foundation, INC. \\"AS IS\\" AND ANY EXPRESS OR IMPLIED WARRANTIES, INCLUDING, BUT NOT
9951 LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE OR
9952 WARRANTIES OF NON-INFRINGEMENT, ARE DISCLAIMED.\n      IN NO EVENT SHALL THE Open Connectivity
9953 Foundation, INC. OR CONTRIBUTORS BE LIABLE FOR ANY DIRECT, INDIRECT, INCIDENTAL, SPECIAL,
9954 EXEMPLARY, OR CONSEQUENTIAL DAMAGES (INCLUDING, BUT NOT LIMITED TO, PROCUREMENT OF SUBSTITUTE GOODS
9955 OR SERVICES; LOSS OF USE, DATA, OR PROFITS; OR BUSINESS INTERRUPTION)\n      HOWEVER CAUSED AND
9956 ON ANY THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT (INCLUDING NEGLIGENCE OR
```

```

9957 OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OF THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY
9958 OF SUCH DAMAGE.\n"
9959     }
9960   },
9961   "schemes": ["http"],
9962   "consumes": ["application/json"],
9963   "produces": ["application/json"],
9964   "paths": {
9965     "/AtomicMeasurementResURI?if=oic.if.ll" : {
9966       "get": {
9967         "description": "The oic.if.ll interface exposes a representation of the links\nRetrieve on
9968 Link List Interface\n",
9969         "parameters": [
9970           { "$ref": "#/parameters/interface-ll" }
9971         ],
9972         "responses": {
9973           "200": {
9974             "description" : "",
9975             "x-example":
9976               [
9977                 {
9978                   "href": "temperature",
9979                   "rt": ["oic.r.temperature"],
9980                   "if": ["oic.if.s", "oic.if.baseline"]
9981                 },
9982                 {
9983                   "href": "bodylocation",
9984                   "rt": ["oic.r.body.location.temperature"],
9985                   "if": ["oic.if.s", "oic.if.baseline"]
9986                 },
9987                 {
9988                   "href": "timestamp",
9989                   "rt": ["oic.r.time.stamp"],
9990                   "if": ["oic.if.s", "oic.if.baseline"]
9991                 }
9992               ]
9993           },
9994           "schema": { "$ref": "#/definitions/links" }
9995         }
9996       }
9997     },
9998   },
9999   "/AtomicMeasurementResURI?if=oic.if.b" : {
10000     "get": {
10001       "description": "The oic.if.b interface returns data items retrieved from resources pointed
10002 to by the links.\nRetrieve the data elements of the Atomic Measurement using the OCF Batch
10003 Interface\n",
10004       "parameters": [
10005         { "$ref": "#/parameters/interface-b" }
10006       ],
10007       "responses": {
10008         "200": {
10009           "description" : "Normal response, no errors, all properties are returned
10010 correctly\n",
10011           "x-example":
10012             [
10013               {
10014                 "href": "temperature",
10015                 "rep":
10016                   {
10017                     "temperature": 38,
10018                     "units": "C",
10019                     "range": [25, 45]
10020                   }
10021               },
10022               {
10023                 "href": "bodylocation",
10024                 "rep":
10025                   {
10026                     "bloc": "ear"
10027                   }

```

```

10028         },
10029         {
10030             "href": "timestamp",
10031             "rep":
10032             {
10033                 "timestamp": "2007-04-05T14:30+09:00"
10034             }
10035         }
10036     ]
10037     ,
10038     "schema": { "$ref": "#/definitions/batch-retrieve" }
10039 }
10040 }
10041 }
10042 },
10043 "/AtomicMeasurementResURI?if=oic.if.baseline" : {
10044     "get": {
10045         "description": "The oic.if.baseline interface exposes a representation of the links
10046 and\nthe common properties of the Atomic Measurement resource.\nRetrieve on Baseline Interface\n",
10047         "parameters": [
10048             { "$ref": "#/parameters/interface-baseline" }
10049         ],
10050         "responses": {
10051             "200": {
10052                 "description" : "",
10053                 "x-example":
10054                 {
10055                     "rt": ["oic.wk.atomicmeasurement"],
10056                     "if": ["oic.if.b", "oic.if.ll", "oic.if.baseline"],
10057                     "rts": [ "oic.r.temperature", "oic.r.body.location.temperature",
10058 "oic.r.time.stamp" ],
10059                     "rts-m": [ "oic.r.temperature", "oic.r.body.location.temperature",
10060 "oic.r.time.stamp" ],
10061                     "links": [
10062                         {
10063                             "href": "temperature",
10064                             "rt": [ "oic.r.temperature" ],
10065                             "if": [ "oic.if.s", "oic.if.baseline" ]
10066                         },
10067                         {
10068                             "href": "bodylocation",
10069                             "rt": [ "oic.r.body.location.temperature" ],
10070                             "if": [ "oic.if.s", "oic.if.baseline" ]
10071                         },
10072                         {
10073                             "href": "timestamp",
10074                             "rt": [ "oic.r.time.stamp" ],
10075                             "if": [ "oic.if.s", "oic.if.baseline" ]
10076                         }
10077                     ]
10078                 }
10079             },
10080             "schema": { "$ref": "#/definitions/baseline" }
10081         }
10082     }
10083 }
10084 }
10085 },
10086 "parameters": {
10087     "interface-ll" : {
10088         "in" : "query",
10089         "name" : "if",
10090         "type" : "string",
10091         "enum" : [ "oic.if.ll" ]
10092     },
10093     "interface-b" : {
10094         "in" : "query",
10095         "name" : "if",
10096         "type" : "string",
10097         "enum" : [ "oic.if.b" ]
10098     },

```

```

10099     "interface-baseline" : {
10100         "in" : "query",
10101         "name" : "if",
10102         "type" : "string",
10103         "enum" : ["oic.if.baseline"]
10104     },
10105     "interface-all" : {
10106         "in" : "query",
10107         "name" : "if",
10108         "type" : "string",
10109         "enum" : ["oic.if.b", "oic.if.ll", "oic.if.baseline"]
10110     }
10111 },
10112 "definitions": {
10113     "links" : {
10114         "type" :
10115             "array"
10116     },
10117     "items" :
10118         {
10119             "$ref": "#/definitions/oic.oic-link"
10120         }
10121     }
10122 },
10123 ,
10124 "batch-retrieve" : {
10125     "title" :
10126         "Collection Batch Retrieve Format (auto merged)"
10127     },
10128     "minItems" :
10129         1
10130     },
10131     "items" :
10132         {
10133             "additionalProperties": true,
10134             "properties": {
10135                 "href": {
10136                     "description": "URI of the target resource relative assuming the collection URI as
10137 anchor",
10138                     "format": "uri",
10139                     "maxLength": 256,
10140                     "type": "string"
10141                 },
10142                 "rep": {
10143                     "oneOf": [
10144                         {
10145                             "description": "The response payload from a single resource",
10146                             "type": "object"
10147                         },
10148                         {
10149                             "description": " The response payload from a collection (batch) resource",
10150                             "items": {
10151                                 "properties": {
10152                                     "anchor": {
10153                                         "description": "This is used to override the context URI e.g. override the
10154 URI of the containing collection.",
10155                                         "format": "uri",
10156                                         "maxLength": 256,
10157                                         "type": "string"
10158                                     },
10159                                     "di": {
10160                                         "allOf": [
10161                                             {
10162                                                 "description": "Format pattern according to IETF RFC 4122.",
10163                                                 "pattern": "^[a-fA-F0-9]{8}-[a-fA-F0-9]{4}-[a-fA-F0-9]{4}-[a-fA-F0-9]{4}-
10164 [a-fA-F0-9]{12}$",
10165                                                 "type": "string"
10166                                             },
10167                                             {
10168                                                 "description": "The device ID"
10169                                             }
10170                                         ]
10171                                     }
10172                                 }
10173                             }
10174                         }
10175                     ]
10176                 }
10177             }
10178         }

```

```

10170         ]
10171     },
10172     "eps": {
10173         "description": "the Endpoint information of the target Resource",
10174         "items": {
10175             "properties": {
10176                 "ep": {
10177                     "description": "Transport Protocol Suite + Endpoint Locator",
10178                     "format": "uri",
10179                     "type": "string"
10180                 },
10181                 "pri": {
10182                     "description": "The priority among multiple Endpoints",
10183                     "minimum": 1,
10184                     "type": "integer"
10185                 }
10186             },
10187             "type": "object"
10188         },
10189         "type": "array"
10190     },
10191     "href": {
10192         "description": "This is the target URI, it can be specified as a Relative
10193 Reference or fully-qualified URI.",
10194         "format": "uri",
10195         "maxLength": 256,
10196         "type": "string"
10197     },
10198     "if": {
10199         "description": "The interface set supported by this resource",
10200         "items": {
10201             "enum": [
10202                 "oic.if.baseline",
10203                 "oic.if.ll",
10204                 "oic.if.b",
10205                 "oic.if.rw",
10206                 "oic.if.r",
10207                 "oic.if.a",
10208                 "oic.if.s"
10209             ],
10210             "type": "string"
10211         },
10212         "minItems": 1,
10213         "type": "array"
10214     },
10215     "ins": {
10216         "description": "The instance identifier for this web link in an array of web
10217 links - used in collections",
10218         "type": "integer"
10219     },
10220     "p": {
10221         "description": "Specifies the framework policies on the Resource referenced
10222 by the target URI",
10223         "properties": {
10224             "bm": {
10225                 "description": "Specifies the framework policies on the Resource
10226 referenced by the target URI for e.g. observable and discoverable",
10227                 "type": "integer"
10228             }
10229         },
10230         "required": [
10231             "bm"
10232         ],
10233         "type": "object"
10234     },
10235     "rel": {
10236         "description": "The relation of the target URI referenced by the link to the
10237 context URI",
10238         "oneOf": [
10239             {
10240                 "default": [

```



```

10241         "hosts"
10242     ],
10243     "items": {
10244         "maxLength": 64,
10245         "type": "string"
10246     },
10247     "minItems": 1,
10248     "type": "array"
10249 },
10250 {
10251     "default": "hosts",
10252     "maxLength": 64,
10253     "type": "string"
10254 }
10255 ]
10256 },
10257 "rt": {
10258     "description": "Resource Type of the Resource",
10259     "items": {
10260         "maxLength": 64,
10261         "type": "string"
10262     },
10263     "minItems": 1,
10264     "type": "array"
10265 },
10266 "title": {
10267     "description": "A title for the link relation. Can be used by the UI to
10268 provide a context.",
10269     "maxLength": 64,
10270     "type": "string"
10271 },
10272 "type": {
10273     "default": "application/cbor",
10274     "description": "A hint at the representation of the resource referenced by
10275 the target URI. This represents the media types that are used for both accepting and emitting.",
10276     "items": {
10277         "maxLength": 64,
10278         "type": "string"
10279     },
10280     "minItems": 1,
10281     "type": "array"
10282 }
10283 },
10284 "required": [
10285     "href",
10286     "rt",
10287     "if"
10288 ],
10289 "type": "object"
10290 },
10291 "type": "array"
10292 }
10293 ]
10294 }
10295 },
10296 "required": [
10297     "href",
10298     "rep"
10299 ],
10300 "type": "object"
10301 }
10302
10303 , "type" :
10304     "array"
10305 }
10306
10307 ,
10308 "baseline" : {
10309     "properties": {
10310         "links" :
10311         {

```

```

10312         "description": "A set of simple or individual OIC Links.",
10313         "items": {
10314             "$ref": "#/definitions/oic.oic-link"
10315         },
10316         "type": "array"
10317     }
10318 }
10319 }
10320     , "type" : "object"
10321 }
10322     , "uuid" :
10323     {
10324         "description": "Format pattern according to IETF RFC 4122.",
10325         "pattern": "^[a-fA-F0-9]{8}-[a-fA-F0-9]{4}-[a-fA-F0-9]{4}-[a-fA-F0-9]{4}-[a-fA-F0-9]{12}$",
10326         "type": "string"
10327     }
10328 }
10329     , "oic.collection.links.arrayoflinks" :
10330     {
10331         "properties": {
10332             "links": {
10333                 "description": "A set of simple or individual OIC Links.",
10334                 "items": {
10335                     "properties": {
10336                         "anchor": {
10337 the containing collection.",
10338                             "description": "This is used to override the context URI e.g. override the URI of
10339                             "format": "uri",
10340                             "maxLength": 256,
10341                             "type": "string"
10342                         },
10343                         "di": {
10344                             "description": "The Device ID formatted according to IETF RFC 4122.",
10345                             "pattern": "^[a-fA-F0-9]{8}-[a-fA-F0-9]{4}-[a-fA-F0-9]{4}-[a-fA-F0-9]{4}-[a-fA-F0-
10346 9]{12}$",
10347                             "type": "string"
10348                         },
10349                         "eps": {
10350                             "description": "the Endpoint information of the target Resource",
10351                             "items": {
10352                                 "properties": {
10353                                     "ep": {
10354                                         "description": "Transport Protocol Suite + Endpoint Locator",
10355                                         "format": "uri",
10356                                         "type": "string"
10357                                     },
10358                                     "pri": {
10359                                         "description": "The priority among multiple Endpoints",
10360                                         "minimum": 1,
10361                                         "type": "integer"
10362                                     }
10363                                 },
10364                                 "type": "object"
10365                             },
10366                             "type": "array"
10367                         },
10368                         "href": {
10369 or fully-qualified URI.",
10370                             "description": "This is the target URI, it can be specified as a Relative Reference
10371                             "format": "uri",
10372                             "maxLength": 256,
10373                             "type": "string"
10374                         },
10375                         "if": {
10376                             "description": "The interface set supported by this resource",
10377                             "items": {
10378                                 "enum": [
10379                                     "oic.if.baseline",
10380                                     "oic.if.ll",
10381                                     "oic.if.b",
10382                                     "oic.if.rw",

```

```

10383         "oic.if.r",
10384         "oic.if.a",
10385         "oic.if.s"
10386     ],
10387     "type": "string"
10388 },
10389     "minItems": 1,
10390     "type": "array"
10391 },
10392     "ins": {
10393         "description": "The instance identifier for this web link in an array of web links
10394 - used in collections",
10395         "type": "integer"
10396     },
10397     "p": {
10398         "description": "Specifies the framework policies on the Resource referenced by the
10399 target URI",
10400         "properties": {
10401             "bm": {
10402                 "description": "Specifies the framework policies on the Resource referenced by
10403 the target URI for e.g. observable and discoverable",
10404                 "type": "integer"
10405             }
10406         },
10407         "required": [
10408             "bm"
10409         ],
10410         "type": "object"
10411     },
10412     "rel": {
10413         "description": "The relation of the target URI referenced by the link to the
10414 context URI",
10415         "oneOf": [
10416             {
10417                 "default": [
10418                     "hosts"
10419                 ],
10420                 "items": {
10421                     "maxLength": 64,
10422                     "type": "string"
10423                 },
10424                 "minItems": 1,
10425                 "type": "array"
10426             },
10427             {
10428                 "default": "hosts",
10429                 "maxLength": 64,
10430                 "type": "string"
10431             }
10432         ]
10433     },
10434     "rt": {
10435         "description": "Resource Type of the Resource",
10436         "items": {
10437             "maxLength": 64,
10438             "type": "string"
10439         },
10440         "minItems": 1,
10441         "type": "array"
10442     },
10443     "title": {
10444         "description": "A title for the link relation. Can be used by the UI to provide a
10445 context.",
10446         "maxLength": 64,
10447         "type": "string"
10448     },
10449     "type": {
10450         "default": "application/cbor",
10451         "description": "A hint at the representation of the resource referenced by the
10452 target URI. This represents the media types that are used for both accepting and emitting.",
10453         "items": {

```

```

10454         "maxLength": 64,
10455         "type": "string"
10456     },
10457     "minItems": 1,
10458     "type": "array"
10459 }
10460 },
10461     "required": [
10462         "href",
10463         "rt",
10464         "if"
10465     ],
10466     "type": "object"
10467 },
10468     "type": "array"
10469 }
10470 }
10471 }
10472
10473     , "oic.collection.properties" :
10474     {
10475         "description": "A collection is a set of links along with additional properties to describe
10476 the collection itself",
10477         "properties": {
10478             "rts": {
10479                 "$ref": "#/definitions/oic.core/properties/rt",
10480                 "description": "The list of allowable resource types (for Target and anchors) in links
10481 included in the collection"
10482             },
10483             "rts-m": {
10484                 "$ref": "#/definitions/oic.core/properties/rt",
10485                 "description": "The list of mandatory resources if any in links included in the
10486 collection"
10487             }
10488         },
10489         "type": "object"
10490     }
10491
10492     , "oic.core" :
10493     {
10494         "properties": {
10495             "rt": {
10496                 "description": "Resource Type of the Resource",
10497                 "items": {
10498                     "maxLength": 64,
10499                     "type": "string"
10500                 },
10501                 "minItems": 1,
10502                 "readOnly": true,
10503                 "type": "array"
10504             }
10505         },
10506         "type": "object"
10507     }
10508
10509     , "oic.collection.links" :
10510     {
10511         "properties": {
10512             "links": {
10513                 "description": "A set of simple or individual OIC Links.",
10514                 "items": {
10515                     "$ref": "#/definitions/oic.oic-link"
10516                 },
10517                 "type": "array"
10518             }
10519         }
10520     }
10521
10522     , "oic.oic-link" :
10523     {
10524         "properties": {

```

```

10525     "anchor": {
10526         "description": "This is used to override the context URI e.g. override the URI of the
10527 containing collection.",
10528         "format": "uri",
10529         "maxLength": 256,
10530         "type": "string"
10531     },
10532     "di": {
10533         "description": "The Device ID formatted according to IETF RFC 4122.",
10534         "pattern": "^[a-fA-F0-9]{8}-[a-fA-F0-9]{4}-[a-fA-F0-9]{4}-[a-fA-F0-
10535 9]{12}$",
10536         "type": "string"
10537     },
10538     "eps": {
10539         "description": "the Endpoint information of the target Resource",
10540         "items": {
10541             "properties": {
10542                 "ep": {
10543                     "description": "Transport Protocol Suite + Endpoint Locator",
10544                     "format": "uri",
10545                     "type": "string"
10546                 },
10547                 "pri": {
10548                     "description": "The priority among multiple Endpoints",
10549                     "minimum": 1,
10550                     "type": "integer"
10551                 }
10552             },
10553             "type": "object"
10554         },
10555         "type": "array"
10556     },
10557     "href": {
10558         "description": "This is the target URI, it can be specified as a Relative Reference or
10559 fully-qualified URI.",
10560         "format": "uri",
10561         "maxLength": 256,
10562         "type": "string"
10563     },
10564     "if": {
10565         "description": "The interface set supported by this resource",
10566         "items": {
10567             "enum": [
10568                 "oic.if.baseline",
10569                 "oic.if.ll",
10570                 "oic.if.b",
10571                 "oic.if.rw",
10572                 "oic.if.r",
10573                 "oic.if.a",
10574                 "oic.if.s"
10575             ],
10576             "type": "string"
10577         },
10578         "minItems": 1,
10579         "type": "array"
10580     },
10581     "ins": {
10582         "description": "The instance identifier for this web link in an array of web links - used
10583 in collections",
10584         "type": "integer"
10585     },
10586     "p": {
10587         "description": "Specifies the framework policies on the Resource referenced by the target
10588 URI",
10589         "properties": {
10590             "bm": {
10591                 "description": "Specifies the framework policies on the Resource referenced by the
10592 target URI for e.g. observable and discoverable",
10593                 "type": "integer"
10594             }
10595         },

```

```

10596         "required": [
10597             "bm"
10598         ],
10599         "type": "object"
10600     },
10601     "rel": {
10602         "description": "The relation of the target URI referenced by the link to the context
10603 URI",
10604         "oneOf": [
10605             {
10606                 "default": [
10607                     "hosts"
10608                 ],
10609                 "items": {
10610                     "maxLength": 64,
10611                     "type": "string"
10612                 },
10613                 "minItems": 1,
10614                 "type": "array"
10615             },
10616             {
10617                 "default": "hosts",
10618                 "maxLength": 64,
10619                 "type": "string"
10620             }
10621         ]
10622     },
10623     "rt": {
10624         "description": "Resource Type of the Resource",
10625         "items": {
10626             "maxLength": 64,
10627             "type": "string"
10628         },
10629         "minItems": 1,
10630         "type": "array"
10631     },
10632     "title": {
10633         "description": "A title for the link relation. Can be used by the UI to provide a
10634 context.",
10635         "maxLength": 64,
10636         "type": "string"
10637     },
10638     "type": {
10639         "default": "application/cbor",
10640         "description": "A hint at the representation of the resource referenced by the target
10641 URI. This represents the media types that are used for both accepting and emitting.",
10642         "items": {
10643             "maxLength": 64,
10644             "type": "string"
10645         },
10646         "minItems": 1,
10647         "type": "array"
10648     }
10649 },
10650 "required": [
10651     "href",
10652     "rt",
10653     "if"
10654 ],
10655 "type": "object"
10656 }
10657 }
10658 }
10659 }
10660

```

### 10661 F.3.5 Property Definition

10662 Table 93 The properties definitions of the resource

Property name	Value type	Mandatory	Access mode	Description
---------------	------------	-----------	-------------	-------------

links	array: see schema		Read Write	A set of simple or individual OIC Links.
rts	multiple types: see schema		Read Write	The list of allowable resource types (for Target and anchors) in links included in the collection
rts-m	multiple types: see schema		Read Write	The list of mandatory resources if any in links included in the collection
rt	array: see schema		Read Only	Resource Type of the Resource
href	string	Yes	Read Write	This is the target URI, it can be specified as a Relative Reference or fully-qualified URI.
rt	array: see schema	Yes	Read Write	Resource Type of the Resource
di	string	No	Read Write	The Device ID formatted according to IETF RFC 4122.
type	array: see schema	No	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.
rel	multiple types: see schema	No	Read Write	The relation of the target URI referenced by the link to the context URI
anchor	string	No	Read Write	

				This is used to override the context URI e.g. override the URI of the containing collection.
ins	integer	No	Read Write	The instance identifier for this web link in an array of web links - used in collections
title	string	No	Read Write	A title for the link relation. Can be used by the UI to provide a context.
p	object: see schema	No	Read Write	Specifies the framework policies on the Resource referenced by the target URI
if	array: see schema	Yes	Read Write	The interface set supported by this resource
eps	array: see schema	No	Read Write	the Endpoint information of the target Resource
href	string	Yes	Read Write	URI of the target resource relative assuming the collection URI as anchor
rep	multiple types: see schema	Yes	Read Write	
links	array: see schema	No	Read Write	A set of simple or individual OIC Links.
links	array: see schema		Read Write	A set of simple or individual OIC Links.

10663

**F.3.6 CRUDN behaviour**

10664

**Table 94 The CRUDN operations of the resource**

Resource	Create	Read	Update	Delete	Notify
----------	--------	------	--------	--------	--------



/AtomicMeasurementResURI		get			observe
--------------------------	--	-----	--	--	---------

10665 **F.4 OCF Collection**

10666 **F.4.1 Introduction**

10667 OCF Collection Resource Type contains properties and links. The oic.if.baseline interface  
 10668 exposes a representation of the links and the properties of the collection resource itself  
 10669

10670 **F.4.2 Example URI**

10671 /CollectionResURI

10672 **F.4.3 Resource Type**

10673 The resource type (rt) is defined as: ['oic.wk.col'].

10674 **F.4.4 Swagger2.0 Definition**

```

10675 {
10676   "swagger": "2.0",
10677   "info": {
10678     "title": "OCF Collection",
10679     "version": "1.0",
10680     "license": {
10681       "name": "copyright 2016-2017 Open Connectivity Foundation, Inc. All rights reserved.",
10682       "x-description": "Redistribution and use in source and binary forms, with or without
10683 modification, are permitted provided that the following conditions are met:\n      1.
10684 Redistributions of source code must retain the above copyright notice, this list of conditions and
10685 the following disclaimer.\n      2. Redistributions in binary form must reproduce the above
10686 copyright notice, this list of conditions and the following disclaimer in the documentation and/or
10687 other materials provided with the distribution.\n\n      THIS SOFTWARE IS PROVIDED BY THE Open
10688 Connectivity Foundation, INC. \AS IS\ AND ANY EXPRESS OR IMPLIED WARRANTIES, INCLUDING, BUT NOT
10689 LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE OR
10690 WARRANTIES OF NON-INFRINGEMENT, ARE DISCLAIMED.\n      IN NO EVENT SHALL THE Open Connectivity
10691 Foundation, INC. OR CONTRIBUTORS BE LIABLE FOR ANY DIRECT, INDIRECT, INCIDENTAL, SPECIAL,
10692 EXEMPLARY, OR CONSEQUENTIAL DAMAGES (INCLUDING, BUT NOT LIMITED TO, PROCUREMENT OF SUBSTITUTE GOODS
10693 OR SERVICES; LOSS OF USE, DATA, OR PROFITS; OR BUSINESS INTERRUPTION)\n      HOWEVER CAUSED AND
10694 ON ANY THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT (INCLUDING NEGLIGENCE OR
10695 OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OF THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY
10696 OF SUCH DAMAGE.\n"
10697     }
10698   },
10699   "schemes": ["http"],
10700   "consumes": ["application/json"],
10701   "produces": ["application/json"],
10702   "paths": {
10703     "/CollectionResURI?if=oic.if.baseline" : {
10704       "get": {
10705         "description": "OCF Collection Resource Type contains properties and links.\nThe
10706 oic.if.baseline interface exposes a representation of\nthe links and the properties of the
10707 collection resource itself\nRetrieve on Baseline Interface\n",
10708         "parameters": [
10709           { "$ref": "#/parameters/interface-baseline" }
10710         ],
10711         "responses": {
10712           "200": {
10713             "description": "",
10714             "x-example":
10715             {
10716               "rt": ["oic.wk.col"],
10717               "id": "unique_example_id",
10718               "rts": [ "oic.r.switch.binary", "oic.r.airflow" ],
10719               "rts-m": [ "oic.r.switch.binary" ],
10720               "links": [
10721                 {
10722                   "href": "switch",
10723                   "rt": [ "oic.r.switch.binary" ],
10724                   "if": [ "oic.if.a", "oic.if.baseline" ],
10725                   "eps": [

```

```

10726         {"ep": "coap://[fe80::b1d6]:1111", "pri": 2},
10727         {"ep": "coaps://[fe80::b1d6]:1122"},
10728         {"ep": "coap+tcp://[2001:db8:a::123]:2222", "pri": 3}
10729     ]
10730 },
10731 {
10732     "href": "airFlow",
10733     "rt": ["oic.r.airflow"],
10734     "if": ["oic.if.a", "oic.if.baseline"],
10735     "eps": [
10736         {"ep": "coap://[fe80::b1d6]:1111", "pri": 2},
10737         {"ep": "coaps://[fe80::b1d6]:1122"},
10738         {"ep": "coap+tcp://[2001:db8:a::123]:2222", "pri": 3}
10739     ]
10740 }
10741 ]
10742 }
10743 ,
10744     "schema": { "$ref": "#/definitions/sbaseline" }
10745 }
10746 },
10747 },
10748 "post": {
10749     "description": "Update on Baseline Interface\n",
10750     "parameters": [
10751         {"$ref": "#/parameters/interface-baseline"},
10752         {
10753             "name": "body",
10754             "in": "body",
10755             "required": true,
10756             "schema": { "$ref": "#/definitions/sbaseline" }
10757         }
10758     ],
10759     "responses": {
10760         "200": {
10761             "description": "",
10762             "schema": { "$ref": "#/definitions/sbaseline" }
10763         }
10764     }
10765 }
10766 },
10767 "/CollectionResURI?if=oic.if.b" : {
10768     "get": {
10769         "description": "OCF Collection Resource Type contains properties and links.\n\nThe oic.if.b
10770 interface exposes a composite representation of the\n\nresources pointed to by the links\n\nRetrieve
10771 on Batch Interface\n",
10772         "parameters": [
10773             {"$ref": "#/parameters/interface-b"}
10774         ],
10775         "responses": {
10776             "200": {
10777                 "description": "All targets returned OK status (HTTP 200 or CoAP 2.05 Content)",
10778                 "x-example":
10779                 [
10780                     {
10781                         "href": "switch",
10782                         "rep":
10783                         {
10784                             "value": true
10785                         }
10786                     },
10787                     {
10788                         "href": "airFlow",
10789                         "rep":
10790                         {
10791                             "direction": "floor",
10792                             "speed": 3
10793                         }
10794                     }
10795                 ]
10796             }
10797         }
10798     }
10799 }

```

```

10797         "schema": { "$ref": "#/definitions/sbatch-retrieve" }
10798     },
10799     "404": {
10800         "description": "One or more targets did not return an OK status, return a
10801 representation containing returned properties from the targets that returned OK",
10802         "x-example":
10803             [
10804                 {
10805                     "href": "switch",
10806                     "rep":
10807                         {
10808                             "value": true
10809                         }
10810                 }
10811             ]
10812         ,
10813         "schema": { "$ref": "#/definitions/sbatch-retrieve" }
10814     }
10815 },
10816 ],
10817 "post": {
10818     "description": "Update on Batch Interface\n",
10819     "parameters": [
10820         { "$ref": "#/parameters/interface-b" },
10821         {
10822             "name": "body",
10823             "in": "body",
10824             "required": true,
10825             "schema": { "$ref": "#/definitions/sbatch-update" },
10826             "x-example":
10827                 [
10828                     {
10829                         "href": "switch",
10830                         "rep":
10831                             {
10832                                 "value": true
10833                             }
10834                     },
10835                     {
10836                         "href": "airFlow",
10837                         "rep":
10838                             {
10839                                 "direction": "floor",
10840                                 "speed": 3
10841                             }
10842                     }
10843                 ]
10844         }
10845     ],
10846     "responses": {
10847         "200": {
10848             "description": "all targets returned OK status (HTTP 200 or CoAP 2.04 Changed)
10849 return a representation of the current state of all targets",
10850             "x-example":
10851                 [
10852                     {
10853                         "href": "switch",
10854                         "rep":
10855                             {
10856                                 "value": true
10857                             }
10858                     },
10859                     {
10860                         "href": "airFlow",
10861                         "rep":
10862                             {
10863                                 "direction": "demist",
10864                                 "speed": 5
10865                             }
10866                     }
10867                 ]

```

```

10868         ,
10869         "schema": { "$ref": "#/definitions/sbatch-retrieve" }
10870     },
10871     "403": {
10872         "description": "one or more targets did not return OK status; return a retrieve
representation of the current state of all targets in the batch",
10873         "x-example":
10874             [
10875                 {
10876                     "href": "switch",
10877                     "rep":
10878                         {
10879                             "value": true
10880                         }
10881                 },
10882                 {
10883                     "href": "airFlow",
10884                     "rep":
10885                         {
10886                             "direction": "floor",
10887                             "speed": 3
10888                         }
10889                 }
10890             ]
10891     },
10892     ,
10893     "schema": { "$ref": "#/definitions/sbatch-retrieve" }
10894 }
10895 }
10896 },
10897 },
10898 "/CollectionResURI?if=oic.if.ll" : {
10899     "get": {
10900         "description": "OCF Collection Resource Type contains properties and links.\nThe oic.if.ll
interface exposes a representation of the links\nRetrieve on Link List Interface\n",
10901         "parameters": [
10902             { "$ref": "#/parameters/interface-ll" }
10903         ],
10904         "responses": {
10905             "200": {
10906                 "description": "",
10907                 "x-example":
10908                     [
10909                         {
10910                             "href": "switch",
10911                             "rt": ["oic.r.switch.binary"],
10912                             "if": ["oic.if.a", "oic.if.baseline"],
10913                             "eps": [
10914                                 { "ep": "coap://[fe80::b1d6]:1111", "pri": 2 },
10915                                 { "ep": "coaps://[fe80::b1d6]:1122" },
10916                                 { "ep": "coap+tcp://[2001:db8:a::123]:2222", "pri": 3 }
10917                             ]
10918                         },
10919                         {
10920                             "href": "airFlow",
10921                             "rt": ["oic.r.airflow"],
10922                             "if": ["oic.if.a", "oic.if.baseline"],
10923                             "eps": [
10924                                 { "ep": "coap://[fe80::b1d6]:1111", "pri": 2 },
10925                                 { "ep": "coaps://[fe80::b1d6]:1122" },
10926                                 { "ep": "coap+tcp://[2001:db8:a::123]:2222", "pri": 3 }
10927                             ]
10928                         }
10929                     ]
10930             }
10931         },
10932         "schema": { "$ref": "#/definitions/slinks" }
10933     }
10934 }
10935 }
10936 },
10937 },
10938 "parameters": {

```

