

OCF Core Specification

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Part 1



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502 1 Scope

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

- 504 • Core Specification documents: The Core Specification documents specify the Framework, i.e.,
505 the OCF core architecture, interfaces, protocols and services to enable OCF profiles
506 implementation for Internet of Things (IoT) usages and ecosystems.
- 507 • Vertical Domain Specification documents: The Vertical Domain Specification documents
508 specify OCF Device profiles to enable IoT usages for different vertical market segments such
509 as smart home, industrial, healthcare, and automotive. They also specify Resource definitions
510 to enable vertical services and use case. Such specifications include the Device Specification
511 which is built upon the interfaces and network security of the OCF core architecture defined in
512 the Core Specification.

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

514

515 2 Normative references

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

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

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

522 IETF RFC 768, *User Datagram Protocol*, August 1980

523 <https://www.rfc-editor.org/info/rfc768>

524 IETF RFC 1981, *Path MTU Discovery for IP version 6*, August 1996

525 <https://www.rfc-editor.org/info/rfc1981>

526 IETF RFC 2460, *Internet Protocol, version 6 (IPv6), December, 1998*

527 <https://www.rfc-editor.org/info/rfc2460>

528 IETF RFC 2616, *Hypertext Transfer Protocol – HTTP/1.1*, June 1999.

529 <https://www.rfc-editor.org/info/rfc2616>

530 IETF RFC 3810, *Multicast Listener Discovery Version 2 (MLDv2) for IPv6*, June 2004

531 <https://www.rfc-editor.org/info/rfc3810>

532 IETF RFC 3986, *Uniform Resource Identifier (URI): General Syntax, January 2005.*

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621 **3 Terms, definitions, symbols and abbreviations**

622 **3.1 Terms and definitions**

623 **3.1.1**

624 **Client**

625 a logical entity that accesses a Resource on a Server

626 **3.1.2**

627 **Collection**

628 a Resource that contains zero or more Links

629 **3.1.3**

630 **Common Properties**

631 Resource Properties specified for all Resources

632 **3.1.4**

633 **Configuration Source**

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

636 **3.1.5**

637 **Core Resources**

638 those Resources that are defined in this specification

639 **3.1.6**

640 **Default Interface**

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

642 **3.1.7**

643 **Device**

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

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

646 **3.1.8**

647 **Device Type**

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

649 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
650 Resource discovery.

651 **3.1.9**

652 **Discoverable Resource**

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

654 **3.1.10**

655 **Endpoint**

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

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

658 **3.1.11**

659 **Entity**

660 an aspect of the physical world that is exposed through a Device

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

662 **3.1.12**

663 **Framework**

664 a set of related functionalities and interactions defined in this specification, which enable
665 interoperability across a wide range of networked devices, including IoT

666 **3.1.13**

667 **Interface**

668 provides a view and permissible responses on a Resource

669 **3.1.14**

670 **Introspection**

671 mechanism to determine the capabilities of the hosted Resources of a Device

672 **3.1.15**

673 **Introspection Device Data**

674 data that describes the payloads per implemented method of the Resources that makes up the
675 Device

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

677 **3.1.16**

678 **Links**

679 extends typed web links according to IETF RFC 5988

680 **3.1.17**

681 **Non-Discoverable Resource**

682 A Resource that is not listed in “/oic/res”. The Resource can be reached by a Link which is
683 conveyed by another resource. For example a Resource linked in a Collection Resource does not
684 have to be listed in “/oic/res”, since traversing the Collection Resource would discover the
685 Resource implemented on the device.

686 **3.1.18**

687 **Non-OCF Device**

688 A device which does not comply with the OCF Device requirements

689 **3.1.19**

690 **Notification**

691 the mechanism to make a Client aware of resource state changes in a Resource

692 **3.1.20**

693 **Observe**

694 the act of monitoring a Resource by sending a RETRIEVE request which is cached by the Server
695 hosting the Resource and reprocessed on every change to that Resource

696 **3.1.21**

697 **Parameter**

698 an element that provides metadata about a Resource referenced by the target URI of a Link

699 **3.1.22**

700 **Partial UPDATE**

701 an UPDATE request to a Resource that includes a subset of the Properties that are visible via the
702 Interface being applied for the Resource Type

703 **3.1.23**

704 **Platform**

705 a physical device containing one or more Devices

706 **3.1.24**
707 **Resource**
708 represents an Entity modelled and exposed by the Framework

709 **3.1.25**
710 **Resource Directory**
711 a set of descriptions of Resources where the actual Resources are held on Servers external to the
712 Device hosting the Resource Directory, allowing lookups to be performed for those resources

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

715 **3.1.26**
716 **Resource Interface**
717 a qualification of the permitted requests on a Resource

718 **3.1.27**
719 **Resource Property**
720 a significant aspect or parameter of a resource, including metadata, that is exposed through the
721 Resource

722 **3.1.28**
723 **Resource Type**
724 a uniquely named definition of a class of Resource Properties and the interactions that are
725 supported by that class

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

727 **3.1.29**
728 **Scene**
729 a static entity that stores a set of defined Resource property values for a collection of Resources

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

732 **3.1.30**
733 **Scene Collection**
734 a collection Resource that contains an enumeration of possible Scene Values and the current
735 Scene Value

736 Note 1 to entry: The member values of the Scene collection Resource are Scene Members.

737 **3.1.31**
738 **Scene Member**
739 a Resource that contains mappings of Scene Values to values of a property in the resource

740 **3.1.32**
741 **Scene Value**
742 a Scene enumerator representing the state in which a Resource can be

743 **3.1.33**
744 **Secure Endpoint**
745 an Endpoint with a secure connection (e.g., CoAPS)

746 **3.1.34**
747 **Server**
748 a Device with the role of providing resource state information and facilitating remote interaction
749 with its resources

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

751 **3.1.35**
752 **Unsecure Endpoint**
753 an Endpoint with an unsecure connection (e.g., CoAP)

754 **3.1.36**
755 **Vertical Resource Type**
756 a Resource Type in a vertical domain specification

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

758 **3.2 Symbols and abbreviations**

759 **3.2.1**
760 **ACL**
761 Access Control List

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

763 **3.2.2**
764 **BLE**
765 Bluetooth Low Energy

766 **3.2.3**
767 **CBOR**
768 Concise Binary Object Representation

769 **3.2.4**
770 **CoAP**
771 Constrained Application Protocol

772 **3.2.5**
773 **CoAPS**
774 Secure Constrained Application Protocol

775 **3.2.6**
776 **DTLS**
777 Datagram Transport Layer Security

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

779 **3.2.7**
780 **EXI**
781 Efficient XML Interchange

782 **3.2.8**
783 **IP**
784 Internet Protocol

785 **3.2.9**
786 **IRI**
787 Internationalized Resource Identifiers

788 **3.2.10**
789 **ISP**
790 Internet Service Provider

791 **3.2.11**
792 **JSON**
793 JavaScript Object Notation

794 **3.2.12**
795 **mDNS**
796 Multicast Domain Name Service

797 **3.2.13**
798 **MTU**
799 Maximum Transmission Unit

800 **3.2.14**
801 **NAT**
802 Network Address Translation

803 **3.2.15**
804 **OCF**
805 Open Connectivity Foundation

806 the organization that created this specification

807 **3.2.16**
808 **RAML**
809 RESTful API Modeling Language

810 **3.2.17**
811 **REST**
812 Representational State Transfer

813 **3.2.18**
814 **RESTful**
815 REST-compliant Web services

816 **3.2.19**
817 **UDP**
818 User Datagram Protocol

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

820 **3.2.20**
821 **URI**
822 Uniform Resource Identifier

823 **3.2.21**
824 **URN**
825 Uniform Resource Name

826 **3.2.22**
827 **UTC**
828 Coordinated Universal Time

829 **3.2.23**
830 **UUID**
831 Universal Unique Identifier

832 **3.2.24**
833 **XML**
834 Extensible Markup Language

835 **3.3 Conventions**

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

840 **3.4 Data types**

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

844
 845 Among other validation keywords, section 7 in JSON Schema Validation defines a “format”
 846 keyword with a number of format attributes such as “uri” and “date-time”, and a “pattern” keyword
 847 with a regular expression that can be used to validate a string. This section defines patterns that
 848 are available for use in describing OCF Resources. The pattern names can be used in specification
 849 text where JSON format names can occur. The actual JSON schemas shall use the JSON type
 850 and pattern instead.

851

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

853

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])\$	As defined in ISO 8601. The format is [yyyy]-[mm]-[dd].
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.

854

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

856

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

860 **4 Document conventions and organization**

861 In this document, features are described as required, recommended, allowed or DEPRECATED as
862 follows:

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

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

867 Recommended (or should)(S).

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

874 Allowed (may or allowed)(O).

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

878 DEPRECATED.

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

885 Conditionally allowed (CA)

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

888 Conditionally required (CR)

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

892

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

894 Words that are emphasized are printed in italic.

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

899 **5 Architecture**

900 **5.1 Overview**

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

905 Specifically, the architecture provides:

- 906 • A communication and interoperability framework for multiple market segments (Consumer,
907 Enterprise, Industrial, Automotive, Health, etc.), OSs, platforms, modes of communication,
908 transports and use cases
- 909 • A common and consistent model for describing the environment and enabling information
910 and semantic interoperability
- 911 • Common communication protocols for discovery and connectivity
- 912 • Common security and identification mechanisms
- 913 • Opportunity for innovation and product differentiation
- 914 • A scalable solution addressing different device capabilities, applicable to smart devices as
915 well as the smallest connected things and wearable devices

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

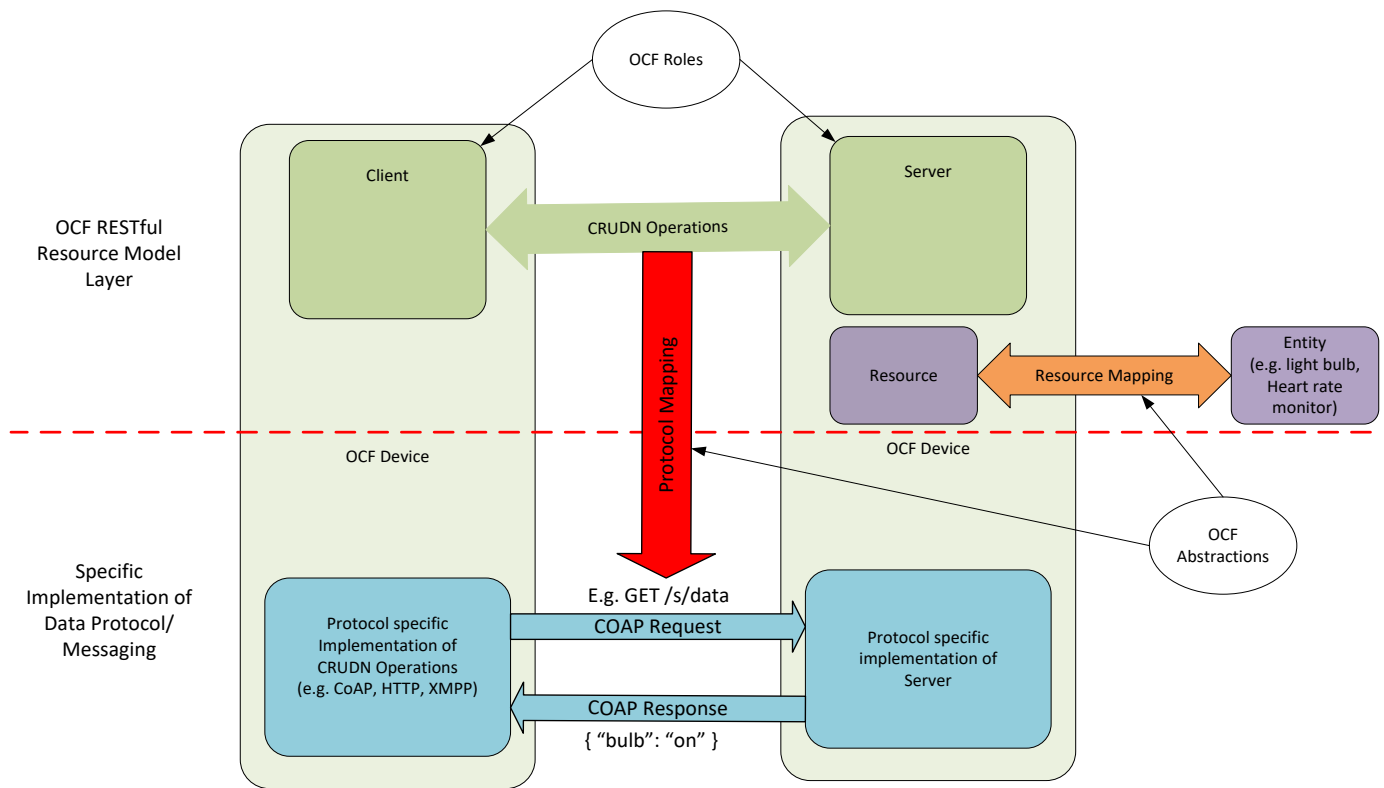
921 **5.2 Principle**

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

926 The architecture defines the overall structure of the Framework as an information system and the
927 interrelationships of the Entities that make up OCF. Entities are exposed as Resources, with their
928 unique identifiers (URIs) and support interfaces that enable RESTful operations on the Resources.
929 Every RESTful operation has an initiator of the operation (the client) and a responder to the

930 operation (the server). In the Framework, the notion of the client and server is realized through
 931 roles (section 5.5). Any Device can act as a Client and initiate a RESTful operation on any Device
 932 acting as a Server. Likewise, any Device that exposes Entities as Resources acts as a Server.
 933 Conformant to the REST architectural style, each RESTful operation contains all the information
 934 necessary to understand the context of the interaction and is driven using a small set of generic
 935 operations, i.e., CREATE, RETRIEVE, UPDATE, DELETE and NOTIFY (CRUDN) defined in
 936 section 8, which include representations of Resources.

937 Figure 1 depicts the architecture.



938
939

940 **Figure 1: Architecture - concepts**

941

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

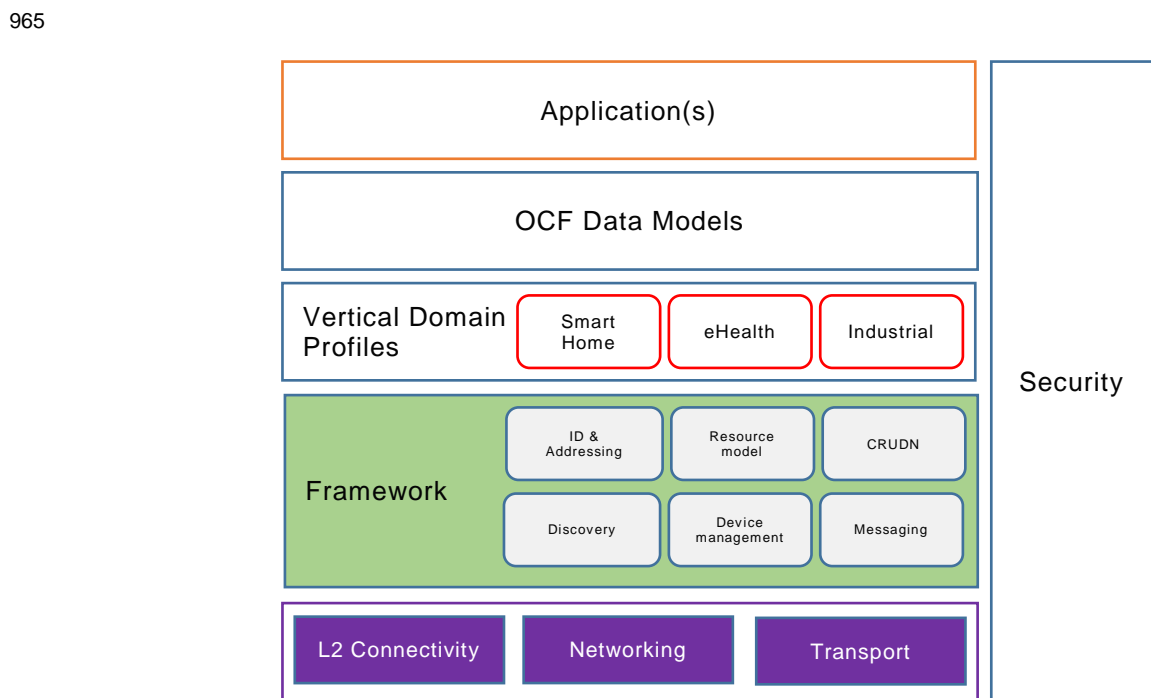
- 944 • **Resource model:** The resource model provides the abstractions and concepts required to
 945 logically model, and logically operate on the application and its environment. The core resource
 946 model is common and agnostic to any specific application domain such as smart home,
 947 industrial or automotive. For example, the resource model defines a Resource which abstracts
 948 an Entity and the representation of a Resource maps the Entity's state. Other resource model
 949 concepts can be used to model other aspects, for example behaviour.
- 950 • **RESTful operations:** The generic CRUDN operations are defined using the RESTful paradigm
 951 to model the interactions with a Resource in a protocol and technology agnostic way. The
 952 specific communication or messaging protocols are part of the protocol abstraction and
 953 mapping of Resources to specific protocols is provided in section 11.8.

- Abstraction: The abstractions in the resource model and the RESTful operations are mapped to concrete elements using abstraction primitives. An entity handler is used to map an Entity to a Resource and connectivity abstraction primitives are used to map logical RESTful operations to data connectivity protocols or technologies. Entity handlers may also be used to map Resources to Entities that are reached over protocols that are not natively supported by OCF.

960

961 5.3 Functional block diagram

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

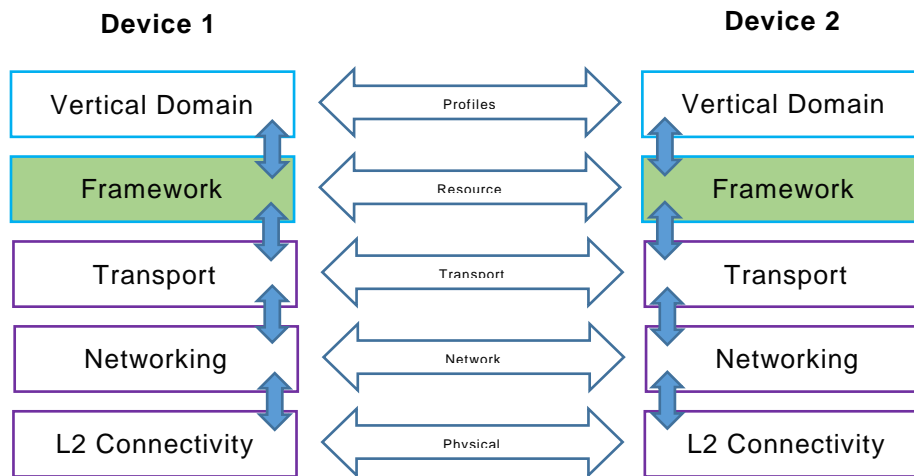


966 **Figure 2: Functional block diagram**

- 967 • **L2 connectivity:** Provides the functionalities required for establishing physical and data
 968 link layer connections (e.g., Wi-Fi™ or Bluetooth® connection) to the network.
- 969 • **Networking:** Provides functionalities required for Devices to exchange data among
 970 themselves over the network (e.g., Internet).
- 971 • **Transport:** Provides end-to-end flow transport with specific QoS constraints. Examples of
 972 a transport protocol include TCP and UDP or new Transport protocols under development
 973 in the IETF, e.g., Delay Tolerant Networking (DTN).
- 974 • **Framework:** Provides the core functionalities as defined in this specification. The
 975 functional block is the source of requests and responses that are the content of the
 976 communication between two Devices.
- 977 • **Vertical Domain profile:** Provides market segment specific functionalities, e.g., functions
 978 for the smart home market segment.

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

981



982 **Figure 3: Communication layering model**

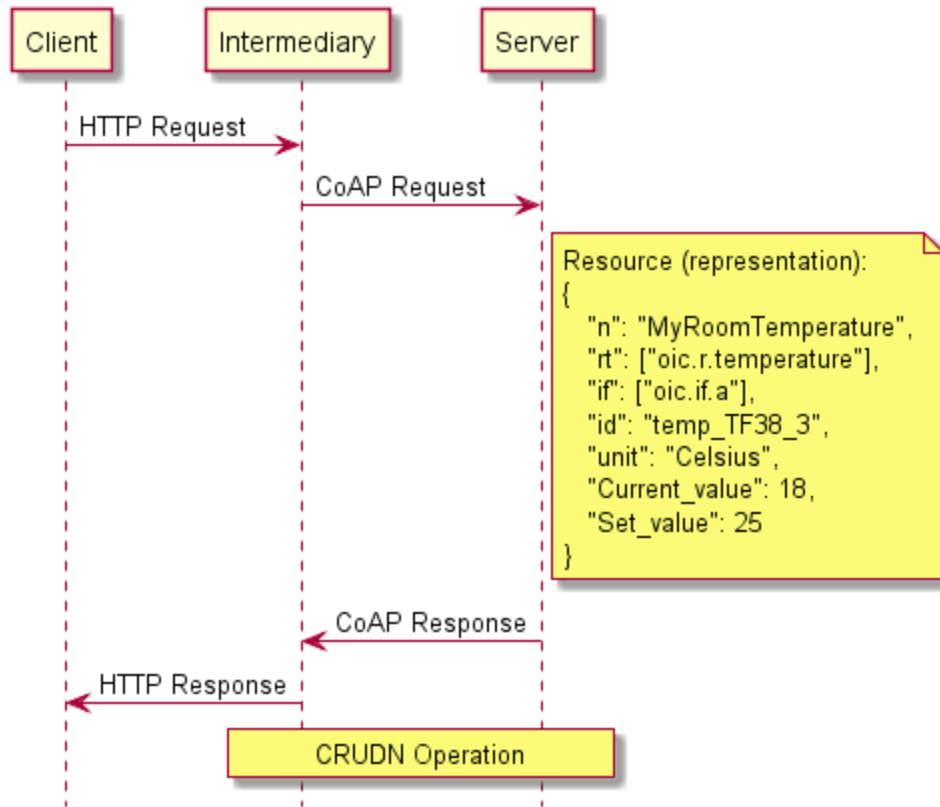
983 **5.4 Framework**

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

- 985 1) **Identification and addressing.** Defines the identifier and addressing capability. The
986 Identification and addressing function is defined in section 6.
- 987 2) **Discovery.** Defines the process for discovering available
988 a) Devices (Endpoint Discovery in section 10) and
989 b) Resources (Resource discovery in section 11.3)
- 990 3) **Resource model.** Specifies the capability for representation of Entities in terms of resources
991 and defines mechanisms for manipulating the resources. The resource model function is
992 defined in section 7.
- 993 4) **CRUDN.** Provides a generic scheme for the interactions between a Client and Server as
994 defined in section 8.
- 995 5) **Messaging.** Provides specific message protocols for RESTful operation, i.e. CRUDN. For
996 example, CoAP is a primary messaging protocol. The messaging function is defined in section
997 11.8.
- 998 6) **Device management.** Specifies the discipline of managing the capabilities of a Device, and
999 includes device provisioning and initial setup as well as device monitoring and diagnostics.
1000 The device management function is defined in section 11.5.
- 1001 7) **Security.** Includes authentication, authorization, and access control mechanisms required for
1002 secure access to Entities. The security function is defined in section 13.

1003 **5.5 Example Scenario with roles**

1004 Interactions are defined between logical entities known as Roles. Three roles are defined: Client,
1005 Server and Intermediary.

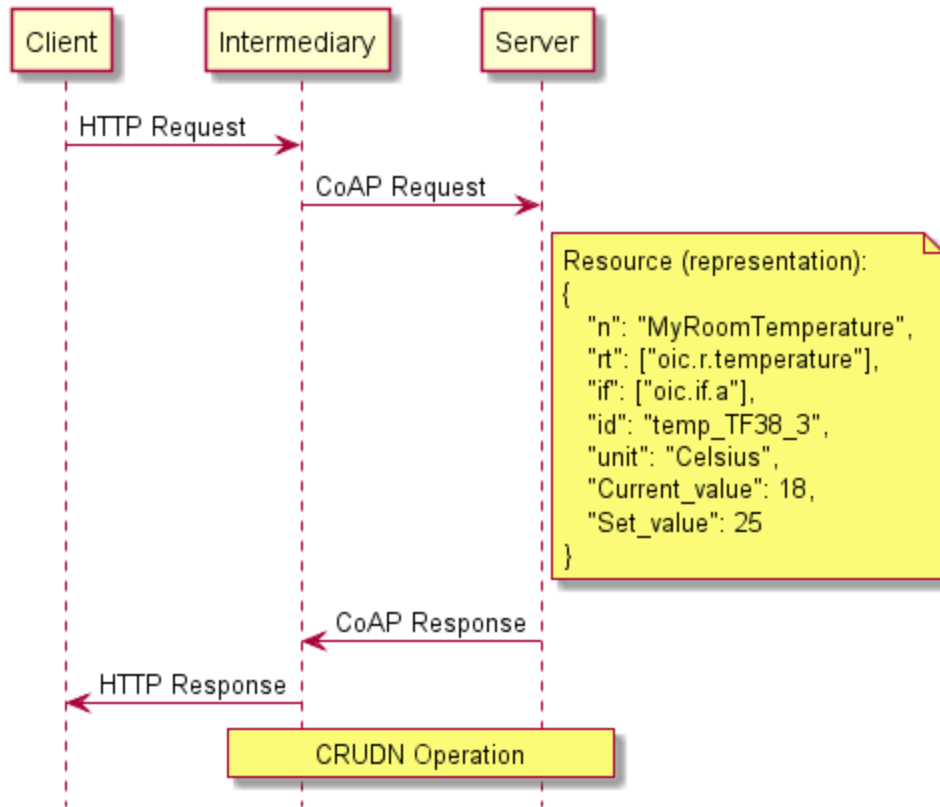


1006
1007

1008 Figure 4 illustrates an example of the Roles in a scenario where a smart phone sends a request
 1009 message to a thermostat; the original request is sent over HTTP, but is translated into a CoAP
 1010 request message by a gateway in between, and then delivered to the thermostat. In this
 1011 example, the smart phone takes the role of a Client, the gateway takes the role of an
 1012 Intermediary and the thermostat takes the role of a Server.



1013



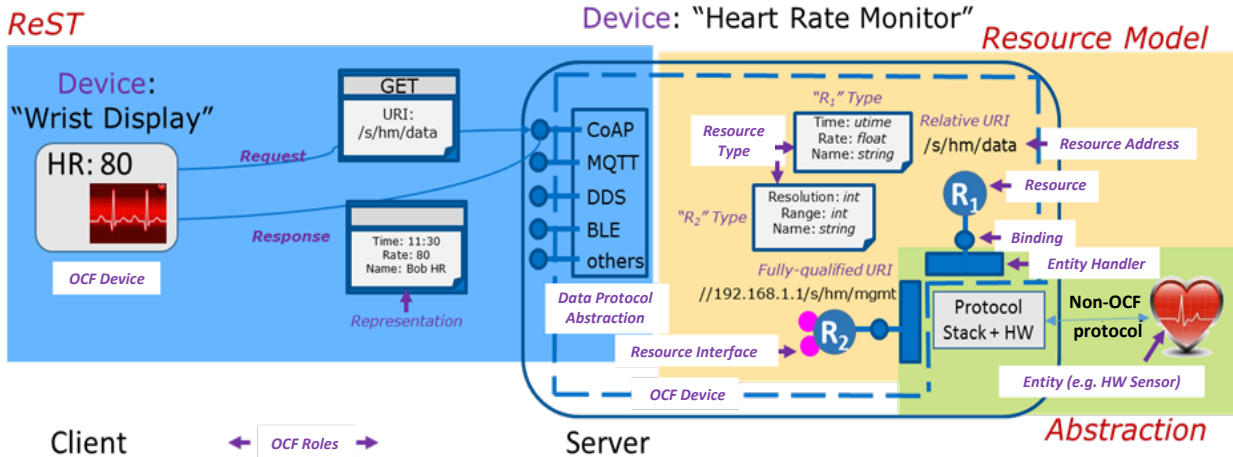
1014
1015

1016 **Figure 4: Example illustrating the Roles**

1017 **5.6 Example Scenario: Bridging to Non- OCF ecosystem**

1018 The use case for this scenario is a display (like a wrist watch) that is used to monitor a heart rate
1019 sensor that implements a protocol that is not OCF supported.

1020 Figure 5 provides a detailed logical view of the concepts described in Figure 1.

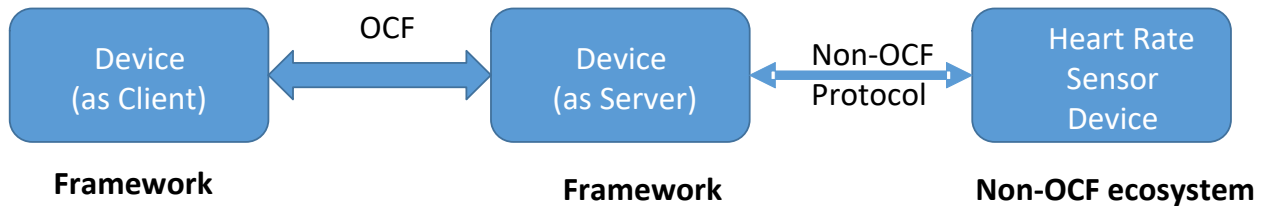


1021
1022

1023 **Figure 5: Framework - Architecture Detail**

1024

1025 The details may be implemented in many ways, for example, by using a Server with an entity handler to interface directly to a non- OCF device as shown in Figure 6.
1026



1027
1028

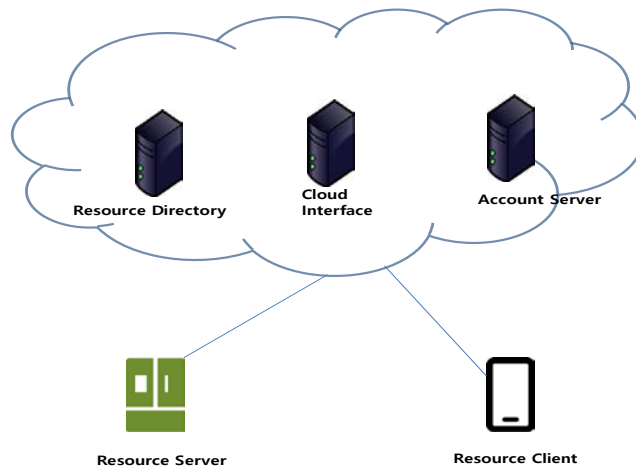
1029 **Figure 6: Server bridging to Non- OCF device**

1030 On start-up the Server runs the entity handlers which discover the non- OCF systems (e.g., Heart
1031 Rate Sensor Device) and create resources for each device or functionality discovered. The entity
1032 handler creates a Resource for each discovered device or functionality and binds itself to that
1033 Resource. These resources are made discoverable by the Server.

1034 Once the resources are created and made discoverable, then the Display Device can discover
1035 these resources and operate on them using the mechanisms described in this specification. The
1036 requests to a resource on the Server are then interpreted by the entity handler and forwarded to
1037 the non- OCF device using the protocol supported by the non-OCF device. The returned
1038 information from the non- OCF device is then mapped to the appropriate response for that resource.

1039 **5.7 OCF Cloud architecture**

1040 This section describes the architecture of OCF Cloud in Figure 7:



1041

1042

Figure 7: OCF Cloud deployment architecture

1043 The Cloud architecture comprises of following three network entities:

- 1044 • *Cloud Interface Server* – A logical entity to which an OCF Device primarily. It encapsulates
1045 Account Server and Resource Directory features. The Cloud Interface routes the packet
1046 between OCF Devices based on the request URI in the packet header. The Client needs to
1047 keep the persistent connection alive to the Server
- 1048 • *Account Server* – A logical entity that handles Device registration, Auth Token validation and
1049 handles sign-in and token-refresh requests from the Device.
- 1050 • *Resource Directory* – A logical entity holding resource information published by Servers. A
1051 Client when looking for a Resource receives a response from the Resource Directory on behalf
1052 of the Server. Then with information included in the response form the Resource Directory, the
1053 Client directly connects to the Server.

1054 When a Client try to access a Server, the Client connects to Cloud Interface Server then Cloud
1055 Interface routes the received message to the indicated Server after checking the privilege.

1056

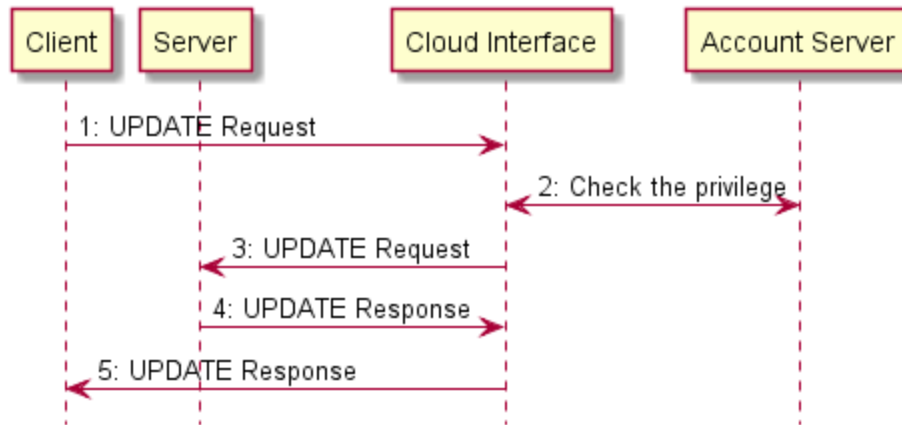


Figure 8: Endpoint routing

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

1089 are guaranteed to be unambiguous across all contexts and domains both spatially and temporally.
1090 The context-specific identifiers could be defined by simple schemes like monotonic enumeration
1091 or may be defined by overloading an address or name, for example an IP address may be an
1092 identifier within the private domain behind a gateway in a smart home. On the other hand, context-
1093 independent identifiers require a stronger scheme that derives universally unique identities, for
1094 example any one of the versions of Universally Unique Identifiers (UUIDs). Context independent
1095 identifier may also be generated using hierarchy of domains where the root of the hierarchy is
1096 identified with a UUID and sub-domains may generate context independent identifier by
1097 concatenating context-specific identifiers for that domain to the context-independent identifier of
1098 their parent.

1099 **6.2.1 Resource identification and addressing**

1100 A resource may be identified using a URI and addressed by the same URI if the URI is a URL. In
1101 some cases a resource may need an identifier that is different from a URI; in this case, the resource
1102 may have a property whose value is the identifier. When the URI is in the form of a URL, then the
1103 URI may be used to address the resource.

1104 An OCF URI is based on the general form of a URI as defined in IETF RFC 3986 as follows:

1105 `<scheme>://<authority>/<path>?<query>`

1106 Specifically the OCF URI is specified in the following form:

1107 `ocf://<authority>/<path>?<query>`

1108 A description of values that each component takes is given below.

1109 The *scheme* for the URI is 'ocf'. The 'ocf' scheme represents the semantics, definitions and use
1110 as defined in this document. If a URI has the portion preceding the '//' (double slash) omitted, then
1111 the 'ocf' scheme shall be assumed.

1112 Each transport binding is responsible for specifying how an OCF URI is converted to a transport
1113 protocol URI before sending over the network by the requestor. Similarly on the receiver side, each
1114 transport binding is responsible for specifying how an OCF URI is converted from a transport
1115 protocol URI before handing over to the resource model layer on the receiver.

1116 The authority of an OCF URI shall be the Device ID ("di") value, as defined in [OCF Security], of
1117 the Server.

1118 The *path* is a string that unambiguously identifies or references a resource within the context of
1119 the Server. In this version of the specification, a path shall not include pct-encoded non-ASCII
1120 characters or NUL characters. A *path* shall be preceded by a '/' (slash). The *path* may have '/'
1121 (slash) separated segments for human readability reasons. In the OCF context, the '/' (slash)
1122 separated segments are treated as a single string that directly references the resources (i.e. a flat
1123 structure) and not parsed as a hierarchy. On the Server, the path or some substring in the path
1124 may be shortened by using hashing or some other scheme provided the resulting reference is
1125 unique within the context of the host.

1126 Once a path is generated, a Client accessing the resource or recipient of the URI should use that
1127 path as an opaque string and should not parse to infer a structure, organization or semantic.

1128 A query string shall contain a list of <name>=<value> segments (aka "name-value pair") each
1129 separated by a '&' (ampersand). The query string will be mapped to the appropriate syntax of the
1130 protocol used for messaging. (e.g., CoAP).

1131 A URI may be either

- 1132 • Fully qualified or
- 1133 • Relative

1134 *Generation of URI:*

1135 A URI may be defined by the Client which is the creator of that resource. Such a URI may be
1136 relative or absolute (fully qualified). A relative URI shall be relative to the Device on which it is
1137 hosted. Alternatively, a URI may be generated by the Server of that resource automatically based
1138 on a pre-defined convention or organization of the resources, based on an interface, based on
1139 some rules or with respect to different roots or bases.

1140 *Use of URI:*

1141 The absolute path reference of a URI is to be treated as an opaque string and a Client should not
1142 infer any explicit or implied structure in the URI – the URI is simply an address. It is also
1143 recommended that Devices hosting a resource treat the URI of each resource as an opaque string
1144 that addresses only that resource. (e.g., URI's /a and /a/b are considered as distinct addresses
1145 and resource b cannot be construed as a child of resource a).

1146 **6.3 Namespace:**

1147 The relative URI prefix “/oic/” is reserved as a namespace for URIs defined in OCF specifications
1148 and shall not be used for URIs that are not defined in OCF specifications.

1149 **6.4 Network addressing**

1150 The following are the addresses used in this specification:

- 1151 • **IP address**

1152 An IP address is used when the device is using an IP configured interface.

1153 When a Device only has the identity information of its peer, a resolution mechanism is needed to
1154 map the identifier to the corresponding address.

1155 **7 Resource model**

1156 **7.1 Introduction**

1157 The Resource Model defines concepts and mechanisms that provide consistency and core
1158 interoperability between devices in the OCF ecosystems. The Resource Model concepts and
1159 mechanisms are then mapped to the transport protocols to enable communication between the
1160 devices – each transport provides the communication protocol interoperability. The Resource
1161 Model, therefore, allows for interoperability to be defined independent of the transports.

1162 In addition, the concepts in the Resource Model support modelling of the primary artefacts and
1163 their relationships to one and another and capture the semantic information required for
1164 interoperability in a context. In this way, OCF goes beyond simple protocol interoperability to
1165 capture the rich semantics required for true interoperability in Wearable and Internet of Things
1166 ecosystems.

1167 The primary concepts in the Resource Model are: Entity, Resources, Uniform Resource Identifiers
1168 (URI), Resource Types, Properties, Representations, Interfaces, Collections and Links. In addition,
1169 the general mechanisms are CREATE, RETRIEVE, UPDATE, DELETE and NOTIFY. These
1170 concepts and mechanisms may be composed in various ways to define the rich semantics and
1171 interoperability needed for a diverse set of use cases that the OCF framework is applied to.

1172 In the OCF Resource Model framework, an Entity needs to be visible, interacted with or
1173 manipulated, it is represented by an abstraction called a Resource. A Resource encapsulates and
1174 represents the state of an Entity. A Resource is identified, addressed and named using URIs.

1175 Properties are "key=value" pairs and represent state of the Resource. A snapshot of these
1176 Properties is the Representation of the Resource. A specific view of the Representation and the
1177 mechanisms applicable in that view are specified as Interfaces. Interactions with a Resource are
1178 done as Requests and Responses containing Representations.

1179 A resource instance is derived from a Resource Type. The uni-directional relationship between
1180 one Resource and another Resource is defined as a Link. A Resource that has Properties and
1181 Links is a Collection.

1182 A set of Properties can be used to define a state of a Resource. This state may be retrieved or
1183 updated using appropriate Representations respectively in the response from and request to that
1184 Resource.

1185 A Resource (and Resource Type) could represent and be used to expose a capability. Interactions
1186 with that Resource can be used to exercise or use that capability. Such capabilities can be used
1187 to define processes like discovery, management, advertisement etc. For example: "discovery of
1188 resources on a device" can be defined as the retrieval of a representation of a specific resource
1189 where a property or properties have values that describe or reference the resources on the device.

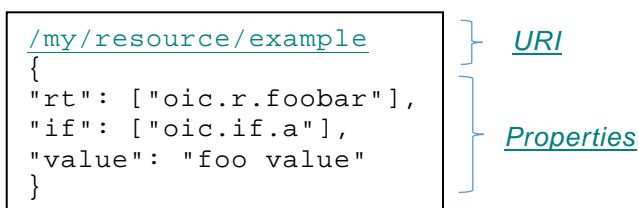
1190 The information for Request or Response with the Representation may be communicated "on the
1191 wire" by serializing using a transfer protocol or encapsulated in the payload of the transport
1192 protocol – the specific method is determined by the normative mapping of the Request or Response
1193 to the transport protocol. See section 11.8 for transport protocols supported.

1194 The RAML definitions used in this document are normative. This also includes that all defined
1195 JSON payloads shall comply with the indicated JSON schema. See Annex D for Resource Types
1196 defined in this specification.

1197 **7.2 Resource**

1198 A Resource shall be defined by one or more Resource Type(s) – see Annex D for Resource Type.
1199 A request to CREATE a Resource shall specify one or more Resource Types that define that
1200 Resource.

1201 A Resource is hosted in a Device. A Resource shall have a URI as defined in section 6. The URI
1202 may be assigned by the Authority at the creation of the Resource or may be pre-defined by the
1203 specification of the Resource Type.



1204
1205 Core Resources are the Resources defined in this specification to enable functional interactions
1206 as defined in section 10 (e.g., Discovery, Device Management, etc). Among the Core Resources,
1207 "/oic/res", "/oic/p", and "/oic/d" shall be supported on all Devices. Devices may support other Core
1208 Resources depending on the functional interactions they support.

1209 7.3 Property

1210 7.3.1 Introduction

1211 A Property describes an aspect that is exposed through a Resource including meta-information
1212 related to that resource.

1213 A Property shall have a name i.e. Property Name and a value i.e. Property Value. The Property is
1214 expressed as a key-value pair where key is the Property Name and value the Property Value like
1215 <Property Name> = <Property Value>. For example if the “temperature” Property has a Property
1216 Name “temp” and a Property Value “30F”, then the Property is expressed as “temp=30F”. The
1217 specific format of the Property depends on the encoding scheme. For example, in JSON, Property
1218 is represented as "key": value (e.g., "temp": 30).

1219 In addition, the Property definition shall have a

- 1220 • **Value Type** – the Value Type defines the values that a Property Value may take. The Value
1221 Type may be a simple data type (e.g. string, Boolean) as defined in section 3.4 or may be a
1222 complex data type defined with a schema. The Value Type may define
 - 1223 ○ Value Rules define the rules for the set of values that the Property Value may take.
1224 Such rules may define the range of values, the min-max, formulas, the set of
1225 enumerated values, patterns, conditional values, and even dependencies on values
1226 of other Properties. The rules may be used to validate the specific values in a
1227 Property Value and flag errors.
- 1228 • **Mandatory** – specifies if the Property is mandatory or not for a given Resource Type.
- 1229 • **Access modes** – specifies whether the Property may be read, written or both. Updates are
1230 equivalent to a write. “r” is used for read and “w” is used for write – both may be specified.
1231 Write does not automatically imply read.

1232 The definition of a Property may include the following additional information – these items are
1233 informative:

- 1234 • **Property Title** - a human-friendly name to designate the Property; usually not sent over the
1235 wire
- 1236 • **Description** – descriptive text defining the purpose and expected use of this Property.

1237 In general, a Property is meaningful only within the Resource to which it is associated. However a
1238 base set of Properties that may be supported by all Resources, known as Common Properties,
1239 keep their semantics intact across Resources i.e. their “key=value” pair means the same in any
1240 Resource. Detailed tables with the above fields for all Common Properties are defined in section
1241 7.3.2.

1242 7.3.2 Common Properties

1243 7.3.2.1 Introduction

1244 The Common Properties defined in this section may be specified for all Resources. The following
1245 Properties are defined as Common Properties: “Resource Type”, “Resource Interface”, “Name”,
1246 and “Resource Identity”.

1247 The name of a Common Property shall be unique and shall not be used by other properties. When
1248 defining a new Resource Type, its non-common properties shall not use the name of existing
1249 Common Properties (e.g., “rt”, “if”, “n”, “id”). When defining a new “Common Property”, it should
1250 be ensured that its name has not been used by any other properties. The uniqueness of a new
1251 Common Property name can be verified by checking all the Properties of all the existing OCF
1252 defined Resource Types. However, this may become cumbersome as the number of Resource
1253 Types grow. To prevent such name conflicts in the future, OCF may reserve a certain name space
1254 for common property. Potential approaches are (1) a specific prefix (e.g. “oic”) may be designated

1255 and the name preceded by the prefix (e.g. "oic.psize") is only for Common Property; (2) the names
 1256 consisting of one or two letters are reserved for Common Property and all other Properties shall
 1257 have the name with the length larger than the 2 letters; (3) Common Properties may be nested
 1258 under specific object to distinguish themselves.

1259 The ability to UPDATE a Common Property (that supports write as an access mode) is restricted
 1260 to the "oic.if.rw" (read-write) Interface; thus a Common Property shall be updatable using the read-
 1261 write Interface if and only if the Property supports write access as defined by the Property definition
 1262 and the associated schema for the read-write Interface.

1263 The following Common Properties for all Resources are specified in section 7.3.2.2 through section
 1264 7.3.2.6 and summarized as follows:

- 1265 • Resource Type ("rt") – this Property is used to declare the Resource Type of that Resource.
 1266 Since a Resource could be define by more than one Resource Type the Property Value of the
 1267 Resource Type Property can be used to declare more than one Resource type. For example:
 1268 "rt": ["oic.wk.d", "oic.d.airconditioner"] declares that the Resource containing this Property is
 1269 defined by either the "oic.wk.d" Resource Type or the "oic.d.airconditioner" Resource Type.
 1270 See section 7.3.2.3 for details.
- 1271 • Interface ("if") – this Property declares the Interfaces supported by the Resource. The Property
 1272 Value of the Interface Property can be multi-valued and lists all the Interfaces supported. See
 1273 section 7.3.2.4 for details.
- 1274 • Name ("n") – the Property declares "human-readable" name assigned to the Resource. See
 1275 section 7.3.2.5.
- 1276 • Resource Identity ("id"): its Property Value shall be a unique (across the scope of the host
 1277 Server) instance identifier for a specific instance of the Resource. The encoding of this identifier
 1278 is device and implementation dependent. See section 7.3.2.6 for details.

1279 7.3.2.2 Property Name and Property Value definitions

1280 The Property Name and Property Value as used in this specification:

- 1281 • **Property Name**– the key in "key=value" pair. Property Name is case sensitive and its data type
 1282 is "string". Property names shall contain only letters A to Z, a to z, digits 0 to 9, hyphen, and
 1283 dot, and shall not begin with a digit.
- 1284 • **Property Value** – the value in "key=value" pair. Property Value is case sensitive when its data
 1285 type is "string".

1286 7.3.2.3 Resource Type

1287 Resource Type Property is specified in section 7.4.

1288 7.3.2.4 Interface

1289 Interface Property is specified in section 7.5.

1290 7.3.2.5 Name

1291 A human friendly name for the Resource, i.e. a specific resource instance name (e.g.,
 1292 MyLivingRoomLight), The Name Property is as defined in Table 2

1293 **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.

1294 The 'Name' Property is read-write unless otherwise restricted by the Resource Type (i.e. the
1295 Resource Type does not support UPDATE or does not support UPDATE using read-write).

1296 **7.3.2.6 Resource Identity**

1297 The Resource Identity Property shall be a unique (across the scope of the host Server) instance
1298 identifier for a specific instance of the Resource. The encoding of this identifier is device and
1299 implementation dependent as long as the uniqueness constraint is met, noting that an
1300 implementation may use a uuid as defined in section 3.4. The Resource Identity Property is as
1301 defined in Table 3.

1302 **Table 3. Resource Identity Property Definition**

1303

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)

1304

1305 **7.4 Resource Type**

1306 **7.4.1 Introduction**

1307 Resource Type is a class or category of Resources and a Resource is an instance of one or more
1308 Resource Types.

1309 The Resource Types of a Resource is declared using the Resource Type Common Property as
1310 described in section 7.3.2.3 or in a Link using the Resource Type Parameter.

1311 A Resource Type may either be pre-defined by OCF or in custom definitions by manufacturers,
1312 end users, or developers of Devices (vendor-defined Resource Types). Resource Types and their
1313 definition details may be communicated out of band (i.e. in documentation) or be defined explicitly
1314 using a meta-language which may be downloaded and used by APIs or applications. OCF has
1315 adopted RAML and JSON Schema as the specification method for OCF's RESTful interfaces and
1316 Resource definitions.

1317 Every Resource Type shall be identified with a Resource Type ID which shall be represented using
1318 the requirements and ABNF governing the Resource Type attribute in IETF RFC 6690(section 2
1319 for ABNF and section 3.1 for requirements) with the caveat that segments are separated by a "."
1320 (period). The entire string represents the Resource Type ID. When defining the ID each segment
1321 may represent any semantics that are appropriate to the Resource Type. For example, each
1322 segment could represent a namespace. Once the ID has been defined, the ID should be used
1323 opaquely and an implementations should not infer any information from the individual segments.
1324 The string "oic", when used as the first segment in the definition of the Resource Type ID, is
1325 reserved for OCF-defined Resource Types. All OCF defined Resource Types are to be registered
1326 with the IANA Core Parameters registry as described also in IETF RFC 6690.

1327 **7.4.2 Resource Type Property**

1328 A Resource when instantiated or created shall have one or more Resource Types that are the
1329 template for that Resource. The Resource Types that the Resource conforms to shall be declared
1330 using the "rt" Common Property for the Resource. The Property Value for the "rt" Common Property
1331 shall be the list of Resource Type IDs for the Resource Types used as templates (i.e., "rt"=<list of
1332 Resource Type IDs>).

1333

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

1334 Resource Types may be explicitly discovered or implicitly shared between the user (i.e. Client) and
 1335 the host (i.e. Server) of the Resource.

1336 **7.4.3 Resource Type definition**

1337 Resource Type is specified as follows:

- 1338 • **Pre-defined URI** (optional) – a pre-defined URI may be specified for a specific Resource Type
 1339 in an OCF specification. When a Resource Type has a pre-defined URI, all instances of that
 1340 Resource Type shall use only the pre-defined URI. An instance of a different Resource Type
 1341 shall not use the pre-defined URI.
- 1342 • **Resource Type Title (optional)** – a human friendly name to designate the Resource Type.
- 1343 • **Resource Type ID** – the value of "rt" property which identifies the Resource Type, (e.g.,
 1344 "oic.wk.p").
 - 1345 • **Resource Interfaces** – list of the interfaces that may be supported by the Resource Type.
 - 1346 • **Resource Properties** – definition of all the properties that apply to the Resource Type. The
 1347 Resource Type definition shall define whether a property is mandatory, conditional mandatory,
 1348 or optional.
 - 1349 • **Related Resource Types** (optional) – the specification of other Resource Types that may be
 1350 referenced as part of the Resource Type, applicable to collections.
 - 1351 • **Mime Types** (optional) – mime types supported by the resource including serializations (e.g.,
 1352 application/cbor, application/json, application/xml).

1353 Table 5 and Table 6 provide an example description of an illustrative foobar Resource Type and
 1354 its associated Properties.

1355 **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

1356 **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

1357
 1358 An instance of the foobar Resource Type is as shown below


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

1359

1360 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"]
  }
}
```

1361

1362 7.4.4 Multi-value "rt" Resource

1363 Multi-value "rt" Resource means a Resource with multiple Resource Types. Such a Resource is
1364 associated with multiple Resource Types and so has an "rt" Property Value of multiple Resource
1365 Type IDs (e.g. "rt": ["oic.r.switch.binary", "oic.r.light.brightness"]). The order of the Resource Type
1366 IDs in the "rt" Property Value is meaningless. For example, "rt": ["oic.r.switch.binary",
1367 "oic.r.light.brightness"] and "rt": ["oic.r.light.brightness", "oic.r.switch.binary"] have the same
1368 meaning.

1369 Resource Types for multi-value "rt" Resources shall satisfy the following conditions.

- 1370 • **Property Name** – Property Names for each Resource Type shall be unique (within the scope
1371 of the multi-value "rt" Resource) with the exception of Common Properties, otherwise there will
1372 be conflicting Property semantics. If two Resource Types have a Property with the same
1373 Property Name, a multi-value "rt" Resource shall not be composed of these Resource Types.

1374 A multi-value "rt" Resource satisfies all the requirements for each Resource Type and conforms to
1375 the RAML/JSON definitions for each component Resource Type. Thus the mandatory Properties
1376 of a multi-value "rt" Resource shall be the union of all the mandatory Properties of each Resource

1377 Type. For example, mandatory Properties of a Resource with "rt": ["oic.r.switch.binary",
1378 "oic.r.light.brightness"] are "value" and "brightness", where the former is mandatory for
1379 "oic.r.switch.binary" and the latter for "oic.r.light.brightness".

1380 The multi-value "rt" Resource Interface set shall be the union of the sets of interfaces from the
1381 component Resource Types. The Resource Representation in response to a CRUDN action on an
1382 Interface shall be the union of the schemas that are defined for that Interface. The Default Interface
1383 for a multi-value "rt" Resource shall be the baseline Interface ("oic.if.baseline") as that is the only
1384 guaranteed common Interface between the Resource Types.

1385 For clarity if each Resource Type supports the same set of Interfaces, then the resultant multi-
1386 value "rt" Resource has that same set of Interfaces with a Default Interface of baseline
1387 ("oic.if.baseline").

1388 See section 7.10.3 for the handling of query parameters as applied to a multi-value "rt" Resource.

1389 **7.5 Device Type**

1390 A Device Type is a class of Device. Each Device Type defined will include a list of minimum
1391 Resource Types that a device shall implement for that Device Type. A device may expose
1392 additional standard and vendor defined Resource Types beyond the minimum list. The Device
1393 Type is used in Resource discovery as specified in section 11.3.4.

1394 Like a Resource Type, a Device Type can be used in the Resource Type Common Property or in
1395 a Link using the Resource Type Parameter.

1396 A Device Type may either be pre-defined (in the OCF Device specification) or in custom definitions
1397 by manufacturers, end users, or developers of Devices (vendor-defined Device Types). Device
1398 Types and their definition details may be communicated out of band (like in documentation).

1399 Every Device Type shall be identified with a Resource Type ID using the same syntax constraints
1400 as a Resource Type.

1401 **7.6 Interface**

1402 **7.6.1 Introduction**

1403 An Interface provides first a view into the Resource and then defines the requests and responses
1404 permissible on that view of the Resource. So this view provided by an Interface defines the context
1405 for requests and responses on a Resource. Therefore, the same request to a Resource when
1406 targeted to different Interfaces may result in different responses.

1407 An Interface may be defined by either this specification (a Core Interface), the OCF Device
1408 specifications (a "vertical Interface") or manufacturers, end users or developers of Devices (a
1409 "vendor-defined Interface").

1410 The Interface Property lists all the Interfaces the Resource support. All resources shall have at
1411 least one Interface. The Default Interface shall be defined by an OCF specification and inherited
1412 from the Resource Type definition. The Default Interface associated with all Resource Types
1413 defined in this specification shall be the supported Interface listed first within the applicable
1414 enumeration in the definition of the Resource Type (see Annex D). All Default Interfaces specified
1415 in an OCF specification shall be mandatory.

1416 In addition to any OCF specification defined interface, all Resources shall support the Baseline
1417 Interface ("oic.if.baseline") as defined in section 7.6.3.2.

1418 See section 7.10.4 for the use of queries to enable selection of a specific interface in a request.

1419 An Interface may accept more than one media type. An Interface may respond with more than one
 1420 media type. The accepted media types may be different from the response media types. The media
 1421 types are specified with the appropriate header parameters in the transfer protocol. (NOTE: This
 1422 feature has to be used judiciously and is allowed to optimize representations on the wire) Each
 1423 Interface shall have at least one media type.

1424

1425 7.6.2 Interface Property

1426

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.

1427 The Interfaces supported by a Resource shall be declared using the Interface Common Property
 1428 (Table 7) as "if=<array of Interfaces>". The Property Value of an Interface Property shall be a
 1429 lower case string with segments separated by a "." (dot). The string "oic", when used as the first
 1430 segment in the Interface Property Value, is reserved for OCF-defined Interfaces. The Interface
 1431 Property Value may also be a reference to an authority similar to IANA that may be used to find
 1432 the definition of an Interface. A Resource Type shall support one or more of the Interfaces defined
 1433 in section 7.6.3.

1434 7.6.3 Interface methods

1435 7.6.3.1 Overview

1436 The OCF -defined Interfaces are listed in the table below:

1437

Table 8. OCF standard Interfaces

Interface	Name	Applicable Methods	Description
baseline	"oic.if.baseline"	RETRIEVE, 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	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, 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	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, 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"	CREATE, RETRIEVE, UPDATE	The actuator Interface is used to read or write the Properties of an actuator Resource.
sensor	"oic.if.s"	RETRIEVE	The sensor Interface is used to read the Properties of a sensor Resource.

1438

1439 **7.6.3.2 Baseline Interface**

1440 **7.6.3.2.1 Overview**

1441 The Representation that is visible using the "baseline" Interface includes all the Properties of the
 1442 Resource including the Common Properties. The "baseline" Interface shall be defined for all
 1443 Resource Types. All Resources shall support the "baseline" Interface.

1444 **7.6.3.2.2 Use of RETRIEVE**

1445 The "baseline" Interface is used when a Client wants to retrieve all Properties of a Resource; that
 1446 is the Server shall respond with a Resource representation that includes all of the implemented
 1447 Properties of the Resource. When the Server is unable to send back the whole Resource
 1448 representation, it shall reply with an error message. The Server shall not return a partial Resource
 1449 representation.

1450 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]
}

```

1451

1452 **7.6.3.2.3 Use of UPDATE**

1453 Using the baseline Interface, all Properties of a Resource with the exception of Common Properties
 1454 may be modified using an UPDATE request with a list of Properties and their desired values if a
 1455 Resource Type has an associated schema for UPDATE using baseline. If the Interfaces exposed
 1456 by a Resource in addition to the baseline Interface do not support the UPDATE semantic then
 1457 UPDATE using the baseline Interface is also not supported.

1458 **7.6.3.3 Link List Interface**

1459 **7.6.3.3.1 Overview**

1460 The links list Interface provides a view into the list of Links in a Collection (Resource). The
 1461 Representation visible through this Interface has only the Links defined in the Property Value of
 1462 the "links" Property – so this Interface is used to manipulate or interact with the list of Links in a
 1463 Collection. The Links list may be RETRIEVED using this Interface.

1464 The Interface definition and semantics are given as follows:

- 1465 • The links list Interface name shall be "oic.if.ll".
- 1466 • If specified in a request (usually in the request header), the serialization in the response shall
 1467 be in the format expected in the request.
- 1468 • In response to a RETRIEVE request on the "links list" Interface, the URIs of the referenced
 1469 Resources shall be returned as a URI reference.

- 1470 • If there are no links present in a Resource, then an empty list shall be returned.
- 1471 • The Representation determined by this Interface depends on the requesting Client. For a Client
- 1472 that includes an OCF-Accept-Content-Format-Version option as defined in section 12.2.5 in
- 1473 the request the response only includes the Property Value of the “links” Property, hence a
- 1474 Collection or /oic/res response with oic.if.ll is an array of OCF Links. For a Client that does not
- 1475 include an OCF-Accept-Content-Format-Version option the response is as defined in E.5.

1476 7.6.3.3.2 Example: “links list” Interface

1477 Example: Request to a Collection

<p>Request to RETRIEVE the Links in room</p> <p>(the Links could be referencing lights, fans, electric sockets etc)</p>	<pre>GET ocf://<devID>/a/room/1?if=oic.if.ll The response would be the array of OCF Links [{ "href": "/the/light/1", "rt": ["oic.r.switch.binary"], "if": ["oic.if.a", "oic.if.baseline"], "eps": [{"ep": "coaps://[2001:db8:a::b1d4]:55555"}] }, { "href": "/the/light/2", "rt": ["oic.r.switch.binary"], "if": ["oic.if.a", "oic.if.baseline"], "eps": [{"ep": "coaps://[2001:db8:a::b1d4]:55555"}] }, { "href": "/my/fan/1", "rt": ["oic.r.switch.binary"], "if": ["oic.if.a", "oic.if.baseline"], "eps": [{"ep": "coaps://[2001:db8:a::b1d4]:55555"}] }]</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]:55555" }] </pre>
--	--

1478

1479 **7.6.3.4 Batch Interface**

1480 **7.6.3.4.1 Overview**

1481 The batch Interface is used to interact with a collection of Resources using a single/same Request.
 1482 The batch Interface can be used to RETRIEVE or UPDATE the Properties of the "linked"
 1483 Resources with a single request.

1484 The batch Interface is defined as follows:

- 1485 • The batch Interface name is "oic.if.b"
- 1486 • A Collection Resource has linked Resources that are represented as URIs. In the "href"
 1487 Property of the batch payload the URI shall be fully qualified for remote Resources and a
 1488 relative reference for local Resources.
- 1489 • The original request is modified to create new requests targeting each of the linked Resources
 1490 in the Collection by substituting the URI in the original request with the URI of the linked
 1491 Resource. The payload in the original request is replicated in the payload of the new requests.
- 1492 • The requests shall be forwarded assuming use of the Default Interface of the linked Resources
 1493 unless otherwise stated.
- 1494 • Requests shall only be forwarded to linked Resources that are identified by relation types "item"
 1495 or "hosts" ("hosts" is the default relation type should the "rel" Link Parameter not be present).
 1496 Requests shall not be forwarded to linked Resources that do not contain the "item" or "hosts"
 1497 relation type values.
- 1498 • The Collection itself may be included in the batch response by exposing a single Link with the
 1499 link relation "self" along with "item" within the Collection (i.e. "rel": ["self","item"], see also the
 1500 example in section 7.6.3.4.2) and ensuring that the "if" Link Parameter of the "self" Link
 1501 contains an Interface(s) that do(-es) not expose the "links" Property, i.e. "oic.if.b" and not
 1502 "oic.if.baseline" or "oic.if.ll", otherwise Link resolution becomes an infinite loop.
- 1503 • Any request forwarded to a linked Resource that is also a Collection (including a "self" Link)
 1504 shall also have the batch Interface applied.
- 1505 • All the responses from the linked Resources shall be aggregated into a single Response to the
 1506 Client. The Server may timeout the response to a time window, the Server may choose any
 1507 appropriate window based on conditions.
- 1508 • If a linked Resource cannot process the request, an empty response, i.e. a JSON object with
 1509 no content ("{}") as the representation for the "rep" Property, or error response should the
 1510 linked Resource Type provide an error schema or diagnostic payload, shall be returned by the
 1511 linked Resource. These empty or error responses for all linked Resources that exhibit an error

1512 shall be included in the aggregated response to the original Client request. See the example
1513 in section 7.6.3.4.2.

- 1514 • If any of the linked Resources returns an error response, the aggregated response sent to the
1515 Client shall also indicate an error (e.g. 4.xx in CoAP). If any of the other linked Resources
1516 returns a successful response, the aggregated response payload shall include that success
1517 response payload.
- 1518 • The aggregated response shall be an array of objects representing the responses from each
1519 linked Resource. Each object in the response shall include at least two items: (1) the URI of
1520 the linked Resource (fully qualified for remote Resources, or a relative reference for local
1521 Resources) as "href": <URI> and (2) the individual response object or array of objects if the
1522 linked Resource is itself a Collection using "rep" as the key, e.g. "rep": { < representation of
1523 individual response> }.
- 1524 • Linked Resources referenced in the Collection may be observed using the batch Interface. The
1525 observe mechanism shall work as defined in 11.4.2 with the observe request forwarded to each
1526 of the linked Resources. All responses to the request shall be aggregated into a single
1527 response to the Client using the same representations and status codes as for RETRIEVE
1528 operations using the batch Interface.
- 1529 • Should any one of the observable linked Resources fail to honour the observe request the
1530 response to the batch observe request shall also indicate that the entire request was not
1531 honoured using the mechanism described in section 11.4.2.3; in this error case the individual
1532 successful observe requests shall be cancelled as described in section 11.4.2.6.
- 1533 • All notifications to the Client that initiated an observe request using the batch Interface shall
1534 use the batch representation for the Collection. This is the aggregation of any individual
1535 observe notifications received by the Device hosting the Collection from the individual observe
1536 requests that were forwarded to the linked Resources.
- 1537 • The Collection itself may be observed by using the links list or baseline Interfaces.
- 1538 • The Client may choose to restrict the linked Resources to which the request is forwarded by
1539 including additional query parameters in the request. The Server should process any additional
1540 query parameters in a request that includes "oic.if.b" as selectors for linked Resources that are
1541 to be processed by the request.
- 1542 • A Client shall perform UPDATE operations using the batch Interface by creating a payload that
1543 is similar to a RETRIEVE response payload from a batch Interface request. The Server shall
1544 send a separate UPDATE request to each of the linked Resources according to each "href"
1545 Property and the corresponding value of the "rep" Property.
- 1546 • If the "href" value is empty, denoted by a zero length string or "" in JSON, the "rep" Property
1547 shall be applied to linked Resources in the Collection.
- 1548 • Items with the empty "href" and link-specific "href" shall not be mixed in the same UPDATE
1549 request.
- 1550 • All of the Properties in the UPDATE request may not be supported by the linked Resource. In
1551 such cases, writable Properties in the UPDATE request that are supported by the linked
1552 Resource shall be modified and Properties that are not supported shall be silently ignored.
- 1553 • The UPDATE response shall contain the updated values using the same payload schema as
1554 RETRIEVE operations if provided by the linked Resource, along with the appropriate status
1555 code. The aggregated response payload shall reflect the known state of the updated Resource
1556 Properties after the batch update was completed. If no payload is provided by the updated
1557 Resource then an empty response (i.e. "rep": {}) shall be provided for that Resource.

1558 **7.6.3.4.2 Examples: Batch Interface**

1559 Note that the examples provided are illustrative and do not include all mandatory schema elements
1560 in all cases.

Resources	<pre> /a/room/1 { "rt": ["oic.wk.col", "x.org.example.rt.room"], "if": ["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": ["oic.wk.col", "x.org.example.rt.room"], "if": ["oic.if.b"], "p": {"bm": 2} }, { "href": "/the/light/1", "rel": ["item"], "rt": ["oic.r.switch.binary"], "if": ["oic.if.a", "oic.if.baseline"], "ins": "11111", "p": {"bm": 2} }, { "href": "/the/light/2", "rel": ["item"], "rt": ["oic.r.switch.binary"], "if": ["oic.if.a", "oic.if.baseline"], "ins": "22222", "p": {"bm": 2} }, { "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 } </pre>
-----------	--


```
/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
}

/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}
    }
  ]
}
```

	<pre> } { "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> <p>GET /a/room/1 (NOTE: uses the batch Interface as specified for batch requests sent to Collections)</p> <p>GET /the/light/1 (NOTE: Uses the Default Interface as specified for this resource)</p> <p>GET /the/light/2 (NOTE: Uses the Default Interface as specified for this resource)</p> <p>GET /my/fan/1 (NOTE: Uses the Default Interface as specified for this resource)</p> <p>GET /his/fan/2 (NOTE: Uses the Default Interface as specified for this resource)</p> <p>GET /the/switches/1?rt=oic.if.b (NOTE: Uses the batch Interface for the Collection that is within the Collection)</p> <p>Response:</p> <pre> [{ "href": "/a/room/1", "rep": {"x.org.example.colour": "blue", "x.org.example.dimension": "15bx15wx10h"} }, { "href": "/the/light/1", </pre>

	<pre> "rep": {"value": false} }, { "href": "/the/light/2", "rep": {"value": true} }, { "href": "/my/fan/1", "rep": {"value": true} }, { "href": "/his/fan/2", "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> [{ </pre>

	<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} }, { "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 (UPDATE has POST semantics)</p>	<pre> UPDATE /a/room/1?if=oic.if.b [{ "href": "/the/light/1", "rep": { "value": false } }, { "href": "/the/light/2", "rep": { "value": true } }, { "href": "/a/room/1", "rep": { "x.org.example.colour": "red" } }] </pre> <p>This turns /the/light/1 off, turns /the/light/2 on, and sets the colour of /a/room/1 to "red".</p> <p>The response will be same as response for GET /a/room/1?if=oic.if.b with the updated Property values as shown below.</p> <pre> [{ "href": "/a/room/1", "rep": {"x.org.example.colour": "red", "x.org.example.dimension": "15bx15wx10h"} }, </pre>

```

{
  "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
    }
  }
]

```

1562 **7.6.3.5 Actuator Interface**

1563 The actuator Interface is the Interface for viewing Resources that may be actuated i.e. changes
1564 some value within or the state of the entity abstracted by the Resource:

- 1565 • The actuator Interface name shall be "oic.if.a"
- 1566 • The actuator Interface shall expose in the Resource Representation all mandatory Properties
1567 as defined by the applicable JSON; the actuator interface may also expose in the Resource
1568 Representation optional Properties as defined by the applicable JSON schema that are
1569 implemented by the target Device.

1570 "Heater" Resource (for illustration only):

```
For the following Resource

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

/a/act/heater
{
  "rt": ["acme.gas"],
  "if": ["oic.if.baseline", "oic.if.r", "oic.if.a", "oic.if.s"],
  "prm": {"sensitivity": 5, "units": "C", "range": [0,10],
  "settemp": 10,
  "currenttemp" : 7
}
```

1571 "Actuator" interface in respect to "Heater" Resource (for illustration only):
1572
1573

```
1. Retrieving values of an actuator

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

Response:
{
  "prm": {"sensitivity": 5, "units": "C", "range": [0,10]},
  "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
  }
```

1574

- 1575 • A RETRIEVE request using this Interface shall return the Representation for this Resource
1576 subject to any query and filter parameters that may also exist
- 1577 • An UPDATE request using this Interface shall provide a payload or body that contains the
1578 Properties that will be updated on the target Resource.

1579 7.6.3.6 Sensor Interface

1580 The sensor Interface is the Interface for retrieving measured, sensed or capability specific
1581 information from a Resource that senses:

- 1582 • The sensor Interface name shall be "oic.if.s"
- 1583 • The sensor Interface shall expose in the Resource Representation all mandatory Properties as
1584 defined by the applicable JSON; the sensor interface may also expose in the Resource
1585 Representation optional Properties as defined by the applicable JSON schema that are
1586 implemented by the target Device.
- 1587 • A RETRIEVE request using this Interface shall return this Representation for the Resource
1588 subject to any query and filter parameters that may also exist
- 1589 •

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

```
{
```



```
Interface      "currenttemp": 15 ← this is possible through actuator
Response:     }
              {
              Error
              }
```

1590

1591 7.6.3.7 Read-only Interface

1592 The read-only Interface exposes only the Properties that may be “read”. This includes Properties
1593 that may be “read-only”, “read-write” but not Properties that are “write-only” or “set-only”. The
1594 applicable methods that can be applied to a Resource is RETRIEVE only. An attempt by a Client
1595 to apply a method other than RETRIEVE to a Resource shall be rejected with an error response
1596 code.

1597 7.6.3.8 Read-write Interface

1598 The read-write Interface exposes only the Properties that may be “read” and “written”. The “read-
1599 only” Properties shall not be included in Representation for the “read-write” Interface. This is a
1600 generic Interface to support “reading” and “setting” Properties in a Resource. The applicable
1601 methods that can be applied to a Resource are RETRIEVE and UPDATE only. An attempt by a
1602 Client to apply a method other than RETRIEVE or UPDATE to a Resource shall be rejected with
1603 an error response code.

1604 7.7 Resource representation

1605 Resource representation captures the state of a Resource at a particular time. The resource
1606 representation is exchanged in the request and response interactions with a Resource. A Resource
1607 representation may be used to retrieve or update the state of a resource.

1608 The resource representation shall not be manipulated by the data connectivity protocols and
1609 technologies (e.g., CoAP, UDP/IP or BLE).

1610 7.8 Structure

1611 7.8.1 Introduction

1612 In many scenarios and contexts, the Resources may have either an implicit or explicit structure
1613 between them. A structure can, for example, be a tree, a mesh, a fan-out or a fan-in. The
1614 Framework provides the means to model and map these structures and the relationships among
1615 Resources. The primary building block for resource structures in Framework is the collection. A
1616 collection represents a container, which is extensible to model complex structures.

1617 7.8.2 Resource Relationships

1618 Resource relationships are expressed as Links. A Link embraces and extends typed web links
1619 concept as a means of expressing relationships between Resources. A Link consists of a set of
1620 Parameters that define:

- 1621 • a context URI,
- 1622 • a target URI,
- 1623 • a relation from the context URI to the target URI
- 1624 • elements that provide metadata about the target URI, the relationship or the context of the Link.

1625 The target URI is mandatory and the other items in a Link are optional. Additional items in the Link
1626 may be made mandatory based on the use of the links in different contexts (e.g. in collections, in
1627 discovery, in bridging etc.). Schema for the Link payload is provided in Annex D.

1628 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" }
```

1629 Two Links are distinct from each other when at least one parameter is different. For example the
1630 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}}
```

1631 The specification may mandate Parameters and Parameter values as required for certain
1632 capabilities. For all Links returned in a response to a RETRIEVE on "/oic/res", if a Link does not
1633 explicitly include the "rel" Parameter, a value of "rel"="hosts" shall be assumed. The relation value
1634 of "hosts" is defined by IETF RFC 6690, the value of "item" by IETF RFC 6573, and the value of
1635 "self" by IETF RFC 4287 and all are registered in the IANA Registry for Link Relations defined in
1636 IANA Link Relations.

1637 As shown in D.2.8 the relation between the context URI and target URI in a Link is specified using
1638 the "rel" JSON element and the value of this element specifies the particular relation.

1639 The context URI of the Link shall implicitly be the URI of the Resource (or specifically a Collection)
1640 that contains the Link unless the Link specifies the anchor parameter. The anchor parameter is
1641 used to change the context URI of a Link – the relationship with the target URI is based off the
1642 anchor URI when the anchor is specified. Anchor parameter uses transfer protocol URI for OIC 1.1
1643 Link (e.g. "anchor": "coaps://[fe80::b1d6]:44444") and OCF URI defined in Sec 6 for OCF 1.0 Links
1644 (e.g. "anchor": "ocf://dc70373c-1e8d-4fb3-962e-017eaa863989").

1645 An example of using anchors in the context of Collections – a floor has rooms and rooms have
1646 lights – the lights may be defined in floor as Links but the Links will have the anchor set to the URI
1647 of the rooms that contain the lights (the relation is contains). This allows all lights in a floor to be
1648 turned on or off together while still having the lights defined with respect to the rooms that contain
1649 them (lights may also be turned on by using the room URI too). See example use of anchor in
1650 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"
    }
  ]
}

```

1651

1652 **7.8.2.1 Parameters**

1653 **7.8.2.1.1 "ins" or Link Instance Parameter**

1654 The "ins" parameter identifies a particular Link instance in a list of Links. The "ins" parameter may
 1655 be used to modify or delete a specific Link in a list of Links. The value of the "ins" parameter is set
 1656 at instantiation of the Link by the OCF Device (Server) that is hosting the list of Links – once it has
 1657 been set, the "ins" parameter shall not be modified for as long as the Link is a member of that list.

1658 **7.8.2.1.2 "p" or Policy Parameter**

1659 The Policy Parameter defines various rules for correctly accessing a Resource referenced by a
 1660 target URI. The Policy rules are configured by a set of key-value pairs as defined below.

1661 The policy Parameter "p" is defined by:

- 1662 • "bm" key: The "bm" key corresponds to an integer value that is interpreted as an 8-bit bitmask.
 1663 Each bit in the bitmask corresponds to a specific Policy rule. The following rules are specified
 1664 for "bm":
 1665

Bit Position	Policy rule	Comment
Bit 0 (the LSB)	discoverable	<p>The discoverable rule defines whether the Link is to be included in the Resource discovery message via "/oic/res".</p> <ul style="list-style-type: none"> • If the Link is to be included in the Resource discovery message, then "p" shall include the "bm" key and set the discoverable bit to value 1. • If the Link is NOT to be included in the Resource discovery message, then "p" shall either include the "bm" key and set the

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

1666

1667 Note that if all the bits in “bm” are defined to value 0, then the “bm” key may be omitted entirely
1668 from “p” as an efficiency measure. However, if any bit is set to value 1, then “bm” shall be
1669 included in “p” and all the bits shall be defined appropriately.

1670 • "sec" and "port" in the remaining bullets shall be used only in a response payload when the
1671 request does not include an OCF-Accept-Content-Format-Version option as defined in section
1672 12.2.5. In a payload sent in response to a request that includes an OCF-Accept-Content-
1673 Format-Version option "sec" and "port" shall not be used and instead the "eps" Parameter shall
1674 provide the information for an encrypted connection. See E.2.8 for the schema for the "p"
1675 Parameter that includes "sec" and "port".

1676 • "sec" key: The “sec” key corresponds to a Boolean value that indicates whether the Resource
1677 referenced by the target URI is accessed via an encrypted connection. If “sec” is true, the
1678 resource is accessed via an encrypted connection, using the “port” specified (see below). If
1679 “sec” is false, the resource is accessed via an unencrypted connection, or via an encrypted
1680 connection (if such a connection is made using the “port” settings for another Resource, for
1681 which “sec” is true).

1682 • "port" key: The “port” key corresponds to an integer value that is used to indicate the port
1683 number where the Resource referenced by the target URI may be accessed via an encrypted
1684 connection.

1685 • If the Resource is only available via an encrypted connection (i.e. DTLS over IP), then
1686 o "p" shall include the "sec" key and its value shall be true.
1687 o "p" shall include the "port" key and its value shall be the port number where the
1688 encrypted connection may be established.

1689 • If the Resource is only available via an unencrypted connection, then
1690 o "p" shall include the "sec" key and its value shall be false or "p" shall omit the "sec"
1691 key; the default value of "sec" is false.

1692 o "p" shall omit the "port" key.

1693 • • If the Resource is available via both an encrypted and unencrypted connection, then

- 1694 o "p" shall include the "sec" key and its value shall be false or "p" shall omit the "sec"
 1695 key; the default value of "sec" is false.
- 1696 o "p" may omit the "port" key. If the "port" key is omitted, the Resource shall be
 1697 available using the same "port" information as another Resource on the Device for
 1698 which "sec" is true.
- 1699 • Access to the Resource on the port specified by the "port" key shall be made by an encrypted
 1700 connection (e.g. coaps://). (Note that unencrypted connection to the Resource may be possible
 1701 on a separate port discovered thru multicast discovery).
 - 1702 • Note that access to the Resource is controlled by the ACL for the Resource. A successful
 1703 encrypted connection does not ensure that the requested action will succeed. See
 1704 OCF Security – Access Control section for more information.

1705 Example 1: below shows the Policy Parameter for a Resource that is discoverable but not
 1706 observable, and for which authenticated accesses shall be done via CoAPS port 33275:

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

1707

1708

1709 Example 2: below shows a self-link, i.e. the "/oic/res" Link in itself that is discoverable and
 1710 observable.

```
{
  "href": "/oic/res",
  "rel": "self",
  "rt": ["oic.wk.res"],
  "if": ["oic.if.ll", "oic.if.baseline"],
  "p": { "bm": 3 }
}
```

1711

1712

1713

1714

1715

1716

1717

1718 **7.8.2.1.3 “type” or Media Type Parameter**

1719 The “type” Parameter may be used to specify the various media types that are supported by a
 1720 specific target Resource. The default type of "application/cbor" shall be used when the “type”
 1721 element is omitted. Once a Client discovers this information for each Resource, it may use one of
 1722 the available representations in the appropriate header field of the Request or Response.

1723 **7.8.2.1.4 “di” or Device ID parameter**

1724 The “di” Parameter specifies the device ID of the Device that hosts the target Resource defined in
 1725 the in the “href” Parameter.

1726 The device ID may be used to qualify a relative reference used in the “href” or to lookup endpoint
 1727 information for the relative reference.

1728 **7.8.2.1.5 “eps” Parameter**

1729 The "eps" Parameter indicates the Endpoint information of the target Resource.

1730 "eps" shall have as its value an array of items and each item represents Endpoint information with
 1731 "ep" and "pri" as specified in 10.2. "ep" is mandatory but "pri" is optional.

1732 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 }
]
```

1733

1734 When "eps" is present in a link, the Endpoint information in "eps" can be used to access the target
1735 Resource referred by the "href" Parameter.

1736 Note that the type of Endpoint – Secure or Unsecure – that a Resource exposes merely determines
1737 the connection type(s) guaranteed to be available for sending requests to the Resource. For
1738 example, if a Resource only exposes a single CoAP "ep", it does not guarantee that the Resource
1739 cannot also be accessed via a Secure Endpoint (e.g. via a CoAPS "ep" from another Resource's
1740 "eps" information). Nor does exposing a given type of Endpoint ensure that access to the Resource
1741 will be granted using the "ep" information. Whether requests to the Resource are granted or denied
1742 by the Access Control layer is separate from the "eps" information, and is determined by the
1743 configuration of the /acl2 Resource (see OCF Security specification section 13.4.2 for details).

1744 When present, max-age information (e.g. Max-Age option for CoAP defined in IETF RFC 7252)
1745 determines the maximum time "eps" values may be cached before they are considered stale.

1746 **7.8.2.2 Formatting**

1747 When formatting in JSON, the list of Links shall be an array.

1748 **7.8.2.3 List of Links in a Collection**

1749 A list of Links in a Resource shall be included in that Resource as the value of the "links" Property
1750 of that Resource. A Resource that contains Links is a Collection.

1751 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 }  
    }  
  ]  
}
```

1752

1753 **7.8.3 Collections**

1754 **7.8.3.1 Overview**

1755 A Resource that contains one or more references (specified as Links) to other resources is a
1756 Collection. These reference may be related to each other or just be a list; the Collection provides
1757 a means to refer to this set of references with a single handle (i.e. the URI). A simple resource is
1758 kept distinct from a collection. Any Resource may be turned into a Collection by binding resource
1759 references as Links. Collections may be used for creating, defining or specifying hierarchies,
1760 indexes, groups, and so on.

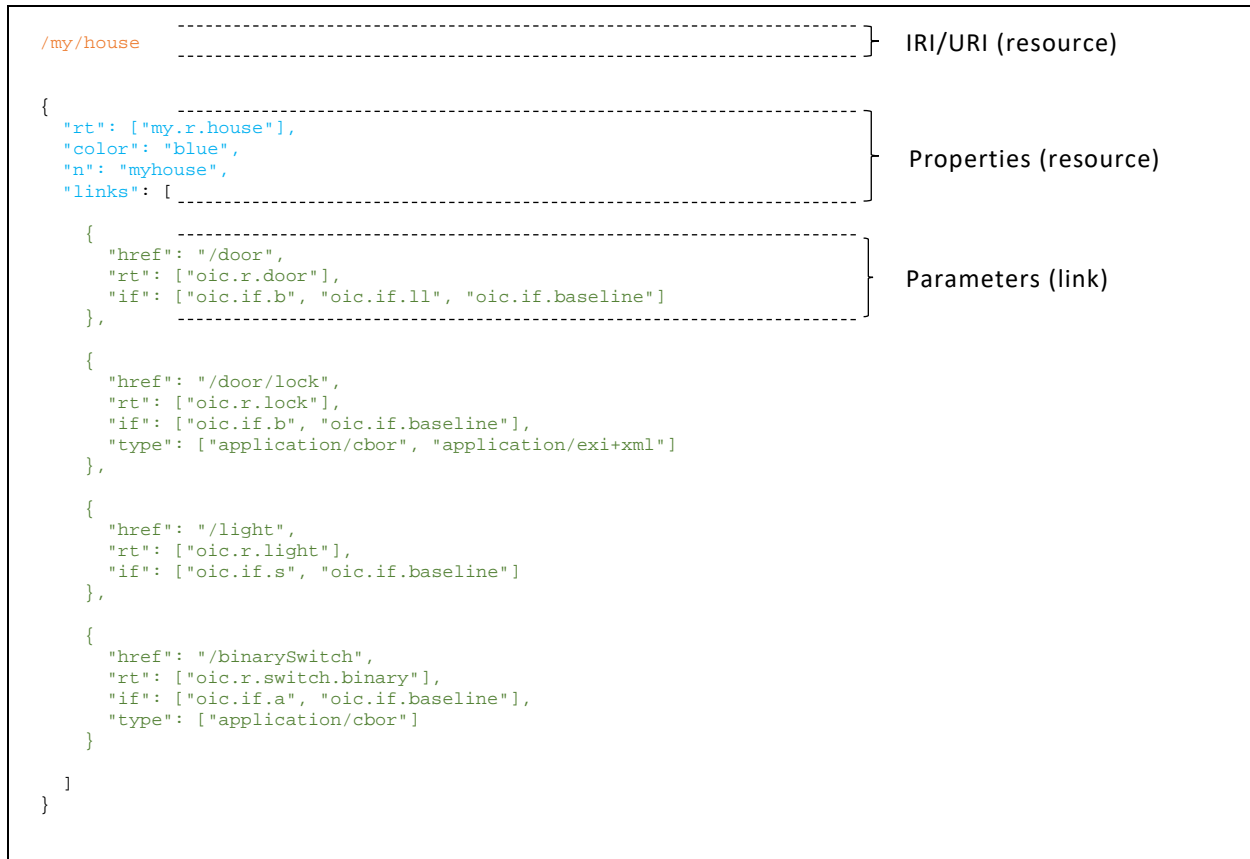
1761 A Collection shall have at least one Resource Type and at least one Interface bound at all times
1762 during its lifetime. During creation time of a collection the Resource Type and interfaces are
1763 specified. The initial defined Resource Types and interfaces may be updated during its life time.
1764 These initial values may be overridden using mechanism used for overriding in the case of a
1765 Resource. Additional Resource Types and Interfaces may be bound to the Collection at creation
1766 or later during the lifecycle of the Collection.

1767 A Collection shall define the "links" Property. The value of the "links" Property is an array with zero
1768 or more Links. The target URIs in the Links may reference another Collection or another Resource.
1769 The referenced Collection or Resource may reside on the same Device as the Collection that
1770 includes that Link (called a local reference) or may reside on another Device (called a remote
1771 reference). The context URI of the Links in the "links" array shall (implicitly) be the Collection that
1772 contains that "links" property. The (implicit) context URI may be overridden with explicit
1773 specification of the "anchor" parameter in the Link where the value of "anchor" is the new base of
1774 the Link.

1775 A Resource may be referenced in more than one Collection, therefore, a unique parent-child
1776 relationship is not guaranteed. There is no pre-defined relationship between a Collection and the
1777 Resource referenced in the Collection, i.e., the application may use Collections to represent a
1778 relationship but none is automatically implied or defined. The lifecycles of the Collection and the
1779 referenced Resource are also independent of one another.

1780 If the "drel" property is defined for the Collection then all Links that don't explicitly specify a
1781 relationship shall inherit this default relationship in the context of that Collection. The default
1782 relationship defines the implicit relationship between the Collection and the target URI in the Link.

1783 A Property "links" represents the list of Links in a Collection. "links" Property has, as its value, an
1784 array of items and each item is an OCF Link as shown:



1785

1786

1787 A Collection may be:

- 1788 • A pre-defined Collection where the Collection has been defined a priori and the Collection is
1789 static over its lifetime. Such Collections may be used to model, for example, an appliance that
1790 is composed of other devices or fixed set of resource representing fixed functions.
- 1791 • A Device local Collection where the Collection is used only on the Device that hosts the
1792 Collection. Such collections may be used as a short-hand on a client for referring to many
1793 Servers as one.
- 1794 • A centralized Collection where the Collection is hosted on an Device but other Devices may
1795 access or update the Collection
- 1796 • A hosted Collection where the collection is centralized but is managed by an authorized agent
1797 or party.

1798 **7.8.3.2 Collection Properties**

1799 A Collection shall define the “links” Property. In addition, other Properties may be defined for the
1800 Collection by the Resource Type. The mandatory and recommended Common Properties for a
1801 Collection are shown in Table 9. This list of Common Properties is in addition to those defined for
1802 Resources in section 7.3.2.

1803
1804

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

Property	Description	Property name	Value Type	Mandatory
Links	The set of links in the collection	"links"	json Array of Links	Yes
Resource Types	The list of allowed Resource Types for links in the collection. Requests for addition of links using link list or link batch interfaces will be validated against this list. If this property is not defined or is null string then any Resource Type is permitted	"rts"	json Array of Resource Type names	No

1805

1806 The Properties of a Collection may not be modified.

1807 **7.8.3.3 Default Resource Type**

1808 A default Resource Type, "oic.wk.col", shall be available for Collections. This Resource Type shall
1809 be used only when another type has not been defined on the Collection or when no Resource Type
1810 has been specified at the creation of the Collection.

1811 The default Resource Type provides support for the Common Properties including the "links"
1812 Property. For the default Resource Type, the value of "links" shall be a simple array of Links.

1813 The default Resource Type shall support the 'baseline' and 'links list' Interfaces. The default
1814 Interface shall be the 'links list' Interface.

1815

1816 **7.9 Third (3rd) party specified extensions**

1817 This section describes how a 3rd party may add Device Types, Resource Types, 3rd party defined
1818 Properties to an existing or 3rd party defined Resource Type, 3rd party defined enumeration values
1819 to an existing enumeration and 3rd party defined parameters to an existing defined Property.

1820 A 3rd party may specify additional (non-OCF) Resources within an OCF Device. A 3rd party may
1821 also specify additional Properties within an existing OCF defined Resource Type. Further a 3rd
1822 party may extend an OCF defined enumeration with 3rd party defined values.

1823 A 3rd party defined Device Type may expose both 3rd party and OCF defined Resource Types. A
1824 3rd party defined Device Type must expose the mandatory Resources for all OCF Devices defined
1825 within this specification.

1826 A 3rd party defined Resource Type shall include any mandatory Properties defined in this
1827 specification and also any vertical specified mandatory Properties. All Properties defined within a
1828 3rd party defined Resource Type that are part of the OCF namespace that are not Common
1829 Properties as defined in this specification shall follow the 3rd party defined Property rules in Table
1830 10.

1831 The following table defines the syntax rules for 3rd party defined Resource Type elements. Within
1832 the table the term "Domain_Name" refers to a domain name that is owned by the 3rd party that is
1833 defining the new element.

Table 10. 3rd party defined Resource elements

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

1835

1836 With respect to the use of the Domain_Name in this scheme the labels are reversed from how they
 1837 appear in DNS or other resolution mechanisms. The 3rd party defined Device Type and Resource
 1838 Type otherwise follow the rules defined in section 7.4.2 Resource Type Property. 3rd party defined
 1839 Resource Types should be registered in the IANA Constrained RESTful Environments (CoRE)
 1840 Parameters registry.

1841 For example:

1842 x.com.samsung.galaxyphone.accelerator

1843 x.com.cisco.ciscorouterport

1844 x.com.hp.printerhead

1845 x.org.allseen.newinterface.newproperty

1846 7.10 Query Parameters

1847 7.10.1 Introduction

1848 Properties and Parameters (including those that are part of a Link) may be used in the query part
 1849 of a URI (see section 6.2.1) as one criterion for selection of a particular Resource. This is done by
 1850 declaring the Property (i.e. <Property Name> = <desired Property Value>) as one of the segments
 1851 of the query. Only ASCII strings are permitted in query filters, and NULL characters are disallowed
 1852 in query filters. This means that only Property Values with ASCII characters may be matched in a
 1853 query filter.

1854 The Resource is selected when all the declared Properties or Link Parameters in the query match
 1855 the corresponding Properties or Link Parameters in the target.

1856 7.10.2 Use of multiple parameters within a query

1857 When a query contains multiple separate query parameters these are delimited by an "&" as
 1858 described in section 6.2.1.

1859 A Client may apply multiple separate query parameters, for
 1860 example "?ins=11111&rt=oic.r.switch.binary". If such queries are supported by the Server this
 1861 shall be accomplished by matching "all of" the different query parameter types ("rt", "ins", "if", etc)
 1862 against the target of the query. In the example, this resolves to an instance of oic.r.switch.binary
 1863 that also has an "ins" populated as "11111". There is no significance applied to the order of the
 1864 query parameters.

1865

1866 A Client may select more than one Resource Type using repeated query parameters, for example
1867 "?rt=oic.r.switch.binary&rt=oic.r.ramptime". If such queries are supported by the Server this shall
1868 be accomplished by matching "any of" the repeated query parameters against the target of the
1869 query. In the example, any instances of "oic.r.switch.binary" and/or "oic.r.ramptime" that may exist
1870 are selected.

1871
1872 A Client may combine both multiple repeated parameters and multiple separate parameters in a
1873 single query, for example "?if=oic.if.b&ins=11111&rt=oic.r.switch.binary&rt=oic.r.ramptime". If
1874 such queries are supported by the Server this shall be accomplished by matching "any of" the
1875 repeated query parameters and then matching "all of" the different query parameter types. In the
1876 example any instances of "oic.r.switch.binary" and/or "oic.r.ramptime" that also have an "ins" of
1877 "11111" that may exist are selected in a batch response.

1878
1879 Note that the parameters within a query string are represented within the actual messaging
1880 protocol as defined in section 12.

1881 **7.10.3 Application to multi-value "rt" Resources**

1882 An "rt" query for a multi-value "rt" Resource with the Default Interface of "oic.if.a", "oic.if.s", "oic.if.r",
1883 "oic.if.rw" or "oic.if.baseline" is an extension of a generic "rt" query. When a Server receives a
1884 RETRIEVE request for a multi-value "rt" Resource with an "rt" query, (i.e. GET
1885 /ResExample?rt=oic.r.foo), the Server should respond only when the query value is an item of the
1886 "rt" Property Value of the target Resource and should send back only the Properties associated
1887 with the query value(s). For example, upon receiving GET /ResExample?rt=oic.r.switch.binary
1888 targeting a Resource with "rt": ["oic.r.switch.binary", "oic.r.light.brightness"], the Server responds
1889 with only the Properties of oic.r.switch.binary.

1890 **7.10.4 Interface specific considerations for queries**

1891 **7.10.4.1 Interface selection**

1892 When an Interface is to be selected for a request, it shall be specified as a query parameter in the
1893 URI of the Resource in the request message. If no query parameter is specified, then the Default
1894 Interface shall be used. If the selected Interface is not one of the permitted Interfaces on the
1895 Resource then selecting that Interface is an error and the Server shall respond with an error
1896 response code.

1897 For example, the baseline Interface may be selected by adding "if=oic.if.baseline" to the list of
1898 query parameters in the URI of the target Resource. For example: "GET /oic/res?if=oic.if.baseline".

1899 **7.10.4.2 Batch Interface**

1900 See section 7.6.3.4 for details on the batch Interface itself. Query parameters may be used with
1901 the batch Interface in order to select particular Resources in a Collection for retrieval or update;
1902 these parameters are used to select items in the Collection by matching Link Parameter Values.

1903 When Link selection query parameters are used with RETRIEVE operations applied using the
1904 batch Interface, only the Resources in the Collection with matching Link Parameters should be
1905 returned.

1906 When Link selection query parameters are used with UPDATE operations applied using the batch
1907 Interface, only the Resources having matching Link Parameters should be updated.

1908 See 7.6.3.4.2 for examples of RETRIEVE and UPDATE operations that use Link selection query
1909 parameters.

1910 **8 CRUDN**

1911 **8.1 Overview**

1912 CREATE, RETRIEVE, UPDATE, DELETE, and NOTIFY (CRUDN) are operations defined for
 1913 manipulating Resources. These operations are performed by a Client on the resources contained
 1914 in n Server.

1915 On reception of a valid CRUDN operation n Server hosting the Resource that is the target of the
 1916 request shall generate a response depending on the Interface included in the request; or based
 1917 on the Default Interface for the Resource Type if no Interface is included.

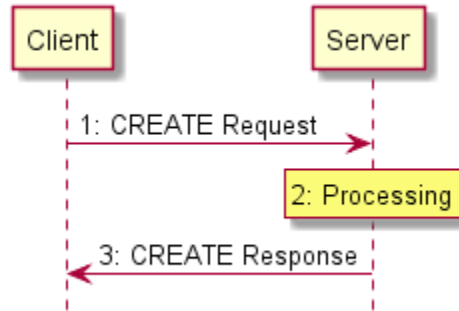
1918 CRUDN operations utilize a set of parameters that are carried in the messages and are defined in
 1919 Table 11. A Device shall use CBOR as the default payload (content) encoding scheme for resource
 1920 representations included in CRUDN operations and operation responses; a Device may negotiate
 1921 a different payload encoding scheme (e.g, see in section 12.2.4 for CoAP messaging). The
 1922 following subsections specify the CRUDN operations and use of the parameters. The type
 1923 definitions for these terms will be mapped in the messaging section for each protocol.

1924 **Table 11. Parameters of CRUDN messages**

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

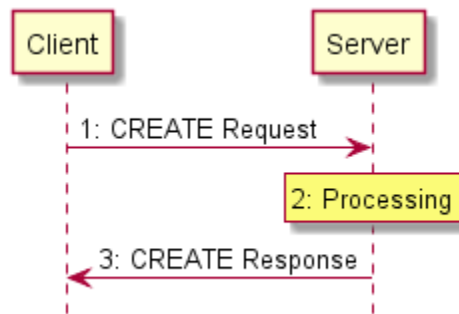
1925 **8.2 CREATE**

1926 The CREATE operation is used to request the creation of new Resources on the Server. The
1927 CREATE operation is initiated by the Client and consists of three steps, as depicted in



1928
1929 Figure 9 and described below.

1930



1931

1932 **Figure 9. CREATE operation**

1933 **8.2.1 CREATE request**

1934 The CREATE request message is transmitted by the Client to the Server to create a new Resource
1935 by the Server. The CREATE request message will carry the following parameters:

- 1936 • *fr*: Unique identifier of the Client
- 1937 • *to*: URI of the target resource responsible for creation of the new resource.
- 1938 • *ri*: Identifier of the CREATE request
- 1939 • *cn*: Information of the resource to be created by the Server
 - 1940 i) *cn* will include the URI and Resource Type property of the resource to be created.
 - 1941 ii) *cn* may include additional properties of the resource to be created.
- 1942 • *op*: CREATE

1943 **8.2.2 Processing by the Server**

1944 Following the receipt of a CREATE request, the Server may validate if the Client has the
1945 appropriate rights for creating the requested resource. If the validation is successful, the Server
1946 creates the requested resource. The Server caches the value of *ri* parameter in the CREATE
1947 request for inclusion in the CREATE response message.

1948 **8.2.3 CREATE response**

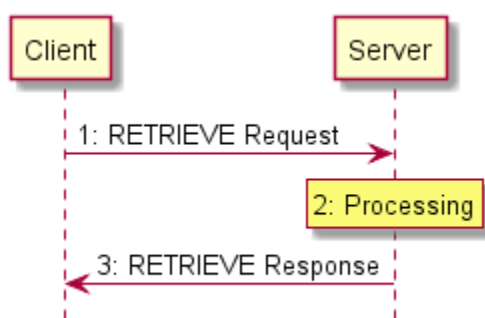
1949 The Server shall transmit a CREATE response message in response to a CREATE request
1950 message from a Client. The CREATE response message will include the following parameters.

- 1951 • *fr*: Unique identifier of the Server
- 1952 • *to*: Unique identifier of the Client
- 1953 • *ri*: Identifier included in the CREATE request
- 1954 • *cn*: Information of the resource as created by the Server.
 - 1955 i) *cn* will include the URI of the created resource.
 - 1956 ii) *cn* will include the resource representation of the created resource.
- 1957 • *rs*: The result of the CREATE operation

1958 **8.3 RETRIEVE**

1959 The RETRIEVE operation is used to request the current state or representation of a Resource.
1960 The RETRIEVE operation is initiated by the Client and consists of three steps, as depicted in
1961 Figure 10 and described below.

1962



1963

1964 **Figure 10. RETRIEVE operation**

1965 **8.3.1 RETRIEVE request**

1966 RETRIEVE request message is transmitted by the Client to the Server to request the
1967 representation of a Resource from a Server. The RETRIEVE request message will carry the
1968 following parameters.

- 1969 • *fr*: Unique identifier of the Client
- 1970 • *to*: URI of the resource the Client is targeting
- 1971 • *ri*: Identifier of the RETRIEVE request
- 1972 • *op*: RETRIEVE

1973 **8.3.2 Processing by the Server**

1974 Following the receipt of a RETRIEVE request, the Server may validate if the Client has the
1975 appropriate rights for retrieving the requested data and the properties are readable. The Server
1976 caches the value of *ri* parameter in the RETRIEVE request for use in the response.

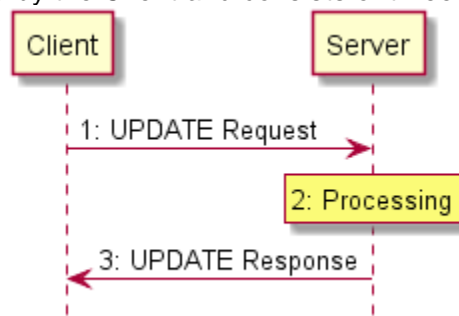
1977 **8.3.3 RETRIEVE response**

1978 The Server shall transmit a RETRIEVE response message in response to a RETRIEVE request
1979 message from a Client. The RETRIEVE response message will include the following parameters.

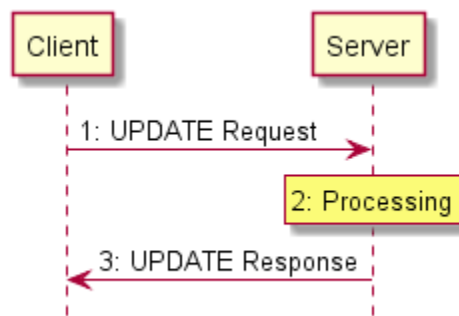
- 1980 • *fr*: Unique identifier of the Server
- 1981 • *to*: Unique identifier of the Client
- 1982 • *ri*: Identifier included in the RETRIEVE request
- 1983 • *cn*: Information of the resource as requested by the Client
- 1984 i) *cn* should include the URI of the resource targeted in the RETRIEVE request
- 1985
- 1986 • *rs*: The result of the RETRIEVE operation

1987 8.4 UPDATE

1988 The UPDATE operation is either a Partial UPDATE or a complete replacement of the information
 1989 in a Resource in conjunction with the interface that is also applied to the operation. The UPDATE
 1990 operation is initiated by the Client and consists of three steps, as depicted in



1991 Figure 11 and described below.



1994 **Figure 11. UPDATE operation**

1996 8.4.1 UPDATE request

1997 The UPDATE request message is transmitted by the Client to the Server to request the update of
 1998 information of a Resource on the Server. The UPDATE request message will carry the following
 1999 parameters.

- 2000 • *fr*: Unique identifier of the Client
- 2001 • *to*: URI of the resource targeted for the information update
- 2002 • *ri*: Identifier of the UPDATE request
- 2003 • *op*: UPDATE
- 2004 • *cn*: Information, including properties, of the resource to be updated at the target resource

2005 **8.4.2 Processing by the Server**

2006 Following the receipt of an UPDATE request, the Server may validate if the Client has the
2007 appropriate rights for updating the requested data. If the validation is successful the Server
2008 updates the target Resource information according to the information carried in *cn* parameter of
2009 the UPDATE request message. The Server caches the value of *ri* parameter in the UPDATE
2010 request for use in the response.

2011 An UPDATE request that includes Properties that are read-only shall be rejected by the Server
2012 with an *rs* indicating a bad request.

2013 An UPDATE request shall be applied only to the Properties in the target resource visible via the
2014 applied interface that support the operation. An UPDATE of non-existent Properties is ignored.

2015 **8.4.3 UPDATE response**

2016 The UPDATE response message will include the following parameters:

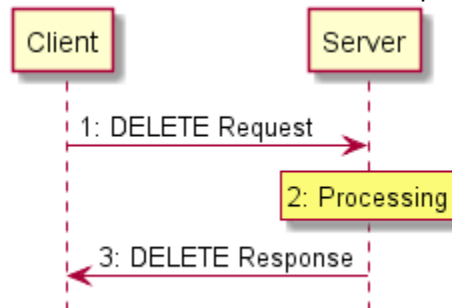
- 2017 • *fr*: Unique identifier of the Server
- 2018 • *to*: Unique identifier of the Client
- 2019 • *ri*: Identifier included in the UPDATE request
- 2020 • *rs*: The result of the UPDATE request

2021 The UPDATE response message may also include the following parameters:

- 2022 • *cn*: The Resource representation following processing of the UPDATE request

2023 **8.5 DELETE**

2024 The DELETE operation is used to request the removal of a Resource. The DELETE operation is
2025 initiated by the Client and consists of three steps, as depicted in



2026
2027 Figure 12 and described below.
2028

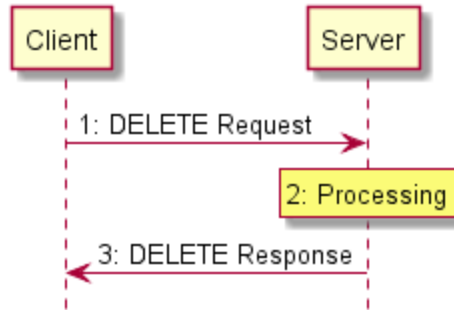


Figure 12. DELETE operation

2029

2030

2031 8.5.1 DELETE request

2032 DELETE request message is transmitted by the Client to the Server to delete a Resource on the
 2033 Server. The DELETE request message will carry the following parameters:

- 2034 • *fr*: Unique identifier of the Client
- 2035 • *to*: URI of the target resource which is the target of deletion
- 2036 • *ri*: Identifier of the DELETE request
- 2037 • *op*: DELETE

2038 8.5.2 Processing by the Server

2039 Following the receipt of a DELETE request, the Server may validate if the Client has the
 2040 appropriate rights for deleting the identified resource, and whether the identified resource exists.
 2041 If the validation is successful, the Server removes the requested resource and deletes all the
 2042 associated information. The Server caches the value of *ri* parameter in the DELETE request for
 2043 use in the response.

2044 8.5.3 DELETE response

2045 The Server shall transmit a DELETE response message in response to a DELETE request
 2046 message from a Client. The DELETE response message will include the following parameters.

- 2047 • *fr*: Unique identifier of the Server
- 2048 • *to*: Unique identifier of the Client
- 2049 • *ri*: Identifier included in the DELETE request
- 2050 • *rs*: The result of the DELETE operation

2051 8.6 NOTIFY

2052 The NOTIFY operation is used to request asynchronous notification of state changes. Complete
 2053 description of the NOTIFY operation is provided in section 11.4. The NOTIFY operation uses the
 2054 NOTIFICATION response message which is defined here.

2055 8.6.1.1 NOTIFICATION response

2056 The NOTIFICATION response message is sent by a Server to notify the URLs identified by the
 2057 Client of a state change. The NOTIFICATION response message carries the following parameters.

- 2058 • *fr*: Unique identifier of the Server
- 2059 • *to*: URI of the Resource target of the NOTIFICATION message
- 2060 • *ri*: Identifier included in the CREATE request

- 2061 • *op*: NOTIFY
- 2062 • *cn*: The updated state of the resource

2063 **9 Network and connectivity**

2064 **9.1 Introduction**

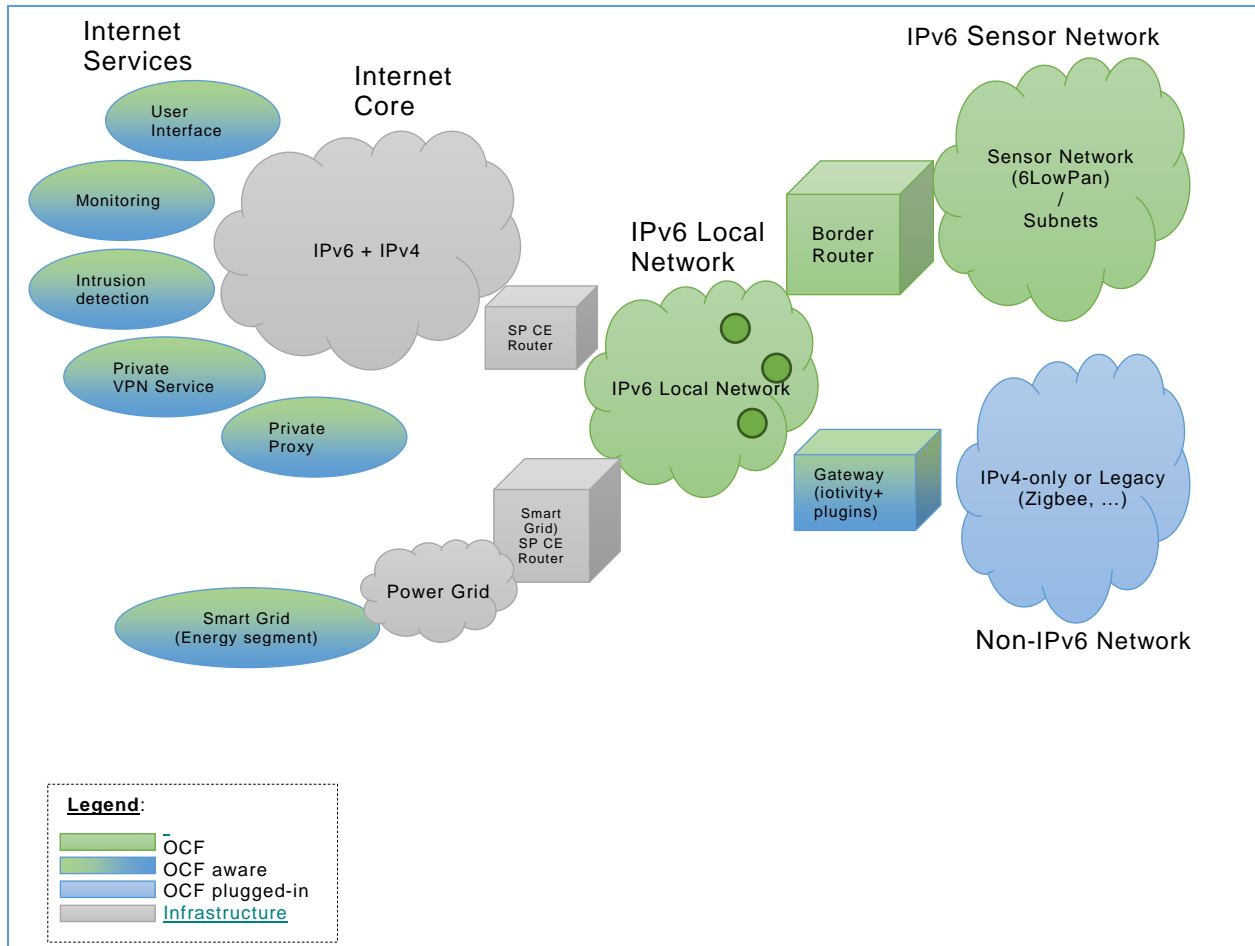
2065 The Internet of Things is comprised of a wide range of applications which sense and actuate the
2066 physical world with a broad spectrum of device and network capabilities: from battery powered
2067 nodes transmitting 100 bytes per day and able to last 10 years on a coin cell battery, to mains
2068 powered nodes able to maintain Megabit video streams. It is estimated that many 10s of billions
2069 of IoT devices will be deployed over the coming years.

2070 It is desirable that the connectivity options be adapted to the IP layer. To that end, IETF has
2071 completed considerable work to adapt Bluetooth®, Wi-Fi, 802.15.4, LPWAN, etc. to IPv6. These
2072 adaptations, plus the larger address space and improved address management capabilities, make
2073 IPv6 the clear choice for the OCF network layer technology.

2074 **9.2 Architecture**

2075 While the aging IPv4 centric network has evolved to support complex topologies, its deployment
2076 was primarily provisioned by a single Internet Service Provider (ISP) as a single network. More
2077 complex network topologies, often seen in residential home, are mostly introduced through the
2078 acquisition of additional home network devices, which rely on technologies like private Network
2079 Address Translation (NAT). These technologies require expert assistance to set up correctly and
2080 should be avoided in a home network as they most often result in breakage of constructs like
2081 routing, naming and discovery services.

2082 The multi-segment ecosystem OCF addresses will not only cause a proliferation of new devices
2083 and associated routers, but also new services introducing additional edge routers. All these new
2084 requirements require advance architectural constructs to address complex network topologies like
2085 the one shown in Figure 13.



2086

2087

Figure 13. High Level Network & Connectivity Architecture

2088 In terms of IETF RFC 6434, IPv6 nodes assume either a router or host role. Nodes may further
 2089 implement various specializations of those roles:

- 2090 • A Router may implement Customer Edge Router capabilities as defined in IETF RFC 7084.
- 2091 • Nodes limited in processing power, memory, non-volatile storage or transmission capacity
 2092 requires special IP adaptation layers (6LoWPAN) and/or dedicated routing protocols (RPL).
 2093 Examples include devices transmitting over low power physical layer like IEEE 802.14.5, ITU
 2094 G9959, Bluetooth Low Energy, DECT Ultra Low Energy, and Near Field Communication (NFC).
- 2095 • A node may translate and route messaging between IPv6 and non-IPv6 networks.

2096 **9.3 IPv6 network layer requirements**

2097 **9.3.1 Introduction**

2098 Projections indicate that many 10s of billions of new IoT endpoints and related services will be
 2099 brought online in the next few years. These endpoint's capabilities will span from battery powered
 2100 nodes with limited compute, storage, and bandwidth to more richly resourced devices operating
 2101 over Ethernet and WiFi links.

2102 Internet Protocol version 4 (IPv4), deployed some 30 years ago, has matured to support a wide
 2103 variety of applications such as Web browsing, email, voice, video, and critical system monitoring
 2104 and control. However, the capabilities of IPv4 are at the point of exhaustion, not the least of which
 2105 is that available address space has been consumed.

2106 The IETF long ago saw the need for a successor to IPv4, thus the development of IPv6. OCF
2107 recommends IPv6 at the network layer. Amongst the reasons for IPv6 recommendations are:

- 2108 • Larger address space. Side-effect: greatly reduce the need for NATs.
- 2109 • More flexible addressing architecture. Multiple addresses and types per interface: Link-local,
2110 ULA, GUA, variously scoped Multicast addresses, etc. Better ability to support multi-homed
2111 networks, better re-numbering capability, etc.
- 2112 • More capable auto configuration capabilities: DHCPv6, SLAAC, Router Discovery, etc.
- 2113 • Technologies enabling IP connectivity on constrained nodes are based upon IPv6.
- 2114 • All major consumer operating systems (iOS, Android, Windows, Linux) are already IPv6 enabled.
- 2115 • Major Service Providers around the globe are deploying IPv6.

2116 **9.3.2 IPv6 node requirements**

2117 **9.3.2.1 Introduction**

2118 In order to ensure network layer services interoperability from node to node, mandating a common
2119 network layer across all nodes is vital. The protocol should enable the network to be: secure,
2120 manageable, and scalable and to include constrained and self-organizing meshed nodes. OCF
2121 mandates IPv6 as the common network layer protocol to ensure interoperability across all Devices.
2122 More capable devices may also include additional protocols creating multiple-stack devices. The
2123 remainder of this section will focus on interoperability requirements for IPv6 hosts, IPv6
2124 constrained hosts and IPv6 routers. The various protocol translation permutations included in
2125 multi-stack gateway devices may be addresses in subsequent addendums of this specification.

2126 **9.3.2.2 IP Layer**

2127 An IPv6 node shall support IPv6 and it shall conform to the requirements as specified in
2128 IETF RFC 6434.

2129

2130 **10 Endpoint**

2131 **10.1 Endpoint definition**

2132 The specific definition of an Endpoint depends on the Transport Protocol Suite being used. For the
2133 example of CoAP over UDP over IPv6, the endpoint is identified by an IPv6 address and UDP port
2134 number.

2135 Each OCF Device shall associate with at least one Endpoint with which it can exchange request
2136 and response messages. When a message is sent to an Endpoint, it shall be delivered to the OCF
2137 Device which is associated with the Endpoint. When a request message is delivered to an Endpoint,
2138 path component is enough to locate the target Resource.

2139 OCF Device can be associated with multiple Endpoints. For example, an OCF Device can have
2140 several IP addresses or port numbers or support both CoAP and HTTP transfer protocol.

2141 On the other hand, an Endpoint can be shared among multiple OCF Devices, only when there is a
2142 way to clearly designate the target Resource with request URI. For example, when multiple CoAP
2143 servers use uniquely different URI paths for all their hosted Resources, and the CoAP
2144 implementation de-multiplexes by path, they can share the same CoAP Endpoint. However, this is
2145 not possible for OIC 1.1 and OCF 1.0 because pre-determined URI (e.g. "/oic/d") is mandatory for
2146 some mandatory Resources (e.g. "oic.wk.d").

2147 **10.2 Endpoint information**

2148 **10.2.1 Introduction**

2149 Endpoint is represented by Endpoint information which consists of two items of key-value pair,
2150 "ep" and "pri".

2151 **10.2.2 “ep”**

2152 "ep" represents Transport Protocol Suite and Endpoint Locator specified as follows:

- 2153 • **Transport Protocol Suite** - a combination of protocols (e.g. CoAP + UDP + IPv6) with which
2154 request and response messages can be exchanged for RESTful transaction (i.e. CRUDN). A
2155 Transport Protocol Suites shall be indicated by a URI scheme name. All OCF-defined schemes
2156 are IANA registered, but URI scheme names in general can be IANA registered or vendor-
2157 defined (e.g., "com.example.foo"), as explained in IETF RFC 7595.
- 2158 • **Endpoint Locator** – an address (e.g. IPv6 address + Port number) through which a message
2159 can be sent to the Endpoint and in turn associated OCF Device. The Endpoint Locator for
2160 "coap", "coaps", "coap+tcp", "coaps+tcp", "http", and "https" shall be specified as "IP address:
2161 port number". Temporary addresses should not be used because Endpoint Locators are for the
2162 purpose of accepting incoming sessions, whereas temporary addresses are for initiating
2163 outgoing sessions (IETF RFC 4941). Moreover its inclusion in "/oic/res" can cause a privacy
2164 concern (IETF RFC 7721).

2165 "ep" shall have as its value a URI (as specified in IETF RFC 3986) with the scheme component
2166 indicating Transport Protocol Suite and the authority component indicating the Endpoint Locator:

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

2167

2168 The current list of "ep" with corresponding Transport Protocol Suite is shown in Table 12:

2169 **Table 12. “ep” value for Transport Protocol Suite**

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

2170 **10.2.3 “pri”**

2171 When there are multiple Endpoints, "pri" indicates the priority among them.

2172 "pri" shall be represented as a positive integer (e.g. "pri": 1) and the lower the value, the higher
2173 the priority.

2174 The default "pri" value is 1, i.e. when "pri" is not present, it shall be equivalent to "pri": 1.

2175 **10.2.4 Endpoint information in "eps" Parameter**

2176 To carry Endpoint information, a new Link Parameter "eps" is defined in 7.8.2.1.5. "eps" has an
2177 array of items as its value and each item represents Endpoint information with two key-value pairs,
2178 "ep" and "pri", of which "ep" is mandatory and "pri" is optional. A link with "eps":

```
{
  "anchor": "ocf://light_device_id",
  "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"}]
}
```

2179

2180 In the previous example, "anchor" represents the hosting OCF Device, "href", target Resource and
2181 "eps" the two Endpoints for the target Resource.

2182 If the target Resource of a Link requires a secure connection (e.g. CoAPS), "eps" Parameter shall
2183 be used to indicate the necessary information (e.g. port number) in OCF 1.0 payload, because
2184 "sec" and "port" shall be used only in OIC 1.1 payload.

2185 **10.3 Endpoint discovery**

2186 **10.3.1 Introduction**

2187 "Endpoint discovery" is defined as the process for a Client to acquire the Endpoint information for
2188 OCF Device or Resource.

2189 **10.3.2 Implicit discovery**

2190 If a Device is the source of a CoAP message (e.g. "/oic/res" response), the source IP address and
2191 port number can be combined to form the Endpoint Locator for the Device. Along with a "coap"
2192 scheme and default "pri" value, Endpoint information for the Device can be constructed.

2193 In other words, an "/oic/res" response message with CoAP can implicitly carry the Endpoint
2194 information of the responding Device and in turn all the hosted Resources, which can be accessed
2195 with the same transfer protocol of CoAP.

2196 **10.3.3 Explicit discovery with "/oic/res" response**

2197 Endpoint information can be explicitly indicated with the "eps" Parameter of the Links in "/oic/res".

2198 As in 10.3.2, an "/oic/res" response can implicitly indicate the Endpoint information for the target
2199 Resources hosted by the responding Device. However "/oic/res" may expose a target Resource
2200 which belongs to another Device. When the Endpoint for a target Resource of a Link cannot be
2201 implicitly inferred, the "eps" Parameter shall be included to provide explicit Endpoint information
2202 with which a Client can access the target Resource.

2203 This applies to the case of "/oic/res" for a Resource Directory or Bridge Device which usually
2204 carries the Links for Resources which another Device hosts.

2205 An "/oic/res" response with the "eps" Parameter 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": "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": "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": "coaps://[2001:db8:a::b1d4]:33333"}]
},
{
  "anchor": "ocf://88b7c7f0-4b51-4e0a-9faa-cfb439fd7f49",
  "href": "/myFan",
  "rt": ["oic.r.switch.binary"],
  "if": ["oic.if.a", "oic.if.baseline"],
  "p": {"bm": 3},
  "eps": [{"ep": "coaps://[2001:db8:a::b1d4]:33333"}]
},
{
  "anchor": "ocf://88b7c7f0-4b51-4e0a-9faa-cfb439fd7f49",
  "href": "/oic/sec/doxm",
  "rt": ["oic.r.doxm"],

```

```

    "if": ["oic.if.baseline"],
    "p": {"bm": 1},
    "eps": [{"ep": "coap://[2001:db8:a::b1d4]:7777"},
             {"ep": "coaps://[2001:db8:a::b1d4]:33333"}]
  },
  {
    "anchor": "ocf://88b7c7f0-4b51-4e0a-9faa-cfb439fd7f49",
    "href": "/oic/sec/pstat",
    "rt": ["oic.r.pstat"],
    "if": ["oic.if.baseline"],
    "p": {"bm": 1},
    "eps": [{"ep": "coaps://[2001:db8:a::b1d4]:33333"}]
  },
  {
    "anchor": "ocf://88b7c7f0-4b51-4e0a-9faa-cfb439fd7f49",
    "href": "/oic/sec/cred",
    "rt": ["oic.r.cred"],
    "if": ["oic.if.baseline"],
    "p": {"bm": 1},
    "eps": [{"ep": "coaps://[2001:db8:a::b1d4]:33333"}]
  },
  {
    "anchor": "ocf://88b7c7f0-4b51-4e0a-9faa-cfb439fd7f49",
    "href": "/oic/sec/acl2",
    "rt": ["oic.r.acl2"],
    "if": ["oic.if.baseline"],
    "p": {"bm": 1},
    "eps": [{"ep": "coaps://[2001:db8:a::b1d4]:33333"}]
  },
  {
    "anchor": "ocf://88b7c7f0-4b51-4e0a-9faa-cfb439fd7f49",
    "href": "/myFanIntrospection",
    "rt": ["oic.wk.introspection"],
    "if": ["oic.if.r", "oic.if.baseline"],
    "p": {"bm": 3},
    "eps": [{"ep": "coaps://[2001:db8:a::b1d4]:33333"}]
  }
]

```

2206

2207 The exact format of the "/oic/res" response and a way for a Client to acquire a "/oic/res" response
 2208 message is specified in D.9 and 11.3.5 respectively.

2209 **10.4 CoAP based Endpoint discovery**

2210 The following describes CoAP based Endpoint discovery:

- 2211 a) Devices shall join the 'All OCF Nodes' multicast groups (as defined in [IANA IPv6 Multicast
 2212 Address Space Registry]) with scopes 2, 3, and 5 (i.e., ff02::158, ff03::158 and ff05::158) and
 2213 shall listen on the port 5683. For compliance to IETF RFC 7252 a Device may additionally join
 2214 the 'All CoAP Nodes' multicast groups.
- 2215 b) Clients intending to discover resources shall join the multicast groups as defined in a).
- 2216 c) Devices shall expose "/oic/res" via an unsecured endpoint.
- 2217 d) Clients shall send discovery requests (GET request) to the 'All OCF Nodes' multicast group
 2218 address with scope 2 (ff02::158) at port 5683. The requested URI shall be "/oic/res". For
 2219 compliance to IETF RFC 7252 a Client may additionally send to the 'All CoAP Nodes' multicast
 2220 groups.