```

10939     "interface-ll" : {
10940         "in" : "query",
10941         "name" : "if",
10942         "type" : "string",
10943         "enum" : ["oic.if.ll"]
10944     },
10945     "interface-b" : {
10946         "in" : "query",
10947         "name" : "if",
10948         "type" : "string",
10949         "enum" : ["oic.if.b"]
10950     },
10951     "interface-baseline" : {
10952         "in" : "query",
10953         "name" : "if",
10954         "type" : "string",
10955         "enum" : ["oic.if.baseline"]
10956     },
10957     "interface-all" : {
10958         "in" : "query",
10959         "name" : "if",
10960         "type" : "string",
10961         "enum" : ["oic.if.ll", "oic.if.baseline", "oic.if.b"]
10962     }
10963 },
10964 "definitions": {
10965     "sbaseline": {
10966         "properties": {
10967             "links" :
10968                 {
10969                     "description": "A set of simple or individual OIC Links.",
10970                     "items": {
10971                         "$ref": "#/definitions/oic.oic-link"
10972                     },
10973                     "type": "array"
10974                 }
10975             }
10976         },
10977         "type" : "object"
10978     }
10979 },
10980 "sbatch-retrieve" : {
10981     "title" :
10982         "Collection Batch Retrieve Format (auto merged)"
10983
10984     , "minItems" :
10985         1
10986
10987     , "items" :
10988         {
10989             "additionalProperties": true,
10990             "properties": {
10991                 "href": {
10992                     "description": "URI of the target resource relative assuming the collection URI as
10993 anchor",
10994                     "format": "uri",
10995                     "maxLength": 256,
10996                     "type": "string"
10997                 },
10998                 "rep": {
10999                     "oneOf": [
11000                         {
11001                             "description": "The response payload from a single resource",
11002                             "type": "object"
11003                         },
11004                         {
11005                             "description": " The response payload from a collection (batch) resource",
11006                             "items": {
11007                                 "properties": {
11008                                     "anchor": {
11009                                         "description": "This is used to override the context URI e.g. override the

```

```

11010 URI of the containing collection.",
11011     "format": "uri",
11012     "maxLength": 256,
11013     "type": "string"
11014   },
11015   "di": {
11016     "allOf": [
11017       {
11018         "description": "Format pattern according to IETF RFC 4122.",
11019         "pattern": "^[a-fA-F0-9]{8}-[a-fA-F0-9]{4}-[a-fA-F0-9]{4}-[a-fA-F0-9]{4}-
11020 [a-fA-F0-9]{12}$",
11021         "type": "string"
11022       },
11023       {
11024         "description": "The device ID"
11025       }
11026     ]
11027   },
11028   "eps": {
11029     "description": "the Endpoint information of the target Resource",
11030     "items": {
11031       "properties": {
11032         "ep": {
11033           "description": "Transport Protocol Suite + Endpoint Locator",
11034           "format": "uri",
11035           "type": "string"
11036         },
11037         "pri": {
11038           "description": "The priority among multiple Endpoints",
11039           "minimum": 1,
11040           "type": "integer"
11041         }
11042       },
11043       "type": "object"
11044     },
11045     "type": "array"
11046   },
11047   "href": {
11048     "description": "This is the target URI, it can be specified as a Relative
11049 Reference or fully-qualified URI.",
11050     "format": "uri",
11051     "maxLength": 256,
11052     "type": "string"
11053   },
11054   "if": {
11055     "description": "The interface set supported by this resource",
11056     "items": {
11057       "enum": [
11058         "oic.if.baseline",
11059         "oic.if.ll",
11060         "oic.if.b",
11061         "oic.if.rw",
11062         "oic.if.r",
11063         "oic.if.a",
11064         "oic.if.s"
11065       ],
11066       "type": "string"
11067     },
11068     "minItems": 1,
11069     "type": "array"
11070   },
11071   "ins": {
11072     "description": "The instance identifier for this web link in an array of web
11073 links - used in collections",
11074     "type": "integer"
11075   },
11076   "p": {
11077     "description": "Specifies the framework policies on the Resource referenced
11078 by the target URI",
11079     "properties": {
11080       "bm": {

```

```

11081         "description": "Specifies the framework policies on the Resource
11082 referenced by the target URI for e.g. observable and discoverable",
11083         "type": "integer"
11084     }
11085 },
11086     "required": [
11087         "bm"
11088     ],
11089     "type": "object"
11090 },
11091     "rel": {
11092         "description": "The relation of the target URI referenced by the link to the
11093 context URI",
11094         "oneOf": [
11095             {
11096                 "default": [
11097                     "hosts"
11098                 ],
11099                 "items": {
11100                     "maxLength": 64,
11101                     "type": "string"
11102                 },
11103                 "minItems": 1,
11104                 "type": "array"
11105             },
11106             {
11107                 "default": "hosts",
11108                 "maxLength": 64,
11109                 "type": "string"
11110             }
11111         ]
11112     },
11113     "rt": {
11114         "description": "Resource Type of the Resource",
11115         "items": {
11116             "maxLength": 64,
11117             "type": "string"
11118         },
11119         "minItems": 1,
11120         "type": "array"
11121     },
11122     "title": {
11123         "description": "A title for the link relation. Can be used by the UI to
11124 provide a context.",
11125         "maxLength": 64,
11126         "type": "string"
11127     },
11128     "type": {
11129         "default": "application/cbor",
11130         "description": "A hint at the representation of the resource referenced by
11131 the target URI. This represents the media types that are used for both accepting and emitting.",
11132         "items": {
11133             "maxLength": 64,
11134             "type": "string"
11135         },
11136         "minItems": 1,
11137         "type": "array"
11138     }
11139 },
11140     "required": [
11141         "href",
11142         "rt",
11143         "if"
11144     ],
11145     "type": "object"
11146 },
11147     "type": "array"
11148 }
11149 ]
11150 }
11151 },

```

```

11152         "required": [
11153             "href",
11154             "rep"
11155         ],
11156         "type": "object"
11157     }
11158
11159     , "type" :
11160         "array"
11161
11162 }
11163
11164 "sbatch-update" : {
11165     "title" :
11166         "Collection Batch Update Format (auto merged)"
11167
11168     , "minItems" :
11169         1
11170
11171     , "items" :
11172         {
11173             "$ref": "#/definitions/oic.batch-update.item"
11174         }
11175
11176     , "type" :
11177         "array"
11178
11179 }
11180
11181 "slinks" : {
11182     "type" :
11183         "array"
11184
11185     , "items" :
11186         {
11187             "$ref": "#/definitions/oic.oic-link"
11188         }
11189
11190 }
11191
11192 "oic.wk.col-batch-update" :
11193 {
11194     "description": "array of resource representations to apply to the batch collection, using
11195 href to indicate which resource(s) in the batch to update. If the href property is empty,
11196 effectively making the URI reference to the collection itself, the representation is to be applied
11197 to all resources in the batch",
11198     "items": {
11199         "$ref": "#/definitions/oic.batch-update.item"
11200     },
11201     "minItems": 1,
11202     "type": "array"
11203 }
11204
11205 , "uuid" :
11206 {
11207     "description": "Format pattern according to IETF RFC 4122.",
11208     "pattern": "^[a-fA-F0-9]{8}-[a-fA-F0-9]{4}-[a-fA-F0-9]{4}-[a-fA-F0-9]{4}-[a-fA-F0-9]{12}$",
11209     "type": "string"
11210 }
11211
11212 "oic.collection.links.arrayoflinks" :
11213 {
11214     "properties": {
11215         "links": {
11216             "description": "A set of simple or individual OIC Links.",
11217             "items": {
11218                 "properties": {
11219                     "anchor": {
11220                         "description": "This is used to override the context URI e.g. override the URI of
11221 the containing collection.",
11222                         "format": "uri",
11223                         "maxLength": 256,

```



```

11223         "type": "string"
11224     },
11225     "di": {
11226         "description": "The Device ID formatted according to IETF RFC 4122.",
11227         "pattern": "^[a-fA-F0-9]{8}-[a-fA-F0-9]{4}-[a-fA-F0-9]{4}-[a-fA-F0-9]{4}-[a-fA-F0-
11228 9]{12}$",
11229         "type": "string"
11230     },
11231     "eps": {
11232         "description": "the Endpoint information of the target Resource",
11233         "items": {
11234             "properties": {
11235                 "ep": {
11236                     "description": "Transport Protocol Suite + Endpoint Locator",
11237                     "format": "uri",
11238                     "type": "string"
11239                 },
11240                 "pri": {
11241                     "description": "The priority among multiple Endpoints",
11242                     "minimum": 1,
11243                     "type": "integer"
11244                 }
11245             },
11246             "type": "object"
11247         },
11248         "type": "array"
11249     },
11250     "href": {
11251         "description": "This is the target URI, it can be specified as a Relative Reference
11252 or fully-qualified URI.",
11253         "format": "uri",
11254         "maxLength": 256,
11255         "type": "string"
11256     },
11257     "if": {
11258         "description": "The interface set supported by this resource",
11259         "items": {
11260             "enum": [
11261                 "oic.if.baseline",
11262                 "oic.if.ll",
11263                 "oic.if.b",
11264                 "oic.if.rw",
11265                 "oic.if.r",
11266                 "oic.if.a",
11267                 "oic.if.s"
11268             ],
11269             "type": "string"
11270         },
11271         "minItems": 1,
11272         "type": "array"
11273     },
11274     "ins": {
11275         "description": "The instance identifier for this web link in an array of web links
11276 - used in collections",
11277         "type": "integer"
11278     },
11279     "p": {
11280         "description": "Specifies the framework policies on the Resource referenced by the
11281 target URI",
11282         "properties": {
11283             "bm": {
11284                 "description": "Specifies the framework policies on the Resource referenced by
11285 the target URI for e.g. observable and discoverable",
11286                 "type": "integer"
11287             }
11288         },
11289         "required": [
11290             "bm"
11291         ],
11292         "type": "object"
11293     },

```

```

11294         "rel": {
11295             "description": "The relation of the target URI referenced by the link to the
context URI",
11296             "oneOf": [
11297                 {
11298                     "default": [
11299                         "hosts"
11300                     ],
11301                 },
11302                 "items": {
11303                     "maxLength": 64,
11304                     "type": "string"
11305                 },
11306                 "minItems": 1,
11307                 "type": "array"
11308             },
11309             {
11310                 "default": "hosts",
11311                 "maxLength": 64,
11312                 "type": "string"
11313             }
11314         ],
11315     },
11316     "rt": {
11317         "description": "Resource Type of the Resource",
11318         "items": {
11319             "maxLength": 64,
11320             "type": "string"
11321         },
11322         "minItems": 1,
11323         "type": "array"
11324     },
11325     "title": {
11326         "description": "A title for the link relation. Can be used by the UI to provide a
context.",
11327         "maxLength": 64,
11328         "type": "string"
11329     },
11330 },
11331 "type": {
11332     "default": "application/cbor",
11333     "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.",
11334     "items": {
11335         "maxLength": 64,
11336         "type": "string"
11337     },
11338     "minItems": 1,
11339     "type": "array"
11340 }
11341 },
11342 },
11343 "required": [
11344     "href",
11345     "rt",
11346     "if"
11347 ],
11348 "type": "object"
11349 },
11350 "type": "array"
11351 }
11352 }
11353 }
11354 , "oic.collection.properties" :
11355 {
11356     "description": "A collection is a set of links along with additional properties to describe
the collection itself",
11357     "properties": {
11358         "rts": {
11359             "$ref": "#/definitions/oic.core/properties/rt",
11360             "description": "The list of allowable resource types (for Target and anchors) in links
included in the collection"
11361         },
11362     },
11363 },
11364

```

```

11365         "rts-m": {
11366             "$ref": "#/definitions/oic.core/properties/rt",
11367             "description": "The list of mandatory resources if any in links included in the
11368 collection"
11369         }
11370     },
11371     "type": "object"
11372 }
11373
11374 , "oic.core" :
11375 {
11376     "properties": {
11377         "rt": {
11378             "description": "Resource Type of the Resource",
11379             "items": {
11380                 "maxLength": 64,
11381                 "type": "string"
11382             },
11383             "minItems": 1,
11384             "readOnly": true,
11385             "type": "array"
11386         }
11387     },
11388     "type": "object"
11389 }
11390
11391 , "oic.batch-update.item" :
11392 {
11393     "additionalProperties": true,
11394     "description": "array of resource representations to apply to the batch collection, using
11395 href to indicate which resource(s) in the batch to update. If the href property is empty,
11396 effectively making the URI reference to the collection itself, the representation is to be applied
11397 to all resources in the batch",
11398     "properties": {
11399         "href": {
11400             "description": "URI of the target resource relative assuming the collection URI as
11401 anchor",
11402             "format": "uri",
11403             "maxLength": 256,
11404             "type": "string"
11405         },
11406         "rep": {
11407             "oneOf": [
11408                 {
11409                     "description": "The response payload from a single resource",
11410                     "type": "object"
11411                 },
11412                 {
11413                     "description": " The response payload from a collection (batch) resource",
11414                     "items": {
11415                         "$ref": "#/definitions/oic.oic-link"
11416                     },
11417                     "type": "array"
11418                 }
11419             ]
11420         }
11421     },
11422     "required": [
11423         "href",
11424         "rep"
11425     ],
11426     "type": "object"
11427 }
11428
11429 , "oic.collection.links" :
11430 {
11431     "properties": {
11432         "links": {
11433             "description": "A set of simple or individual OIC Links.",
11434             "items": {
11435                 "$ref": "#/definitions/oic.oic-link"

```

```

11436         },
11437         "type": "array"
11438     }
11439 }
11440 }
11441
11442     , "oic.oic-link" :
11443     {
11444         "properties": {
11445             "anchor": {
11446                 "description": "This is used to override the context URI e.g. override the URI of the
11447 containing collection.",
11448                 "format": "uri",
11449                 "maxLength": 256,
11450                 "type": "string"
11451             },
11452             "di": {
11453                 "description": "The Device ID formatted according to IETF RFC 4122.",
11454                 "pattern": "^[a-fA-F0-9]{8}-[a-fA-F0-9]{4}-[a-fA-F0-9]{4}-[a-fA-F0-
11455 9]{12}$",
11456                 "type": "string"
11457             },
11458             "eps": {
11459                 "description": "the Endpoint information of the target Resource",
11460                 "items": {
11461                     "properties": {
11462                         "ep": {
11463                             "description": "Transport Protocol Suite + Endpoint Locator",
11464                             "format": "uri",
11465                             "type": "string"
11466                         },
11467                         "pri": {
11468                             "description": "The priority among multiple Endpoints",
11469                             "minimum": 1,
11470                             "type": "integer"
11471                         }
11472                     },
11473                     "type": "object"
11474                 },
11475                 "type": "array"
11476             },
11477             "href": {
11478                 "description": "This is the target URI, it can be specified as a Relative Reference or
11479 fully-qualified URI.",
11480                 "format": "uri",
11481                 "maxLength": 256,
11482                 "type": "string"
11483             },
11484             "if": {
11485                 "description": "The interface set supported by this resource",
11486                 "items": {
11487                     "enum": [
11488                         "oic.if.baseline",
11489                         "oic.if.ll",
11490                         "oic.if.b",
11491                         "oic.if.rw",
11492                         "oic.if.r",
11493                         "oic.if.a",
11494                         "oic.if.s"
11495                     ],
11496                     "type": "string"
11497                 },
11498                 "minItems": 1,
11499                 "type": "array"
11500             },
11501             "ins": {
11502                 "description": "The instance identifier for this web link in an array of web links - used
11503 in collections",
11504                 "type": "integer"
11505             },
11506             "p": {

```

```

11507         "description": "Specifies the framework policies on the Resource referenced by the target
11508 URI",
11509         "properties": {
11510             "bm": {
11511                 "description": "Specifies the framework policies on the Resource referenced by the
11512 target URI for e.g. observable and discoverable",
11513                 "type": "integer"
11514             }
11515         },
11516         "required": [
11517             "bm"
11518         ],
11519         "type": "object"
11520     },
11521     "rel": {
11522         "description": "The relation of the target URI referenced by the link to the context
11523 URI",
11524         "oneOf": [
11525             {
11526                 "default": [
11527                     "hosts"
11528                 ],
11529                 "items": {
11530                     "maxLength": 64,
11531                     "type": "string"
11532                 },
11533                 "minItems": 1,
11534                 "type": "array"
11535             },
11536             {
11537                 "default": "hosts",
11538                 "maxLength": 64,
11539                 "type": "string"
11540             }
11541         ]
11542     },
11543     "rt": {
11544         "description": "Resource Type of the Resource",
11545         "items": {
11546             "maxLength": 64,
11547             "type": "string"
11548         },
11549         "minItems": 1,
11550         "type": "array"
11551     },
11552     "title": {
11553         "description": "A title for the link relation. Can be used by the UI to provide a
11554 context.",
11555         "maxLength": 64,
11556         "type": "string"
11557     },
11558     "type": {
11559         "default": "application/cbor",
11560         "description": "A hint at the representation of the resource referenced by the target
11561 URI. This represents the media types that are used for both accepting and emitting.",
11562         "items": {
11563             "maxLength": 64,
11564             "type": "string"
11565         },
11566         "minItems": 1,
11567         "type": "array"
11568     }
11569 },
11570 "required": [
11571     "href",
11572     "rt",
11573     "if"
11574 ],
11575 "type": "object"
11576 }
11577

```

11578 }  
 11579 }  
 11580 }

11581 **F.4.5 Property Definition**

11582 **Table 95 The properties definitions of the resource**

Property name	Value type	Mandatory	Access mode	Description
links	array: see schema		Read Write	A set of simple or individual OIC Links.
rt	array: see schema		Read Only	Resource Type of the Resource
links	array: see schema		Read Write	A set of simple or individual OIC Links.
rts-m	multiple types: see schema		Read Write	The list of mandatory resources if any in links included in the collection
rts	multiple types: see schema		Read Write	The list of allowable resource types (for Target and anchors) in links included in the collection
ins	integer	No	Read Write	The instance identifier for this web link in an array of web links - used in collections
eps	array: see schema	No	Read Write	the Endpoint information of the target Resource
if	array: see schema	Yes	Read Write	The interface set supported by this resource
p	object: see schema	No	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.
rt	array: see schema	Yes	Read Write	Resource Type of the Resource
anchor	string	No	Read Write	This is used to override the context URI e.g. override the URI of the containing collection.
type	array: see schema	No	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.
rel	multiple types: see schema	No	Read Write	The relation of the target URI referenced by the link to the context URI
title	string	No	Read Write	A title for the link relation. Can be used by the UI to provide a context.
di	string	No	Read Write	The Device ID formatted according to IETF RFC 4122.
href	string	Yes	Read Write	URI of the target resource relative assuming the collection URI as anchor
rep	multiple types: see schema	Yes	Read Write	
href	string	Yes	Read Write	

				URI of the target resource relative assuming the collection URI as anchor
rep	multiple types: see schema	Yes	Read Write	
links	array: see schema	No	Read Write	A set of simple or individual OIC Links.

11583 **F.4.6 CRUDN behaviour**

11584 **Table 96 The CRUDN operations of the resource**

Resource	Create	Read	Update	Delete	Notify
/CollectionResURI		get	post		observe

11585 **F.5 Platform Configuration**

11586 **F.5.1 Introduction**

11587 Resource that allows for platform specific information to be configured.

11588

11589 **F.5.2 Example URI**

11590 /examplePlatformConfigurationResURI

11591 **F.5.3 Resource Type**

11592 The resource type (rt) is defined as: ['oic.wk.con.p'].

11593 **F.5.4 Swagger2.0 Definition**

```

11594 {
11595   "swagger": "2.0",
11596   "info": {
11597     "title": "Platform Configuration",
11598     "version": "v1-20160622",
11599     "license": {
11600       "name": "copyright 2016-2017 Open Connectivity Foundation, Inc. All rights reserved.",
11601       "x-description": "Redistribution and use in source and binary forms, with or without
11602 modification, are permitted provided that the following conditions are met:\n      1.
11603 Redistributions of source code must retain the above copyright notice, this list of conditions and
11604 the following disclaimer.\n      2. Redistributions in binary form must reproduce the above
11605 copyright notice, this list of conditions and the following disclaimer in the documentation and/or
11606 other materials provided with the distribution.\n\n      THIS SOFTWARE IS PROVIDED BY THE Open
11607 Connectivity Foundation, INC. \ "AS IS\ " AND ANY EXPRESS OR IMPLIED WARRANTIES, INCLUDING, BUT NOT
11608 LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE OR
11609 WARRANTIES OF NON-INFRINGEMENT, ARE DISCLAIMED.\n\n      IN NO EVENT SHALL THE Open Connectivity
11610 Foundation, INC. OR CONTRIBUTORS BE LIABLE FOR ANY DIRECT, INDIRECT, INCIDENTAL, SPECIAL,
11611 EXEMPLARY, OR CONSEQUENTIAL DAMAGES (INCLUDING, BUT NOT LIMITED TO, PROCUREMENT OF SUBSTITUTE GOODS
11612 OR SERVICES; LOSS OF USE, DATA, OR PROFITS; OR BUSINESS INTERRUPTION)\n\n      HOWEVER CAUSED AND
11613 ON ANY THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT (INCLUDING NEGLIGENCE OR
11614 OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OF THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY
11615 OF SUCH DAMAGE.\n"
11616     }
11617   },
11618   "schemes": ["http"],
11619   "consumes": ["application/json"],
11620   "produces": ["application/json"],
11621   "paths": {
11622     "/examplePlatformConfigurationResURI" : {
11623       "get": {
11624         "description": "Resource that allows for platform specific information to be
11625 configured.\nRetrieves the current platform configuration settings\n",

```



```

11626     "parameters": [
11627         { "$ref": "#/parameters/interface-all" }
11628     ],
11629     "responses": {
11630         "200": {
11631             "description": "",
11632             "x-example":
11633                 {
11634                     "rt": [ "oic.wk.con.p" ],
11635                     "mnpn": [ { "language": "en", "value": "My Friendly Device Name" } ]
11636                 }
11637             ,
11638             "schema": { "$ref": "#/definitions/Conf_Platform" }
11639         }
11640     },
11641 },
11642 "post": {
11643     "description": "Update the information about the platform\n",
11644     "parameters": [
11645         { "$ref": "#/parameters/interface-rw" },
11646         {
11647             "name": "body",
11648             "in": "body",
11649             "required": true,
11650             "schema": { "$ref": "#/definitions/Update_Platform" },
11651             "x-example":
11652                 {
11653                     "n": "Nuevo nombre",
11654                     "mnpn": [ { "language": "es", "value": "Nuevo nombre de Plataforma Amigable" } ]
11655                 }
11656         }
11657     ],
11658     "responses": {
11659         "200": {
11660             "description": "",
11661             "x-example":
11662                 {
11663                     "n": "Nuevo nombre",
11664                     "mnpn": [ { "language": "es", "value": "Nuevo nombre de Plataforma Amigable" } ]
11665                 }
11666             ,
11667             "schema": { "$ref": "#/definitions/Update_Platform" }
11668         }
11669     }
11670 },
11671 },
11672 },
11673 "parameters": {
11674     "interface-rw" : {
11675         "in" : "query",
11676         "name" : "if",
11677         "type" : "string",
11678         "enum" : [ "oic.if.rw" ]
11679     },
11680     "interface-all" : {
11681         "in" : "query",
11682         "name" : "if",
11683         "type" : "string",
11684         "enum" : [ "oic.if.rw", "oic.if.baseline" ]
11685     }
11686 },
11687 "definitions": {
11688     "Conf_Platform" : {
11689         "properties": {
11690             "rt" :
11691                 {
11692                     "description": "Resource Type of the Resource",
11693                     "items": {
11694                         "maxLength": 64,
11695                         "type": "string"
11696                     }
11697                 }
11698         }
11699     }
12000 }

```

```

11697         "minItems": 1,
11698         "readOnly": true,
11699         "type": "array"
11700     },
11701
11702     "n" :
11703     {
11704         "description": "Friendly name of the resource",
11705         "maxLength": 64,
11706         "readOnly": true,
11707         "type": "string"
11708     },
11709
11710     "mnpn" :
11711     {
11712         "description": "Platform names",
11713         "items": {
11714             "properties": {
11715                 "language": {
11716                     "allOf": [
11717                         {
11718                             "description": "Format pattern according to IETF RFC 5646 (language tag).",
11719                             "pattern": "^[A-Za-z]{1,8}(-[A-Za-z0-9]{1,8})*$",
11720                             "type": "string"
11721                         },
11722                         {
11723                             "description": "An RFC 5646 language tag."
11724                         }
11725                     ]
11726                 },
11727                 "value": {
11728                     "description": "The Platform description in the indicated language.",
11729                     "maxLength": 64,
11730                     "type": "string"
11731                 }
11732             },
11733             "type": "object"
11734         },
11735         "minItems": 1,
11736         "type": "array"
11737     },
11738
11739     "id" :
11740     {
11741         "description": "Instance ID of this specific resource",
11742         "maxLength": 64,
11743         "readOnly": true,
11744         "type": "string"
11745     },
11746
11747     "if" :
11748     {
11749         "description": "The interface set supported by this resource",
11750         "items": {
11751             "enum": [
11752                 "oic.if.baseline",
11753                 "oic.if.ll",
11754                 "oic.if.b",
11755                 "oic.if.lb",
11756                 "oic.if.rw",
11757                 "oic.if.r",
11758                 "oic.if.a",
11759                 "oic.if.s"
11760             ],
11761             "type": "string"
11762         },
11763         "minItems": 1,
11764         "readOnly": true,
11765         "type": "array"
11766     }
11767

```

```

11768     }
11769     , "type" : "object"
11770 }
11771 ,
11772 "Update_Platform" : {
11773     "properties": {
11774         "rt" :
11775             {
11776                 "description": "Resource Type of the Resource",
11777                 "items": {
11778                     "maxLength": 64,
11779                     "type": "string"
11780                 },
11781                 "minItems": 1,
11782                 "readOnly": true,
11783                 "type": "array"
11784             },
11785         "n" :
11786             {
11787                 "description": "Friendly name of the resource",
11788                 "maxLength": 64,
11789                 "type": "string"
11790             },
11791         "mnpn" :
11792             {
11793                 "description": "Platform names",
11794                 "items": {
11795                     "properties": {
11796                         "language": {
11797                             "allOf": [
11800                                 {
11801                                     "description": "Format pattern according to IETF RFC 5646 (language tag).",
11802                                     "pattern": "^[A-Za-z]{1,8}(-[A-Za-z0-9]{1,8})*$",
11803                                     "type": "string"
11804                                 },
11805                                 {
11806                                     "description": "An RFC 5646 language tag."
11807                                 }
11808                             ]
11809                         },
11810                         "value": {
11811                             "description": "The Platform description in the indicated language.",
11812                             "maxLength": 64,
11813                             "type": "string"
11814                         }
11815                     },
11816                     "type": "object"
11817                 },
11818                 "minItems": 1,
11819                 "type": "array"
11820             },
11821         "id" :
11822             {
11823                 "anyOf": [
11824                     {
11825                         "maxLength": 64,
11826                         "type": "string"
11827                     },
11828                     {
11829                         "description": "Format pattern according to IETF RFC 4122.",
11830                         "pattern": "^[a-fA-F0-9]{8}-[a-fA-F0-9]{4}-[a-fA-F0-9]{4}-[a-fA-F0-9]{4}-[a-fA-F0-9]{12}$",
11831                         "type": "string"
11832                     }
11833                 ],
11834                 "description": "Instance ID of this specific resource",
11835                 "readOnly": true
11836             },
11837     },
11838 }

```

```

11839
11840     "if" :
11841         {
11842         "description": "The interface set supported by this resource",
11843         "items": {
11844             "enum": [
11845                 "oic.if.baseline",
11846                 "oic.if.ll",
11847                 "oic.if.b",
11848                 "oic.if.lb",
11849                 "oic.if.rw",
11850                 "oic.if.r",
11851                 "oic.if.a",
11852                 "oic.if.s"
11853             ],
11854             "type": "string"
11855         },
11856         "minItems": 1,
11857         "readOnly": true,
11858         "type": "array"
11859     }
11860 }
11861 }
11862 , "type" : "object"
11863 , "required": ["mnpn"]
11864 }
11865 }
11866 }
11867

```

## 11868 F.5.5 Property Definition

11869 **Table 97 The properties definitions of the resource**

Property name	Value type	Mandatory	Access mode	Description
mnpn	array: see schema	Yes	Read Write	Platform names
n	string	No	Read Write	Friendly name of the resource
if	array: see schema	No	Read Only	The interface set supported by this resource
id	multiple types: see schema	No	Read Only	Instance ID of this specific resource
rt	array: see schema	No	Read Only	Resource Type of the Resource
mnpn	array: see schema		Read Write	Platform names
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
rt	array: see schema		Read Only	Resource Type of the Resource

11870 **F.5.6 CRUDN behaviour**

11871 **Table 98 The CRUDN operations of the resource**

Resource	Create	Read	Update	Delete	Notify
/examplePlatformConfigurationResURI		get	post		observe

11872 **F.6 Device Configuration**

11873 **F.6.1 Introduction**

11874 Resource that allows for Device specific information to be configured.

11875

11876 **F.6.2 Example URI**

11877 /exampleDeviceConfigurationResURI

11878 **F.6.3 Resource Type**

11879 The resource type (rt) is defined as: ['oic.wk.con'].

11880 **F.6.4 Swagger2.0 Definition**

```

11881 {
11882   "swagger": "2.0",
11883   "info": {
11884     "title": "Device Configuration",
11885     "version": "v1-20160622",
11886     "license": {
11887       "name": "copyright 2016-2017 Open Connectivity Foundation, Inc. All rights reserved.",
11888       "x-description": "Redistribution and use in source and binary forms, with or without
11889 modification, are permitted provided that the following conditions are met:\n      1.
11890 Redistributions of source code must retain the above copyright notice, this list of conditions and
11891 the following disclaimer.\n      2. Redistributions in binary form must reproduce the above
11892 copyright notice, this list of conditions and the following disclaimer in the documentation and/or
11893 other materials provided with the distribution.\n\n      THIS SOFTWARE IS PROVIDED BY THE Open
11894 Connectivity Foundation, INC. \AS IS\ AND ANY EXPRESS OR IMPLIED WARRANTIES, INCLUDING, BUT NOT
11895 LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE OR
11896 WARRANTIES OF NON-INFRINGEMENT, ARE DISCLAIMED.\n      IN NO EVENT SHALL THE Open Connectivity
11897 Foundation, INC. OR CONTRIBUTORS BE LIABLE FOR ANY DIRECT, INDIRECT, INCIDENTAL, SPECIAL,
11898 EXEMPLARY, OR CONSEQUENTIAL DAMAGES (INCLUDING, BUT NOT LIMITED TO, PROCUREMENT OF SUBSTITUTE GOODS
11899 OR SERVICES; LOSS OF USE, DATA, OR PROFITS; OR BUSINESS INTERRUPTION)\n      HOWEVER CAUSED AND
11900 ON ANY THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT (INCLUDING NEGLIGENCE OR
11901 OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OF THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY
11902 OF SUCH DAMAGE.\n"
11903     }
11904   },
11905   "schemes": ["http"],
11906   "consumes": ["application/json"],
11907   "produces": ["application/json"],
11908   "paths": {
11909     "/exampleDeviceConfigurationResURI" : {
11910       "get": {
11911         "description": "Resource that allows for Device specific information to be
11912 configured.\nRetrieves the current Device configuration settings\n",
11913         "parameters": [
11914           {"$ref": "#/parameters/interface-all"}
11915         ],
11916         "responses": {
11917           "200": {
11918             "description": "",

```