- 2221 e) If the discovery request is intended for a specific Resource Type, the Query parameter "rt" shall
 2222 be included in the request (section 6.2.1) with its value set to the desired Resource Type. Only
 2223 Devices hosting the Resource Type shall respond to the discovery request.
- 2224 f) When the "rt" Query parameter is omitted, all Devices shall respond to the discovery request.
- 2225 g) Handling of multicast requests shall be as described in section 8 of IETF RFC 7252 and section
 2226 4.1 in IETF RFC 6690.
- 2227 h) Devices which receive the request shall respond using CBOR payload encoding. A Device shall
 2228 indicate support for CBOR payload encoding for multicast discovery as described in section
 2229 12.3.6.

2230 **11 Functional interactions**

2231 **11.1 Introduction**

2232 The functional interactions between a Client and a Server are described in section 11.2 through
 2233 section 11.6 respectively. The functional interactions use CRUDN messages (section 8) and
 2234 include Discovery, Notification, and Device management. These functions require support of core
 2235 defined resources as defined in Table 13. More details about these resources are provided later
 2236 in this section.

2237 **Table 13. List of Core Resources**

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

2238

2239 **11.2 Onboarding, Provisioning and Configuration**

2240 Onboarding and Provisioning are fully defined by the OCF Security Specification.

2241

2242 Should a Device support Client update of configurable information it shall do so via exposing an
 2243 oic.wk.con Core Resource (Table 14) in "/oic/res";

2244

2245 **Table 14. Configuration Resource**

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

"/example/oic/con"	Platform Configuration	"oic.wk.con.p"	"oic.if.rw"	The optional Resource Type through which configurable information specific to the Platform is exposed. The resource properties exposed in "oic.wk.con.p" are listed in Table 16.	Configuration
--------------------	------------------------	----------------	-------------	--	---------------

2246

2247 Table 15 defines the "oic.wk.con" resource type.

2248

2249

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

Property title	Property name	Value type	Value rule	Unit	Access mode	Mandatory	Description
(Device) Name	n (Common Property of "/example/oic/con")	string			R, W	yes	Human friendly name configurable by the end user (e.g. Bob's thermostat). The "n" Common Property of the oic.wk.con Core Resource and the "n" Common Property of the "/oic/d" Core Resource shall have the same Value. When the "n" Common Property Value of the oic.wk.con Core Resource is modified, it shall be reflected to the "n" Common Property of "/oic/d" Core Resource.
Location	loc	array of float (has two elements, the first is latitude, the second is longitude)		Degrees	R, W	no	Provides location information where available.
Location Name	locn	string			R, W	no	Human friendly name for location For example, "Living Room".
Currency	c	string			R,W	no	Indicates the currency that is used for any monetary transactions
Region	r	string			R,W	no	Free form text Indicating the current region in which the device is located geographically.
Localized Names	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.
Default Language	dl	language-tag			R,W	no	The default language supported by the Device, specified as an IETF RFC 5646 language tag. By default, clients can treat any string property as being in this language unless the property specifies otherwise.

2250

2251 Table 16 defines the “oic.wk.con.p” resource type.

2252

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

Property title	Property name	Value type	Value rule	Unit	Access mode	Mandatory	Description
Platform Names	mnpn	array			R,W	no	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"}]

2253

2254

2255 11.3 Resource discovery

2256 11.3.1 Introduction

2257 Discovery is a function which enables endpoint discovery as well as resource based discovery.
2258 Endpoint discovery is described in detail in section 10. This section mainly describes the resource
2259 based discovery.

2260 11.3.2 Resource based discovery: mechanisms

2261 11.3.2.1 Overview

2262 As part of discovery, a Client may find appropriate information about other OCF peers. This
2263 information could be instances of Resources, Resource Types or any other information
2264 represented in the resource model that an OCF peer would want another OCF peer to discover.

2265 At the minimum, Resource based discovery uses the following:

- 2266 1) A resource to enable discovery shall be defined. The representation of that resource shall
2267 contain the information that can be discovered.

- 2268 2) The resource to enable discovery shall be specified and commonly known a-priori. A Device
2269 for hosting the resource to enable discovery shall be identified.
- 2270 3) A mechanism and process to publish the information that needs to be discovered with the
2271 resource to enable discovery.
- 2272 4) A mechanism and process to access and obtain the information from the resource to enable
2273 discovery. A query may be used in the request to limit the returned information.
- 2274 5) A scope for the publication
- 2275 6) A scope for the access.
- 2276 7) A policy for visibility of the information.

2277

2278 Depending on the choice of the base aspects defined above, the Framework defines three resource
2279 based discovery mechanisms:

- 2280 • Direct discovery, where the Resources are published locally at the Device hosting the
2281 resources and are discovered through peer inquiry.
- 2282 • Indirect discovery, where Resources are published at a third party assisting with the
2283 discovery and peers publish and perform discovery against the resource to enable
2284 discovery on the assisting 3rd party.
- 2285 • Advertisement discovery, where the resource to enable discovery is hosted local to the
2286 initiator of the discovery inquiry but remote to the Devices that are publishing discovery
2287 information.

2288 A Device shall support direct discovery.

2289 **11.3.2.2 Direct discovery**

2290 In direct discovery,

- 2291 1) The Device that is providing the information shall host the resource to enable discovery.
- 2292 2) The Device publishes the information available for discovery with the local resource to
2293 enable discovery (i.e. local scope).
- 2294 3) Clients interested in discovering information about this Device shall issue RETRIEVE
2295 requests directly to the resource. The request may be made as a unicast or multicast.
2296 The request may be generic or may be qualified or limited by using appropriate queries in
2297 the request.
- 2298 4) The “server” Device that receives the request shall send a response with the discovered
2299 information directly back to the requesting “client” Device.
- 2300 5) The information that is included in the request is determined by the policies set for the
2301 resource to be discovered locally on the responding Device.

2302

2303 **11.3.2.3 Indirect discovery of Resources (resource directory based discovery)**

2304 In indirect discovery the information about the resource to be discovered is hosted on a Server
2305 that is not hosting the resource. See section 11.3.6 for details on resource directory based
2306 discovery.

2307 In indirect discovery:

- 2308 a) The resource to be discovered is hosted on a Device that is neither the client initiating
2309 the discovery nor the Device that is providing or publishing the information to be
2310 discovered. This Device may use the same resource to provide discovery for multiple
2311 agents looking to discover and for multiple agents with information to be discovered.

- 2312 b) The Device to be discovered or with information to discover, publishes that information
- 2313 with resource to be discovered on a different Device. The policies on the information
- 2314 shared including the lifetime/validity are specified by the publishing Device. The
- 2315 publishing Device may modify these policies as required.
- 2316 c) The client doing the discovery may send a unicast discovery request to the Device
- 2317 hosting the discovery information or send a multicast request that shall be monitored and
- 2318 responded to by the Device. In both cases, the Device hosting the discovery information
- 2319 is acting on behalf of the publishing Device.
- 2320 d) The discovery policies may be set by the Device hosting the discovery information or by
- 2321 the party that is publishing the information to be discovered. The discovery information
- 2322 that is returned in the discovery response shall adhere to the policies that are in effect at
- 2323 the time of the request.
- 2324

2325 11.3.2.4 Advertisement Discovery

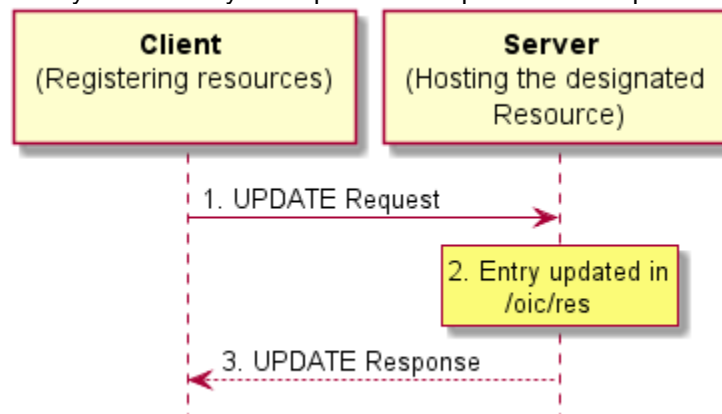
2326 In advertisement discovery:

- 2327 a) The resource to enable discovery is hosted local to the Device that is initiating the discovery
- 2328 request (client). The resource to enable discovery may be a Core Resource or discovered
- 2329 as part of a bootstrap.
- 2330 b) The request could be an implementation dependent lookup or be a local RETRIEVE request
- 2331 against the resource that enables discovery.
- 2332 c) The Device with information to be discovered shall publish the appropriate information to
- 2333 the resource that enables discovery.
- 2334 d) The publishing Device is responsible for the published information. The publishing Device
- 2335 may UPDATE the information at the resource to enable discovery based on its needs by
- 2336 sending additional publication requests. The policies on the information that is discovered
- 2337 including lifetime is determined by the publishing Device.
- 2338

2339 11.3.3 Resource based discovery: Information publication process

2340 The mechanism to publish information with the resource to enable discovery can be done either

2341 locally or remotely. The publication process is depicted in



2342

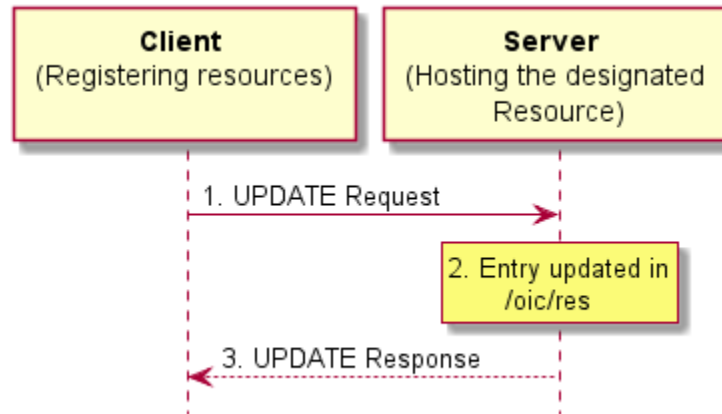
2343 Figure 14. The Device which has discovery information to publish shall a) either update the

2344 resource that enables discovery if hosted locally or b) issue an UPDATE request with the

2345 information to the Device which hosts the resource that enables discovery. The Device hosting the

2346 resource to enable discovery adds/updates the resource to enable discovery with the provided

2347 information and then responds to the Device which has requested the publication of the resource
2348 with an UPDATE response.



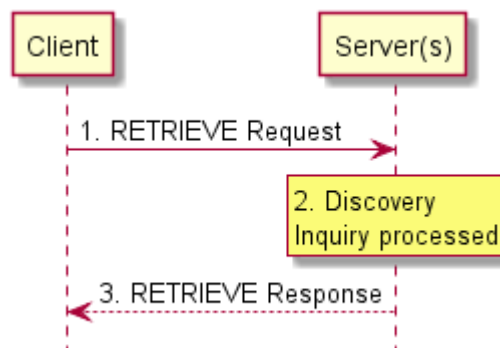
2349

2350

Figure 14. Resource based discovery: Information publication process

2351

11.3.4 Resource based discovery: Finding information

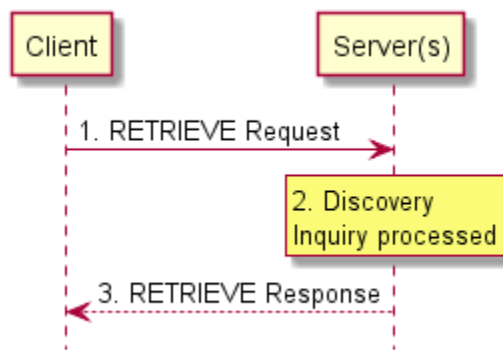


2352

The discovery process (

2353 Figure 15) is initiated as a RETRIEVE request to the resource to enable discovery. The request
2354 may be sent to a single Device (as in a Unicast) or to multiple Devices (as in Multicast). The
2355 specific mechanisms used to do Unicast or Multicast are determined by the support in the data
2356 connectivity layer. The response to the request has the information to be discovered based on the
2357 policies for that information. The policies can determine which information is shared, when and to
2358 which requesting agent. The information that can be discovered can be resources, types,
2359 configuration and many other standards or custom aspects depending on the request to
2360 appropriate resource and the form of request. Optionally the requester may narrow the information
2361 to be returned in the request using query parameters in the URI query.

2362



2363

2364

Figure 15. Resource based discovery: Finding information

2365

2366 **Discovery Resources**

2367 The following Core Resources shall be implemented on all Devices to support discovery:

- 2368 ● “/oic/res” for discovery of resources
- 2369 ● “/oic/p” for discovery of platform
- 2370 ● “/oic/d” for discovery of device information

2371 Devices shall expose each of “/oic/res”, “/oic/d”, and “/oic/p” via an unsecured endpoint. Further
2372 details for these mandatory Core Resources are described in Table 17

2373 Platform resource –

2374 The OCF recognizes that more than one instance of Device may be hosted on a single platform.
2375 Clients need a way to discover and access the information on the platform. The core resource,
2376 “/oic/p” exposes platform specific properties. All instances of Device on the same Platform shall
2377 have the same values of any properties exposed (i.e. a Device may choose to expose optional
2378 properties within “/oic/p” but when exposed the value of that property should be the same as the
2379 value of that property on all other Devices on that Platform)

2380

2381 Device resource

2382 The device resource shall have the pre-defined URI “/oic/d”. The resource “/oic/d” exposes the
2383 properties pertaining to a Device as defined in Table 17. The properties exposed are determined
2384 by the specific instance of Device and defined by the Resource Type(s) of “/oic/d” on that Device.
2385 Since all the Resource Types of “/oic/d” are not known a priori, the Resource Type(s) of “/oic/d”
2386 shall be determined by discovery through the core resource “/oic/res”. The device resource “/oic/d”
2387 shall have a default Resource Type that helps in bootstrapping the interactions with this device
2388 (the default type is described in Table 17.)

2389

2390 Protocol indication

2391 A Device may need to support different messaging protocols depending on requirements for
2392 different vertical domain profiles. For example, a Smart Home profile may use CoAP and an
2393 Industrial profile may use DDS. To enable interoperability, a Device uses the protocol indication
2394 to indicate the transport protocols they support and can communicate over.

2395

Table 17. Mandatory discovery Core Resources

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

2397

2398 Table 18 defines "oic.wk.res" Resource Type.

2399

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

Property title	Property name	Value type	Value rule	Unit	Access mode	Mandatory	Description
Name	n	string			R	no	Human-friendly name defined by the vendor
Links	links	array	See 7.8.2		R	yes	The array of Links describes the URI, supported Resource Types and interfaces, and access policy.
Messaging Protocol	mpro	SSV			R	No	String with Space Separated Values (SSV) of messaging protocols supported as a SI Number from Table 19 For example, "1 and 3" indicates that the Device supports coap and http as messaging protocols.

2400 A Device which wants to indicate its messaging protocol capabilities may add the property 'mpro'
2401 in response to a request on "/oic/res". A Device shall support CoAP based discovery as the
2402 baseline discovery mechanism (see section 10.4). A Client which sees this property in a discovery

2403 response can choose any of the supported messaging protocols for communicating with the Server
 2404 for further messages. For example, if a Device supporting multiple protocols indicates it supports
 2405 a value of "1 3" for the 'mpro' property in the discovery response, then it cannot be assumed that
 2406 there is an implied ordering or priority. But a vertical specification may choose to specify an implied
 2407 ordering or priority. If the 'mpro' property is not present in the response, A Client shall use the
 2408 default messaging protocol as specified in the vertical specification for further communication.

2409 The "/oic/res" shall list all Resources that are indicated as discoverable (see section 11.3). Also
 2410 the following architecture Resource Types shall be listed:

- 2411 • Introspection resource indicated with an "rt" value of "oic.wk.introspection"
- 2412 • "/oic/p" indicated with an "rt" value of "oic.wk.p"
- 2413 • "/oic/d" indicated with an "rt" value of "oic.wk.d"
- 2414 • "/oic/sec/doxm" indicated with an "rt" value of "oic.r.doxm" as defined in the OCF Security
 2415 Specification
- 2416 • "/oic/sec/pstat" indicated with an "rt" value of "oic.r.pstat" as defined in the OCF Security
 2417 Specification
- 2418 • "/oic/sec/acl2" indicated with an "rt" value of "oic.r.acl2" as defined in the OCF Security
 2419 Specification
- 2420 • "/oic/sec/cred" indicated with an "rt" value of "oic.r.cred" as defined in the OCF Security
 2421 Specification

2422 Conditionally required:

- 2423 • "/oic/res" with an "rt" value of "oic.wk.res" as self-reference, on the condition that "oic/res" has
 2424 to signal that it is observable by a Client.

2425 The Introspection Resource is only applicable for Devices that host Vertical Resource Types (e.g.
 2426 "oic.r.switch.binary") or vendor-defined Resource Types. Devices that only host Resources
 2427 required to onboard the Device as a Client do not have to implement the Introspection Resource.

2428 Table 19 provides an OCF registry for protocol schemes.

2429 **Table 19. Protocol scheme registry**

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

2430 Note: The discovery of an endpoint used by a specific protocol is out of scope. The mechanism used by a Client to form
 2431 requests in a different messaging protocol other than discovery is out of scope.

2432

2433 The following applies to the use of "/oic/d" as defined above:

- 2434 • A Device may choose to expose its Device Type (e.g., refrigerator or A/C) by adding the Device
 2435 Type to the list of Resource Types associated with "/oic/d".

- 2436 ○ For example; "rt" of "/oic/d" becomes ["oic.wk.d", "oic.d.<thing>"]; where
2437 "oic.d.<thing>" is defined in another spec such as the OCF Device specification.
- 2438 ○ This implies that the properties exposed by "/oic/d" are by default the mandatory
2439 properties in Table 20.
- 2440 • A vertical may choose to extend the list of properties defined by the Resource Type "oic.wk.d".
2441 In that case, the vertical shall assign a new Device Type specific Resource Type ID. The
2442 mandatory properties defined in Table 20 shall always be present.
 - 2443 • A Device may choose to expose a separate, discoverable Resource with its Resource Type ID
2444 set to an OCF defined Device Type. In this case the Resource is equivalent to an instance of
2445 "oic.wk.d" and adheres to the definition thereof. As such the Resource shall at a minimum
2446 expose the mandatory Resource Properties of "oic.wk.d". In the case where the Resource
2447 tagged in this manner is defined to be an instance of a Collection (i.e. it also includes the "rt"
2448 value of "oic.wk.col") then the Resources that are part of that Collection shall at a minimum
2449 include the Resource Types mandated for the Device Type. For example, if a Resource has an
2450 "rt" value of ["oic.d.light", "oic.wk.col"], that Resource follows the definitions of both "oic.wk.d"
2451 and "oic.wk.col". In this example, the collection includes an instance of "oic.r.switch.binary"
2452 which is mandatory for an "oic.d.light" as per the OCF Device specification.

2453 Table 20 "oic.wk.d" Resource Type definition defines the base Resource Type for the "/oic/d"
2454 resource.
2455

2456 **Table 20. "oic.wk.d" Resource Type definition**

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

							<p><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.</p>
Protocol Independent ID	piid	uuid			R	yes	A unique and immutable Device identifier. A Client can detect that a single Device supports multiple communication protocols if it discovers that the Device uses a single Protocol Independent ID value for all the protocols it supports. Handling privacy-sensitivity for the "piid" Property, refer to section 13.8 in OCF Security.
Localized Descriptions	ld	array			R	no	Detailed description of the Device, in one or more languages. This property is an array of objects where each object has a 'language' field (containing an IETF RFC 5646 language tag) and a 'value' field containing the device description in the indicated language.
Software Version	sv	string			R	no	Version of the device software.
Manufacturer Name	dmn	array			R	no	Name of manufacturer of the Device, in one or more languages. This property is an array of objects where each object has a 'language' field (containing an IETF RFC 5646 language tag) and a 'value' field containing the manufacturer name in the indicated language.
Model Number	dmno	string			R	no	Model number as designated by manufacturer.

2457

2458 The additional Resource Type(s) of the "/oic/d" resource are defined by the OCF Device
2459 specification.

2460

2461 Table 21 defines "oic.wk.p" Resource Type.

2462

2463

Table 21. "oic.wk.p" Resource Type definition

Property title	Property name	Value type	Value rule	Unit	Access mode	Mandatory	Description
Platform ID	pi	string			R	yes	Unique identifier for the physical platform (UIUID); this shall be a UUID in accordance with IETF RFC 4122. It is recommended that the UUID be created using the random generation scheme (version 4 UUID) specific in the RFC. Handling privacy-sensitivity for the "pi" Property, refer to section 13.8 in OCF Security.
Manufacturer Name	mnmn	string			R	yes	Name of manufacturer
Manufacturer Details Link	mnml	uri			R	no	Reference to manufacturer, represented as a URI
Model Number	mnmo	string			R	no	Model number as designated by manufacturer
Date of Manufacture	mndt	date		Time	R	no	Manufacturing date of Platform as defined in ISO 8601.
Platform Version	mnpv	string			R	no	Version of platform – string (defined by manufacturer)
OS Version	mnos	string			R	no	Version of platform resident OS – string (defined by manufacturer)
Hardware Version	mnhw	string			R	no	Version of platform hardware
Firmware version	mnfv	string			R	no	Version of Platform firmware
Support link	mnsi	uri			R	no	URI that points to support information from manufacturer
SystemTime	st	date-time			R	no	Reference time for the Platform.
Vendor ID	vid	string			R	no	Vendor defined string for the platform. The string is freeform and up

							to the vendor on what text to populate it.
--	--	--	--	--	--	--	--

2464

2465 **Composite Device**

2466 A physical device may be modelled as a single device or as a composition of other devices. For
2467 example a refrigerator may be modelled as a composition, as such part of its definition of may
2468 include a sub-tending thermostat device which itself may be composed of a sub-tending
2469 thermometer device.

2470 There may be more than one way to model a server as a composition. One example method would
2471 be to have Platform which represents the composite device to have more than one instance of a
2472 Device on the Platform. Each Device instance represents one of the distinct devices in the
2473 composition. Each instance of Device may itself have or host multiple instances of other resources.

2474 An implementation irrespective of how it is composed shall only expose a single instance of “/oic/d”
2475 with an ‘rt’ of choice for each logical Server.

2476 Thus, for the above refrigerator example if modeled as a single Server; “/oic/res” would expose
2477 “/oic/d” with a Resource Type name appropriate to a refrigerator. The sub-tending thermostat and
2478 thermometer devices would be exposed simply as instances of a resource with a device
2479 appropriate Resource Type with an associated URI assigned by the implementation; e.g.,
2480 /MyHost/MyRefrigerator/Thermostat and /MyHost/MyRefrigerator/Thermostat/Thermometer.

2481

2482 **11.3.5 Resource discovery using “/oic/res”**

2483 Discovery using “/oic/res” is the default discovery mechanism that shall be supported by all Devices
2484 as follows:

2485 a) Every Device updates its local “/oic/res” with the resources that are discoverable (see section
2486 7.3.2.2). Every time a new resource is instantiated on the Device and if that resource is
2487 discoverable by a remote Device then that resource is published with the “/oic/res” resource
2488 that is local to the Device (as the instantiated resource).

2489 b) A Device wanting to discover resources or Resource Types on one or more remote Devices
2490 makes a RETRIEVE request to the “/oic/res” on the remote Devices. This request may be sent
2491 multicast (default) or unicast if only a specific host is to be probed. The RETRIEVE request
2492 may optionally be restricted using appropriate clauses in the query portion of the request.
2493 Queries may select based on Resource Types, interfaces, or properties.

2494 c) The query applies to the representation of the resources. “/oic/res” is the only resource whose
2495 representation has “rt”. So “/oic/res” is the only resource that can be used for Multicast
2496 discovery at the transport protocol layer.

2497 d) The Device receiving the RETRIEVE request responds with a list of resources, the Resource
2498 Type of each of the resources and the interfaces that each resource supports. Additionally,
2499 information on the policies active on the resource can also be sent. The policy supported
2500 includes observability and discoverability. (More details below)

2501 e) The receiving Device may do a deeper discovery based on the resources returned in the
2502 request to “/oic/res”.

2503

2504 The information that is returned on discovery against “/oic/res” is at the minimum:

- 2505 • The URI (relative or fully qualified URL) of the resource
- 2506 • The Resource Type(s) of each resource. More than one Resource Type may be returned if the
- 2507 resource enables more than one type. To access resources of multiple types, the specific
- 2508 Resource Type that is targeted shall be specified in the request.
- 2509 • The Interfaces supported by that Resource. Multiple interfaces may be returned. To access a
- 2510 specific interface that interface shall be specified in the request. If the interface is not specified,
- 2511 then the Default Interface is assumed.

2512 Different "/oic/res" responses are returned according to requesting Clients, which indicate their
2513 preference via inclusion or otherwise of an OCF-Accept-Content-Format-Version option.

2514 For Clients that do not include the OCF-Accept-Content-Format-Version option, an "/oic/res"
2515 response shall use "sec" and "port" to provide the information for an encrypted connection. See
2516 E.2.8 for the schema for the Link.

2517 For Clients that do include the OCF-Accept-Content-Format-Version option, an "/oic/res" response
2518 includes an "array of Links" to conform to IETF RFC 6690. Each Link shall use an "eps" Parameter
2519 to provide the information for an encrypted connection and carry "anchor" of the value OCF URI
2520 where the authority component of <deviceId> indicates the Device hosting the target Resource.

2521 The JSON schema for discovery using "/oic/res" is described in D.9; the schema that is applicable
2522 to requesting Clients that do not include an OCF-Accept-Content-Format-Version option is
2523 described in E.4 and E.5. Also refer to section 10 (Endpoint Discovery) for details of Multicast
2524 discovery using "/oic/res" on a CoAP transport.

2525 For example, a Light device might return the following to OIC 1.1 clients:

```

2526 [
2527   {
2528     "di": "e61c3e6b-9c54-4b81-8ce5-f9039c1d04d9",
2529     "links": [
2530       {
2531         "href": "coaps://[fe80::b1d6]:44444/oic/res",
2532         "rel": "self",
2533         "rt": ["oic.wk.res"],
2534         "if": ["oic.if.ll", "oic.if.baseline"],
2535         "p": {"bm": 3}
2536       },
2537       {
2538         "href": "/oic/p",
2539         "rt": ["oic.wk.p"],
2540         "if": ["oic.if.r", "oic.if.baseline"],
2541         "p": {"bm": 3, "sec": true, "port": 11111}
2542       },
2543       {
2544         "href": "/oic/d",
2545         "rt": ["oic.wk.d", "oic.d.light"],
2546         "if": ["oic.if.r", "oic.if.baseline"],
2547         "p": {"bm": 3, "sec": true, "port": 11111}
2548       },
2549       {
2550         "href": "/myLight",
2551         "rt": ["oic.r.switch.binary"],
2552         "if": ["oic.if.a", "oic.if.baseline"],
2553         "p": {"bm": 3, "sec": true, "port": 11111}
2554       }
2555     ]
2556   }
2557 ]

```


2558 The light device might return the following to clients that request with the Content Format of
2559 "application/vnd.ocf+cbor" in Accept Option:

```
2560 [
2561   {
2562     "href": "/oic/res",
2563     "anchor": "ocf://dc70373c-1e8d-4fb3-962e-017eaa863989/oic/res",
2564     "rel": "self",
2565     "rt": ["oic.wk.res"],
2566     "if": ["oic.if.ll", "oic.if.baseline"],
2567     "p": {"bm": 3},
2568     "eps": [{"ep": "coap://[fe80::b1d6]:44444"}]
2569   },
2570   {
2571     "href": "/oic/p",
2572     "anchor": "ocf://dc70373c-1e8d-4fb3-962e-017eaa863989",
2573     "rt": ["oic.wk.p"],
2574     "if": ["oic.if.r", "oic.if.baseline"],
2575     "p": {"bm": 3},
2576     "eps": [{"ep": "coap://[fe80::b1d6]:44444"},
2577             {"ep": "coaps://[fe80::b1d6]:11111"}]
2578   },
2579   {
2580     "href": "/oic/d",
2581     "anchor": "ocf://dc70373c-1e8d-4fb3-962e-017eaa863989",
2582     "rt": ["oic.wk.d", "oic.d.light"],
2583     "if": ["oic.if.r", "oic.if.baseline"],
2584     "p": {"bm": 3},
2585     "eps": [{"ep": "coap://[fe80::b1d6]:44444"},
2586             {"ep": "coaps://[fe80::b1d6]:11111"}]
2587   },
2588   {
2589     "href": "/myLight",
2590     "anchor": "ocf://dc70373c-1e8d-4fb3-962e-017eaa863989",
2591     "rt": ["oic.r.switch.binary"],
2592     "if": ["oic.if.a", "oic.if.baseline"],
2593     "p": {"bm": 3},
2594     "eps": [{"ep": "coap://[fe80::b1d6]:44444"},
2595             {"ep": "coaps://[fe80::b1d6]:11111"}]
2596   }
2597 ]
2598
2599
2600
```

2601 After performing discovery using "/oic/res", Clients may discover additional details about Server
2602 by performing discovery using "/oic/p", /oic/rts etc. If a Client already knows about Server it may
2603 discover using other resources without going through the discovery of "/oic/res".

2604 11.3.6 Resource directory (RD) based discovery

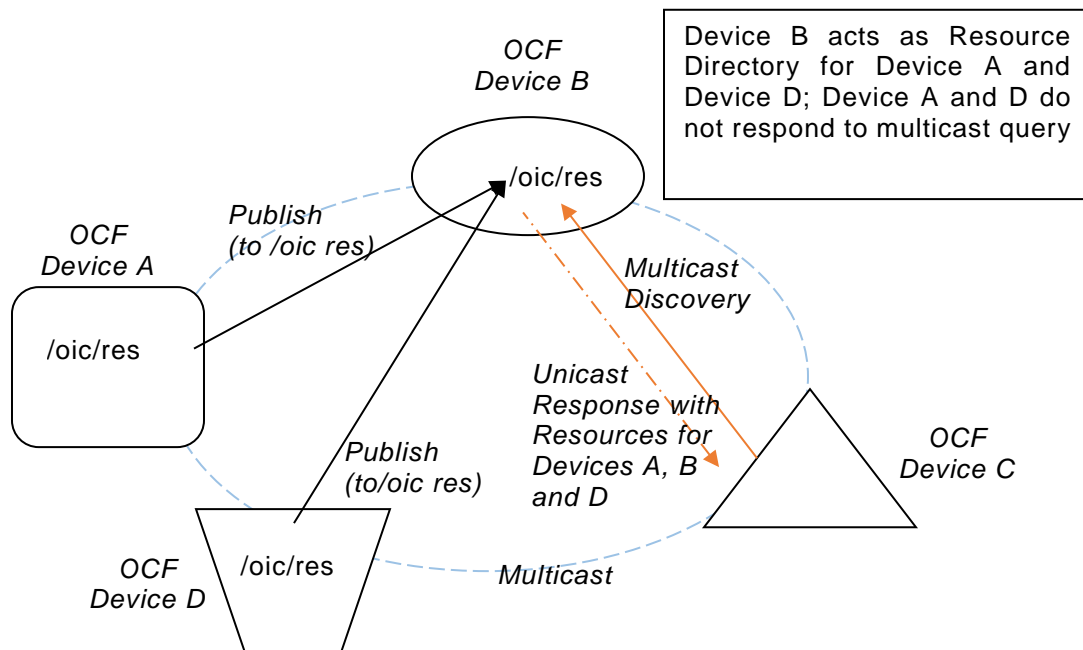
2605 11.3.6.1 Introduction

2606 11.3.6.1.1 Indirect discovery for lookup of the Resources

2607 Direct discovery is the mechanism used currently to find Resources in the network. When needed,
2608 Resources are queried at a particular Device directly or a multicast packet is sent to all Devices.
2609 Each queried Device responds directly with its Resources to the discovering Device. Resources
2610 available locally are registered on the same Device.

2611 In some situations, one of the other mechanisms described in section 11.3.2.3, called indirect
2612 discovery, may be required. Indirect discovery is when a 3rd party Device, other than the

2613 discovering Device and the discovered Device, assists with the discovery process. The 3rd party
 2614 Device, called Resource Directory (RD), only provides information on Resources on behalf of
 2615 another Device but does not host Resources on part of that Device.



2616

2617

Figure 16. Indirect discovery of Resources by via an RD

2618 In Figure 16, Device B acts as Resource Directory for Device A and Device D. Device A and Device
 2619 D publish their Resource information to Device B. Device C may query Device B to acquire the
 2620 Resource information of Device A and Device D. Device A and Device D may not respond to a
 2621 multicast query when Device B, as a Resource Directory, responds to the query on their behalf.

2622 Indirect discovery is useful for a constrained Device that needs to sleep to manage power and
 2623 cannot process every discovery request, or when Devices may not be on the same network and
 2624 requires optimization for discovery. Once Resources are discovered using indirect discovery, i.e.,
 2625 RD query, then the access to the Resource is done by a request sent directly to the Device that
 2626 hosts that Resource.

2627 11.3.6.1.2 Resource directory

2628 A Resource Directory (RD) is a Device that assists with indirect discovery. A Device which acts as
 2629 an RD will be involved in the following operations.

- 2630 • **RD discovery** – the procedure with which publishing Devices discover an RD and acquire the
 2631 criteria to select from among multiple detected RDs.
- 2632 • **Resource publish** – the procedures with which Devices publish their Resource information,
 2633 i.e. Links. Future revision of this specification will allow modifying RD entries with UPDATE
 2634 and DELETE operations. Any UPDATE or DELETE operations performed on an RD in this
 2635 specification should be either silently ignored or generate an error.
- 2636 • **Resource exposure** – the feature with which RDs expose the Links hosted by the 3rd party
 2637 Devices via their own "/oic/res".

2638 For the above, RDs make use of Resource Type "oic.wk.rd" defined in Table 22 and Table 23. A
 2639 Device that supports the capability to host indirect discovery shall expose an instance of "oic.wk.rd"
 2640 in its "/oic/res" to announce that it serves as an RD. The discoverable instance of "oic.wk.rd" shall

2641 allow only secure connections (e.g. endpoint with a scheme of "coaps" or "coaps+tcp"). A
 2642 publishing Device may send a RETRIEVE request to "/oic/rd" to acquire the selection criteria
 2643 among multiple RDs. Then it may send an UPDATE request to "/oic/rd" with its Links in the
 2644 payload to publish the Links in "/oic/res" of the RD. A publishing Device is responsible to insure
 2645 an RD has the correct published Links to expose via its "/oic/res".

2646 **Table 22. "oic.wk.rd" Resource Type definition**

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

2647

2648 **Table 23. "oic.wk.rd" Properties**

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

2649

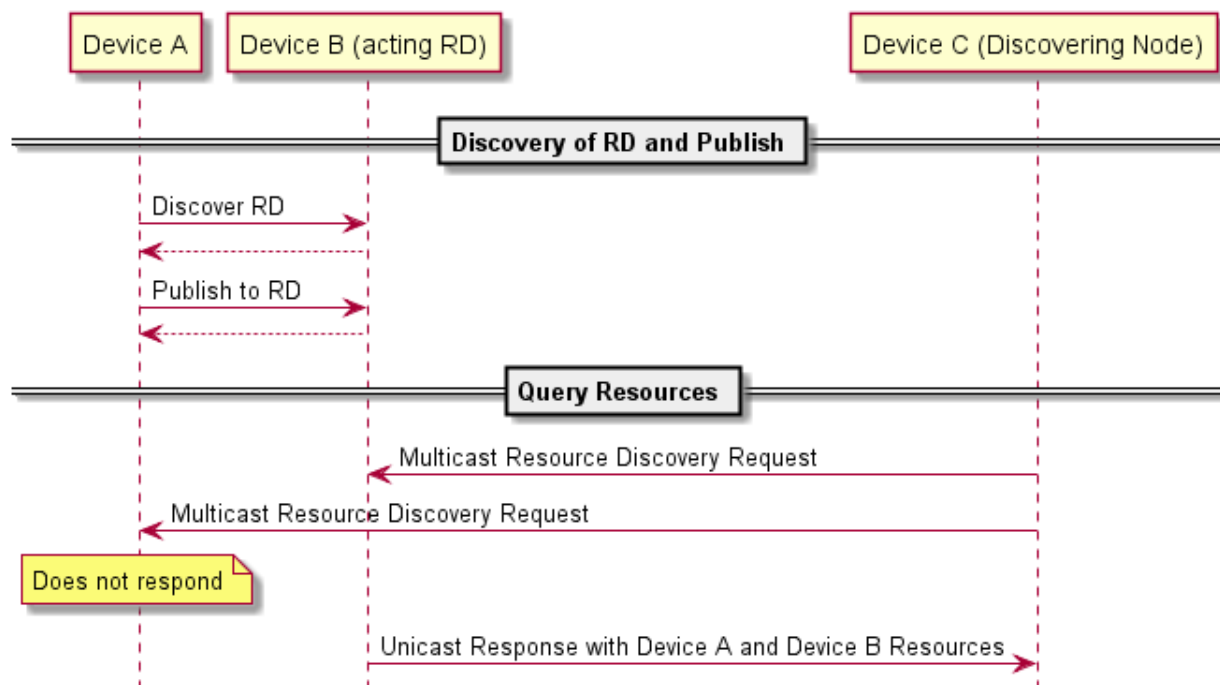
2650 An RD may be queried at its "/oic/res" Resource to find Resources hosted on other Devices. These
 2651 Devices can be sleepy nodes or any other device that cannot or may not respond to discovery
 2652 requests. A publishing Device may publish all or a partial list of Resources they host to an RD.
 2653 The RD then responds to queries for Resource discovery on behalf of the publishing Device (for
 2654 example: when a Device may go to sleep). For general Resource discovery, the RD behaves like
 2655 any other Server in responding to requests to "/oic/res".

2656 The remainder of section 11.3.6 is divided into three parts. The first part covers "RD Discovery"
 2657 (section 11.3.6.2), i.e., discovering and selecting of an RD. The second part covers "Resource
 2658 publish" (section 11.3.6.3), i.e., publishing of Resources. The third part covers "Resource
 2659 exposure" (section 11.3.6.4) where the RD replies to queries from Devices looking to discover
 2660 Resources.

2661 **11.3.6.2 RD discovery**

2662 **11.3.6.2.1 Discovering an RD**

2663 An RD shall support RD discovery.



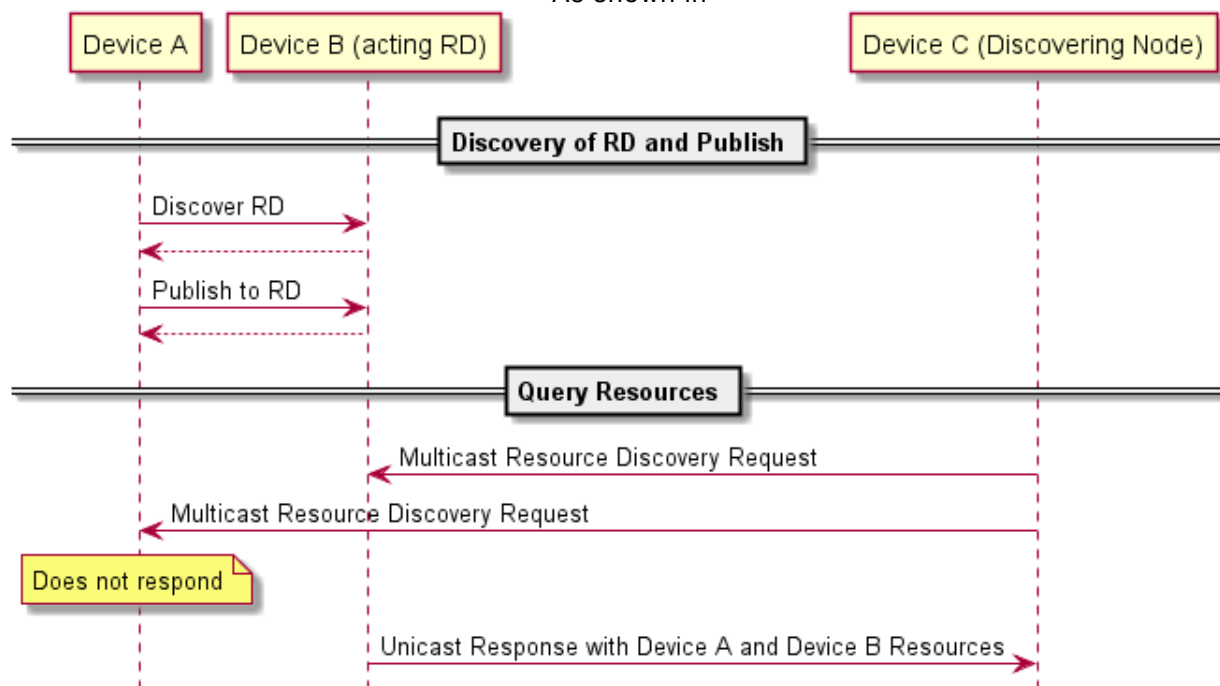
2664

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

2665

2666

As shown in



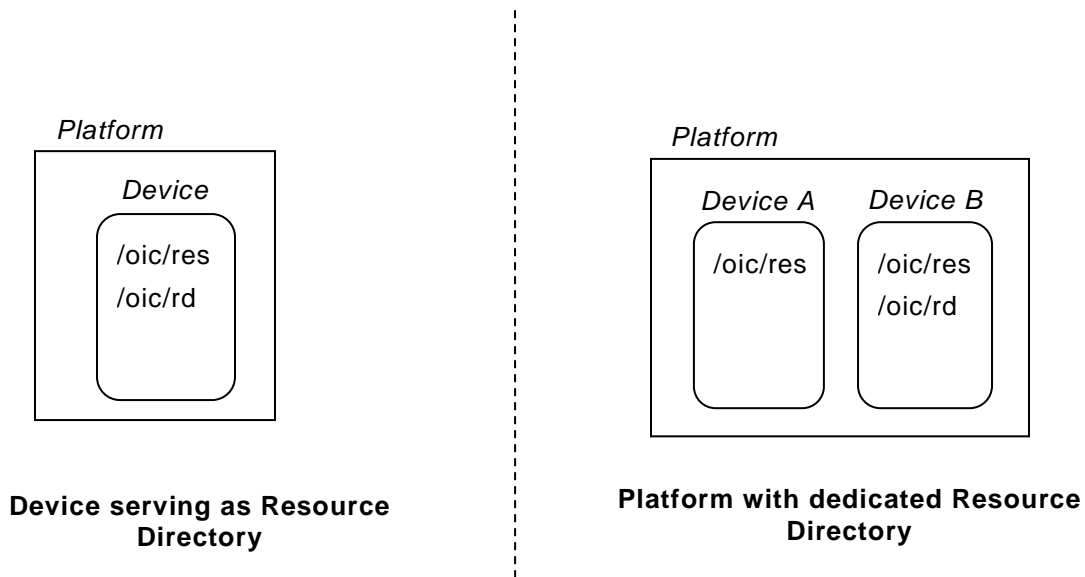
2667

2668 Figure 17, a Device that wishes to publish its Resources first discovers an RD and then publishes
 2669 the desired Resource information. Once a set of Resources have been published to an RD then
 2670 the publishing Device should not respond to multicast Resource discovery queries for those
 2671 published Resources when the RD is on the same multicast domain. In that case, only the RD
 2672 should respond to multicast Resource discovery requests on the Resource published to it.

2673 It is allowed for more than one Device to act as an RD. The reason to have multiple RD support is
2674 to make networks scalable, handle network failures and prevent centralized Device failure
2675 bottlenecks. This does not preclude a scenario where a use case or deployment environment may
2676 require a single Device in the environment to be deployed as the only RD (e.g. gateway model).

2677 Discovering an RD may result in responses from more than one RD. If more than one RD responds,
2678 the discovering Device may select one of them based on the weighting parameter(s) provided in
2679 the response from the RD.

2680 A Client that performs Resource discovery uses an RD just like it uses any other Server for
2681 discovery. It may send a unicast request to the RD when it needs only the Resources published
2682 on the RD or do a multicast query when it does not require or have explicit knowledge of an RD.



2683

2684

Figure 18. Resource Direction Deployment Scenarios

2685 RDs may also be discovered in the following ways:

2686 • Pre-configuration: Devices wishing to publish Resource information may be configured a priori
2687 with the information (e.g. IP address, port, transport etc.) of a specific RD. This pre-
2688 configuration may be done at onboarding or may be updated on the Device using an out-of-
2689 band method. This pre-configuration may be done by the manufacturer.

2690 • Query-oriented: A publishing Device wanting to discover resource directories using query-
2691 oriented discovery may issue a multicast Resource discovery request for "/oic/res?rt=oic.wk.rd".
2692 Only and all Devices that can be an RD shall respond to this query. The "/oic/rd" response shall
2693 include information about the RD i.e., the presence of "oic.wk.rd" Link (as defined by the
2694 Resource Type) and a subsequent query to "/oic/rd" would produce weighting parameters to
2695 allow the discovering Device to select between RDs (see details in RD selection section
2696 11.3.6.2.2). The "oic.wk.rd" resource shall be instantiated on the Devices acting as RDs. The
2697 "oic.wk.rd" schema is as defined in D.13.

2698 **11.3.6.2.2 RD selection process**

2699 The Device that wants to use an RD will find zero or more RDs on the network. There may not be
2700 an RD within the network. When discovering RDs, the Device needs to select an RD of all RDs
2701 found on the network. The Device may send a RETRIEVE request to "/oic/rd" of a specific RD, the
2702 RD shall respond with the representation of "/oic/rd/" containing selection criteria as defined by

2703 the "sel" Property. The lower the "sel" Property value is, the more preferable the responding RD
2704 is. The creation of the "sel" value is vendor defined.

2705 For example an "/oic/rd" response may return the following.

2706

2707

2708

2709

```
{
  "rt": ["oic.wk.rd"],
  "if": ["oic.if.baseline"],
  "sel": 50
}
```

2710 The selection based on the "sel" Property value will ensure that a Device can judge if the found
2711 RD is suitable for its needs.

2712 The following situations may occur during the selection of an RD:

2713 1) A single or multiple RDs are present in the network

2714 2) No RD is present in the network

2715 3) an additional RD arrives on the network

2716 In the first scenario, the RDs are already present. If a single RD is detected then that RD may be
2717 used. When multiple RDs are detected the Device may use the "sel" Property value to select the
2718 RD.

2719 In the second scenario, the publishing Device may continue looking for an RD until one is found
2720 or give up using an RD altogether.

2721 In the third scenario, the Device has already published its resources to an existing RD, then
2722 discovers a new RD on the network. After judging the "sel" Property value, the Device may choose
2723 to move to the new RD. The Device should delete its Resource information from the currently used
2724 RD and publish the information to the new RD.

2725 **11.3.6.3 Resource publish**

2726 **11.3.6.3.1 Overview**

2727 An RD shall provide the facility to allow Devices to publish their Resource information to an RD.

2728 **11.3.6.3.2 Publish resources**

2729 **11.3.6.3.2.1 Overview**

2730 After the selection process of an RD, a device may push its Resource information to the selected
2731 RD, i.e., publish the Links in its "/oic/res" to the "/oic/res" of the RD.

2732 The publishing Device may decide to publish all Resources or just a few of the Resources on the
2733 RD. The publishing Device should only publish Resources that are otherwise published to its own
2734 "/oic/res"; a publishing Device should not publish non-discoverable Resources or Resources
2735 hosted by some other Device. A publishing Device shall respond to discovery requests on its
2736 "/oic/res" resource unless all its discoverable Resources have been published in an RD.

2737 **11.3.6.3.2.2 Publish: Push Resource information**

2738 Resource information may be published using an UPDATE request sent to "/oic/rd".

2739 A Device which hosts a Resource may publish the Resource information, i.e. the Link targeting the
2740 Resource, to an RD by sending an UPDATE request with the Link in the payload. The published
2741 Link shall be exposed through the "/oic/res" of the RD.

2742 When a Device first publishes a Link or Links, it shall send an UPDATE request to the "/oic/rd"
2743 Resource of the RD including the following key-value pairs in the payload:

- 2744 • **di** –its value shall be the Device ID of the publishing Device, i.e. the "di" value of "/oic/d".
- 2745 • **links** –its value shall be the array of Links to be published. Links may omit the "ins" parameter
2746 in which case the RD will assign a value for each Link. The supplied "ins" parameter by the
2747 Client is allowed to be overruled by the RD, e.g. an RD can ignore the supplied "ins" value.
- 2748 • **tll** –its value indicates how long (in seconds) the publishing Device requests the RD to keep
2749 this published Link.

2750 Take notice that the payload shall carry the appropriate Content-Format of
2751 "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"}
      ]
    }
  ],
  "tll": 600
}
```

2752

2753 When an RD receives this initial UPDATE request, it determines whether to grant the request or
2754 not. Upon granting the request, the RD shall send back an UPDATE response to the publishing
2755 Device. The response shall include a payload with the same information as the original UPDATE
2756 request with the following possible differences:

- 2757 • For each Link, an "ins" Parameter shall be included in the response. The RD shall assign a
2758 unique "ins" value identifying the Link among all the Links it advertises. If the publishing Device
2759 included an "ins" value in the UPDATE request, the RD may use it as long as it doesn't match
2760 any existing "ins" value in the published Links.
- 2761 • The "ttl" Property Value shall be assigned by the RD and it shall be included in the response.
2762 The RD should use the value included in the UPDATE request but may assign a value that is
2763 lower if it is not able to honour the requested "ttl" value. After this time elapses, the RD shall
2764 remove the Links. To keep a Link alive the publishing Device may update the "ttl" using the
2765 UPDATE schema.

2766 The RD shall add the new Links to its "/oic/res" and expose them to a valid discovery query, i.e.
2767 RETRIEVE request:

2768

```
{
  "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
  }
```

2769

2770 Once a publishing Device has published Resources to an RD, it may choose not to respond to the
2771 multicast discovery queries for the same Resources against its own `"/oic/res"`, especially when on
2772 the same multicast domain as the RD. After publishing Resources, primarily it is the RDs
2773 responsibility to reply to the queries for the published Resources.

2774 There is another possibility that the RD and the publishing Device both respond to the multicast
2775 query from the discovering Device. This will create a duplication of the information but is an
2776 alternative that may be used for non-robust networks. It is not a recommended option but for
2777 industrial scenarios, this is one of the possibilities. Either way, discovering Clients need to always
2778 be prepared to process duplicate information in responses to multicast discovery request. The
2779 `"/oic/rd"` schema is as defined in D.13 to specify publishing to the `"/oic/rd"` Resource.

2780 **11.3.6.4 Resource exposure**

2781 **11.3.6.4.1 `"/oic/res"` and retrieving of the Resources**

2782 The `"/oic/res"` based discovery process remains the same as that in the absence of an RD.
2783 Resources may be discovered by retrieving the `"/oic/res"` Resource by sending a multicast or
2784 unicast request. In the case of a multicast discovery request, an RD shall include in its response
2785 any published Resources on behalf of the Device that hosts the Resources. Clients should be
2786 prepared to process duplicate Resource information from more than one RD responding with the
2787 same information or from an RD and the hosting Device (publishing the Resource information) both
2788 responding to the request. Interaction with Resources discovered using the RD is done using the
2789 same mechanism and methods as with Resources discovered by retrieving the `"/oic/res"` Resource
2790 of the Device hosting the Resources (e.g., connect to the hosting Device and perform CRUDN
2791 operations on the Resource).

2792 Resource Directories provide different `"/oic/res"` responses according to the requesting Clients,
2793 which indicate their preference with content format. OCF 1.0 Clients request with a "Content
2794 Format of `"application/vnd.ocf+cbor"` in the Accept Option, whereas the Content-Format
2795 `"application/cbor"` in the Accept Option indicates OIC 1.1 Clients. For OIC 1.1 Clients, the `"/oic/res"`
2796 response includes Links conforming to OIC 1.1 specification, which OIC 1.1 Clients can understand.
2797 In this case the Resources hosted by the same Device shall be grouped together within a single
2798 JSON Object with `"di"` indicating the hosting Device. For a 3rd party Resource, i.e., a Resource
2799 which doesn't belong to the responding RD, its `"href"` value shall be a fully qualified transfer
2800 protocol URI with an IP address and port number as its authority component (e.g.,
2801 `coaps://[2001:db8:b::c2e5]:22222/myLightSwitch`).

2802 For example, an RD might return the following to an OIC 1.1 Clients:

```
2803 [
2804   {
2805     "di": "88b7c7f0-4b51-4e0a-9faa-cfb439fd7f49",
2806     "links": [
2807       {
2808         "href": "/oic/res",
2809         "rel": "self",
2810         "rt": ["oic.wk.res"],
2811         "if": ["oic.if.ll", "oic.if.baseline"],
2812         "p": {"bm": 3, "sec": false}
2813       }
2814     ]
2815   }
2816 ]
```

```

2813     },
2814     {
2815         "href": "/oic/d",
2816         "rt": ["oic.wk.d", "oic.d.fan"],
2817         "if": ["oic.if.r", "oic.if.baseline"],
2818         "p": {"bm": 3, "sec": false}
2819     },
2820     {
2821         "href": "/oic/p",
2822         "rt": ["oic.wk.p"],
2823         "if": ["oic.if.r", "oic.if.baseline"],
2824         "p": {"bm": 3, "sec": true, "port": 33333}
2825     },
2826     {
2827         "href": "/myFanIntrospection",
2828         "rt": ["oic.wk.introspection"],
2829         "if": ["oic.if.r", "oic.if.baseline"],
2830         "p": {"bm": 3, "sec": true, "port": 33333}
2831     },
2832     {
2833         "href": "/oic/rd",
2834         "rt": ["oic.wk.rd"],
2835         "if": ["oic.if.baseline"],
2836         "p": {"bm": 3, "sec": true, "port": 33333}
2837     },
2838     {
2839         "href": "/myFanSwitch",
2840         "rt": ["oic.r.switch.binary"],
2841         "if": ["oic.if.a", "oic.if.baseline"],
2842         "p": {"bm": 3, "sec": true, "port": 33333}
2843     },
2844     {
2845         "href": "/oic/sec/doxm",
2846         "rt": ["oic.r.doxm"],
2847         "if": ["oic.if.baseline"],
2848         "p": {"bm": 1, "sec": false}
2849     },
2850     {
2851         "href": "/oic/sec/pstat",
2852         "rt": ["oic.r.pstat"],
2853         "if": ["oic.if.baseline"],
2854         "p": {"bm": 1, "sec": true, "port": 33333}
2855     },
2856     {
2857         "href": "/oic/sec/cred",
2858         "rt": ["oic.r.cred"],
2859         "if": ["oic.if.baseline"],
2860         "p": {"bm": 1, "sec": true, "port": 33333}
2861     },
2862     {
2863         "href": "/oic/sec/acl2",
2864         "rt": ["oic.r.acl2"],
2865         "if": ["oic.if.baseline"],
2866         "p": {"bm": 1, "sec": true, "port": 33333}
2867     }
2868 ]
2869 },
2870 {
2871     "di": "dc70373c-1e8d-4fb3-962e-017eaa863989",
2872     "links": [
2873         {
2874             "href": "coap://[2001:db8:b::c2e5]:66666/oic/d",
2875             "rt": ["oic.wk.d", "oic.d.light", "oic.d.virtual"],

```

```

2876     "if": ["oic.if.r", "oic.if.baseline"],
2877     "p": {"bm": 3, "sec": false}
2878   },
2879   {
2880     "href": "coaps://[2001:db8:b::c2e5]:22222/oic/p",
2881     "rt": ["oic.wk.p"],
2882     "if": ["oic.if.r", "oic.if.baseline"],
2883     "p": {"bm": 3, "sec": true, "port": 22222}
2884   },
2885   {
2886     "href": "coaps://[2001:db8:b::c2e5]:22222/myLightSwitch",
2887     "rt": ["oic.r.switch.binary"],
2888     "if": ["oic.if.a", "oic.if.baseline"],
2889     "p": {"bm": 3, "sec": true, "port": 22222}
2890   },
2891   {
2892     "href": "coaps://[2001:db8:b::c2e5]:22222/myLightBrightness",
2893     "rt": ["oic.r.brightness"],
2894     "if": ["oic.if.a", "oic.if.baseline"],
2895     "p": {"bm": 3, "sec": true, "port": 22222}
2896   }
2897 ]
2898 }
2899 ]
2900 ]

```

2901 For OCF 1.0 Clients, the "/oic/res" response includes the OCF 1.0 Links with the "anchor"
 2902 Parameter containing an OCF URI. The "/oic/res" response has a single array of Links to conform
 2903 to IETF RFC 6690. Each Link shall contain the "anchor" Parameter of the value OCF URI where
 2904 the authority component of <deviceID> indicates the Device hosting the target Resource.

2905 For example, an RD may return the following to an OCF 1.0 Client.

```

2906 [
2907 {
2908   "anchor": "ocf://88b7c7f0-4b51-4e0a-9faa-cfb439fd7f49",
2909   "href": "/oic/res",
2910   "rel": "self",
2911   "rt": ["oic.wk.res"],
2912   "if": ["oic.if.ll", "oic.if.baseline"],
2913   "p": {"bm": 3},
2914   "eps": [{"ep": "coap://[2001:db8:a::b1d4]:7777"},
2915           {"ep": "coaps://[2001:db8:a::b1d4]:33333"}]
2916 },
2917 {
2918   "anchor": "ocf://88b7c7f0-4b51-4e0a-9faa-cfb439fd7f49",
2919   "href": "/oic/d",
2920   "rt": ["oic.wk.d", "oic.d.fan"],
2921   "if": ["oic.if.r", "oic.if.baseline"],
2922   "p": {"bm": 3},
2923   "eps": [{"ep": "coap://[2001:db8:a::b1d4]:7777"},
2924           {"ep": "coaps://[2001:db8:a::b1d4]:33333"}]
2925 },
2926 {
2927   "anchor": "ocf://88b7c7f0-4b51-4e0a-9faa-cfb439fd7f49",
2928   "href": "/oic/p",
2929   "rt": ["oic.wk.p"],
2930   "if": ["oic.if.r", "oic.if.baseline"],
2931   "p": {"bm": 3},
2932   "eps": [{"ep": "coaps://[2001:db8:a::b1d4]:33333"}]
2933 },
2934 ]

```

```

2935     "anchor": "ocf://88b7c7f0-4b51-4e0a-9faa-cfb439fd7f49",
2936     "href": "/myFanIntrospection",
2937     "rt": ["oic.wk.introspection"],
2938     "if": ["oic.if.r", "oic.if.baseline"],
2939     "p": {"bm": 3},
2940     "eps": [{"ep": "coaps://[2001:db8:a::b1d4]:33333"}]
2941   },
2942   {
2943     "anchor": "ocf://88b7c7f0-4b51-4e0a-9faa-cfb439fd7f49",
2944     "href": "/oic/rd",
2945     "rt": ["oic.wk.rd"],
2946     "if": ["oic.if.baseline"],
2947     "p": {"bm": 3},
2948     "eps": [{"ep": "coaps://[2001:db8:a::b1d4]:33333"}]
2949   },
2950   {
2951     "anchor": "ocf://88b7c7f0-4b51-4e0a-9faa-cfb439fd7f49",
2952     "href": "/myFanSwitch",
2953     "rt": ["oic.r.switch.binary"],
2954     "if": ["oic.if.a", "oic.if.baseline"],
2955     "p": {"bm": 3},
2956     "eps": [{"ep": "coaps://[2001:db8:a::b1d4]:33333"}]
2957   },
2958   {
2959     "anchor": "ocf://88b7c7f0-4b51-4e0a-9faa-cfb439fd7f49",
2960     "href": "/oic/sec/doxm",
2961     "rt": ["oic.r.doxm"],
2962     "if": ["oic.if.baseline"],
2963     "p": {"bm": 1},
2964     "eps": [{"ep": "coap://[2001:db8:a::b1d4]:77777"},
2965             {"ep": "coaps://[2001:db8:a::b1d4]:33333"}]
2966   },
2967   {
2968     "anchor": "ocf://88b7c7f0-4b51-4e0a-9faa-cfb439fd7f49",
2969     "href": "/oic/sec/pstat",
2970     "rt": ["oic.r.pstat"],
2971     "if": ["oic.if.baseline"],
2972     "p": {"bm": 1},
2973     "eps": [{"ep": "coaps://[2001:db8:a::b1d4]:33333"}]
2974   },
2975   {
2976     "anchor": "ocf://88b7c7f0-4b51-4e0a-9faa-cfb439fd7f49",
2977     "href": "/oic/sec/cred",
2978     "rt": ["oic.r.cred"],
2979     "if": ["oic.if.baseline"],
2980     "p": {"bm": 1},
2981     "eps": [{"ep": "coaps://[2001:db8:a::b1d4]:33333"}]
2982   },
2983   {
2984     "anchor": "ocf://88b7c7f0-4b51-4e0a-9faa-cfb439fd7f49",
2985     "href": "/oic/sec/acl2",
2986     "rt": ["oic.r.acl2"],
2987     "if": ["oic.if.baseline"],
2988     "p": {"bm": 1},
2989     "eps": [{"ep": "coaps://[2001:db8:a::b1d4]:33333"}]
2990   },
2991   {
2992     "anchor": "ocf://dc70373c-1e8d-4fb3-962e-017eaa863989",
2993     "href": "/oic/d",
2994     "rt": ["oic.wk.d", "oic.d.light"],
2995     "if": ["oic.if.r", "oic.if.baseline"],
2996     "p": {"bm": 3},
2997

```

```

2998     "eps": [{"ep": "coap://[2001:db8:b:c2e5]:66666"},
2999           {"ep": "coaps://[2001:db8:b:c2e5]:22222"}]
3000   },
3001   {
3002     "anchor": "ocf://dc70373c-1e8d-4fb3-962e-017eaa863989",
3003     "href": "/oic/p",
3004     "rt": ["oic.wk.p"],
3005     "if": ["oic.if.r", "oic.if.baseline"],
3006     "p": {"bm": 3},
3007     "eps": [{"ep": "coaps://[2001:db8:b:c2e5]:22222"}]
3008   },
3009   {
3010     "anchor": "ocf://dc70373c-1e8d-4fb3-962e-017eaa863989",
3011     "href": "/myLightSwitch",
3012     "rt": ["oic.r.switch.binary"],
3013     "if": ["oic.if.a", "oic.if.baseline"],
3014     "p": {"bm": 3},
3015     "eps": [{"ep": "coaps://[2001:db8:b:c2e5]:22222"}]
3016   },
3017   {
3018     "anchor": "ocf://dc70373c-1e8d-4fb3-962e-017eaa863989",
3019     "href": "/myLightBrightness",
3020     "rt": ["oic.r.brightness"],
3021     "if": ["oic.if.a", "oic.if.baseline"],
3022     "p": {"bm": 3},
3023     "eps": [{"ep": "coaps://[2001:db8:b:c2e5]:22222"}]
3024   }
3025 ]

```

3026

3027 11.4 Notification

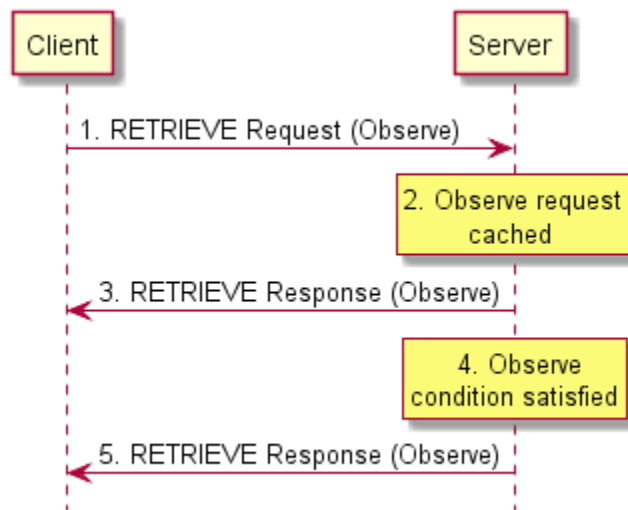
3028 11.4.1 Overview

3029 A Server shall support NOTIFY operation to enable a Client to request and be notified of desired
3030 states of one or more Resources in an asynchronous manner. Section 11.4.2 specifies the observe
3031 mechanism in which updates are delivered to the requester.

3032 11.4.2 Observe

3033 In observe mechanism the Client utilizes the RETRIEVE operation to require the Server for updates
3034 in case of Resource state changes. The Observe mechanism consists of five steps which are
3035 depicted in Figure 19 and described below.

3036 Note: the observe mechanism can only be used for a resource with a property of observable
3037 (section 7.3.2.2).



3039

3040

3041

Figure 19. Observe Mechanism

3042 **11.4.2.1 RETRIEVE request with observe indication**

3043 The Client transmits a RETRIEVE request message to the Server to request updates for the
 3044 Resource on the Server if there is a state change. The RETRIEVE request message carries the
 3045 following parameters:

- 3046 • *fr*: Unique identifier of the Client
- 3047 • *to*: Resource that the Client is requesting to observe
- 3048 • *ri*: Identifier of the RETRIEVE request
- 3049 • *op*: RETRIEVE
- 3050 • *obs*: Indication for observe request

3051 **11.4.2.2 Processing by the Server**

3052 Following the receipt of the RETRIEVE request, the Server may validate if the Client has the
 3053 appropriate rights for the requested operation and the properties are readable and observable. If
 3054 the validation is successful, the Server caches the information related to the observe request. The
 3055 Server caches the value of the *ri* parameter from the RETRIEVE request for use in the initial
 3056 response and future responses in case of a change of state.

3057 **11.4.2.3 RETRIEVE response with observe indication**

3058 The Server shall transmit a RETRIEVE response message in response to a RETRIEVE request
 3059 message from a Client. The RETRIEVE response message shall include the following parameters.
 3060 If validation succeeded, the response includes an observe indication. If not, the observe indication
 3061 is omitted from the response which signals to the requesting client that registration for notification
 3062 was not allowed.

3063 The RETRIEVE response message shall include the following parameters:

- 3064 • *fr*: Unique identifier of the Server
- 3065 • *to*: Unique identifier of the Client

- 3066 • *ri*: Identifier included in the RETRIEVE request
- 3067 • *cn*: Information resource representation as requested by the Client
- 3068 • *rs*: The result of the RETRIEVE operation
- 3069 • *obs*: Indication that the response is made to an observe request

3070 **11.4.2.4 Resource monitoring by the Server**

3071 The Server shall monitor the state the Resource identified in the observe request from the Client.
 3072 Anytime there is a change in the state of the observed resource, the Server sends another
 3073 RETRIEVE response with the observe indication. The mechanism does not allow the client to
 3074 specify any bounds or limits which trigger a notification, the decision is left entirely to the server.

3075 **11.4.2.5 Additional RETRIEVE responses with observe indication**

3076 The Server shall transmit updated RETRIEVE response messages following observed changes in
 3077 the state of the Resources indicated by the Client. The RETRIEVE response message shall include
 3078 the parameters listed in section 11.4.2.3.

3079 **11.4.2.6 Cancelling Observe**

3080 The Client can explicitly cancel observe by sending a RETRIEVE request without the observe
 3081 indication field to the same resource on Server which it was observing. For certain protocol
 3082 mappings, the client may also be able to cancel an observe by ceasing to respond to the
 3083 RETRIEVE responses.

3084 **11.5 Device management**

3085 **11.5.1 Overview**

3086 The Device Management includes the following functions:

- 3087 • Diagnostics and maintenance

3088 The device management functionalities specified in this version of specification are intended to
 3089 address the basic device management features. Addition of new device management features in
 3090 the future versions of the specification is expected.

3091 **11.5.2 Diagnostics and maintenance**

3092 The Diagnostics and Maintenance function is intended for use by administrators to resolve issues
 3093 encountered with the Devices while operating in the field. If diagnostics and maintenance is
 3094 supported by a Device, the Core Resource “/oic/mnt” shall be supported as described in Table 24.

3095 **Table 24. Optional diagnostics and maintenance device management Core Resources**

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

3096

3097 Table 25 defines the “oic.wk.mnt” Resource Type. At least one of the Factory_Reset, and Reboot
 3098 properties shall be implemented.

Table 25. “oic.wk.mnt” Resource Type definition

Property title	Property name	Value type	Value rule	Unit	Access mode	Mandatory	Description
Factory_Reset	fr	boolean			R, W	no	When writing to this Property: 0 – No action (Default*) 1 – Start Factory Reset After factory reset, this value shall be changed back to the default value (i.e., 0). After factory reset all configuration and state data will be lost. When reading this Property, a value of “1” indicates a pending factory reset, otherwise the value shall be “0” after the factory reset.
Reboot	rb	boolean			R, W	no	When writing to this Property: 0 – No action (Default) 1 – Start Reboot After Reboot, this value shall be changed back to the default value (i.e., 0)

3100

3101 Note: * - Default indicates the value of this property as soon as the device is rebooted or factory reset

3102

3103 **11.6 Scenes**3104 **11.6.1 Introduction**

3105 Scenes are a mechanism for automating certain operations.

3106 A scene is a static entity that stores a set of defined resource property values for a collection of
 3107 resources. Scenes provide a mechanism to store a setting over multiple Resources that may be
 3108 hosted by multiple separate Servers. Scenes, once set up, can be used by multiple Clients to recall
 3109 a setup.

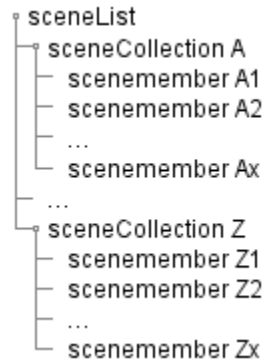
3110 Scenes can be grouped and reused, a group of scenes is also a scene.

3111 In short, scenes are bundled user settings.

3112 **11.6.2 Scenes**3113 **11.6.2.1 Introduction**

3114 Scenes are described by means of resources. The scene resources are hosted by a Server and
 3115 the top level resource is listed in “/oic/res”. This means that a Client can determine if the scene
 3116 functionality is hosted on a Server via Resource discovery as defined in section 11.3. The setup
 3117 of scenes is driven by Client interactions. This includes creating new scenes, and mappings of
 3118 Server resource properties that are part of a scene.

3119 The scene functionality is created by multiple resources and has the structure depicted in Figure
3120 20. The sceneList and sceneCollection resources are overloaded collection resources. The
3121 sceneCollection contains a list of scenes. This list contains zero or more scenes. The
3122 sceneMember resource contains the mapping between a scene and what needs to happen
3123 according to that scene on an indicated resource.

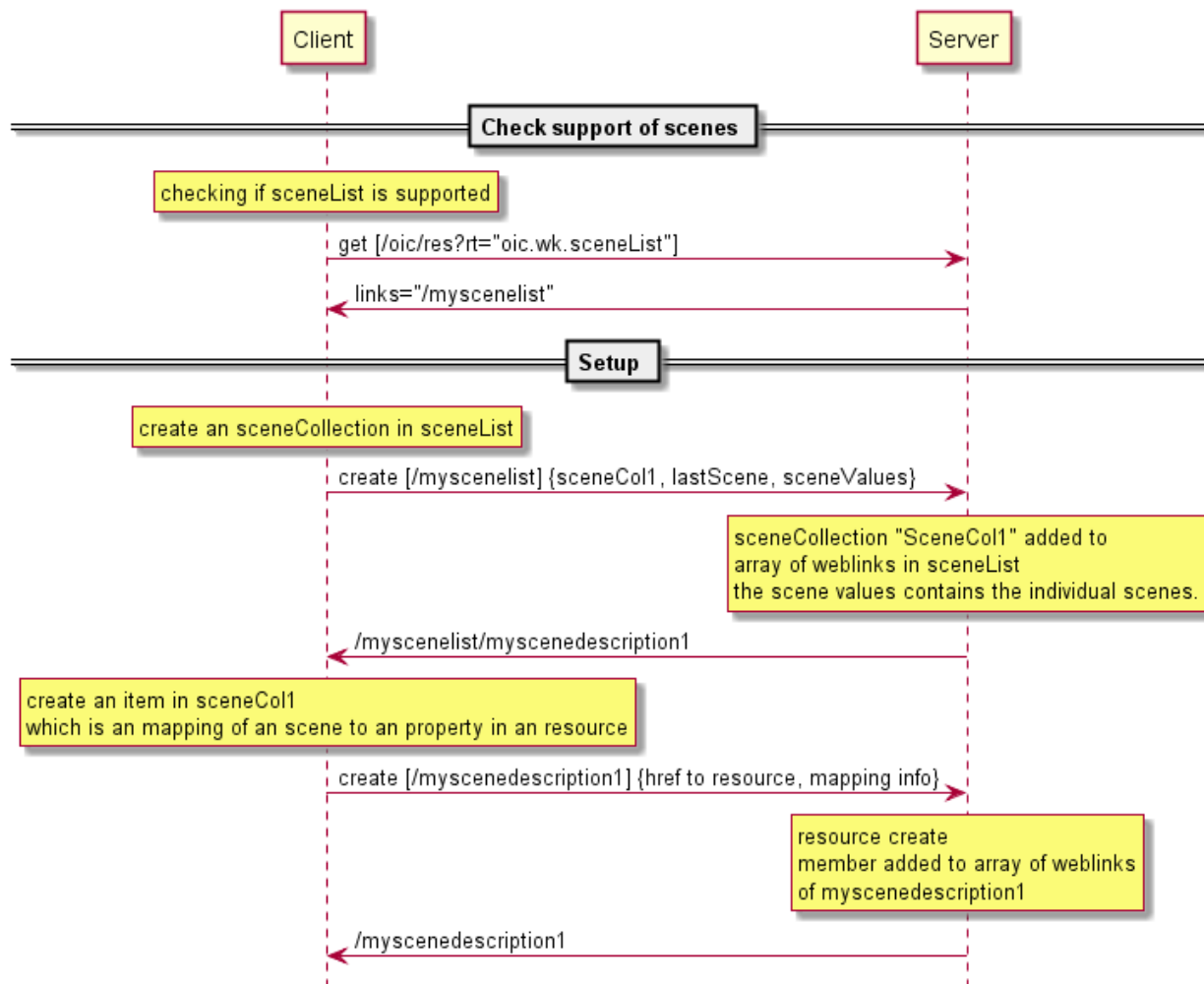


3124

3125 **Figure 20 Generic scene resource structure**

3126 **11.6.2.2 Scene creation**

3127 A Client desiring to interact with scenes needs to first determine if the server supports the scene
3128 feature; the sceneMembers of a scene do not have to be co-located on the server supporting the
3129 scene feature. This can be done by checking if "/oic/res" contains the "rt" of the sceneList resource.
3130 This is depicted in first steps of Figure 21. The sceneCollection is created by the Server using
3131 some out of bound mechanism, Client creation of scenes is not supported at this time. This will
3132 entail defining the scene with an applicable list of scene values and the mappings for each
3133 Resource being part of the scene. The mapping for each resource being part of the sceneCollection
3134 is described by a resource called sceneMember. The sceneMember resource contains the link to
3135 a resource and the mapping between the scene listed in the sceneValues property and the actual
3136 resource property value of the Resource indicated by the link.



3137

3138

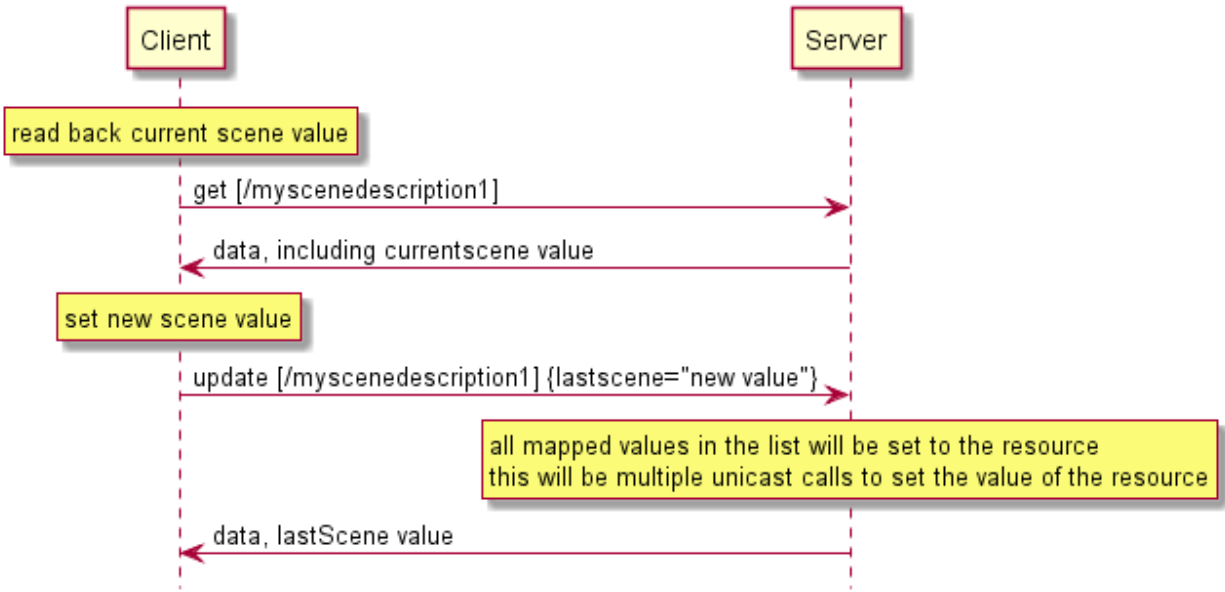
3139

Figure 21 Interactions to check Scene support and setup of specific scenes

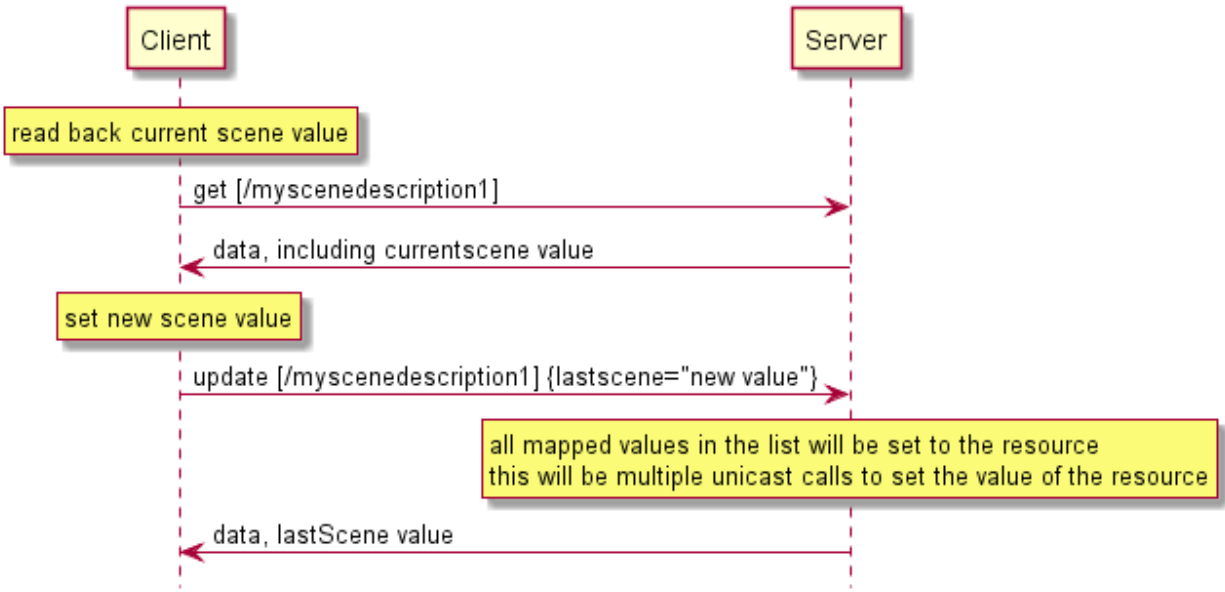
3140

11.6.2.3 Interacting with Scenes

3141 All capable Clients can interact with scenes. The allowed scene values and the last applied scene
 3142 value can be retrieved from the server hosting the scene. The scene value shall be changed by
 3143 issuing an UPDATE operation with a payload that sets the lastScene property to one of the listed
 3144 allowed scene values. These steps are depicted in Figure 22. Note that the lastScene value does
 3145 not imply that the current state of all resources that are part of the scene will be at the mapped
 3146 value. This is due to that the setting the scene values are not modelled as actual states of the
 3147 system. This means that another Client can change just one resource being part of the scene
 3148 without having feedback that the state of the scene is changed.



3149

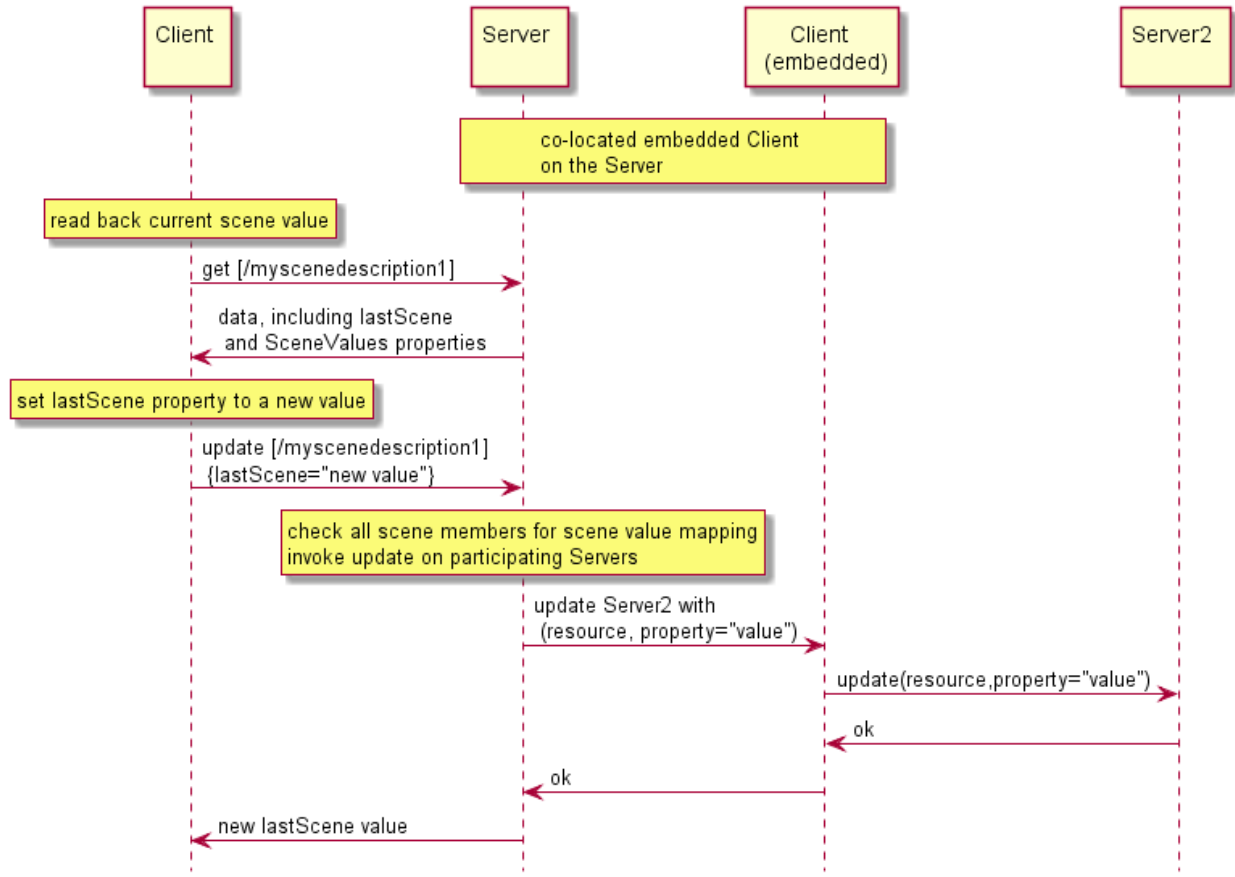


3150

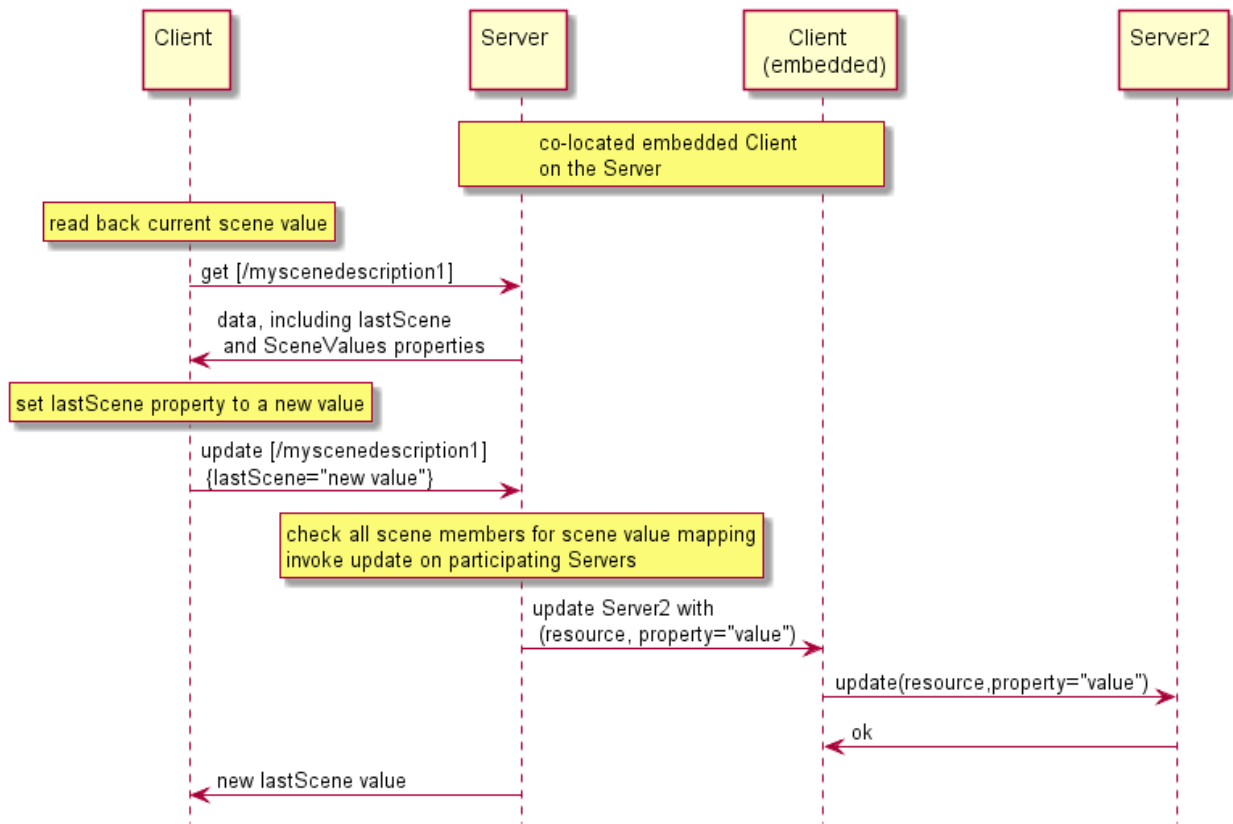
3151

Figure 22 Client interactions on a specific scene

3152 As described previously, a scene can reference one or more resources (i.e., sceneMembers) that
 3153 are present on one or more Servers. The scene members are re-evaluated each time a scene
 3154 change takes place. This evaluation is triggered by a Client that is either embedded as part of the
 3155 Server hosting the scene, or separate to the server having knowledge of the scene via a RETRIEVE
 3156 operation, observing the referenced resources using the mechanism described in section 11.4.2.
 3157 The embedded Client located in the same Device with the Server is a general Client but interacts
 3158 only with scene functionalities. During the evaluation the mappings for the new scene value will be
 3159 applied to the Server. This behaviour is depicted in Figure 23.



3160



3161

Figure 23 Interaction overview due to a Scene change

3162

11.6.2.4 Summary of Resource Types defined for Scene functionality

3163

Table 26 summarizes the list of Resource Types that are part of Scenes.

3164

Table 26 list of Resource Types for Scenes

3165

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

11.6.3 Security considerations

3166

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.

3167

3168

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3171

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.

3172

3173

3174

3175 **11.7 Icons**

3176 **11.7.1 Overview**

3177 Icons are a primitive that are needed by various OCF subsystems, such as bridging. An optional
 3178 Resource Type of “oic.r.icon” has been defined to provide a common representation of an icon
 3179 Resource that can be used by Devices.

3180 **11.7.2 Resource**

3181 The icon Resource is as defined in Table 27.

3182 **Table 27. 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 Resource properties exposed by “/example/oic/mnt” are listed in Table 28.	Icon

3183

3184 Table 28 defines the details for the “oic.r.icon” Resource Type.

3185 **Table 28. “oic.r.icon” Resource Type definition**

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

3186

3187 **11.8 Introspection**

3188 **11.8.1 Overview**

3189 Introspection is a mechanism to announce the capabilities of Resources hosted on the Device.

3190 The intended usage of the Introspection Device Data is to enable dynamic clients. E.g. clients that
 3191 can use the Introspection Device Data to generate dynamically an UI or dynamically create
 3192 translations of the hosted Resources to another eco-system. Other usages of the Introspection is
 3193 that the information can be used to generate client code. The Introspection Device Data is designed
 3194 to augment the existing data already on the wire. This means that existing mechanism needs to
 3195 be used to get a full overview of what is implemented in the Device. For example the Introspection
 3196 Device Data does not convey information about observe, since that is already conveyed with the
 3197 “p” Property on the links in “/oic/res” (see section 7.8.2.1.2).

3198 The Introspection Device Data is recommended to be conveyed as "static" data. Meaning that the
3199 data does not change during the uptime of a Device. However when the data is not static the
3200 Introspection Resource shall indicate to be observable and the url Property value of
3201 "oic.wk.introspection" Resource shall change to indicate that the Introspection Device Data is
3202 changed.

3203 The Introspection Device Data describes the Resources that make up the Device. For the complete
3204 list of included Resources Table 13. The Introspection Device Data is described as a swagger2.0
3205 in JSON format file. The swagger2.0 file will contain the description of the Resources as defined
3206 below: All Resources with the next remarks:

3207 • The Introspection Device Data will use the HTTP syntax, e.g., define the CRUDN operation as
3208 HTTP methods and use the HTTP status codes.

3209 • The Introspection Device Data does not have to define all the status codes that indicate an
3210 error situation.

3211 • The Introspection Device Data does not have to define a schema when the status code
3212 indicates that there is no payload (see HTTP status code 204 as an example)

3213 • The URLs of the Resources in the Introspection Device Data shall be without the endpoint
3214 description, e.g. it shall not be a full URL but only the relative path from the endpoint. The
3215 relative path shall be the same as being conveyed by "/oic/res".

3216 • "/oic/res" Resource shall not be listed in the Introspection Device Data unless 3rd party defined
3217 or optional Properties are implemented.

3218 • The Resources "/oic/d", "/oic/p", the Introspection Resource and the Security Virtual Resources
3219 may be included in the Introspection Device Data.

3220 • The "/oic/d", "/oic/p", "/oic/res" and the Security Virtual Resources shall be included when 3rd
3221 party defined or optional Properties are implemented. All other Core Specification defined
3222 Resources shall be included when 3rd party defined Properties are implemented.

3223 • When the Device does not expose instances of Vertical Resource Types, and does not have
3224 any 3rd party defined Resources (see section 7.9), and does not need to include Resources in
3225 the Introspection Resource Data due to other clauses in this section, then the Introspection
3226 Device Data shall be an empty Swagger2.0 file. An example of an empty Swagger2.0 file can
3227 be found in found in Annex G.2:

3228 • All other Resources are required to be listed in the Introspection Device Data.

3229 • Per Resource it will include:

3230 ○ All Implemented Methods

3231 ■ For an OCF defined Resource, only the methods that are standardized are
3232 allowed to exist in the Introspection Device Data. The supported methods
3233 shall comply with the listed Interfaces. For example, if an Interface is listed
3234 that allows updates then the update method shall be listed. It is not allowed
3235 to have methods listed for OCF defined Resources that does not have this
3236 method defined.

3237 ○ Per Supported Method:

3238 ■ Implemented queryParameters per Method.

3239 • This includes the supported interfaces ("if") as enum value.

3240 ■ Schemas of the payload for the request and response bodies of the Method

3241 ■ The schema data shall be conveyed by the swagger schema object as
3242 defined in the parameters section.

3243 ■ The swagger2.0 schema object shall comply with:

- 3244
- 3245
- 3246
- 3247
- 3248
- 3249
- 3250
- 3251
- 3252
- 3253
- 3254
- 3255
- 3256
- 3257
- 3258
- 3259
- 3260
- The schemas shall be fully resolved, e.g. no references shall exist outside the swagger file.
 - The schemas shall list which interfaces are supported on the method.
 - The schemas shall list if a Property is optional or required.
 - The schemas shall include all Property validation keywords. Where an enum is defined the enum shall contain the values supported by the Device. When vendor defined extensions exist to the enum (defined in accordance to Section 7.9) these shall be included in the enum.
 - The schemas shall indicate if an Property is read only or read-write
 - By means of the readOnly schema tag belonging to the Property
 - The default value of the “rt” Property shall be used to indicate the supported Resource Types.
 - oneOf and anyOf constructs are allowed to be used as part of an Swagger2.0 schema object. The Swagger2.0 schema with oneOf and anyOf constructs can be found in Annex G.1.

3261 Dynamic Resources (e.g. Resources that can be created up on a request by a Client) shall have a
3262 URL definition which contains a URL identifier (e.g. using the {} syntax). A URL with {} identifies
3263 that the Resource definition applies to the whole group of Resources that can be created. The
3264 actual path can contain the collection node that links to the Resource.

3265 Example of an URL with identifiers:

3266 /SceneListResURI/{SceneCollectionResURI}/{SceneMemberResURI}:

3267 When different Resource Types are allowed to be created in a collection, then the different
3268 schemas for the create method shall define all possible Resource Types that can be created. The
3269 schema construct oneOf allows the definition of a schema with selectable Resources. The oneOf
3270 construct allows the integration of all schemas and that only one existing sub schemas shall be
3271 used to indicate the definition of the Resource that can be created.

3272 Example usage of oneOf JSON schema construct:

```
3273 {  
3274   "oneOf": [  
3275     { <<subschema 1 definition>> },  
3276     { << sub schema 2 definition >> }  
3277   ...  
3278   ]  
3279 }
```

3280

3281 A Client using the Introspection Device Data of a Device should check the version of the supported
3282 Introspection Device Data of the Device. The swagger version is indicated in each file with the tag
3283 "swagger". Example of the 2.0 supported version of the tag is: "swagger": "2.0". Later versions of
3284 the spec may reference newer versions of the swagger specification, for example 3.0.

3285 A Server shall support one Resource with a Resource Type of “oic.wk.introspection” as defined in
 3286 Table 29. The Resource with a Resource Type of “oic.wk.introspection” shall be included in the
 3287 Resource “/oic/res”.

3288 **Table 29. 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

3289
 3290 Table 30 defines “oic.wk.introspection” Resource Type.

3291 **Table 30. “oic.wk.introspection” Resource Type definition**

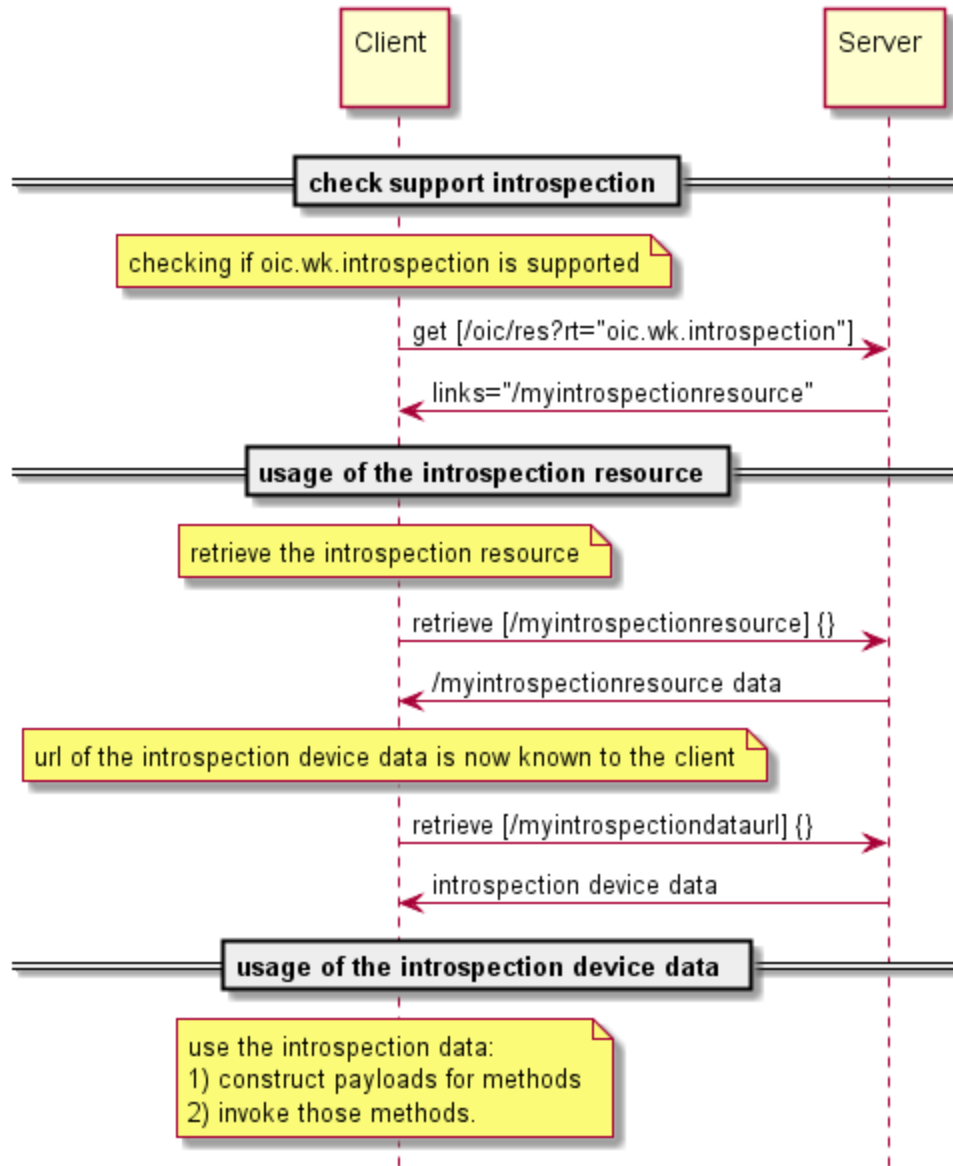
Property title	Property name	Value type	Value rule	Unit	Access mode	Mandatory	Description
urlInfo	urlInfo	array			R	yes	array of objects
url	url	string	uri		R	yes	URL to the hosted payload
protocol	protocol	string	enum		R	yes	Protocol definition to retrieve the Introspection Device Data from the url.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

3292 **11.8.2 Usage of introspection**

3293 The Introspection Device Data is retrieved in the following steps:

- 3294 1) Check if the Introspection Resource is supported and retrieve the URL of the Resource.
- 3295 2) Retrieve the contents of the Introspection Resource
- 3296 3) Download the Introspection Device Data from the URL specified the Introspection Resource.
- 3297 4) Usage of the Introspection Device Data by the Client

3298



3299

Figure 24 Interactions to check Introspection support and download the Introspection Device Data.

3300

3301

3302 12 Messaging

3303 12.1 Introduction

3304 This section specifies the protocol messaging mapping to the CRUDN messaging operations
 3305 (section 8) for each messaging protocol specified (e.g., CoAP.). Mapping to additional protocols is
 3306 expected in later version of this specification. All the property information from the resource model
 3307 shall be carried within the message payload. This payload shall be generated in the resource
 3308 model layer and shall be encapsulated in the data connectivity layer. The message header shall
 3309 only be used to describe the message payload (e.g., verb, mime-type, message payload format),
 3310 in addition to the mandatory header fields defined in messaging protocol (e.g., CoAP) specification.
 3311 If the message header does not support this, then this information shall also be carried in the
 3312 message payload. Resource model information shall not be included in the message header
 3313 structure unless the message header field is mandatory in the messaging protocol specification.

3314 When a Resource is specified with a restful description language like RAML or Swagger2.0 then
 3315 the HTTP syntax definitions are used in the description (e.g., HTTP syntax for the CRUDN
 3316 operations, status codes, etc). The HTTP syntax will be mapped to the actual used web transfer
 3317 protocol (e.g., CoAP).

3318 **12.2 Mapping of CRUDN to CoAP**

3319 **12.2.1 Overview**

3320 A Device implementing CoAP shall conform to IETF RFC 7252 for the methods specified in section
 3321 12.2.3. A Device implementing CoAP shall conform to IETF RFC 7641 to implement the CoAP
 3322 Observe option. Support for CoAP block transfer when the payload is larger than the MTU is
 3323 defined in section 12.2.8.

3324 **12.2.2 URIs**

3325 An OCF: URI is mapped to a coap: URI by replacing the scheme name "ocf" with "coap" if unsecure
 3326 or 'coaps' if secure before sending over the network by the requestor. Similarly on the receiver
 3327 side, the scheme name is replaced with "ocf".

3328 Any query string that is present within the URI is encoded as one or more URI-Query Options as
 3329 defined in IETF RFC 7252 section 6.4.

3330

3331 **12.2.3 CoAP method with request and response**

3332 **12.2.3.1 Overview**

3333 Every request has a CoAP method that realizes the request. The primary methods and their
 3334 meanings are shown in Table 31, which provides the mapping of GET/PUT/POST/DELETE
 3335 methods to CREATE, RETRIEVE, UPDATE, and DELETE operations. The associated text provides
 3336 the generic behaviours when using these methods, however resource interfaces may modify these
 3337 generic semantics. The HTTP codes in the restful descriptions will be translated as described in
 3338 IETF RFC 8075 section 7 Response Code Mapping.
 3339

3340

Table 31. CoAP request and response

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

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

3341

3342 **12.2.3.2 CREATE with POST or PUT**

3343 **12.2.3.2.1 With POST**

3344 POST shall be used only in situations where the request URI is valid, that is it is the URI of an
 3345 existing Resource on the Server that is processing the request. If no such Resource is present,
 3346 the Server shall respond with an error response code of 4.xx. The use of POST for CREATE shall
 3347 use an existing request URI which identifies the Resource on the Server responsible for creation.
 3348 The URI of the created Resource is determined by the Server and provided to the Client in the
 3349 response.

3350 A Client shall include the representation of the new Resource in the request payload. The new
 3351 resource representation in the payload shall have all the necessary properties to create a valid
 3352 Resource instance, i.e. the created Resource should be able to properly respond to the valid
 3353 Request with mandatory Interface (e.g., "GET with ?if=oic.if.baseline").

3354 Upon receiving the POST request, the Server shall either

- 3355 • create the new Resource with a new URI, respond with the new URI for the newly created
 3356 Resource and a success response code (2.xx); or
- 3357 • respond with an error response code (4.xx or 5.xx).

3358 POST is unsafe and is the supported method when idempotent behaviour cannot be expected or
 3359 guaranteed.

3360 **12.2.3.2.2 With PUT**

3361 PUT shall be used to create a new Resource or completely replace the entire representation of an
 3362 existing Resource. The resource representation in the payload of the PUT request shall be the
 3363 complete representation. PUT for CREATE shall use a new request URI identifying the new
 3364 Resource to be created.

3365 The new resource representation in the payload shall have all the necessary properties to create
 3366 a valid Resource instance, i.e. the created Resource should be able to properly respond to the
 3367 valid Request with mandatory Interface (e.g. "GET with ?if=oic.if.baseline").

3368 Upon receiving the PUT request, the Server shall either

- 3369 • create the new Resource with the request URI provided in the PUT request and send back a
 3370 response with a success response code (2.xx); or
- 3371 • respond with an error response code (4.xx or 5.xx).

3372 PUT is an unsafe method but it is idempotent, thus when a PUT request is repeated the outcome
 3373 is the same each time.

3374 **12.2.3.3 RETRIEVE with GET**

3375 GET shall be used for the RETRIEVE operation. The GET method retrieves the representation of
 3376 the target Resource identified by the request URI.

3377 Upon receiving the GET request, the Server shall either

3378 • send back the response with the representation of the target Resource with a success response
3379 code (2.xx); or

3380 • respond with an error response code (4.xx or 5.xx) or ignore it (e.g. non-applicable multicast
3381 GET).

3382 GET is a safe method and is idempotent.

3383 12.2.3.4 UPDATE with POST

3384 POST shall be used only in situations where the request URI is valid, that is it is the URI of an
3385 existing Resource on the Server that is processing the request. If no such Resource is present,
3386 the Server shall respond with an error response code of 4.xx. A client shall use POST to UPDATE
3387 Property values of an existing Resource (see sections 3.1.32 and 8.4.2).

3388 Upon receiving the request, the Server shall either

3389 • apply the request to the Resource identified by the request URI in accordance with the applied
3390 interface (i.e. POST for non-existent Properties is ignored) and send back a response with a
3391 success response code (2.xx); or

3392 • respond with an error response code (4.xx or 5.xx). Note that if the representation in the
3393 payload is incompatible with the target Resource for POST using the applied interface (i.e. the
3394 "overwrite" semantic cannot be honored because of read-only property in the payload), then
3395 the error response code 4.xx shall be returned.

3396 POST is unsafe and is the supported method when idempotent behaviour cannot be expected or
3397 guaranteed.

3398 12.2.3.5 DELETE with DELETE

3399 DELETE shall be used for DELETE operation. The DELETE method requests that the resource
3400 identified by the request URI be deleted.

3401 Upon receiving the DELETE request, the Server shall either

3402 • delete the target Resource and send back a response with a success response code (2.xx); or

3403 • respond with an error response code (4.xx or 5.xx).

3404 DELETE is unsafe but idempotent (unless URIs are recycled for new instances).

3405
3406

3407 12.2.4 Content-Format negotiation

3408 The OCF Framework mandates support of CBOR, however it allows for negotiation of the payload
3409 body if more than one Content-Format (e.g. CBOR and JSON) is supported by an implementation.
3410 In this case the Accept Option defined in section 5.10.4 of IETF RFC 7252 shall be used to indicate
3411 which Content-Format (e.g. JSON) is requested by the Client.

3412 The Content-Formats supported are shown in Table 32.

3413

Table 32. OCF Content-Formats

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

3414 Clients shall include a Content-Format Option in every message that contains a payload. Servers
 3415 shall include a Content-Format Option for all success (2.xx) responses with a payload body. Per
 3416 IETF RFC 7252 section 5.5.1, Servers shall include a Content-Format Option for all error (4.xx or
 3417 5.xx) responses with a payload body unless they include a Diagnostic Payload; error responses
 3418 with a Diagnostic Payload do not include a Content-Format Option. The Content-Format Option
 3419 shall use the ID column numeric value from Table 32. An OCF vertical may mandate a specific
 3420 Content-Format Option.

3421 Clients shall also include an Accept Option in every request message. The Accept Option shall
 3422 indicate the required Content-Format as defined in Table 32 for response messages. The Server
 3423 shall return the required Content-Format if available. If the required Content-Format cannot be
 3424 returned, then the Server shall respond with an appropriate error message.

3425 **12.2.5 OCF-Content-Format-Version information**

3426 Servers and Clients shall include the OCF-Content-Format-Version Option in both request and
 3427 response messages with a payload. Clients shall include the OCF-Accept-Content-Format-Version
 3428 Option in request messages. The OCF-Content-Format-Version Option and OCF-Accept-Content-
 3429 Format-Version Option are specified as Option Numbers in the CoAP header as shown in Table
 3430 33.

3431 **Table 33. OCF-Content-Format-Version and OCF-Accept-Content-Format-Version Option**
 3432 **Numbers**

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

3433 The value of both the OCF-Accept-Content-Format-Version Option and the OCF-Content-Format-
 3434 Version Option is a two-byte unsigned integer that is used to define the major, minor and sub
 3435 versions. The major and minor versions are represented by 5 bits and the sub version is
 3436 represented by 6 bits as shown in Table 34.

3437 **Table 34. OCF-Accept-Content-Format-Version and OCF-Content-Format-Version**
 3438 **Representation**

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

3439 Table 35 illustrates several examples:

3440 **Table 35. Examples of OCF-Content-Format-Version and OCF-Accept-Content-Format-**
 3441 **Version Representation**

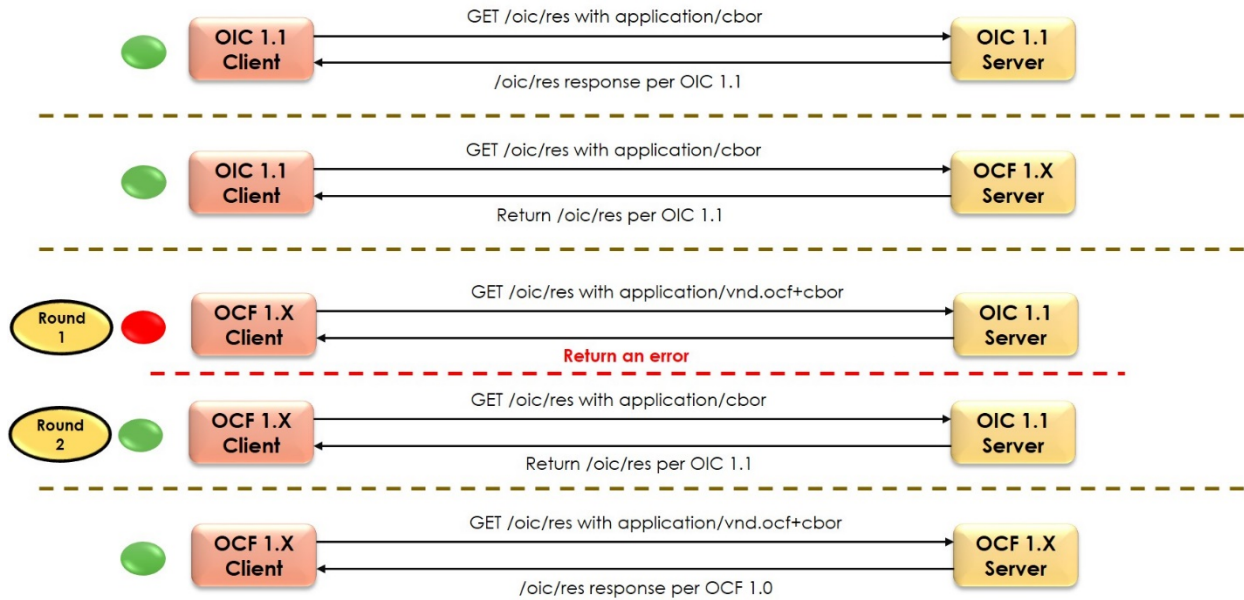
OCF version	Binary representation	Integer value
1.0.0	0000 1000 0000 0000	2048
1.1.0	0000 1000 0100 0000	2112

3442 The OCF-Accept-Content-Format-Version Option and OCF-Content-Format-Version Option for this
 3443 version of the specification shall be 1.0.0 (i.e. 0b0000 1000 0000 0000).

3444 **12.2.6 Content-Format policy**

3445 To maintain compatibility between devices implemented to different versions of this specification,
 3446 Devices shall follow the policy as described in Figure 25.

3447



3448

3449

Figure 25 Content-Format Policy

3450 All Devices shall support the current and all previous Content-Format Option and Versions. Clients
 3451 shall send discovery request messages with the current and all previous Content-Format and
 3452 Versions until it discovers all Servers in the network.

3453 **12.2.7 CRUDN to CoAP response codes**

3454 The mapping of CRUDN operations response codes to CoAP response codes are identical to the
 3455 response codes defined in IETF RFC 7252.

3456 **12.2.8 CoAP block transfer**

3457 Basic CoAP messages work well for the small payloads typical of light-weight, constrained IoT
 3458 devices. However scenarios can be envisioned in which an application needs to transfer larger
 3459 payloads.

3460 CoAP block-wise transfer as defined in IETF RFC 7959 shall be used by all Servers which
 3461 generate a content payload that would exceed the size of a CoAP datagram as the result of
 3462 handling any defined CRUDN operation.

3463 Similarly, CoAP block-wise transfer as defined in IETF RFC 7959 shall be supported by all
 3464 Clients. The use of block-wise transfer is applied to both the reception of payloads as well as
 3465 transmission of payloads that would exceed the size of a CoAP datagram.

3466 All blocks that are sent using this mechanism for a single instance of a transfer shall all have the
 3467 same reliability setting (i.e. all confirmable or all non-confirmable).

3468 A Client may support both the block1 (as descriptive) and block2 (as control) options as
 3469 described by IETF RFC 7959. A Server may support both the block1 (as control) and block2 (as
 3470 descriptive) options as described by IETF RFC 7959.

3471 **12.3 CoAP serialization over TCP**

3472 **12.3.1 Introduction**

3473 In environments where TCP is already available, CoAP can take advantage of it to provide
 3474 reliability. Also in some environments UDP traffic is blocked, so deployments may use TCP. For

3475 example, consider a cloud application acting as a Client and the Server is located at the user's
3476 home. A Server which already support CoAP as a messaging protocol could easily support CoAP
3477 serialization over TCP rather than adding another messaging protocol. A Device implementing
3478 CoAP Serialization over TCP should conform to IETF draft-ietf-core-coap-tcp-tls-07.

3479 **12.3.2 Indication of support**

3480 If UDP is blocked, clients depend on the pre-configured details on the device to find support for
3481 CoAP over TCP. If UDP is not-blocked, a Device which supports CoAP serialization over TCP shall
3482 populate the Messaging Protocol (“mpro”) property in “/oic/res” with the value “coap+tcp” or
3483 “coaps+tcp” to indicate that the device supports messaging protocol as specified by section 11.3.4.

3484 **12.3.3 Message type and header**

3485 The message type transported between Client and Server shall be a non-confirmable message
3486 (NON). The protocol stack used in this scenario should be as described in section 3 in IETF draft-
3487 ietf-core-coap-tcp-tls-07.

3488 The CoAP header as described in figure 6 in IETF draft-ietf-core-coap-tcp-tls-07 should be used
3489 for messages transmitted between a Client and a Server. A Device should use “Alternative L3” as
3490 defined in IETF draft-ietf-core-coap-tcp-tls-07.

3491 **12.3.4 URI scheme**

3492 The URI scheme used shall be as defined in section 6 in IETF draft-ietf-core-coap-tcp-tls-07.

3493 For the “coaps+tcp” URI scheme the “TLS Application Layer Protocol Negotiation Extension”
3494 IETF RFC 7301 shall be used.

3495 **12.3.5 KeepAlive**

3496 **12.3.5.1 Overview**

3497 In order to ensure that the connection between a Devices is maintained, when using CoAP
3498 serialization over TCP, a Device that initiated the connection should send application layer
3499 KeepAlive messages. The reasons to support application layer KeepAlive are as follows:

- 3500 • TCP KeepAlive only guarantees that a connection is alive at the network layer, but not at the
3501 application layer
- 3502 • Interval of TCP KeepAlive is configurable only using kernel parameters, and is OS dependent
3503 (e.g., 2 hours by default in Linux)

3504 **12.3.5.2 KeepAlive Mechanism**

3505 Devices supporting CoAP over TCP should use Ping and Pong messages as described in
3506 IETF draft-ietf-core-coap-tcp-tls-07.

3507 **12.3.6 CoAP native Cloud**

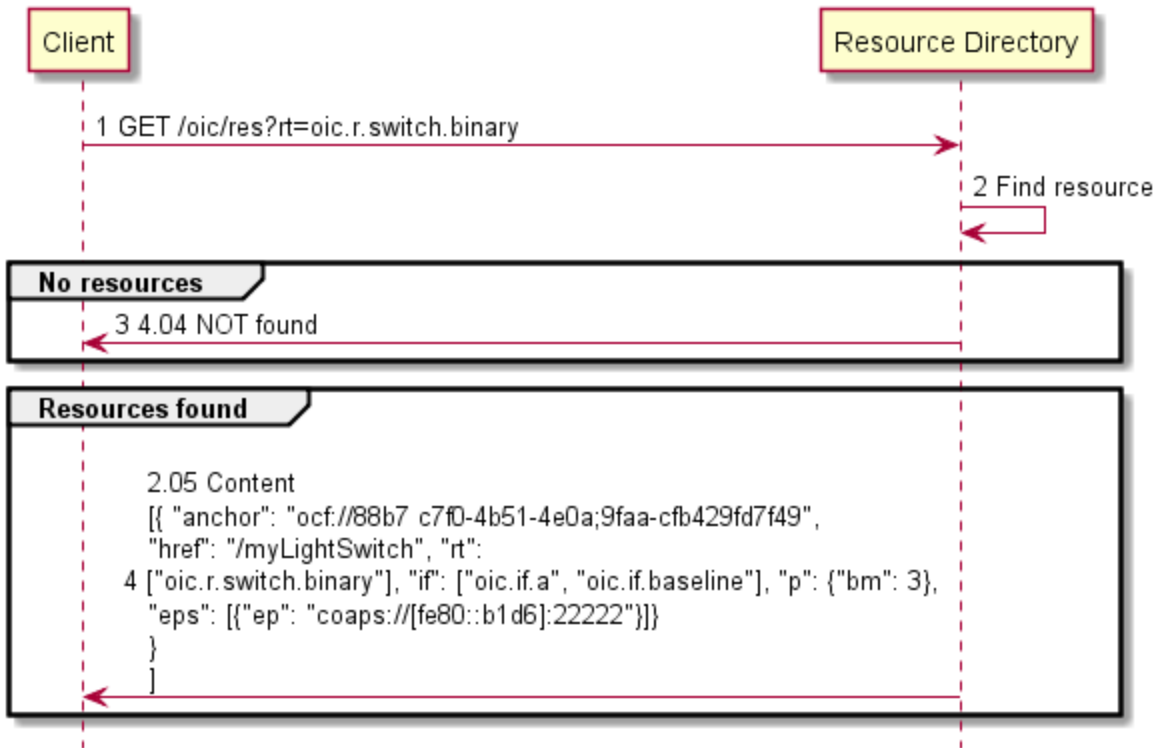
3508 **12.3.6.1 Overview**

3509 CoAP native Cloud extends the use of CoAP to reach a native Cloud service without the need of
3510 a hub or gateway by utilizing following features

- 3511 • CoAP over TCP protocol defined in section 12.3
- 3512 • Keep-Alive defined in section 12.3.5
- 3513 • Resource Directory defined in section 11.3.6

3514 **12.3.6.2 Architecture flow**

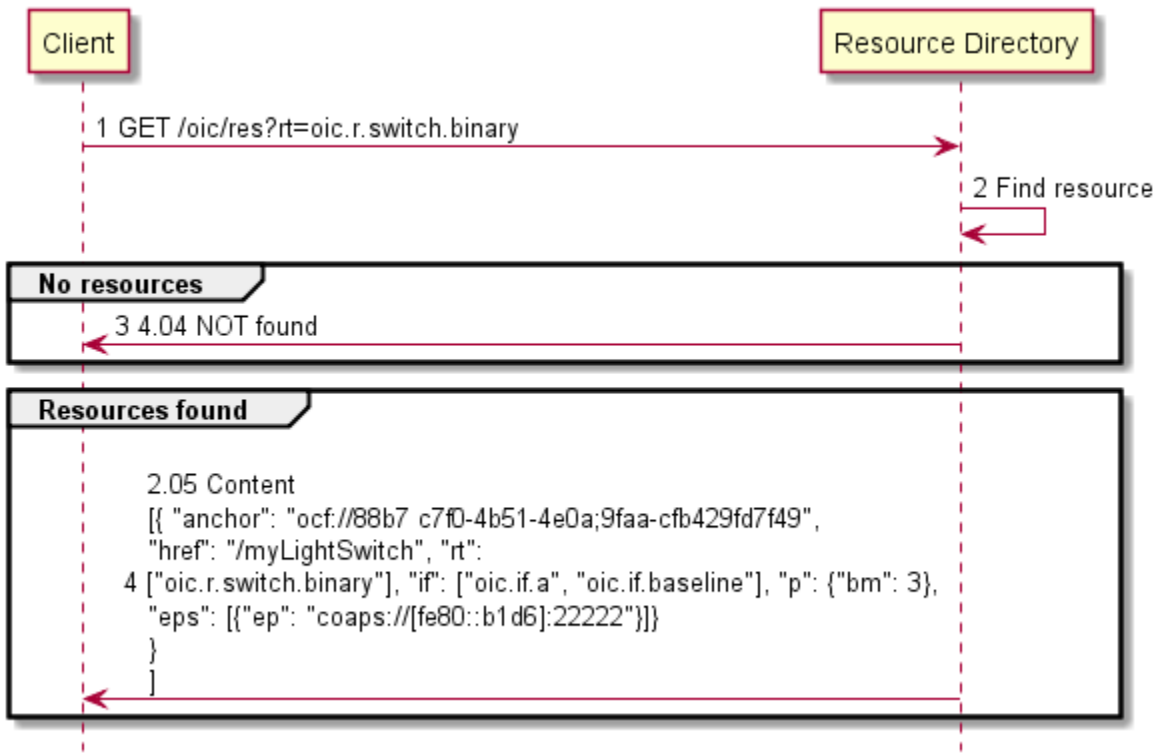
3515 This section describes the operational flow utilizing CoAP native Cloud for Resource discovery
3516 and endpoint routing.



3517

3518 Figure 26 illustrates the case when a Client discovers the published Resources on a Resource
 3519 Directory (RD). The RD responds with Links for the Resources on the Server. The "anchor"
 3520 Property and the "eps" Property in the response message imply the value of the Cloud Interface.
 3521 The value of the "eps" Property can be the address of Cloud Interface.

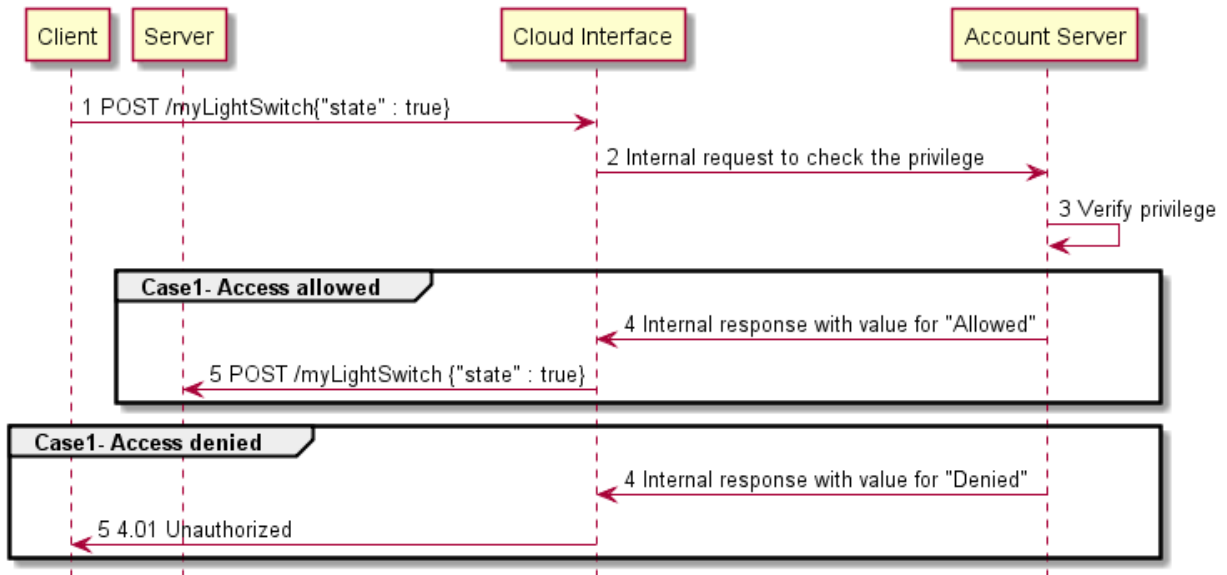
3522



3523

3524

Figure 26 Resource discovery through OCF Cloud



3525

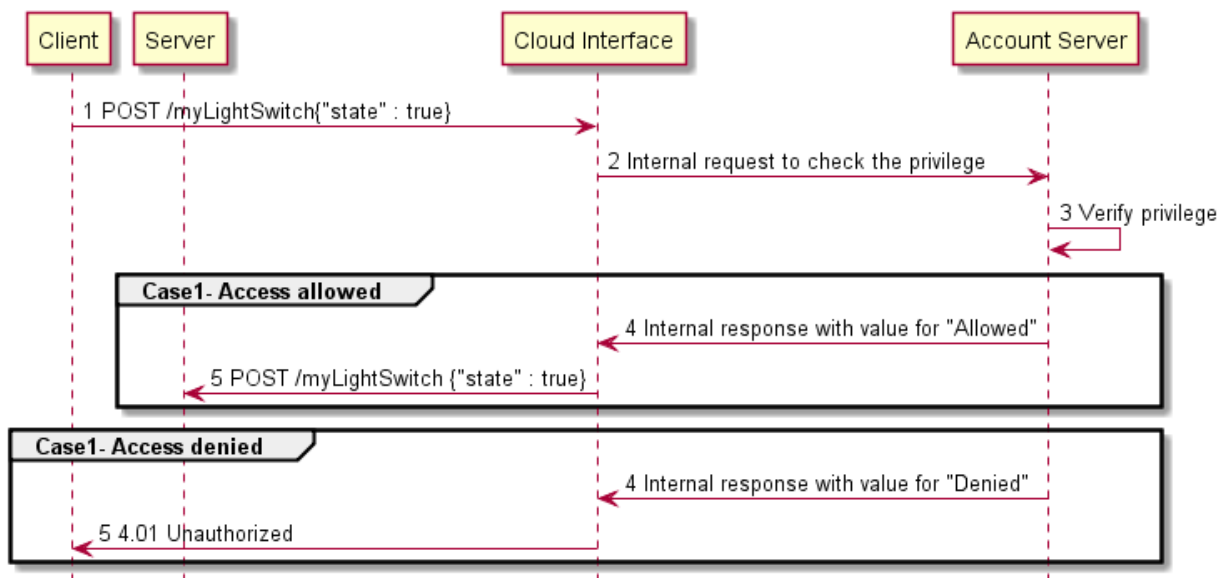
3526

3527

3528

3529

Figure 27 illustrates the case when a Client accesses a Server. The Client sends message to Cloud Interface, then the Cloud Interface will route the packets to the Server. The Cloud Interface maintains mapping table between URI and packet addressing information (ex, port number, socket id, etc).



3530

3531

Figure 27 Endpoint routing through OCF Cloud

3532

12.4 Payload Encoding in CBOR

3533 OCF implementations shall perform the conversion to CBOR from JSON defined schemas and to
 3534 JSON from CBOR in accordance with IETF RFC 7049 section 4 unless otherwise specified in this
 3535 section.

3536 Properties defined as a JSON integer shall be encoded in CBOR as an integer (CBOR major types
 3537 0 and 1). Properties defined as a JSON number shall be encoded as an integer, single- or double-
 3538 precision floating point (CBOR major type 7, sub-types 26 and 27); the choice is implementation
 3539 dependent. Half-precision floating point (CBOR major 7, sub-type 25) shall not be used. Integer
 3540 numbers shall be within the closed interval $[-2^{53}, 2^{53}]$. Properties defined as a JSON number
 3541 should be encoded as integers whenever possible; if this is not possible Properties defined as a
 3542 JSON number should use single-precision if the loss of precision does not affect the quality of
 3543 service, otherwise the Property shall use double-precision.

3544

3545 On receipt of a CBOR payload, an implementation shall be able to interpret CBOR integer values
 3546 in any position. If a property defined as a JSON integer is received encoded other than as an
 3547 integer, the implementation may reject this encoding using a final response as appropriate for the
 3548 underlying transport (e.g. 4.00 for CoAP) and thus optimise for the integer case. If a property is
 3549 defined as a JSON number an implementation shall accept integers, single- and double-precision
 3550 floating point.

3551

13 Security

3552 The details for handling security and privacy are specified in [OCF Security].

3553

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=oic.example.light with Resource Type definition as illustration in Table 36.

Table 36. oic.example.light Resource Type definition

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

rt=oic.example.garagedoor with Resource Type definition as illustration in Table 37.

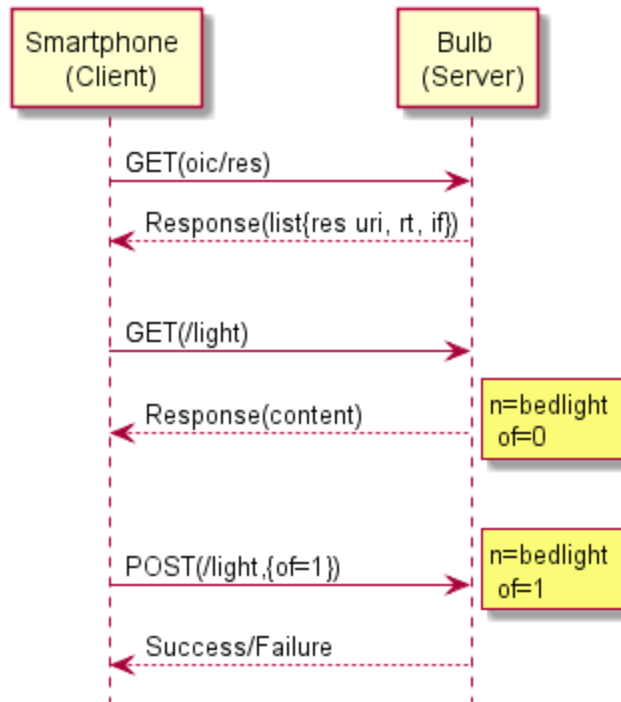
Table 37. oic.example.garagedoor Resource Type definition

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

“/oic/mnt” (“rt=oic.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 28) the discovery and control of an OCF light resource from an OCF smartphone.



3574

3575

Figure 28. When at home: from smartphone turn on a single light

3576

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

3577

3578

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

3579

3580

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

3581

3582

3583

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

3584

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

3585

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

3586

3587

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

3588

3589

3590

A.3 GroupAction execution

3591

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

3592

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

3593

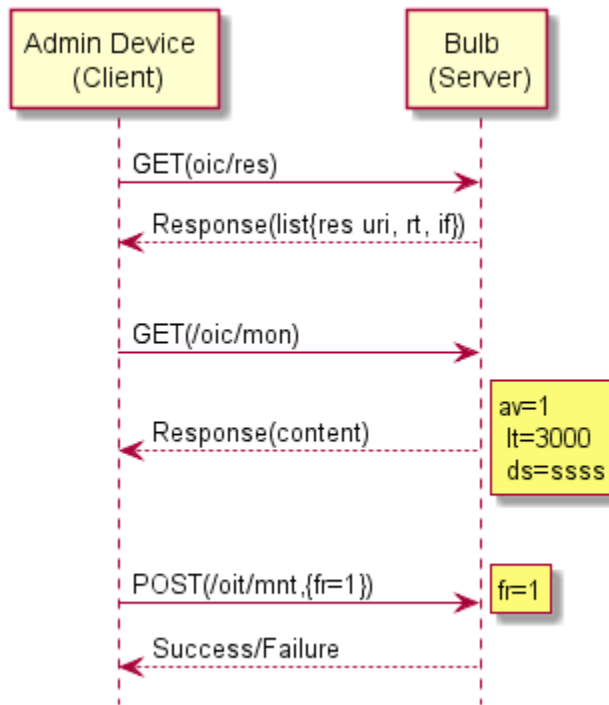
This example will be added when scripts feature is added in later version of specification

3594

A.5 Device management

3595

This sequence highlights (Figure 29) the device management function of maintenance.



3597

3598

Figure 29. Device management (maintenance)

3599 **Pre-Condition:** Admin device has different security permissions and hence can perform device
3600 management operations on the Device

3601 1) Admin device sends a GET request to `/oic/res` resource to discover all resources hosted on
3602 a targeted end point (in this case Bulb)

3603 10) The end point (bulb) responds with the list of Resource URI, Resource Type and Interfaces
3604 supported on the end point (one of the resources is `/oic/mnt` whose `rt=oic.wk.mnt`)

3605 11) Admin Device changes the `fr` property of the maintenance resource by
3606 sending a POST request to `/oic/mnt` resource (`{fr=1}`). This triggers a factory reset of the
3607 end point (bulb)

3608 12) On successful execution of the request, the end point responds with the changed
3609 resource representation. Else, error code is returned. Details of the error codes are defined
3610 in section 12.2.7.

3611
3612
3613
3614

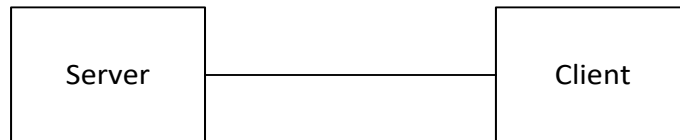
Annex B (informative)

OCF interaction scenarios and deployment models

3615 B.1 OCF interaction scenarios

3616 A Client connects to one or multiple Servers in order to access the resources provided by those
3617 Servers. The following are scenarios representing possible interactions among Roles:

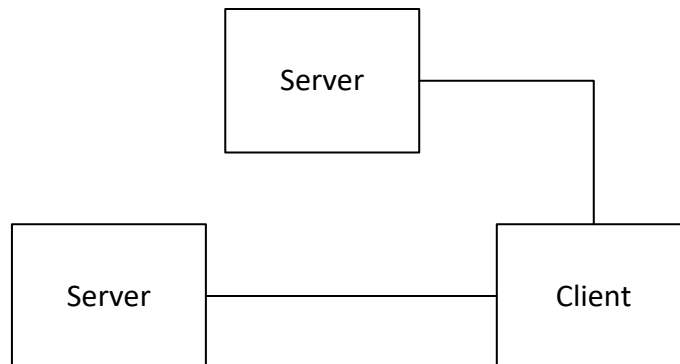
- 3618 • Direct interaction between Client and Server (Figure 30). In this scenario the Client and the
3619 Server directly communicate without involvement of any other Device. A smartphone which
3620 controls an actuator directly uses this scenario.



3621

3622 **Figure 30. Direct interaction between Server and Client**

- 3623 • Interaction between Client and Server using another server (Figure 31). In this scenario,
3624 another Server provides the support needed for the Client to directly access the desired
3625 resource on a specific Server. This scenario is used for example, when a smartphone first
3626 accesses a discovery server to find the addressing information of a specific appliance, and
3627 then directly accesses the appliance to control it.



3628

3629 **Figure 31. Interaction between Client and Server using another Server**

- 3630 • Interaction between Client and Server using Intermediary (Figure 32). In this scenario an
3631 Intermediary facilitates the interaction between the Client and the Server. A smartphone which
3632 controls appliances in a smart home via MQTT broker uses this scenario.

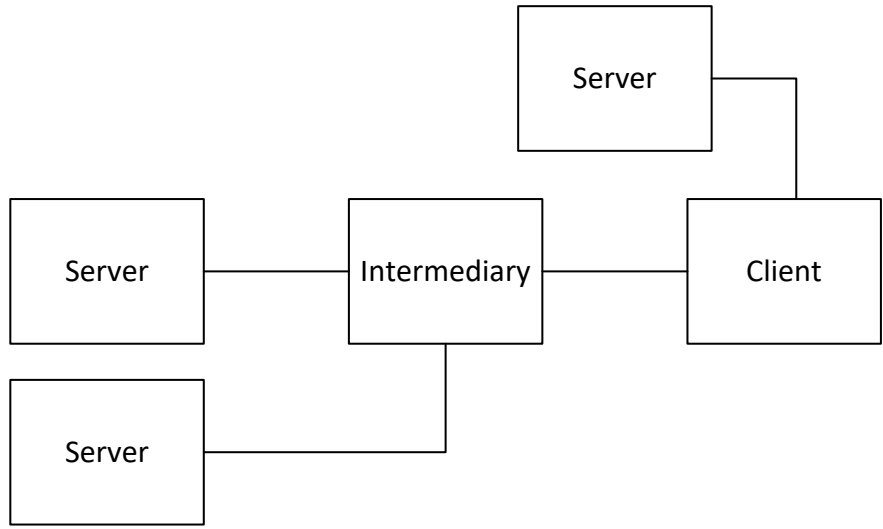


3633

3634 **Figure 32. Interaction between Client and Server using Intermediary**

- 3635 • Interaction between Client and Server using support from multiple Servers and intermediary
3636 (Figure 33). In this scenario, both Server and Intermediary roles are present to facilitate the
3637 transaction between the Client and a specific Server. An example scenario is when a

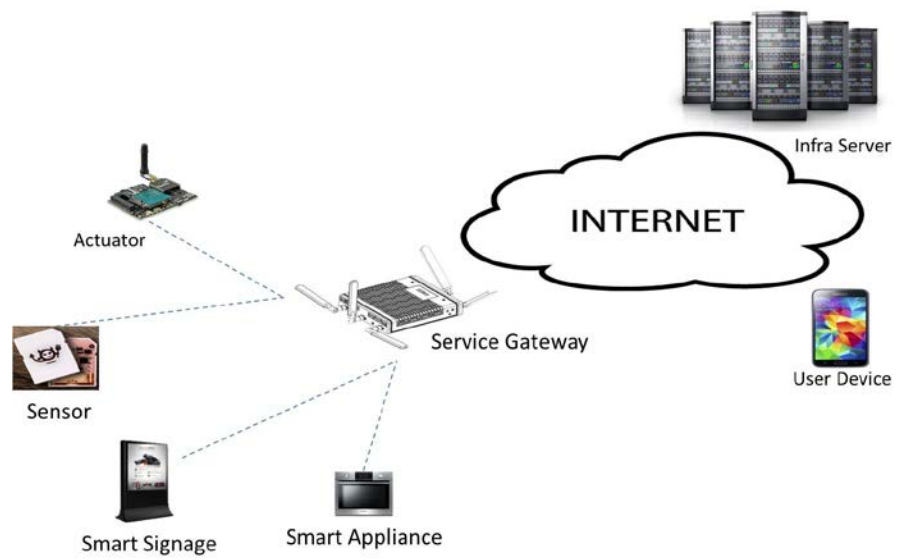
3638 smartphone first accesses a Resource Directory (RD) server to find the address to a specific
 3639 appliance, then utilizes MQTT broker to deliver a command message to the appliance. The
 3640 smartphone can utilize the mechanisms defined in CoRE Resource Directory such as default
 3641 location, anycast address or DHCP to discover the Resource Directory information.



3642
 3643 **Figure 33. Interaction between Client and Server using support from multiple Servers and**
 3644 **Intermediary**

3645 **B.2 Deployment model**

3646 In deployment, Devices are deployed and interact via either wired or wireless connections. Devices
 3647 are the physical entities that may host resources and play one or more Roles. There is no constraint
 3648 on the structure of a deployment or number of Devices in it. Architecture is flexible and scalable
 3649 and capable of addressing large number of devices with different device capabilities, including
 3650 constrained devices which have limited memory and capabilities. Constrained devices are defined
 3651 and categorized in [TCNN].



3652
 3653 **Figure 34. Example of Devices**

3654 Figure 34 depicts a typical deployment and set of Devices, which may be divided in the following
3655 categories:

- 3656 • **Things:** Networked devices which are able to interface with physical environments. Things are
3657 the devices which are primarily controlled and monitored. Examples include smart appliances,
3658 sensors, and actuators. Things mostly take the role of Server but they may also take the role of
3659 Client, for example in machine-to-machine communications.
- 3660 • **User Devices:** Devices employed by the users enabling the users to access resources and
3661 services. Examples include smart phones, tablets, and wearable devices. User Devices mainly
3662 take the role of Client, but may also take the role of Server or Intermediary.
- 3663 • **Service Gateways:** Network equipment which take the role of Intermediary. Examples are
3664 home gateways.
- 3665 • **Infra Servers:** Data centers residing in cloud infrastructure, which facilitate the interaction
3666 among Devices by providing network services such as AAA, NAT traversal or discovery. It can
3667 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.

3714 **C.3 Resource model indication**

3715 The Client and server exchange the information about what resource model(s) each supports.
3716 Based on the exchanged information, the Client and Server choose a resource model to perform
3717 RESTful interactions or to perform translation. The exchange could be part of discovery and
3718 negotiation. Based on the exchange, the Client and Server follow a procedure to ensure
3719 interoperability among them. They may choose a common resource model or execute translation
3720 between resource models.

- 3721 • **Resource model schema exchange:** The Client and Server may share the resource model
3722 information when they initiate a RESTful interaction. They may exchange the information about
3723 which resource model they support as part of session establishment procedures. Alternatively,
3724 each request or response message may carry the indication of which resource model it is using.
3725 For example, [COAP] defines “Content-Format option” to indicate the “representation format”
3726 such as “application/json”. It’s possible to extend the Content-Format Option to indicate the
3727 resource model used with the representation format such as “application/ipsso-json”.
- 3728 • **Ensuing procedures:** After the Client and Server exchange the resource model information,
3729 they perform a suitable procedure to ensure interoperability among them. The simplest way is
3730 to choose a resource model supported by both the Client and Server. In case there is no
3731 common resource model, the Client and Server may interact through a 3rd party.

3732 In addition to translation which can be resource intensive, a method based on profiles can be used
3733 in which an OCF implementation can accommodate multiple profiles and hence multiple
3734 ecosystems.

- 3735 • **Resource Model Profile:** the Framework defines resource model profiles and implementers or
3736 users choose the active profile. The chosen profile constraints the Device to strict rules in how
3737 resources are defined, instantiated and interacted with. This would allow for interoperation with
3738 devices from the ecosystem identified by the profile (e.g., IPSO, OneM2M etc.). Although this
3739 enables a Device to participate in and be part of any given ecosystem, this scheme does not
3740 allow for generic interoperability at runtime. While this approach may be suitable for resource
3741 constrained devices, more resource capable devices are expected to support more than one
3742 profile.

3743 **C.4 An Example Profile (IPSO profile)**

3744 IPSO defines smart objects that have specific resources and they take values determined by the
3745 data type of that resource. The smart object specification defines a category of such objects. Each
3746 resource represents a characteristic of the smart object being modelled.

3747 While the terms may be different, there are equivalent concepts in OCF to represent these terms.
3748 This section provides the equivalent OCF terms and then frames the IPSO smart object in OCF
3749 terms.

3750 The IPSO object Light Control defined in section 16 of the IPSO Smart Objects 1.0 is used as the
3751 reference example.

3752 **C.4.1 Conceptual equivalence**

3753 The IPSO smart object definition is equivalent to a Resource Type definition which defines the
3754 relevant characteristics of an entity being modelled. The specific IPSO Resource is equivalent to
3755 a Property that like an IPSO Resource has a defined data type, enumeration of acceptable values,
3756 units, a general description and access modes (based on the Interface).

3757 The general method for developing the equivalent Resource Type from an IPSO Smart Object
3758 definition is to ignore the Object ID and replace the Object URN with and OCF ‘.’ (dot) separated
3759 name that incorporates the IPSO object. Alternatively the Object URN can be used as the Resource

3760 Type ID as is (as long as the URN does not contain any '.' (dots)) – using the same Object URN
 3761 as the Resource Type ID allows for compatibility when interacting with an IPSO compliant device.
 3762 The object URN based naming does not have any bearing for OCF to OCF interoperability and so
 3763 the OCF format is preferred – for OCF to OCF interoperability only the data model consistency is
 3764 required.

3765 Two models are available to render IPSO objects into OCF.

3766 1) One is where the IPSO Smart Object represents a Resource. In this case, the IP Smart Object
 3767 is regarded as a resource with the Resource Type matching the description of the Smart Object.
 3768 Furthermore, each resource in the IPSO definition is represented as a Property in the Resource
 3769 Type (the IPSO Resource ID is replaced with a string representing the Property). This is the
 3770 preferred approach when the IPSO Data Model is expressed in the Resource Model.

3771 13) The other approach is to model an IPSO Smart Object as a Collection. Each IPSO
 3772 Resource is then modelled as a Resource with a Resource Type that matches the definition
 3773 of the IPSO Resource. Each of these resource instances are then bound to the Collection
 3774 that represents this IPSO Smart Object.

3775

3776 Below is an example showing how an IPSO LightControl Object is modelled as a Resource.

3777 **Resource Type: Light Control**

3778 Description: This Object is used to control a light source, such as a LED or other light. It allows a
 3779 light to be turned on or off and its dimmer setting to be controlled as a percentage value between
 3780 0 and 100. An optional colour setting enables a string to be used to indicate the desired colour.
 3781 Table 38 and Table 39 define the Resource Type and its properties, respectively.

3782

Table 38. 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

3783

3784

Table 39. Light control Resource Type definition

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

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

3785
3786

3787
3788
3789
3790

Annex D (normative)

Resource Type definitions

3791 D.1 List of Resource Type definitions

3792 Table 40 contains the list of defined core resources in this specification.

3793 **Table 40. Alphabetized list of core resources**

Friendly Name (informative)	Resource Type (rt)	Section
Collections	“oic.wk.col”	D.2
Device Configuration	“oic.wk.con”	D.3
Platform Configuration	“oic.wk.con.p”	D.4
Device	“oic.wk.d”	D.5
Discoverable Resources, baseline interface	“oic.wk.res”	D.8
Discoverable Resources, link list interface	“oic.wk.res”	D.9
Icon	“oic.r.icon”	D.14
Introspection	“oic.wk.introspection”	D.15
Maintenance	“oic.wk.mnt”	D.6
Platform	“oic.wk.p”	D.7
Resource Directory	“oic.wk.rd”	D.13
Scenes (Top Level)	“oic.wk.scenelist”	D.10
Scenes Collections	“oic.wk.scenecollection”	D.11
Scenes Member	“oic.wk.scenemember”	D.12

3794 D.2 OCF Collection

3795 D.2.1 Introduction

3796 OCF Collection Resource Type contains properties and links. The oic.if.baseline interface exposes
3797 a representation of the links and the properties of the collection resource itself

3798 D.2.2 Example URI

3799 /CollectionBaselineInterfaceURI

3800 D.2.3 Resource Type

3801 The resource type (rt) is defined as: oic.wk.col.

3802 D.2.4 RAML Definition