```

11919         "x-example":
11920             {
11921                 "n":      "My Friendly Device Name",
11922                 "rt":    ["oic.wk.con"],
11923                 "loc":   [32.777,-96.797],
11924                 "locn":  "My Location Name",
11925                 "c":     "USD",
11926                 "r":     "MyRegion",
11927                 "dl":    "en"
11928             }
11929         ,
11930         "schema": { "$ref": "#/definitions/Configuration" }
11931     }
11932 }
11933 },
11934 "post": {
11935     "description": "Update the information about the Device\n",
11936     "parameters": [
11937         { "$ref": "#/parameters/interface-rw" },
11938         {
11939             "name": "body",
11940             "in": "body",
11941             "required": true,
11942             "schema": { "$ref": "#/definitions/Update" },
11943             "x-example":
11944                 {
11945                     "n": "Nuevo Nombre Amistoso",
11946                     "r": "MyNewRegion",
11947                     "ln": [ { "language": "es", "value": "Nuevo Nombre Amistoso" } ],
11948                     "dl": "es"
11949                 }
11950         }
11951     ],
11952     "responses": {
11953         "200": {
11954             "description": "",
11955             "x-example":
11956                 {
11957                     "n": "Nuevo Nombre Amistoso",
11958                     "r": "MyNewRegion",
11959                     "ln": [ { "language": "es", "value": "Nuevo Nombre Amistoso" } ],
11960                     "dl": "es"
11961                 }
11962         }
11963     },
11964     "schema": { "$ref": "#/definitions/Update" }
11965 }
11966 }
11967 }
11968 },
11969 "parameters": {
11970     "interface-rw" : {
11971         "in" : "query",
11972         "name" : "if",
11973         "type" : "string",
11974         "enum" : ["oic.if.rw"]
11975     },
11976     "interface-all" : {
11977         "in" : "query",
11978         "name" : "if",
11979         "type" : "string",
11980         "enum" : ["oic.if.rw", "oic.if.baseline"]
11981     }
11982 },
11983 "definitions": {
11984     "Configuration" : {
11985         "properties": {
11986             "rt" :
11987                 {
11988                     "description": "Resource Type of the Resource",
11989                     "items": {

```

```

11990         "maxLength": 64,
11991         "type": "string"
11992     },
11993     "minItems": 1,
11994     "readOnly": true,
11995     "type": "array"
11996 },
11997
11998 "loc" :
11999     {
12000     "description": "Location information (lat, long)",
12001     "items": {
12002     "type": "number"
12003     },
12004     "maxItems": 2,
12005     "minItems": 2,
12006     "type": "array"
12007 },
12008
12009 "c" :
12010     {
12011     "description": "Currency",
12012     "maxLength": 64,
12013     "type": "string"
12014 },
12015
12016 "ln" :
12017     {
12018     "description": "Localized names",
12019     "items": {
12020     "properties": {
12021     "language": {
12022     "allOf": [
12023     {
12024     "description": "Format pattern according to IETF RFC 5646 (language tag).",
12025     "pattern": "^[A-Za-z]{1,8}(-[A-Za-z0-9]{1,8})*$",
12026     "type": "string"
12027     },
12028     {
12029     "description": "An RFC 5646 language tag."
12030     }
12031     ]
12032     },
12033     "value": {
12034     "description": "The Device name in the indicated language.",
12035     "maxLength": 64,
12036     "type": "string"
12037     }
12038     },
12039     "type": "object"
12040 },
12041 "minItems": 1,
12042 "type": "array"
12043 },
12044
12045 "locn" :
12046     {
12047     "description": "Human Friendly Name for location",
12048     "maxLength": 64,
12049     "type": "string"
12050 },
12051
12052 "dl" :
12053     {
12054     "allOf": [
12055     {
12056     "description": "Format pattern according to IETF RFC 5646 (language tag).",
12057     "pattern": "^[A-Za-z]{1,8}(-[A-Za-z0-9]{1,8})*$",
12058     "type": "string"
12059     },
12060     {

```

```

12061         "description": "Default Language as an RFC 5646 language tag."
12062     }
12063 ]
12064 },
12065
12066 "n" :
12067     {
12068         "description": "Friendly name of the resource",
12069         "maxLength": 64,
12070         "readOnly": true,
12071         "type": "string"
12072     },
12073
12074 "r" :
12075     {
12076         "description": "Region",
12077         "maxLength": 64,
12078         "type": "string"
12079     },
12080
12081 "id" :
12082     {
12083         "description": "Instance ID of this specific resource",
12084         "maxLength": 64,
12085         "readOnly": true,
12086         "type": "string"
12087     },
12088
12089 "if" :
12090     {
12091         "description": "The interface set supported by this resource",
12092         "items": {
12093             "enum": [
12094                 "oic.if.baseline",
12095                 "oic.if.ll",
12096                 "oic.if.b",
12097                 "oic.if.lb",
12098                 "oic.if.rw",
12099                 "oic.if.r",
12100                 "oic.if.a",
12101                 "oic.if.s"
12102             ],
12103             "type": "string"
12104         },
12105         "minItems": 1,
12106         "readOnly": true,
12107         "type": "array"
12108     }
12109 }
12110 },
12111 "type" : "object"
12112 , "required": ["n"]
12113 }
12114 ,
12115 "Update" : {
12116     "properties": {
12117         "rt" :
12118             {
12119                 "description": "Resource Type of the Resource",
12120                 "items": {
12121                     "maxLength": 64,
12122                     "type": "string"
12123                 },
12124                 "minItems": 1,
12125                 "readOnly": true,
12126                 "type": "array"
12127             },
12128
12129 "loc" :
12130     {
12131         "description": "Location information (lat, long)",

```



```

12132         "items": {
12133             "type": "number"
12134         },
12135         "maxItems": 2,
12136         "minItems": 2,
12137         "type": "array"
12138     },
12139
12140     "c" :
12141     {
12142         "description": "Currency",
12143         "maxLength": 64,
12144         "type": "string"
12145     },
12146
12147     "ln" :
12148     {
12149         "description": "Localized names",
12150         "items": {
12151             "properties": {
12152                 "language": {
12153                     "allOf": [
12154                         {
12155                             "description": "Format pattern according to IETF RFC 5646 (language tag).",
12156                             "pattern": "^[A-Za-z]{1,8}(-[A-Za-z0-9]{1,8})*$",
12157                             "type": "string"
12158                         },
12159                         {
12160                             "description": "An RFC 5646 language tag."
12161                         }
12162                     ]
12163                 },
12164                 "value": {
12165                     "description": "The Device name in the indicated language.",
12166                     "maxLength": 64,
12167                     "type": "string"
12168                 }
12169             },
12170             "type": "object"
12171         },
12172         "minItems": 1,
12173         "type": "array"
12174     },
12175
12176     "locn" :
12177     {
12178         "description": "Human Friendly Name for location",
12179         "maxLength": 64,
12180         "type": "string"
12181     },
12182
12183     "dl" :
12184     {
12185         "allOf": [
12186             {
12187                 "description": "Format pattern according to IETF RFC 5646 (language tag).",
12188                 "pattern": "^[A-Za-z]{1,8}(-[A-Za-z0-9]{1,8})*$",
12189                 "type": "string"
12190             },
12191             {
12192                 "description": "Default Language as an RFC 5646 language tag."
12193             }
12194         ]
12195     },
12196
12197     "n" :
12198     {
12199         "description": "Friendly name of the resource",
12200         "maxLength": 64,
12201         "type": "string"
12202     },

```

```

12203
12204     "r" :
12205         {
12206             "description": "Region",
12207             "maxLength": 64,
12208             "type": "string"
12209         },
12210
12211     "id" :
12212         {
12213             "anyOf": [
12214                 {
12215                     "maxLength": 64,
12216                     "type": "string"
12217                 },
12218                 {
12219                     "description": "Format pattern according to IETF RFC 4122.",
12220                     "pattern": "^[a-fA-F0-9]{8}-[a-fA-F0-9]{4}-[a-fA-F0-9]{4}-[a-fA-F0-
12221 9]{12}$",
12222                     "type": "string"
12223                 }
12224             ],
12225             "description": "Instance ID of this specific resource",
12226             "readOnly": true
12227         },
12228
12229     "if" :
12230         {
12231             "description": "The interface set supported by this resource",
12232             "items": {
12233                 "enum": [
12234                     "oic.if.baseline",
12235                     "oic.if.ll",
12236                     "oic.if.b",
12237                     "oic.if.lb",
12238                     "oic.if.rw",
12239                     "oic.if.r",
12240                     "oic.if.a",
12241                     "oic.if.s"
12242                 ],
12243                 "type": "string"
12244             },
12245             "minItems": 1,
12246             "readOnly": true,
12247             "type": "array"
12248         }
12249     }
12250 }
12251 , "anyOf" :
12252     [
12253         {
12254             "required": [
12255                 "loc"
12256             ]
12257         },
12258         {
12259             "required": [
12260                 "locn"
12261             ]
12262         },
12263         {
12264             "required": [
12265                 "c"
12266             ]
12267         },
12268         {
12269             "required": [
12270                 "r"
12271             ]
12272         },
12273     ]

```

```

12274     "required": [
12275         "ln"
12276     ],
12277 },
12278 {
12279     "required": [
12280         "dl"
12281     ],
12282 },
12283 {
12284     "required": [
12285         "n"
12286     ]
12287 }
12288 ]
12289
12290     , "type" : "object"
12291 }
12292 }
12293 }
12294

```

### 12295 F.6.5 Property Definition

12296 **Table 99 The properties definitions of the resource**

Property name	Value type	Mandatory	Access mode	Description
r	string	No	Read Write	Region
if	array: see schema	No	Read Only	The interface set supported by this resource
ln	array: see schema	No	Read Write	Localized names
n	string	Yes	Read Write	Friendly name of the resource
loc	array: see schema	No	Read Write	Location information (lat, long)
dl	multiple types: see schema	No	Read Write	
id	multiple types: see schema	No	Read Only	Instance ID of this specific resource
c	string	No	Read Write	Currency
rt	array: see schema	No	Read Only	Resource Type of the Resource
locn	string	No	Read Write	Human Friendly Name for location
r	string	No	Read Write	Region
if	array: see schema	No	Read Only	

				The interface set supported by this resource
In	array: see schema	No	Read Write	Localized names
n	string	Yes	Read Only	Friendly name of the resource
loc	array: see schema	No	Read Write	Location information (lat, long)
dl	multiple types: see schema	No	Read Write	
id	string	No	Read Only	Instance ID of this specific resource
c	string	No	Read Write	Currency
rt	array: see schema	No	Read Only	Resource Type of the Resource
locn	string	No	Read Write	Human Friendly Name for location

12297 **F.6.6 CRUDN behaviour**

12298 **Table 100 The CRUDN operations of the resource**

Resource	Create	Read	Update	Delete	Notify
/exampleDeviceConfigurationResURI		get	post		observe

12299 **F.7 Device**

12300 **F.7.1 Introduction**

12301 Known resource that is hosted by every Server. Allows for logical device specific information to  
 12302 be discovered.  
 12303

12304 **F.7.2 Wellknown URI**

12305 /oic/d

12306 **F.7.3 Resource Type**

12307 The resource type (rt) is defined as: ['oic.wk.d'].

12308 **F.7.4 Swagger2.0 Definition**

```

12309 {
12310   "swagger": "2.0",
12311   "info": {
12312     "title": "Device",
12313     "version": "v1-20160622",
12314     "license": {
12315       "name": "copyright 2016-2017 Open Connectivity Foundation, Inc. All rights reserved.",
12316       "x-description": "Redistribution and use in source and binary forms, with or without
12317 modification, are permitted provided that the following conditions are met:\n
12318 1.
Redistributions of source code must retain the above copyright notice, this list of conditions and

```

12319 the following disclaimer.\n 2. Redistributions in binary form must reproduce the above  
12320 copyright notice, this list of conditions and the following disclaimer in the documentation and/or  
12321 other materials provided with the distribution.\n\n THIS SOFTWARE IS PROVIDED BY THE Open  
12322 Connectivity Foundation, INC. \ "AS IS\ " AND ANY EXPRESS OR IMPLIED WARRANTIES, INCLUDING, BUT NOT  
12323 LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE OR  
12324 WARRANTIES OF NON-INFRINGEMENT, ARE DISCLAIMED.\n IN NO EVENT SHALL THE Open Connectivity  
12325 Foundation, INC. OR CONTRIBUTORS BE LIABLE FOR ANY DIRECT, INDIRECT, INCIDENTAL, SPECIAL,  
12326 EXEMPLARY, OR CONSEQUENTIAL DAMAGES (INCLUDING, BUT NOT LIMITED TO, PROCUREMENT OF SUBSTITUTE GOODS  
12327 OR SERVICES; LOSS OF USE, DATA, OR PROFITS; OR BUSINESS INTERRUPTION)\n HOWEVER CAUSED AND  
12328 ON ANY THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT (INCLUDING NEGLIGENCE OR  
12329 OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OF THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY  
12330 OF SUCH DAMAGE.\n"

```

12331   }
12332 },
12333 "schemes": ["http"],
12334 "consumes": ["application/json"],
12335 "produces": ["application/json"],
12336 "paths": {
12337   "/oic/d" : {
12338     "get": {
12339       "description": "Known resource that is hosted by every Server.\nAllows for logical device
12340 specific information to be discovered.\nRetrieve the information about the Device\n",
12341       "parameters": [
12342         { "$ref": "#/parameters/interface" }
12343       ],
12344       "responses": {
12345         "200": {
12346           "description" : "",
12347           "x-example":
12348             {
12349               "n": "Device 1",
12350               "rt": ["oic.wk.d"],
12351               "di": "54919CA5-4101-4AE4-595B-353C51AA983C",
12352               "icv": "ocf.1.0.0",
12353               "dmv": "ocf.res.1.0.0, ocf.sh.1.0.0",
12354               "piid": "6F0AAC04-2BB0-468D-B57C-16570A26AE48"
12355             }
12356           ,
12357           "schema": { "$ref": "#/definitions/Device" }
12358         }
12359       }
12360     }
12361   },
12362 },
12363 "parameters": {
12364   "interface" : {
12365     "in" : "query",
12366     "name" : "if",
12367     "type" : "string",
12368     "enum" : ["oic.if.r", "oic.if.baseline"]
12369   }
12370 },
12371 "definitions": {
12372   "Device" : {
12373     "properties": {
12374       "rt" :
12375         {
12376           "description": "Resource Type of the Resource",
12377           "items": {
12378             "maxLength": 64,
12379             "type": "string"
12380           },
12381           "minItems": 1,
12382           "readOnly": true,
12383           "type": "array"
12384         },
12385       "ld" :
12386         {
12387           "description": "Localized Descriptions.",
12388           "items": {

```

```

12390         "properties": {
12391             "language": {
12392                 "allOf": [
12393                     {
12394                         "description": "Format pattern according to IETF RFC 5646 (language tag).",
12395                         "pattern": "^[A-Za-z]{1,8}(-[A-Za-z0-9]{1,8})*$",
12396                         "type": "string"
12397                     },
12398                     {
12399                         "description": "An RFC 5646 language tag.",
12400                         "readOnly": true
12401                     }
12402                 ]
12403             },
12404             "value": {
12405                 "description": "Device description in the indicated language.",
12406                 "maxLength": 64,
12407                 "readOnly": true,
12408                 "type": "string"
12409             }
12410         },
12411         "type": "object"
12412     },
12413     "minItems": 1,
12414     "readOnly": true,
12415     "type": "array"
12416 },
12417
12418 "piid" :
12419 {
12420     "allOf": [
12421         {
12422             "description": "Format pattern according to IETF RFC 4122.",
12423             "pattern": "^[a-fA-F0-9]{8}-[a-fA-F0-9]{4}-[a-fA-F0-9]{4}-[a-fA-F0-
12424 9]{12}$",
12425             "type": "string"
12426         },
12427         {
12428             "description": "Protocol independent unique identifier for device that is
12429 immutable.",
12430             "readOnly": true
12431         }
12432     ]
12433 },
12434
12435 "di" :
12436 {
12437     "allOf": [
12438         {
12439             "description": "Format pattern according to IETF RFC 4122.",
12440             "pattern": "^[a-fA-F0-9]{8}-[a-fA-F0-9]{4}-[a-fA-F0-9]{4}-[a-fA-F0-
12441 9]{12}$",
12442             "type": "string"
12443         },
12444         {
12445             "description": "Unique identifier for device",
12446             "readOnly": true
12447         }
12448     ]
12449 },
12450
12451 "dmno" :
12452 {
12453     "description": "Model number as designated by manufacturer.",
12454     "maxLength": 64,
12455     "readOnly": true,
12456     "type": "string"
12457 },
12458
12459 "sv" :
12460 {

```

```

12461         "description": "Software version.",
12462         "maxLength": 64,
12463         "readOnly": true,
12464         "type": "string"
12465     },
12466
12467     "dmn" :
12468     {
12469         "description": "Manufacturer Name.",
12470         "items": {
12471             "properties": {
12472                 "language": {
12473                     "allOf": [
12474                         {
12475                             "description": "Format pattern according to IETF RFC 5646 (language tag).",
12476                             "pattern": "^[A-Za-z]{1,8}(-[A-Za-z0-9]{1,8})*$",
12477                             "type": "string"
12478                         },
12479                         {
12480                             "description": "An RFC 5646 language tag.",
12481                             "readOnly": true
12482                         }
12483                     ]
12484                 },
12485                 "value": {
12486                     "description": "Manufacturer name in the indicated language.",
12487                     "maxLength": 64,
12488                     "readOnly": true,
12489                     "type": "string"
12490                 }
12491             },
12492             "type": "object"
12493         },
12494         "minItems": 1,
12495         "readOnly": true,
12496         "type": "array"
12497     },
12498
12499     "icv" :
12500     {
12501         "description": "The version of the OIC Server",
12502         "maxLength": 64,
12503         "readOnly": true,
12504         "type": "string"
12505     },
12506
12507     "dmv" :
12508     {
12509         "description": "Spec versions of the Resource and Device Specifications to which this
12510 device data model is implemented",
12511         "maxLength": 256,
12512         "readOnly": true,
12513         "type": "string"
12514     },
12515
12516     "n" :
12517     {
12518         "description": "Friendly name of the resource",
12519         "maxLength": 64,
12520         "readOnly": true,
12521         "type": "string"
12522     },
12523
12524     "id" :
12525     {
12526         "description": "Instance ID of this specific resource",
12527         "maxLength": 64,
12528         "readOnly": true,
12529         "type": "string"
12530     },
12531
12532     },

```

```

12532     "if" :
12533         {
12534             "description": "The interface set supported by this resource",
12535             "items": {
12536                 "enum": [
12537                     "oic.if.baseline",
12538                     "oic.if.ll",
12539                     "oic.if.b",
12540                     "oic.if.lb",
12541                     "oic.if.rw",
12542                     "oic.if.r",
12543                     "oic.if.a",
12544                     "oic.if.s"
12545                 ],
12546                 "type": "string"
12547             },
12548             "minItems": 1,
12549             "readOnly": true,
12550             "type": "array"
12551         }
12552     },
12553     "type" : "object"
12554 }, "required": ["n", "di", "icv", "dmv", "piid"]
12555 }
12556 }
12557 }
12558 }
12559 }

```

### F.7.5 Property Definition

**Table 101 The properties definitions of the resource**

Property name	Value type	Mandatory	Access mode	Description
piid	multiple types: see schema	Yes	Read Write	
sv	string	No	Read Only	Software version.
dmno	string	No	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	No	Read Only	The interface set supported by this resource
id	string	No	Read Only	Instance ID of this specific resource
n	string	Yes	Read Only	Friendly name of the resource



di	multiple types: see schema	Yes	Read Write	
ld	array: see schema	No	Read Only	Localized Descriptions.
rt	array: see schema	No	Read Only	Resource Type of the Resource
dmn	array: see schema	No	Read Only	Manufacturer Name.
icv	string	Yes	Read Only	The version of the OIC Server

12562 **F.7.6 CRUDN behaviour**

12563 **Table 102 The CRUDN operations of the resource**

Resource	Create	Read	Update	Delete	Notify
/oic/d		get			observe

12564 **F.8 Maintenance**

12565 **F.8.1 Introduction**

12566 The resource through which a Device is maintained and can be used for diagnostic purposes.  
 12567 fr (Factory Reset) is a boolean. The value 0 means No action (Default), the value 1 means Start  
 12568 Factory Reset. After factory reset, this value shall be changed back to the default value  
 12569 rb (Reboot) is a boolean. The value 0 means No action (Default), the value 1 means Start  
 12570 Reboot. After Reboot, this value shall be changed back to the default value.

12572 **F.8.2 Wellknown URI**

12573 /oic/mnt

12574 **F.8.3 Resource Type**

12575 The resource type (rt) is defined as: ['oic.wk.mnt'].

12576 **F.8.4 Swagger2.0 Definition**

```

12577 {
12578   "swagger": "2.0",
12579   "info": {
12580     "title": "Maintenance",
12581     "version": "v1-20180313",
12582     "license": {
12583       "name": "copyright 2016-2017 Open Connectivity Foundation, Inc. All rights reserved.",
12584       "x-description": "Redistribution and use in source and binary forms, with or without
12585 modification, are permitted provided that the following conditions are met:\n      1.
12586 Redistributions of source code must retain the above copyright notice, this list of conditions and
12587 the following disclaimer.\n      2. Redistributions in binary form must reproduce the above
12588 copyright notice, this list of conditions and the following disclaimer in the documentation and/or
12589 other materials provided with the distribution.\n      THIS SOFTWARE IS PROVIDED BY THE Open
12590 Connectivity Foundation, INC. \ "AS IS\ " AND ANY EXPRESS OR IMPLIED WARRANTIES, INCLUDING, BUT NOT
12591 LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE OR
12592 WARRANTIES OF NON-INFRINGEMENT, ARE DISCLAIMED.\n      IN NO EVENT SHALL THE Open Connectivity
12593 Foundation, INC. OR CONTRIBUTORS BE LIABLE FOR ANY DIRECT, INDIRECT, INCIDENTAL, SPECIAL,
12594 EXEMPLARY, OR CONSEQUENTIAL DAMAGES (INCLUDING, BUT NOT LIMITED TO, PROCUREMENT OF SUBSTITUTE GOODS
12595 OR SERVICES; LOSS OF USE, DATA, OR PROFITS; OR BUSINESS INTERRUPTION)\n      HOWEVER CAUSED AND
12596 ON ANY THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT (INCLUDING NEGLIGENCE OR
12597 OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OF THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY
12598 OF SUCH DAMAGE.\n"
12599   }
  
```

```

12600     },
12601     "schemes": ["http"],
12602     "consumes": ["application/json"],
12603     "produces": ["application/json"],
12604     "paths": {
12605         "/oic/mnt" : {
12606             "get": {
12607                 "description": "The resource through which a Device is maintained and can be used for
12608 diagnostic purposes.\nfr (Factory Reset) is a boolean.\n The value 0 means No action (Default),
12609 the value 1 means Start Factory Reset\nAfter factory reset, this value shall be changed back to the
12610 default value\nrb (Reboot) is a boolean.\n The value 0 means No action (Default), the value 1
12611 means Start Reboot\nAfter Reboot, this value shall be changed back to the default value\nRetrieve
12612 the maintenance action status",
12613                 "parameters": [
12614                     { "$ref": "#/parameters/interface-all" }
12615                 ],
12616                 "responses": {
12617                     "200": {
12618                         "description" : "",
12619                         "x-example":
12620                         {
12621                             "rt":  ["oic.wk.mnt"],
12622                             "fr":  false,
12623                             "rb":  false,
12624                             "err" : 503
12625                         }
12626                     },
12627                     "schema": { "$ref": "#/definitions/mnt" }
12628                 }
12629             }
12630         },
12631         "post": {
12632             "description": "Set the maintenance action(s)\n",
12633             "parameters": [
12634                 { "$ref": "#/parameters/interface-rw" },
12635                 {
12636                     "name": "body",
12637                     "in": "body",
12638                     "required": true,
12639                     "schema": { "$ref": "#/definitions/mnt-update" },
12640                     "x-example":
12641                     {
12642                         "fr":  false,
12643                         "rb":  false
12644                     }
12645                 }
12646             ],
12647             "responses": {
12648                 "200": {
12649                     "description" : "",
12650                     "x-example":
12651                     {
12652                         "fr":  false,
12653                         "rb":  false
12654                     }
12655                 },
12656                 "schema": { "$ref": "#/definitions/mnt" }
12657             }
12658         }
12659     }
12660 },
12661 },
12662 "parameters": {
12663     "interface-rw" : {
12664         "in" : "query",
12665         "name" : "if",
12666         "type" : "string",
12667         "enum" : ["oic.if.rw", "oic.if.baseline"]
12668     },
12669     "interface-all" : {
12670         "in" : "query",

```

```

12671     "name" : "if",
12672     "type" : "string",
12673     "enum" : ["oic.if.rw", "oic.if.baseline"]
12674   }
12675 },
12676 "definitions": {
12677   "mnt" : {
12678     "properties": {
12679       "rt" :
12680         {
12681           "description": "Resource Type of the Resource",
12682           "items": {
12683             "maxLength": 64,
12684             "type": "string"
12685           },
12686           "minItems": 1,
12687           "readOnly": true,
12688           "type": "array"
12689         },
12690       "fr" :
12691         {
12692           "description": "Factory Reset",
12693           "type": "boolean"
12694         },
12695       "err" :
12696         {
12697           "description": "last HTTP occurred error",
12698           "maximum": 599,
12699           "minimum": 399,
12700           "readOnly": true,
12701           "type": "integer"
12702         },
12703       "n" :
12704         {
12705           "description": "Friendly name of the resource",
12706           "maxLength": 64,
12707           "readOnly": true,
12708           "type": "string"
12709         },
12710       "rb" :
12711         {
12712           "description": "Reboot Action",
12713           "type": "boolean"
12714         },
12715       "id" :
12716         {
12717           "description": "Instance ID of this specific resource",
12718           "maxLength": 64,
12719           "readOnly": true,
12720           "type": "string"
12721         },
12722       "if" :
12723         {
12724           "description": "The interface set supported by this resource",
12725           "items": {
12726             "enum": [
12727               "oic.if.baseline",
12728               "oic.if.ll",
12729               "oic.if.b",
12730               "oic.if.lb",
12731               "oic.if.rw",
12732               "oic.if.r",
12733               "oic.if.a",
12734               "oic.if.s"
12735             ]
12736           }
12737         }
12738     }
12739   }
12740 }
12741 ]

```

```

12742         "type": "string"
12743     },
12744     "minItems": 1,
12745     "readOnly": true,
12746     "type": "array"
12747 }
12748
12749 }
12750 , "anyOf" :
12751     [
12752     {
12753         "required": [
12754             "fr"
12755         ]
12756     },
12757     {
12758         "required": [
12759             "rb"
12760         ]
12761     },
12762     {
12763         "required": [
12764             "err"
12765         ]
12766     }
12767 ]
12768
12769     , "type" : "object"
12770 }
12771
12772 "mnt-update" : {
12773     "properties": {
12774         "rt" :
12775             {
12776                 "description": "Resource Type of the Resource",
12777                 "items": {
12778                     "maxLength": 64,
12779                     "type": "string"
12780                 },
12781                 "minItems": 1,
12782                 "readOnly": true,
12783                 "type": "array"
12784             },
12785         "fr" :
12786             {
12787                 "description": "Factory Reset",
12788                 "type": "boolean"
12789             },
12790         "n" :
12791             {
12792                 "description": "Friendly name of the resource",
12793                 "maxLength": 64,
12794                 "readOnly": true,
12795                 "type": "string"
12796             },
12797         "rb" :
12798             {
12799                 "description": "Reboot Action",
12800                 "type": "boolean"
12801             },
12802         "id" :
12803             {
12804                 "description": "Instance ID of this specific resource",
12805                 "maxLength": 64,
12806                 "readOnly": true,
12807                 "type": "string"
12808             }
12809         },
12810     }
12811 }
12812

```

```

12813
12814     "if" :
12815         {
12816             "description": "The interface set supported by this resource",
12817             "items": {
12818                 "enum": [
12819                     "oic.if.baseline",
12820                     "oic.if.ll",
12821                     "oic.if.b",
12822                     "oic.if.lb",
12823                     "oic.if.rw",
12824                     "oic.if.r",
12825                     "oic.if.a",
12826                     "oic.if.s"
12827                 ],
12828                 "type": "string"
12829             },
12830             "minItems": 1,
12831             "readOnly": true,
12832             "type": "array"
12833         }
12834     }
12835     , "anyOf" :
12836         [
12837             {
12838                 "required": [
12839                     "fr"
12840                 ]
12841             },
12842             {
12843                 "required": [
12844                     "rb"
12845                 ]
12846             }
12847         ]
12848     ],
12849     "type" : "object"
12850 }
12851 }
12852 }
12853 }
12854

```

### 12855 F.8.5 Property Definition

12856 **Table 103** The properties definitions of the resource

Property name	Value type	Mandatory	Access mode	Description
rb	boolean	Yes	Read Write	Reboot Action
fr	boolean	No	Read Write	Factory Reset
n	string	No	Read Only	Friendly name of the resource
rt	array: see schema	No	Read Only	Resource Type of the Resource
id	string	No	Read Only	Instance ID of this specific resource
if	array: see schema	No	Read Only	The interface set supported by this resource

rb	boolean	No	Read Write	Reboot Action
fr	boolean	No	Read Write	Factory Reset
n	string	No	Read Only	Friendly name of the resource
rt	array: see schema	No	Read Only	Resource Type of the Resource
err	integer	Yes	Read Only	last HTTP occurred error
id	string	No	Read Only	Instance ID of this specific resource
if	array: see schema	No	Read Only	The interface set supported by this resource

12857 **F.8.6 CRUDN behaviour**

12858 **Table 104 The CRUDN operations of the resource**

Resource	Create	Read	Update	Delete	Notify
/oic/mnt		get	post		observe

12859 **F.9 Network Monitoring**

12860 **F.9.1 Introduction**

12861 The resource through which a Device can monitor network traffic.

12862

12863 **F.9.2 Example URI**

12864 /nmonResURI

12865 **F.9.3 Resource Type**

12866 The resource type (rt) is defined as: ['oic.wk.nmon'].

12867 **F.9.4 Swagger2.0 Definition**

```

12868 {
12869   "swagger": "2.0",
12870   "info": {
12871     "title": "Network Monitoring",
12872     "version": "v1-20180306",
12873     "license": {
12874       "name": "copyright 2016-2017 Open Connectivity Foundation, Inc. All rights reserved.",
12875       "x-description": "Redistribution and use in source and binary forms, with or without
12876 modification, are permitted provided that the following conditions are met:\n      1.
12877 Redistributions of source code must retain the above copyright notice, this list of conditions and/or
12878 the following disclaimer.\n      2. Redistributions in binary form must reproduce the above
12879 copyright notice, this list of conditions and the following disclaimer in the documentation and/or
12880 other materials provided with the distribution.\n      THIS SOFTWARE IS PROVIDED BY THE Open
12881 Connectivity Foundation, INC. \"AS IS\" AND ANY EXPRESS OR IMPLIED WARRANTIES, INCLUDING, BUT NOT
12882 LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE OR
12883 WARRANTIES OF NON-INFRINGEMENT, ARE DISCLAIMED.\n      IN NO EVENT SHALL THE Open Connectivity
12884 Foundation, INC. OR CONTRIBUTORS BE LIABLE FOR ANY DIRECT, INDIRECT, INCIDENTAL, SPECIAL,
12885 EXEMPLARY, OR CONSEQUENTIAL DAMAGES (INCLUDING, BUT NOT LIMITED TO, PROCUREMENT OF SUBSTITUTE GOODS
12886 OR SERVICES; LOSS OF USE, DATA, OR PROFITS; OR BUSINESS INTERRUPTION)\n      HOWEVER CAUSED AND

```