```
3803 #%RAML 0.8
3804 title: Collections
3805 version: 1.0
3806 traits:
3807   - interface-ll :
3808     queryParameters:
3809       if:
3810         enum: ["oic.if.ll"]
3811   - interface-b :
3812     queryParameters:
3813       if:
3814         enum: ["oic.if.b"]
3815   - interface-baseline :
3816     queryParameters:
3817       if:
3818         enum: ["oic.if.baseline"]
3819   - interface-all :
3820     queryParameters:
3821       if:
3822         enum: ["oic.if.ll", "oic.if.baseline", "oic.if.b"]
3823
3824 /CollectionBaselineInterfaceURI:
3825   description: |
3826     OCF Collection Resource Type contains properties and links.
3827     The oic.if.baseline interface exposes a representation of
3828     the links and the properties of the collection resource itself
3829
3830   is : ['interface-baseline']
3831   get:
3832     description: |
3833       Retrieve on Baseline Interface
3834
3835   responses :
3836     200:
3837       body:
3838         application/json:
3839           schema: /
3840             {
3841               "$schema": "http://json-schema.org/draft-04/schema#",
3842               "description" : "Copyright (c) 2016 Open Connectivity Foundation, Inc. All rights
3843 reserved.",
3844               "id": "http://www.openconnectivity.org/ocf-apis/core/schemas/oic.collection-
3845 schema.json#",
```

```

3846         "title": "Collection",
3847         "definitions": {
3848             "oic.oic-link": {
3849                 "type": "object",
3850                 "properties": {
3851                     "href": {
3852                         "type": "string",
3853                         "maxLength": 256,
3854                         "description": "This is the target URI, it can be specified as a
3855 Relative Reference or fully-qualified URI.",
3856                         "format": "uri"
3857                     },
3858                     "rel": {
3859                         "oneOf": [
3860                             {
3861                                 "type": "array",
3862                                 "items": {
3863                                     "type": "string",
3864                                     "maxLength": 64
3865                                 },
3866                                 "minItems": 1,
3867                                 "default": ["hosts"]
3868                             },
3869                             {
3870                                 "type": "string",
3871                                 "maxLength": 64,
3872                                 "default": "hosts"
3873                             }
3874                         ],
3875                         "description": "The relation of the target URI referenced by the link
3876 to the context URI"
3877                     },
3878                     "rt": {
3879                         "type": "array",
3880                         "items": {
3881                             "type": "string",
3882                             "maxLength": 64
3883                         },
3884                         "minItems": 1,
3885                         "description": "Resource Type of the Resource"
3886                     },
3887                     "if": {
3888                         "type": "array",
3889                         "items": {
3890                             "type": "string",
3891                             "enum": ["oic.if.baseline", "oic.if.ll", "oic.if.b", "oic.if.rw",
3892 "oic.if.r", "oic.if.a", "oic.if.s" ]
3893                         },
3894                         "minItems": 1,
3895                         "description": "The interface set supported by this resource"
3896                     },
3897                     "di": {
3898                         "$ref": "#/definitions/uuid",
3899                         "description": "The device ID"
3900                     },
3901                     "p": {
3902                         "description": "Specifies the framework policies on the Resource
3903 referenced by the target URI",
3904                         "type": "object",
3905                         "properties": {
3906                             "bm": {
3907                                 "description": "Specifies the framework policies on the Resource
3908 referenced by the target URI for e.g. observable and discoverable",
3909                                 "type": "integer"
3910                             }
3911                         },
3912                         "required": ["bm"]
3913                     },
3914                     "title": {
3915                         "type": "string",
3916                         "maxLength": 64,

```



```

3917         "description": "A title for the link relation. Can be used by the UI to
3918 provide a context."
3919     },
3920     "anchor": {
3921         "type": "string",
3922         "maxLength": 256,
3923         "description": "This is used to override the context URI e.g. override
3924 the URI of the containing collection.",
3925         "format": "uri"
3926     },
3927     "ins": {
3928         "type": "integer",
3929         "description": "The instance identifier for this web link in an array
3930 of web links - used in collections"
3931     },
3932     "type": {
3933         "type": "array",
3934         "description": "A hint at the representation of the resource referenced
3935 by the target URI. This represents the media types that are used for both accepting and emitting.",
3936         "items": {
3937             "type": "string",
3938             "maxLength": 64
3939         },
3940         "minItems": 1,
3941         "default": "application/cbor"
3942     },
3943     "eps": {
3944         "type": "array",
3945         "description": "the Endpoint information of the target Resource",
3946         "items": {
3947             "type": "object",
3948             "properties": {
3949                 "ep": {
3950                     "type": "string",
3951                     "format": "uri",
3952                     "description": "Transport Protocol Suite + Endpoint Locator"
3953                 },
3954                 "pri": {
3955                     "type": "integer",
3956                     "minimum": 1,
3957                     "description": "The priority among multiple Endpoints"
3958                 }
3959             }
3960         }
3961     },
3962     "required": [ "href", "rt", "if" ]
3963 },
3964 "oic.collection.linksexpanded": {
3965     "type": "object",
3966     "properties": {
3967         "links": {
3968             "description": "A set of simple or individual OIC Links.",
3969             "type": "array",
3970             "items": {
3971                 "type": "object",
3972                 "properties": {
3973                     "href": {
3974                         "type": "string",
3975                         "maxLength": 256,
3976                         "description": "This is the target URI, it can be specified
3977 as a Relative Reference or fully-qualified URI.",
3978                         "format": "uri"
3979                     },
3980                     "rel": {
3981                         "oneOf": [
3982                             {
3983                                 "type": "array",
3984                                 "items": {
3985                                     "type": "string",
3986                                     "maxLength": 64

```

```

3988         },
3989         "minItems": 1,
3990         "default": ["hosts"]
3991     },
3992     {
3993         "type": "string",
3994         "maxLength": 64,
3995         "default": "hosts"
3996     }
3997 ],
3998     "description": "The relation of the target URI referenced by
3999 the link to the context URI"
4000 },
4001 "rt": {
4002     "type": "array",
4003     "items": {
4004         "type": "string",
4005         "maxLength": 64
4006     },
4007     "minItems": 1,
4008     "description": "Resource Type of the Resource"
4009 },
4010 "if": {
4011     "type": "array",
4012     "items": {
4013         "type": "string",
4014         "enum": ["oic.if.baseline", "oic.if.ll", "oic.if.b",
4015 "oic.if.rw", "oic.if.r", "oic.if.a", "oic.if.s" ]
4016     },
4017     "minItems": 1,
4018     "description": "The interface set supported by this resource"
4019 },
4020 "di": {
4021     "description": "Format pattern according to IETF RFC 4122.",
4022     "type": "string",
4023     "pattern": "^[a-fA-F0-9]{8}-[a-fA-F0-9]{4}-[a-fA-F0-9]{4}-[a-
4024 fA-F0-9]{4}-[a-fA-F0-9]{12}$"
4025 },
4026 "p": {
4027     "description": "Specifies the framework policies on the
4028 Resource referenced by the target URI",
4029     "type": "object",
4030     "properties": {
4031         "bm": {
4032             "description": "Specifies the framework policies on the
4033 Resource referenced by the target URI for e.g. observable and discoverable",
4034             "type": "integer"
4035         }
4036     },
4037     "required": ["bm"]
4038 },
4039 "title": {
4040     "type": "string",
4041     "maxLength": 64,
4042     "description": "A title for the link relation. Can be used by
4043 the UI to provide a context."
4044 },
4045 "anchor": {
4046     "type": "string",
4047     "maxLength": 256,
4048     "description": "This is used to override the context URI e.g.
4049 override the URI of the containing collection.",
4050     "format": "uri"
4051 },
4052 "ins": {
4053     "type": "integer",
4054     "description": "The instance identifier for this web link in
4055 an array of web links - used in collections"
4056 },
4057 "type": {
4058     "type": "array",

```

```

4059         "description": "A hint at the representation of the resource
4060 referenced by the target URI. This represents the media types that are used for both accepting and
4061 emitting.",
4062         "items" : {
4063             "type": "string",
4064             "maxLength": 64
4065         },
4066         "minItems": 1,
4067         "default": "application/cbor"
4068     },
4069     "eps": {
4070         "type": "array",
4071         "description": "the Endpoint information of the target
Resource",
4072     },
4073     "items": {
4074         "type": "object",
4075         "properties": {
4076             "ep": {
4077                 "type": "string",
4078                 "format": "uri",
4079                 "description": "Transport Protocol Suite + Endpoint
Locator"
4080             },
4081             "pri": {
4082                 "type": "integer",
4083                 "minimum": 1,
4084                 "description": "The priority among multiple Endpoints"
4085             }
4086         }
4087     },
4088     "required": [ "href", "rt", "if" ]
4089 },
4090 },
4091 "required": [ "href", "rt", "if" ]
4092 },
4093 },
4094 },
4095 },
4096 "oic.core": {
4097     "type": "object",
4098     "properties": {
4099         "rt": {
4100             "type": "array",
4101             "items" : {
4102                 "type" : "string",
4103                 "maxLength": 64
4104             },
4105             "minItems" : 1,
4106             "readOnly": true,
4107             "description": "Resource Type of the Resource"
4108         }
4109     },
4110 },
4111 "uuid": {
4112     "description": "Format pattern according to IETF RFC 4122.",
4113     "type": "string",
4114     "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}$"
4115 },
4116 },
4117 "oic.collection.links": {
4118     "type": "object",
4119     "properties": {
4120         "links": {
4121             "description": "A set of simple or individual OIC Links.",
4122             "type": "array",
4123             "items": {
4124                 "$ref": "#/definitions/oic.oic-link"
4125             }
4126         }
4127     },
4128 },
4129 "oic.collection.properties": {

```

```

4130         "type": "object",
4131         "description": "A collection is a set of links along with additional
4132 properties to describe the collection itself",
4133         "properties": {
4134             "rts": {
4135                 "$ref": "#/definitions/oic.core/properties/rt",
4136                 "description": "The list of allowable resource types (for
4137 Target and anchors) in links included in the collection"
4138             }
4139         }
4140     },
4141 },
4142 "type": "object",
4143 "allof": [
4144     {"$ref": "oic.core-schema.json#/definitions/oic.core"},
4145     {"$ref": "#/definitions/oic.collection.properties"},
4146     {"$ref": "#/definitions/oic.collection.links"}
4147 ]
4148 }
4149

```

```

4150 example: /
4151 {
4152     "rt": ["oic.wk.col"],
4153     "id": "unique_example_id",
4154     "rts": ["oic.r.switch.binary", "oic.r.airflow"],
4155     "links": [
4156         {
4157             "href": "switch",
4158             "rt": ["oic.r.switch.binary"],
4159             "if": ["oic.if.a", "oic.if.baseline"],
4160             "eps": [
4161                 {"ep": "coap://[fe80::b1d6]:1111", "pri": 2},
4162                 {"ep": "coaps://[fe80::b1d6]:1122"},
4163                 {"ep": "coap+tcp://[2001:db8:a::123]:2222", "pri": 3}
4164             ]
4165         },
4166         {
4167             "href": "airFlow",
4168             "rt": ["oic.r.airflow"],
4169             "if": ["oic.if.a", "oic.if.baseline"],
4170             "eps": [
4171                 {"ep": "coap://[fe80::b1d6]:1111", "pri": 2},
4172                 {"ep": "coaps://[fe80::b1d6]:1122"},
4173                 {"ep": "coap+tcp://[2001:db8:a::123]:2222", "pri": 3}
4174             ]
4175         }
4176     ]
4177 }
4178

```

```

4179 post:
4180     description: |
4181         Update on Baseline Interface
4182
4183     body:
4184         application/json:
4185             schema: /
4186             {
4187                 "$schema": "http://json-schema.org/draft-04/schema#",
4188                 "description": "Copyright (c) 2016 Open Connectivity Foundation, Inc. All rights
4189 reserved.",
4190                 "id": "http://www.openconnectivity.org/ocf-apis/core/schemas/oic.collection-
4191 schema.json#",
4192                 "title": "Collection",
4193                 "definitions": {
4194                     "oic.oic-link": {
4195                         "type": "object",
4196                         "properties": {

```

```

4197         "href": {
4198             "type": "string",
4199             "maxLength": 256,
4200             "description": "This is the target URI, it can be specified as a Relative
Reference or fully-qualified URI.",
4201             "format": "uri"
4202         },
4203     },
4204     "rel": {
4205         "oneOf": [
4206             {
4207                 "type": "array",
4208                 "items": {
4209                     "type": "string",
4210                     "maxLength": 64
4211                 },
4212                 "minItems": 1,
4213                 "default": ["hosts"]
4214             },
4215             {
4216                 "type": "string",
4217                 "maxLength": 64,
4218                 "default": "hosts"
4219             }
4220         ],
4221         "description": "The relation of the target URI referenced by the link to
the context URI"
4222     },
4223     "rt": {
4224         "type": "array",
4225         "items": {
4226             "type": "string",
4227             "maxLength": 64
4228         },
4229         "minItems": 1,
4230         "description": "Resource Type of the Resource"
4231     },
4232     "if": {
4233         "type": "array",
4234         "items": {
4235             "type": "string",
4236             "enum": ["oic.if.baseline", "oic.if.ll", "oic.if.b", "oic.if.rw",
"oic.if.r", "oic.if.a", "oic.if.s"]
4237         },
4238         "minItems": 1,
4239         "description": "The interface set supported by this resource"
4240     },
4241     "di": {
4242         "$ref": "#/definitions/uuid",
4243         "description": "The device ID"
4244     },
4245     "p": {
4246         "description": "Specifies the framework policies on the Resource referenced
by the target URI",
4247         "type": "object",
4248         "properties": {
4249             "bm": {
4250                 "description": "Specifies the framework policies on the Resource
referenced by the target URI for e.g. observable and discoverable",
4251                 "type": "integer"
4252             }
4253         },
4254         "required": ["bm"]
4255     },
4256     "title": {
4257         "type": "string",
4258         "maxLength": 64,
4259         "description": "A title for the link relation. Can be used by the UI to
provide a context."
4260     },
4261     "anchor": {
4262         "type": "string",
4263     }
4264 }

```

```

4268         "maxLength": 256,
4269         "description": "This is used to override the context URI e.g. override the
4270 URI of the containing collection.",
4271         "format": "uri"
4272     },
4273     "ins": {
4274         "type": "integer",
4275         "description": "The instance identifier for this web link in an array of
4276 web links - used in collections"
4277     },
4278     "type": {
4279         "type": "array",
4280         "description": "A hint at the representation of the resource referenced by
4281 the target URI. This represents the media types that are used for both accepting and emitting.",
4282         "items": {
4283             "type": "string",
4284             "maxLength": 64
4285         },
4286         "minItems": 1,
4287         "default": "application/cbor"
4288     },
4289     "eps": {
4290         "type": "array",
4291         "description": "the Endpoint information of the target Resource",
4292         "items": {
4293             "type": "object",
4294             "properties": {
4295                 "ep": {
4296                     "type": "string",
4297                     "format": "uri",
4298                     "description": "Transport Protocol Suite + Endpoint Locator"
4299                 },
4300                 "pri": {
4301                     "type": "integer",
4302                     "minimum": 1,
4303                     "description": "The priority among multiple Endpoints"
4304                 }
4305             }
4306         }
4307     },
4308 },
4309 "required": [ "href", "rt", "if" ]
4310 },
4311     "oic.collection.linksexpanded": {
4312         "type": "object",
4313         "properties": {
4314             "links": {
4315                 "description": "A set of simple or individual OIC Links.",
4316                 "type": "array",
4317                 "items": {
4318                     "type": "object",
4319                     "properties": {
4320                         "href": {
4321                             "type": "string",
4322                             "maxLength": 256,
4323                             "description": "This is the target URI, it can be specified as a
4324 Relative Reference or fully-qualified URI.",
4325                             "format": "uri"
4326                         },
4327                         "rel": {
4328                             "oneOf": [
4329                                 {
4330                                     "type": "array",
4331                                     "items": {
4332                                         "type": "string",
4333                                         "maxLength": 64
4334                                     },
4335                                     "minItems": 1,
4336                                     "default": ["hosts"]
4337                                 },
4338                                 {

```

```

4339         "type": "string",
4340         "maxLength": 64,
4341         "default": "hosts"
4342     }
4343 },
4344     "description": "The relation of the target URI referenced by the
4345 link to the context URI"
4346 },
4347     "rt": {
4348         "type": "array",
4349         "items": {
4350             "type": "string",
4351             "maxLength": 64
4352         },
4353         "minItems": 1,
4354         "description": "Resource Type of the Resource"
4355     },
4356     "if": {
4357         "type": "array",
4358         "items": {
4359             "type": "string",
4360             "enum": ["oic.if.baseline", "oic.if.ll", "oic.if.b",
4361 "oic.if.rw", "oic.if.r", "oic.if.a", "oic.if.s" ]
4362         },
4363         "minItems": 1,
4364         "description": "The interface set supported by this resource"
4365     },
4366     "di": {
4367         "description": "Format pattern according to IETF RFC 4122.",
4368         "type": "string",
4369         "pattern": "^[a-fA-F0-9]{8}-[a-fA-F0-9]{4}-[a-fA-F0-9]{4}-[a-fA-
4370 F0-9]{4}-[a-fA-F0-9]{12}$"
4371     },
4372     "p": {
4373         "description": "Specifies the framework policies on the Resource
4374 referenced by the target URI",
4375         "type": "object",
4376         "properties": {
4377             "bm": {
4378                 "description": "Specifies the framework policies on the
4379 Resource referenced by the target URI for e.g. observable and discoverable",
4380                 "type": "integer"
4381             }
4382         },
4383         "required": ["bm"]
4384     },
4385     "title": {
4386         "type": "string",
4387         "maxLength": 64,
4388         "description": "A title for the link relation. Can be used by the
4389 UI to provide a context."
4390     },
4391     "anchor": {
4392         "type": "string",
4393         "maxLength": 256,
4394         "description": "This is used to override the context URI e.g.
4395 override the URI of the containing collection.",
4396         "format": "uri"
4397     },
4398     "ins": {
4399         "type": "integer",
4400         "description": "The instance identifier for this web link in an
4401 array of web links - used in collections"
4402     },
4403     "type": {
4404         "type": "array",
4405         "description": "A hint at the representation of the resource
4406 referenced by the target URI. This represents the media types that are used for both accepting and
4407 emitting.",
4408         "items": {
4409             "type": "string",

```

```

4410         "maxLength": 64
4411     },
4412     "minItems": 1,
4413     "default": "application/cbor"
4414 },
4415     "eps": {
4416         "type": "array",
4417         "description": "the Endpoint information of the target Resource",
4418         "items": {
4419             "type": "object",
4420             "properties": {
4421                 "ep": {
4422                     "type": "string",
4423                     "format": "uri",
4424                     "description": "Transport Protocol Suite + Endpoint
Locator"
4425                 },
4426             },
4427             "pri": {
4428                 "type": "integer",
4429                 "minimum": 1,
4430                 "description": "The priority among multiple Endpoints"
4431             }
4432         }
4433     }
4434 },
4435 },
4436     "required": [ "href", "rt", "if" ]
4437 }
4438 }
4439 }
4440 },
4441     "oic.core": {
4442         "type": "object",
4443         "properties": {
4444             "rt": {
4445                 "type": "array",
4446                 "items": {
4447                     "type": "string",
4448                     "maxLength": 64
4449                 },
4450                 "minItems": 1,
4451                 "readOnly": true,
4452                 "description": "Resource Type of the Resource"
4453             }
4454         }
4455     },
4456     "uuid": {
4457         "description": "Format pattern according to IETF RFC 4122.",
4458         "type": "string",
4459         "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}$"
4460     },
4461 },
4462     "oic.collection.links": {
4463         "type": "object",
4464         "properties": {
4465             "links": {
4466                 "description": "A set of simple or individual OIC Links.",
4467                 "type": "array",
4468                 "items": {
4469                     "$ref": "#/definitions/oic.oic-link"
4470                 }
4471             }
4472         }
4473     },
4474     "oic.collection.properties": {
4475         "type": "object",
4476         "description": "A collection is a set of links along with additional
properties to describe the collection itself",
4477         "properties": {
4478             "rts": {
4479                 "$ref": "#/definitions/oic.core/properties/rt",
4480

```



```

4481         "description": "The list of allowable resource types (for
4482 Target and anchors) in links included in the collection"
4483     }
4484 }
4485 }
4486 },
4487 "type": "object",
4488 "allOf": [
4489     {"$ref": "oic.core-schema.json#/definitions/oic.core"},
4490     {"$ref": "#/definitions/oic.collection.properties"},
4491     {"$ref": "#/definitions/oic.collection.links"}
4492 ]
4493 }
4494
4495 responses :
4496     200:
4497         body:
4498             application/json:
4499                 schema: /
4500                 {
4501                     "$schema": "http://json-schema.org/draft-04/schema#",
4502                     "description" : "Copyright (c) 2016 Open Connectivity Foundation, Inc. All rights
4503 reserved.",
4504                     "id": "http://www.openconnectivity.org/ocf-apis/core/schemas/oic.collection-
4505 schema.json#",
4506                     "title": "Collection",
4507                     "definitions": {
4508                         "oic.oic-link": {
4509                             "type": "object",
4510                             "properties": {
4511                                 "href": {
4512                                     "type": "string",
4513                                     "maxLength": 256,
4514                                     "description": "This is the target URI, it can be specified as a
4515 Relative Reference or fully-qualified URI.",
4516                                     "format": "uri"
4517                                 },
4518                                 "rel": {
4519                                     "oneOf": [
4520                                         {
4521                                             "type": "array",
4522                                             "items": {
4523                                                 "type": "string",
4524                                                 "maxLength": 64
4525                                             },
4526                                             "minItems": 1,
4527                                             "default": ["hosts"]
4528                                         },
4529                                         {
4530                                             "type": "string",
4531                                             "maxLength": 64,
4532                                             "default": "hosts"
4533                                         }
4534                                     ],
4535                                     "description": "The relation of the target URI referenced by the link
4536 to the context URI"
4537                                 },
4538                                 "rt": {
4539                                     "type": "array",
4540                                     "items": {
4541                                         "type": "string",
4542                                         "maxLength": 64
4543                                     },
4544                                     "minItems": 1,
4545                                     "description": "Resource Type of the Resource"
4546                                 },
4547                                 "if": {
4548                                     "type": "array",

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```

4549         "items": {
4550             "type": "string",
4551             "enum": ["oic.if.baseline", "oic.if.ll", "oic.if.b", "oic.if.rw",
4552 "oic.if.r", "oic.if.a", "oic.if.s" ]
4553         },
4554         "minItems": 1,
4555         "description": "The interface set supported by this resource"
4556     },
4557     "di": {
4558         "$ref": "#/definitions/uuid",
4559         "description": "The device ID"
4560     },
4561     "p": {
4562         "description": "Specifies the framework policies on the Resource
4563 referenced by the target URI",
4564         "type": "object",
4565         "properties": {
4566             "bm": {
4567                 "description": "Specifies the framework policies on the Resource
4568 referenced by the target URI for e.g. observable and discoverable",
4569                 "type": "integer"
4570             }
4571         },
4572         "required": ["bm"]
4573     },
4574     "title": {
4575         "type": "string",
4576         "maxLength": 64,
4577         "description": "A title for the link relation. Can be used by the UI to
4578 provide a context."
4579     },
4580     "anchor": {
4581         "type": "string",
4582         "maxLength": 256,
4583         "description": "This is used to override the context URI e.g. override
4584 the URI of the containing collection.",
4585         "format": "uri"
4586     },
4587     "ins": {
4588         "type": "integer",
4589         "description": "The instance identifier for this web link in an array
4590 of web links - used in collections"
4591     },
4592     "type": {
4593         "type": "array",
4594         "description": "A hint at the representation of the resource referenced
4595 by the target URI. This represents the media types that are used for both accepting and emitting.",
4596         "items": {
4597             "type": "string",
4598             "maxLength": 64
4599         },
4600         "minItems": 1,
4601         "default": "application/cbor"
4602     },
4603     "eps": {
4604         "type": "array",
4605         "description": "the Endpoint information of the target Resource",
4606         "items": {
4607             "type": "object",
4608             "properties": {
4609                 "ep": {
4610                     "type": "string",
4611                     "format": "uri",
4612                     "description": "Transport Protocol Suite + Endpoint Locator"
4613                 },
4614                 "pri": {
4615                     "type": "integer",
4616                     "minimum": 1,
4617                     "description": "The priority among multiple Endpoints"
4618                 }
4619             }
4620         }
4621     }

```

```

4620     }
4621   },
4622 },
4623 "required": [ "href", "rt", "if" ]
4624 },
4625 "oic.collection.linksexpanded": {
4626   "type": "object",
4627   "properties": {
4628     "links": {
4629       "description": "A set of simple or individual OIC Links.",
4630       "type": "array",
4631       "items": {
4632         "type": "object",
4633         "properties": {
4634           "href": {
4635             "type": "string",
4636             "maxLength": 256,
4637             "description": "This is the target URI, it can be specified
4638 as a Relative Reference or fully-qualified URI.",
4639             "format": "uri"
4640           },
4641           "rel": {
4642             "oneOf": [
4643               {
4644                 "type": "array",
4645                 "items": {
4646                   "type": "string",
4647                   "maxLength": 64
4648                 },
4649                 "minItems": 1,
4650                 "default": ["hosts"]
4651               },
4652               {
4653                 "type": "string",
4654                 "maxLength": 64,
4655                 "default": "hosts"
4656               }
4657             ],
4658             "description": "The relation of the target URI referenced by
4659 the link to the context URI"
4660           },
4661           "rt": {
4662             "type": "array",
4663             "items": {
4664               "type": "string",
4665               "maxLength": 64
4666             },
4667             "minItems": 1,
4668             "description": "Resource Type of the Resource"
4669           },
4670           "if": {
4671             "type": "array",
4672             "items": {
4673               "type": "string",
4674               "enum": ["oic.if.baseline", "oic.if.ll", "oic.if.b",
4675 "oic.if.rw", "oic.if.r", "oic.if.a", "oic.if.s" ]
4676             },
4677             "minItems": 1,
4678             "description": "The interface set supported by this resource"
4679           },
4680           "di": {
4681             "description": "Format pattern according to IETF RFC 4122.",
4682             "type": "string",
4683             "pattern": "^[a-fA-F0-9]{8}-[a-fA-F0-9]{4}-[a-fA-F0-9]{4}-[a-
4684 fA-F0-9]{4}-[a-fA-F0-9]{12}$"
4685           },
4686           "p": {
4687             "description": "Specifies the framework policies on the
4688 Resource referenced by the target URI",
4689             "type": "object",
4690             "properties": {

```

```

4691         "bm": {
4692             "description": "Specifies the framework policies on the
Resource referenced by the target URI for e.g. observable and discoverable",
4694             "type": "integer"
4695         },
4696     },
4697     "required" : ["bm"]
4698 },
4699 "title": {
4700     "type": "string",
4701     "maxLength": 64,
4702     "description": "A title for the link relation. Can be used by
the UI to provide a context."
4704 },
4705 "anchor": {
4706     "type": "string",
4707     "maxLength": 256,
4708     "description": "This is used to override the context URI e.g.
override the URI of the containing collection.",
4710     "format": "uri"
4711 },
4712 "ins": {
4713     "type": "integer",
4714     "description": "The instance identifier for this web link in
an array of web links - used in collections"
4716 },
4717 "type": {
4718     "type": "array",
4719     "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.",
4722     "items" : {
4723         "type": "string",
4724         "maxLength": 64
4725     },
4726     "minItems": 1,
4727     "default": "application/cbor"
4728 },
4729 "eps": {
4730     "type": "array",
4731     "description": "the Endpoint information of the target
Resource",
4733     "items": {
4734         "type": "object",
4735         "properties": {
4736             "ep": {
4737                 "type": "string",
4738                 "format": "uri",
4739                 "description": "Transport Protocol Suite + Endpoint
Locator"
4741             },
4742             "pri": {
4743                 "type": "integer",
4744                 "minimum": 1,
4745                 "description": "The priority among multiple Endpoints"
4746             }
4747         }
4748     }
4749 },
4750 },
4751 "required": [ "href", "rt", "if" ]
4752 }
4753 }
4754 }
4755 },
4756 "oic.core": {
4757     "type": "object",
4758     "properties": {
4759         "rt": {
4760             "type": "array",
4761             "items" : {

```

```

4762         "type" : "string",
4763         "maxLength": 64
4764     },
4765     "minItems" : 1,
4766     "readOnly": true,
4767     "description": "Resource Type of the Resource"
4768     }
4769 },
4770 },
4771 "uuid": {
4772     "description": "Format pattern according to IETF RFC 4122.",
4773     "type": "string",
4774     "pattern": "^[a-fA-F0-9]{8}-[a-fA-F0-9]{4}-[a-fA-F0-9]{4}-[a-fA-F0-9]{4}-
4775 [a-fA-F0-9]{12}$"
4776 },
4777 "oic.collection.links": {
4778     "type": "object",
4779     "properties": {
4780         "links": {
4781             "description": "A set of simple or individual OIC Links.",
4782             "type": "array",
4783             "items": {
4784                 "$ref": "#/definitions/oic.oic-link"
4785             }
4786         }
4787     }
4788 },
4789 "oic.collection.properties": {
4790     "type": "object",
4791     "description": "A collection is a set of links along with additional
4792 properties to describe the collection itself",
4793     "properties": {
4794         "rts": {
4795             "$ref": "#/definitions/oic.core/properties/rt",
4796             "description": "The list of allowable resource types (for
4797 Target and anchors) in links included in the collection"
4798         }
4799     }
4800 }
4801 },
4802 "type": "object",
4803 "allOf": [
4804     {"$ref": "oic.core-schema.json#/definitions/oic.core"},
4805     {"$ref": "#/definitions/oic.collection.properties"},
4806     {"$ref": "#/definitions/oic.collection.links"}
4807 ]
4808 }
4809

```

4810 D.2.5 Property Definition

Property name	Value type	Mandatory	Access mode	Description
rt	array: see schema	yes		Resource Type of the Resource
di	multiple types: see schema			
title	string			A title for the link relation. Can be used by the UI to provide a context.
eps	array: see schema			the Endpoint information of the target Resource

pri (eps)	integer			The priority among multiple Endpoints
ep (eps)	string			Transport Protocol Suite + Endpoint Locator
ins	integer			The instance identifier for this web link in an array of web links - used in collections
p	object: schema see			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: schema see			A hint at the representation of the resource referenced by the target URI. This represents the media types that are used for both accepting and emitting.
anchor	string			This is used to override the context URI e.g. override the URI of the containing collection.

if	array: schema	see	yes		The interface set supported by this resource
----	------------------	-----	-----	--	--

4811 **D.2.6 CRUDN behaviour**

Resource	Create	Read	Update	Delete	Notify
/CollectionBaselineInterfaceURI		get	post		

4812 **D.2.7 Referenced JSON schemas**

4813 **D.2.8 oic.oic-link-schema.json**

```

4814 {
4815   "$schema": "http://json-schema.org/draft-04/schema#",
4816   "description": "Copyright (c) 2016, 2017 Open Connectivity Foundation, Inc. All rights
4817 reserved.",
4818   "id": "http://www.openconnectivity.org/ocf-apis/core/schemas/oic.oic-link-schema.json#",
4819   "definitions": {
4820     "oic.oic-link": {
4821       "type": "object",
4822       "properties": {
4823         "href": {
4824           "type": "string",
4825           "maxLength": 256,
4826           "description": "This is the target URI, it can be specified as a Relative Reference or
4827 fully-qualified URI.",
4828           "format": "uri"
4829         },
4830         "rel": {
4831           "oneOf": [
4832             {
4833               "type": "array",
4834               "items": {
4835                 "type": "string",
4836                 "maxLength": 64
4837               },
4838               "minItems": 1,
4839               "default": ["hosts"]
4840             },
4841             {
4842               "type": "string",
4843               "maxLength": 64,
4844               "default": "hosts"
4845             }
4846           ],
4847           "description": "The relation of the target URI referenced by the link to the context URI"
4848         },
4849         "rt": {
4850           "type": "array",
4851           "items": {
4852             "type": "string",
4853             "maxLength": 64
4854           },
4855           "minItems": 1,
4856           "description": "Resource Type of the Resource"
4857         },
4858         "if": {
4859           "type": "array",
4860           "items": {
4861             "type": "string",
4862             "enum": ["oic.if.baseline", "oic.if.ll", "oic.if.b", "oic.if.rw", "oic.if.r",
4863 "oic.if.a", "oic.if.s"]
4864           },
4865           "minItems": 1,
4866           "description": "The interface set supported by this resource"
4867         },
4868         "di": {
4869           "allof": [
4870             {
4871               "$ref": "oic.types-schema.json#/definitions/uuid"

```

```

4872         },
4873         {
4874             "description": "The device ID"
4875         }
4876     ]
4877 },
4878 "p": {
4879     "description": "Specifies the framework policies on the Resource referenced by the target
4880 URI",
4881     "type": "object",
4882     "properties": {
4883         "bm": {
4884             "description": "Specifies the framework policies on the Resource referenced by the
4885 target URI for e.g. observable and discoverable",
4886             "type": "integer"
4887         }
4888     },
4889     "required" : ["bm"]
4890 },
4891 "title": {
4892     "type": "string",
4893     "maxLength": 64,
4894     "description": "A title for the link relation. Can be used by the UI to provide a
4895 context."
4896 },
4897 "anchor": {
4898     "type": "string",
4899     "maxLength": 256,
4900     "description": "This is used to override the context URI e.g. override the URI of the
4901 containing collection.",
4902     "format": "uri"
4903 },
4904 "ins": {
4905     "type": "integer",
4906     "description": "The instance identifier for this web link in an array of web links - used
4907 in collections"
4908 },
4909 "type": {
4910     "type": "array",
4911     "description": "A hint at the representation of the resource referenced by the target
4912 URI. This represents the media types that are used for both accepting and emitting.",
4913     "items" : {
4914         "type": "string",
4915         "maxLength": 64
4916     },
4917     "minItems": 1,
4918     "default": "application/cbor"
4919 },
4920 "eps": {
4921     "type": "array",
4922     "description": "the Endpoint information of the target Resource",
4923     "items": {
4924         "type": "object",
4925         "properties": {
4926             "ep": {
4927                 "type": "string",
4928                 "format": "uri",
4929                 "description": "Transport Protocol Suite + Endpoint Locator"
4930             },
4931             "pri": {
4932                 "type": "integer",
4933                 "minimum": 1,
4934                 "description": "The priority among multiple Endpoints"
4935             }
4936         }
4937     }
4938 },
4939 },
4940 "required": [ "href", "rt", "if" ]
4941 }
4942 },

```



```

4943     "type": "object",
4944     "allOf": [
4945       { "$ref": "#/definitions/oic.oic-link" }
4946     ]
4947   }
4948 }

```

4949 **D.3 Device Configuration**

4950 **D.3.1 Introduction**

4951 Resource that allows for Device specific information to be configured.

4952 **D.3.2 Example URI**

4953 /exampleDeviceConfigurationResURI

4954 **D.3.3 Resource Type**

4955 The resource type (rt) is defined as: oic.wk.con.

4956 **D.3.4 RAML Definition**

```

4957 #%RAML 0.8
4958 title: OCF Configuration
4959 version: v1-20160622
4960 traits:
4961   - interface-rw :
4962     queryParameters:
4963       if:
4964         enum: ["oic.if.rw"]
4965   - interface-all :
4966     queryParameters:
4967       if:
4968         enum: ["oic.if.rw", "oic.if.baseline"]
4969
4970 /exampleDeviceConfigurationResURI:
4971   description: |
4972     Resource that allows for Device specific information to be configured.
4973
4974   get:
4975     description: |
4976       Retrieves the current Device configuration settings
4977
4978   is : ['interface-all']
4979   responses :
4980     200:
4981       body:
4982         application/json:
4983           schema: /
4984             {
4985               "id": "http://www.openconnectivity.org/ocf-apis/core/schemas/oic.wk.con-
4986 schema.json#",
4987               "$schema": "http://json-schema.org/draft-04/schema#",
4988               "description" : "Copyright (c) 2016, 2017 Open Connectivity Foundation, Inc. All
4989 rights reserved.",
4990               "definitions": {
4991                 "oic.wk.con": {
4992                   "type": "object",
4993                   "properties": {
4994                     "loc": {
4995                       "type": "array",
4996                       "description": "Location information (lat, long)",

```

```

4997         "items": {
4998             "type": "number"
4999         },
5000         "minItems": 2,
5001         "maxItems": 2
5002     },
5003     "locn": {
5004         "type": "string",
5005         "maxLength": 64,
5006         "description": "Human Friendly Name for location"
5007     },
5008     "c": {
5009         "type": "string",
5010         "maxLength": 64,
5011         "description": "Currency"
5012     },
5013     "r": {
5014         "type": "string",
5015         "maxLength": 64,
5016         "description": "Region"
5017     },
5018     "ln": {
5019         "type": "array",
5020         "items" :
5021         {
5022             "type": "object",
5023             "properties": {
5024                 "language": {
5025                     "allOf": [
5026                         {
5027                             "$ref": "oic.types-schema.json#/definitions/language-tag"
5028                         },
5029                         {
5030                             "description": "An RFC 5646 language tag."
5031                         }
5032                     ]
5033                 },
5034                 "value": {
5035                     "type": "string",
5036                     "maxLength": 64,
5037                     "description": "The Device name in the indicated language."
5038                 }
5039             }
5040         },
5041         "minItems" : 1,
5042         "description": "Localized names"
5043     },
5044     "dl": {
5045         "allOf": [
5046             {
5047                 "$ref": "oic.types-schema.json#/definitions/language-tag"
5048             },
5049             {
5050                 "description": "Default Language as an RFC 5646 language tag."
5051             }
5052         ]
5053     }
5054 }
5055 }
5056 },
5057 "type": "object",
5058 "allOf": [
5059     { "$ref": "oic.core-schema.json#/definitions/oic.core" },
5060     { "$ref": "#/definitions/oic.wk.con" }
5061 ],
5062 "required": ["n"]
5063 }
5064

```

example: /

```

5066     {
5067         "n": "My Friendly Device Name",
5068         "rt": ["oic.wk.con"],
5069         "loc": [32.777,-96.797],
5070         "locn": "My Location Name",
5071         "c": "USD",
5072         "r": "MyRegion",
5073         "dl": "en"
5074     }
5075
5076     post:
5077         description: |
5078             Update the information about the Device
5079
5080         is : ['interface-rw']
5081         body:
5082             application/json:
5083                 schema: /
5084                 {
5085                     "id": "http://www.openconnectivity.org/ocf-apis/core/schemas/oic.wk.con-Update-
5086 schema.json#",
5087                     "$schema": "http://json-schema.org/draft-04/schema#",
5088                     "description" : "Copyright (c) 2016 Open Connectivity Foundation, Inc. All rights
5089 reserved.",
5090                     "definitions": {
5091                         "oic.wk.con": {
5092                             "type": "object",
5093                             "anyOf": [
5094                                 {"required": ["loc"]},
5095                                 {"required": ["locn"]},
5096                                 {"required": ["c"]},
5097                                 {"required": ["r"]},
5098                                 {"required": ["ln"]},
5099                                 {"required": ["dl"]},
5100                                 {"required": ["n"]}
5101                             ],
5102                             "properties": {
5103                                 "loc": {
5104                                     "type": "array",
5105                                     "description": "Location information (lat, long)",
5106                                     "items": {
5107                                         "type": "number"
5108                                     },
5109                                     "minItems": 2,
5110                                     "maxItems": 2
5111                                 },
5112                                 "locn": {
5113                                     "type": "string",
5114                                     "maxLength": 64,
5115                                     "description": "Human Friendly Name for location"
5116                                 },
5117                                 "c": {
5118                                     "type": "string",
5119                                     "maxLength": 64,
5120                                     "description": "Currency"
5121                                 },
5122                                 "r": {
5123                                     "type": "string",
5124                                     "maxLength": 64,
5125                                     "description": "Region"
5126                                 },
5127                                 "ln": {
5128                                     "type": "array",
5129                                     "items" :
5130                                     {
5131                                         "type": "object",
5132                                         "properties": {
5133                                             "language": {

```

```

5134         "allOf": [
5135             {
5136                 "$ref": "oic.types-schema.json#/definitions/language-tag"
5137             },
5138             {
5139                 "description": "An RFC 5646 language tag."
5140             }
5141         ],
5142     },
5143     "value": {
5144         "type": "string",
5145         "maxLength": 64,
5146         "description": "The Device name in the indicated language."
5147     }
5148 },
5149 ],
5150 "minItems" : 1,
5151 "description": "Localized names"
5152 },
5153 "dl": {
5154     "allOf": [
5155         {
5156             "$ref": "oic.types-schema.json#/definitions/language-tag"
5157         },
5158         {
5159             "description": "Default Language as an RFC 5646 language tag."
5160         }
5161     ]
5162 }
5163 }
5164 },
5165 },
5166 "type": "object",
5167 "allOf": [
5168     { "$ref": "oic.core-schema.rw.json#/definitions/oic.core" },
5169     { "$ref": "#/definitions/oic.wk.con" }
5170 ]
5171 }
5172
5173 example: /
5174 {
5175     "n": "Nuevo Nombre Amistoso",
5176     "r": "MyNewRegion",
5177     "ln": [ { "language": "es", "value": "Nuevo Nombre Amistoso" } ],
5178     "dl": "es"
5179 }
5180
5181 responses :
5182 200:
5183     body:
5184         application/json:
5185             schema: /
5186                 {
5187                     "id": "http://www.openconnectivity.org/ocf-apis/core/schemas/oic.wk.con-Update-
5188 schema.json#",
5189                     "$schema": "http://json-schema.org/draft-04/schema#",
5190                     "description" : "Copyright (c) 2016 Open Connectivity Foundation, Inc. All rights
5191 reserved.",
5192                     "definitions": {
5193                         "oic.wk.con": {
5194                             "type": "object",
5195                             "anyOf": [
5196                                 { "required": ["loc"] },
5197                                 { "required": ["locn"] },
5198                                 { "required": ["c"] },
5199                                 { "required": ["r"] },
5200                                 { "required": ["ln"] },

```

```

5201         {"required": ["dl"]},
5202         {"required": ["n"]}
5203     ],
5204     "properties": {
5205         "loc": {
5206             "type": "array",
5207             "description": "Location information (lat, long)",
5208             "items": {
5209                 "type": "number"
5210             },
5211             "minItems": 2,
5212             "maxItems": 2
5213         },
5214         "locn": {
5215             "type": "string",
5216             "maxLength": 64,
5217             "description": "Human Friendly Name for location"
5218         },
5219         "c": {
5220             "type": "string",
5221             "maxLength": 64,
5222             "description": "Currency"
5223         },
5224         "r": {
5225             "type": "string",
5226             "maxLength": 64,
5227             "description": "Region"
5228         },
5229         "ln": {
5230             "type": "array",
5231             "items": {
5232                 {
5233                     "type": "object",
5234                     "properties": {
5235                         "language": {
5236                             "allOf": [
5237                                 {
5238                                     "$ref": "oic.types-schema.json#/definitions/language-tag"
5239                                 },
5240                                 {
5241                                     "description": "An RFC 5646 language tag."
5242                                 }
5243                             ]
5244                         },
5245                         "value": {
5246                             "type": "string",
5247                             "maxLength": 64,
5248                             "description": "The Device name in the indicated language."
5249                         }
5250                     }
5251                 },
5252                 "minItems": 1,
5253                 "description": "Localized names"
5254             },
5255             "dl": {
5256                 "allOf": [
5257                     {
5258                         "$ref": "oic.types-schema.json#/definitions/language-tag"
5259                     },
5260                     {
5261                         "description": "Default Language as an RFC 5646 language tag."
5262                     }
5263                 ]
5264             }
5265         }
5266     },
5267     "type": "object",
5268     "allOf": [
5269         { "$ref": "oic.core-schema.rw.json#/definitions/oic.core" },
5270         { "$ref": "#/definitions/oic.wk.con" }
5271     ]

```

```

5272     ]
5273     }
5274
5275     example: /
5276     {
5277         "n": "Nuevo Nombre Amistoso",
5278         "r": "MyNewRegion",
5279         "ln": [ { "language": "es", "value": "Nuevo Nombre Amistoso" } ],
5280         "dl": "es"
5281     }
5282

```

5283 D.3.5 Property Definition

Property name	Value type	Mandatory	Access mode	Description
loc	array: see schema			Location information (lat, long)
c	string			Currency
ln	array: see schema			Localized names
value (ln)	string			The Device name in the indicated language.
language (ln)	multiple types: see schema			
locn	string			Human Friendly Name for location
dl	multiple types: see schema			
r	string			Region

5284 D.3.6 CRUDN behaviour

Resource	Create	Read	Update	Delete	Notify
/exampleDeviceConfigurationResURI		get	post		

5285 D.4 Platform Configuration

5286 D.4.1 Introduction

5287 Resource that allows for platform specific information to be configured.

5288 D.4.2 Example URI

5289 /examplePlatformConfigurationResURI

5290 D.4.3 Resource Type

5291 The resource type (rt) is defined as: oic.wk.con.p.

5292 D.4.4 RAML Definition

```

5293 #%RAML 0.8
5294 title: OCF Platform Configuration
5295 version: v1-20160622
5296 traits:
5297   - interface-rw :
5298       queryParameters:
5299         if:
5300           enum: ["oic.if.rw"]

```

```

5301 - interface-all :
5302   queryParameters:
5303     if:
5304       enum: ["oic.if.rw", "oic.if.baseline"]
5305
5306 /examplePlatformConfigurationResURI:
5307   description: |
5308     Resource that allows for platform specific information to be configured.
5309
5310   get:
5311     description: |
5312       Retrieves the current platform configuration settings
5313
5314     is : ['interface-all']
5315     responses :
5316       200:
5317         body:
5318           application/json:
5319             schema: /
5320               {
5321                 "id": "http://www.openconnectivity.org/ocf-apis/core/schemas/oic.wk.con.p-
5322 schema.json#",
5323                 "$schema": "http://json-schema.org/draft-04/schema#",
5324                 "description" : "Copyright (c) 2017 Open Connectivity Foundation, Inc. All rights
5325 reserved.",
5326                 "definitions": {
5327                   "oic.wk.con.p": {
5328                     "type": "object",
5329                     "properties": {
5330                       "mnpn": {
5331                         "type": "array",
5332                         "items" :
5333                           {
5334                             "type": "object",
5335                             "properties": {
5336                               "language": {
5337                                 "allOf": [
5338                                   {
5339                                     "$ref": "oic.types-schema.json#/definitions/language-tag"
5340                                   },
5341                                   {
5342                                     "description": "An RFC 5646 language tag."
5343                                   }
5344                                 ]
5345                               },
5346                               "value": {
5347                                 "type": "string",
5348                                 "maxLength": 64,
5349                                 "description": "The Platform description in the indicated
5350 language."
5351                               }
5352                             }
5353                           },
5354                       "minItems" : 1,
5355                       "description": "Platform names"
5356                     }
5357                   }
5358                 },
5359                 "type": "object",
5360                 "allOf": [
5361                   { "$ref": "oic.core-schema.json#/definitions/oic.core" },
5362                   { "$ref": "#/definitions/oic.wk.con.p" }
5363                 ]
5364             ]

```

```

5365     }
5366
5367     example: /
5368     {
5369         "rt": ["oic.wk.con.p"],
5370         "mnpn": [ { "language": "en", "value": "My Friendly Device Name" } ]
5371     }
5372
5373     post:
5374         description: |
5375             Update the information about the platform
5376
5377         is : ['interface-rw']
5378         body:
5379             application/json:
5380                 schema: /
5381                 {
5382                     "id": "http://www.openconnectivity.org/ocf-apis/core/schemas/oic.wk.con.p-Update-
5383 schema.json#",
5384                     "$schema": "http://json-schema.org/draft-04/schema#",
5385                     "description" : "Copyright (c) 2017 Open Connectivity Foundation, Inc. All rights
5386 reserved.",
5387                     "definitions": {
5388                         "oic.wk.con.p": {
5389                             "type": "object",
5390                             "properties": {
5391                                 "mnpn": {
5392                                     "type": "array",
5393                                     "items" :
5394                                         {
5395                                             "type": "object",
5396                                             "properties": {
5397                                                 "language": {
5398                                                     "allof": [
5399                                                         {
5400                                                             "$ref": "oic.types-schema.json#/definitions/language-tag"
5401                                                         },
5402                                                         {
5403                                                             "description": "An RFC 5646 language tag."
5404                                                         }
5405                                                     ]
5406                                                 },
5407                                                 "value": {
5408                                                     "type": "string",
5409                                                     "maxLength": 64,
5410                                                     "description": "The Platform description in the indicated language."
5411                                                 }
5412                                             }
5413                                         },
5414                                     "minItems" : 1,
5415                                     "description": "Platform names"
5416                                 }
5417                             }
5418                         },
5419                     },
5420                     "type": "object",
5421                     "allOf": [
5422                         { "$ref": "oic.core-schema.rw.json#/definitions/oic.core" },
5423                         { "$ref": "#/definitions/oic.wk.con.p" }
5424                     ],
5425                     "required": ["mnpn"]
5426                 }
5427
5428     example: /

```



```

5429     {
5430         "n": "Nuevo nombre",
5431         "mnpn": [ { "language": "es", "value": "Nuevo nombre de Plataforma Amigable" } ]
5432     }
5433
5434     responses :
5435         200:
5436             body:
5437                 application/json:
5438                     schema: /
5439                         {
5440                             "id": "http://www.openconnectivity.org/ocf-apis/core/schemas/oic.wk.con.p-Update-
5441 schema.json#",
5442                             "$schema": "http://json-schema.org/draft-04/schema#",
5443                             "description" : "Copyright (c) 2017 Open Connectivity Foundation, Inc. All rights
5444 reserved.",
5445                             "definitions": {
5446                                 "oic.wk.con.p": {
5447                                     "type": "object",
5448                                     "properties": {
5449                                         "mnpn": {
5450                                             "type": "array",
5451                                             "items" :
5452                                                 {
5453                                                     "type": "object",
5454                                                     "properties": {
5455                                                         "language": {
5456                                                             "allOf": [
5457                                                                 {
5458                                                                     "$ref": "oic.types-schema.json#/definitions/language-tag"
5459                                                                 },
5460                                                                 {
5461                                                                     "description": "An RFC 5646 language tag."
5462                                                                 }
5463                                                             ]
5464                                                         },
5465                                                         "value": {
5466                                                             "type": "string",
5467                                                             "maxLength": 64,
5468                                                             "description": "The Platform description in the indicated
5469 language."
5470                                                         }
5471                                                     }
5472                                                 },
5473                                         "minItems" : 1,
5474                                         "description": "Platform names"
5475                                     }
5476                                 }
5477                             },
5478                             "type": "object",
5479                             "allOf": [
5480                                 { "$ref": "oic.core-schema.rw.json#/definitions/oic.core"},
5481                                 { "$ref": "#/definitions/oic.wk.con.p" }
5482                             ],
5483                             "required": ["mnpn"]
5484                         }
5485
5486
5487         example: /
5488             {
5489                 "n": "Nuevo nombre",
5490                 "mnpn": [ { "language": "es", "value": "Nuevo nombre de Plataforma Amigable" } ]
5491             }
5492

```

5493 **D.4.5 Property Definition**

Property name	Value type	Mandatory	Access mode	Description
mnpn	array: see schema			Platform names
value (mnpn)	string			The Platform description in the indicated language.
language (mnpn)	multiple types: see schema			

5494 **D.4.6 CRUDN behaviour**

Resource	Create	Read	Update	Delete	Notify
/examplePlatformConfigurationResURI		get	post		

5495 **D.5 Device**

5496 **D.5.1 Introduction**

5497 Known resource that is hosted by every Server. Allows for logical device specific information to be
5498 discovered.

5499 **D.5.2 Wellknown URI**

5500 /oic/d

5501 **D.5.3 Resource Type**

5502 The resource type (rt) is defined as: oic.wk.d.

5503 **D.5.4 RAML Definition**

```
5504 #%RAML 0.8
5505 title: OIC Root Device
5506 version: v1-20160622
5507 traits:
5508   - interface :
5509     queryParameters:
5510       if:
5511         enum: ["oic.if.r", "oic.if.baseline"]
5512
5513 /oic/d:
5514   description: |
5515     Known resource that is hosted by every Server.
5516     Allows for logical device specific information to be discovered.
5517
5518   is : ['interface']
5519   get:
5520     description: |
5521       Retrieve the information about the Device
5522
5523   responses :
5524     200:
5525       body:
5526         application/json:
5527           schema: /
5528             {
5529               "$schema": "http://json-schemas.org/draft-04/schema#",
5530               "description" : "Copyright (c) 2016, 2017 Open Connectivity Foundation, Inc. All
```

```

5531 rights reserved.",
5532     "id": "http://www.openconnectivity.org/ocf-apis/core/schemas/oic.wk.d-
5533 schema.json#",
5534     "definitions": {
5535         "oic.wk.d": {
5536             "type": "object",
5537             "properties": {
5538                 "di": {
5539                     "allOf": [
5540                         {
5541                             "$ref": "oic.types-schema.json#/definitions/uuid"
5542                         },
5543                         {
5544                             "readOnly": true,
5545                             "description": "Unique identifier for device"
5546                         }
5547                     ]
5548                 },
5549                 "icv": {
5550                     "type": "string",
5551                     "maxLength": 64,
5552                     "readOnly": true,
5553                     "description": "The version of the OIC Server"
5554                 },
5555                 "dmv": {
5556                     "type": "string",
5557                     "maxLength": 256,
5558                     "readOnly": true,
5559                     "description": "Spec versions of the Resource and Device Specifications to
5560 which this device data model is implemented"
5561                 },
5562                 "ld": {
5563                     "type": "array",
5564                     "items": {
5565                         {
5566                             "type": "object",
5567                             "properties": {
5568                                 "language": {
5569                                     "allOf": [
5570                                         {
5571                                             "$ref": "oic.types-schema.json#/definitions/language-tag"
5572                                         },
5573                                         {
5574                                             "readOnly": true,
5575                                             "description": "An RFC 5646 language tag."
5576                                         }
5577                                     ]
5578                                 },
5579                                 "value": {
5580                                     "type": "string",
5581                                     "maxLength": 64,
5582                                     "readOnly": true,
5583                                     "description": "Device description in the indicated language."
5584                                 }
5585                             }
5586                         },
5587                     "minItems": 1,
5588                     "readOnly": true,
5589                     "description": "Localized Descriptions."
5590                 },
5591                 "sv": {
5592                     "type": "string",
5593                     "maxLength": 64,
5594                     "readOnly": true,
5595                     "description": "Software version."
5596                 },
5597                 "dmn": {
5598                     "type": "array",
5599                     "items": {
5600                         {
5601                             "type": "object",

```

```

5602         "properties": {
5603             "language": {
5604                 "allOf": [
5605                     {
5606                         "$ref": "oic.types-schema.json#/definitions/language-tag"
5607                     },
5608                     {
5609                         "readOnly": true,
5610                         "description": "An RFC 5646 language tag."
5611                     }
5612                 ]
5613             },
5614             "value": {
5615                 "type": "string",
5616                 "maxLength": 64,
5617                 "readOnly": true,
5618                 "description": "Manufacturer name in the indicated language."
5619             }
5620         },
5621     },
5622     "minItems" : 1,
5623     "readOnly": true,
5624     "description": "Manufacturer Name."
5625 },
5626 "dmno": {
5627     "type": "string",
5628     "maxLength": 64,
5629     "readOnly": true,
5630     "description": "Model number as designated by manufacturer."
5631 },
5632 "piid": {
5633     "allOf": [
5634         {
5635             "$ref": "oic.types-schema.json#/definitions/uuid"
5636         },
5637         {
5638             "readOnly": true,
5639             "description": "Protocol independent unique identifier for device that
5640 is immutable."
5641         }
5642     ]
5643 }
5644 }
5645 }
5646 },
5647 "type": "object",
5648 "allOf": [
5649     { "$ref": "oic.core-schema.json#/definitions/oic.core" },
5650     { "$ref": "#/definitions/oic.wk.d" }
5651 ],
5652 "required": [ "n", "di", "icv", "dmv", "piid" ]
5653 }
5654
5655 example: /
5656 {
5657     "n": "Device 1",
5658     "rt": ["oic.wk.d"],
5659     "di": "54919CA5-4101-4AE4-595B-353C51AA983C",
5660     "icv": "ocf.1.0.0",
5661     "dmv": "ocf.res.1.0.0, ocf.sh.1.0.0",
5662     "piid": "6F0AAC04-2BB0-468D-B57C-16570A26AE48"
5663 }
5664

```

5665 D.5.5 Property Definition

Property name	Value type	Mandatory	Access mode	Description
ld	array: schema	see	Read Only	Localized Descriptions.

value (ld)	string		Read Only	Device description in the indicated language.
language (ld)	multiple types: see schema			
piid	multiple types: see schema	yes		
di	multiple types: see schema	yes		
dmno	string		Read Only	Model number as designated by manufacturer.
sv	string		Read Only	Software version.
dmn	array: see schema		Read Only	Manufacturer Name.
value (dmn)	string		Read Only	Manufacturer name in the indicated language.
language (dmn)	multiple types: see schema			
dmv	string	yes	Read Only	Spec versions of the Resource and Device Specifications to which this device data model is implemented
icv	string	yes	Read Only	The version of the OIC Server

5666 **D.5.6 CRUDN behaviour**

Resource	Create	Read	Update	Delete	Notify
/oic/d		get			

5667 **D.6 Maintenance**

5668 **D.6.1 Introduction**

5669 The resource through which a Device is maintained and can be used for diagnostic purposes. fr
5670 (Factory Reset) is a boolean. The value 0 means No action (Default), the value 1 means Start
5671 Factory Reset After factory reset, this value shall be changed back to the default value rb (Reboot)
5672 is a boolean. The value 0 means No action (Default), the value 1 means Start Reboot After Reboot,
5673 this value shall be changed back to the default value

5674 **D.6.2 Wellknown URI**

5675 /oic/mnt

5676 **D.6.3 Resource Type**

5677 The resource type (rt) is defined as: oic.wk.mnt.

5678 **D.6.4 RAML Definition**

5679 `##RAML 0.8`

5680 `title: Maintenance`

5681 `version: v1-20160622`

```

5682 traits:
5683   - interface-rw :
5684     queryParameters:
5685       if:
5686         enum: ["oic.if.rw", "oic.if.baseline"]
5687   - interface-all :
5688     queryParameters:
5689       if:
5690         enum: ["oic.if.rw", "oic.if.r", "oic.if.baseline"]
5691
5692 /oic/mnt:
5693   description: |
5694     The resource through which a Device is maintained and can be used for diagnostic purposes.
5695     fr (Factory Reset) is a boolean.
5696     The value 0 means No action (Default), the value 1 means Start Factory Reset
5697     After factory reset, this value shall be changed back to the default value
5698     rb (Reboot) is a boolean.
5699     The value 0 means No action (Default), the value 1 means Start Reboot
5700     After Reboot, this value shall be changed back to the default value
5701
5702   get:
5703     description: |
5704       Retrieve the maintenance action status
5705
5706     is : ['interface-all']
5707     responses :
5708       200:
5709         body:
5710           application/json:
5711             schema: /
5712               {
5713                 "$schema": "http://json-schemas.org/draft-04/schema#",
5714                 "description" : "Copyright (c) 2016, 2017 Open Connectivity Foundation, Inc. All
5715 rights reserved.",
5716                 "id": "http://www.openconnectivity.org/ocf-apis/core/schemas/oic.wk.mnt-
5717 schema.json#",
5718                 "definitions": {
5719                   "oic.wk.mnt": {
5720                     "type": "object",
5721                     "anyOf": [
5722                       {"required": ["fr"]},
5723                       {"required": ["rb"]}
5724                     ],
5725                     "properties": {
5726                       "fr": {
5727                         "type": "boolean",
5728                         "description": "Factory Reset"
5729                       },
5730                       "rb": {
5731                         "type": "boolean",
5732                         "description": "Reboot Action"
5733                       }
5734                     }
5735                   }
5736                 },
5737                 "type": "object",
5738                 "allOf": [
5739                   {"$ref": "oic.core-schema.json#/definitions/oic.core"},
5740                   {"$ref": "#/definitions/oic.wk.mnt" }
5741                 ]
5742               }
5743

```

```

5744         example: /
5745             {
5746                 "rt": ["oic.wk.mnt"],
5747                 "fr": false,
5748                 "rb": false
5749             }
5750
5751     post:
5752         description: |
5753             Set the maintenance action(s)
5754
5755         is : ['interface-rw']
5756         body:
5757             application/json:
5758                 schema: /
5759                     {
5760                         "$schema": "http://json-schemas.org/draft-04/schema#",
5761                         "description" : "Copyright (c) 2016, 2017 Open Connectivity Foundation, Inc. All rights
5762 reserved.",
5763                         "id": "http://www.openconnectivity.org/ocf-apis/core/schemas/oic.wk.mnt-schema.json#",
5764                         "definitions": {
5765                             "oic.wk.mnt": {
5766                                 "type": "object",
5767                                 "anyOf": [
5768                                     {"required": ["fr"]},
5769                                     {"required": ["rb"]}
5770                                 ],
5771                                 "properties": {
5772                                     "fr": {
5773                                         "type": "boolean",
5774                                         "description": "Factory Reset"
5775                                     },
5776                                     "rb": {
5777                                         "type": "boolean",
5778                                         "description": "Reboot Action"
5779                                     }
5780                                 }
5781                             }
5782                         },
5783                         "type": "object",
5784                         "allOf": [
5785                             {"$ref": "oic.core-schema.json#/definitions/oic.core"},
5786                             {"$ref": "#/definitions/oic.wk.mnt"}
5787                         ]
5788                     }
5789
5790         example: /
5791             {
5792                 "fr": false,
5793                 "rb": false
5794             }
5795
5796     responses :
5797         200:
5798             body:
5799                 application/json:
5800                     schema: /
5801                         {
5802                             "$schema": "http://json-schemas.org/draft-04/schema#",
5803                             "description" : "Copyright (c) 2016, 2017 Open Connectivity Foundation, Inc. All
5804 rights reserved.",
5805                             "id": "http://www.openconnectivity.org/ocf-apis/core/schemas/oic.wk.mnt-
5806 schema.json#",

```

```

5807     "definitions": {
5808       "oic.wk.mnt": {
5809         "type": "object",
5810         "anyOf": [
5811           {"required": ["fr"]},
5812           {"required": ["rb"]}
5813         ],
5814         "properties": {
5815           "fr": {
5816             "type": "boolean",
5817             "description": "Factory Reset"
5818           },
5819           "rb": {
5820             "type": "boolean",
5821             "description": "Reboot Action"
5822           }
5823         }
5824       }
5825     },
5826     "type": "object",
5827     "allOf": [
5828       {"$ref": "oic.core-schema.json#/definitions/oic.core"},
5829       {"$ref": "#/definitions/oic.wk.mnt"}
5830     ]
5831   }
5832
5833   example: /
5834   {
5835     "fr": false,
5836     "rb": false
5837   }
5838

```

5839 D.6.5 Property Definition

Property name	Value type	Mandatory	Access mode	Description
fr	boolean	yes		Factory Reset
rb	boolean	yes		Reboot Action

5840 D.6.6 CRUDN behaviour

Resource	Create	Read	Update	Delete	Notify
/oic/mnt		get	post		

5841 D.7 Platform

5842 D.7.1 Introduction

5843 Known resource that is defines the platform on which an Server is hosted. Allows for platform
5844 specific information to be discovered.

5845 D.7.2 Wellknown URI

5846 /oic/p

5847 D.7.3 Resource Type

5848 The resource type (rt) is defined as: oic.wk.p.

5849 D.7.4 RAML Definition

```

5850 #%RAML 0.8
5851 title: Platform
5852 version: v1-20160622
5853 traits:
5854   - interface :
5855     queryParameters:
5856       if:

```



```

5857         enum: ["oic.if.r", "oic.if.baseline"]
5858
5859 /oic/p:
5860     description: |
5861         Known resource that is defines the platform on which an Server is hosted.
5862         Allows for platform specific information to be discovered.
5863
5864     is : ['interface']
5865     get:
5866         description: |
5867             Retrieve the information about the Platform
5868
5869     responses :
5870         200:
5871             body:
5872                 application/json:
5873                     schema: /
5874                         {
5875                             "$schema": "http://json-schemas.org/draft-04/schema#",
5876                             "description" : "Copyright (c) 2016, 2017 Open Connectivity Foundation, Inc. All
rights reserved.",
5877                             "id": "http://www.openconnectivity.org/ocf-apis/core/schemas/oic.wk.p-
5878                             schema.json#",
5879                             "definitions": {
5880                                 "oic.wk.p": {
5881                                     "type": "object",
5882                                     "properties": {
5883                                         "pi": {
5884                                             "allOf": [
5885                                                 {
5886                                                     "$ref": "oic.types-schema.json#/definitions/uuid"
5887                                                 },
5888                                                 {
5889                                                     "readOnly": true,
5890                                                     "description": "Platform Identifier"
5891                                                 }
5892                                             ]
5893                                         },
5894                                         "mnmn": {
5895                                             "type": "string",
5896                                             "readOnly": true,
5897                                             "description": "Manufacturer Name",
5898                                             "maxLength": 64
5899                                         },
5900                                         "mnml": {
5901                                             "type": "string",
5902                                             "readOnly": true,
5903                                             "description": "Manufacturer's URL",
5904                                             "maxLength": 256,
5905                                             "format": "uri"
5906                                         },
5907                                         "mnmo": {
5908                                             "type": "string",
5909                                             "maxLength": 64,
5910                                             "readOnly": true,
5911                                             "description": "Model number as designated by the manufacturer"
5912                                         },
5913                                         "mndt": {
5914                                             "allOf": [
5915                                                 {
5916                                                     "$ref": "oic.types-schema.json#/definitions/date"
5917                                                 },
5918                                                 {
5919                                                     "readOnly": true,
5920                                                     "description": "Manufacturing Date in ISO8601 format."
5921

```

```

5922     }
5923   ]
5924 },
5925 "mnpv": {
5926   "type": "string",
5927   "maxLength": 64,
5928   "readOnly": true,
5929   "description": "Platform Version"
5930 },
5931 "mnos": {
5932   "type": "string",
5933   "maxLength": 64,
5934   "readOnly": true,
5935   "description": "Platform Resident OS Version"
5936 },
5937 "mnhw": {
5938   "type": "string",
5939   "maxLength": 64,
5940   "readOnly": true,
5941   "description": "Platform Hardware Version"
5942 },
5943 "mnfv": {
5944   "type": "string",
5945   "maxLength": 64,
5946   "readOnly": true,
5947   "description": "Manufacturer's firmware version"
5948 },
5949 "mns1": {
5950   "type": "string",
5951   "readOnly": true,
5952   "description": "Manufacturer's Support Information URL",
5953   "maxLength": 256,
5954   "format": "uri"
5955 },
5956 "st": {
5957   "type": "string",
5958   "readOnly": true,
5959   "description": "Reference time for the device in ISO8601 format.",
5960   "format": "date-time"
5961 },
5962 "vid": {
5963   "type": "string",
5964   "maxLength": 64,
5965   "readOnly": true,
5966   "description": "Manufacturer's defined information for the platform. The
5967 content is freeform, with population rules up to the manufacturer"
5968 }
5969 }
5970 }
5971 },
5972 "type": "object",
5973 "allof": [
5974   { "$ref": "oic.core-schema.json#/definitions/oic.core" },
5975   { "$ref": "#/definitions/oic.wk.p" }
5976 ],
5977 "required": [ "pi", "mnmn" ]
5978 }
5979
5980 example: /
5981 {
5982   "pi": "54919CA5-4101-4AE4-595B-353C51AA983C",
5983   "rt": ["oic.wk.p"],
5984   "mnmn": "Acme, Inc"
5985 }
5986

```

5987 D.7.5 Property Definition

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	Reference time for the device in ISO8601 format.
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

5988 **D.7.6 CRUDN behaviour**

Resource	Create	Read	Update	Delete	Notify
/oic/p		get			

5989 **D.8 Discoverable Resources Baseline Interface**

5990 **D.8.1 Introduction**

5991 Baseline representation of /oic/res; list of discoverable resources

5992 **D.8.2 Wellknown URI**

5993 /oic/res

5994 **D.8.3 Resource Type**

5995 The resource type (rt) is defined as: oic.wk.res.

5996 **D.8.4 RAML Definition**

5997 `##RAML 0.8`

5998 `title: Discoverable Resources`

5999 `version: v1-20160622`

```

6000 traits:
6001   - interface-11 :
6002     queryParameters:
6003       if:
6004         enum: ["oic.if.11"]
6005   - interface-baseline :
6006     queryParameters:
6007       if:
6008         enum: ["oic.if.baseline"]
6009   - interface-all :
6010     queryParameters:
6011       if:
6012         enum: ["oic.if.11", "oic.if.baseline"]
6013
6014 /oic/res?if=oic.if.baseline:
6015   description: |
6016     Baseline representation of /oic/res; list of discoverable resources
6017
6018   is : ['interface-baseline']
6019   get:
6020     description: |
6021       Retrieve the discoverable resource set, baseline interface
6022
6023   responses :
6024     200:
6025       body:
6026         application/json:
6027           schema: /
6028             {
6029               "$schema": "http://json-schema.org/draft-v4/schema#",
6030               "description" : "Copyright (c) 2016, 2017 Open Connectivity Foundation, Inc. All
rights reserved.",
6031               "id": "http://www.openconnectivity.org/ocf-apis/core/schemas/oic.wk.res-
6032               schema.json#",
6033               "definitions": {
6034                 "oic.res-baseline": {
6035                   "type": "object",
6036                   "properties": {
6037                     "rt": {
6038                       "type": "array",
6039                       "items" : {
6040                         "type" : "string",
6041                         "maxLength": 64
6042                       },
6043                       "minItems" : 1,
6044                       "readOnly": true,
6045                       "description": "Resource Type of the Resource"
6046                     },
6047                     "if": {
6048                       "type": "array",
6049                       "items": {
6050                         "type" : "string",
6051                         "enum" : ["oic.if.baseline", "oic.if.11"]
6052                       },
6053                       "minItems": 1,
6054                       "readOnly": true,
6055                       "description": "The interface set supported by this resource"
6056                     },
6057                     "n": {
6058                       "type": "string",
6059                       "maxLength": 64,
6060                       "readOnly": true,
6061

```

```

6062         "description": "Human friendly name"
6063     },
6064     "mpro": {
6065         "readOnly": true,
6066         "description": "Supported messaging protocols",
6067         "type": "string",
6068         "maxLength": 64
6069     },
6070     "links": {
6071         "type": "array",
6072         "items": {
6073             "$ref": "oic.oic-link-schema.json#/definitions/oic.oic-link"
6074         }
6075     }
6076 },
6077 "required": ["rt", "if", "links"]
6078 }
6079 },
6080 "description": "The list of resources expressed as Links",
6081 "type": "array",
6082 "items": {
6083     "$ref": "#/definitions/oic.res-baseline"
6084 }
6085 }
6086

```

```

6087 example: /
6088 [
6089     {
6090         "rt": ["oic.wk.res"],
6091         "if": ["oic.if.baseline", "oic.if.ll" ],
6092         "links":
6093             [
6094                 {
6095                     "href": "/humidity",
6096                     "rt": ["oic.r.humidity"],
6097                     "if": ["oic.if.s"],
6098                     "p": {"bm": 3},
6099                     "eps": [
6100                         {"ep": "coaps://[fe80::b1d6]:1111", "pri": 2},
6101                         {"ep": "coaps://[fe80::b1d6]:1122"},
6102                         {"ep": "coap+tcp://[2001:db8:a::123]:2222", "pri": 3}
6103                     ]
6104                 },
6105                 {
6106                     "href": "/temperature",
6107                     "rt": ["oic.r.temperature"],
6108                     "if": ["oic.if.s"],
6109                     "p": {"bm": 3},
6110                     "eps": [
6111                         {"ep": "coaps://[[2001:db8:a::123]:2222"}
6112                     ]
6113                 }
6114             ]
6115     }
6116 ]
6117

```

6118 D.8.5 Property Definition

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		

mpro	string		Read Only	Supported messaging protocols
if	array: schema	see	yes	Read Only
				The interface set supported by this resource

6119 **D.8.6 CRUDN behaviour**

Resource	Create	Read	Update	Delete	Notify
/oic/res		get			

6120 **D.9 Discoverable Resources Link List interface**

6121 **D.9.1 Introduction**

6122 Link list representation of /oic/res; list of discoverable resources

6123 **D.9.2 Wellknown URI**

6124 /oic/res

6125 **D.9.3 Resource Type**

6126 The resource type (rt) is defined as: oic.wk.res.

6127 **D.9.4 RAML Definition**

```

6128 #%RAML 0.8
6129 title: Discoverable Resources
6130 version: v1-20160622
6131 traits:
6132   - interface-ll :
6133     queryParameters:
6134       if:
6135         enum: ["oic.if.ll"]
6136   - interface-baseline :
6137     queryParameters:
6138       if:
6139         enum: ["oic.if.baseline"]
6140   - interface-all :
6141     queryParameters:
6142       if:
6143         enum: ["oic.if.ll", "oic.if.baseline"]
6144
6145 /oic/res?if=oic.if.ll:
6146   description: |
6147     Link list representation of /oic/res; list of discoverable resources
6148
6149   is : ['interface-ll']
6150   get:
6151     description: |
6152       Retrieve the discoverable resource set, link list interface
6153
6154   responses :
6155     200:
6156       body:
6157         application/json:
6158           schema: /

```

```

6159     {
6160         "$schema": "http://json-schema.org/draft-v4/schema#",
6161         "description": "Copyright (c) 2016, 2017 Open Connectivity Foundation, Inc. All
rights reserved.",
6162         "id": "http://www.openconnectivity.org/ocf-apis/core/schemas/oic.wk.res-schema-
6163 ll.json#",
6164         "description": "The list of resources expressed as OCF links without di",
6165         "definitions": {
6166             "oic.res-ll": {
6167                 "$ref": "oic.oic-link-schema.json#/definitions/oic.oic-link"
6168             }
6169         },
6170     },
6171     "type": "array",
6172     "items": {
6173         "$ref": "#/definitions/oic.res-ll"
6174     }
6175 }
6176
6177 example: /
6178 [
6179     {
6180         "href": "/humidity",
6181         "rt": ["oic.r.humidity"],
6182         "if": ["oic.if.s"],
6183         "p": {"bm": 3},
6184         "eps": [
6185             {"ep": "coaps://[fe80::b1d6]:1111", "pri": 2},
6186             {"ep": "coaps://[fe80::b1d6]:1122"},
6187             {"ep": "coaps+tcp://[2001:db8:a::123]:2222", "pri": 3}
6188         ]
6189     },
6190     {
6191         "href": "/temperature",
6192         "rt": ["oic.r.temperature"],
6193         "if": ["oic.if.s"],
6194         "p": {"bm": 3},
6195         "eps": [
6196             {"ep": "coaps://[[2001:db8:a::123]:2222"}
6197         ]
6198     }
6199 ]
6200

```

6201 D.9.5 Property Definition

Property name	Value type	Mandatory	Access mode	Description
Rt	array: see schema	yes		Resource Type of the Resource
Di	multiple types: see schema			
Title	string			A title for the link relation. Can be used by the UI to provide a context.
Eps	array: see schema			the Endpoint information of the target Resource
pri (eps)	integer			The priority among multiple Endpoints
ep (eps)	string			Transport Protocol Suite + Endpoint Locator

Ins	integer			The instance identifier for this web link in an array of web links - used in collections
P	object: see schema			Specifies the framework policies on the Resource referenced by the target URI
bm (p)	integer	yes		Specifies the framework policies on the Resource referenced by the target URI for e.g. observable and discoverable
Href	string	yes		This is the target URI, it can be specified as a Relative Reference or fully-qualified URI.
Rel	multiple types: see schema			The relation of the target URI referenced by the link to the context URI
Type	array: see schema			A hint at the representation of the resource referenced by the target URI. This represents the media types that are used for both accepting and emitting.
anchor	string			This is used to override the context URI e.g. override the URI of the containing collection.
If	array: see schema	yes		The interface set supported by this resource

6202

D.9.6 CRUDN behaviour

Resource	Create	Read	Update	Delete	Notify
/oic/res		get			

6203 D.9.7 Referenced JSON schemas

6204 D.9.8 oic.oic-link-schema.json

```
6205 {
6206   "$schema": "http://json-schema.org/draft-04/schema#",
6207   "description": "Copyright (c) 2016, 2017 Open Connectivity Foundation, Inc. All rights
6208 reserved.",
6209   "id": "http://www.openconnectivity.org/ocf-apis/core/schemas/oic.oic-link-schema.json#",
6210   "definitions": {
6211     "oic.oic-link": {
6212       "type": "object",
6213       "properties": {
6214         "href": {
6215           "type": "string",
6216           "maxLength": 256,
6217           "description": "This is the target URI, it can be specified as a Relative Reference or
6218 fully-qualified URI.",
6219           "format": "uri"
6220         },
6221         "rel": {
6222           "oneOf": [
6223             {
6224               "type": "array",
6225               "items": {
6226                 "type": "string",
6227                 "maxLength": 64
6228               },
6229               "minItems": 1,
6230               "default": ["hosts"]
6231             },
6232             {
6233               "type": "string",
6234               "maxLength": 64,
6235               "default": "hosts"
6236             }
6237           ],
6238           "description": "The relation of the target URI referenced by the link to the context URI"
6239         },
6240         "rt": {
6241           "type": "array",
6242           "items": {
6243             "type": "string",
6244             "maxLength": 64
6245           },
6246           "minItems": 1,
6247           "description": "Resource Type of the Resource"
6248         },
6249         "if": {
6250           "type": "array",
6251           "items": {
6252             "type": "string",
6253             "enum": ["oic.if.baseline", "oic.if.ll", "oic.if.b", "oic.if.rw", "oic.if.r",
6254 "oic.if.a", "oic.if.s" ]
6255           },
6256           "minItems": 1,
6257           "description": "The interface set supported by this resource"
6258         },
6259         "di": {
6260           "allOf": [
6261             {
6262               "$ref": "oic.types-schema.json#/definitions/uuid"
6263             },
6264             {
6265               "description": "The device ID"
6266             }
6267           ]
6268         },
6269         "p": {
6270           "description": "Specifies the framework policies on the Resource referenced by the target
6271 URI",
```

```

6272         "type": "object",
6273         "properties": {
6274             "bm": {
6275                 "description": "Specifies the framework policies on the Resource referenced by the
6276 target URI for e.g. observable and discoverable",
6277                 "type": "integer"
6278             }
6279         },
6280         "required" : ["bm"]
6281     },
6282     "title": {
6283         "type": "string",
6284         "maxLength": 64,
6285         "description": "A title for the link relation. Can be used by the UI to provide a
6286 context."
6287     },
6288     "anchor": {
6289         "type": "string",
6290         "maxLength": 256,
6291         "description": "This is used to override the context URI e.g. override the URI of the
6292 containing collection.",
6293         "format": "uri"
6294     },
6295     "ins": {
6296         "type": "integer",
6297         "description": "The instance identifier for this web link in an array of web links - used
6298 in collections"
6299     },
6300     "type": {
6301         "type": "array",
6302         "description": "A hint at the representation of the resource referenced by the target
6303 URI. This represents the media types that are used for both accepting and emitting.",
6304         "items" : {
6305             "type": "string",
6306             "maxLength": 64
6307         },
6308         "minItems": 1,
6309         "default": "application/cbor"
6310     },
6311     "eps": {
6312         "type": "array",
6313         "description": "the Endpoint information of the target Resource",
6314         "items": {
6315             "type": "object",
6316             "properties": {
6317                 "ep": {
6318                     "type": "string",
6319                     "format": "uri",
6320                     "description": "Transport Protocol Suite + Endpoint Locator"
6321                 },
6322                 "pri": {
6323                     "type": "integer",
6324                     "minimum": 1,
6325                     "description": "The priority among multiple Endpoints"
6326                 }
6327             }
6328         }
6329     },
6330     },
6331     "required": [ "href", "rt", "if" ]
6332 }
6333 },
6334 "type": "object",
6335 "allOf": [
6336     { "$ref": "#/definitions/oic.oic-link" }
6337 ]
6338 }
6339

```

6340 D.10 Scenes (Top level)

6341 D.10.1 Introduction

6342 Toplevel Scene resource. This resource is a generic collection resource. The rts value shall contain
6343 oic.wk.scenecollection resource types.

6344 D.10.2 Example URI

6345 /SceneListResURI

6346 D.10.3 Resource Type

6347 The resource type (rt) is defined as: oic.wk.scenelist.

6348 D.10.4 RAML Definition

6349 `##RAML 0.8`

6350 `title: Scene`

6351 `version: v1-20160622`

6352 `traits:`

6353 `- interface :`

6354 `queryParameters:`

6355 `if:`

6356 `enum: ["oic.if.a", "oic.if.ll", "oic.if.baseline"]`

6357

6358 `/SceneListResURI:`

6359 `description: |`

6360 `Toplevel Scene resource.`

6361 `This resource is a generic collection resource.`

6362 `The rts value shall contain oic.wk.scenecollection resource types.`

6363

6364 `get:`

6365 `description: |`

6366 `Provides the current list of web links pointing to scenes`

6367

6368 `responses :`

6369 `200:`

6370 `body:`

6371 `application/json:`

6372 `schema: |`

6373 `{`

6374 `"$schema": "http://json-schema.org/draft-04/schema#",`

6375 `"description" : "Copyright (c) 2016 Open Connectivity Foundation, Inc. All rights`

6376 `reserved.",`

6377 `"id": "http://www.openconnectivity.org/ocf-apis/core/schemas/oic.collection-`

6378 `schema.json#",`

6379 `"title": "Collection",`

6380 `"definitions": {`

6381 `"oic.oic-link": {`

6382 `"type": "object",`

6383 `"properties": {`

6384 `"href": {`

6385 `"type": "string",`

6386 `"maxLength": 256,`

6387 `"description": "This is the target URI, it can be specified as a`

6388 `Relative Reference or fully-qualified URI.",`

6389 `"format": "uri"`

6390 `},`

6391 `"rel": {`

6392 `"oneOf": [`

6393 `{`

6394 `"type": "array",`

6395 `"items": {`

```

6396         "type": "string",
6397         "maxLength": 64
6398     },
6399     "minItems": 1,
6400     "default": ["hosts"]
6401 },
6402 {
6403     "type": "string",
6404     "maxLength": 64,
6405     "default": "hosts"
6406 }
6407 ],
6408 "description": "The relation of the target URI referenced by the link
6409 to the context URI"
6410 },
6411 "rt": {
6412     "type": "array",
6413     "items": {
6414         "type": "string",
6415         "maxLength": 64
6416     },
6417     "minItems": 1,
6418     "description": "Resource Type of the Resource"
6419 },
6420 "if": {
6421     "type": "array",
6422     "items": {
6423         "type": "string",
6424         "enum": ["oic.if.baseline", "oic.if.ll", "oic.if.b", "oic.if.rw",
6425 "oic.if.r", "oic.if.a", "oic.if.s"]
6426     },
6427     "minItems": 1,
6428     "description": "The interface set supported by this resource"
6429 },
6430 "di": {
6431     "$ref": "#/definitions/uuid",
6432     "description": "The device ID"
6433 },
6434 "p": {
6435     "description": "Specifies the framework policies on the Resource
6436 referenced by the target URI",
6437     "type": "object",
6438     "properties": {
6439         "bm": {
6440             "description": "Specifies the framework policies on the Resource
6441 referenced by the target URI for e.g. observable and discoverable",
6442             "type": "integer"
6443         }
6444     },
6445     "required": ["bm"]
6446 },
6447 "title": {
6448     "type": "string",
6449     "maxLength": 64,
6450     "description": "A title for the link relation. Can be used by the UI to
6451 provide a context."
6452 },
6453 "anchor": {
6454     "type": "string",
6455     "maxLength": 256,
6456     "description": "This is used to override the context URI e.g. override
6457 the URI of the containing collection.",
6458     "format": "uri"
6459 },
6460 "ins": {
6461     "type": "integer",
6462     "description": "The instance identifier for this web link in an array
6463 of web links - used in collections"
6464 },
6465 "type": {
6466     "type": "array",

```

```

6467         "description": "A hint at the representation of the resource referenced
6468 by the target URI. This represents the media types that are used for both accepting and emitting.",
6469         "items" : {
6470             "type": "string",
6471             "maxLength": 64
6472         },
6473         "minItems": 1,
6474         "default": "application/cbor"
6475     },
6476     "eps": {
6477         "type": "array",
6478         "description": "the Endpoint information of the target Resource",
6479         "items": {
6480             "type": "object",
6481             "properties": {
6482                 "ep": {
6483                     "type": "string",
6484                     "format": "uri",
6485                     "description": "Transport Protocol Suite + Endpoint Locator"
6486                 },
6487                 "pri": {
6488                     "type": "integer",
6489                     "minimum": 1,
6490                     "description": "The priority among multiple Endpoints"
6491                 }
6492             }
6493         }
6494     },
6495 },
6496 "required": [ "href", "rt", "if" ]
6497 },
6498 "oic.collection.linksexpanded": {
6499     "type": "object",
6500     "properties": {
6501         "links": {
6502             "description": "A set of simple or individual OIC Links.",
6503             "type": "array",
6504             "items": {
6505                 "type": "object",
6506                 "properties": {
6507                     "href": {
6508                         "type": "string",
6509                         "maxLength": 256,
6510                         "description": "This is the target URI, it can be specified
6511 as a Relative Reference or fully-qualified URI.",
6512                         "format": "uri"
6513                     },
6514                     "rel": {
6515                         "oneOf": [
6516                             {
6517                                 "type": "array",
6518                                 "items": {
6519                                     "type": "string",
6520                                     "maxLength": 64
6521                                 },
6522                                 "minItems": 1,
6523                                 "default": ["hosts"]
6524                             },
6525                             {
6526                                 "type": "string",
6527                                 "maxLength": 64,
6528                                 "default": "hosts"
6529                             }
6530                         ],
6531                         "description": "The relation of the target URI referenced by
6532 the link to the context URI"
6533                     },
6534                     "rt": {
6535                         "type": "array",
6536                         "items" : {
6537                             "type" : "string",

```

```

6538         "maxLength": 64
6539     },
6540     "minItems" : 1,
6541     "description": "Resource Type of the Resource"
6542 },
6543 "if": {
6544     "type": "array",
6545     "items": {
6546         "type" : "string",
6547         "enum" : ["oic.if.baseline", "oic.if.ll", "oic.if.b",
6548 "oic.if.rw", "oic.if.r", "oic.if.a", "oic.if.s" ]
6549     },
6550     "minItems": 1,
6551     "description": "The interface set supported by this resource"
6552 },
6553 "di": {
6554     "description": "Format pattern according to IETF RFC 4122.",
6555     "type": "string",
6556     "pattern": "^[a-fA-F0-9]{8}-[a-fA-F0-9]{4}-[a-fA-F0-9]{4}-[a-
6557 fA-F0-9]{4}-[a-fA-F0-9]{12}$"
6558 },
6559 "p": {
6560     "description": "Specifies the framework policies on the
6561 Resource referenced by the target URI",
6562     "type": "object",
6563     "properties": {
6564         "bm": {
6565             "description": "Specifies the framework policies on the
6566 Resource referenced by the target URI for e.g. observable and discoverable",
6567             "type": "integer"
6568         }
6569     },
6570     "required" : ["bm"]
6571 },
6572 "title": {
6573     "type": "string",
6574     "maxLength": 64,
6575     "description": "A title for the link relation. Can be used by
6576 the UI to provide a context."
6577 },
6578 "anchor": {
6579     "type": "string",
6580     "maxLength": 256,
6581     "description": "This is used to override the context URI e.g.
6582 override the URI of the containing collection.",
6583     "format": "uri"
6584 },
6585 "ins": {
6586     "type": "integer",
6587     "description": "The instance identifier for this web link in
6588 an array of web links - used in collections"
6589 },
6590 "type": {
6591     "type": "array",
6592     "description": "A hint at the representation of the resource
6593 referenced by the target URI. This represents the media types that are used for both accepting and
6594 emitting.",
6595     "items" : {
6596         "type": "string",
6597         "maxLength": 64
6598     },
6599     "minItems": 1,
6600     "default": "application/cbor"
6601 },
6602 "eps": {
6603     "type": "array",
6604     "description": "the Endpoint information of the target
6605 Resource",
6606     "items": {
6607         "type": "object",
6608         "properties": {

```

```

6609         "ep": {
6610             "type": "string",
6611             "format": "uri",
6612             "description": "Transport Protocol Suite + Endpoint
6613 Locator"
6614         },
6615         "pri": {
6616             "type": "integer",
6617             "minimum": 1,
6618             "description": "The priority among multiple Endpoints"
6619         }
6620     },
6621     },
6622     },
6623     },
6624     "required": [ "href", "rt", "if" ]
6625 }
6626 }
6627 }
6628 },
6629 "oic.core": {
6630     "type": "object",
6631     "properties": {
6632         "rt": {
6633             "type": "array",
6634             "items": {
6635                 "type": "string",
6636                 "maxLength": 64
6637             },
6638             "minItems": 1,
6639             "readOnly": true,
6640             "description": "Resource Type of the Resource"
6641         }
6642     }
6643 },
6644 "uuid": {
6645     "description": "Format pattern according to IETF RFC 4122.",
6646     "type": "string",
6647     "pattern": "^[a-fA-F0-9]{8}-[a-fA-F0-9]{4}-[a-fA-F0-9]{4}-[a-fA-F0-9]{4}-
6648 [a-fA-F0-9]{12}$"
6649 },
6650 "oic.collection.links": {
6651     "type": "object",
6652     "properties": {
6653         "links": {
6654             "description": "A set of simple or individual OIC Links.",
6655             "type": "array",
6656             "items": {
6657                 "$ref": "#/definitions/oic.oic-link"
6658             }
6659         }
6660     }
6661 },
6662 "oic.collection.properties": {
6663     "type": "object",
6664     "description": "A collection is a set of links along with additional
6665 properties to describe the collection itself",
6666     "properties": {
6667         "rts": {
6668             "$ref": "#/definitions/oic.core.properties/rt",
6669             "description": "The list of allowable resource types (for
6670 Target and anchors) in links included in the collection"
6671         }
6672     }
6673 }
6674 },
6675 "type": "object",
6676 "allOf": [
6677     { "$ref": "oic.core-schema.json#/definitions/oic.core" },
6678     { "$ref": "#/definitions/oic.collection.properties" },
6679     { "$ref": "#/definitions/oic.collection.links" }

```

```

6680         ]
6681     }
6682
6683     example: /
6684     {
6685         "rt":      ["oic.wk.scenelist"],
6686         "n":       "list of scene Collections",
6687         "rts":     ["oic.wk.scenecollection"],
6688         "links":  [
6689             ]
6690     }
6691

```

6692 D.10.5 Property Definition

Property name	Value type	Mandatory	Access mode	Description
rts	multiple types: see schema			The list of allowable resource types (for Target and anchors) in links included in the collection

6693 D.10.6 CRUDN behaviour

Resource	Create	Read	Update	Delete	Notify
/SceneListResURI		get			

6694 D.11 Scene Collections

6695 D.11.1 Introduction

6696 Collection that models a set of Scenes. This resource is a generic collection resource with
6697 additional parameters. The rts value shall contain oic.scenemember resource types. The additional
6698 parameters are lastScene, this is the scene value last set by any OCF Client sceneValues, this
6699 is the list of available scenes lastScene shall be listed in sceneValues.

6700 D.11.2 Example URI

6701 /SceneCollectionResURI

6702 D.11.3 Resource Type

6703 The resource type (rt) is defined as: oic.wk.scenecollection.

6704 D.11.4 RAML Definition

```

6705 #%RAML 0.8
6706 title: Scene
6707 version: v1-20160622
6708 traits:
6709   - interface :
6710       queryParameters:
6711           if:
6712               enum: ["oic.if.a", "oic.if.ll", "oic.if.baseline"]
6713
6714 /SceneCollectionResURI:
6715     description: |
6716         Collection that models a set of Scenes.
6717         This resource is a generic collection resource with additional parameters.
6718         The rts value shall contain oic.scenemember resource types.
6719         The additional parameters are
6720         lastScene, this is the scene value last set by any OCF Client

```



```

6721     sceneValues, this is the list of available scenes
6722     lastScene shall be listed in sceneValues.
6723
6724 get:
6725     description: |
6726     Provides the current list of web links pointing to scenes
6727
6728     responses :
6729         200:
6730             body:
6731                 application/json:
6732                     schema: /
6733                         {
6734                             "$schema": "http://json-schema.org/draft-04/schema#",
6735                             "description" : "Copyright (c) 2016, 2017 Open Connectivity Foundation, Inc. All
rights reserved.",
6736                             "id": "http://www.openconnectivity.org/ocf-apis/core/schemas/oic.sceneCollection-
schema.json#",
6737                             "title" : "Scene Collection",
6738                             "definitions": {
6739                                 "oic.sceneCollection": {
6740                                     "type": "object",
6741                                     "properties": {
6742                                         "lastScene": {
6743                                             "type": "string",
6744                                             "description": "Last selected Scene from the set of sceneValues"
6745                                         },
6746                                         "sceneValues": {
6747                                             "type": "array",
6748                                             "readOnly": true,
6749                                             "description": "All available scene values",
6750                                             "items": {
6751                                                 "type": "string"
6752                                             }
6753                                         }
6754                                     }
6755                                 },
6756                                 "required": [ "lastScene","sceneValues","rts","id" ]
6757                             },
6758                             "type": "object",
6759                             "allOf" : [
6760                                 { "$ref": "oic.core-schema.json#/definitions/oic.core" },
6761                                 { "$ref": "oic.collection-schema.json#/definitions/oic.collection.properties"},
6762                                 { "$ref": "oic.collection-schema.json#/definitions/oic.collection.linksexpanded"}
6763                             ],
6764                             { "$ref": "#/definitions/oic.sceneCollection" }
6765                         ]
6766                     }
6767
6768
6769     example: /
6770         {
6771             "lastScene": "off",
6772             "sceneValues": ["off","Reading","TVWatching"],
6773             "rt":         ["oic.wk.scenecollection"],
6774             "n":          "My Scenes for my living room",
6775             "id":         "0685B960-736F-46F7-BECO-9E6CBD671ADC1",
6776             "rts":        ["oic.wk.scenemember"],
6777             "links": [
6778                 ]
6779         }
6780
6781 post:
6782     description: |
6783     Provides the action to change the last set scene selection.
6784     Calling this method shall update all scene members to the prescribed membervalue.
6785     When this method is called with the same value as the current lastScene value

```

```

6786         then all scene members shall be updated.
6787
6788     body:
6789         application/json:
6790             schema: /
6791                 {
6792                     "$schema": "http://json-schema.org/draft-04/schema#",
6793                     "description" : "Copyright (c) 2016, 2017 Open Connectivity Foundation, Inc. All rights
6794 reserved.",
6795                     "id": "http://www.openconnectivity.org/ocf-apis/core/schemas/oic.sceneCollection-
6796 Update-schema.json#",
6797                     "title" : "Scene Collection",
6798                     "definitions": {
6799                         "oic.sceneCollection-Update": {
6800                             "type": "object",
6801                             "properties": {
6802                                 "lastScene": {
6803                                     "type": "string",
6804                                     "description": "Last selected Scene from the set of sceneValues"
6805                                 }
6806                             },
6807                             "required": [ "lastScene" ]
6808                         }
6809                     },
6810                     "type": "object",
6811                     "allOf" : [
6812                         { "$ref": "oic.core-schema.json#/definitions/oic.core" },
6813                         { "$ref": "#/definitions/oic.sceneCollection-Update" }
6814                     ]
6815                 }
6816
6817             example: /
6818                 {
6819                     "lastScene": "Reading"
6820                 }
6821
6822     responses :
6823         200:
6824             description: |
6825                 Indicates that the value is changed.
6826                 The changed properties are provided in the response.
6827
6828     body:
6829         application/json:
6830             schema: /
6831                 {
6832                     "$schema": "http://json-schema.org/draft-04/schema#",
6833                     "description" : "Copyright (c) 2016, 2017 Open Connectivity Foundation, Inc. All
6834 rights reserved.",
6835                     "id": "http://www.openconnectivity.org/ocf-apis/core/schemas/oic.sceneCollection-
6836 Update-schema.json#",
6837                     "title" : "Scene Collection",
6838                     "definitions": {
6839                         "oic.sceneCollection-Update": {
6840                             "type": "object",
6841                             "properties": {
6842                                 "lastScene": {
6843                                     "type": "string",
6844                                     "description": "Last selected Scene from the set of sceneValues"
6845                                 }
6846                             },
6847                             "required": [ "lastScene" ]
6848                         }
6849                     },
6850                     "type": "object",

```

```

6851         "allOf" : [
6852             { "$ref": "oic.core-schema.json#/definitions/oic.core" },
6853             { "$ref": "#/definitions/oic.sceneCollection-Update" }
6854         ]
6855     }
6856
6857     example: /
6858     {
6859         "lastScene": "Reading"
6860     }
6861

```

6862 D.11.5 Property Definition

Property name	Value type	Mandatory	Access mode	Description
lastScene	string	yes		Last selected Scene from the set of sceneValues
sceneValues	array: see schema	yes	Read Only	All available scene values

6863 D.11.6 CRUDN behaviour

Resource	Create	Read	Update	Delete	Notify
/SceneCollectionResURI		get	post		

6864 D.12 Scene Member

6865 D.12.1 Introduction

6866 Collection that models a scene member.

6867 D.12.2 Example URI

6868 /SceneMemberResURI

6869 D.12.3 Resource Type

6870 The resource type (rt) is defined as: oic.wk.scenemember.

6871 D.12.4 RAML Definition

```

6872 #%RAML 0.8
6873 title: Scene
6874 version: v1-20160622
6875 traits:
6876   - interface :
6877       queryParams:
6878         if:
6879             enum: ["oic.if.a", "oic.if.ll", "oic.if.baseline"]
6880
6881 /SceneMemberResURI:
6882   description: |
6883     Collection that models a scene member.
6884
6885   get:
6886     description: |
6887       Provides the scene member
6888
6889   responses :
6890     200:
6891       body:

```

```

6892     application/json:
6893         schema: /
6894             {
6895                 "$schema": "http://json-schema.org/draft-04/schema#",
6896                 "description" : "Copyright (c) 2016, 2017 Open Connectivity Foundation, Inc. All
6897 rights reserved.",
6898                 "id": "http://www.openconnectivity.org/ocf-apis/core/schemas/oic.sceneMember-
6899 schema.json#",
6900                 "title" : "Scene Member",
6901                 "definitions": {
6902                     "oic.sceneMember": {
6903                         "type": "object",
6904                         "properties": {
6905                             "SceneMappings" : {
6906                                 "type": "array",
6907                                 "description": "array of mappings per scene, can be one(1)",
6908                                 "items": {
6909                                     "type": "object",
6910                                     "properties": {
6911                                         "scene": {
6912                                             "type": "string",
6913                                             "description": "Specifies a scene value that will be acted upon"
6914                                         },
6915                                         "memberProperty": {
6916                                             "type": "string",
6917                                             "readOnly": true,
6918                                             "description": "property name that will be mapped"
6919                                         },
6920                                         "memberValue": {
6921                                             "type": "string",
6922                                             "readOnly": true,
6923                                             "description": "value of the Member Property"
6924                                         }
6925                                     },
6926                                     "required": [ "scene", "memberProperty", "memberValue" ]
6927                                 }
6928                             },
6929                             "link": {
6930                                 "allOf": [
6931                                     {
6932                                         "$ref": "oic.oic-link-schema.json#/definitions/oic.oic-link"
6933                                     },
6934                                     {
6935                                         "description": "OCF link that points to a resource"
6936                                     }
6937                                 ]
6938                             }
6939                         },
6940                         "required": [ "link" ]
6941                     }
6942                 },
6943                 "type": "object",
6944                 "allOf" : [
6945                     { "$ref": "oic.core-schema.json#/definitions/oic.core" },
6946                     { "$ref": "#/definitions/oic.sceneMember" }
6947                 ]
6948             }
6949         }
6950
6951     example: /
6952         {
6953             "rt": ["oic.wk.scenemember"],
6954             "id": "0685B960-FFFF-46F7-BEC0-9E6234671ADC1",
6955             "n": "my binary switch (for light bulb) mappings",
6956             "link": {
6957                 "href": "binarySwitch",
6958                 "rt": ["oic.r.switch.binary"],
6959                 "if": ["oic.if.a", "oic.if.baseline"],
6960                 "eps": [

```

```

6961         {"ep": "coap://[fe80::b1d6]:1111", "pri": 2},
6962         {"ep": "coaps://[fe80::b1d6]:1122"},
6963         {"ep": "coap+tcp://[2001:db8:a::123]:2222", "pri": 3}
6964     ]
6965 },
6966     "sceneMappings": [
6967     {
6968         "scene": "off",
6969         "memberProperty": "value",
6970         "memberValue": true
6971     },
6972     {
6973         "scene": "Reading",
6974         "memberProperty": "value",
6975         "memberValue": false
6976     },
6977     {
6978         "scene": "TVWatching",
6979         "memberProperty": "value",
6980         "memberValue": true
6981     }
6982     ]
6983 }
6984

```

6985 D.12.5 Property Definition

Property name	Value type	Mandatory	Access mode	Description
SceneMappings	array: see schema			array of mappings per scene, can be one(1)
memberValue (SceneMappings)	string	yes	Read Only	value of the Member Property
memberProperty (SceneMappings)	string	yes	Read Only	property name that will be mapped
scene (SceneMappings)	string	yes		Specifies a scene value that will be acted upon
link	multiple types: see schema	yes		

6986 D.12.6 CRUDN behaviour

Resource	Create	Read	Update	Delete	Notify
/SceneMemberResURI		get			

6987 D.13 Resource directory resource

6988 D.13.1 Introduction

6989 Resource to be exposed by any Device that can act as a Resource Directory. 1) Provides selector
6990 criteria (e.g., integer) with GET request 2) Publish a Link in /oic/res with POST request

6991 D.13.2 Wellknown URI

6992 /oic/rd

6993 D.13.3 Resource Type

6994 The resource type (rt) is defined as: oic.wk.rd.

6995 D.13.4 RAML Definition

6996 `##RAML 0.8`

```

6997 title: Resource Directory
6998 version: v1-20160622

6999 traits:
7000 - rdgetinterface :
7001   queryParameters:
7002     if:
7003       enum: ["oic.if.baseline"]
7004       description: Interface is optional since there is only one interface supported for the
7005 Resource Type
7006 Both for RD selection and for publish.
7007 Example: GET /oic/rd?if=oic.if.baseline
7008
7009 - rdpostinterface :
7010   queryParameters:
7011     if:
7012       enum: ["oic.if.baseline"]
7013       description: Interface is optional since there is only one interface supported for the
7014 Resource Type
7015 Both for RD selection and for publish.
7016 Example: POST /oic/rd?if=oic.if.baseline
7017
7018
7019 /oic/rd:
7020 description: |
7021 Resource to be exposed by any Device that can act as a Resource Directory.
7022 1) Provides selector criteria (e.g., integer) with GET request
7023 2) Publish a Link in /oic/res with POST request
7024
7025 get:
7026 description: |
7027 Get the attributes of the Resource Directory for selection purposes.
7028
7029 is : ['rdgetinterface']
7030 responses :
7031 200:
7032 description: |
7033 Respond with the selector criteria - either the set of attributes or the bias factor
7034
7035 body:
7036 application/json:
7037   schema: /
7038     {
7039       "$schema": "http://json-schema.org/draft-04/schema#",
7040       "description" : "Copyright (c) 2016, 2017 Open Connectivity Foundation, Inc. All
7041 rights reserved.",
7042       "id": "http://www.openconnectivity.org/ocf-apis/core/schemas/oic.rd.selection-
7043 schema.json#",
7044       "title" : "RD Selection",
7045       "definitions": {
7046         "oic.rd.attributes": {
7047           "type": "object",
7048           "properties": {
7049             "sel": {
7050               "type": "integer",
7051               "minimum": 0,
7052               "maximum": 100,
7053               "readOnly": true,
7054               "description": "A bias factor calculated by the Resource directory"
7055             },
7056           },
7057           "required": ["sel"]
7058         }
7059       }

```