```

12887 ON ANY THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT (INCLUDING NEGLIGENCE OR
12888 OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OF THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY
12889 OF SUCH DAMAGE.\n"
12890 }
12891 },
12892 "schemes": ["http"],
12893 "consumes": ["application/json"],
12894 "produces": ["application/json"],
12895 "paths": {
12896   "/nmonResURI" : {
12897     "get": {
12898       "description": "The resource through which a Device can monitor network traffic.\nRetrieve
12899 the network monitor action status",
12900       "parameters": [
12901         {"$ref": "#/parameters/interface-all"}
12902       ],
12903       "responses": {
12904         "200": {
12905           "description": "",
12906           "x-example":
12907             {
12908               "rt": ["oic.wk.nmon"],
12909               "ianaifType": 71,
12910               "reset": false,
12911               "col": false,
12912               "tx" : 10,
12913               "rx" : 15,
12914               "mmstx" : 50,
12915               "amstx" : 35,
12916               "mmsrx" : 35,
12917               "amsrx" : 20
12918             }
12919           ,
12920           "schema": { "$ref": "#/definitions/nmon" }
12921         }
12922       }
12923     },
12924     "post": {
12925       "description": "Start/Stop collecting and reset the networking monitor resource\n",
12926       "parameters": [
12927         {"$ref": "#/parameters/interface-rw"},
12928         {
12929           "name": "body",
12930           "in": "body",
12931           "required": true,
12932           "schema": { "$ref": "#/definitions/nmon-update" },
12933           "x-example":
12934             {
12935               "col": true,
12936               "reset": true
12937             }
12938         }
12939       ],
12940       "responses": {
12941         "200": {
12942           "description": "",
12943           "x-example":
12944             {
12945               "rt": ["oic.wk.nmon"],
12946               "ianaifType": 71,
12947               "reset": false,
12948               "col" : true,
12949               "tx" : 0,
12950               "rx" : 0,
12951               "mms-tx" : 0,
12952               "ams-tx" : 0,
12953               "mms-rx" : 0,
12954               "ams-rx" : 0
12955             }
12956           ,
12957           "schema": { "$ref": "#/definitions/nmon" }
12958         }
12959       }
12960     }
12961   }
12962 }

```

```

12958     }
12959   }
12960 }
12961 },
12962 "parameters": {
12963   "interface-rw" : {
12964     "in" : "query",
12965     "name" : "if",
12966     "type" : "string",
12967     "enum" : ["oic.if.rw"]
12968   },
12969   "interface-all" : {
12970     "in" : "query",
12971     "name" : "if",
12972     "type" : "string",
12973     "enum" : ["oic.if.rw", "oic.if.baseline"]
12974   }
12975 },
12976 "definitions": {
12977   "nmon" : {
12978     "properties": {
12979       "amstx" :
12980         {
12981           "description": "Average transmitted message size in bytes (tx) in the collection period",
12982           "readOnly": true,
12983           "type": "integer"
12984         },
12985       "reset" :
12986         {
12987           "description": "True: reset the collected values",
12988           "readOnly": false,
12989           "type": "boolean"
12990         },
12991     },
12992     "mmsrx" :
12993     {
12994       "description": "Maximum received message size in bytes (rx) in the collection period",
12995       "readOnly": true,
12996       "type": "integer"
12997     },
12998   },
12999   "mmstx" :
13000   {
13001     "description": "Maximum transmitted message size in bytes (tx) in the collection period",
13002     "readOnly": true,
13003     "type": "integer"
13004   },
13005   "tx" :
13006   {
13007     "description": "Amount of transmitted kilo bytes from the collection",
13008     "readOnly": true,
13009     "type": "integer"
13010   },
13011   "rt" :
13012   {
13013     "description": "Resource Type of the Resource",
13014     "items": {
13015       "maxLength": 64,
13016       "type": "string"
13017     },
13018     "minItems": 1,
13019     "readOnly": true,
13020     "type": "array"
13021   },
13022   "ianaifType" :
13023   {
13024     "description": "The type of the network connection, as defined by iana

```



```

13029 https://www.iana.org/assignments/ianaiftype-mib/ianaiftype-mib",
13030     "readOnly": true,
13031     "type": "integer"
13032 },
13033
13034     "rx" :
13035     {
13036         "description": "Amount of received kilo bytes from the collection",
13037         "readOnly": true,
13038         "type": "integer"
13039     },
13040
13041     "id" :
13042     {
13043         "description": "Instance ID of this specific resource",
13044         "maxLength": 64,
13045         "readOnly": true,
13046         "type": "string"
13047     },
13048
13049     "amsrx" :
13050     {
13051         "description": "Average received message size in bytes (rx) in the collection period",
13052         "readOnly": true,
13053         "type": "integer"
13054     },
13055
13056     "n" :
13057     {
13058         "description": "Friendly name of the resource",
13059         "maxLength": 64,
13060         "readOnly": true,
13061         "type": "string"
13062     },
13063
13064     "col" :
13065     {
13066         "description": "True: Device is collecting values",
13067         "readOnly": false,
13068         "type": "boolean"
13069     },
13070
13071     "if" :
13072     {
13073         "description": "The interface set supported by this resource",
13074         "items": {
13075             "enum": [
13076                 "oic.if.baseline",
13077                 "oic.if.ll",
13078                 "oic.if.b",
13079                 "oic.if.lb",
13080                 "oic.if.rw",
13081                 "oic.if.r",
13082                 "oic.if.a",
13083                 "oic.if.s"
13084             ],
13085             "type": "string"
13086         },
13087         "minItems": 1,
13088         "readOnly": true,
13089         "type": "array"
13090     }
13091 }
13092 },
13093 "type" : "object"
13094 , "required": ["reset", "col", "ianaifType"]
13095 }
13096 ,
13097 "nmon-update" : {
13098     "properties": {
13099         "reset" :

```

```

13100         {
13101             "description": "True: reset the collected values",
13102             "readOnly": false,
13103             "type": "boolean"
13104         },
13105
13106         "rt" :
13107         {
13108             "description": "Resource Type of the Resource",
13109             "items": {
13110                 "maxLength": 64,
13111                 "type": "string"
13112             },
13113             "minItems": 1,
13114             "readOnly": true,
13115             "type": "array"
13116         },
13117
13118         "n" :
13119         {
13120             "description": "Friendly name of the resource",
13121             "maxLength": 64,
13122             "type": "string"
13123         },
13124
13125         "id" :
13126         {
13127             "anyOf": [
13128                 {
13129                     "maxLength": 64,
13130                     "type": "string"
13131                 },
13132                 {
13133                     "description": "Format pattern according to IETF RFC 4122.",
13134                     "pattern": "^[a-fA-F0-9]{8}-[a-fA-F0-9]{4}-[a-fA-F0-9]{4}-[a-fA-F0-
13135 9]{12}$",
13136                     "type": "string"
13137                 }
13138             ],
13139             "description": "Instance ID of this specific resource",
13140             "readOnly": true
13141         },
13142
13143         "col" :
13144         {
13145             "description": "True: Device is collecting values",
13146             "readOnly": false,
13147             "type": "boolean"
13148         },
13149
13150         "if" :
13151         {
13152             "description": "The interface set supported by this resource",
13153             "items": {
13154                 "enum": [
13155                     "oic.if.baseline",
13156                     "oic.if.ll",
13157                     "oic.if.b",
13158                     "oic.if.lb",
13159                     "oic.if.rw",
13160                     "oic.if.r",
13161                     "oic.if.a",
13162                     "oic.if.s"
13163                 ],
13164                 "type": "string"
13165             },
13166             "minItems": 1,
13167             "readOnly": true,
13168             "type": "array"
13169         }
13170     }

```

```

13171     }
13172     , "type" : "object"
13173     , "required": ["reset", "col"]
13174   }
13175 }
13176 }
13177

```

### F.9.5 Property Definition

**Table 105 The properties definitions of the resource**

Property name	Value type	Mandatory	Access mode	Description
rt	array: see schema	No	Read Only	Resource Type of the Resource
id	multiple types: see schema	No	Read Only	Instance ID of this specific resource
reset	boolean	Yes	Read Write	True: reset the collected values
n	string	No	Read Write	Friendly name of the resource
if	array: see schema	No	Read Only	The interface set supported by this resource
col	boolean	Yes	Read Write	True: Device is collecting values
rt	array: see schema	No	Read Only	Resource Type of the Resource
ianaifType	integer	Yes	Read Only	The type of the network connection, as defined by iana <a href="https://www.iana.org/assignments/ianaiftype-mib/ianaiftype-mib">https://www.iana.org/assignments/ianaiftype- mib/ianaiftype-mib</a>
reset	boolean	Yes	Read Write	True: reset the collected values
n	string	No	Read Only	Friendly name of the resource
rx	integer	No	Read Only	Amount of received kilo bytes from the collection
if	array: see schema	No	Read Only	The interface set supported by this resource
col	boolean	Yes	Read Write	True: Device is collecting values
mmstx	integer	No	Read Only	Maximum transmitted message size in bytes (tx) in the collection period
mmsrx	integer	No	Read Only	Maximum received message size in bytes (rx) in the collection period
id	string	No	Read Only	Instance ID of this specific resource

tx	integer	No	Read Only	Amount of transmitted kilo bytes from the collection
amstx	integer	No	Read Only	Average transmitted message size in bytes (tx) in the collection period
amsrx	integer	No	Read Only	Average received message size in bytes (rx) in the collection period

13180 **F.9.6 CRUDN behaviour**

13181 **Table 106 The CRUDN operations of the resource**

Resource	Create	Read	Update	Delete	Notify
/nmonResURI		get	post		observe

13182 **F.10 Platform**

13183 **F.10.1 Introduction**

13184 Known resource that is defines the platform on which a Server is hosted. Allows for platform  
 13185 specific information to be discovered.  
 13186

13187 **F.10.2 Wellknown URI**

13188 /oic/p

13189 **F.10.3 Resource Type**

13190 The resource type (rt) is defined as: ['oic.wk.p'].

13191 **F.10.4 Swagger2.0 Definition**

```

13192 {
13193   "swagger": "2.0",
13194   "info": {
13195     "title": "Platform",
13196     "version": "v1-20160622",
13197     "license": {
13198       "name": "copyright 2016-2017 Open Connectivity Foundation, Inc. All rights reserved.",
13199       "x-description": "Redistribution and use in source and binary forms, with or without
13200 modification, are permitted provided that the following conditions are met:\n      1.
13201 Redistributions of source code must retain the above copyright notice, this list of conditions and
13202 the following disclaimer.\n      2. Redistributions in binary form must reproduce the above
13203 copyright notice, this list of conditions and the following disclaimer in the documentation and/or
13204 other materials provided with the distribution.\n\n      THIS SOFTWARE IS PROVIDED BY THE Open
13205 Connectivity Foundation, INC. \ "AS IS\ " AND ANY EXPRESS OR IMPLIED WARRANTIES, INCLUDING, BUT NOT
13206 LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE OR
13207 WARRANTIES OF NON-INFRINGEMENT, ARE DISCLAIMED.\n      IN NO EVENT SHALL THE Open Connectivity
13208 Foundation, INC. OR CONTRIBUTORS BE LIABLE FOR ANY DIRECT, INDIRECT, INCIDENTAL, SPECIAL,
13209 EXEMPLARY, OR CONSEQUENTIAL DAMAGES (INCLUDING, BUT NOT LIMITED TO, PROCUREMENT OF SUBSTITUTE GOODS
13210 OR SERVICES; LOSS OF USE, DATA, OR PROFITS; OR BUSINESS INTERRUPTION)\n      HOWEVER CAUSED AND
13211 ON ANY THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT (INCLUDING NEGLIGENCE OR
13212 OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OF THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY
13213 OF SUCH DAMAGE.\n"
13214   }
13215 },
13216 "schemes": ["http"],
13217 "consumes": ["application/json"],
13218 "produces": ["application/json"],
13219 "paths": {
13220   "/oic/p" : {
13221     "get": {
13222       "description": "Known resource that is defines the platform on which an Server is
13223 hosted.\nAllows for platform specific information to be discovered.\nRetrieve the information about
13224 the Platform\n",

```

```

13225     "parameters": [
13226       { "$ref": "#/parameters/interface" }
13227     ],
13228     "responses": {
13229       "200": {
13230         "description": "",
13231         "x-example":
13232           {
13233             "pi": "54919CA5-4101-4AE4-595B-353C51AA983C",
13234             "rt": ["oic.wk.p"],
13235             "mmn": "Acme, Inc"
13236           }
13237       },
13238       "schema": { "$ref": "#/definitions/Platform" }
13239     }
13240   }
13241 }
13242 },
13243 },
13244 "parameters": {
13245   "interface": {
13246     "in": "query",
13247     "name": "if",
13248     "type": "string",
13249     "enum": ["oic.if.r", "oic.if.baseline"]
13250   }
13251 },
13252 "definitions": {
13253   "Platform": {
13254     "properties": {
13255       "rt":
13256         {
13257           "description": "Resource Type of the Resource",
13258           "items": {
13259             "maxLength": 64,
13260             "type": "string"
13261           },
13262           "minItems": 1,
13263           "readOnly": true,
13264           "type": "array"
13265         },
13266       "pi":
13267         {
13268           "allOf": [
13269             {
13270               "description": "Format pattern according to IETF RFC 4122.",
13271               "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}$",
13272               "type": "string"
13273             },
13274             {
13275               "description": "Platform Identifier",
13276               "readOnly": true
13277             }
13278           ]
13279         },
13280       "mnfv":
13281         {
13282           "description": "Manufacturer's firmware version",
13283           "maxLength": 64,
13284           "readOnly": true,
13285           "type": "string"
13286         },
13287       "vid":
13288         {
13289           "description": "Manufacturer's defined information for the platform. The content is freeform, with population rules up to the manufacturer",
13290           "maxLength": 64,

```

```

13296         "readOnly": true,
13297         "type": "string"
13298     },
13299
13300     "mnmn" :
13301     {
13302         "description": "Manufacturer Name",
13303         "maxLength": 64,
13304         "readOnly": true,
13305         "type": "string"
13306     },
13307
13308     "mnmo" :
13309     {
13310         "description": "Model number as designated by the manufacturer",
13311         "maxLength": 64,
13312         "readOnly": true,
13313         "type": "string"
13314     },
13315
13316     "mnhw" :
13317     {
13318         "description": "Platform Hardware Version",
13319         "maxLength": 64,
13320         "readOnly": true,
13321         "type": "string"
13322     },
13323
13324     "mnos" :
13325     {
13326         "description": "Platform Resident OS Version",
13327         "maxLength": 64,
13328         "readOnly": true,
13329         "type": "string"
13330     },
13331
13332     "mndt" :
13333     {
13334         "allof": [
13335             {
13336                 "description": "The full-date format pattern according to IETF RFC 3339",
13337                 "pattern": "^[0-9]{4}-(1[0-2]|0[1-9])-(3[0-1]|2[0-9]|1[0-9]|0[1-9])$",
13338                 "type": "string"
13339             },
13340             {
13341                 "description": "Manufacturing Date.",
13342                 "readOnly": true
13343             }
13344         ]
13345     },
13346
13347     "id" :
13348     {
13349         "description": "Instance ID of this specific resource",
13350         "maxLength": 64,
13351         "readOnly": true,
13352         "type": "string"
13353     },
13354
13355     "mnsi" :
13356     {
13357         "description": "Manufacturer's Support Information URL",
13358         "format": "uri",
13359         "maxLength": 256,
13360         "readOnly": true,
13361         "type": "string"
13362     },
13363
13364     "mnpv" :
13365     {
13366         "description": "Platform Version",

```

```

13367         "maxLength": 64,
13368         "readOnly": true,
13369         "type": "string"
13370     },
13371
13372     "st" :
13373     {
13374         "description": "The date-time format pattern according to IETF RFC 3339.",
13375         "format": "date-time",
13376         "readOnly": true,
13377         "type": "string"
13378     },
13379
13380     "n" :
13381     {
13382         "description": "Friendly name of the resource",
13383         "maxLength": 64,
13384         "readOnly": true,
13385         "type": "string"
13386     },
13387
13388     "mnmml" :
13389     {
13390         "description": "Manufacturer's URL",
13391         "format": "uri",
13392         "maxLength": 256,
13393         "readOnly": true,
13394         "type": "string"
13395     },
13396
13397     "mnsel" :
13398     {
13399         "description": "Serial number as designated by the manufacturer",
13400         "maxLength": 64,
13401         "readOnly": true,
13402         "type": "string"
13403     },
13404
13405     "if" :
13406     {
13407         "description": "The interface set supported by this resource",
13408         "items": {
13409             "enum": [
13410                 "oic.if.baseline",
13411                 "oic.if.ll",
13412                 "oic.if.b",
13413                 "oic.if.lb",
13414                 "oic.if.rw",
13415                 "oic.if.r",
13416                 "oic.if.a",
13417                 "oic.if.s"
13418             ],
13419             "type": "string"
13420         },
13421         "minItems": 1,
13422         "readOnly": true,
13423         "type": "array"
13424     }
13425 }
13426
13427 , "type" : "object"
13428 , "required": ["pi", "mnmn"]
13429 }
13430 }
13431 }
13432

```

Table 107 The properties definitions of the resource

Property name	Value type	Mandatory	Access mode	Description
vid	string	No	Read Only	Manufacturer's defined information for the platform. The content is freeform, with population rules up to the manufacturer
mpv	string	No	Read Only	Platform Version
mpfv	string	No	Read Only	Manufacturer's firmware version
mdt	multiple types: see schema	No	Read Write	
pi	multiple types: see schema	Yes	Read Write	
rt	array: see schema	No	Read Only	Resource Type of the Resource
mnmo	string	No	Read Only	Model number as designated by the manufacturer
id	string	No	Read Only	Instance ID of this specific resource
mnml	string	No	Read Only	Manufacturer's URL
st	string	No	Read Only	The date-time format pattern according to IETF RFC 3339.
mnhw	string	No	Read Only	Platform Hardware Version
mnmn	string	Yes	Read Only	Manufacturer Name
if	array: see schema	No	Read Only	The interface set supported by this resource
mnsel	string	No	Read Only	



				Serial number as designated by the manufacturer
mnsi	string	No	Read Only	Manufacturer's Support Information URL
n	string	No	Read Only	Friendly name of the resource
mnos	string	No	Read Only	Platform Resident OS Version

13435 **F.10.6 CRUDN behaviour**

13436 **Table 108 The CRUDN operations of the resource**

Resource	Create	Read	Update	Delete	Notify
/oic/p		get			observe

13437 **F.11 Resource Directory Resource**

13438 **F.11.1 Introduction**

13439 Resource to be exposed by any Device that can act as a Resource Directory.

- 13440 1) Provides selector criteria (e.g., integer) with GET request  
 13441 2) Publish a Link in /oic/res with POST request  
 13442

13443 **F.11.2 Wellknown URI**

13444 /oic/rd

13445 **F.11.3 Resource Type**

13446 The resource type (rt) is defined as: ['oic.wk.rd'].

13447 **F.11.4 Swagger2.0 Definition**

```

13448 {
13449   "swagger": "2.0",
13450   "info": {
13451     "title": "Resource directory resource",
13452     "version": "v1-20160622",
13453     "license": {
13454       "name": "copyright 2016-2017 Open Connectivity Foundation, Inc. All rights reserved.",
13455       "x-description": "Redistribution and use in source and binary forms, with or without
13456 modification, are permitted provided that the following conditions are met:\n      1.
13457 Redistributions of source code must retain the above copyright notice, this list of conditions and
13458 the following disclaimer.\n      2. Redistributions in binary form must reproduce the above
13459 copyright notice, this list of conditions and the following disclaimer in the documentation and/or
13460 other materials provided with the distribution.\n\n      THIS SOFTWARE IS PROVIDED BY THE Open
13461 Connectivity Foundation, INC. \AS IS\ AND ANY EXPRESS OR IMPLIED WARRANTIES, INCLUDING, BUT NOT
13462 LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE OR
13463 WARRANTIES OF NON-INFRINGEMENT, ARE DISCLAIMED.\n      IN NO EVENT SHALL THE Open Connectivity
13464 Foundation, INC. OR CONTRIBUTORS BE LIABLE FOR ANY DIRECT, INDIRECT, INCIDENTAL, SPECIAL,
13465 EXEMPLARY, OR CONSEQUENTIAL DAMAGES (INCLUDING, BUT NOT LIMITED TO, PROCUREMENT OF SUBSTITUTE GOODS
13466 OR SERVICES; LOSS OF USE, DATA, OR PROFITS; OR BUSINESS INTERRUPTION)\n      HOWEVER CAUSED AND
13467 ON ANY THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT (INCLUDING NEGLIGENCE OR
13468 OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OF THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY
13469 OF SUCH DAMAGE.\n"
13470   }
13471 },
13472   "schemes": ["http"],

```

```

13473     "consumes": ["application/json"],
13474     "produces": ["application/json"],
13475     "paths": {
13476         "/oic/rd" : {
13477             "get": {
13478                 "description": "Resource to be exposed by any Device that can act as a Resource
13479 Directory.\n1) Provides selector criteria (e.g., integer) with GET request\n2) Publish a Link in
13480 /oic/res with POST request\nGet the attributes of the Resource Directory for selection
13481 purposes.\n",
13482                 "parameters": [
13483                     { "$ref": "#/parameters/rdgetinterface" }
13484                 ],
13485                 "responses": {
13486                     "200": {
13487                         "description": "Respond with the selector criteria - either the set of attributes or
13488 the bias factor\n",
13489                         "x-example":
13490                         {
13491                             "rt": ["oic.wk.rd"],
13492                             "if": ["oic.if.baseline"],
13493                             "sel": 50
13494                         }
13495                     },
13496                     "schema": { "$ref": "#/definitions/rdSelection" }
13497                 }
13498             }
13499         },
13500         "post": {
13501             "description": "Publish the resource information for the first time in /oic/res. Updates to
13502 existing entries are not allowed.\nAppropriates parts of the information, i.e., Links of the
13503 published Resources will be discovered through /oic/res.\n1) When a Device first publishes a Link,
13504 the request payload to RD may include the Links without an \"ins\" Parameter.\n2) Upon granting the
13505 request, the RD assigns a unique instance value identifying the Link among all the Links it
13506 advertises\n and sends back the instance value in the \"ins\" Parameter in the Link to the
13507 publishing Device.\n",
13508             "parameters": [
13509                 { "$ref": "#/parameters/rdpostinterface" },
13510                 {
13511                     "name": "body",
13512                     "in": "body",
13513                     "required": true,
13514                     "schema": { "$ref": "#/definitions/rdPublish" },
13515                     "x-example":
13516                     {
13517                         "di": "e61c3e6b-9c54-4b81-8ce5-f9039c1d04d9",
13518                         "links": [
13519                             {
13520                                 "anchor": "ocf://e61c3e6b-9c54-4b81-8ce5-f9039c1d04d9",
13521                                 "href": "/myLightSwitch",
13522                                 "rt": ["oic.r.switch.binary"],
13523                                 "if": ["oic.if.a", "oic.if.baseline"],
13524                                 "p": {"bm": 3},
13525                                 "eps": [
13526                                     {"ep": "coaps://[2001:db8:a::b1d6]:1111", "pri": 2},
13527                                     {"ep": "coaps://[2001:db8:a::b1d6]:1122"},
13528                                     {"ep": "coaps+tcp://[2001:db8:a::123]:2222", "pri": 3}
13529                                 ]
13530                             },
13531                             {
13532                                 "anchor": "ocf://e61c3e6b-9c54-4b81-8ce5-f9039c1d04d9",
13533                                 "href": "/myLightBrightness",
13534                                 "rt": ["oic.r.brightness"],
13535                                 "if": ["oic.if.a", "oic.if.baseline"],
13536                                 "p": {"bm": 3},
13537                                 "eps": [
13538                                     {"ep": "coaps://[[2001:db8:a::123]:2222"}
13539                                 ]
13540                             }
13541                         ]
13542                     },
13543                     "ttl": 600
13544                 }
13545             }

```

```

13544     }
13545   ],
13546   "responses": {
13547     "200": {
13548       "description": "Respond with the same schema as publish with the additional \"ins\"
13549 Parameter in the Link.\n",
13550       "x-example":
13551         {
13552           "di": "e61c3e6b-9c54-4b81-8ce5-f9039c1d04d9",
13553           "links": [
13554             {
13555               "anchor": "ocf://e61c3e6b-9c54-4b81-8ce5-f9039c1d04d9",
13556               "href": "/myLightSwitch",
13557               "rt": ["oic.r.switch.binary"],
13558               "if": ["oic.if.a", "oic.if.baseline"],
13559               "p": {"bm": 3},
13560               "eps": [
13561                 {"ep": "coaps://[2001:db8:a::b1d6]:1111", "pri": 2},
13562                 {"ep": "coaps://[2001:db8:a::b1d6]:1122"},
13563                 {"ep": "coaps+tcp://[2001:db8:a::123]:2222", "pri": 3}
13564               ],
13565               "ins": 11235
13566             },
13567             {
13568               "anchor": "ocf://e61c3e6b-9c54-4b81-8ce5-f9039c1d04d9",
13569               "href": "/myLightBrightness",
13570               "rt": ["oic.r.brightness"],
13571               "if": ["oic.if.a", "oic.if.baseline"],
13572               "p": {"bm": 3},
13573               "eps": [
13574                 {"ep": "coaps://[2001:db8:a::123]:2222"}
13575               ],
13576               "ins": 112358
13577             }
13578           ],
13579           "ttl": 600
13580         }
13581       ,
13582       "schema": { "$ref": "#/definitions/rdPublish" }
13583     }
13584   }
13585 }
13586 },
13587 "parameters": {
13588   "rdgetinterface": {
13589     "in": "query",
13590     "name": "if",
13591     "type": "string",
13592     "enum": ["oic.if.baseline"],
13593     "description": "enumdescription"
13594   },
13595   "rdpostinterface": {
13596     "in": "query",
13597     "name": "if",
13598     "type": "string",
13599     "enum": ["oic.if.baseline"],
13600     "description": "enumdescription"
13601   }
13602 },
13603 "definitions": {
13604   "rdSelection": {
13605     "properties": {
13606       "rt": {
13607         {
13608           "description": "Resource Type of the Resource",
13609           "items": {
13610             "maxLength": 64,
13611             "type": "string"
13612           },
13613         },
13614         "minItems": 1,

```

```

13615         "readOnly": true,
13616         "type": "array"
13617     },
13618     "n" :
13619     {
13620         {
13621             "description": "Friendly name of the resource",
13622             "maxLength": 64,
13623             "readOnly": true,
13624             "type": "string"
13625         },
13626         "sel" :
13627         {
13628             {
13629                 "description": "A bias factor calculated by the Resource directory",
13630                 "maximum": 100,
13631                 "minimum": 0,
13632                 "readOnly": true,
13633                 "type": "integer"
13634             },
13635             "id" :
13636             {
13637                 {
13638                     "description": "Instance ID of this specific resource",
13639                     "maxLength": 64,
13640                     "readOnly": true,
13641                     "type": "string"
13642                 },
13643                 "if" :
13644                 {
13645                     {
13646                         "description": "The interface set supported by this resource",
13647                         "items": {
13648                             "enum": [
13649                                 "oic.if.baseline",
13650                                 "oic.if.ll",
13651                                 "oic.if.b",
13652                                 "oic.if.lb",
13653                                 "oic.if.rw",
13654                                 "oic.if.r",
13655                                 "oic.if.a",
13656                                 "oic.if.s"
13657                             ],
13658                             "type": "string"
13659                         },
13660                         "minItems": 1,
13661                         "readOnly": true,
13662                         "type": "array"
13663                     }
13664                 }
13665             }, "type" : "object"
13666         }
13667     }
13668 ,
13669 "rdPublish" : {
13670     "properties": {
13671         "rt" :
13672         {
13673             {
13674                 "description": "Resource Type of the Resource",
13675                 "items": {
13676                     "maxLength": 64,
13677                     "type": "string"
13678                 },
13679                 "minItems": 1,
13680                 "readOnly": true,
13681                 "type": "array"
13682             },
13683             "links" :
13684             {
13685                 {
13686                     "description": "A set of simple or individual OIC Links.",

```

```

13686     "items": {
13687         "properties": {
13688             "anchor": {
13689                 "description": "This is used to override the context URI e.g. override the URI of
13690 the containing collection.",
13691                 "format": "uri",
13692                 "maxLength": 256,
13693                 "type": "string"
13694             },
13695             "di": {
13696                 "description": "The Device ID formatted according to IETF RFC 4122.",
13697                 "pattern": "^[a-fA-F0-9]{8}-[a-fA-F0-9]{4}-[a-fA-F0-9]{4}-[a-fA-F0-
13698 9]{12}$",
13699                 "type": "string"
13700             },
13701             "eps": {
13702                 "description": "the Endpoint information of the target Resource",
13703                 "items": {
13704                     "properties": {
13705                         "ep": {
13706                             "description": "Transport Protocol Suite + Endpoint Locator",
13707                             "format": "uri",
13708                             "type": "string"
13709                         },
13710                         "pri": {
13711                             "description": "The priority among multiple Endpoints",
13712                             "minimum": 1,
13713                             "type": "integer"
13714                         }
13715                     },
13716                     "type": "object"
13717                 },
13718                 "type": "array"
13719             },
13720             "href": {
13721                 "description": "This is the target URI, it can be specified as a Relative Reference
13722 or fully-qualified URI.",
13723                 "format": "uri",
13724                 "maxLength": 256,
13725                 "type": "string"
13726             },
13727             "if": {
13728                 "description": "The interface set supported by this resource",
13729                 "items": {
13730                     "enum": [
13731                         "oic.if.baseline",
13732                         "oic.if.ll",
13733                         "oic.if.b",
13734                         "oic.if.rw",
13735                         "oic.if.r",
13736                         "oic.if.a",
13737                         "oic.if.s"
13738                     ],
13739                     "type": "string"
13740                 },
13741                 "minItems": 1,
13742                 "type": "array"
13743             },
13744             "ins": {
13745                 "description": "The instance identifier for this web link in an array of web links
13746 - used in collections",
13747                 "type": "integer"
13748             },
13749             "p": {
13750                 "description": "Specifies the framework policies on the Resource referenced by the
13751 target URI",
13752                 "properties": {
13753                     "bm": {
13754                         "description": "Specifies the framework policies on the Resource referenced by
13755 the target URI for e.g. observable and discoverable",
13756                         "type": "integer"

```

```

13757         }
13758     },
13759     "required": [
13760         "bm"
13761     ],
13762     "type": "object"
13763 },
13764 "rel": {
13765     "description": "The relation of the target URI referenced by the link to the
context URI",
13766     "oneOf": [
13767         {
13768             "default": [
13769                 "hosts"
13770             ],
13771             "items": {
13772                 "maxLength": 64,
13773                 "type": "string"
13774             },
13775             "minItems": 1,
13776             "type": "array"
13777         },
13778         {
13779             "default": "hosts",
13780             "maxLength": 64,
13781             "type": "string"
13782         }
13783     ]
13784 },
13785 "rt": {
13786     "description": "Resource Type of the Resource",
13787     "items": {
13788         "maxLength": 64,
13789         "type": "string"
13790     },
13791     "minItems": 1,
13792     "type": "array"
13793 },
13794 "title": {
13795     "description": "A title for the link relation. Can be used by the UI to provide a
context.",
13796     "maxLength": 64,
13797     "type": "string"
13798 },
13799 "type": {
13800     "default": "application/cbor",
13801     "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.",
13802     "items": {
13803         "maxLength": 64,
13804         "type": "string"
13805     },
13806     "minItems": 1,
13807     "type": "array"
13808 },
13809 "required": [
13810     "href",
13811     "rt",
13812     "if"
13813 ],
13814 "type": "object"
13815 },
13816 "type": "array"
13817 },
13818 "di" :
13819 {
13820     "$ref": "#/definitions/uuid",
13821     "description": "A UUID that is the identifier for the publishing Device"
13822 },
13823 },
13824 },

```

```

13828
13829     "n" :
13830     {
13831         "description": "Friendly name of the resource",
13832         "maxLength": 64,
13833         "readOnly": true,
13834         "type": "string"
13835     },
13836
13837     "ttl" :
13838     {
13839         "description": "Time to indicate a RD, i.e. how long to keep this published item.",
13840         "type": "integer"
13841     },
13842
13843     "id" :
13844     {
13845         "description": "Instance ID of this specific resource",
13846         "maxLength": 64,
13847         "readOnly": true,
13848         "type": "string"
13849     },
13850
13851     "if" :
13852     {
13853         "description": "The interface set supported by this resource",
13854         "items": {
13855             "enum": [
13856                 "oic.if.baseline",
13857                 "oic.if.ll",
13858                 "oic.if.b",
13859                 "oic.if.lb",
13860                 "oic.if.rw",
13861                 "oic.if.r",
13862                 "oic.if.a",
13863                 "oic.if.s"
13864             ],
13865             "type": "string"
13866         },
13867         "minItems": 1,
13868         "readOnly": true,
13869         "type": "array"
13870     }
13871 }
13872 }
13873 , "type" : "object"
13874 , "required": ["di", "links", "ttl"]
13875 }
13876 , "oic.rd.publish" :
13877 {
13878     "properties": {
13879         "di": {
13880             "$ref": "#/definitions/uuid",
13881             "description": "A UUID that is the identifier for the publishing Device"
13882         },
13883         "ttl": {
13884             "description": "Time to indicate a RD, i.e. how long to keep this published item.",
13885             "type": "integer"
13886         }
13887     }
13888 }
13889
13890 , "oic.collection.links.arrayoflinks" :
13891 {
13892     "properties": {
13893         "links": {
13894             "description": "A set of simple or individual OIC Links.",
13895             "items": {
13896                 "properties": {
13897                     "anchor": {
13898                         "description": "This is used to override the context URI e.g. override the URI of

```

```

13899 the containing collection.",
13900     "format": "uri",
13901     "maxLength": 256,
13902     "type": "string",
13903 },
13904 "di": {
13905     "description": "The Device ID formatted according to IETF RFC 4122.",
13906     "pattern": "^[a-fA-F0-9]{8}-[a-fA-F0-9]{4}-[a-fA-F0-9]{4}-[a-fA-F0-
13907 9]{12}$",
13908     "type": "string"
13909 },
13910 "eps": {
13911     "description": "the Endpoint information of the target Resource",
13912     "items": {
13913         "properties": {
13914             "ep": {
13915                 "description": "Transport Protocol Suite + Endpoint Locator",
13916                 "format": "uri",
13917                 "type": "string"
13918             },
13919             "pri": {
13920                 "description": "The priority among multiple Endpoints",
13921                 "minimum": 1,
13922                 "type": "integer"
13923             }
13924         },
13925         "type": "object"
13926     },
13927     "type": "array"
13928 },
13929 "href": {
13930     "description": "This is the target URI, it can be specified as a Relative Reference
13931 or fully-qualified URI.",
13932     "format": "uri",
13933     "maxLength": 256,
13934     "type": "string"
13935 },
13936 "if": {
13937     "description": "The interface set supported by this resource",
13938     "items": {
13939         "enum": [
13940             "oic.if.baseline",
13941             "oic.if.ll",
13942             "oic.if.b",
13943             "oic.if.rw",
13944             "oic.if.r",
13945             "oic.if.a",
13946             "oic.if.s"
13947         ],
13948         "type": "string"
13949     },
13950     "minItems": 1,
13951     "type": "array"
13952 },
13953 "ins": {
13954     "description": "The instance identifier for this web link in an array of web links
13955 - used in collections",
13956     "type": "integer"
13957 },
13958 "p": {
13959     "description": "Specifies the framework policies on the Resource referenced by the
13960 target URI",
13961     "properties": {
13962         "bm": {
13963             "description": "Specifies the framework policies on the Resource referenced by
13964 the target URI for e.g. observable and discoverable",
13965             "type": "integer"
13966         }
13967     },
13968     "required": [
13969         "bm"

```



```

13970         ],
13971         "type": "object"
13972     },
13973     "rel": {
13974         "description": "The relation of the target URI referenced by the link to the
context URI",
13975         "oneOf": [
13976             {
13977                 "default": [
13978                     "hosts"
13979                 ],
13980                 "items": {
13981                     "maxLength": 64,
13982                     "type": "string"
13983                 },
13984                 "minItems": 1,
13985                 "type": "array"
13986             },
13987             {
13988                 "default": "hosts",
13989                 "maxLength": 64,
13990                 "type": "string"
13991             }
13992         ]
13993     },
13994     "rt": {
13995         "description": "Resource Type of the Resource",
13996         "items": {
13997             "maxLength": 64,
13998             "type": "string"
13999         },
14000         "minItems": 1,
14001         "type": "array"
14002     },
14003     "title": {
14004         "description": "A title for the link relation. Can be used by the UI to provide a
context.",
14005         "maxLength": 64,
14006         "type": "string"
14007     },
14008     "type": {
14009         "default": "application/cbor",
14010         "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.",
14011         "items": {
14012             "maxLength": 64,
14013             "type": "string"
14014         },
14015         "minItems": 1,
14016         "type": "array"
14017     }
14018 },
14019 "required": [
14020     "href",
14021     "rt",
14022     "if"
14023 ],
14024 "type": "object"
14025 },
14026 "type": "array"
14027 }
14028 }
14029 }
14030 }
14031 }
14032 }
14033 }
14034 , "oic.core" :
14035 {
14036     "properties": {
14037         "id": {
14038             "description": "Instance ID of this specific resource",
14039             "maxLength": 64,
14040             "readOnly": true,

```

```

14041     "type": "string"
14042   },
14043   "if": {
14044     "description": "The interface set supported by this resource",
14045     "items": {
14046       "enum": [
14047         "oic.if.baseline",
14048         "oic.if.ll",
14049         "oic.if.b",
14050         "oic.if.lb",
14051         "oic.if.rw",
14052         "oic.if.r",
14053         "oic.if.a",
14054         "oic.if.s"
14055       ],
14056       "type": "string"
14057     },
14058     "minItems": 1,
14059     "readOnly": true,
14060     "type": "array"
14061   },
14062   "n": {
14063     "description": "Friendly name of the resource",
14064     "maxLength": 64,
14065     "readOnly": true,
14066     "type": "string"
14067   },
14068   "rt": {
14069     "description": "Resource Type of the Resource",
14070     "items": {
14071       "maxLength": 64,
14072       "type": "string"
14073     },
14074     "minItems": 1,
14075     "readOnly": true,
14076     "type": "array"
14077   }
14078 },
14079 "type": "object"
14080 }
14081
14082 , "uuid" :
14083 {
14084   "description": "Format pattern according to IETF RFC 4122.",
14085   "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}$",
14086   "type": "string"
14087 }
14088 }
14089 }
14090 }
14091

```

### F.11.5 Property Definition

**Table 109** The properties definitions of the resource

Property name	Value type	Mandatory	Access mode	Description
links	array: see schema	No	Read Write	A set of simple or individual OIC Links.
di	multiple types: see schema		Read Write	A UUID that is the identifier for the publishing Device
ttl	integer		Read Write	

				Time to indicate a RD, i.e. how long to keep this published item.
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
sel	integer		Read Only	A bias factor calculated by the Resource directory
n	string		Read Only	Friendly name of the resource
id	string	No	Read Only	Instance ID of this specific resource
if	array: see schema	No	Read Only	The interface set supported by this resource
links	array: see schema	Yes	Read Write	A set of simple or individual OIC Links.
n	string	No	Read Only	Friendly name of the resource
ttl	integer	Yes	Read Write	Time to indicate a RD, i.e. how long to keep this published item.
rt	array: see schema	No	Read Only	Resource Type of the Resource
di	multiple types: see schema	Yes	Read Write	A UUID that is the identifier for the publishing Device
rt	array: see schema		Read Only	Resource Type of the Resource
id	string		Read Only	

				Instance ID of this specific resource
n	string		Read Only	Friendly name of the resource
if	array: schema	see	Read Only	The interface set supported by this resource

14094 **F.11.6 CRUDN behaviour**

14095 **Table 110 The CRUDN operations of the resource**

Resource	Create	Read	Update	Delete	Notify
/oic/rd		get	post		observe

14096 **F.12 Discoverable Resources**

14097 **F.12.1 Introduction**

14098 Baseline representation of /oic/res; list of discoverable resources  
14099

14100 **F.12.2 Wellknown URI**

14101 /oic/res

14102 **F.12.3 Resource Type**

14103 **F.12.4 Swagger2.0 Definition**

```

14104 {
14105   "swagger": "2.0",
14106   "info": {
14107     "title": "Discoverable Resources Link List interface",
14108     "version": "v1-20160622",
14109     "license": {
14110       "name": "copyright 2016-2017 Open Connectivity Foundation, Inc. All rights reserved.",
14111       "x-description": "Redistribution and use in source and binary forms, with or without
14112 modification, are permitted provided that the following conditions are met:\n      1.
14113 Redistributions of source code must retain the above copyright notice, this list of conditions and
14114 the following disclaimer.\n      2. Redistributions in binary form must reproduce the above
14115 copyright notice, this list of conditions and the following disclaimer in the documentation and/or
14116 other materials provided with the distribution.\n\n      THIS SOFTWARE IS PROVIDED BY THE Open
14117 Connectivity Foundation, INC. \AS IS\ AND ANY EXPRESS OR IMPLIED WARRANTIES, INCLUDING, BUT NOT
14118 LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE OR
14119 WARRANTIES OF NON-INFRINGEMENT, ARE DISCLAIMED.\n\n      IN NO EVENT SHALL THE Open Connectivity
14120 Foundation, INC. OR CONTRIBUTORS BE LIABLE FOR ANY DIRECT, INDIRECT, INCIDENTAL, SPECIAL,
14121 EXEMPLARY, OR CONSEQUENTIAL DAMAGES (INCLUDING, BUT NOT LIMITED TO, PROCUREMENT OF SUBSTITUTE GOODS
14122 OR SERVICES; LOSS OF USE, DATA, OR PROFITS; OR BUSINESS INTERRUPTION)\n\n      HOWEVER CAUSED AND
14123 ON ANY THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT (INCLUDING NEGLIGENCE OR
14124 OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OF THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY
14125 OF SUCH DAMAGE.\n"
14126     }
14127   },
14128   "schemes": ["http"],
14129   "consumes": ["application/json"],
14130   "produces": ["application/json"],
14131   "paths": {
14132     "/oic/res?if=oic.if.ll" : {
14133       "get": {
14134         "description": "Link list representation of /oic/res; list of discoverable
14135 resources\nRetrieve the discoverable resource set, link list interface\n",
14136         "parameters": [
14137           {"$ref": "#/parameters/interface-ll"}
14138         ],

```

```

14139     "responses": {
14140         "200": {
14141             "description" : "",
14142             "x-example":
14143                 [
14144                     {
14145                         "href": "/humidity",
14146                         "rt":  ["oic.r.humidity"],
14147                         "if":  ["oic.if.s"],
14148                         "p":   {"bm": 3},
14149                         "eps": [
14150                             {"ep": "coaps://[fe80::bld6]:1111", "pri": 2},
14151                             {"ep": "coaps://[fe80::bld6]:1122"},
14152                             {"ep": "coaps+tcp://[2001:db8:a::123]:2222", "pri": 3}
14153                         ]
14154                     },
14155                     {
14156                         "href": "/temperature",
14157                         "rt":  ["oic.r.temperature"],
14158                         "if":  ["oic.if.s"],
14159                         "p":   {"bm": 3},
14160                         "eps": [
14161                             {"ep": "coaps://[[2001:db8:a::123]:2222"}
14162                         ]
14163                     }
14164                 ]
14165             ,
14166             "schema": { "$ref": "#/definitions/slinklist" }
14167         }
14168     }
14169 },
14170
14171 "/oic/res?if=oic.if.baseline" : {
14172     "get": {
14173         "description": "Baseline representation of /oic/res; list of discoverable
14174 resources\nRetrieve the discoverable resource set, baseline interface\n",
14175         "parameters": [
14176             {"$ref": "#/parameters/interface-baseline"}
14177         ],
14178         "responses": {
14179             "200": {
14180                 "description" : "",
14181                 "x-example":
14182                     [
14183                         {
14184                             "rt": ["oic.wk.res"],
14185                             "if": ["oic.if.baseline", "oic.if.ll" ],
14186                             "links":
14187                                 [
14188                                     {
14189                                         "href": "/humidity",
14190                                         "rt":  ["oic.r.humidity"],
14191                                         "if":  ["oic.if.s"],
14192                                         "p":   {"bm": 3},
14193                                         "eps": [
14194                                             {"ep": "coaps://[fe80::bld6]:1111", "pri": 2},
14195                                             {"ep": "coaps://[fe80::bld6]:1122"},
14196                                             {"ep": "coap+tcp://[2001:db8:a::123]:2222", "pri": 3}
14197                                         ]
14198                                     },
14199                                     {
14200                                         "href": "/temperature",
14201                                         "rt":  ["oic.r.temperature"],
14202                                         "if":  ["oic.if.s"],
14203                                         "p":   {"bm": 3},
14204                                         "eps": [
14205                                             {"ep": "coaps://[[2001:db8:a::123]:2222"}
14206                                         ]
14207                                     }
14208                                 ]
14209                         }
14209                     ]

```

```

14210         ]
14211         ,
14212         "schema": { "$ref": "#/definitions/sbaseline" }
14213     }
14214 }
14215 }
14216 }
14217 },
14218 "parameters": {
14219     "interface-ll" : {
14220         "in" : "query",
14221         "name" : "if",
14222         "type" : "string",
14223         "enum" : ["oic.if.ll"]
14224     },
14225     "interface-baseline" : {
14226         "in" : "query",
14227         "name" : "if",
14228         "type" : "string",
14229         "enum" : ["oic.if.baseline"]
14230     },
14231     "interface-all" : {
14232         "in" : "query",
14233         "name" : "if",
14234         "type" : "string",
14235         "enum" : ["oic.if.ll", "oic.if.baseline"]
14236     }
14237 },
14238 "definitions": {
14239     "slinklist" : {
14240         "items" :
14241         {
14242             "properties": {
14243                 "anchor": {
14244                     "description": "This is used to override the context URI e.g. override the URI of the
14245 containing collection.",
14246                     "format": "uri",
14247                     "maxLength": 256,
14248                     "type": "string"
14249                 },
14250                 "di": {
14251                     "description": "The Device ID formatted according to IETF RFC 4122.",
14252                     "pattern": "^[a-fA-F0-9]{8}-[a-fA-F0-9]{4}-[a-fA-F0-9]{4}-[a-fA-F0-
14253 9]{12}$",
14254                     "type": "string"
14255                 },
14256                 "eps": {
14257                     "description": "the Endpoint information of the target Resource",
14258                     "items": {
14259                         "properties": {
14260                             "ep": {
14261                                 "description": "Transport Protocol Suite + Endpoint Locator",
14262                                 "format": "uri",
14263                                 "type": "string"
14264                             },
14265                             "pri": {
14266                                 "description": "The priority among multiple Endpoints",
14267                                 "minimum": 1,
14268                                 "type": "integer"
14269                             }
14270                         },
14271                         "type": "object"
14272                     },
14273                     "type": "array"
14274                 },
14275                 "href": {
14276                     "description": "This is the target URI, it can be specified as a Relative Reference or
14277 fully-qualified URI.",
14278                     "format": "uri",
14279                     "maxLength": 256,
14280                     "type": "string"

```

```

14281     },
14282     "if": {
14283         "description": "The interface set supported by this resource",
14284         "items": {
14285             "enum": [
14286                 "oic.if.baseline",
14287                 "oic.if.ll",
14288                 "oic.if.b",
14289                 "oic.if.rw",
14290                 "oic.if.r",
14291                 "oic.if.a",
14292                 "oic.if.s"
14293             ],
14294             "type": "string"
14295         },
14296         "minItems": 1,
14297         "type": "array"
14298     },
14299     "ins": {
14300         "description": "The instance identifier for this web link in an array of web links -
14301 used in collections",
14302         "type": "integer"
14303     },
14304     "p": {
14305         "description": "Specifies the framework policies on the Resource referenced by the
14306 target URI",
14307         "properties": {
14308             "bm": {
14309                 "description": "Specifies the framework policies on the Resource referenced by the
14310 target URI for e.g. observable and discoverable",
14311                 "type": "integer"
14312             }
14313         },
14314         "required": [
14315             "bm"
14316         ],
14317         "type": "object"
14318     },
14319     "rel": {
14320         "description": "The relation of the target URI referenced by the link to the context
14321 URI",
14322         "oneOf": [
14323             {
14324                 "default": [
14325                     "hosts"
14326                 ],
14327                 "items": {
14328                     "maxLength": 64,
14329                     "type": "string"
14330                 },
14331                 "minItems": 1,
14332                 "type": "array"
14333             },
14334             {
14335                 "default": "hosts",
14336                 "maxLength": 64,
14337                 "type": "string"
14338             }
14339         ]
14340     },
14341     "rt": {
14342         "description": "Resource Type of the Resource",
14343         "items": {
14344             "maxLength": 64,
14345             "type": "string"
14346         },
14347         "minItems": 1,
14348         "type": "array"
14349     },
14350     "title": {
14351         "description": "A title for the link relation. Can be used by the UI to provide a

```

```

14352 context.",
14353     "maxLength": 64,
14354     "type": "string"
14355 },
14356 "type": {
14357     "default": "application/cbor",
14358     "description": "A hint at the representation of the resource referenced by the target
14359 URI. This represents the media types that are used for both accepting and emitting.",
14360     "items": {
14361         "maxLength": 64,
14362         "type": "string"
14363     },
14364     "minItems": 1,
14365     "type": "array"
14366 }
14367 },
14368 "required": [
14369     "href",
14370     "rt",
14371     "if"
14372 ],
14373 "type": "object"
14374 }
14375 ,
14376 "type" :
14377     "array"
14378 }
14379 ,
14380 "sbaseline" : {
14381     "items" :
14382         {
14383             "properties": {
14384                 "if": {
14385                     "description": "The interface set supported by this resource",
14386                     "items": {
14387                         "enum": [
14388                             "oic.if.baseline",
14389                             "oic.if.ll"
14390                         ],
14391                         "type": "string"
14392                     },
14393                 },
14394                 "minItems": 1,
14395                 "readOnly": true,
14396                 "type": "array"
14397             },
14398             "links": {
14399                 "items": {
14400                     "properties": {
14401                         "anchor": {
14402                             "description": "This is used to override the context URI e.g. override the URI of
14403 the containing collection.",
14404                             "format": "uri",
14405                             "maxLength": 256,
14406                             "type": "string"
14407                         },
14408                         "di": {
14409                             "description": "The Device ID formatted according to IETF RFC 4122.",
14410                             "pattern": "^[a-fA-F0-9]{8}-[a-fA-F0-9]{4}-[a-fA-F0-9]{4}-[a-fA-F0-9]{4}-[a-fA-
14411 F0-9]{12}$",
14412                             "type": "string"
14413                         },
14414                         "eps": {
14415                             "description": "the Endpoint information of the target Resource",
14416                             "items": {
14417                                 "properties": {
14418                                     "ep": {
14419                                         "description": "Transport Protocol Suite + Endpoint Locator",
14420                                         "format": "uri",
14421                                         "type": "string"
14422                                     },

```



```

14423         "pri": {
14424             "description": "The priority among multiple Endpoints",
14425             "minimum": 1,
14426             "type": "integer"
14427         }
14428     },
14429     "type": "object"
14430 },
14431 "type": "array"
14432 },
14433 "href": {
14434     "description": "This is the target URI, it can be specified as a Relative
14435 Reference or fully-qualified URI.",
14436     "format": "uri",
14437     "maxLength": 256,
14438     "type": "string"
14439 },
14440 "if": {
14441     "description": "The interface set supported by this resource",
14442     "items": {
14443         "enum": [
14444             "oic.if.baseline",
14445             "oic.if.ll",
14446             "oic.if.b",
14447             "oic.if.rw",
14448             "oic.if.r",
14449             "oic.if.a",
14450             "oic.if.s"
14451         ],
14452         "type": "string"
14453     },
14454     "minItems": 1,
14455     "type": "array"
14456 },
14457 "ins": {
14458     "description": "The instance identifier for this web link in an array of web
14459 links - used in collections",
14460     "type": "integer"
14461 },
14462 "p": {
14463     "description": "Specifies the framework policies on the Resource referenced by
14464 the target URI",
14465     "properties": {
14466         "bm": {
14467             "description": "Specifies the framework policies on the Resource referenced
14468 by the target URI for e.g. observable and discoverable",
14469             "type": "integer"
14470         }
14471     },
14472     "required": [
14473         "bm"
14474     ],
14475     "type": "object"
14476 },
14477 "rel": {
14478     "description": "The relation of the target URI referenced by the link to the
14479 context URI",
14480     "oneOf": [
14481         {
14482             "default": [
14483                 "hosts"
14484             ],
14485             "items": {
14486                 "maxLength": 64,
14487                 "type": "string"
14488             },
14489             "minItems": 1,
14490             "type": "array"
14491         },
14492         {
14493             "default": "hosts",

```

```

14494         "maxLength": 64,
14495         "type": "string"
14496     }
14497 ]
14498 },
14499 "rt": {
14500     "description": "Resource Type of the Resource",
14501     "items": {
14502         "maxLength": 64,
14503         "type": "string"
14504     },
14505     "minItems": 1,
14506     "type": "array"
14507 },
14508 "title": {
14509     "description": "A title for the link relation. Can be used by the UI to provide a
14510 context.",
14511     "maxLength": 64,
14512     "type": "string"
14513 },
14514 "type": {
14515     "default": "application/cbor",
14516     "description": "A hint at the representation of the resource referenced by the
14517 target URI. This represents the media types that are used for both accepting and emitting.",
14518     "items": {
14519         "maxLength": 64,
14520         "type": "string"
14521     },
14522     "minItems": 1,
14523     "type": "array"
14524 }
14525 },
14526 "required": [
14527     "href",
14528     "rt",
14529     "if"
14530 ],
14531 "type": "object"
14532 },
14533 "type": "array"
14534 },
14535 "n": {
14536     "description": "Human friendly name",
14537     "maxLength": 64,
14538     "readOnly": true,
14539     "type": "string"
14540 },
14541 "rt": {
14542     "description": "Resource Type of the Resource",
14543     "items": {
14544         "maxLength": 64,
14545         "type": "string"
14546     },
14547     "minItems": 1,
14548     "readOnly": true,
14549     "type": "array"
14550 }
14551 },
14552 "required": [
14553     "rt",
14554     "if",
14555     "links"
14556 ],
14557 "type": "object"
14558 }
14559
14560 , "type" :
14561     "array"
14562 }
14563 }
14564 }

```

14565 }  
14566

14567 **F.12.5 Property Definition**

14568

**Table 111 The properties definitions of the resource**

Property name	Value type	Mandatory	Access mode	Description
links	array: see schema	Yes	Read Write	
n	string	No	Read Only	Human friendly name
if	array: see schema	Yes	Read Only	The interface set supported by this resource
rt	array: see schema	Yes	Read Only	Resource Type of the Resource
rel	multiple types: see schema	No	Read Write	The relation of the target URI referenced by the link to the context URI
p	object: see schema	No	Read Write	Specifies the framework policies on the Resource referenced by the target URI
ins	integer	No	Read Write	The instance identifier for this web link in an array of web links - used in collections
di	string	No	Read Write	The Device ID formatted according to IETF RFC 4122.
if	array: see schema	Yes	Read Write	The interface set supported by this resource
type	array: see schema	No	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	No	Read Write	This is used to override the context URI e.g. override the URI of the containing collection.
title	string	No	Read Write	A title for the link relation. Can be used by the UI to provide a context.
href	string	Yes	Read Write	This is the target URI, it can be specified as a Relative Reference or fully-qualified URI.
eps	array: schema see	No	Read Write	the Endpoint information of the target Resource
rt	array: schema see	Yes	Read Write	Resource Type of the Resource

14569 **F.12.6 CRUDN behaviour**

14570 **Table 112 The CRUDN operations of the resource**

Resource	Create	Read	Update	Delete	Notify
/oic/res		get			observe

14571 **F.13 Scene List**

14572 **F.13.1 Introduction**

14573 Toplevel Scene resource. This resource is a generic collection resource. The rts value shall  
 14574 contain oic.wk.scenecollection resource types.  
 14575

14576 **F.13.2 Example URI**

14577 /SceneListResURI

14578 **F.13.3 Resource Type**

14579 The resource type (rt) is defined as: ['oic.wk.scenelist'].

14580 **F.13.4 Swagger2.0 Definition**

```

14581 {
14582   "swagger": "2.0",
14583   "info": {
14584     "title": "Scenes (Top level)",

```

```

14585     "version": "v1-20160622",
14586     "license": {
14587         "name": "copyright 2016-2017 Open Connectivity Foundation, Inc. All rights reserved.",
14588         "x-description": "Redistribution and use in source and binary forms, with or without
14589 modification, are permitted provided that the following conditions are met:\n      1.
14590 Redistributions of source code must retain the above copyright notice, this list of conditions and
14591 the following disclaimer.\n      2. Redistributions in binary form must reproduce the above
14592 copyright notice, this list of conditions and the following disclaimer in the documentation and/or
14593 other materials provided with the distribution.\n\n      THIS SOFTWARE IS PROVIDED BY THE Open
14594 Connectivity Foundation, INC. \ "AS IS\ " AND ANY EXPRESS OR IMPLIED WARRANTIES, INCLUDING, BUT NOT
14595 LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE OR
14596 WARRANTIES OF NON-INFRINGEMENT, ARE DISCLAIMED.\n      IN NO EVENT SHALL THE Open Connectivity
14597 Foundation, INC. OR CONTRIBUTORS BE LIABLE FOR ANY DIRECT, INDIRECT, INCIDENTAL, SPECIAL,
14598 EXEMPLARY, OR CONSEQUENTIAL DAMAGES (INCLUDING, BUT NOT LIMITED TO, PROCUREMENT OF SUBSTITUTE GOODS
14599 OR SERVICES; LOSS OF USE, DATA, OR PROFITS; OR BUSINESS INTERRUPTION)\n      HOWEVER CAUSED AND
14600 ON ANY THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT (INCLUDING NEGLIGENCE OR
14601 OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OF THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY
14602 OF SUCH DAMAGE.\n"
14603     },
14604 },
14605 "schemes": ["http"],
14606 "consumes": ["application/json"],
14607 "produces": ["application/json"],
14608 "paths": {
14609     "/SceneListResURI" : {
14610         "get": {
14611             "description": "Toplevel Scene resource.\nThis resource is a generic collection
14612 resource.\nThe rts value shall contain oic.wk.scenecollection resource types.\nProvides the current
14613 list of web links pointing to scenes\n",
14614             "parameters": [
14615                 {"$ref": "#/parameters/interface-baseline"}
14616             ],
14617             "responses": {
14618                 "200": {
14619                     "description": "",
14620                     "x-example":
14621                     {
14622                         "rt": ["oic.wk.scenelist"],
14623                         "n": "list of scene Collections",
14624                         "rts": ["oic.wk.scenecollection"],
14625                         "links": [
14626                             ]
14627                     }
14628                 },
14629                 "schema": { "$ref": "#/definitions/Collection" }
14630             }
14631         }
14632     }
14633 },
14634 "/SceneMemberResURI" : {
14635     "get": {
14636         "description": "Collection that models a scene member.\nProvides the scene member\n",
14637         "parameters": [
14638             {"$ref": "#/parameters/interface-baseline"}
14639         ],
14640         "responses": {
14641             "200": {
14642                 "description": "",
14643                 "x-example":
14644                 {
14645                     "rt": ["oic.wk.scenemember"],
14646                     "id": "0685B960-FFFF-46F7-BEC0-9E6234671ADC1",
14647                     "n": "my binary switch (for light bulb) mappings",
14648                     "link": {
14649                         "href": "binarySwitch",
14650                         "rt": ["oic.r.switch.binary"],
14651                         "if": ["oic.if.a", "oic.if.baseline"],
14652                         "eps": [
14653                             {"ep": "coap://[fe80::b1d6]:1111", "pri": 2},
14654                             {"ep": "coaps://[fe80::b1d6]:1122"},
14655                             {"ep": "coap+tcp://[2001:db8:a::123]:2222", "pri": 3}
14656                         ]
14657                     }
14658                 }
14659             }
14660         }
14661     }
14662 }

```

```

14656         ]
14657     },
14658     "SceneMappings": [
14659         {
14660             "scene":         "off",
14661             "memberProperty": "value",
14662             "memberValue":   "true"
14663         },
14664         {
14665             "scene":         "Reading",
14666             "memberProperty": "value",
14667             "memberValue":   "false"
14668         },
14669         {
14670             "scene":         "TVWatching",
14671             "memberProperty": "value",
14672             "memberValue":   "true"
14673         }
14674     ]
14675 }
14676 ,
14677 "schema": { "$ref": "#/definitions/SceneMember" }
14678 }
14679 }
14680 }
14681 },
14682 "/SceneCollectionResURI" : {
14683     "get": {
14684         "description": "Collection that models a set of Scenes.\nThis resource is a generic
14685 collection resource with additional parameters.\nThe rts value shall contain oic.scenemember
14686 resource types.\nThe additional parameters are\n lastScene, this is the scene value last set by
14687 any OCF Client\n sceneValues, this is the list of available scenes\n lastScene shall be listed in
14688 sceneValues.\nProvides the current list of web links pointing to scenes\n",
14689         "parameters": [
14690             { "$ref": "#/parameters/interface-baseline" }
14691         ],
14692         "responses": {
14693             "200": {
14694                 "description": "",
14695                 "x-example":
14696                 {
14697                     "lastScene": "off",
14698                     "sceneValues": ["off","Reading","TVWatching"],
14699                     "rt":         ["oic.wk.scenecollection"],
14700                     "n":         "My Scenes for my living room",
14701                     "id":        "0685B960-736F-46F7-BECO-9E6CBD671ADC1",
14702                     "rts":       ["oic.wk.scenemember"],
14703                     "links": [
14704                         ]
14705                 }
14706             },
14707             "schema": { "$ref": "#/definitions/SceneCollection" }
14708         }
14709     }
14710 },
14711 "post": {
14712     "description": "Provides the action to change the last set scene selection.\nCalling this
14713 method shall update all scene members to the prescribed membervalue.\nWhen this method is called
14714 with the same value as the current lastScene value\nthen all scene members shall be updated.\n",
14715     "parameters": [
14716         { "$ref": "#/parameters/interface-update" },
14717         {
14718             "name": "body",
14719             "in": "body",
14720             "required": true,
14721             "schema": { "$ref": "#/definitions/SceneCollectionUpdate" },
14722             "x-example":
14723             {
14724                 "lastScene": "Reading"
14725             }
14726         }
14727     ]
14728 }

```