```

7059         },
7060         "type": "object",
7061         "allOf": [
7062             { "$ref": "oic.core-schema.json#/definitions/oic.core" },
7063             { "$ref": "#/definitions/oic.rd.attributes" }
7064         ]
7065     }
7066
7067     example: /
7068     {
7069         "rt": ["oic.wk.rd"],
7070         "if": ["oic.if.baseline"],
7071         "sel": 50
7072     }
7073
7074     post:
7075     description: |
7076         Publish the resource information for the first time in /oic/res
7077         Updates to existing entries are not allowed.
7078         Appropriates parts of the information, i.e., Links of the published Resources will be
7079         discovered through /oic/res.
7080         1) When a Device first publishes a Link, the request payload to RD may include the Links
7081         without an "ins" Parameter.
7082         2) Upon granting the request, the RD assigns a unique instance value identifying the Link
7083         among all the Links it advertises
7084         and sends back the instance value in the "ins" Parameter in the Link to the publishing
7085         Device.
7086
7087     is : ['rdpostinterface']
7088     body:
7089     application/json:
7090     schema: /
7091     {
7092         "$schema": "http://json-schema.org/draft-04/schema#",
7093         "description": "Copyright (c) 2016,2017 Open Connectivity Foundation, Inc. All rights
7094         reserved.",
7095         "id": "http://www.openconnectivity.org/ocf-apis/core/schemas/oic.rd.publish-
7096         schema.json#",
7097         "title": "RD Publish & Update",
7098         "definitions": {
7099             "oic.rd.publish": {
7100                 "properties": {
7101                     "di": {
7102                         "$ref": "oic.types-schema.json#/definitions/uuid",
7103                         "description": "A UUID that is the identifier for the publishing Device"
7104                     },
7105                     "ttl": {
7106                         "type": "integer",
7107                         "description": "Time to indicate a RD, i.e. how long to keep this published
7108         item."
7109                     }
7110                 }
7111             }
7112         },
7113         "type": "object",
7114         "allOf": [
7115             { "$ref": "oic.core-schema.json#/definitions/oic.core" },
7116             { "$ref": "#/definitions/oic.rd.publish" },
7117             { "$ref": "oic.collection-schema.json#/definitions/oic.collection.linksexpanded" }
7118         ],
7119         "required": ["di", "links", "ttl"]
7120     }
7121
7122     example: /

```

```

7123     {
7124         "di": "e61c3e6b-9c54-4b81-8ce5-f9039c1d04d9",
7125         "links": [
7126             {
7127                 "anchor": "ocf://e61c3e6b-9c54-4b81-8ce5-f9039c1d04d9",
7128                 "href": "/myLightSwitch",
7129                 "rt": ["oic.r.switch.binary"],
7130                 "if": ["oic.if.a", "oic.if.baseline"],
7131                 "p": {"bm": 3},
7132                 "eps": [
7133                     {"ep": "coaps://[2001:db8:a::b1d6]:1111", "pri": 2},
7134                     {"ep": "coaps://[2001:db8:a::b1d6]:1122"},
7135                     {"ep": "coaps+tcp://[2001:db8:a::123]:2222", "pri": 3}
7136                 ]
7137             },
7138             {
7139                 "anchor": "ocf://e61c3e6b-9c54-4b81-8ce5-f9039c1d04d9",
7140                 "href": "/myLightBrightness",
7141                 "rt": ["oic.r.brightness"],
7142                 "if": ["oic.if.a", "oic.if.baseline"],
7143                 "p": {"bm": 3},
7144                 "eps": [
7145                     {"ep": "coaps://[[2001:db8:a::123]:2222"}
7146                 ]
7147             }
7148         ],
7149         "ttl": 600
7150     }
7151
7152 responses :
7153 200:
7154     description: |
7155         Respond with the same schema as publish with the additional "ins" Parameter in the Link.
7156
7157     body:
7158     application/json:
7159         schema: /
7160             {
7161                 "$schema": "http://json-schema.org/draft-04/schema#",
7162                 "description": "Copyright (c) 2016,2017 Open Connectivity Foundation, Inc. All
7163 rights reserved.",
7164                 "id": "http://www.openconnectivity.org/ocf-apis/core/schemas/oic.rd.publish-
7165 schema.json#",
7166                 "title": "RD Publish & Update",
7167                 "definitions": {
7168                     "oic.rd.publish": {
7169                         "properties": {
7170                             "di": {
7171                                 "$ref": "oic.types-schema.json#/definitions/uuid",
7172                                 "description": "A UUID that is the identifier for the publishing Device"
7173                             },
7174                             "ttl": {
7175                                 "type": "integer",
7176                                 "description": "Time to indicate a RD, i.e. how long to keep this published
7177 item."
7178                             }
7179                         }
7180                     }
7181                 },
7182                 "type": "object",
7183                 "allOf": [
7184                     {"$ref": "oic.core-schema.json#/definitions/oic.core"},
7185                     {"$ref": "#/definitions/oic.rd.publish"},
7186                     {"$ref": "oic.collection-schema.json#/definitions/oic.collection.linksexpanded"}
7187                 ],
7188                 "required": ["di", "links", "ttl"]
7189             }
7190

```



```

7191     example: /
7192     {
7193         "di": "e61c3e6b-9c54-4b81-8ce5-f9039c1d04d9",
7194         "links": [
7195             {
7196                 "anchor": "ocf://e61c3e6b-9c54-4b81-8ce5-f9039c1d04d9",
7197                 "href": "/myLightSwitch",
7198                 "rt": ["oic.r.switch.binary"],
7199                 "if": ["oic.if.a", "oic.if.baseline"],
7200                 "p": {"bm": 3},
7201                 "eps": [
7202                     {"ep": "coaps://[2001:db8:a::b1d6]:1111", "pri": 2},
7203                     {"ep": "coaps://[2001:db8:a::b1d6]:1122"},
7204                     {"ep": "coaps+tcp://[2001:db8:a::123]:2222", "pri": 3}
7205                 ],
7206                 "ins": 11235
7207             },
7208             {
7209                 "anchor": "ocf://e61c3e6b-9c54-4b81-8ce5-f9039c1d04d9",
7210                 "href": "/myLightBrightness",
7211                 "rt": ["oic.r.brightness"],
7212                 "if": ["oic.if.a", "oic.if.baseline"],
7213                 "p": {"bm": 3},
7214                 "eps": [
7215                     {"ep": "coaps://[2001:db8:a::123]:2222"}
7216                 ],
7217                 "ins": 112358
7218             }
7219         ],
7220         "ttl": 600
7221     }
7222

```

7223 D.13.5 Property Definition

Property name	Value type	Mandatory	Access mode	Description
sel	integer	yes	Read Only	A bias factor calculated by the Resource directory

7224 D.13.6 CRUDN behaviour

Resource	Create	Read	Update	Delete	Notify
/oic/rd		get	post		

7225 D.14 Icon

7226 D.14.1 Introduction

7227 This resource describes the attributes associated with an Icon.

7228 D.14.2 Example URI

7229 /IconResURI

7230 D.14.3 Resource Type

7231 The resource type (rt) is defined as: oic.r.icon.

7232 D.14.4 RAML Definition

```

7233 #%RAML 0.8
7234 title: OICIcon
7235 version: v1.1.0-20161107
7236 traits:
7237   - interface :
7238       queryParameters:

```

```

7239     if:
7240         enum: ["oic.if.r", "oic.if.baseline"]
7241
7242 /IconResURI:
7243     description: |
7244         This resource describes the attributes associated with an Icon.
7245
7246     is : ['interface']
7247     get:
7248         description: |
7249             Retrieves the current icon properties.
7250
7251     responses :
7252         200:
7253             body:
7254                 application/json:
7255                     schema: /
7256
7257                     {
7258                         "id": "http://www.openconnectivity.org/ocf-apis/core/schemas/oic.r.icon.json#",
7259                         "$schema": "http://json-schema.org/draft-04/schema#",
7260                         "description" : "Copyright (c) 2017 Open Connectivity Foundation, Inc. All rights
7261 reserved.",
7262                         "title": "Icon",
7263                         "definitions": {
7264                             "oic.r.icon": {
7265                                 "properties": {
7266                                     "mimetype": {
7267                                         "type": "string",
7268                                         "maxLength": 64,
7269                                         "readOnly": true,
7270                                         "description": "The Media Type of the icon"
7271                                     },
7272                                     "width": {
7273                                         "type": "integer",
7274                                         "minimum": 1,
7275                                         "readOnly": true,
7276                                         "description": "The width in pixels"
7277                                     },
7278                                     "height": {
7279                                         "type": "integer",
7280                                         "minimum": 1,
7281                                         "readOnly": true,
7282                                         "description": "The height in pixels"
7283                                     },
7284                                     "media": {
7285                                         "type": "string",
7286                                         "maxLength": 256,
7287                                         "format" : "uri",
7288                                         "readOnly": true,
7289                                         "description": "Specifies the URI to the icon"
7290                                     }
7291                                 }
7292                             },
7293                             "type": "object",
7294                             "allOf": [
7295                                 { "$ref": "oic.core-schema.json#/definitions/oic.core"},
7296                                 { "$ref": "#/definitions/oic.r.icon"}
7297                             ],
7298                             "required": ["mimetype", "width", "height", "media"]
7299                         }
7300
7301     example: /

```

```

7302     {
7303     "rt": ["oic.r.icon"],
7304     "id": "unique_example_id",
7305     "mimetype": "image/png",
7306     "width": 256,
7307     "height": 256,
7308     "media": "http://findbetter.ru/public/uploads/1481662800/2043.png"
7309     }
7310

```

7311 D.14.5 Property Definition

Property name	Value type	Mandatory	Access mode	Description
mimetype	string	yes	Read Only	The Media Type of the icon
width	integer	yes	Read Only	The width in pixels
media	string	yes	Read Only	Specifies the URI to the icon
height	integer	yes	Read Only	The height in pixels

7312 D.14.6 CRUDN behaviour

Resource	Create	Read	Update	Delete	Notify
/IconResURI		get			

7313 D.15 Introspection Resource

7314 D.15.1 Introduction

7315 This resource provides the means to get the device introspection data specifying all the endpoints
7316 of the device. The url hosted by this resource is either a local or an external url.

7317 D.15.2 Example URI

7318 /IntrospectionResURI

7319 D.15.3 Resource Type

7320 The resource type (rt) is defined as: oic.wk.introspection.

7321 D.15.4 RAML Definition

```

7322 #%RAML 0.8
7323 title: OICIntrospection
7324 version: v1.0.0-20160707
7325 traits:
7326   - interface :
7327     queryParameters:
7328       if:
7329         enum: ["oic.if.r", "oic.if.baseline"]
7330
7331 /IntrospectionResURI:
7332   description: |
7333     This resource provides the means to get the device introspection data specifying all the
7334     endpoints of the device.
7335     The url hosted by this resource is either a local or an external url.
7336
7337   is : ['interface']
7338   get:
7339     responses :
7340       200:

```

```

7341     body:
7342         application/json:
7343             schema: /
7344                 {
7345                     "id": "http://www.openconnectivity.org/ocf-
7346 apis/core/schemas/oic.wk.introspectionInfo.json#",
7347                     "$schema": "http://json-schema.org/draft-04/schema#",
7348                     "description" : "Copyright (c) 2017 Open Interconnect Consortium, Inc. All rights
7349 reserved.",
7350                     "title": "introspection resource",
7351                     "definitions": {
7352                         "oic.wk.introspectionInfo": {
7353                             "type": "object",
7354                             "properties": {
7355                                 "urlInfo": {
7356                                     "type": "array",
7357                                     "description": "Information on the location of the introspection data.",
7358                                     "readOnly": true,
7359                                     "minItems": 1,
7360                                     "items": {
7361                                         "type": "object",
7362                                         "properties": {
7363                                             "url": {
7364                                                 "type": "string",
7365                                                 "format": "uri",
7366                                                 "description" : "The URL of the introspection information."
7367                                             },
7368                                             "protocol": {
7369                                                 "type": "string",
7370                                                 "enum": [ "coap", "coaps", "http", "https", "coap+tcp",
7371 "coaps+tcp" ],
7372                                                 "description" : "Identifier for the protocol to be used to obtain the
7373 introspection information"
7374                                             },
7375                                             "content-type": {
7376                                                 "type": "string",
7377                                                 "enum": [ "application/json", "application/cbor" ],
7378                                                 "default" : "application/cbor",
7379                                                 "description" : "content-type of the introspection data"
7380                                             },
7381                                             "version": {
7382                                                 "type": "integer",
7383                                                 "enum": [ 1 ],
7384                                                 "default" : 1,
7385                                                 "description" : "The version of the introspection data that can be
7386 downloaded"
7387                                             }
7388                                         },
7389                                         "required" : [ "url","protocol" ]
7390                                     }
7391                                 },
7392                                 "required" : [ "urlInfo" ]
7393                             }
7394                         },
7395                         "type": "object",
7396                         "allOf": [
7397                             { "$ref": "#/definitions/oic.wk.introspectionInfo" },
7398                             { "$ref": "oic.core-schema.json#/definitions/oic.core" }
7399                         ]
7400                     }
7401                 }
7402
7403             example: /
7404                 {
7405                     "rt" : ["oic.wk.introspection"],
7406                     "urlInfo" : [
7407                         {
7408                             "content-type" : "application/cbor",
7409                             "protocol" : "coap",

```

```

7410         "url" : "coap://[fe80::1]:1234/IntrospectionExampleURI"
7411     }
7412 ]
7413 }
7414

```

7415 **D.15.5 Property Definition**

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

7416 **D.15.6 CRUDN behaviour**

Resource	Create	Read	Update	Delete	Notify
/IntrospectionResURI		get			

7417
7418
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Annex E (normative)

OIC 1.1 Resource Type definitions

E.1 List of Resource Type Definitions

Table 41 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 41. 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

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7441

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:

```

```

7442     if:
7443         enum: ["oic.if.ll"]
7444 - interface-b :
7445     queryParameters:
7446         if:
7447             enum: ["oic.if.b"]
7448 - interface-baseline :
7449     queryParameters:
7450         if:
7451             enum: ["oic.if.baseline"]
7452
7453 /CollectionBaselineInterfaceURI:
7454     description: |
7455         OCF Collection Resource Type contains properties and links.
7456         The oic.if.baseline interface exposes a representation of
7457         the links and the properties of the collection resource itself
7458
7459     is : ['interface-baseline']
7460     get:
7461         description: |
7462             Retrieve on Baseline Interface
7463
7464     responses :
7465         200:
7466             body:
7467                 application/json:
7468                 schema: |
7469                     {
7470                         "$schema": "http://json-schema.org/draft-04/schema#",
7471                         "description" : "Copyright (c) 2016 Open Connectivity Foundation, Inc. All rights
7472 reserved.",
7473                         "id": "http://www.openconnectivity.org/ocf-apis/core/schemas/oic.collection-
7474 schema.json#",
7475                         "title": "Collection",
7476                         "definitions": {
7477                             "oic.collection.setoflinks": {
7478                                 "description": "A set (array) of simple or individual OIC Links. In
7479 addition to properties required for an OIC Link, the identifier for that link in this set is also
7480 required",
7481                                 "type": "array",
7482                                 "items": {
7483                                     "$ref": "oic.oic-link-schema.json#/definitions/oic.oic-link"
7484                                 }
7485                             },
7486                             "oic.collection.alllinks": {
7487                                 "description": "All forms of links in a collection",
7488                                 "oneOf": [
7489                                     {
7490                                         "$ref": "#/definitions/oic.collection.setoflinks"
7491                                     }
7492                                 ]
7493                             },
7494                             "oic.collection": {
7495                                 "type": "object",
7496                                 "description": "A collection is a set (array) of tagged-link or set
7497 (array) of simple links along with additional properties to describe the collection itself",
7498                                 "properties": {
7499                                     "n": {
7500                                         "type": "string",
7501                                         "description": "User friendly name of the
7502 collection"
7503                                     },
7504                                     "id": {

```

```

7504         "anyOf": [
7505             {
7506                 "type": "integer",
7507                 "description": "A number that is unique to that
7508 collection; like an ordinal number that is not repeated"
7509             },
7510             {
7511                 "type": "string",
7512                 "description": "A unique string that could be a hash or
7513 similarly unique"
7514             },
7515             {
7516                 "$ref": "oic.types-schema.json#/definitions/uuid",
7517                 "description": "A unique string that could be a UUIDv4"
7518             }
7519         ],
7520         "description": "ID for the collection. Can be an value that is
7521 unique to the use context or a UUIDv4"
7522     },
7523     "di": {
7524         "$ref": "oic.types-schema.json#/definitions/uuid",
7525         "description": "The device ID which is an UUIDv4 string; used for
7526 backward compatibility with Spec A definition of /oic/res"
7527     },
7528     "rts": {
7529         "$ref": "oic.core-
7530 schema.json#/definitions/oic.core/properties/rt",
7531         "description": "Defines the list of allowable resource types (for
7532 Target and anchors) in links included in the collection; new links being created can only be from
7533 this list"
7534     },
7535     "drel": {
7536         "type": "string",
7537         "description": "When specified this is the default relationship
7538 to use when an OIC Link does not specify an explicit relationship with *rel* parameter"
7539     },
7540     "links": {
7541         "$ref": "#/definitions/oic.collection.alllinks"
7542     }
7543 }
7544 },
7545 "type": "object",
7546 "allOf": [
7547     {"$ref": "oic.core-schema.json#/definitions/oic.core"},
7548     {"$ref": "#/definitions/oic.collection"}
7549 ]
7550 }
7551
7552 example: /
7553 {
7554     "rt": ["oic.wk.col"],
7555     "id": "unique_example_id",
7556     "rts": [ "oic.r.switch.binary", "oic.r.airflow" ],
7557     "links": [
7558         {
7559             "href": "switch",
7560             "rt": [ "oic.r.switch.binary" ],
7561             "if": [ "oic.if.a", "oic.if.baseline" ]
7562         },
7563         {
7564             "href": "airFlow",
7565             "rt": [ "oic.r.airflow" ],
7566             "if": [ "oic.if.a", "oic.if.baseline" ]
7567         }
7568     ]
7569 }
7570
7571 post:
7572     description: |

```


7573 Update on Baseline Interface

7574

7575 body:

7576 application/json:

```
7577     schema: /
7578         {
7579             "$schema": "http://json-schema.org/draft-04/schema#",
7580             "description": "Copyright (c) 2016 Open Connectivity Foundation, Inc. All rights
7581 reserved.",
7582             "id": "http://www.openconnectivity.org/ocf-apis/core/schemas/oic.collection-
7583 schema.json#",
7584             "title": "Collection",
7585             "definitions": {
7586                 "oic.collection.setoflinks": {
7587                     "description": "A set (array) of simple or individual OIC Links. In addition
7588 to properties required for an OIC Link, the identifier for that link in this set is also required",
7589                     "type": "array",
7590                     "items": {
7591                         "$ref": "oic.oic-link-schema.json#/definitions/oic.oic-link"
7592                     }
7593                 },
7594                 "oic.collection.alllinks": {
7595                     "description": "All forms of links in a collection",
7596                     "oneOf": [
7597                         {
7598                             "$ref": "#/definitions/oic.collection.setoflinks"
7599                         }
7600                     ]
7601                 },
7602                 "oic.collection": {
7603                     "type": "object",
7604                     "description": "A collection is a set (array) of tagged-link or set (array)
7605 of simple links along with additional properties to describe the collection itself",
7606                     "properties": {
7607                         "n": {
7608                             "type": "string",
7609                             "description": "User friendly name of the
7610 collection"
7611                         },
7612                         "id": {
7613                             "anyOf": [
7614                                 {
7615                                     "type": "integer",
7616                                     "description": "A number that is unique to that collection;
7617 like an ordinal number that is not repeated"
7618                                 },
7619                                 {
7620                                     "type": "string",
7621                                     "description": "A unique string that could be a hash or
7622 similarly unique"
7623                                 },
7624                                 {
7625                                     "$ref": "oic.types-schema.json#/definitions/uuid",
7626                                     "description": "A unique string that could be a UUIDv4"
7627                                 }
7628                             ],
7629                             "description": "ID for the collection. Can be an value that is unique
7630 to the use context or a UUIDv4"
7631                         },
7632                         "di": {
7633                             "$ref": "oic.types-schema.json#/definitions/uuid",
7634                             "description": "The device ID which is an UUIDv4 string; used for
7635 backward compatibility with Spec A definition of /oic/res"
7636                         },
7637                         "rts": {
7638                             "$ref": "oic.core-schema.json#/definitions/oic.core.properties/rt",
7639                             "description": "Defines the list of allowable resource types (for
7640 Target and anchors) in links included in the collection; new links being created can only be from
7641 this list"
7642                         },
7643                         "drel": {
```

```

7642         "type": "string",
7643         "description": "When specified this is the default relationship to
7644 use when an OIC Link does not specify an explicit relationship with *rel* parameter"
7645     },
7646     "links": {
7647         "$ref": "#/definitions/oic.collection.alllinks"
7648     }
7649 }
7650 }
7651 },
7652 "type": "object",
7653 "allOf": [
7654     {"$ref": "oic.core-schema.json#/definitions/oic.core"},
7655     {"$ref": "#/definitions/oic.collection"}
7656 ]
7657 }
7658
7659 responses :
7660     200:
7661         body:
7662             application/json:
7663                 schema: /
7664                 {
7665                     "$schema": "http://json-schema.org/draft-04/schema#",
7666                     "description" : "Copyright (c) 2016 Open Connectivity Foundation, Inc. All rights
7667 reserved.",
7668                     "id": "http://www.openconnectivity.org/ocf-apis/core/schemas/oic.collection-
7669 schema.json#",
7670                     "title": "Collection",
7671                     "definitions": {
7672                         "oic.collection.setoflinks": {
7673                             "description": "A set (array) of simple or individual OIC Links. In
7674 addition to properties required for an OIC Link, the identifier for that link in this set is also
7675 required",
7676                             "type": "array",
7677                             "items": {
7678                                 "$ref": "oic.oic-link-schema.json#/definitions/oic.oic-link"
7679                             }
7680                         },
7681                         "oic.collection.alllinks": {
7682                             "description": "All forms of links in a collection",
7683                             "oneOf": [
7684                                 {
7685                                     "$ref": "#/definitions/oic.collection.setoflinks"
7686                                 }
7687                             ]
7688                         },
7689                         "oic.collection": {
7690                             "type": "object",
7691                             "description": "A collection is a set (array) of tagged-link or set
7692 (array) of simple links along with additional properties to describe the collection itself",
7693                             "properties": {
7694                                 "n": {
7695                                     "type": "string",
7696                                     "description": "User friendly name of the
7697 collection"
7698                                 },
7699                                 "id": {
7700                                     "anyOf": [
7701                                         {
7702                                             "type": "integer",
7703                                             "description": "A number that is unique to that
7704 collection; like an ordinal number that is not repeated"
7705                                         },
7706                                         {
7707                                             "type": "string",
7708                                             "description": "A unique string that could be a hash or
7709 similarly unique"
7710                                         }
7711                                     ],

```

```

7710         {
7711             "$ref": "oic.types-schema.json#/definitions/uuid",
7712             "description": "A unique string that could be a UUIDv4"
7713         }
7714     ],
7715     "description": "ID for the collection. Can be an value that is
7716 unique to the use context or a UUIDv4"
7717 },
7718     "di": {
7719         "$ref": "oic.types-schema.json#/definitions/uuid",
7720         "description": "The device ID which is an UUIDv4 string; used for
7721 backward compatibility with Spec A definition of /oic/res"
7722     },
7723     "rts": {
7724         "$ref": "oic.core-
7725 schema.json#/definitions/oic.core/properties/rt",
7726         "description": "Defines the list of allowable resource types (for
7727 Target and anchors) in links included in the collection; new links being created can only be from
7728 this list"
7729     },
7730     "drel": {
7731         "type": "string",
7732         "description": "When specified this is the default relationship
7733 to use when an OIC Link does not specify an explicit relationship with *rel* parameter"
7734     },
7735     "links": {
7736         "$ref": "#/definitions/oic.collection.alllinks"
7737     }
7738 },
7739 },
7740 "type": "object",
7741 "allOf": [
7742     {"$ref": "oic.core-schema.json#/definitions/oic.core"},
7743     {"$ref": "#/definitions/oic.collection"}
7744 ]
7745 }
7746

```

7747

E.2.5 Property Definition

Property name	Value type	Mandatory	Access mode	Description
rt	array: see schema	yes	Read Write	Resource Type
di	multiple types: see schema		Read Write	Unique identifier for device (UUID)
title	string		Read Write	A title for the link relation. Can be used by the UI to provide a context
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

7748

E.2.6 CRUDN behavior

Resource	Create	Read	Update	Delete	Notify
/CollectionBaselineInterfaceURI		get	post		

7749

E.2.7 Referenced JSON schemas

7750

E.2.8 oic.oic-link-schema.json

7751
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7753
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7759
7760
7761

```
{
  "$schema": "http://json-schema.org/draft-04/schema#",
  "description": "Copyright (c) 2016 Open Connectivity Foundation, Inc. All rights reserved.",
  "id": "http://www.openconnectivity.org/ocf-apis/core/schemas/oic.oic-link-schema.json#",
  "definitions": {
    "oic.oic-link": {
      "type": "object",
      "properties": {
        "href": {
          "type": "string",
          "maxLength": 256,
```

```

7762         "description": "This is the target URI, it can be specified as a Relative Reference or
7763 fully-qualified URI. Relative Reference should be used along with the di parameter to make it
7764 unique.",
7765         "format": "uri"
7766     },
7767     "rel": {
7768         "oneOf": [
7769             {
7770                 "type": "array",
7771                 "items": {
7772                     "type": "string",
7773                     "maxLength": 64
7774                 },
7775                 "minItems": 1,
7776                 "default": ["hosts"]
7777             },
7778             {
7779                 "type": "string",
7780                 "maxLength": 64,
7781                 "default": "hosts"
7782             }
7783         ],
7784         "description": "The relation of the target URI referenced by the link to the context URI"
7785     },
7786     "rt": {
7787         "type": "array",
7788         "items": {
7789             "type": "string",
7790             "maxLength": 64
7791         },
7792         "minItems": 1,
7793         "description": "Resource Type"
7794     },
7795     "if": {
7796         "type": "array",
7797         "items": {
7798             "type": "string",
7799             "enum": ["oic.if.baseline", "oic.if.ll", "oic.if.b", "oic.if.rw", "oic.if.r",
7800 "oic.if.a", "oic.if.s" ]
7801         },
7802         "minItems": 1,
7803         "description": "The interface set supported by this resource"
7804     },
7805     "di": {
7806         "$ref": "oic.types-schema.json#/definitions/uuid",
7807         "description": "Unique identifier for device (UUID)"
7808     },
7809     "buri": {
7810         "type": "string",
7811         "description": "The base URI used to fully qualify a Relative Reference in the href
7812 parameter. Use the OCF Schema for URI",
7813         "maxLength": 256,
7814         "format": "uri"
7815     },
7816     "p": {
7817         "description": "Specifies the framework policies on the Resource referenced by the target
7818 URI",
7819         "type": "object",
7820         "properties": {
7821             "bm": {
7822                 "description": "Specifies the framework policies on the Resource referenced by the
7823 target URI for e.g. observable and discoverable",
7824                 "type": "integer"
7825             },
7826             "sec": {
7827                 "description": "Specifies if security needs to be turned on when looking to interact
7828 with the Resource",
7829                 "default": false,
7830                 "type": "boolean"
7831             },
7832             "port": {

```

```

7833         "description": "Secure port to be used for connection",
7834         "type": "integer"
7835     },
7836 },
7837 "required" : ["bm"]
7838 },
7839 "title": {
7840     "type": "string",
7841     "maxLength": 64,
7842     "description": "A title for the link relation. Can be used by the UI to provide a
7843 context"
7844 },
7845 "anchor": {
7846     "type": "string",
7847     "maxLength": 256,
7848     "description": "This is used to override the context URI e.g. override the URI of the
7849 containing collection",
7850     "format": "uri"
7851 },
7852 "ins": {
7853     "oneOf": [
7854         {
7855             "type": "integer",
7856             "description": "An ordinal number that is not repeated - must be unique in the
7857 collection context"
7858         },
7859         {
7860             "type": "string",
7861             "maxLength": 256,
7862             "format": "uri",
7863             "description": "Any unique string including a URI"
7864         },
7865         {
7866             "$ref": "oic.types-schema.json#/definitions/uuid",
7867             "description": "Unique identifier (UUID)"
7868         }
7869     ],
7870     "description": "The instance identifier for this web link in an array of web links - used
7871 in collections"
7872 },
7873 "type": {
7874     "type": "array",
7875     "description": "A hint at the representation of the resource referenced by the target
7876 URI. This represents the media types that are used for both accepting and emitting",
7877     "items" : {
7878         "type": "string",
7879         "maxLength": 64
7880     },
7881     "minItems": 1,
7882     "default": "application/cbor"
7883 }
7884 },
7885 "required": [ "href", "rt", "if" ]
7886 }
7887 },
7888 "type": "object",
7889 "allOf": [
7890     { "$ref": "#/definitions/oic.oic-link" }
7891 ]
7892 }
7893
7894

```

7895 **E.3 Collection, link list interface**

7896 **E.3.1 Introduction**

7897 OCF Collection Resource Type contains properties and links. The oic.if.ll interface exposes a
7898 representation of the links

7899 **E.3.2 Example URI**

7900 /CollectionLinkListInterfaceURI

7901 **E.3.3 Resource Type**

7902 The resource type (rt) is defined as: oic.wk.col.

7903 **E.3.4 RAML Definition**

```

7904 #%RAML 0.8
7905 title: Collections
7906 version: 1.0
7907 traits:
7908   - interface-ll :
7909     queryParameters:
7910       if:
7911         enum: ["oic.if.ll"]
7912   - interface-b :
7913     queryParameters:
7914       if:
7915         enum: ["oic.if.b"]
7916   - interface-baseline :
7917     queryParameters:
7918       if:
7919         enum: ["oic.if.baseline"]
7920
7921 /CollectionLinkListInterfaceURI:
7922   description: |
7923     OCF Collection Resource Type contains properties and links.
7924     The oic.if.ll interface exposes a representation of the links
7925
7926   is : ['interface-ll']
7927   get:
7928     description: |
7929       Retrieve on Link List Interface
7930
7931   responses :
7932     200:
7933       body:
7934         application/json:
7935           schema: /
7936             {
7937               "$schema": "http://json-schema.org/draft-v4/schema#",
7938               "description" : "Copyright (c) 2016 Open Connectivity Foundation, Inc. All rights
7939 reserved.",
7940               "id": "http://www.openconnectivity.org/ocf-
7941 apis/core/schemas/oic.collection.linkslist-schema.json#",
7942               "definitions": {
7943                 "oic.collection.alllinks": {
7944                   "$ref": "oic.collection-
7945 schema.json#/definitions/oic.collection.alllinks"
7946                 }
7947               },
7948               "type": "object",
7949               "properties": {
7950                 "links": {
7951                   "$ref": "#/definitions/oic.collection.alllinks"
7952                 }
7953               }
7954             }
7955

```

```

7956 example: /
7957 {
7958   "links":
7959   [
7960     {
7961       "href": "switch",
7962       "rt": ["oic.r.switch.binary"],
7963       "if": ["oic.if.a", "oic.if.baseline"]
7964     },
7965     {
7966       "href": "airFlow",
7967       "rt": ["oic.r.airflow"],
7968       "if": ["oic.if.a", "oic.if.baseline"]
7969     }
7970   ]
7971 }
7972

```

7973

E.3.5 Property Definition

Property name	Value type	Mandatory	Access mode	Description
rt	array: see schema	yes	Read Write	Resource Type
di	multiple types: see schema		Read Write	Unique identifier for device (UUID)
title	string		Read Write	A title for the link relation. Can be used by the UI to provide a context
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	see	yes	Read Write	The interface set supported by this resource

7974

E.3.6 CRUDN behavior

Resource	Create	Read	Update	Delete	Notify
/CollectionLinkListInterfaceURI		get			

7975

E.3.7 Referenced JSON schemas

7976

E.3.8 oic.oic-link-schema.json

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```

{
  "$schema": "http://json-schema.org/draft-04/schema#",
  "description": "Copyright (c) 2016 Open Connectivity Foundation, Inc. All rights reserved.",
  "id": "http://www.openconnectivity.org/ocf-apis/core/schemas/oic.oic-link-schema.json#",
  "definitions": {
    "oic.oic-link": {
      "type": "object",
      "properties": {
        "href": {
          "type": "string",
          "maxLength": 256,
          "description": "This is the target URI, it can be specified as a Relative Reference or
fully-qualified URI. Relative Reference should be used along with the di parameter to make it
unique.",
          "format": "uri"
        },
        "rel": {
          "oneOf": [
            {
              "type": "array",
              "items": {
                "type": "string",
                "maxLength": 64
              },
              "minItems": 1,
              "default": ["hosts"]
            },
            {
              "type": "string",
              "maxLength": 64,
              "default": "hosts"
            }
          ]
        }
      }
    }
  }
}

```

```

8008     }
8009   ],
8010   "description": "The relation of the target URI referenced by the link to the context URI"
8011 },
8012 "rt": {
8013   "type": "array",
8014   "items": {
8015     "type": "string",
8016     "maxLength": 64
8017   },
8018   "minItems": 1,
8019   "description": "Resource Type"
8020 },
8021 "if": {
8022   "type": "array",
8023   "items": {
8024     "type": "string",
8025     "enum": ["oic.if.baseline", "oic.if.ll", "oic.if.b", "oic.if.rw", "oic.if.r",
8026 "oic.if.a", "oic.if.s" ]
8027   },
8028   "minItems": 1,
8029   "description": "The interface set supported by this resource"
8030 },
8031 "di": {
8032   "$ref": "oic.types-schema.json#/definitions/uuid",
8033   "description": "Unique identifier for device (UUID)"
8034 },
8035 "buri": {
8036   "type": "string",
8037   "description": "The base URI used to fully qualify a Relative Reference in the href
8038 parameter. Use the OCF Schema for URI",
8039   "maxLength": 256,
8040   "format": "uri"
8041 },
8042 "p": {
8043   "description": "Specifies the framework policies on the Resource referenced by the target
8044 URI",
8045   "type": "object",
8046   "properties": {
8047     "bm": {
8048       "description": "Specifies the framework policies on the Resource referenced by the
8049 target URI for e.g. observable and discoverable",
8050       "type": "integer"
8051     },
8052     "sec": {
8053       "description": "Specifies if security needs to be turned on when looking to interact
8054 with the Resource",
8055       "default": false,
8056       "type": "boolean"
8057     },
8058     "port": {
8059       "description": "Secure port to be used for connection",
8060       "type": "integer"
8061     }
8062   },
8063   "required": ["bm"]
8064 },
8065 "title": {
8066   "type": "string",
8067   "maxLength": 64,
8068   "description": "A title for the link relation. Can be used by the UI to provide a
8069 context"
8070 },
8071 "anchor": {
8072   "type": "string",
8073   "maxLength": 256,
8074   "description": "This is used to override the context URI e.g. override the URI of the
8075 containing collection",
8076   "format": "uri"
8077 },
8078 "ins": {

```

```

8079         "oneOf": [
8080             {
8081                 "type": "integer",
8082                 "description": "An ordinal number that is not repeated - must be unique in the
8083 collection context"
8084             },
8085             {
8086                 "type": "string",
8087                 "maxLength": 256,
8088                 "format": "uri",
8089                 "description": "Any unique string including a URI"
8090             },
8091             {
8092                 "$ref": "oic.types-schema.json#/definitions/uuid",
8093                 "description": "Unique identifier (UUID)"
8094             }
8095         ],
8096         "description": "The instance identifier for this web link in an array of web links - used
8097 in collections"
8098     },
8099     "type": {
8100         "type": "array",
8101         "description": "A hint at the representation of the resource referenced by the target
8102 URI. This represents the media types that are used for both accepting and emitting",
8103         "items": {
8104             "type": "string",
8105             "maxLength": 64
8106         },
8107         "minItems": 1,
8108         "default": "application/cbor"
8109     }
8110 },
8111 "required": [ "href", "rt", "if" ]
8112 }
8113 },
8114 "type": "object",
8115 "allOf": [
8116     { "$ref": "#/definitions/oic.oic-link" }
8117 ]
8118 }
8119
8120

```

8121 **E.4 Discoverable Resources, baseline**
8122 **interface**

8123 **E.4.1 Introduction**

8124 Baseline representation of /oic/res; list of discoverable resources

8125 **E.4.2 Wellknown URI**

8126 /oic/res

8127 **E.4.3 Resource Type**

8128 The resource type (rt) is defined as: oic.wk.res.

8129 **E.4.4 RAML Definition**

```

8130 #%RAML 0.8
8131 title: Discoverable Resources
8132 version: v1-20160622
8133 traits:
8134   - interface-ll :
8135       queryParameters:
8136           if:
8137               enum: ["oic.if.ll"]
8138   - interface-baseline :

```

```

8139     queryParameters:
8140         if:
8141             enum: ["oic.if.baseline"]
8142
8143 /oic-res-baseline-URI:
8144     description: |
8145         Baseline representation of /oic/res; list of discoverable resources
8146
8147     is : ['interface-baseline']
8148     get:
8149         description: |
8150             Retrieve the discoverable resource set, baseline interface
8151
8152     responses :
8153         200:
8154             body:
8155                 application/json:
8156                 schema: /
8157                     {
8158                         "$schema": "http://json-schema.org/draft-v4/schema#",
8159                         "description" : "Copyright (c) 2016 Open Connectivity Foundation, Inc. All rights
8160 reserved.",
8161                         "id": "http://www.openconnectivity.org/ocf-apis/core/schemas/oic.wk.res-
8162 schema.json#",
8163                         "definitions": {
8164                             "oic.res-baseline": {
8165                                 "type": "object",
8166                                 "properties": {
8167                                     "rt": {
8168                                         "type": "array",
8169                                         "items" : {
8170                                             "type" : "string",
8171                                             "maxLength": 64
8172                                         },
8173                                         "minItems" : 1,
8174                                         "readOnly": true,
8175                                         "description": "Resource Type"
8176                                     },
8177                                     "if": {
8178                                         "type": "array",
8179                                         "items": {
8180                                             "type" : "string",
8181                                             "enum" : ["oic.if.baseline", "oic.if.ll"]
8182                                         },
8183                                         "minItems": 1,
8184                                         "readOnly": true,
8185                                         "description": "The interface set supported by this resource"
8186                                     },
8187                                     "n": {
8188                                         "type": "string",
8189                                         "maxLength": 64,
8190                                         "readOnly": true,
8191                                         "description": "Human friendly name"
8192                                     },
8193                                     "di": {
8194                                         "$ref": "oic.types-schema.json#/definitions/uuid",
8195                                         "readOnly": true,
8196                                         "description": "Unique identifier for device (UUID) as indicated by the
8197 /oic/d resource of the device"
8198                                     },
8199                                     "mpro": {
8200                                         "readOnly": true,
8201                                         "description": "Supported messaging protocols",
8202                                         "type": "string",

```

```

8203         "maxLength": 64
8204     },
8205     "links": {
8206         "type": "array",
8207         "items": {
8208             "$ref": "oic.oic-link-schema.json#/definitions/oic.oic-link"
8209         }
8210     },
8211 },
8212 "required": ["rt", "if", "di", "links"]
8213 }
8214 },
8215 "description": "The list of resources expressed as OIC links",
8216 "type": "array",
8217 "items": {
8218     "$ref": "#/definitions/oic.res-baseline"
8219 }
8220 }
8221
8222 example: /
8223 [
8224     {
8225         "rt": ["oic.wk.res"],
8226         "if": ["oic.if.baseline", "oic.if.ll" ],
8227         "di": "0685B960-736F-46F7-BE60-9E6CBD61ADC1",
8228         "links":
8229             [
8230                 {
8231                     "href": "/humidity",
8232                     "rt": ["oic.r.humidity"],
8233                     "if": ["oic.if.s"]
8234                 },
8235                 {
8236                     "href": "/temperature",
8237                     "rt": ["oic.r.temperature"],
8238                     "if": ["oic.if.s"]
8239                 }
8240             ]
8241     }
8242 ]
8243

```

8244

E.4.5 Property Definition

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

8245

E.4.6 CRUDN behavior

Resource	Create	Read	Update	Delete	Notify
/oic/res		get			

8246

E.5 Discoverable Resources, link list interface

8247

8248

E.5.1 Introduction

8249

Link list representation of /oic/res; list of discoverable resources

8250

E.5.2 Wellknown URI

8251

/oic/res

8252

E.5.3 Resource Type

8253

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

8254

E.5.4 RAML Definition

8255

```
##RAML 0.8
```

8256

```
title: Discoverable Resources
```

8257

```
version: v1-20160622
```

8258

```
traits:
```

8259

```
- interface-ll :
```

8260

```
  queryParameters:
```

8261

```
    if:
```

8262

```
      enum: ["oic.if.ll"]
```

8263

```
- interface-baseline :
```

8264

```
  queryParameters:
```

8265

```
    if:
```

8266

```
      enum: ["oic.if.baseline"]
```

8267

8268

```
/oic-res-ll-URI:
```

8269

```
  description: |
```

8270

```
    Link list representation of /oic/res; list of discoverable resources
```

8271

8272

```
  is : ['interface-ll']
```

8273

```
  get:
```

8274

```
    description: |
```

8275

```
      Retrieve the discoverable resource set, link list interface
```

8276

8277

```
  responses :
```

8278

```
    200:
```

8279

```
      body:
```

8280

```
        application/json:
```

8281

```
          schema: |
```

8282

```
            {
```

8283

```
              "$schema": "http://json-schema.org/draft-v4/schema#",
```

8284

```
              "description" : "Copyright (c) 2016 Open Connectivity Foundation, Inc. All rights
```

8285

```
reserved.",
```

8286

```
              "id": "http://www.openconnectivity.org/ocf-apis/core/schemas/oic.wk.res-schema-
```

8287

```
ll.json#",
```

8288

```
              "definitions": {
```

8289

```
                "oic.res-ll": {
```

8290

```
                  "type": "object",
```

8291

```
                  "properties": {
```

8292

```
                    "di": {
```

8293

```
                      "$ref": "oic.types-schema.json#/definitions/uuid",
```

8294

```
                      "readOnly": true,
```

```

8295         "description": "Unique identifier for device (UUID) as indicated by the
8296 /oic/d resource of the device"
8297     },
8298     "links": {
8299         "type": "array",
8300         "items": {
8301             "$ref": "oic.oic-link-schema.json#/definitions/oic.oic-link"
8302         }
8303     },
8304 },
8305 "required": ["di", "links"]
8306 }
8307 },
8308 "description": "The list of resources expressed as OIC links with di ",
8309 "type": "array",
8310 "items": {
8311     "$ref": "#/definitions/oic.res-ll"
8312 }
8313 }
8314
8315 example: /
8316 [
8317     {
8318         "di": "0685B960-736F-46F7-BEC0-9E6CBD61ADC1",
8319         "links":
8320         [
8321             {
8322                 "href": "/humidity",
8323                 "rt": ["oic.r.humidity"],
8324                 "if": ["oic.if.s"]
8325             },
8326             {
8327                 "href": "/temperature",
8328                 "rt": ["oic.r.temperature"],
8329                 "if": ["oic.if.s"]
8330             }
8331         ]
8332     }
8333 ]
8334
8335

```

E.5.5 Property Definition

Property name	Value type	Mandatory	Access mode	Description
links	array: see schema	yes	Read Write	
di	multiple types: see schema	yes	Read Only	Unique identifier for device (UUID) as indicated by the /oic/d resource of the device
rt	array: see schema	yes	Read Write	Resource Type
di	multiple types: see schema		Read Write	Unique identifier for device (UUID)
title	string		Read Write	A title for the link relation. Can be used by the UI to provide a context
buri	string		Read Write	The base URI used to fully qualify a Relative Reference in the

				href parameter. Use the OCF Schema for URI
ins	multiple types: see schema		Read Write	The instance identifier for this web link in an array of web links - used in collections
p	object: see schema		Read Write	Specifies the framework policies on the Resource referenced by the target URI
href	string	yes	Read Write	This is the target URI, it can be specified as a Relative Reference or fully-qualified URI. Relative Reference should be used along with the di parameter to make it unique.
rel	multiple types: see schema		Read Write	The relation of the target URI referenced by the link to the context URI
type	array: see schema		Read Write	A hint at the representation of the resource referenced by the target URI. This represents the media types that are used for both accepting and emitting
anchor	string		Read Write	This is used to override the context URI e.g. override the URI of the containing collection
if	array: see schema	yes	Read Write	The interface set supported by this resource

8336

E.5.6 CRUDN behavior

Resource	Create	Read	Update	Delete	Notify
/oic/res		get			

8337

E.5.7 Referenced JSON schemas

8338

E.5.8 oic.oic-link-schema.json

8339

```
{
  "$schema": "http://json-schema.org/draft-04/schema#",
  "description": "Copyright (c) 2016 Open Connectivity Foundation, Inc. All rights reserved.",
  "id": "http://www.openconnectivity.org/ocf-apis/core/schemas/oic.oic-link-schema.json#",
  "definitions": {
    "oic.oic-link": {
      "type": "object",
      "properties": {
        "href": {
          "type": "string",
          "maxLength": 256,
          "description": "This is the target URI, it can be specified as a Relative Reference or
fully-qualified URI. Relative Reference should be used along with the di parameter to make it
unique.",
          "format": "uri"
        },
        "rel": {
          "oneOf": [
            {
              "type": "array",
              "items": {
                "type": "string",
                "maxLength": 64
              },
              "minItems": 1,
              "default": ["hosts"]
            },
            {
              "type": "string",
              "maxLength": 64,
              "default": "hosts"
            }
          ],
          "description": "The relation of the target URI referenced by the link to the context URI"
        },
        "rt": {
          "type": "array",
          "items": {
            "type": "string",
            "maxLength": 64
          },
          "minItems": 1,
          "description": "Resource Type"
        },
        "if": {
          "type": "array",
          "items": {
            "type": "string",
            "enum": ["oic.if.baseline", "oic.if.ll", "oic.if.b", "oic.if.rw", "oic.if.r",
"oic.if.a", "oic.if.s" ]
          },
          "minItems": 1,
          "description": "The interface set supported by this resource"
        },
        "di": {
          "$ref": "oic.types-schema.json#/definitions/uuid",
          "description": "Unique identifier for device (UUID)"
        },
        "buri": {
          "type": "string",
          "description": "The base URI used to fully qualify a Relative Reference in the href
parameter. Use the OCF Schema for URI",
          "maxLength": 256,
          "format": "uri"
        },
        "p": {
          "description": "Specifies the framework policies on the Resource referenced by the target"
        }
      }
    }
  }
}
```

8405

```

8406 URI",
8407     "type": "object",
8408     "properties": {
8409         "bm": {
8410             "description": "Specifies the framework policies on the Resource referenced by the
8411 target URI for e.g. observable and discoverable",
8412             "type": "integer"
8413         },
8414         "sec": {
8415             "description": "Specifies if security needs to be turned on when looking to interact
8416 with the Resource",
8417             "default": false,
8418             "type": "boolean"
8419         },
8420         "port": {
8421             "description": "Secure port to be used for connection",
8422             "type": "integer"
8423         }
8424     },
8425     "required" : ["bm"]
8426 },
8427     "title": {
8428         "type": "string",
8429         "maxLength": 64,
8430         "description": "A title for the link relation. Can be used by the UI to provide a
8431 context"
8432     },
8433     "anchor": {
8434         "type": "string",
8435         "maxLength": 256,
8436         "description": "This is used to override the context URI e.g. override the URI of the
8437 containing collection",
8438         "format": "uri"
8439     },
8440     "ins": {
8441         "oneOf": [
8442             {
8443                 "type": "integer",
8444                 "description": "An ordinal number that is not repeated - must be unique in the
8445 collection context"
8446             },
8447             {
8448                 "type": "string",
8449                 "maxLength": 256,
8450                 "format": "uri",
8451                 "description": "Any unique string including a URI"
8452             },
8453             {
8454                 "$ref": "oic.types-schema.json#/definitions/uuid",
8455                 "description": "Unique identifier (UUID)"
8456             }
8457         ],
8458         "description": "The instance identifier for this web link in an array of web links - used
8459 in collections"
8460     },
8461     "type": {
8462         "type": "array",
8463         "description": "A hint at the representation of the resource referenced by the target
8464 URI. This represents the media types that are used for both accepting and emitting",
8465         "items": {
8466             "type": "string",
8467             "maxLength": 64
8468         },
8469         "minItems": 1,
8470         "default": "application/cbor"
8471     }
8472 },
8473     "required": [ "href", "rt", "if" ]
8474 }
8475 },
8476     "type": "object",

```

```
8477     "allOf": [  
8478         { "$ref": "#/definitions/oic.oic-link" }  
8479     ]  
8480 }  
8481
```

8482

8483
8484
8485
8486

Annex F (informative)

Swagger2.0 definitions

8487 **F.1 Icon**

8488 **F.1.1 Introduction**

8489 This resource describes the attributes associated with an Icon.
8490 Retrieves the current icon properties.
8491

8492 **F.1.2 Example URI**

8493 /IconResURI

8494 **F.1.3 Resource Type**

8495 The resource type (rt) is defined as: ['oic.r.icon'].

8496 **F.1.4 Swagger2.0 Definition**

```
8497 {  
8498   "swagger": "2.0",  
8499   "info": {  
8500     "title": "Icon",  
8501     "version": "v1.1.0-20161107",  
8502     "license": {  
8503       "name": "copyright 2016-2017 Open Connectivity Foundation, Inc. All rights reserved.",  
8504       "x-description": "Redistribution and use in source and binary forms, with or without  
8505 modification, are permitted provided that the following conditions are met:\n      1.  
8506 Redistributions of source code must retain the above copyright notice, this list of conditions and  
8507 the following disclaimer.\n      2. Redistributions in binary form must reproduce the above  
8508 copyright notice, this list of conditions and the following disclaimer in the documentation and/or  
8509 other materials provided with the distribution.\n\n      THIS SOFTWARE IS PROVIDED BY THE Open  
8510 Connectivity Foundation, INC. \n      AS IS\n      AND ANY EXPRESS OR IMPLIED WARRANTIES, INCLUDING, BUT NOT  
8511 LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE OR  
8512 WARRANTIES OF NON-INFRINGEMENT, ARE DISCLAIMED.\n\n      IN NO EVENT SHALL THE Open Connectivity  
8513 Foundation, INC. OR CONTRIBUTORS BE LIABLE FOR ANY DIRECT, INDIRECT, INCIDENTAL, SPECIAL,  
8514 EXEMPLARY, OR CONSEQUENTIAL DAMAGES (INCLUDING, BUT NOT LIMITED TO, PROCUREMENT OF SUBSTITUTE GOODS  
8515 OR SERVICES; LOSS OF USE, DATA, OR PROFITS; OR BUSINESS INTERRUPTION)\n\n      HOWEVER CAUSED AND  
8516 ON ANY THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT (INCLUDING NEGLIGENCE OR  
8517 OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OF THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY  
8518 OF SUCH DAMAGE.\n\n    }  
8519   },  
8520 },  
8521 "schemes": ["http"],  
8522 "consumes": ["application/json"],  
8523 "produces": ["application/json"],  
8524 "paths": {  
8525   "/IconResURI" : {  
8526     "get": {  
8527       "description": "This resource describes the attributes associated with an Icon.\nRetrieves  
8528 the current icon properties.\n",  
8529       "parameters": [  
8530         ],  
8531       "responses": {  
8532         "200": {  
8533           "description": "",  
8534           "x-example":  
8535             {  
8536               "rt": ["oic.r.icon"],  
8537               "id": "unique_example_id",  
8538               "mimetype": "image/png",  
8539               "width": 256,  
8540               "height": 256,  
8541               "media": "http://findbetter.ru/public/uploads/1481662800/2043.png"  
8542             }  
8543           }  
8544         }  
8545       }  
8546     }  
8547   }  
8548 }
```

```

8543         ,
8544         "schema": { "$ref": "#/definitions/Icon" }
8545     }
8546 }
8547 }
8548 }
8549 },
8550 "parameters": {
8551     "interface" : {
8552         "in" : "query",
8553         "name" : "if",
8554         "type" : "string",
8555         "enum" : ["oic.if.r", "oic.if.baseline"]
8556     }
8557 },
8558 "definitions": {
8559     "Icon" : {
8560         "properties": {
8561             "mimetype" :
8562                 {
8563                     "description": "The Media Type of the icon",
8564                     "maxLength": 64,
8565                     "readOnly": true,
8566                     "type": "string"
8567                 },
8568
8569             "rt" :
8570                 {
8571                     "description": "Resource Type of the Resource",
8572                     "items": {
8573                         "maxLength": 64,
8574                         "type": "string"
8575                     },
8576                     "minItems": 1,
8577                     "readOnly": true,
8578                     "type": "array"
8579                 },
8580
8581             "media" :
8582                 {
8583                     "description": "Specifies the URI to the icon",
8584                     "format": "uri",
8585                     "maxLength": 256,
8586                     "readOnly": true,
8587                     "type": "string"
8588                 },
8589
8590             "n" :
8591                 {
8592                     "description": "Friendly name of the resource",
8593                     "maxLength": 64,
8594                     "readOnly": true,
8595                     "type": "string"
8596                 },
8597
8598             "width" :
8599                 {
8600                     "description": "The width in pixels",
8601                     "minimum": 1,
8602                     "readOnly": true,
8603                     "type": "integer"
8604                 },
8605
8606             "height" :
8607                 {
8608                     "description": "The height in pixels",
8609                     "minimum": 1,
8610                     "readOnly": true,
8611                     "type": "integer"
8612                 },
8613

```

```

8614     "id" :
8615         {
8616             "description": "Instance ID of this specific resource",
8617             "maxLength": 64,
8618             "readOnly": true,
8619             "type": "string"
8620         },
8621
8622     "if" :
8623         {
8624             "description": "The interface set supported by this resource",
8625             "items": {
8626                 "enum": [
8627                     "oic.if.baseline",
8628                     "oic.if.ll",
8629                     "oic.if.b",
8630                     "oic.if.lb",
8631                     "oic.if.rw",
8632                     "oic.if.r",
8633                     "oic.if.a",
8634                     "oic.if.s"
8635                 ],
8636                 "type": "string"
8637             },
8638             "minItems": 1,
8639             "readOnly": true,
8640             "type": "array"
8641         }
8642     },
8643     "required": ["mimetype", "width", "height", "media"]
8644 }
8645 }
8646 }
8647 }
8648 }

```

8649 F.1.5 Property Definition

Property name	Value type	Mandatory	Access mode	Description
if	array: see schema		Read Only	The interface set supported by this resource
media	string	yes	Read Only	Specifies the URI to the icon
height	integer	yes	Read Only	The height in pixels
width	integer	yes	Read Only	The width in pixels
id	string		Read Only	Instance ID of this specific resource
mimetype	string	yes	Read Only	The Media Type of the icon
n	string		Read Only	Friendly name of the resource
rt	array: see schema		Read Only	Resource Type of the Resource

8650 F.1.6 CRUDN behaviour

Resource	Create	Read	Update	Delete	Notify
/IconResURI		get			

8651 F.2 Introspection Resource

8652 F.2.1 Introduction

8653 This resource provides the means to get the device introspection data specifying all the endpoints
8654 of the device.
8655 The url hosted by this resource is either a local or an external url.
8656

8657 F.2.2 Wellknown URI

8658 /IntrospectionResURI

8659 F.2.3 Resource Type

8660 The resource type (rt) is defined as: ['oic.wk.introspection'].

8661 F.2.4 Swagger2.0 Definition

```
8662 {
8663   "swagger": "2.0",
8664   "info": {
8665     "title": "Introspection Resource",
8666     "version": "v1.0.0-20160707",
8667     "license": {
8668       "name": "copyright 2016-2017 Open Connectivity Foundation, Inc. All rights reserved.",
8669       "x-description": "Redistribution and use in source and binary forms, with or without
8670 modification, are permitted provided that the following conditions are met:\n      1.
8671 Redistributions of source code must retain the above copyright notice, this list of conditions and
8672 the following disclaimer.\n      2. Redistributions in binary form must reproduce the above
8673 copyright notice, this list of conditions and the following disclaimer in the documentation and/or
8674 other materials provided with the distribution.\n\n      THIS SOFTWARE IS PROVIDED BY THE Open
8675 Connectivity Foundation, INC. \AS IS\ AND ANY EXPRESS OR IMPLIED WARRANTIES, INCLUDING, BUT NOT
8676 LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE OR
8677 WARRANTIES OF NON-INFRINGEMENT, ARE DISCLAIMED.\n\n      IN NO EVENT SHALL THE Open Connectivity
8678 Foundation, INC. OR CONTRIBUTORS BE LIABLE FOR ANY DIRECT, INDIRECT, INCIDENTAL, SPECIAL,
8679 EXEMPLARY, OR CONSEQUENTIAL DAMAGES (INCLUDING, BUT NOT LIMITED TO, PROCUREMENT OF SUBSTITUTE GOODS
8680 OR SERVICES; LOSS OF USE, DATA, OR PROFITS; OR BUSINESS INTERRUPTION)\n\n      HOWEVER CAUSED AND
8681 ON ANY THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT (INCLUDING NEGLIGENCE OR
8682 OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OF THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY
8683 OF SUCH DAMAGE.\n"
8684   }
8685 },
8686 "schemes": ["http"],
8687 "consumes": ["application/json"],
8688 "produces": ["application/json"],
8689 "paths": {
8690   "/IntrospectionResURI" : {
8691     "get": {
8692       "description": "This resource provides the means to get the device introspection data
8693 specifying all the endpoints of the device.\n\nThe url hosted by this resource is either a local or
8694 an external url.\n",
8695       "parameters": [
8696       ],
8697       "responses": {
8698         "200": {
8699           "description": "",
8700           "x-example":
8701             {
8702               "rt" : ["oic.wk.introspection"],
8703               "urlInfo" : [
8704                 {
8705                   "content-type" : "application/cbor",
8706                   "protocol" : "coap",
8707                   "url" : "coap://[fe80::]:1234/IntrospectionExampleURI"
8708                 }
8709               ]
8710             }
8711         }
8712       }
8713     }
8714   }
8715 }
```

```

8714     }
8715   }
8716 }
8717 },
8718 "parameters": {
8719   "interface" : {
8720     "in" : "query",
8721     "name" : "if",
8722     "type" : "string",
8723     "enum" : ["oic.if.r", "oic.if.baseline"]
8724   }
8725 },
8726 "definitions": {
8727   "oic.wk.introspectionInfo" : {
8728     "properties": {
8729       "rt" :
8730         {
8731           "description": "Resource Type of the Resource",
8732           "items": {
8733             "maxLength": 64,
8734             "type": "string"
8735           },
8736           "minItems": 1,
8737           "readOnly": true,
8738           "type": "array"
8739         },
8740       "n" :
8741         {
8742           "description": "Friendly name of the resource",
8743           "maxLength": 64,
8744           "readOnly": true,
8745           "type": "string"
8746         },
8747     },
8748     "urlInfo" :
8749       {
8750         "description": "Information on the location of the introspection data.",
8751         "items": {
8752           "properties": {
8753             "content-type": {
8754               "default": "application/cbor",
8755               "description": "content-type of the introspection data",
8756               "enum": [
8757                 "application/json",
8758                 "application/cbor"
8759               ],
8760               "type": "string"
8761             },
8762           },
8763           "protocol": {
8764             "description": "Identifier for the protocol to be used to obtain the introspection
8765 information",
8766             "enum": [
8767               "coap",
8768               "coaps",
8769               "http",
8770               "https",
8771               "coap+tcp",
8772               "coaps+tcp"
8773             ],
8774             "type": "string"
8775           },
8776           "url": {
8777             "description": "The URL of the introspection information.",
8778             "format": "uri",
8779             "type": "string"
8780           },
8781           "version": {
8782             "default": 1,
8783             "description": "The version of the introspection data that can be downloaded",
8784             "enum": [

```



```

8785         1
8786         ],
8787         "type": "integer"
8788     }
8789 },
8790 "required": [
8791     "url",
8792     "protocol"
8793 ],
8794 "type": "object"
8795 },
8796 "minItems": 1,
8797 "readOnly": true,
8798 "type": "array"
8799 },
8800 "id" :
8801 {
8802     "description": "Instance ID of this specific resource",
8803     "maxLength": 64,
8804     "readOnly": true,
8805     "type": "string"
8806 },
8807 "if" :
8808 {
8809     "description": "The interface set supported by this resource",
8810     "items": {
8811         "enum": [
8812             "oic.if.baseline",
8813             "oic.if.ll",
8814             "oic.if.b",
8815             "oic.if.lb",
8816             "oic.if.rw",
8817             "oic.if.r",
8818             "oic.if.a",
8819             "oic.if.s"
8820         ],
8821         "type": "string"
8822     },
8823     "minItems": 1,
8824     "readOnly": true,
8825     "type": "array"
8826 }
8827 }
8828 }
8829 }
8830 }
8831 }
8832 }
8833 }
8834 }

```

8835 F.2.5 Property Definition

Property name	Value type	Mandatory	Access mode	Description
n	string		Read Only	Friendly name of the resource
id	string		Read Only	Instance ID of this specific resource
urlInfo	array: see schema		Read Only	Information on the location of the introspection data.
rt	array: see schema		Read Only	Resource Type of the Resource

if	array: schema	see		Read Only	The interface set supported by this resource
----	------------------	-----	--	-----------	--

8836 **F.2.6 CRUDN behaviour**

Resource	Create	Read	Update	Delete	Notify
/IntrospectionResURI		get			

8837 **F.3 OCF Collection**

8838 **F.3.1 Introduction**

8839 OCF Collection Resource Type contains properties and links.
 8840 The oic.if.baseline interface exposes a representation of
 8841 the links and the properties of the collection resource itself.
 8842

8843 **F.3.2 Example URI**

8844 /CollectionBaselineInterfaceURI

8845 **F.3.3 Resource Type**

8846 The resource type (rt) is defined as: ['oic.wk.col'].

8847 **F.3.4 Swagger2.0 Definition**