```

14727     ],
14728     "responses": {
14729         "200": {
14730             "description": "Indicates that the value is changed.\n\nThe changed properties are
14731 provided in the response.\n\n",
14732             "x-example":
14733                 {
14734                     "lastScene": "Reading"
14735                 }
14736             ,
14737             "schema": { "$ref": "#/definitions/SceneCollectionUpdate" }
14738         }
14739     }
14740 }
14741 },
14742 },
14743 "parameters": {
14744     "interface-update" : {
14745         "in" : "query",
14746         "name" : "if",
14747         "type" : "string",
14748         "enum" : ["oic.if.a"]
14749     },
14750     "interface-baseline" : {
14751         "in" : "query",
14752         "name" : "if",
14753         "type" : "string",
14754         "enum" : ["oic.if.baseline"]
14755     },
14756     "interface-all" : {
14757         "in" : "query",
14758         "name" : "if",
14759         "type" : "string",
14760         "enum" : ["oic.if.a", "oic.if.ll", "oic.if.baseline"]
14761     }
14762 },
14763 "definitions": {
14764     "Collection" : {
14765         "properties": {
14766             "links" :
14767                 {
14768                     "description": "A set of simple or individual OIC Links.",
14769                     "items": {
14770                         "$ref": "#/definitions/oic.oic-link"
14771                     },
14772                     "type": "array"
14773                 }
14774             }
14775         }
14776         , "type" : "object"
14777     }
14778     ,
14779     "SceneMember" : {
14780         "properties": {
14781             "rt" :
14782                 {
14783                     "description": "Resource Type of the Resource",
14784                     "items": {
14785                         "maxLength": 64,
14786                         "type": "string"
14787                     },
14788                     "minItems": 1,
14789                     "readOnly": true,
14790                     "type": "array"
14791                 }
14792             },
14793         "SceneMappings" :
14794             {
14795                 "description": "array of mappings per scene, can be one(1)",
14796                 "items": {
14797                     "properties": {

```

```

14798         "memberProperty": {
14799             "description": "property name that will be mapped",
14800             "readOnly": true,
14801             "type": "string"
14802         },
14803         "memberValue": {
14804             "description": "value of the Member Property",
14805             "readOnly": true,
14806             "type": "string"
14807         },
14808         "scene": {
14809             "description": "Specifies a scene value that will be acted upon",
14810             "type": "string"
14811         }
14812     },
14813     "required": [
14814         "scene",
14815         "memberProperty",
14816         "memberValue"
14817     ],
14818     "type": "object"
14819 },
14820 "type": "array"
14821 },
14822
14823 "n" :
14824     {
14825         "description": "Friendly name of the resource",
14826         "maxLength": 64,
14827         "readOnly": true,
14828         "type": "string"
14829     },
14830
14831 "link" :
14832     {
14833         "allOf": [
14834             {
14835                 "properties": {
14836                     "anchor": {
14837                         "description": "This is used to override the context URI e.g. override the URI of
14838 the containing collection.",
14839                         "format": "uri",
14840                         "maxLength": 256,
14841                         "type": "string"
14842                     },
14843                     "di": {
14844                         "allOf": [
14845                             {
14846                                 "description": "Format pattern according to IETF RFC 4122.",
14847                                 "pattern": "^[a-fA-F0-9]{8}-[a-fA-F0-9]{4}-[a-fA-F0-9]{4}-[a-
14848 fA-F0-9]{12}$",
14849                                 "type": "string"
14850                             },
14851                             {
14852                                 "description": "The device ID"
14853                             }
14854                         ]
14855                     },
14856                     "eps": {
14857                         "description": "the Endpoint information of the target Resource",
14858                         "items": {
14859                             "properties": {
14860                                 "ep": {
14861                                     "description": "Transport Protocol Suite + Endpoint Locator",
14862                                     "format": "uri",
14863                                     "type": "string"
14864                                 },
14865                                 "pri": {
14866                                     "description": "The priority among multiple Endpoints",
14867                                     "minimum": 1,
14868                                     "type": "integer"

```



```

14869         }
14870     },
14871     "type": "object"
14872 },
14873 "type": "array"
14874 },
14875 "href": {
14876     "description": "This is the target URI, it can be specified as a Relative
14877 Reference or fully-qualified URI.",
14878     "format": "uri",
14879     "maxLength": 256,
14880     "type": "string"
14881 },
14882 "if": {
14883     "description": "The interface set supported by this resource",
14884     "items": {
14885         "enum": [
14886             "oic.if.baseline",
14887             "oic.if.ll",
14888             "oic.if.b",
14889             "oic.if.rw",
14890             "oic.if.r",
14891             "oic.if.a",
14892             "oic.if.s"
14893         ],
14894         "type": "string"
14895     },
14896     "minItems": 1,
14897     "type": "array"
14898 },
14899 "ins": {
14900     "description": "The instance identifier for this web link in an array of web
14901 links - used in collections",
14902     "type": "integer"
14903 },
14904 "p": {
14905     "description": "Specifies the framework policies on the Resource referenced by
14906 the target URI",
14907     "properties": {
14908         "bm": {
14909             "description": "Specifies the framework policies on the Resource referenced
14910 by the target URI for e.g. observable and discoverable",
14911             "type": "integer"
14912         }
14913     },
14914     "required": [
14915         "bm"
14916     ],
14917     "type": "object"
14918 },
14919 "rel": {
14920     "description": "The relation of the target URI referenced by the link to the
14921 context URI",
14922     "oneOf": [
14923         {
14924             "default": [
14925                 "hosts"
14926             ],
14927             "items": {
14928                 "maxLength": 64,
14929                 "type": "string"
14930             },
14931             "minItems": 1,
14932             "type": "array"
14933         },
14934         {
14935             "default": "hosts",
14936             "maxLength": 64,
14937             "type": "string"
14938         }
14939     ]

```

```

14940     },
14941     "rt": {
14942         "description": "Resource Type of the Resource",
14943         "items": {
14944             "maxLength": 64,
14945             "type": "string"
14946         },
14947         "minItems": 1,
14948         "type": "array"
14949     },
14950     "title": {
14951         "description": "A title for the link relation. Can be used by the UI to provide a
14952 context.",
14953         "maxLength": 64,
14954         "type": "string"
14955     },
14956     "type": {
14957         "default": "application/cbor",
14958         "description": "A hint at the representation of the resource referenced by the
14959 target URI. This represents the media types that are used for both accepting and emitting.",
14960         "items": {
14961             "maxLength": 64,
14962             "type": "string"
14963         },
14964         "minItems": 1,
14965         "type": "array"
14966     }
14967 },
14968 "required": [
14969     "href",
14970     "rt",
14971     "if"
14972 ],
14973 "type": "object"
14974 },
14975 {
14976     "description": "OCF link that points to a resource"
14977 }
14978 ]
14979 },
14980
14981 "id" :
14982 {
14983     "description": "Instance ID of this specific resource",
14984     "maxLength": 64,
14985     "readOnly": true,
14986     "type": "string"
14987 },
14988
14989 "if" :
14990 {
14991     "description": "The interface set supported by this resource",
14992     "items": {
14993         "enum": [
14994             "oic.if.baseline",
14995             "oic.if.ll",
14996             "oic.if.b",
14997             "oic.if.lb",
14998             "oic.if.rw",
14999             "oic.if.r",
15000             "oic.if.a",
15001             "oic.if.s"
15002         ],
15003         "type": "string"
15004     },
15005     "minItems": 1,
15006     "readOnly": true,
15007     "type": "array"
15008 }
15009 }
15010 }

```

```

15011     , "type" : "object"
15012   }
15013   ,
15014   "SceneCollection" : {
15015     "properties" : {
15016       "rt" :
15017         {
15018           "description": "Resource Type of the Resource",
15019           "items": {
15020             "maxLength": 64,
15021             "type": "string"
15022           },
15023           "minItems": 1,
15024           "readOnly": true,
15025           "type": "array"
15026         },
15027
15028       "lastScene" :
15029         {
15030           "description": "Last selected Scene from the set of sceneValues",
15031           "type": "string"
15032         },
15033
15034       "links" :
15035         {
15036           "description": "A set of simple or individual OIC Links.",
15037           "items": {
15038             "properties": {
15039               "anchor": {
15040                 "description": "This is used to override the context URI e.g. override the URI of
15041 the containing collection.",
15042                 "format": "uri",
15043                 "maxLength": 256,
15044                 "type": "string"
15045               },
15046               "di": {
15047                 "description": "The Device ID formatted according to IETF RFC 4122.",
15048                 "pattern": "^[a-fA-F0-9]{8}-[a-fA-F0-9]{4}-[a-fA-F0-9]{4}-[a-fA-F0-9]{4}-[a-fA-F0-
15049 9]{12}$",
15050                 "type": "string"
15051               },
15052               "eps": {
15053                 "description": "the Endpoint information of the target Resource",
15054                 "items": {
15055                   "properties": {
15056                     "ep": {
15057                       "description": "Transport Protocol Suite + Endpoint Locator",
15058                       "format": "uri",
15059                       "type": "string"
15060                     },
15061                     "pri": {
15062                       "description": "The priority among multiple Endpoints",
15063                       "minimum": 1,
15064                       "type": "integer"
15065                     }
15066                   },
15067                   "type": "object"
15068                 },
15069                 "type": "array"
15070               },
15071               "href": {
15072                 "description": "This is the target URI, it can be specified as a Relative Reference
15073 or fully-qualified URI.",
15074                 "format": "uri",
15075                 "maxLength": 256,
15076                 "type": "string"
15077               },
15078               "if": {
15079                 "description": "The interface set supported by this resource",
15080                 "items": {
15081                   "enum": [

```

```

15082         "oic.if.baseline",
15083         "oic.if.ll",
15084         "oic.if.b",
15085         "oic.if.rw",
15086         "oic.if.r",
15087         "oic.if.a",
15088         "oic.if.s"
15089     ],
15090     "type": "string"
15091 },
15092     "minItems": 1,
15093     "type": "array"
15094 },
15095     "ins": {
15096         "description": "The instance identifier for this web link in an array of web links
15097 - used in collections",
15098         "type": "integer"
15099     },
15100     "p": {
15101         "description": "Specifies the framework policies on the Resource referenced by the
15102 target URI",
15103         "properties": {
15104             "bm": {
15105                 "description": "Specifies the framework policies on the Resource referenced by
15106 the target URI for e.g. observable and discoverable",
15107                 "type": "integer"
15108             }
15109         },
15110         "required": [
15111             "bm"
15112         ],
15113         "type": "object"
15114     },
15115     "rel": {
15116         "description": "The relation of the target URI referenced by the link to the
15117 context URI",
15118         "oneOf": [
15119             {
15120                 "default": [
15121                     "hosts"
15122                 ],
15123                 "items": {
15124                     "maxLength": 64,
15125                     "type": "string"
15126                 },
15127                 "minItems": 1,
15128                 "type": "array"
15129             },
15130             {
15131                 "default": "hosts",
15132                 "maxLength": 64,
15133                 "type": "string"
15134             }
15135         ]
15136     },
15137     "rt": {
15138         "description": "Resource Type of the Resource",
15139         "items": {
15140             "maxLength": 64,
15141             "type": "string"
15142         },
15143         "minItems": 1,
15144         "type": "array"
15145     },
15146     "title": {
15147         "description": "A title for the link relation. Can be used by the UI to provide a
15148 context.",
15149         "maxLength": 64,
15150         "type": "string"
15151     },
15152     "type": {

```

```

15153         "default": "application/cbor",
15154         "description": "A hint at the representation of the resource referenced by the
15155 target URI. This represents the media types that are used for both accepting and emitting.",
15156         "items": {
15157             "maxLength": 64,
15158             "type": "string"
15159         },
15160         "minItems": 1,
15161         "type": "array"
15162     }
15163 },
15164     "required": [
15165         "href",
15166         "rt",
15167         "if"
15168     ],
15169     "type": "object"
15170 },
15171     "type": "array"
15172 },
15173     "sceneValues" :
15174     {
15175         "description": "All available scene values",
15176         "items": {
15177             "type": "string"
15178         },
15179         "readOnly": true,
15180         "type": "array"
15181     },
15182 },
15183     "n" :
15184     {
15185         "description": "Friendly name of the resource",
15186         "maxLength": 64,
15187         "readOnly": true,
15188         "type": "string"
15189     },
15190 },
15191     "rts" :
15192     {
15193         "description": "Resource Type of the Resource",
15194         "items": {
15195             "maxLength": 64,
15196             "type": "string"
15197         },
15198     },
15199     "minItems": 1,
15200     "readOnly": true,
15201     "type": "array"
15202 },
15203     "id" :
15204     {
15205         "description": "Instance ID of this specific resource",
15206         "maxLength": 64,
15207         "readOnly": true,
15208         "type": "string"
15209     },
15210 },
15211     "rts-m" :
15212     {
15213         "description": "Resource Type of the Resource",
15214         "items": {
15215             "maxLength": 64,
15216             "type": "string"
15217         },
15218     },
15219     "minItems": 1,
15220     "readOnly": true,
15221     "type": "array"
15222 },
15223

```

```

15224     "if" :
15225         {
15226             "description": "The interface set supported by this resource",
15227             "items": {
15228                 "enum": [
15229                     "oic.if.baseline",
15230                     "oic.if.ll",
15231                     "oic.if.b",
15232                     "oic.if.lb",
15233                     "oic.if.rw",
15234                     "oic.if.r",
15235                     "oic.if.a",
15236                     "oic.if.s"
15237                 ],
15238                 "type": "string"
15239             },
15240             "minItems": 1,
15241             "readOnly": true,
15242             "type": "array"
15243         }
15244     },
15245     "type" : "object"
15246 }
15247
15248 ,
15249 "SceneCollectionUpdate" : {
15250     "properties": {
15251         "rt" :
15252             {
15253                 "description": "Resource Type of the Resource",
15254                 "items": {
15255                     "maxLength": 64,
15256                     "type": "string"
15257                 },
15258                 "minItems": 1,
15259                 "readOnly": true,
15260                 "type": "array"
15261             },
15262     "lastScene" :
15263         {
15264             "description": "Last selected Scene from the set of sceneValues",
15265             "type": "string"
15266         },
15267     },
15268     "n" :
15269         {
15270             "description": "Friendly name of the resource",
15271             "maxLength": 64,
15272             "readOnly": true,
15273             "type": "string"
15274         },
15275     },
15276     "id" :
15277         {
15278             "description": "Instance ID of this specific resource",
15279             "maxLength": 64,
15280             "readOnly": true,
15281             "type": "string"
15282         },
15283     },
15284     "if" :
15285         {
15286             "description": "The interface set supported by this resource",
15287             "items": {
15288                 "enum": [
15289                     "oic.if.baseline",
15290                     "oic.if.ll",
15291                     "oic.if.b",
15292                     "oic.if.lb",
15293                     "oic.if.rw",

```

```

15295         "oic.if.r",
15296         "oic.if.a",
15297         "oic.if.s"
15298     ],
15299     "type": "string"
15300 },
15301 "minItems": 1,
15302 "readOnly": true,
15303 "type": "array"
15304 }
15305
15306 }
15307 , "type" : "object"
15308 }
15309 , "uuid" :
15310 {
15311     "description": "Format pattern according to IETF RFC 4122.",
15312     "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}$",
15313     "type": "string"
15314 }
15315
15316 , "oic.collection.links.arrayoflinks" :
15317 {
15318     "properties": {
15319         "links": {
15320             "description": "A set of simple or individual OIC Links.",
15321             "items": {
15322                 "properties": {
15323                     "anchor": {
15324                         "description": "This is used to override the context URI e.g. override the URI of
15325 the containing collection.",
15326                         "format": "uri",
15327                         "maxLength": 256,
15328                         "type": "string"
15329                     },
15330                     "di": {
15331                         "description": "The Device ID formatted according to IETF RFC 4122.",
15332                         "pattern": "^[a-fA-F0-9]{8}-[a-fA-F0-9]{4}-[a-fA-F0-9]{4}-[a-fA-F0-9]{4}-[a-fA-F0-
15333 9]{12}$",
15334                         "type": "string"
15335                     },
15336                     "eps": {
15337                         "description": "the Endpoint information of the target Resource",
15338                         "items": {
15339                             "properties": {
15340                                 "ep": {
15341                                     "description": "Transport Protocol Suite + Endpoint Locator",
15342                                     "format": "uri",
15343                                     "type": "string"
15344                                 },
15345                                 "pri": {
15346                                     "description": "The priority among multiple Endpoints",
15347                                     "minimum": 1,
15348                                     "type": "integer"
15349                                 }
15350                             },
15351                             "type": "object"
15352                         },
15353                         "type": "array"
15354                     },
15355                     "href": {
15356                         "description": "This is the target URI, it can be specified as a Relative Reference
15357 or fully-qualified URI.",
15358                         "format": "uri",
15359                         "maxLength": 256,
15360                         "type": "string"
15361                     },
15362                     "if": {
15363                         "description": "The interface set supported by this resource",
15364                         "items": {
15365                             "enum": [

```

```

15366         "oic.if.baseline",
15367         "oic.if.ll",
15368         "oic.if.b",
15369         "oic.if.rw",
15370         "oic.if.r",
15371         "oic.if.a",
15372         "oic.if.s"
15373     ],
15374     "type": "string"
15375 },
15376     "minItems": 1,
15377     "type": "array"
15378 },
15379     "ins": {
15380         "description": "The instance identifier for this web link in an array of web links
15381 - used in collections",
15382         "type": "integer"
15383     },
15384     "p": {
15385         "description": "Specifies the framework policies on the Resource referenced by the
15386 target URI",
15387         "properties": {
15388             "bm": {
15389                 "description": "Specifies the framework policies on the Resource referenced by
15390 the target URI for e.g. observable and discoverable",
15391                 "type": "integer"
15392             }
15393         },
15394         "required": [
15395             "bm"
15396         ],
15397         "type": "object"
15398     },
15399     "rel": {
15400         "description": "The relation of the target URI referenced by the link to the
15401 context URI",
15402         "oneOf": [
15403             {
15404                 "default": [
15405                     "hosts"
15406                 ],
15407                 "items": {
15408                     "maxLength": 64,
15409                     "type": "string"
15410                 },
15411                 "minItems": 1,
15412                 "type": "array"
15413             },
15414             {
15415                 "default": "hosts",
15416                 "maxLength": 64,
15417                 "type": "string"
15418             }
15419         ]
15420     },
15421     "rt": {
15422         "description": "Resource Type of the Resource",
15423         "items": {
15424             "maxLength": 64,
15425             "type": "string"
15426         },
15427         "minItems": 1,
15428         "type": "array"
15429     },
15430     "title": {
15431         "description": "A title for the link relation. Can be used by the UI to provide a
15432 context.",
15433         "maxLength": 64,
15434         "type": "string"
15435     },
15436     "type": {

```



```

15437         "default": "application/cbor",
15438         "description": "A hint at the representation of the resource referenced by the
15439 target URI. This represents the media types that are used for both accepting and emitting.",
15440         "items": {
15441             "maxLength": 64,
15442             "type": "string"
15443         },
15444         "minItems": 1,
15445         "type": "array"
15446     }
15447 },
15448     "required": [
15449         "href",
15450         "rt",
15451         "if"
15452     ],
15453     "type": "object"
15454 },
15455     "type": "array"
15456 }
15457 }
15458 }
15459
15460     , "oic.collection.properties" :
15461     {
15462         "description": "A collection is a set of links along with additional properties to describe
15463 the collection itself",
15464         "properties": {
15465             "rts": {
15466                 "$ref": "#/definitions/oic.core/properties/rt",
15467                 "description": "The list of allowable resource types (for Target and anchors) in links
15468 included in the collection"
15469             },
15470             "rts-m": {
15471                 "$ref": "#/definitions/oic.core/properties/rt",
15472                 "description": "The list of mandatory resources if any in links included in the
15473 collection"
15474             }
15475         },
15476         "type": "object"
15477     }
15478
15479     , "oic.core" :
15480     {
15481         "properties": {
15482             "rt": {
15483                 "description": "Resource Type of the Resource",
15484                 "items": {
15485                     "maxLength": 64,
15486                     "type": "string"
15487                 },
15488                 "minItems": 1,
15489                 "readOnly": true,
15490                 "type": "array"
15491             }
15492         },
15493         "type": "object"
15494     }
15495
15496     , "oic.collection.links" :
15497     {
15498         "properties": {
15499             "links": {
15500                 "description": "A set of simple or individual OIC Links.",
15501                 "items": {
15502                     "$ref": "#/definitions/oic.oic-link"
15503                 },
15504                 "type": "array"
15505             }
15506         }
15507     }

```

```

15508
15509     , "oic.oic-link" :
15510         {
15511             "properties": {
15512                 "anchor": {
15513                     "description": "This is used to override the context URI e.g. override the URI of the
15514 containing collection.",
15515                     "format": "uri",
15516                     "maxLength": 256,
15517                     "type": "string"
15518                 },
15519                 "di": {
15520                     "description": "The Device ID formatted according to IETF RFC 4122.",
15521                     "pattern": "^[a-fA-F0-9]{8}-[a-fA-F0-9]{4}-[a-fA-F0-9]{4}-[a-fA-F0-
15522 9]{12}$",
15523                     "type": "string"
15524                 },
15525                 "eps": {
15526                     "description": "the Endpoint information of the target Resource",
15527                     "items": {
15528                         "properties": {
15529                             "ep": {
15530                                 "description": "Transport Protocol Suite + Endpoint Locator",
15531                                 "format": "uri",
15532                                 "type": "string"
15533                             },
15534                             "pri": {
15535                                 "description": "The priority among multiple Endpoints",
15536                                 "minimum": 1,
15537                                 "type": "integer"
15538                             }
15539                         },
15540                         "type": "object"
15541                     },
15542                     "type": "array"
15543                 },
15544                 "href": {
15545                     "description": "This is the target URI, it can be specified as a Relative Reference or
15546 fully-qualified URI.",
15547                     "format": "uri",
15548                     "maxLength": 256,
15549                     "type": "string"
15550                 },
15551                 "if": {
15552                     "description": "The interface set supported by this resource",
15553                     "items": {
15554                         "enum": [
15555                             "oic.if.baseline",
15556                             "oic.if.ll",
15557                             "oic.if.b",
15558                             "oic.if.rw",
15559                             "oic.if.r",
15560                             "oic.if.a",
15561                             "oic.if.s"
15562                         ],
15563                         "type": "string"
15564                     },
15565                     "minItems": 1,
15566                     "type": "array"
15567                 },
15568                 "ins": {
15569                     "description": "The instance identifier for this web link in an array of web links - used
15570 in collections",
15571                     "type": "integer"
15572                 },
15573                 "p": {
15574                     "description": "Specifies the framework policies on the Resource referenced by the target
15575 URI",
15576                     "properties": {
15577                         "bm": {
15578                             "description": "Specifies the framework policies on the Resource referenced by the

```

```

15579 target URI for e.g. observable and discoverable",
15580     "type": "integer"
15581     },
15582   },
15583   "required": [
15584     "bm"
15585   ],
15586   "type": "object"
15587 },
15588 "rel": {
15589   "description": "The relation of the target URI referenced by the link to the context
15590 URI",
15591   "oneOf": [
15592     {
15593       "default": [
15594         "hosts"
15595       ],
15596       "items": {
15597         "maxLength": 64,
15598         "type": "string"
15599       },
15600       "minItems": 1,
15601       "type": "array"
15602     },
15603     {
15604       "default": "hosts",
15605       "maxLength": 64,
15606       "type": "string"
15607     }
15608   ],
15609 },
15610 "rt": {
15611   "description": "Resource Type of the Resource",
15612   "items": {
15613     "maxLength": 64,
15614     "type": "string"
15615   },
15616   "minItems": 1,
15617   "type": "array"
15618 },
15619 "title": {
15620   "description": "A title for the link relation. Can be used by the UI to provide a
15621 context.",
15622   "maxLength": 64,
15623   "type": "string"
15624 },
15625 "type": {
15626   "default": "application/cbor",
15627   "description": "A hint at the representation of the resource referenced by the target
15628 URI. This represents the media types that are used for both accepting and emitting.",
15629   "items": {
15630     "maxLength": 64,
15631     "type": "string"
15632   },
15633   "minItems": 1,
15634   "type": "array"
15635 }
15636 },
15637 "required": [
15638   "href",
15639   "rt",
15640   "if"
15641 ],
15642 "type": "object"
15643 }
15644 }
15645 }
15646 }
15647

```

15648  
15649

### F.13.5 Property Definition

**Table 113 The properties definitions of the resource**

Property name	Value type	Mandatory	Access mode	Description
rt	array: see schema		Read Only	Resource Type of the Resource
links	array: see schema		Read Write	A set of simple or individual OIC Links.
links	array: see schema	No	Read Write	A set of simple or individual OIC Links.
rts-m	multiple types: see schema		Read Write	The list of mandatory resources if any in links included in the collection
rts	multiple types: see schema		Read Write	The list of allowable resource types (for Target and anchors) in links included in the collection
rts	array: see schema	No	Read Only	Resource Type of the Resource
links	array: see schema	No	Read Write	A set of simple or individual OIC Links.
rt	array: see schema	Yes	Read Only	Resource Type of the Resource
if	array: see schema	Yes	Read Only	The interface set supported by this resource
sceneValues	array: see schema	No	Read Only	All available scene values
rts-m	array: see schema	No	Read Only	Resource Type of the Resource
n	string	No	Read Only	Friendly name of the resource
lastScene	string	No	Read Write	Last selected Scene from the

				set of sceneValues
id	string	No	Read Only	Instance ID of this specific resource
href	string	Yes	Read Write	This is the target URI, it can be specified as a Relative Reference or fully-qualified URI.
di	string	No	Read Write	The Device ID formatted according to IETF RFC 4122.
title	string	No	Read Write	A title for the link relation. Can be used by the UI to provide a context.
rt	array: schema see	Yes	Read Write	Resource Type of the Resource
if	array: schema see	Yes	Read Write	The interface set supported by this resource
ins	integer	No	Read Write	The instance identifier for this web link in an array of web links - used in collections
eps	array: schema see	No	Read Write	the Endpoint information of the target Resource
p	object: schema see	No	Read Write	Specifies the framework policies on the Resource referenced by the target URI
type	array: schema see	No	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.
rel	multiple types: see schema	No	Read Write	The relation of the target URI referenced by the link to the context URI
anchor	string	No	Read Write	This is used to override the context URI e.g. override the URI of the containing collection.
if	array: see schema	No	Read Only	The interface set supported by this resource
rt	array: see schema	No	Read Only	Resource Type of the Resource
SceneMappings	array: see schema	No	Read Write	array of mappings per scene, can be one(1)
n	string	No	Read Only	Friendly name of the resource
link	multiple types: see schema	No	Read Write	
id	string	No	Read Only	Instance ID of this specific resource
n	string		Read Only	Friendly name of the resource
lastScene	string		Read Write	Last selected Scene from the set of sceneValues
rt	array: see schema		Read Only	Resource Type 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
links	array: see schema		Read Write	A set of simple or individual OIC Links.

15650 **F.13.6 CRUDN behaviour**

15651 **Table 114 The CRUDN operations of the resource**

Resource	Create	Read	Update	Delete	Notify
/SceneListResURI		get			observe

15652 **F.14 Scene Collection**

15653 **F.14.1 Introduction**

15654 Collection that models a set of Scenes. This resource is a generic collection resource with  
 15655 additional parameters. The rts value shall contain oic.scenemember resource types.  
 15656 The additional parameters are lastScene, this is the scene value last set by any OCF Client.  
 15657 sceneValues, this is the list of available scenes. lastScene shall be listed in sceneValues.  
 15658

15659 **F.14.2 Example URI**

15660 /SceneCollectionResURI

15661 **F.14.3 Resource Type**

15662 The resource type (rt) is defined as: ['oic.wk.scenecollection'].

15663 **F.14.4 Swagger2.0 Definition**

```

15664 {
15665   "swagger": "2.0",
15666   "info": {
15667     "title": "Scenes (Top level)",
15668     "version": "v1-20160622",
15669     "license": {
15670       "name": "copyright 2016-2017 Open Connectivity Foundation, Inc. All rights reserved.",
15671       "x-description": "Redistribution and use in source and binary forms, with or without
15672 modification, are permitted provided that the following conditions are met:\n      1.
15673 Redistributions of source code must retain the above copyright notice, this list of conditions and
15674 the following disclaimer.\n      2. Redistributions in binary form must reproduce the above
15675 copyright notice, this list of conditions and the following disclaimer in the documentation and/or
15676 other materials provided with the distribution.\n\n      THIS SOFTWARE IS PROVIDED BY THE Open
15677 Connectivity Foundation, INC. \"AS IS\" AND ANY EXPRESS OR IMPLIED WARRANTIES, INCLUDING, BUT NOT
15678 LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE OR
15679 WARRANTIES OF NON-INFRINGEMENT, ARE DISCLAIMED.\n      IN NO EVENT SHALL THE Open Connectivity
15680 Foundation, INC. OR CONTRIBUTORS BE LIABLE FOR ANY DIRECT, INDIRECT, INCIDENTAL, SPECIAL,
15681 EXEMPLARY, OR CONSEQUENTIAL DAMAGES (INCLUDING, BUT NOT LIMITED TO, PROCUREMENT OF SUBSTITUTE GOODS
15682 OR SERVICES; LOSS OF USE, DATA, OR PROFITS; OR BUSINESS INTERRUPTION)\n      HOWEVER CAUSED AND
15683 ON ANY THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT (INCLUDING NEGLIGENCE OR
15684 OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OF THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY
15685 OF SUCH DAMAGE.\n"
15686     }
15687   },
15688   "schemes": ["http"],
15689   "consumes": ["application/json"],
15690   "produces": ["application/json"],
15691   "paths": {

```

```

15692     "/SceneListResURI" : {
15693         "get": {
15694             "description": "Toplevel Scene resource.\nThis resource is a generic collection
15695 resource.\nThe rts value shall contain oic.wk.scenecollection resource types.\nProvides the current
15696 list of web links pointing to scenes\n",
15697             "parameters": [
15698                 { "$ref": "#/parameters/interface-baseline" }
15699             ],
15700             "responses": {
15701                 "200": {
15702                     "description" : "",
15703                     "x-example":
15704                         {
15705                             "rt":          ["oic.wk.scenelist"],
15706                             "n":          "list of scene Collections",
15707                             "rts":        ["oic.wk.scenecollection"],
15708                             "links": [
15709                                 ]
15710                         }
15711                 },
15712                 "schema": { "$ref": "#/definitions/Collection" }
15713             }
15714         }
15715     },
15716     "/SceneMemberResURI" : {
15717         "get": {
15718             "description": "Collection that models a scene member.\nProvides the scene member\n",
15719             "parameters": [
15720                 { "$ref": "#/parameters/interface-baseline" }
15721             ],
15722             "responses": {
15723                 "200": {
15724                     "description" : "",
15725                     "x-example":
15726                         {
15727                             "rt": ["oic.wk.scenemember"],
15728                             "id": "0685B960-FFFF-46F7-BEC0-9E6234671ADC1",
15729                             "n": "my binary switch (for light bulb) mappings",
15730                             "link": {
15731                                 "href": "binarySwitch",
15732                                 "rt":  ["oic.r.switch.binary"],
15733                                 "if":  ["oic.if.a", "oic.if.baseline"],
15734                                 "eps": [
15735                                     {"ep": "coap://[fe80::b1d6]:1111", "pri": 2},
15736                                     {"ep": "coaps://[fe80::b1d6]:1122"},
15737                                     {"ep": "coap+tcp://[2001:db8:a::123]:2222", "pri": 3}
15738                                 ]
15739                             }
15740                         },
15741                     "SceneMappings": [
15742                         {
15743                             "scene":          "off",
15744                             "memberProperty": "value",
15745                             "memberValue":   "true"
15746                         },
15747                         {
15748                             "scene":          "Reading",
15749                             "memberProperty": "value",
15750                             "memberValue":   "false"
15751                         },
15752                         {
15753                             "scene":          "TVWatching",
15754                             "memberProperty": "value",
15755                             "memberValue":   "true"
15756                         }
15757                     ]
15758                 }
15759             },
15760             "schema": { "$ref": "#/definitions/SceneMember" }
15761         }
15762     }

```



```

15763     }
15764   },
15765   "/SceneCollectionResURI" : {
15766     "get": {
15767       "description": "Collection that models a set of Scenes.\nThis resource is a generic
15768 collection resource with additional parameters.\nThe rts value shall contain oic.scenemember
15769 resource types.\nThe additional parameters are\n lastScene, this is the scene value last set by
15770 any OCF Client\n sceneValues, this is the list of available scenes\n lastScene shall be listed in
15771 sceneValues.\nProvides the current list of web links pointing to scenes\n",
15772       "parameters": [
15773         { "$ref": "#/parameters/interface-baseline"}
15774       ],
15775       "responses": {
15776         "200": {
15777           "description": "",
15778           "x-example":
15779             {
15780               "lastScene": "off",
15781               "sceneValues": ["off", "Reading", "TVWatching"],
15782               "rt": ["oic.wk.scenecollection"],
15783               "n": "My Scenes for my living room",
15784               "id": "0685B960-736F-46F7-BE00-9E6CBD671ADC1",
15785               "rts": ["oic.wk.scenemember"],
15786               "links": [
15787                 ]
15788             }
15789           ,
15790           "schema": { "$ref": "#/definitions/SceneCollection" }
15791         }
15792       }
15793     },
15794     "post": {
15795       "description": "Provides the action to change the last set scene selection.\nCalling this
15796 method shall update all scene members to the prescribed membervalue.\nWhen this method is called
15797 with the same value as the current lastScene value\nthen all scene members shall be updated.\n",
15798       "parameters": [
15799         { "$ref": "#/parameters/interface-update" },
15800         {
15801           "name": "body",
15802           "in": "body",
15803           "required": true,
15804           "schema": { "$ref": "#/definitions/SceneCollectionUpdate" },
15805           "x-example":
15806             {
15807               "lastScene": "Reading"
15808             }
15809         }
15810       ],
15811       "responses": {
15812         "200": {
15813           "description": "Indicates that the value is changed.\nThe changed properties are
15814 provided in the response.\n",
15815           "x-example":
15816             {
15817               "lastScene": "Reading"
15818             }
15819           ,
15820           "schema": { "$ref": "#/definitions/SceneCollectionUpdate" }
15821         }
15822       }
15823     }
15824   },
15825 },
15826 "parameters": {
15827   "interface-update" : {
15828     "in" : "query",
15829     "name" : "if",
15830     "type" : "string",
15831     "enum" : ["oic.if.a"]
15832   },
15833   "interface-baseline" : {

```

```

15834     "in" : "query",
15835     "name" : "if",
15836     "type" : "string",
15837     "enum" : ["oic.if.baseline"]
15838 },
15839 "interface-all" : {
15840     "in" : "query",
15841     "name" : "if",
15842     "type" : "string",
15843     "enum" : ["oic.if.a", "oic.if.ll", "oic.if.baseline"]
15844 }
15845 },
15846 "definitions": {
15847     "Collection" : {
15848         "properties": {
15849             "links" :
15850                 {
15851                     "description": "A set of simple or individual OIC Links.",
15852                     "items": {
15853                         "$ref": "#/definitions/oic.oic-link"
15854                     },
15855                     "type": "array"
15856                 }
15857             }
15858         }, "type" : "object"
15859     }
15860 },
15861 "SceneMember" : {
15862     "properties": {
15863         "rt" :
15864             {
15865                 "description": "Resource Type of the Resource",
15866                 "items": {
15867                     "maxLength": 64,
15868                     "type": "string"
15869                 },
15870                 "minItems": 1,
15871                 "readOnly": true,
15872                 "type": "array"
15873             },
15874     },
15875     "SceneMappings" :
15876         {
15877             "description": "array of mappings per scene, can be one(1)",
15878             "items": {
15879                 "properties": {
15880                     "memberProperty": {
15881                         "description": "property name that will be mapped",
15882                         "readOnly": true,
15883                         "type": "string"
15884                     },
15885                     "memberValue": {
15886                         "description": "value of the Member Property",
15887                         "readOnly": true,
15888                         "type": "string"
15889                     },
15890                     "scene": {
15891                         "description": "Specifies a scene value that will be acted upon",
15892                         "type": "string"
15893                     }
15894                 },
15895                 "required": [
15896                     "scene",
15897                     "memberProperty",
15898                     "memberValue"
15899                 ],
15900                 "type": "object"
15901             },
15902         },
15903     "type": "array"
15904 },

```

```

15905
15906     "n" :
15907         {
15908             "description": "Friendly name of the resource",
15909             "maxLength": 64,
15910             "readOnly": true,
15911             "type": "string"
15912         },
15913
15914     "link" :
15915         {
15916             "allOf": [
15917                 {
15918                     "properties": {
15919                         "anchor": {
15920                             "description": "This is used to override the context URI e.g. override the URI of
15921 the containing collection.",
15922                             "format": "uri",
15923                             "maxLength": 256,
15924                             "type": "string"
15925                         },
15926                         "di": {
15927                             "allOf": [
15928                                 {
15929                                     "description": "Format pattern according to IETF RFC 4122.",
15930                                     "pattern": "^[a-fA-F0-9]{8}-[a-fA-F0-9]{4}-[a-fA-F0-9]{4}-[a-
15931 fA-F0-9]{12}$",
15932                                     "type": "string"
15933                                 },
15934                                 {
15935                                     "description": "The device ID"
15936                                 }
15937                             ]
15938                         },
15939                         "eps": {
15940                             "description": "the Endpoint information of the target Resource",
15941                             "items": {
15942                                 "properties": {
15943                                     "ep": {
15944                                         "description": "Transport Protocol Suite + Endpoint Locator",
15945                                         "format": "uri",
15946                                         "type": "string"
15947                                     },
15948                                     "pri": {
15949                                         "description": "The priority among multiple Endpoints",
15950                                         "minimum": 1,
15951                                         "type": "integer"
15952                                     }
15953                                 },
15954                                 "type": "object"
15955                             },
15956                             "type": "array"
15957                         },
15958                         "href": {
15959                             "description": "This is the target URI, it can be specified as a Relative
15960 Reference or fully-qualified URI.",
15961                             "format": "uri",
15962                             "maxLength": 256,
15963                             "type": "string"
15964                         },
15965                         "if": {
15966                             "description": "The interface set supported by this resource",
15967                             "items": {
15968                                 "enum": [
15969                                     "oic.if.baseline",
15970                                     "oic.if.ll",
15971                                     "oic.if.b",
15972                                     "oic.if.rw",
15973                                     "oic.if.r",
15974                                     "oic.if.a",
15975                                     "oic.if.s"

```

```

15976         ],
15977         "type": "string"
15978     },
15979     "minItems": 1,
15980     "type": "array"
15981 },
15982 "ins": {
15983     "description": "The instance identifier for this web link in an array of web
15984 links - used in collections",
15985     "type": "integer"
15986 },
15987 "p": {
15988     "description": "Specifies the framework policies on the Resource referenced by
15989 the target URI",
15990     "properties": {
15991         "bm": {
15992             "description": "Specifies the framework policies on the Resource referenced
15993 by the target URI for e.g. observable and discoverable",
15994             "type": "integer"
15995         }
15996     },
15997     "required": [
15998         "bm"
15999     ],
16000     "type": "object"
16001 },
16002 "rel": {
16003     "description": "The relation of the target URI referenced by the link to the
16004 context URI",
16005     "oneOf": [
16006         {
16007             "default": [
16008                 "hosts"
16009             ],
16010             "items": {
16011                 "maxLength": 64,
16012                 "type": "string"
16013             },
16014             "minItems": 1,
16015             "type": "array"
16016         },
16017         {
16018             "default": "hosts",
16019             "maxLength": 64,
16020             "type": "string"
16021         }
16022     ]
16023 },
16024 "rt": {
16025     "description": "Resource Type of the Resource",
16026     "items": {
16027         "maxLength": 64,
16028         "type": "string"
16029     },
16030     "minItems": 1,
16031     "type": "array"
16032 },
16033 "title": {
16034     "description": "A title for the link relation. Can be used by the UI to provide a
16035 context.",
16036     "maxLength": 64,
16037     "type": "string"
16038 },
16039 "type": {
16040     "default": "application/cbor",
16041     "description": "A hint at the representation of the resource referenced by the
16042 target URI. This represents the media types that are used for both accepting and emitting.",
16043     "items": {
16044         "maxLength": 64,
16045         "type": "string"
16046     },

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16047         "minItems": 1,
16048         "type": "array"
16049     }
16050 },
16051 "required": [
16052     "href",
16053     "rt",
16054     "if"
16055 ],
16056 "type": "object"
16057 },
16058 {
16059     "description": "OCF link that points to a resource"
16060 }
16061 ]
16062 },
16063
16064 "id" :
16065     {
16066         "description": "Instance ID of this specific resource",
16067         "maxLength": 64,
16068         "readOnly": true,
16069         "type": "string"
16070     },
16071
16072 "if" :
16073     {
16074         "description": "The interface set supported by this resource",
16075         "items": {
16076             "enum": [
16077                 "oic.if.baseline",
16078                 "oic.if.ll",
16079                 "oic.if.b",
16080                 "oic.if.lb",
16081                 "oic.if.rw",
16082                 "oic.if.r",
16083                 "oic.if.a",
16084                 "oic.if.s"
16085             ],
16086             "type": "string"
16087         },
16088         "minItems": 1,
16089         "readOnly": true,
16090         "type": "array"
16091     }
16092
16093     },
16094     "type" : "object"
16095 }
16096 ,
16097 "SceneCollection" : {
16098     "properties": {
16099         "rt" :
16100             {
16101                 "description": "Resource Type of the Resource",
16102                 "items": {
16103                     "maxLength": 64,
16104                     "type": "string"
16105                 },
16106                 "minItems": 1,
16107                 "readOnly": true,
16108                 "type": "array"
16109             },
16110
16111         "lastScene" :
16112             {
16113                 "description": "Last selected Scene from the set of sceneValues",
16114                 "type": "string"
16115             },
16116
16117         "links" :

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16118     {
16119     "description": "A set of simple or individual OIC Links.",
16120     "items": {
16121     "properties": {
16122     "anchor": {
16123     "description": "This is used to override the context URI e.g. override the URI of
16124 the containing collection.",
16125     "format": "uri",
16126     "maxLength": 256,
16127     "type": "string"
16128     },
16129     "di": {
16130     "description": "The Device ID formatted according to IETF RFC 4122.",
16131     "pattern": "^[a-fA-F0-9]{8}-[a-fA-F0-9]{4}-[a-fA-F0-9]{4}-[a-fA-F0-9]{4}-[a-fA-F0-
16132 9]{12}$",
16133     "type": "string"
16134     },
16135     "eps": {
16136     "description": "the Endpoint information of the target Resource",
16137     "items": {
16138     "properties": {
16139     "ep": {
16140     "description": "Transport Protocol Suite + Endpoint Locator",
16141     "format": "uri",
16142     "type": "string"
16143     },
16144     "pri": {
16145     "description": "The priority among multiple Endpoints",
16146     "minimum": 1,
16147     "type": "integer"
16148     }
16149     },
16150     "type": "object"
16151     },
16152     "type": "array"
16153     },
16154     "href": {
16155     "description": "This is the target URI, it can be specified as a Relative Reference
16156 or fully-qualified URI.",
16157     "format": "uri",
16158     "maxLength": 256,
16159     "type": "string"
16160     },
16161     "if": {
16162     "description": "The interface set supported by this resource",
16163     "items": {
16164     "enum": [
16165     "oic.if.baseline",
16166     "oic.if.ll",
16167     "oic.if.b",
16168     "oic.if.rw",
16169     "oic.if.r",
16170     "oic.if.a",
16171     "oic.if.s"
16172     ],
16173     "type": "string"
16174     },
16175     "minItems": 1,
16176     "type": "array"
16177     },
16178     "ins": {
16179     "description": "The instance identifier for this web link in an array of web links
16180 - used in collections",
16181     "type": "integer"
16182     },
16183     "p": {
16184     "description": "Specifies the framework policies on the Resource referenced by the
16185 target URI",
16186     "properties": {
16187     "bm": {
16188     "description": "Specifies the framework policies on the Resource referenced by

```

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16189 the target URI for e.g. observable and discoverable",
16190     "type": "integer"
16191     },
16192   },
16193   "required": [
16194     "bm"
16195   ],
16196   "type": "object"
16197 },
16198 "rel": {
16199   "description": "The relation of the target URI referenced by the link to the
16200 context URI",
16201   "oneOf": [
16202     {
16203       "default": [
16204         "hosts"
16205       ],
16206       "items": {
16207         "maxLength": 64,
16208         "type": "string"
16209       },
16210       "minItems": 1,
16211       "type": "array"
16212     },
16213     {
16214       "default": "hosts",
16215       "maxLength": 64,
16216       "type": "string"
16217     }
16218   ]
16219 },
16220 "rt": {
16221   "description": "Resource Type of the Resource",
16222   "items": {
16223     "maxLength": 64,
16224     "type": "string"
16225   },
16226   "minItems": 1,
16227   "type": "array"
16228 },
16229 "title": {
16230   "description": "A title for the link relation. Can be used by the UI to provide a
16231 context.",
16232   "maxLength": 64,
16233   "type": "string"
16234 },
16235 "type": {
16236   "default": "application/cbor",
16237   "description": "A hint at the representation of the resource referenced by the
16238 target URI. This represents the media types that are used for both accepting and emitting.",
16239   "items": {
16240     "maxLength": 64,
16241     "type": "string"
16242   },
16243   "minItems": 1,
16244   "type": "array"
16245 }
16246 },
16247 "required": [
16248   "href",
16249   "rt",
16250   "if"
16251 ],
16252 "type": "object"
16253 },
16254 "type": "array"
16255 },
16256 "sceneValues" :
16257 {
16258   "description": "All available scene values",
16259 }

```

```

16260         "items": {
16261             "type": "string"
16262         },
16263         "readOnly": true,
16264         "type": "array"
16265     },
16266
16267     "n" :
16268     {
16269         "description": "Friendly name of the resource",
16270         "maxLength": 64,
16271         "readOnly": true,
16272         "type": "string"
16273     },
16274
16275     "rts" :
16276     {
16277         "description": "Resource Type of the Resource",
16278         "items": {
16279             "maxLength": 64,
16280             "type": "string"
16281         },
16282         "minItems": 1,
16283         "readOnly": true,
16284         "type": "array"
16285     },
16286
16287     "id" :
16288     {
16289         "description": "Instance ID of this specific resource",
16290         "maxLength": 64,
16291         "readOnly": true,
16292         "type": "string"
16293     },
16294
16295     "rts-m" :
16296     {
16297         "description": "Resource Type of the Resource",
16298         "items": {
16299             "maxLength": 64,
16300             "type": "string"
16301         },
16302         "minItems": 1,
16303         "readOnly": true,
16304         "type": "array"
16305     },
16306
16307     "if" :
16308     {
16309         "description": "The interface set supported by this resource",
16310         "items": {
16311             "enum": [
16312                 "oic.if.baseline",
16313                 "oic.if.ll",
16314                 "oic.if.b",
16315                 "oic.if.lb",
16316                 "oic.if.rw",
16317                 "oic.if.r",
16318                 "oic.if.a",
16319                 "oic.if.s"
16320             ],
16321             "type": "string"
16322         },
16323         "minItems": 1,
16324         "readOnly": true,
16325         "type": "array"
16326     }
16327
16328     }
16329     , "type" : "object"
16330 }

```



```

16331     ,
16332     "SceneCollectionUpdate" : {
16333         "properties": {
16334             "rt" :
16335                 {
16336                     "description": "Resource Type of the Resource",
16337                     "items": {
16338                         "maxLength": 64,
16339                         "type": "string"
16340                     },
16341                     "minItems": 1,
16342                     "readOnly": true,
16343                     "type": "array"
16344                 },
16345             "lastScene" :
16346                 {
16347                     "description": "Last selected Scene from the set of sceneValues",
16348                     "type": "string"
16349                 },
16350             "n" :
16351                 {
16352                     "description": "Friendly name of the resource",
16353                     "maxLength": 64,
16354                     "readOnly": true,
16355                     "type": "string"
16356                 },
16357             "id" :
16358                 {
16359                     "description": "Instance ID of this specific resource",
16360                     "maxLength": 64,
16361                     "readOnly": true,
16362                     "type": "string"
16363                 },
16364             "if" :
16365                 {
16366                     "description": "The interface set supported by this resource",
16367                     "items": {
16368                         "enum": [
16369                             "oic.if.baseline",
16370                             "oic.if.ll",
16371                             "oic.if.b",
16372                             "oic.if.lb",
16373                             "oic.if.rw",
16374                             "oic.if.r",
16375                             "oic.if.a",
16376                             "oic.if.s"
16377                         ],
16378                         "type": "string"
16379                     },
16380                     "minItems": 1,
16381                     "readOnly": true,
16382                     "type": "array"
16383                 }
16384             },
16385             "type" : "object"
16386         }
16387     },
16388     "uuid" :
16389     {
16390         "description": "Format pattern according to IETF RFC 4122.",
16391         "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}$",
16392         "type": "string"
16393     }
16394 },
16395 "oic.collection.links.arrayoflinks" :
16396 {
16397     "properties": {

```

```

16402     "links": {
16403         "description": "A set of simple or individual OIC Links.",
16404         "items": {
16405             "properties": {
16406                 "anchor": {
16407                     "description": "This is used to override the context URI e.g. override the URI of
16408 the containing collection.",
16409                     "format": "uri",
16410                     "maxLength": 256,
16411                     "type": "string"
16412                 },
16413                 "di": {
16414                     "description": "The Device ID formatted according to IETF RFC 4122.",
16415                     "pattern": "^[a-fA-F0-9]{8}-[a-fA-F0-9]{4}-[a-fA-F0-9]{4}-[a-fA-F0-9]{4}-[a-fA-F0-
16416 9]{12}$",
16417                     "type": "string"
16418                 },
16419                 "eps": {
16420                     "description": "the Endpoint information of the target Resource",
16421                     "items": {
16422                         "properties": {
16423                             "ep": {
16424                                 "description": "Transport Protocol Suite + Endpoint Locator",
16425                                 "format": "uri",
16426                                 "type": "string"
16427                             },
16428                             "pri": {
16429                                 "description": "The priority among multiple Endpoints",
16430                                 "minimum": 1,
16431                                 "type": "integer"
16432                             }
16433                         },
16434                         "type": "object"
16435                     },
16436                     "type": "array"
16437                 },
16438                 "href": {
16439                     "description": "This is the target URI, it can be specified as a Relative Reference
16440 or fully-qualified URI.",
16441                     "format": "uri",
16442                     "maxLength": 256,
16443                     "type": "string"
16444                 },
16445                 "if": {
16446                     "description": "The interface set supported by this resource",
16447                     "items": {
16448                         "enum": [
16449                             "oic.if.baseline",
16450                             "oic.if.ll",
16451                             "oic.if.b",
16452                             "oic.if.rw",
16453                             "oic.if.r",
16454                             "oic.if.a",
16455                             "oic.if.s"
16456                         ],
16457                         "type": "string"
16458                     },
16459                     "minItems": 1,
16460                     "type": "array"
16461                 },
16462                 "ins": {
16463                     "description": "The instance identifier for this web link in an array of web links
16464 - used in collections",
16465                     "type": "integer"
16466                 },
16467                 "p": {
16468                     "description": "Specifies the framework policies on the Resource referenced by the
16469 target URI",
16470                     "properties": {
16471                         "bm": {
16472                             "description": "Specifies the framework policies on the Resource referenced by

```

```

16473 the target URI for e.g. observable and discoverable",
16474     "type": "integer"
16475     },
16476   },
16477   "required": [
16478     "bm"
16479   ],
16480   "type": "object"
16481 },
16482 "rel": {
16483   "description": "The relation of the target URI referenced by the link to the
16484 context URI",
16485   "oneOf": [
16486     {
16487       "default": [
16488         "hosts"
16489       ],
16490       "items": {
16491         "maxLength": 64,
16492         "type": "string"
16493       },
16494       "minItems": 1,
16495       "type": "array"
16496     },
16497     {
16498       "default": "hosts",
16499       "maxLength": 64,
16500       "type": "string"
16501     }
16502   ],
16503 },
16504 "rt": {
16505   "description": "Resource Type of the Resource",
16506   "items": {
16507     "maxLength": 64,
16508     "type": "string"
16509   },
16510   "minItems": 1,
16511   "type": "array"
16512 },
16513 "title": {
16514   "description": "A title for the link relation. Can be used by the UI to provide a
16515 context.",
16516   "maxLength": 64,
16517   "type": "string"
16518 },
16519 "type": {
16520   "default": "application/cbor",
16521   "description": "A hint at the representation of the resource referenced by the
16522 target URI. This represents the media types that are used for both accepting and emitting.",
16523   "items": {
16524     "maxLength": 64,
16525     "type": "string"
16526   },
16527   "minItems": 1,
16528   "type": "array"
16529 }
16530 },
16531 "required": [
16532   "href",
16533   "rt",
16534   "if"
16535 ],
16536 "type": "object"
16537 },
16538 "type": "array"
16539 }
16540 }
16541 }
16542
16543 , "oic.collection.properties" :

```

```

16544     {
16545         "description": "A collection is a set of links along with additional properties to describe
16546 the collection itself",
16547         "properties": {
16548             "rts": {
16549                 "$ref": "#/definitions/oic.core/properties/rt",
16550                 "description": "The list of allowable resource types (for Target and anchors) in links
16551 included in the collection"
16552             },
16553             "rts-m": {
16554                 "$ref": "#/definitions/oic.core/properties/rt",
16555                 "description": "The list of mandatory resources if any in links included in the
16556 collection"
16557             }
16558         },
16559         "type": "object"
16560     }
16561
16562     , "oic.core" :
16563     {
16564         "properties": {
16565             "rt": {
16566                 "description": "Resource Type of the Resource",
16567                 "items": {
16568                     "maxLength": 64,
16569                     "type": "string"
16570                 },
16571                 "minItems": 1,
16572                 "readOnly": true,
16573                 "type": "array"
16574             }
16575         },
16576         "type": "object"
16577     }
16578
16579     , "oic.collection.links" :
16580     {
16581         "properties": {
16582             "links": {
16583                 "description": "A set of simple or individual OIC Links.",
16584                 "items": {
16585                     "$ref": "#/definitions/oic.oic-link"
16586                 },
16587                 "type": "array"
16588             }
16589         }
16590     }
16591
16592     , "oic.oic-link" :
16593     {
16594         "properties": {
16595             "anchor": {
16596                 "description": "This is used to override the context URI e.g. override the URI of the
16597 containing collection.",
16598                 "format": "uri",
16599                 "maxLength": 256,
16600                 "type": "string"
16601             },
16602             "di": {
16603                 "description": "The Device ID formatted according to IETF RFC 4122.",
16604                 "pattern": "^[a-fA-F0-9]{8}-[a-fA-F0-9]{4}-[a-fA-F0-9]{4}-[a-fA-F0-9]{4}-[a-fA-F0-
16605 9]{12}$",
16606                 "type": "string"
16607             },
16608             "eps": {
16609                 "description": "the Endpoint information of the target Resource",
16610                 "items": {
16611                     "properties": {
16612                         "ep": {
16613                             "description": "Transport Protocol Suite + Endpoint Locator",
16614                             "format": "uri",

```

```

16615         "type": "string"
16616     },
16617     "pri": {
16618         "description": "The priority among multiple Endpoints",
16619         "minimum": 1,
16620         "type": "integer"
16621     }
16622 },
16623     "type": "object"
16624 },
16625     "type": "array"
16626 },
16627     "href": {
16628         "description": "This is the target URI, it can be specified as a Relative Reference or
16629 fully-qualified URI.",
16630         "format": "uri",
16631         "maxLength": 256,
16632         "type": "string"
16633     },
16634     "if": {
16635         "description": "The interface set supported by this resource",
16636         "items": {
16637             "enum": [
16638                 "oic.if.baseline",
16639                 "oic.if.ll",
16640                 "oic.if.b",
16641                 "oic.if.rw",
16642                 "oic.if.r",
16643                 "oic.if.a",
16644                 "oic.if.s"
16645             ],
16646             "type": "string"
16647         },
16648         "minItems": 1,
16649         "type": "array"
16650     },
16651     "ins": {
16652         "description": "The instance identifier for this web link in an array of web links - used
16653 in collections",
16654         "type": "integer"
16655     },
16656     "p": {
16657         "description": "Specifies the framework policies on the Resource referenced by the target
16658 URI",
16659         "properties": {
16660             "bm": {
16661                 "description": "Specifies the framework policies on the Resource referenced by the
16662 target URI for e.g. observable and discoverable",
16663                 "type": "integer"
16664             }
16665         },
16666         "required": [
16667             "bm"
16668         ],
16669         "type": "object"
16670     },
16671     "rel": {
16672         "description": "The relation of the target URI referenced by the link to the context
16673 URI",
16674         "oneOf": [
16675             {
16676                 "default": [
16677                     "hosts"
16678                 ],
16679                 "items": {
16680                     "maxLength": 64,
16681                     "type": "string"
16682                 },
16683                 "minItems": 1,
16684                 "type": "array"
16685             }
16686         ],

```

```

16686     {
16687         "default": "hosts",
16688         "maxLength": 64,
16689         "type": "string"
16690     }
16691 ]
16692 },
16693 "rt": {
16694     "description": "Resource Type of the Resource",
16695     "items": {
16696         "maxLength": 64,
16697         "type": "string"
16698     },
16699     "minItems": 1,
16700     "type": "array"
16701 },
16702 "title": {
16703     "description": "A title for the link relation. Can be used by the UI to provide a
16704 context.",
16705     "maxLength": 64,
16706     "type": "string"
16707 },
16708 "type": {
16709     "default": "application/cbor",
16710     "description": "A hint at the representation of the resource referenced by the target
16711 URI. This represents the media types that are used for both accepting and emitting.",
16712     "items": {
16713         "maxLength": 64,
16714         "type": "string"
16715     },
16716     "minItems": 1,
16717     "type": "array"
16718 }
16719 },
16720 "required": [
16721     "href",
16722     "rt",
16723     "if"
16724 ],
16725 "type": "object"
16726 }
16727 }
16728 }
16729 }
16730

```

#### 16731 F.14.5 Property Definition

16732 **Table 115 The properties definitions of the resource**

Property name	Value type	Mandatory	Access mode	Description
links	array: see schema		Read Write	A set of simple or individual OIC Links.
rt	array: see schema		Read Only	Resource Type of the Resource
if	array: see schema	Yes	Read Write	The interface set supported by this resource
eps	array: see schema	No	Read Write	the Endpoint information of

				the target Resource
type	array: schema see	No	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.
ins	integer	No	Read Write	The instance identifier for this web link in an array of web links - used in collections
di	string	No	Read Write	The Device ID formatted according to IETF RFC 4122.
rt	array: schema see	Yes	Read Write	Resource Type of the Resource
href	string	Yes	Read Write	This is the target URI, it can be specified as a Relative Reference or fully-qualified URI.
title	string	No	Read Write	A title for the link relation. Can be used by the UI to provide a context.
anchor	string	No	Read Write	This is used to override the context URI e.g. override the URI of the containing collection.
p	object: schema see	No	Read Write	Specifies the framework policies on the Resource

				referenced by the target URI
rel	multiple types: see schema	No	Read Write	The relation of the target URI referenced by the link to the context URI
link	multiple types: see schema	No	Read Write	
if	array: see schema	Yes	Read Only	The interface set supported by this resource
SceneMappings	array: see schema	No	Read Write	array of mappings per scene, can be one(1)
n	string	No	Read Only	Friendly name of the resource
rt	array: see schema	Yes	Read Only	Resource Type of the Resource
id	string	No	Read Only	Instance ID of this specific resource
n	string		Read Only	Friendly name of the resource
if	array: see schema		Read Only	The interface set supported by this resource
rt	array: see schema		Read Only	Resource Type of the Resource
id	string		Read Only	Instance ID of this specific resource
lastScene	string		Read Write	Last selected Scene from the set of sceneValues
sceneValues	array: see schema	No	Read Only	All available scene values
if	array: see schema	Yes	Read Only	The interface set supported by this resource



rts-m	array: schema see	No	Read Only	Resource Type of the Resource
rts	array: schema see	No	Read Only	Resource Type of the Resource
n	string	No	Read Only	Friendly name of the resource
rt	array: schema see	Yes	Read Only	Resource Type of the Resource
id	string	No	Read Only	Instance ID of this specific resource
lastScene	string	No	Read Write	Last selected Scene from the set of sceneValues
links	array: schema see	No	Read Write	A set of simple or individual OIC Links.
links	array: schema see	No	Read Write	A set of simple or individual OIC Links.
links	array: schema see		Read Write	A set of simple or individual OIC Links.
rts-m	multiple types: see schema		Read Write	The list of mandatory resources if any in links included in the collection
rts	multiple types: see schema		Read Write	The list of allowable resource types (for Target and anchors) in links included in the collection

16733

**F.14.6 CRUDN behaviour**

16734

**Table 116 The CRUDN operations of the resource**

Resource	Create	Read	Update	Delete	Notify
/SceneCollectionResURI		get	post		observe

16735 **F.15 Scene Member**

16736 **F.15.1 Introduction**

16737 Collection that models a scene member.  
16738

16739 **F.15.2 Example URI**

16740 /SceneMemberResURI

16741 **F.15.3 Resource Type**

16742 The resource type (rt) is defined as: ['oic.wk.scenemember'].

16743 **F.15.4 Swagger2.0 Definition**

```
16744 {  
16745   "swagger": "2.0",  
16746   "info": {  
16747     "title": "Scenes (Top level)",  
16748     "version": "v1-20160622",  
16749     "license": {  
16750       "name": "copyright 2016-2017 Open Connectivity Foundation, Inc. All rights reserved.",  
16751       "x-description": "Redistribution and use in source and binary forms, with or without  
16752 modification, are permitted provided that the following conditions are met:\n      1.  
16753 Redistributions of source code must retain the above copyright notice, this list of conditions and  
16754 the following disclaimer.\n      2. Redistributions in binary form must reproduce the above  
16755 copyright notice, this list of conditions and the following disclaimer in the documentation and/or  
16756 other materials provided with the distribution.\n      THIS SOFTWARE IS PROVIDED BY THE Open  
16757 Connectivity Foundation, INC. \AS IS\ AND ANY EXPRESS OR IMPLIED WARRANTIES, INCLUDING, BUT NOT  
16758 LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE OR  
16759 WARRANTIES OF NON-INFRINGEMENT, ARE DISCLAIMED.\n      IN NO EVENT SHALL THE Open Connectivity  
16760 Foundation, INC. OR CONTRIBUTORS BE LIABLE FOR ANY DIRECT, INDIRECT, INCIDENTAL, SPECIAL,  
16761 EXEMPLARY, OR CONSEQUENTIAL DAMAGES (INCLUDING, BUT NOT LIMITED TO, PROCUREMENT OF SUBSTITUTE GOODS  
16762 OR SERVICES; LOSS OF USE, DATA, OR PROFITS; OR BUSINESS INTERRUPTION)\n      HOWEVER CAUSED AND  
16763 ON ANY THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT (INCLUDING NEGLIGENCE OR  
16764 OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OF THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY  
16765 OF SUCH DAMAGE.\n    }  
16766   },  
16767   "schemes": ["http"],  
16768   "consumes": ["application/json"],  
16769   "produces": ["application/json"],  
16770   "paths": {  
16771     "/SceneListResURI" : {  
16772       "get": {  
16773         "description": "Toplevel Scene resource.\nThis resource is a generic collection  
16774 resource.\nThe rts value shall contain oic.wk.scenecollection resource types.\nProvides the current  
16775 list of web links pointing to scenes\n",  
16776         "parameters": [  
16777           { "$ref": "#/parameters/interface-baseline" }  
16778         ],  
16779         "responses": {  
16780           "200": {  
16781             "description": "",  
16782             "x-example":  
16783               {  
16784                 "rt": ["oic.wk.scenelist"],  
16785                 "n": "list of scene Collections",  
16786                 "rts": ["oic.wk.scenecollection"],  
16787                 "links": [  
16788                   ]  
16789               }  
16790             }  
16791           },  
16792           "schema": { "$ref": "#/definitions/Collection" }  
16793         }  
16794       }  
16795     }  
16796   },  
16797   "/SceneMemberResURI" : {
```

```

16798 "get": {
16799   "description": "Collection that models a scene member.\nProvides the scene member\n",
16800   "parameters": [
16801     {"$ref": "#/parameters/interface-baseline"}
16802   ],
16803   "responses": {
16804     "200": {
16805       "description": "",
16806       "x-example":
16807         {
16808           "rt": ["oic.wk.scenemember"],
16809           "id": "0685B960-FFFF-46F7-BEC0-9E6234671ADC1",
16810           "n": "my binary switch (for light bulb) mappings",
16811           "link": {
16812             "href": "binarySwitch",
16813             "rt": ["oic.r.switch.binary"],
16814             "if": ["oic.if.a", "oic.if.baseline"],
16815             "eps": [
16816               {"ep": "coap://[fe80::b1d6]:1111", "pri": 2},
16817               {"ep": "coaps://[fe80::b1d6]:1122"},
16818               {"ep": "coap+tcp://[2001:db8:a::123]:2222", "pri": 3}
16819             ]
16820           },
16821           "SceneMappings": [
16822             {
16823               "scene": "off",
16824               "memberProperty": "value",
16825               "memberValue": "true"
16826             },
16827             {
16828               "scene": "Reading",
16829               "memberProperty": "value",
16830               "memberValue": "false"
16831             },
16832             {
16833               "scene": "TVWatching",
16834               "memberProperty": "value",
16835               "memberValue": "true"
16836             }
16837           ]
16838         },
16839       "schema": { "$ref": "#/definitions/SceneMember" }
16840     }
16841   }
16842 }
16843 },
16844 "/SceneCollectionResURI" : {
16845   "get": {
16846     "description": "Collection that models a set of Scenes.\nThis resource is a generic
16847 collection resource with additional parameters.\nThe rts value shall contain oic.scenemember
16848 resource types.\nThe additional parameters are\n lastScene, this is the scene value last set by
16849 any OCF Client\n sceneValues, this is the list of available scenes\n lastScene shall be listed in
16850 sceneValues.\nProvides the current list of web links pointing to scenes\n",
16851     "parameters": [
16852       {"$ref": "#/parameters/interface-baseline"}
16853     ],
16854     "responses": {
16855       "200": {
16856         "description": "",
16857         "x-example":
16858           {
16859             "lastScene": "off",
16860             "sceneValues": ["off", "Reading", "TVWatching"],
16861             "rt": ["oic.wk.scenecollection"],
16862             "n": "My Scenes for my living room",
16863             "id": "0685B960-736F-46F7-BEC0-9E6CBD671ADC1",
16864             "rts": ["oic.wk.scenemember"],
16865             "links": [
16866               ]
16867           }
16868       }
16869     }
16870   }
16871 }

```

```

16869         ,
16870         "schema": { "$ref": "#/definitions/SceneCollection" }
16871     }
16872 },
16873 },
16874 "post": {
16875     "description": "Provides the action to change the last set scene selection.\nCalling this
16876 method shall update all scene members to the prescribed membervalue.\nWhen this method is called
16877 with the same value as the current lastScene value\nthen all scene members shall be updated.\n",
16878     "parameters": [
16879         { "$ref": "#/parameters/interface-update" },
16880         {
16881             "name": "body",
16882             "in": "body",
16883             "required": true,
16884             "schema": { "$ref": "#/definitions/SceneCollectionUpdate" },
16885             "x-example":
16886                 {
16887                     "lastScene": "Reading"
16888                 }
16889         }
16890     ],
16891     "responses": {
16892         "200": {
16893             "description": "Indicates that the value is changed.\nThe changed properties are
16894 provided in the response.\n",
16895             "x-example":
16896                 {
16897                     "lastScene": "Reading"
16898                 }
16899             ,
16900             "schema": { "$ref": "#/definitions/SceneCollectionUpdate" }
16901         }
16902     }
16903 }
16904 },
16905 },
16906 "parameters": {
16907     "interface-update" : {
16908         "in" : "query",
16909         "name" : "if",
16910         "type" : "string",
16911         "enum" : ["oic.if.a"]
16912     },
16913     "interface-baseline" : {
16914         "in" : "query",
16915         "name" : "if",
16916         "type" : "string",
16917         "enum" : ["oic.if.baseline"]
16918     },
16919     "interface-all" : {
16920         "in" : "query",
16921         "name" : "if",
16922         "type" : "string",
16923         "enum" : ["oic.if.a", "oic.if.ll", "oic.if.baseline"]
16924     }
16925 },
16926 "definitions": {
16927     "Collection" : {
16928         "properties": {
16929             "links" :
16930                 {
16931                     "description": "A set of simple or individual OIC Links.",
16932                     "items": {
16933                         "$ref": "#/definitions/oic.oic-link"
16934                     },
16935                     "type": "array"
16936                 }
16937             }
16938         }
16939         , "type" : "object"

```

```

16940     }
16941     ,
16942     "SceneMember" : {
16943         "properties": {
16944             "rt" :
16945                 {
16946                     "description": "Resource Type of the Resource",
16947                     "items": {
16948                         "maxLength": 64,
16949                         "type": "string"
16950                     },
16951                     "minItems": 1,
16952                     "readOnly": true,
16953                     "type": "array"
16954                 },
16955         "SceneMappings" :
16956             {
16957                 "description": "array of mappings per scene, can be one(1)",
16958                 "items": {
16959                     "properties": {
16960                         "memberProperty": {
16961                             "description": "property name that will be mapped",
16962                             "readOnly": true,
16963                             "type": "string"
16964                         },
16965                         "memberValue": {
16966                             "description": "value of the Member Property",
16967                             "readOnly": true,
16968                             "type": "string"
16969                         },
16970                         "scene": {
16971                             "description": "Specifies a scene value that will be acted upon",
16972                             "type": "string"
16973                         }
16974                     },
16975                     "required": [
16976                         "scene",
16977                         "memberProperty",
16978                         "memberValue"
16979                     ],
16980                     "type": "object"
16981                 },
16982                 "type": "array"
16983             },
16984     },
16985     "n" :
16986         {
16987             "description": "Friendly name of the resource",
16988             "maxLength": 64,
16989             "readOnly": true,
16990             "type": "string"
16991         },
16992     "link" :
16993         {
16994             "allof": [
16995                 {
16996                     "properties": {
16997                         "anchor": {
17000 the containing collection.",
17001                         "description": "This is used to override the context URI e.g. override the URI of",
17002                         "format": "uri",
17003                         "maxLength": 256,
17004                         "type": "string"
17005                     },
17006                     "di": {
17007                         "allof": [
17008                             {
17009                                 "description": "Format pattern according to IETF RFC 4122.",
17010                                 "pattern": "^[a-zA-F0-9]{8}-[a-zA-F0-9]{4}-[a-zA-F0-9]{4}-[a-zA-F0-9]{4}-[a-

```

```

17011 fA-F0-9]{12}$",
17012         "type": "string"
17013     },
17014     {
17015         "description": "The device ID"
17016     }
17017 ]
17018 },
17019 "eps": {
17020     "description": "the Endpoint information of the target Resource",
17021     "items": {
17022         "properties": {
17023             "ep": {
17024                 "description": "Transport Protocol Suite + Endpoint Locator",
17025                 "format": "uri",
17026                 "type": "string"
17027             },
17028             "pri": {
17029                 "description": "The priority among multiple Endpoints",
17030                 "minimum": 1,
17031                 "type": "integer"
17032             }
17033         },
17034         "type": "object"
17035     },
17036     "type": "array"
17037 },
17038 "href": {
17039     "description": "This is the target URI, it can be specified as a Relative
17040 Reference or fully-qualified URI.",
17041     "format": "uri",
17042     "maxLength": 256,
17043     "type": "string"
17044 },
17045 "if": {
17046     "description": "The interface set supported by this resource",
17047     "items": {
17048         "enum": [
17049             "oic.if.baseline",
17050             "oic.if.ll",
17051             "oic.if.b",
17052             "oic.if.rw",
17053             "oic.if.r",
17054             "oic.if.a",
17055             "oic.if.s"
17056         ],
17057         "type": "string"
17058     },
17059     "minItems": 1,
17060     "type": "array"
17061 },
17062 "ins": {
17063     "description": "The instance identifier for this web link in an array of web
17064 links - used in collections",
17065     "type": "integer"
17066 },
17067 "p": {
17068     "description": "Specifies the framework policies on the Resource referenced by
17069 the target URI",
17070     "properties": {
17071         "bm": {
17072             "description": "Specifies the framework policies on the Resource referenced
17073 by the target URI for e.g. observable and discoverable",
17074             "type": "integer"
17075         }
17076     },
17077     "required": [
17078         "bm"
17079     ],
17080     "type": "object"
17081 },

```

```

17082         "rel": {
17083             "description": "The relation of the target URI referenced by the link to the
17084 context URI",
17085             "oneOf": [
17086                 {
17087                     "default": [
17088                         "hosts"
17089                     ],
17090                     "items": {
17091                         "maxLength": 64,
17092                         "type": "string"
17093                     },
17094                     "minItems": 1,
17095                     "type": "array"
17096                 },
17097                 {
17098                     "default": "hosts",
17099                     "maxLength": 64,
17100                     "type": "string"
17101                 }
17102             ]
17103         },
17104         "rt": {
17105             "description": "Resource Type of the Resource",
17106             "items": {
17107                 "maxLength": 64,
17108                 "type": "string"
17109             },
17110             "minItems": 1,
17111             "type": "array"
17112         },
17113         "title": {
17114             "description": "A title for the link relation. Can be used by the UI to provide a
17115 context.",
17116             "maxLength": 64,
17117             "type": "string"
17118         },
17119         "type": {
17120             "default": "application/cbor",
17121             "description": "A hint at the representation of the resource referenced by the
17122 target URI. This represents the media types that are used for both accepting and emitting.",
17123             "items": {
17124                 "maxLength": 64,
17125                 "type": "string"
17126             },
17127             "minItems": 1,
17128             "type": "array"
17129         }
17130     },
17131     "required": [
17132         "href",
17133         "rt",
17134         "if"
17135     ],
17136     "type": "object"
17137 },
17138 {
17139     "description": "OCF link that points to a resource"
17140 }
17141 ]
17142 },
17143
17144 "id" :
17145 {
17146     "description": "Instance ID of this specific resource",
17147     "maxLength": 64,
17148     "readOnly": true,
17149     "type": "string"
17150 },
17151
17152 "if" :

```

```

17153         {
17154         "description": "The interface set supported by this resource",
17155         "items": {
17156             "enum": [
17157                 "oic.if.baseline",
17158                 "oic.if.ll",
17159                 "oic.if.b",
17160                 "oic.if.lb",
17161                 "oic.if.rw",
17162                 "oic.if.r",
17163                 "oic.if.a",
17164                 "oic.if.s"
17165             ],
17166             "type": "string"
17167         },
17168         "minItems": 1,
17169         "readOnly": true,
17170         "type": "array"
17171     }
17172 }
17173 }
17174 , "type" : "object"
17175 }
17176 /
17177 "SceneCollection" : {
17178     "properties": {
17179         "rt" :
17180             {
17181                 "description": "Resource Type of the Resource",
17182                 "items": {
17183                     "maxLength": 64,
17184                     "type": "string"
17185                 },
17186                 "minItems": 1,
17187                 "readOnly": true,
17188                 "type": "array"
17189             },
17190         "lastScene" :
17191             {
17192                 "description": "Last selected Scene from the set of sceneValues",
17193                 "type": "string"
17194             },
17195     },
17196     "links" :
17197         {
17198             "description": "A set of simple or individual OIC Links.",
17199             "items": {
17200                 "properties": {
17201                     "anchor": {
17202                         "description": "This is used to override the context URI e.g. override the URI of
17203 the containing collection.",
17204                         "format": "uri",
17205                         "maxLength": 256,
17206                         "type": "string"
17207                     },
17208                     "di": {
17209                         "description": "The Device ID formatted according to IETF RFC 4122.",
17210                         "pattern": "^[a-fA-F0-9]{8}-[a-fA-F0-9]{4}-[a-fA-F0-9]{4}-[a-fA-F0-9]{4}-[a-fA-F0-
17211 9]{12}$",
17212                         "type": "string"
17213                     },
17214                     "eps": {
17215                         "description": "the Endpoint information of the target Resource",
17216                         "items": {
17217                             "properties": {
17218                                 "ep": {
17219                                     "description": "Transport Protocol Suite + Endpoint Locator",
17220                                     "format": "uri",
17221                                     "type": "string"
17222                                 }
17223                             }

```



```

17224         "pri": {
17225             "description": "The priority among multiple Endpoints",
17226             "minimum": 1,
17227             "type": "integer"
17228         }
17229     },
17230     "type": "object"
17231 },
17232 "type": "array"
17233 },
17234 "href": {
17235     "description": "This is the target URI, it can be specified as a Relative Reference
17236 or fully-qualified URI.",
17237     "format": "uri",
17238     "maxLength": 256,
17239     "type": "string"
17240 },
17241 "if": {
17242     "description": "The interface set supported by this resource",
17243     "items": {
17244         "enum": [
17245             "oic.if.baseline",
17246             "oic.if.ll",
17247             "oic.if.b",
17248             "oic.if.rw",
17249             "oic.if.r",
17250             "oic.if.a",
17251             "oic.if.s"
17252         ],
17253         "type": "string"
17254     },
17255     "minItems": 1,
17256     "type": "array"
17257 },
17258 "ins": {
17259     "description": "The instance identifier for this web link in an array of web links
17260 - used in collections",
17261     "type": "integer"
17262 },
17263 "p": {
17264     "description": "Specifies the framework policies on the Resource referenced by the
17265 target URI",
17266     "properties": {
17267         "bm": {
17268             "description": "Specifies the framework policies on the Resource referenced by
17269 the target URI for e.g. observable and discoverable",
17270             "type": "integer"
17271         }
17272     },
17273     "required": [
17274         "bm"
17275     ],
17276     "type": "object"
17277 },
17278 "rel": {
17279     "description": "The relation of the target URI referenced by the link to the
17280 context URI",
17281     "oneOf": [
17282         {
17283             "default": [
17284                 "hosts"
17285             ],
17286             "items": {
17287                 "maxLength": 64,
17288                 "type": "string"
17289             },
17290             "minItems": 1,
17291             "type": "array"
17292         },
17293         {
17294             "default": "hosts",

```

```

17295         "maxLength": 64,
17296         "type": "string"
17297     }
17298 ]
17299 },
17300 "rt": {
17301     "description": "Resource Type of the Resource",
17302     "items": {
17303         "maxLength": 64,
17304         "type": "string"
17305     },
17306     "minItems": 1,
17307     "type": "array"
17308 },
17309 "title": {
17310     "description": "A title for the link relation. Can be used by the UI to provide a
17311 context.",
17312     "maxLength": 64,
17313     "type": "string"
17314 },
17315 "type": {
17316     "default": "application/cbor",
17317     "description": "A hint at the representation of the resource referenced by the
17318 target URI. This represents the media types that are used for both accepting and emitting.",
17319     "items": {
17320         "maxLength": 64,
17321         "type": "string"
17322     },
17323     "minItems": 1,
17324     "type": "array"
17325 },
17326 },
17327 "required": [
17328     "href",
17329     "rt",
17330     "if"
17331 ],
17332 "type": "object"
17333 },
17334 "type": "array"
17335 },
17336
17337 "sceneValues" :
17338 {
17339     "description": "All available scene values",
17340     "items": {
17341         "type": "string"
17342     },
17343     "readOnly": true,
17344     "type": "array"
17345 },
17346
17347 "n" :
17348 {
17349     "description": "Friendly name of the resource",
17350     "maxLength": 64,
17351     "readOnly": true,
17352     "type": "string"
17353 },
17354
17355 "rts" :
17356 {
17357     "description": "Resource Type of the Resource",
17358     "items": {
17359         "maxLength": 64,
17360         "type": "string"
17361     },
17362     "minItems": 1,
17363     "readOnly": true,
17364     "type": "array"
17365 },

```

```

17366
17367     "id" :
17368         {
17369             "description": "Instance ID of this specific resource",
17370             "maxLength": 64,
17371             "readOnly": true,
17372             "type": "string"
17373         },
17374
17375     "rts-m" :
17376         {
17377             "description": "Resource Type of the Resource",
17378             "items": {
17379                 "maxLength": 64,
17380                 "type": "string"
17381             },
17382             "minItems": 1,
17383             "readOnly": true,
17384             "type": "array"
17385         },
17386
17387     "if" :
17388         {
17389             "description": "The interface set supported by this resource",
17390             "items": {
17391                 "enum": [
17392                     "oic.if.baseline",
17393                     "oic.if.ll",
17394                     "oic.if.b",
17395                     "oic.if.lb",
17396                     "oic.if.rw",
17397                     "oic.if.r",
17398                     "oic.if.a",
17399                     "oic.if.s"
17400                 ],
17401                 "type": "string"
17402             },
17403             "minItems": 1,
17404             "readOnly": true,
17405             "type": "array"
17406         }
17407     }
17408     }, "type" : "object"
17409 }
17410
17411 ,
17412 "SceneCollectionUpdate" : {
17413     "properties": {
17414         "rt" :
17415             {
17416                 "description": "Resource Type of the Resource",
17417                 "items": {
17418                     "maxLength": 64,
17419                     "type": "string"
17420                 },
17421                 "minItems": 1,
17422                 "readOnly": true,
17423                 "type": "array"
17424             },
17425
17426         "lastScene" :
17427             {
17428                 "description": "Last selected Scene from the set of sceneValues",
17429                 "type": "string"
17430             },
17431
17432         "n" :
17433             {
17434                 "description": "Friendly name of the resource",
17435                 "maxLength": 64,
17436                 "readOnly": true,

```

```

17437         "type": "string"
17438     },
17439
17440     "id" :
17441     {
17442         "description": "Instance ID of this specific resource",
17443         "maxLength": 64,
17444         "readOnly": true,
17445         "type": "string"
17446     },
17447
17448     "if" :
17449     {
17450         "description": "The interface set supported by this resource",
17451         "items": {
17452             "enum": [
17453                 "oic.if.baseline",
17454                 "oic.if.ll",
17455                 "oic.if.b",
17456                 "oic.if.lb",
17457                 "oic.if.rw",
17458                 "oic.if.r",
17459                 "oic.if.a",
17460                 "oic.if.s"
17461             ],
17462             "type": "string"
17463         },
17464         "minItems": 1,
17465         "readOnly": true,
17466         "type": "array"
17467     }
17468
17469     },
17470     "type" : "object"
17471 }
17472 , "uuid" :
17473 {
17474     "description": "Format pattern according to IETF RFC 4122.",
17475     "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}$",
17476     "type": "string"
17477 }
17478
17479 , "oic.collection.links.arrayoflinks" :
17480 {
17481     "properties": {
17482         "links": {
17483             "description": "A set of simple or individual OIC Links.",
17484             "items": {
17485                 "properties": {
17486                     "anchor": {
17487                         "description": "This is used to override the context URI e.g. override the URI of
17488 the containing collection.",
17489                         "format": "uri",
17490                         "maxLength": 256,
17491                         "type": "string"
17492                     },
17493                     "di": {
17494                         "description": "The Device ID formatted according to IETF RFC 4122.",
17495                         "pattern": "^[a-fA-F0-9]{8}-[a-fA-F0-9]{4}-[a-fA-F0-9]{4}-[a-fA-F0-9]{4}-[a-fA-F0-
17496 9]{12}$",
17497                         "type": "string"
17498                     },
17499                     "eps": {
17500                         "description": "the Endpoint information of the target Resource",
17501                         "items": {
17502                             "properties": {
17503                                 "ep": {
17504                                     "description": "Transport Protocol Suite + Endpoint Locator",
17505                                     "format": "uri",
17506                                     "type": "string"
17507                                 }

```

```

17508         "pri": {
17509             "description": "The priority among multiple Endpoints",
17510             "minimum": 1,
17511             "type": "integer"
17512         }
17513     },
17514     "type": "object"
17515 },
17516 "type": "array"
17517 },
17518 "href": {
17519     "description": "This is the target URI, it can be specified as a Relative Reference
17520 or fully-qualified URI.",
17521     "format": "uri",
17522     "maxLength": 256,
17523     "type": "string"
17524 },
17525 "if": {
17526     "description": "The interface set supported by this resource",
17527     "items": {
17528         "enum": [
17529             "oic.if.baseline",
17530             "oic.if.ll",
17531             "oic.if.b",
17532             "oic.if.rw",
17533             "oic.if.r",
17534             "oic.if.a",
17535             "oic.if.s"
17536         ],
17537         "type": "string"
17538     },
17539     "minItems": 1,
17540     "type": "array"
17541 },
17542 "ins": {
17543     "description": "The instance identifier for this web link in an array of web links
17544 - used in collections",
17545     "type": "integer"
17546 },
17547 "p": {
17548     "description": "Specifies the framework policies on the Resource referenced by the
17549 target URI",
17550     "properties": {
17551         "bm": {
17552             "description": "Specifies the framework policies on the Resource referenced by
17553 the target URI for e.g. observable and discoverable",
17554             "type": "integer"
17555         }
17556     },
17557     "required": [
17558         "bm"
17559     ],
17560     "type": "object"
17561 },
17562 "rel": {
17563     "description": "The relation of the target URI referenced by the link to the
17564 context URI",
17565     "oneOf": [
17566         {
17567             "default": [
17568                 "hosts"
17569             ],
17570             "items": {
17571                 "maxLength": 64,
17572                 "type": "string"
17573             },
17574             "minItems": 1,
17575             "type": "array"
17576         },
17577         {
17578             "default": "hosts",

```

```

17579         "maxLength": 64,
17580         "type": "string"
17581     }
17582 ]
17583 },
17584 "rt": {
17585     "description": "Resource Type of the Resource",
17586     "items": {
17587         "maxLength": 64,
17588         "type": "string"
17589     },
17590     "minItems": 1,
17591     "type": "array"
17592 },
17593 "title": {
17594     "description": "A title for the link relation. Can be used by the UI to provide a
17595 context.",
17596     "maxLength": 64,
17597     "type": "string"
17598 },
17599 "type": {
17600     "default": "application/cbor",
17601     "description": "A hint at the representation of the resource referenced by the
17602 target URI. This represents the media types that are used for both accepting and emitting.",
17603     "items": {
17604         "maxLength": 64,
17605         "type": "string"
17606     },
17607     "minItems": 1,
17608     "type": "array"
17609 }
17610 },
17611 "required": [
17612     "href",
17613     "rt",
17614     "if"
17615 ],
17616 "type": "object"
17617 },
17618 "type": "array"
17619 }
17620 }
17621 }
17622
17623 , "oic.collection.properties" :
17624 {
17625     "description": "A collection is a set of links along with additional properties to describe
17626 the collection itself",
17627     "properties": {
17628         "rts": {
17629             "$ref": "#/definitions/oic.core/properties/rt",
17630             "description": "The list of allowable resource types (for Target and anchors) in links
17631 included in the collection"
17632         },
17633         "rts-m": {
17634             "$ref": "#/definitions/oic.core/properties/rt",
17635             "description": "The list of mandatory resources if any in links included in the
17636 collection"
17637         }
17638     },
17639     "type": "object"
17640 }
17641
17642 , "oic.core" :
17643 {
17644     "properties": {
17645         "rt": {
17646             "description": "Resource Type of the Resource",
17647             "items": {
17648                 "maxLength": 64,
17649                 "type": "string"

```

```

17650         },
17651         "minItems": 1,
17652         "readOnly": true,
17653         "type": "array"
17654     }
17655 },
17656 "type": "object"
17657 }
17658
17659 , "oic.collection.links" :
17660 {
17661     "properties": {
17662         "links": {
17663             "description": "A set of simple or individual OIC Links.",
17664             "items": {
17665                 "$ref": "#/definitions/oic.oic-link"
17666             },
17667             "type": "array"
17668         }
17669     }
17670 }
17671
17672 , "oic.oic-link" :
17673 {
17674     "properties": {
17675         "anchor": {
17676             "description": "This is used to override the context URI e.g. override the URI of the
17677 containing collection.",
17678             "format": "uri",
17679             "maxLength": 256,
17680             "type": "string"
17681         },
17682         "di": {
17683             "description": "The Device ID formatted according to IETF RFC 4122.",
17684             "pattern": "^[a-fA-F0-9]{8}-[a-fA-F0-9]{4}-[a-fA-F0-9]{4}-[a-fA-F0-
17685 9]{12}$",
17686             "type": "string"
17687         },
17688         "eps": {
17689             "description": "the Endpoint information of the target Resource",
17690             "items": {
17691                 "properties": {
17692                     "ep": {
17693                         "description": "Transport Protocol Suite + Endpoint Locator",
17694                         "format": "uri",
17695                         "type": "string"
17696                     },
17697                     "pri": {
17698                         "description": "The priority among multiple Endpoints",
17699                         "minimum": 1,
17700                         "type": "integer"
17701                     }
17702                 },
17703                 "type": "object"
17704             },
17705             "type": "array"
17706         },
17707         "href": {
17708             "description": "This is the target URI, it can be specified as a Relative Reference or
17709 fully-qualified URI.",
17710             "format": "uri",
17711             "maxLength": 256,
17712             "type": "string"
17713         },
17714         "if": {
17715             "description": "The interface set supported by this resource",
17716             "items": {
17717                 "enum": [
17718                     "oic.if.baseline",
17719                     "oic.if.ll",
17720                     "oic.if.b",

```

```

17721         "oic.if.rw",
17722         "oic.if.r",
17723         "oic.if.a",
17724         "oic.if.s"
17725     ],
17726     "type": "string"
17727 },
17728     "minItems": 1,
17729     "type": "array"
17730 },
17731     "ins": {
17732         "description": "The instance identifier for this web link in an array of web links - used
17733 in collections",
17734         "type": "integer"
17735     },
17736     "p": {
17737         "description": "Specifies the framework policies on the Resource referenced by the target
17738 URI",
17739         "properties": {
17740             "bm": {
17741                 "description": "Specifies the framework policies on the Resource referenced by the
17742 target URI for e.g. observable and discoverable",
17743                 "type": "integer"
17744             }
17745         },
17746         "required": [
17747             "bm"
17748         ],
17749         "type": "object"
17750     },
17751     "rel": {
17752         "description": "The relation of the target URI referenced by the link to the context
17753 URI",
17754         "oneOf": [
17755             {
17756                 "default": [
17757                     "hosts"
17758                 ],
17759                 "items": {
17760                     "maxLength": 64,
17761                     "type": "string"
17762                 },
17763                 "minItems": 1,
17764                 "type": "array"
17765             },
17766             {
17767                 "default": "hosts",
17768                 "maxLength": 64,
17769                 "type": "string"
17770             }
17771         ]
17772     },
17773     "rt": {
17774         "description": "Resource Type of the Resource",
17775         "items": {
17776             "maxLength": 64,
17777             "type": "string"
17778         },
17779         "minItems": 1,
17780         "type": "array"
17781     },
17782     "title": {
17783         "description": "A title for the link relation. Can be used by the UI to provide a
17784 context.",
17785         "maxLength": 64,
17786         "type": "string"
17787     },
17788     "type": {
17789         "default": "application/cbor",
17790         "description": "A hint at the representation of the resource referenced by the target
17791 URI. This represents the media types that are used for both accepting and emitting.",

```



```

17792     "items": {
17793         "maxLength": 64,
17794         "type": "string"
17795     },
17796     "minItems": 1,
17797     "type": "array"
17798 }
17799 },
17800 "required": [
17801     "href",
17802     "rt",
17803     "if"
17804 ],
17805 "type": "object"
17806 }
17807 }
17808 }
17809 }
17810 }

```

### F.15.5 Property Definition

**Table 117 The properties definitions of the resource**

Property name	Value type	Mandatory	Access mode	Description
links	array: see schema		Read Write	A set of simple or individual OIC Links.
rts	array: see schema	No	Read Only	Resource Type of the Resource
links	array: see schema	No	Read Write	A set of simple or individual OIC Links.
rts-m	array: see schema	No	Read Only	Resource Type of the Resource
id	string	No	Read Only	Instance ID of this specific resource
rt	array: see schema	Yes	Read Only	Resource Type of the Resource
if	array: see schema	Yes	Read Only	The interface set supported by this resource
lastScene	string	No	Read Write	Last selected Scene from the set of sceneValues
n	string	No	Read Only	Friendly name of the resource
sceneValues	array: see schema	No	Read Only	All available scene values

anchor	string	No	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
href	string	Yes	Read Write	This is the target URI, it can be specified as a Relative Reference or fully-qualified URI.
title	string	No	Read Write	A title for the link relation. Can be used by the UI to provide a context.
ins	integer	No	Read Write	The instance identifier for this web link in an array of web links - used in collections
rt	array: see schema	Yes	Read Write	Resource Type of the Resource
rel	multiple types: see schema	No	Read Write	The relation of the target URI referenced by the link to the context URI
p	object: see schema	No	Read Write	Specifies the framework policies on the Resource referenced by the target URI
di	string	No	Read Write	The Device ID formatted according to IETF RFC 4122.
type	array: see schema	No	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.
eps	array: schema see	No	Read Write	the Endpoint information of the target Resource
rt	array: schema see		Read Only	Resource Type of the Resource
id	string		Read Only	Instance ID of this specific resource
lastScene	string		Read Write	Last selected Scene from the set of sceneValues
n	string		Read Only	Friendly name of the resource
if	array: schema see		Read Only	The interface set supported by this resource
id	string	No	Read Only	Instance ID of this specific resource
n	string	No	Read Only	Friendly name of the resource
link	multiple types: see schema	No	Read Write	
rt	array: schema see	Yes	Read Only	Resource Type of the Resource
if	array: schema see	Yes	Read Only	The interface set supported by this resource
SceneMappings	array: schema see	No	Read Write	array of mappings per scene, can be one(1)

links	array: see schema	No	Read Write	A set of simple or individual OIC Links.
rt	array: see schema		Read Only	Resource Type of the Resource
rts	multiple types: see schema		Read Write	The list of allowable resource types (for Target and anchors) in links included in the collection
rts-m	multiple types: see schema		Read Write	The list of mandatory resources if any in links included in the collection
links	array: see schema		Read Write	A set of simple or individual OIC Links.

17813

**F.15.6 CRUDN behaviour**

17814

**Table 118 The CRUDN operations of the resource**

Resource	Create	Read	Update	Delete	Notify
/SceneMemberResURI		get			observe

17815  
17816  
17817  
17818

## Annex G (informative)

### Swagger2.0 Schema Extension

17819

#### **G.1 Swagger 2.0 Schema Reference**

17820 Swagger 2.0 does not support allOf and anyOf JSON schema validation constructs; this  
17821 specification has extended the underlying Swagger 2.0 schema to enable these, all Swagger 2.0  
17822 files are valid against the extended schema. Please reference the following location for a copy of  
17823 the extended schema:

17824 <https://github.com/openconnectivityfoundation/OCFswagger2.0-schema>

17825

#### **G.2 Swagger 2.0 Introspection empty file**

17826 Reference the following location for a copy of an empty Swagger2.0 file:

17827 <https://github.com/openconnectivityfoundation/DeviceBuilder/blob/master/examples/introspection>  
17828 [-empty.txt](#)

17829