```

8848 {
8849   "swagger": "2.0",
8850   "info": {
8851     "title": "OCF Collection",
8852     "version": "1.0",
8853     "license": {
8854       "name": "copyright 2016-2017 Open Connectivity Foundation, Inc. All rights reserved.",
8855       "x-description": "Redistribution and use in source and binary forms, with or without
8856 modification, are permitted provided that the following conditions are met:\n      1.
8857 Redistributions of source code must retain the above copyright notice, this list of conditions and
8858 the following disclaimer.\n      2. Redistributions in binary form must reproduce the above
8859 copyright notice, this list of conditions and the following disclaimer in the documentation and/or
8860 other materials provided with the distribution.\n\n      THIS SOFTWARE IS PROVIDED BY THE Open
8861 Connectivity Foundation, INC. \ "AS IS\ " AND ANY EXPRESS OR IMPLIED WARRANTIES, INCLUDING, BUT NOT
8862 LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE OR
8863 WARRANTIES OF NON-INFRINGEMENT, ARE DISCLAIMED.\n      IN NO EVENT SHALL THE Open Connectivity
8864 Foundation, INC. OR CONTRIBUTORS BE LIABLE FOR ANY DIRECT, INDIRECT, INCIDENTAL, SPECIAL,
8865 EXEMPLARY, OR CONSEQUENTIAL DAMAGES (INCLUDING, BUT NOT LIMITED TO, PROCUREMENT OF SUBSTITUTE GOODS
8866 OR SERVICES; LOSS OF USE, DATA, OR PROFITS; OR BUSINESS INTERRUPTION)\n      HOWEVER CAUSED AND
8867 ON ANY THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT (INCLUDING NEGLIGENCE OR
8868 OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OF THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY
8869 OF SUCH DAMAGE.\n"
8870     }
8871   },
8872   "schemes": ["http"],
8873   "consumes": ["application/json"],
8874   "produces": ["application/json"],
8875   "paths": {
8876     "/CollectionBaselineInterfaceURI" : {
8877       "get": {
8878         "description": "OCF Collection Resource Type contains properties and links.\nThe
8879 oic.if.baseline interface exposes a representation of\nthe links and the properties of the
8880 collection resource itself\nRetrieve on Baseline Interface\n",
8881         "parameters": [
8882           ],
8883         "responses": {
8884           "200": {
8885             "description" : "",
8886             "x-example":
8887               {
8888                 "rt": ["oic.wk.col"],
8889                 "id": "unique_example_id",

```

```

8890         "rts": [ "oic.r.switch.binary", "oic.r.airflow" ],
8891         "links": [
8892             {
8893                 "href": "switch",
8894                 "rt": [ "oic.r.switch.binary" ],
8895                 "if": [ "oic.if.a", "oic.if.baseline" ],
8896                 "eps": [
8897                     { "ep": "coap://[fe80::b1d6]:1111", "pri": 2 },
8898                     { "ep": "coaps://[fe80::b1d6]:1122" },
8899                     { "ep": "coap+tcp://[2001:db8:a::123]:2222", "pri": 3 }
8900                 ]
8901             },
8902             {
8903                 "href": "airFlow",
8904                 "rt": [ "oic.r.airflow" ],
8905                 "if": [ "oic.if.a", "oic.if.baseline" ],
8906                 "eps": [
8907                     { "ep": "coap://[fe80::b1d6]:1111", "pri": 2 },
8908                     { "ep": "coaps://[fe80::b1d6]:1122" },
8909                     { "ep": "coap+tcp://[2001:db8:a::123]:2222", "pri": 3 }
8910                 ]
8911             }
8912         ]
8913     },
8914     ,
8915     "schema": { "$ref": "#/definitions/sbaseline" }
8916 }
8917 },
8918 },
8919 "post": {
8920     "description": "Update on Baseline Interface\n",
8921     "parameters": [
8922         {
8923             "name": "body",
8924             "in": "body",
8925             "required": true,
8926             "schema": { "$ref": "#/definitions/sbaseline" }
8927         }
8928     ],
8929     "responses": {
8930         "200": {
8931             "description": "",
8932             "schema": { "$ref": "#/definitions/sbaseline" }
8933         }
8934     }
8935 },
8936 },
8937 "/CollectionBatchInterfaceURI" : {
8938     "get": {
8939         "description": "OCF Collection Resource Type contains properties and links.\n\nThe oic.if.b
8940 on Batch Interface\n",
8941         "parameters": [
8942             ],
8943         "responses": {
8944             "200": {
8945                 "description": "All targets returned OK status (HTTP 200 or CoAP 2.05 Content)",
8946                 "x-example":
8947                 [
8948                     {
8949                         "href": "switch",
8950                         "rep":
8951                         {
8952                             "value": true
8953                         }
8954                     },
8955                     {
8956                         "href": "airFlow",
8957                         "rep":
8958                         {
8959                             "direction": "floor",

```

```

8961         "speed":      3
8962     }
8963 }
8964 ]
8965 ,
8966 "schema": { "$ref": "#/definitions/sbatch-retrieve" }
8967 },
8968 "404": {
8969     "description" : "One or more targets did not return an OK status, return a
8970 representation containing returned properties from the targets that returned OK",
8971     "x-example":
8972     [
8973     {
8974         "href": "switch",
8975         "rep":
8976         {
8977             "value": true
8978         }
8979     }
8980     ]
8981 ,
8982 "schema": { "$ref": "#/definitions/sbatch-retrieve" }
8983 }
8984 },
8985 ],
8986 "post": {
8987     "description": "Update on Batch Interface\n",
8988     "parameters": [
8989     {
8990         "name": "body",
8991         "in": "body",
8992         "required": true,
8993         "schema": { "$ref": "#/definitions/sbatch-update" },
8994         "x-example":
8995         [
8996         {
8997             "href": "switch",
8998             "rep":
8999             {
9000                 "value": true
9001             }
9002         },
9003         {
9004             "href": "airFlow",
9005             "rep":
9006             {
9007                 "direction": "floor",
9008                 "speed": 3
9009             }
9010         }
9011     ]
9012     }
9013 ],
9014 "responses": {
9015     "200": {
9016         "description" : "all targets returned OK status (HTTP 200 or CoAP 2.04 Changed)
9017 return a representation of the current state of all targets",
9018         "x-example":
9019         [
9020         {
9021             "href": "switch",
9022             "rep":
9023             {
9024                 "value": true
9025             }
9026         },
9027         {
9028             "href": "airFlow",
9029             "rep":
9030             {
9031                 "direction": "demist",

```

```

9032         "speed": 5
9033     }
9034 }
9035 ]
9036 ,
9037 "schema": { "$ref": "#/definitions/sbatch-retrieve" }
9038 },
9039 "403": {
9040     "description": "one or more targets did not return OK status; return a retrieve
9041 representation of the current state of all targets in the batch",
9042     "x-example":
9043     [
9044     {
9045         "href": "switch",
9046         "rep":
9047         {
9048             "value": true
9049         }
9050     },
9051     {
9052         "href": "airFlow",
9053         "rep":
9054         {
9055             "direction": "floor",
9056             "speed": 3
9057         }
9058     }
9059     ]
9060 ,
9061 "schema": { "$ref": "#/definitions/sbatch-retrieve" }
9062 }
9063 }
9064 }
9065 },
9066 "/CollectionLinkListInterfaceURI" : {
9067     "get": {
9068         "description": "OCF Collection Resource Type contains properties and links.\nThe oic.if.ll
9069 interface exposes a representation of the links\nRetrieve on Link List Interface\n",
9070         "parameters": [
9071         ],
9072         "responses": {
9073             "200": {
9074                 "description": "",
9075                 "x-example":
9076                 [
9077                 {
9078                     "href": "switch",
9079                     "rt": ["oic.r.switch.binary"],
9080                     "if": ["oic.if.a", "oic.if.baseline"],
9081                     "eps": [
9082                         {"ep": "coap://[fe80::b1d6]:1111", "pri": 2},
9083                         {"ep": "coaps://[fe80::b1d6]:1122"},
9084                         {"ep": "coap+tcp://[2001:db8:a::123]:2222", "pri": 3}
9085                     ]
9086                 },
9087                 {
9088                     "href": "airFlow",
9089                     "rt": ["oic.r.airflow"],
9090                     "if": ["oic.if.a", "oic.if.baseline"],
9091                     "eps": [
9092                         {"ep": "coap://[fe80::b1d6]:1111", "pri": 2},
9093                         {"ep": "coaps://[fe80::b1d6]:1122"},
9094                         {"ep": "coap+tcp://[2001:db8:a::123]:2222", "pri": 3}
9095                     ]
9096                 }
9097                 ]
9098             },
9099             "schema": { "$ref": "#/definitions/slinks" }
9100         }
9101     }
9102 }

```

```

9103     }
9104   },
9105   "parameters": {
9106     "interface-11" : {
9107       "in" : "query",
9108       "name" : "if",
9109       "type" : "string",
9110       "enum" : ["oic.if.11"]
9111     },
9112     "interface-b" : {
9113       "in" : "query",
9114       "name" : "if",
9115       "type" : "string",
9116       "enum" : ["oic.if.b"]
9117     },
9118     "interface-baseline" : {
9119       "in" : "query",
9120       "name" : "if",
9121       "type" : "string",
9122       "enum" : ["oic.if.baseline"]
9123     },
9124     "interface-all" : {
9125       "in" : "query",
9126       "name" : "if",
9127       "type" : "string",
9128       "enum" : ["oic.if.11", "oic.if.baseline", "oic.if.b"]
9129     }
9130   },
9131   "definitions": {
9132     "sbaseline" : {
9133       "properties": {
9134         "links" :
9135         {
9136           "description": "A set of simple or individual OIC Links.",
9137           "items": {
9138             "$ref": "#/definitions/oic.oic-link"
9139           },
9140           "type": "array"
9141         }
9142       }
9143     }
9144   },
9145   "sbatch-retrieve" : {
9146     "title" :
9147       "Collection Batch Retrieve Format (auto merged)"
9148     , "minItems" :
9149       1
9150     , "items" :
9151     {
9152       "additionalProperties": true,
9153       "properties": {
9154         "href": {
9155           "description": "URI of the target resource relative assuming the collection URI as
9156           anchor",
9157           "format": "uri",
9158           "maxLength": 256,
9159           "type": "string"
9160         },
9161         "rep": {
9162           "oneOf": [
9163             {
9164               "description": "The response payload from a single resource",
9165               "type": "object"
9166             },
9167             {
9168               "description": " The response payload from a collection (batch) resource",
9169               "items": {
9170                 "properties": {
9171

```

```

9174         "anchor": {
9175             "description": "This is used to override the context URI e.g. override the
9176 URI of the containing collection.",
9177             "format": "uri",
9178             "maxLength": 256,
9179             "type": "string"
9180         },
9181         "di": {
9182             "allOf": [
9183                 {
9184                     "description": "Format pattern according to IETF RFC 4122.",
9185                     "pattern": "^[a-fA-F0-9]{8}-[a-fA-F0-9]{4}-[a-fA-F0-9]{4}-[a-fA-F0-9]{4}-
9186 [a-fA-F0-9]{12}$",
9187                     "type": "string"
9188                 },
9189                 {
9190                     "description": "The device ID"
9191                 }
9192             ]
9193         },
9194         "eps": {
9195             "description": "the Endpoint information of the target Resource",
9196             "items": {
9197                 "properties": {
9198                     "ep": {
9199                         "description": "Transport Protocol Suite + Endpoint Locator",
9200                         "format": "uri",
9201                         "type": "string"
9202                     },
9203                     "pri": {
9204                         "description": "The priority among multiple Endpoints",
9205                         "minimum": 1,
9206                         "type": "integer"
9207                     }
9208                 },
9209                 "type": "object"
9210             },
9211             "type": "array"
9212         },
9213         "href": {
9214             "description": "This is the target URI, it can be specified as a Relative
9215 Reference or fully-qualified URI.",
9216             "format": "uri",
9217             "maxLength": 256,
9218             "type": "string"
9219         },
9220         "if": {
9221             "description": "The interface set supported by this resource",
9222             "items": {
9223                 "enum": [
9224                     "oic.if.baseline",
9225                     "oic.if.ll",
9226                     "oic.if.b",
9227                     "oic.if.rw",
9228                     "oic.if.r",
9229                     "oic.if.a",
9230                     "oic.if.s"
9231                 ],
9232                 "type": "string"
9233             },
9234             "minItems": 1,
9235             "type": "array"
9236         },
9237         "ins": {
9238             "description": "The instance identifier for this web link in an array of web
9239 links - used in collections",
9240             "type": "integer"
9241         },
9242         "p": {
9243             "description": "Specifies the framework policies on the Resource referenced
9244 by the target URI",

```

```

9245         "properties": {
9246             "bm": {
9247                 "description": "Specifies the framework policies on the Resource
9248 referenced by the target URI for e.g. observable and discoverable",
9249                 "type": "integer"
9250             }
9251         },
9252         "required": [
9253             "bm"
9254         ],
9255         "type": "object"
9256     },
9257     "rel": {
9258         "description": "The relation of the target URI referenced by the link to the
9259 context URI",
9260         "oneOf": [
9261             {
9262                 "default": [
9263                     "hosts"
9264                 ],
9265                 "items": {
9266                     "maxLength": 64,
9267                     "type": "string"
9268                 },
9269                 "minItems": 1,
9270                 "type": "array"
9271             },
9272             {
9273                 "default": "hosts",
9274                 "maxLength": 64,
9275                 "type": "string"
9276             }
9277         ]
9278     },
9279     "rt": {
9280         "description": "Resource Type of the Resource",
9281         "items": {
9282             "maxLength": 64,
9283             "type": "string"
9284         },
9285         "minItems": 1,
9286         "type": "array"
9287     },
9288     "title": {
9289         "description": "A title for the link relation. Can be used by the UI to
9290 provide a context.",
9291         "maxLength": 64,
9292         "type": "string"
9293     },
9294     "type": {
9295         "default": "application/cbor",
9296         "description": "A hint at the representation of the resource referenced by
9297 the target URI. This represents the media types that are used for both accepting and emitting.",
9298         "items": {
9299             "maxLength": 64,
9300             "type": "string"
9301         },
9302         "minItems": 1,
9303         "type": "array"
9304     }
9305 },
9306 "required": [
9307     "href",
9308     "rt",
9309     "if"
9310 ],
9311 "type": "object"
9312 },
9313 "type": "array"
9314 }
9315 ]

```



```

9316     }
9317     },
9318     "required": [
9319         "href",
9320         "rep"
9321     ],
9322     "type": "object"
9323 }
9324
9325 , "type" :
9326     "array"
9327
9328 }
9329 ,
9330 "sbatch-update" : {
9331     "title" :
9332         "Collection Batch Update Format (auto merged)"
9333
9334     , "minItems" :
9335         1
9336
9337     , "items" :
9338         {
9339             "$ref": "#/definitions/oic.batch-update.item"
9340         }
9341
9342     , "type" :
9343         "array"
9344
9345 }
9346 ,
9347 "slinks" : {
9348     "type" :
9349         "array"
9350
9351     , "items" :
9352         {
9353             "$ref": "#/definitions/oic.oic-link"
9354         }
9355
9356 }
9357 , "oic.wk.col-batch-update" :
9358     {
9359         "description": "array of resource representations to apply to the batch collection, using
9360 href to indicate which resource(s) in the batch to update. If the href property is empty,
9361 effectively making the URI reference to the collection itself, the representation is to be applied
9362 to all resources in the batch",
9363         "items": {
9364             "$ref": "#/definitions/oic.batch-update.item"
9365         },
9366         "minItems": 1,
9367         "type": "array"
9368     }
9369
9370 , "uuid" :
9371     {
9372         "description": "Format pattern according to IETF RFC 4122.",
9373         "pattern": "^[a-fA-F0-9]{8}-[a-fA-F0-9]{4}-[a-fA-F0-9]{4}-[a-fA-F0-9]{4}-[a-fA-F0-9]{12}$",
9374         "type": "string"
9375     }
9376
9377 , "oic.collection.properties" :
9378     {
9379         "description": "A collection is a set of links along with additional properties to describe
9380 the collection itself",
9381         "properties": {
9382             "rts": {
9383                 "$ref": "#/definitions/oic.core/properties/rt",
9384                 "description": "The list of allowable resource types (for Target and anchors) in links
9385 included in the collection"
9386             }

```

```

9387     },
9388     "type": "object"
9389 }
9390
9391 , "oic.core" :
9392 {
9393     "properties": {
9394         "rt": {
9395             "description": "Resource Type of the Resource",
9396             "items": {
9397                 "maxLength": 64,
9398                 "type": "string"
9399             },
9400             "minItems": 1,
9401             "readOnly": true,
9402             "type": "array"
9403         }
9404     },
9405     "type": "object"
9406 }
9407
9408 , "oic.batch-update.item" :
9409 {
9410     "additionalProperties": true,
9411     "description": "array of resource representations to apply to the batch collection, using
9412 href to indicate which resource(s) in the batch to update. If the href property is empty,
9413 effectively making the URI reference to the collection itself, the representation is to be applied
9414 to all resources in the batch",
9415     "properties": {
9416         "href": {
9417             "description": "URI of the target resource relative assuming the collection URI as
9418 anchor",
9419             "format": "uri",
9420             "maxLength": 256,
9421             "type": "string"
9422         },
9423         "rep": {
9424             "oneOf": [
9425                 {
9426                     "description": "The response payload from a single resource",
9427                     "type": "object"
9428                 },
9429                 {
9430                     "description": " The response payload from a collection (batch) resource",
9431                     "items": {
9432                         "$ref": "#/definitions/oic.oic-link"
9433                     },
9434                     "type": "array"
9435                 }
9436             ]
9437         }
9438     },
9439     "required": [
9440         "href",
9441         "rep"
9442     ],
9443     "type": "object"
9444 }
9445
9446 , "oic.collection.linksexpanded" :
9447 {
9448     "properties": {
9449         "links": {
9450             "description": "A set of simple or individual OIC Links.",
9451             "items": {
9452                 "properties": {
9453                     "anchor": {
9454                         "description": "This is used to override the context URI e.g. override the URI of
9455 the containing collection.",
9456                         "format": "uri",
9457                         "maxLength": 256,

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```

9458         "type": "string"
9459     },
9460     "di": {
9461         "description": "Format pattern according to IETF RFC 4122.",
9462         "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}$",
9463     },
9464     "type": "string"
9465 },
9466 "eps": {
9467     "description": "the Endpoint information of the target Resource",
9468     "items": {
9469         "properties": {
9470             "ep": {
9471                 "description": "Transport Protocol Suite + Endpoint Locator",
9472                 "format": "uri",
9473                 "type": "string"
9474             },
9475             "pri": {
9476                 "description": "The priority among multiple Endpoints",
9477                 "minimum": 1,
9478                 "type": "integer"
9479             }
9480         },
9481         "type": "object"
9482     },
9483     "type": "array"
9484 },
9485 "href": {
9486     "description": "This is the target URI, it can be specified as a Relative Reference
9487 or fully-qualified URI.",
9488     "format": "uri",
9489     "maxLength": 256,
9490     "type": "string"
9491 },
9492 "if": {
9493     "description": "The interface set supported by this resource",
9494     "items": {
9495         "enum": [
9496             "oic.if.baseline",
9497             "oic.if.ll",
9498             "oic.if.b",
9499             "oic.if.rw",
9500             "oic.if.r",
9501             "oic.if.a",
9502             "oic.if.s"
9503         ],
9504         "type": "string"
9505     },
9506     "minItems": 1,
9507     "type": "array"
9508 },
9509 "ins": {
9510     "description": "The instance identifier for this web link in an array of web links
9511 - used in collections",
9512     "type": "integer"
9513 },
9514 "p": {
9515     "description": "Specifies the framework policies on the Resource referenced by the
9516 target URI",
9517     "properties": {
9518         "bm": {
9519             "description": "Specifies the framework policies on the Resource referenced by
9520 the target URI for e.g. observable and discoverable",
9521             "type": "integer"
9522         }
9523     },
9524     "required": [
9525         "bm"
9526     ],
9527     "type": "object"
9528 },

```

```

9529         "rel": {
9530             "description": "The relation of the target URI referenced by the link to the
context URI",
9531             "oneOf": [
9532                 {
9533                     "default": [
9534                         "hosts"
9535                     ],
9536                 },
9537                 {
9538                     "items": {
9539                         "maxLength": 64,
9540                         "type": "string"
9541                     },
9542                     "minItems": 1,
9543                     "type": "array"
9544                 },
9545                 {
9546                     "default": "hosts",
9547                     "maxLength": 64,
9548                     "type": "string"
9549                 }
9550             ],
9551             "rt": {
9552                 "description": "Resource Type of the Resource",
9553                 "items": {
9554                     "maxLength": 64,
9555                     "type": "string"
9556                 },
9557                 "minItems": 1,
9558                 "type": "array"
9559             },
9560             "title": {
9561                 "description": "A title for the link relation. Can be used by the UI to provide a
context.",
9562                 "maxLength": 64,
9563                 "type": "string"
9564             },
9565             "type": {
9566                 "default": "application/cbor",
9567                 "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.",
9568                 "items": {
9569                     "maxLength": 64,
9570                     "type": "string"
9571                 },
9572                 "minItems": 1,
9573                 "type": "array"
9574             }
9575         },
9576         "required": [
9577             "href",
9578             "rt",
9579             "if"
9580         ],
9581         "type": "object"
9582     },
9583     "type": "array"
9584 }
9585 }
9586 }
9587 },
9588 "type": "object"
9589 }
9590
9591 , "oic.collection.links" :
9592 {
9593     "properties": {
9594         "links": {
9595             "description": "A set of simple or individual OIC Links.",
9596             "items": {
9597                 "$ref": "#/definitions/oic.oic-link"
9598             },
9599             "type": "array"

```

```

9600     }
9601   },
9602   "type": "object"
9603 }
9604
9605   , "oic.oic-link" :
9606     {
9607       "properties": {
9608         "anchor": {
9609           "description": "This is used to override the context URI e.g. override the URI of the
9610 containing collection.",
9611           "format": "uri",
9612           "maxLength": 256,
9613           "type": "string"
9614         },
9615         "di": {
9616           "$ref": "#/definitions/uuid",
9617           "description": "The device ID"
9618         },
9619         "eps": {
9620           "description": "the Endpoint information of the target Resource",
9621           "items": {
9622             "properties": {
9623               "ep": {
9624                 "description": "Transport Protocol Suite + Endpoint Locator",
9625                 "format": "uri",
9626                 "type": "string"
9627               },
9628               "pri": {
9629                 "description": "The priority among multiple Endpoints",
9630                 "minimum": 1,
9631                 "type": "integer"
9632               }
9633             },
9634             "type": "object"
9635           },
9636           "type": "array"
9637         },
9638         "href": {
9639           "description": "This is the target URI, it can be specified as a Relative Reference or
9640 fully-qualified URI.",
9641           "format": "uri",
9642           "maxLength": 256,
9643           "type": "string"
9644         },
9645         "if": {
9646           "description": "The interface set supported by this resource",
9647           "items": {
9648             "enum": [
9649               "oic.if.baseline",
9650               "oic.if.ll",
9651               "oic.if.b",
9652               "oic.if.rw",
9653               "oic.if.r",
9654               "oic.if.a",
9655               "oic.if.s"
9656             ],
9657             "type": "string"
9658           },
9659           "minItems": 1,
9660           "type": "array"
9661         },
9662         "ins": {
9663           "description": "The instance identifier for this web link in an array of web links - used
9664 in collections",
9665           "type": "integer"
9666         },
9667         "p": {
9668           "description": "Specifies the framework policies on the Resource referenced by the target
9669 URI",
9670           "properties": {

```

```

9671         "bm": {
9672             "description": "Specifies the framework policies on the Resource referenced by the
9673 target URI for e.g. observable and discoverable",
9674             "type": "integer"
9675         }
9676     },
9677     "required": [
9678         "bm"
9679     ],
9680     "type": "object"
9681 },
9682 "rel": {
9683     "description": "The relation of the target URI referenced by the link to the context
9684 URI",
9685     "oneOf": [
9686         {
9687             "default": [
9688                 "hosts"
9689             ],
9690             "items": {
9691                 "maxLength": 64,
9692                 "type": "string"
9693             },
9694             "minItems": 1,
9695             "type": "array"
9696         },
9697         {
9698             "default": "hosts",
9699             "maxLength": 64,
9700             "type": "string"
9701         }
9702     ]
9703 },
9704 "rt": {
9705     "description": "Resource Type of the Resource",
9706     "items": {
9707         "maxLength": 64,
9708         "type": "string"
9709     },
9710     "minItems": 1,
9711     "type": "array"
9712 },
9713 "title": {
9714     "description": "A title for the link relation. Can be used by the UI to provide a
9715 context.",
9716     "maxLength": 64,
9717     "type": "string"
9718 },
9719 "type": {
9720     "default": "application/cbor",
9721     "description": "A hint at the representation of the resource referenced by the target
9722 URI. This represents the media types that are used for both accepting and emitting.",
9723     "items": {
9724         "maxLength": 64,
9725         "type": "string"
9726     },
9727     "minItems": 1,
9728     "type": "array"
9729 }
9730 },
9731 "required": [
9732     "href",
9733     "rt",
9734     "if"
9735 ],
9736 "type": "object"
9737 }
9738 }
9739 }
9740 }
9741

```

F.3.5 Property Definition

Property name	Value type	Mandatory	Access mode	Description
rt	array: see schema		Read Only	Resource Type of the Resource
anchor	string			This is used to override the context URI e.g. override the URI of the containing collection.
if	array: see schema	yes		The interface set supported by this resource
rt	array: see schema	yes		Resource Type of the Resource
di	multiple types: see schema			The device ID
href	string	yes		This is the target URI, it can be specified as a Relative Reference or fully-qualified URI.
eps	array: see schema			the Endpoint information of the target Resource
rel	multiple types: see schema			The relation of the target URI referenced by the link to the context URI
title	string			A title for the link relation. Can be used by the UI to provide a context.
p	object: see schema			Specifies the framework policies on the Resource referenced by the target URI
ins	integer			The instance identifier for this web link in an array of web links - used in collections
type	array: see schema			A hint at the representation of the resource referenced by the target URI.

				This represents the media types that are used for both accepting and emitting.
rep	multiple types: see schema	yes		
href	string	yes		URI of the target resource relative assuming the collection URI as anchor
links	array: see schema			A set of simple or individual OIC Links.
rep	multiple types: see schema	yes		
href	string	yes		URI of the target resource relative assuming the collection URI as anchor
links	array: see schema			A set of simple or individual OIC Links.
links	array: see schema			A set of simple or individual OIC Links.
rts	multiple types: see schema			The list of allowable resource types (for Target and anchors) in links included in the collection

9743 **F.3.6 CRUDN behaviour**

Resource	Create	Read	Update	Delete	Notify
/CollectionBaselineInterfaceURI		get	post		

9744 **F.4 Platform Configuration**

9745 **F.4.1 Introduction**

9746 Resource that allows for platform specific information to be configured.
9747

9748 **F.4.2 Example URI**

9749 /examplePlatformConfigurationResURI

9750 **F.4.3 Resource Type**

9751 The resource type (rt) is defined as: ['oic.wk.con.p'].

9752 **F.4.4 Swagger2.0 Definition**

9753 {
9754 "swagger": "2.0",
9755 "info": {


```

9756     "title": "Platform Configuration",
9757     "version": "v1-20160622",
9758     "license": {
9759         "name": "copyright 2016-2017 Open Connectivity Foundation, Inc. All rights reserved.",
9760         "x-description": "Redistribution and use in source and binary forms, with or without
9761 modification, are permitted provided that the following conditions are met:\n      1.
9762 Redistributions of source code must retain the above copyright notice, this list of conditions and
9763 the following disclaimer.\n      2. Redistributions in binary form must reproduce the above
9764 copyright notice, this list of conditions and the following disclaimer in the documentation and/or
9765 other materials provided with the distribution.\n\n      THIS SOFTWARE IS PROVIDED BY THE Open
9766 Connectivity Foundation, INC. \\"AS IS\\" AND ANY EXPRESS OR IMPLIED WARRANTIES, INCLUDING, BUT NOT
9767 LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE OR
9768 WARRANTIES OF NON-INFRINGEMENT, ARE DISCLAIMED.\n      IN NO EVENT SHALL THE Open Connectivity
9769 Foundation, INC. OR CONTRIBUTORS BE LIABLE FOR ANY DIRECT, INDIRECT, INCIDENTAL, SPECIAL,
9770 EXEMPLARY, OR CONSEQUENTIAL DAMAGES (INCLUDING, BUT NOT LIMITED TO, PROCUREMENT OF SUBSTITUTE GOODS
9771 OR SERVICES; LOSS OF USE, DATA, OR PROFITS; OR BUSINESS INTERRUPTION)\n      HOWEVER CAUSED AND
9772 ON ANY THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT (INCLUDING NEGLIGENCE OR
9773 OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OF THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY
9774 OF SUCH DAMAGE.\n"
9775     },
9776 },
9777 "schemes": ["http"],
9778 "consumes": ["application/json"],
9779 "produces": ["application/json"],
9780 "paths": {
9781     "/examplePlatformConfigurationResURI" : {
9782         "get": {
9783             "description": "Resource that allows for platform specific information to be
9784 configured.\nRetrieves the current platform configuration settings\n",
9785             "parameters": [
9786                 { "$ref": "#/parameters/interface-all" }
9787             ],
9788             "responses": {
9789                 "200": {
9790                     "description": "",
9791                     "x-example":
9792                     {
9793                         "rt": ["oic.wk.con.p"],
9794                         "mnpn": [ { "language": "en", "value": "My Friendly Device Name" } ]
9795                     }
9796                 },
9797                 "schema": { "$ref": "#/definitions/Conf_Platform" }
9798             }
9799         }
9800     },
9801     "post": {
9802         "description": "Update the information about the platform\n",
9803         "parameters": [
9804             { "$ref": "#/parameters/interface-rw" },
9805             {
9806                 "name": "body",
9807                 "in": "body",
9808                 "required": true,
9809                 "schema": { "$ref": "#/definitions/Update_Platform" },
9810                 "x-example":
9811                 {
9812                     "n": "Nuevo nombre",
9813                     "mnpn": [ { "language": "es", "value": "Nuevo nombre de Plataforma Amigable" } ]
9814                 }
9815             }
9816         ],
9817         "responses": {
9818             "200": {
9819                 "description": "",
9820                 "x-example":
9821                 {
9822                     "n": "Nuevo nombre",
9823                     "mnpn": [ { "language": "es", "value": "Nuevo nombre de Plataforma Amigable" } ]
9824                 }
9825             },
9826             "schema": { "$ref": "#/definitions/Update_Platform" }

```

```

9827     }
9828   }
9829 }
9830 }
9831 },
9832 "parameters": {
9833   "interface-rw" : {
9834     "in" : "query",
9835     "name" : "if",
9836     "type" : "string",
9837     "enum" : ["oic.if.rw"]
9838   },
9839   "interface-all" : {
9840     "in" : "query",
9841     "name" : "if",
9842     "type" : "string",
9843     "enum" : ["oic.if.rw", "oic.if.baseline"]
9844   }
9845 },
9846 "definitions": {
9847   "Conf_Platform" : {
9848     "properties": {
9849       "rt" :
9850         {
9851           "description": "Resource Type of the Resource",
9852           "items": {
9853             "maxLength": 64,
9854             "type": "string"
9855           },
9856           "minItems": 1,
9857           "readOnly": true,
9858           "type": "array"
9859         },
9860
9861     "n" :
9862       {
9863         "description": "Friendly name of the resource",
9864         "maxLength": 64,
9865         "readOnly": true,
9866         "type": "string"
9867       },
9868
9869     "mnpn" :
9870       {
9871         "description": "Platform names",
9872         "items": {
9873           "properties": {
9874             "language": {
9875               "allOf": [
9876                 {
9877                   "description": "Format pattern according to IETF RFC 5646 (language tag).",
9878                   "pattern": "^[A-Za-z]{1,8}(-[A-Za-z0-9]{1,8})*$",
9879                   "type": "string"
9880                 },
9881                 {
9882                   "description": "An RFC 5646 language tag."
9883                 }
9884               ]
9885             },
9886             "value": {
9887               "description": "The Platform description in the indicated language.",
9888               "maxLength": 64,
9889               "type": "string"
9890             }
9891           },
9892           "type": "object"
9893         },
9894         "minItems": 1,
9895         "type": "array"
9896       },
9897     },

```

```

9898     "id" :
9899         {
9900             "description": "Instance ID of this specific resource",
9901             "maxLength": 64,
9902             "readOnly": true,
9903             "type": "string"
9904         },
9905     "if" :
9906         {
9907             "description": "The interface set supported by this resource",
9908             "items": {
9909                 "enum": [
9910                     "oic.if.baseline",
9911                     "oic.if.ll",
9912                     "oic.if.b",
9913                     "oic.if.lb",
9914                     "oic.if.rw",
9915                     "oic.if.r",
9916                     "oic.if.a",
9917                     "oic.if.s"
9918                 ],
9919                 "type": "string"
9920             },
9921             "minItems": 1,
9922             "readOnly": true,
9923             "type": "array"
9924         }
9925     }
9926 }
9927 }
9928 }
9929 /
9930 "Update_Platform" : {
9931     "properties": {
9932         "rt" :
9933             {
9934                 "description": "Resource Type of the Resource",
9935                 "items": {
9936                     "maxLength": 64,
9937                     "type": "string"
9938                 },
9939                 "minItems": 1,
9940                 "readOnly": true,
9941                 "type": "array"
9942             },
9943     },
9944     "n" :
9945         {
9946             "description": "Friendly name of the resource",
9947             "maxLength": 64,
9948             "type": "string"
9949         },
9950     "mnpn" :
9951         {
9952             "description": "Platform names",
9953             "items": {
9954                 "properties": {
9955                     "language": {
9956                         "allOf": [
9957                             {
9958                                 "description": "Format pattern according to IETF RFC 5646 (language tag).",
9959                                 "pattern": "^[A-Za-z]{1,8}(-[A-Za-z0-9]{1,8})*$",
9960                                 "type": "string"
9961                             },
9962                             {
9963                                 "description": "An RFC 5646 language tag."
9964                             }
9965                         ]
9966                     }
9967                 },
9968                 "value": {

```

```

9969         "description": "The Platform description in the indicated language.",
9970         "maxLength": 64,
9971         "type": "string"
9972     },
9973     },
9974     "type": "object"
9975 },
9976 "minItems": 1,
9977 "type": "array"
9978 },
9979
9980 "id" :
9981     {
9982     "anyOf": [
9983     {
9984         "maxLength": 64,
9985         "type": "string"
9986     },
9987     {
9988         "description": "Format pattern according to IETF RFC 4122.",
9989         "pattern": "^[a-fA-F0-9]{8}-[a-fA-F0-9]{4}-[a-fA-F0-9]{4}-[a-fA-F0-
9990 9]{12}$",
9991         "type": "string"
9992     }
9993     ],
9994     "description": "Instance ID of this specific resource",
9995     "readOnly": true
9996 },
9997
9998 "if" :
9999     {
10000     "description": "The interface set supported by this resource",
10001     "items": {
10002         "enum": [
10003             "oic.if.baseline",
10004             "oic.if.ll",
10005             "oic.if.b",
10006             "oic.if.lb",
10007             "oic.if.rw",
10008             "oic.if.r",
10009             "oic.if.a",
10010             "oic.if.s"
10011         ],
10012         "type": "string"
10013     },
10014     "minItems": 1,
10015     "readOnly": true,
10016     "type": "array"
10017 }
10018 },
10019 "required": ["mnpn"]
10020 }
10021 }
10022 }
10023 }
10024

```

F.4.5 Property Definition

Property name	Value type	Mandatory	Access mode	Description
rt	array: see schema		Read Only	Resource Type of the Resource
id	string		Read Only	Instance ID of this specific resource
if	array: see schema		Read Only	The interface set supported by this resource

mnpn	array: see schema			Platform names
n	string		Read Only	Friendly name of the resource
rt	array: see schema		Read Only	Resource Type of the Resource
id	multiple types: see schema		Read Only	Instance ID of this specific resource
if	array: see schema		Read Only	The interface set supported by this resource
mnpn	array: see schema	yes		Platform names
n	string			Friendly name of the resource

10026 **F.4.6 CRUDN behaviour**

Resource	Create	Read	Update	Delete	Notify
/examplePlatformConfigurationResURI		get	post		

10027 **F.5 Platform Configuration**

10028 **F.5.1 Introduction**

10029 Resource that allows for platform specific information to be configured.
 10030 Retrieves the current platform configuration settings
 10031

10032 **F.5.2 Wellknown URI**

10033 /examplePlatformConfigurationResURI

10034 **F.5.3 Resource Type**

10035 The resource type (rt) is defined as: ['oic.wk.con.p'].

10036 **F.5.4 Swagger2.0 Definition**

```

10037 {
10038   "swagger": "2.0",
10039   "info": {
10040     "title": "Platform Configuration",
10041     "version": "v1-20160622",
10042     "license": {
10043       "name": "copyright 2016-2017 Open Connectivity Foundation, Inc. All rights reserved.",
10044       "x-description": "Redistribution and use in source and binary forms, with or without
10045 modification, are permitted provided that the following conditions are met:\n      1.
10046 Redistributions of source code must retain the above copyright notice, this list of conditions and
10047 the following disclaimer.\n      2. Redistributions in binary form must reproduce the above
10048 copyright notice, this list of conditions and the following disclaimer in the documentation and/or
10049 other materials provided with the distribution.\n\n      THIS SOFTWARE IS PROVIDED BY THE Open
10050 Connectivity Foundation, INC. \\"AS IS\\" AND ANY EXPRESS OR IMPLIED WARRANTIES, INCLUDING, BUT NOT
10051 LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE OR
10052 WARRANTIES OF NON-INFRINGEMENT, ARE DISCLAIMED.\n      IN NO EVENT SHALL THE Open Connectivity
10053 Foundation, INC. OR CONTRIBUTORS BE LIABLE FOR ANY DIRECT, INDIRECT, INCIDENTAL, SPECIAL,
10054 EXEMPLARY, OR CONSEQUENTIAL DAMAGES (INCLUDING, BUT NOT LIMITED TO, PROCUREMENT OF SUBSTITUTE GOODS
10055 OR SERVICES; LOSS OF USE, DATA, OR PROFITS; OR BUSINESS INTERRUPTION)\n      HOWEVER CAUSED AND
10056 ON ANY THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT (INCLUDING NEGLIGENCE OR
10057 OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OF THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY
10058 OF SUCH DAMAGE.\n"
10059   }
10060 },
10061 "schemes": ["http"],
10062 "consumes": ["application/json"],

```

```

10063     "produces": ["application/json"],
10064     "paths": {
10065         "/examplePlatformConfigurationResURI" : {
10066             "get": {
10067                 "description": "Resource that allows for platform specific information to be
10068 configured.\nRetrieves the current platform configuration settings\n",
10069                 "parameters": [
10070                     { "$ref": "#/parameters/interface-all" }
10071                 ],
10072                 "responses": {
10073                     "200": {
10074                         "description": "",
10075                         "x-example":
10076                             {
10077                                 "rt": ["oic.wk.con.p"],
10078                                 "mnpn": [ { "language": "en", "value": "My Friendly Device Name" } ]
10079                             }
10080                         ,
10081                         "schema": { "$ref": "#/definitions/Conf_Platform" }
10082                     }
10083                 }
10084             },
10085             "post": {
10086                 "description": "Update the information about the platform\n",
10087                 "parameters": [
10088                     { "$ref": "#/parameters/interface-rw" },
10089                     {
10090                         "name": "body",
10091                         "in": "body",
10092                         "required": true,
10093                         "schema": { "$ref": "#/definitions/Update_Platform" },
10094                         "x-example":
10095                             {
10096                                 "n": "Nuevo nombre",
10097                                 "mnpn": [ { "language": "es", "value": "Nuevo nombre de Plataforma Amigable" } ]
10098                             }
10099                     }
10100                 ],
10101                 "responses": {
10102                     "200": {
10103                         "description": "",
10104                         "x-example":
10105                             {
10106                                 "n": "Nuevo nombre",
10107                                 "mnpn": [ { "language": "es", "value": "Nuevo nombre de Plataforma Amigable" } ]
10108                             }
10109                         ,
10110                         "schema": { "$ref": "#/definitions/Update_Platform" }
10111                     }
10112                 }
10113             }
10114         }
10115     },
10116     "parameters": {
10117         "interface-rw" : {
10118             "in" : "query",
10119             "name" : "if",
10120             "type" : "string",
10121             "enum" : ["oic.if.rw"]
10122         },
10123         "interface-all" : {
10124             "in" : "query",
10125             "name" : "if",
10126             "type" : "string",
10127             "enum" : ["oic.if.rw", "oic.if.baseline"]
10128         }
10129     },
10130     "definitions": {
10131         "Conf_Platform" : {
10132             "properties": {
10133                 "rt" :

```

```

10134         {
10135         "description": "Resource Type of the Resource",
10136         "items": {
10137             "maxLength": 64,
10138             "type": "string"
10139         },
10140         "minItems": 1,
10141         "readOnly": true,
10142         "type": "array"
10143     },
10144
10145     "n" :
10146     {
10147         "description": "Friendly name of the resource",
10148         "maxLength": 64,
10149         "readOnly": true,
10150         "type": "string"
10151     },
10152
10153     "mnpn" :
10154     {
10155         "description": "Platform names",
10156         "items": {
10157             "properties": {
10158                 "language": {
10159                     "allOf": [
10160                         {
10161                             "description": "Format pattern according to IETF RFC 5646 (language tag).",
10162                             "pattern": "^[A-Za-z]{1,8}(-[A-Za-z0-9]{1,8})*$",
10163                             "type": "string"
10164                         },
10165                         {
10166                             "description": "An RFC 5646 language tag."
10167                         }
10168                     ]
10169                 },
10170                 "value": {
10171                     "description": "The Platform description in the indicated language.",
10172                     "maxLength": 64,
10173                     "type": "string"
10174                 }
10175             },
10176             "type": "object"
10177         },
10178         "minItems": 1,
10179         "type": "array"
10180     },
10181
10182     "id" :
10183     {
10184         "description": "Instance ID of this specific resource",
10185         "maxLength": 64,
10186         "readOnly": true,
10187         "type": "string"
10188     },
10189
10190     "if" :
10191     {
10192         "description": "The interface set supported by this resource",
10193         "items": {
10194             "enum": [
10195                 "oic.if.baseline",
10196                 "oic.if.ll",
10197                 "oic.if.b",
10198                 "oic.if.lb",
10199                 "oic.if.rw",
10200                 "oic.if.r",
10201                 "oic.if.a",
10202                 "oic.if.s"
10203             ],
10204             "type": "string"

```

```

10205         },
10206         "minItems": 1,
10207         "readOnly": true,
10208         "type": "array"
10209     }
10210 }
10211 }
10212 }
10213 ,
10214 "Update_Platform" : {
10215     "properties": {
10216         "rt" :
10217         {
10218             "description": "Resource Type of the Resource",
10219             "items": {
10220                 "maxLength": 64,
10221                 "type": "string"
10222             },
10223             "minItems": 1,
10224             "readOnly": true,
10225             "type": "array"
10226         },
10227     },
10228     "n" :
10229     {
10230         "description": "Friendly name of the resource",
10231         "maxLength": 64,
10232         "type": "string"
10233     },
10234     "mnpn" :
10235     {
10236         "description": "Platform names",
10237         "items": {
10238             "properties": {
10239                 "language": {
10240                     "allOf": [
10241                         {
10242                             "description": "Format pattern according to IETF RFC 5646 (language tag).",
10243                             "pattern": "^[A-Za-z]{1,8}(-[A-Za-z0-9]{1,8})*$",
10244                             "type": "string"
10245                         },
10246                         {
10247                             "description": "An RFC 5646 language tag."
10248                         }
10249                     ]
10250                 },
10251                 "value": {
10252                     "description": "The Platform description in the indicated language.",
10253                     "maxLength": 64,
10254                     "type": "string"
10255                 }
10256             },
10257             "type": "object"
10258         },
10259         "minItems": 1,
10260         "type": "array"
10261     },
10262 },
10263 "id" :
10264 {
10265     "anyOf": [
10266         {
10267             "maxLength": 64,
10268             "type": "string"
10269         },
10270         {
10271             "description": "Format pattern according to IETF RFC 4122.",
10272             "pattern": "^[a-fA-F0-9]{8}-[a-fA-F0-9]{4}-[a-fA-F0-9]{4}-[a-fA-F0-9]{4}-[a-fA-F0-9]{12}$",
10273             "type": "string"
10274         }
10275     ]

```



```

10276     }
10277   ],
10278   "description": "Instance ID of this specific resource",
10279   "readOnly": true
10280 },
10281
10282 "if" :
10283   {
10284     "description": "The interface set supported by this resource",
10285     "items": {
10286       "enum": [
10287         "oic.if.baseline",
10288         "oic.if.ll",
10289         "oic.if.b",
10290         "oic.if.lb",
10291         "oic.if.rw",
10292         "oic.if.r",
10293         "oic.if.a",
10294         "oic.if.s"
10295       ],
10296       "type": "string"
10297     },
10298     "minItems": 1,
10299     "readOnly": true,
10300     "type": "array"
10301   }
10302 },
10303 "required": ["mnpn"]
10304 }
10305 }
10306 }
10307 }
10308

```

10309 **F.5.5 Property Definition**

Property name	Value type	Mandatory	Access mode	Description
rt	array: see schema		Read Only	Resource Type of the Resource
n	string			Friendly name of the resource
if	array: see schema		Read Only	The interface set supported by this resource
id	multiple types: see schema		Read Only	Instance ID of this specific resource
mnpn	array: see schema	yes		Platform names
rt	array: see schema		Read Only	Resource Type of the Resource
n	string		Read Only	Friendly name of the resource
if	array: see schema		Read Only	The interface set supported by this resource
id	string		Read Only	Instance ID of this specific resource
mnpn	array: see schema			Platform names

10310 **F.5.6 CRUDN behaviour**

Resource	Create	Read	Update	Delete	Notify
/examplePlatformConfigurationResURI		get	post		

10311 **F.6 Device Configuration**

10312 **F.6.1 Introduction**

10313 Resource that allows for Device specific information to be configured.
10314

10315 **F.6.2 Example URI**

10316 /exampleDeviceConfigurationResURI

10317 **F.6.3 Resource Type**

10318 The resource type (rt) is defined as: ['oic.wk.con'].

10319 **F.6.4 Swagger2.0 Definition**

```

10320 {
10321   "swagger": "2.0",
10322   "info": {
10323     "title": "Device Configuration",
10324     "version": "v1-20160622",
10325     "license": {
10326       "name": "copyright 2016-2017 Open Connectivity Foundation, Inc. All rights reserved.",
10327       "x-description": "Redistribution and use in source and binary forms, with or without
10328 modification, are permitted provided that the following conditions are met:\n      1.
10329 Redistributions of source code must retain the above copyright notice, this list of conditions and
10330 the following disclaimer.\n      2. Redistributions in binary form must reproduce the above
10331 copyright notice, this list of conditions and the following disclaimer in the documentation and/or
10332 other materials provided with the distribution.\n\n      THIS SOFTWARE IS PROVIDED BY THE Open
10333 Connectivity Foundation, INC. \AS IS\ AND ANY EXPRESS OR IMPLIED WARRANTIES, INCLUDING, BUT NOT
10334 LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE OR
10335 WARRANTIES OF NON-INFRINGEMENT, ARE DISCLAIMED.\n      IN NO EVENT SHALL THE Open Connectivity
10336 Foundation, INC. OR CONTRIBUTORS BE LIABLE FOR ANY DIRECT, INDIRECT, INCIDENTAL, SPECIAL,
10337 EXEMPLARY, OR CONSEQUENTIAL DAMAGES (INCLUDING, BUT NOT LIMITED TO, PROCUREMENT OF SUBSTITUTE GOODS
10338 OR SERVICES; LOSS OF USE, DATA, OR PROFITS; OR BUSINESS INTERRUPTION)\n      HOWEVER CAUSED AND
10339 ON ANY THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT (INCLUDING NEGLIGENCE OR
10340 OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OF THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY
10341 OF SUCH DAMAGE.\n"
10342   }
10343 },
10344 "schemes": ["http"],
10345 "consumes": ["application/json"],
10346 "produces": ["application/json"],
10347 "paths": {
10348   "/exampleDeviceConfigurationResURI" : {
10349     "get": {
10350       "description": "Resource that allows for Device specific information to be
10351 configured.\nRetrieves the current Device configuration settings\n",
10352       "parameters": [
10353         {"$ref": "#/parameters/interface-all"}
10354       ],
10355       "responses": {
10356         "200": {
10357           "description": "",
10358           "x-example":
10359             {
10360               "n": "My Friendly Device Name",
10361               "rt": ["oic.wk.con"],
10362               "loc": [32.777, -96.797],
10363               "locn": "My Location Name",
10364               "c": "USD",
10365               "r": "MyRegion",
10366               "dl": "en"
10367             }
10368         }
10369       }
10370     }
10371   }
10372 }

```

```

10369         "schema": { "$ref": "#/definitions/Configuration" }
10370     }
10371 }
10372 },
10373 "post": {
10374     "description": "Update the information about the Device\n",
10375     "parameters": [
10376         { "$ref": "#/parameters/interface-rw" },
10377         {
10378             "name": "body",
10379             "in": "body",
10380             "required": true,
10381             "schema": { "$ref": "#/definitions/Update" },
10382             "x-example":
10383                 {
10384                     "n": "Nuevo Nombre Amistoso",
10385                     "r": "MyNewRegion",
10386                     "ln": [ { "language": "es", "value": "Nuevo Nombre Amistoso" } ],
10387                     "dl": "es"
10388                 }
10389         },
10390     ],
10391     "responses": {
10392         "200": {
10393             "description": "",
10394             "x-example":
10395                 {
10396                     "n": "Nuevo Nombre Amistoso",
10397                     "r": "MyNewRegion",
10398                     "ln": [ { "language": "es", "value": "Nuevo Nombre Amistoso" } ],
10399                     "dl": "es"
10400                 }
10401             ,
10402             "schema": { "$ref": "#/definitions/Update" }
10403         }
10404     }
10405 }
10406 },
10407 "parameters": {
10408     "interface-rw" : {
10409         "in" : "query",
10410         "name" : "if",
10411         "type" : "string",
10412         "enum" : ["oic.if.rw"]
10413     },
10414     "interface-all" : {
10415         "in" : "query",
10416         "name" : "if",
10417         "type" : "string",
10418         "enum" : ["oic.if.rw", "oic.if.baseline"]
10419     }
10420 },
10421 "definitions": {
10422     "Configuration" : {
10423         "properties": {
10424             "rt" :
10425                 {
10426                     "description": "Resource Type of the Resource",
10427                     "items": {
10428                         "maxLength": 64,
10429                         "type": "string"
10430                     },
10431                     "minItems": 1,
10432                     "readOnly": true,
10433                     "type": "array"
10434                 },
10435         },
10436         "loc" :
10437             {
10438                 "description": "Location information (lat, long)",

```

```

10440         "items": {
10441             "type": "number"
10442         },
10443         "maxItems": 2,
10444         "minItems": 2,
10445         "type": "array"
10446     },
10447
10448     "c" :
10449     {
10450         "description": "Currency",
10451         "maxLength": 64,
10452         "type": "string"
10453     },
10454
10455     "ln" :
10456     {
10457         "description": "Localized names",
10458         "items": {
10459             "properties": {
10460                 "language": {
10461                     "allOf": [
10462                         {
10463                             "description": "Format pattern according to IETF RFC 5646 (language tag).",
10464                             "pattern": "^[A-Za-z]{1,8}(-[A-Za-z0-9]{1,8})*$",
10465                             "type": "string"
10466                         },
10467                         {
10468                             "description": "An RFC 5646 language tag."
10469                         }
10470                     ]
10471                 },
10472                 "value": {
10473                     "description": "The Device name in the indicated language.",
10474                     "maxLength": 64,
10475                     "type": "string"
10476                 }
10477             },
10478             "type": "object"
10479         },
10480         "minItems": 1,
10481         "type": "array"
10482     },
10483
10484     "locn" :
10485     {
10486         "description": "Human Friendly Name for location",
10487         "maxLength": 64,
10488         "type": "string"
10489     },
10490
10491     "dl" :
10492     {
10493         "allOf": [
10494             {
10495                 "description": "Format pattern according to IETF RFC 5646 (language tag).",
10496                 "pattern": "^[A-Za-z]{1,8}(-[A-Za-z0-9]{1,8})*$",
10497                 "type": "string"
10498             },
10499             {
10500                 "description": "Default Language as an RFC 5646 language tag."
10501             }
10502         ]
10503     },
10504
10505     "n" :
10506     {
10507         "description": "Friendly name of the resource",
10508         "maxLength": 64,
10509         "readOnly": true,
10510         "type": "string"

```

```

10511     },
10512
10513     "r" :
10514     {
10515         "description": "Region",
10516         "maxLength": 64,
10517         "type": "string"
10518     },
10519
10520     "id" :
10521     {
10522         "description": "Instance ID of this specific resource",
10523         "maxLength": 64,
10524         "readOnly": true,
10525         "type": "string"
10526     },
10527
10528     "if" :
10529     {
10530         "description": "The interface set supported by this resource",
10531         "items": {
10532             "enum": [
10533                 "oic.if.baseline",
10534                 "oic.if.ll",
10535                 "oic.if.b",
10536                 "oic.if.lb",
10537                 "oic.if.rw",
10538                 "oic.if.r",
10539                 "oic.if.a",
10540                 "oic.if.s"
10541             ],
10542             "type": "string"
10543         },
10544         "minItems": 1,
10545         "readOnly": true,
10546         "type": "array"
10547     }
10548
10549     },
10550     "required": ["n"]
10551 }
10552
10553 "Update" : {
10554     "properties": {
10555         "rt" :
10556         {
10557             "description": "Resource Type of the Resource",
10558             "items": {
10559                 "maxLength": 64,
10560                 "type": "string"
10561             },
10562             "minItems": 1,
10563             "readOnly": true,
10564             "type": "array"
10565         },
10566
10567         "loc" :
10568         {
10569             "description": "Location information (lat, long)",
10570             "items": {
10571                 "type": "number"
10572             },
10573             "maxItems": 2,
10574             "minItems": 2,
10575             "type": "array"
10576         },
10577
10578         "c" :
10579         {
10580             "description": "Currency",
10581             "maxLength": 64,

```

```

10582     "type": "string"
10583   },
10584
10585   "ln" :
10586     {
10587       "description": "Localized names",
10588       "items": {
10589         "properties": {
10590           "language": {
10591             "allOf": [
10592               {
10593                 "description": "Format pattern according to IETF RFC 5646 (language tag).",
10594                 "pattern": "^[A-Za-z]{1,8}(-[A-Za-z0-9]{1,8})*$",
10595                 "type": "string"
10596               },
10597               {
10598                 "description": "An RFC 5646 language tag."
10599               }
10600             ]
10601           },
10602           "value": {
10603             "description": "The Device name in the indicated language.",
10604             "maxLength": 64,
10605             "type": "string"
10606           }
10607         },
10608         "type": "object"
10609       },
10610       "minItems": 1,
10611       "type": "array"
10612     },
10613
10614   "locn" :
10615     {
10616       "description": "Human Friendly Name for location",
10617       "maxLength": 64,
10618       "type": "string"
10619     },
10620
10621   "dl" :
10622     {
10623       "allOf": [
10624         {
10625           "description": "Format pattern according to IETF RFC 5646 (language tag).",
10626           "pattern": "^[A-Za-z]{1,8}(-[A-Za-z0-9]{1,8})*$",
10627           "type": "string"
10628         },
10629         {
10630           "description": "Default Language as an RFC 5646 language tag."
10631         }
10632       ]
10633     },
10634
10635   "n" :
10636     {
10637       "description": "Friendly name of the resource",
10638       "maxLength": 64,
10639       "type": "string"
10640     },
10641
10642   "r" :
10643     {
10644       "description": "Region",
10645       "maxLength": 64,
10646       "type": "string"
10647     },
10648
10649   "id" :
10650     {
10651       "anyOf": [
10652         {

```

```

10653         "maxLength": 64,
10654         "type": "string"
10655     },
10656     {
10657         "description": "Format pattern according to IETF RFC 4122.",
10658         "pattern": "^[a-fA-F0-9]{8}-[a-fA-F0-9]{4}-[a-fA-F0-9]{4}-[a-fA-F0-
10659 9]{12}$",
10660         "type": "string"
10661     }
10662 ],
10663 "description": "Instance ID of this specific resource",
10664 "readOnly": true
10665 },
10666 "if" :
10667 {
10668     "description": "The interface set supported by this resource",
10669     "items": {
10670         "enum": [
10671             "oic.if.baseline",
10672             "oic.if.ll",
10673             "oic.if.b",
10674             "oic.if.lb",
10675             "oic.if.rw",
10676             "oic.if.r",
10677             "oic.if.a",
10678             "oic.if.s"
10679         ],
10680         "type": "string"
10681     },
10682     "minItems": 1,
10683     "readOnly": true,
10684     "type": "array"
10685 }
10686 }
10687 }
10688 }
10689 }
10690 }
10691 }
10692 }

```

F.6.5 Property Definition

Property name	Value type	Mandatory	Access mode	Description
n	string			Friendly name of the resource
loc	array: see schema			Location information (lat, long)
if	array: see schema		Read Only	The interface set supported by this resource
rt	array: see schema		Read Only	Resource Type of the Resource
ln	array: see schema			Localized names
c	string			Currency
r	string			Region
locn	string			Human Friendly Name for location
dl	multiple types: see schema			

id	multiple types: see schema		Read Only	Instance ID of this specific resource
n	string	yes	Read Only	Friendly name of the resource
loc	array: see schema			Location information (lat, long)
if	array: see schema		Read Only	The interface set supported by this resource
rt	array: see schema		Read Only	Resource Type of the Resource
ln	array: see schema			Localized names
c	string			Currency
r	string			Region
locn	string			Human Friendly Name for location
dl	multiple types: see schema			
id	string		Read Only	Instance ID of this specific resource

10694 **F.6.6 CRUDN behaviour**

Resource	Create	Read	Update	Delete	Notify
/exampleDeviceConfigurationResURI		get	post		

10695 **F.7 Device**

10696 **F.7.1 Introduction**

10697 Known resource that is hosted by every Server.
 10698 Allows for logical device specific information to be discovered.
 10699

10700 **F.7.2 Wellknown URI**

10701 /oic/d

10702 **F.7.3 Resource Type**

10703 The resource type (rt) is defined as: ['oic.wk.d'].

10704 **F.7.4 Swagger2.0 Definition**

```

10705 {
10706   "swagger": "2.0",
10707   "info": {
10708     "title": "Device",
10709     "version": "v1-20160622",
10710     "license": {
10711       "name": "copyright 2016-2017 Open Connectivity Foundation, Inc. All rights reserved.",
10712       "x-description": "Redistribution and use in source and binary forms, with or without
10713 modification, are permitted provided that the following conditions are met:\n
10714 1. Redistributions of source code must retain the above copyright notice, this list of conditions and
10715 the following disclaimer.\n
10716 2. Redistributions in binary form must reproduce the above
10717 copyright notice, this list of conditions and the following disclaimer in the documentation and/or
10718 other materials provided with the distribution.\n\n
10719 THIS SOFTWARE IS PROVIDED BY THE Open
10720 Connectivity Foundation, INC. \AS IS\ AND ANY EXPRESS OR IMPLIED WARRANTIES, INCLUDING, BUT NOT
10721 LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE OR

```



```

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10721 Foundation, INC. OR CONTRIBUTORS BE LIABLE FOR ANY DIRECT, INDIRECT, INCIDENTAL, SPECIAL,
10722 EXEMPLARY, OR CONSEQUENTIAL DAMAGES (INCLUDING, BUT NOT LIMITED TO, PROCUREMENT OF SUBSTITUTE GOODS
10723 OR SERVICES; LOSS OF USE, DATA, OR PROFITS; OR BUSINESS INTERRUPTION)\n          HOWEVER CAUSED AND
10724 ON ANY THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT (INCLUDING NEGLIGENCE OR
10725 OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OF THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY
10726 OF SUCH DAMAGE.\n"
10727 }
10728 },
10729 "schemes": ["http"],
10730 "consumes": ["application/json"],
10731 "produces": ["application/json"],
10732 "paths": {
10733   "/oic/d" : {
10734     "get": {
10735       "description": "Known resource that is hosted by every Server.\nAllows for logical device
10736 specific information to be discovered.\nRetrieve the information about the Device\n",
10737       "parameters": [
10738         ],
10739       "responses": {
10740         "200": {
10741           "description" : "",
10742           "x-example":
10743             {
10744               "n": "Device 1",
10745               "rt": ["oic.wk.d"],
10746               "di": "54919CA5-4101-4AE4-595B-353C51AA983C",
10747               "icv": "ocf.1.0.0",
10748               "dmv": "ocf.res.1.0.0, ocf.sh.1.0.0",
10749               "piid": "6F0AAC04-2BB0-468D-B57C-16570A26AE48"
10750             }
10751           ,
10752           "schema": { "$ref": "#/definitions/Device" }
10753         }
10754       }
10755     }
10756   }
10757 },
10758 "parameters": {
10759   "interface" : {
10760     "in" : "query",
10761     "name" : "if",
10762     "type" : "string",
10763     "enum" : ["oic.if.r", "oic.if.baseline"]
10764   }
10765 },
10766 "definitions": {
10767   "Device" : {
10768     "properties": {
10769       "rt" :
10770         {
10771           "description": "Resource Type of the Resource",
10772           "items": {
10773             "maxLength": 64,
10774             "type": "string"
10775           },
10776           "minItems": 1,
10777           "readOnly": true,
10778           "type": "array"
10779         },
10780       "ld" :
10781         {
10782           "description": "Localized Descriptions.",
10783           "items": {
10784             "properties": {
10785               "language": {
10786                 "allOf": [
10787                   {
10788                     "description": "Format pattern according to IETF RFC 5646 (language tag).",
10789                     "pattern": "^[A-Za-z]{1,8}(-[A-Za-z0-9]{1,8})*$"

```

```

10791         "type": "string"
10792     },
10793     {
10794         "description": "An RFC 5646 language tag.",
10795         "readOnly": true
10796     }
10797 ]
10798 },
10799 "value": {
10800     "description": "Device description in the indicated language.",
10801     "maxLength": 64,
10802     "readOnly": true,
10803     "type": "string"
10804 }
10805 },
10806 "type": "object"
10807 },
10808 "minItems": 1,
10809 "readOnly": true,
10810 "type": "array"
10811 },
10812
10813 "piid" :
10814 {
10815     "allof": [
10816     {
10817         "description": "Format pattern according to IETF RFC 4122.",
10818         "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}$",
10819     },
10820     {
10821         "description": "Protocol independent unique identifier for device that is
10822         immutable.",
10823         "readOnly": true
10824     }
10825     ]
10826 },
10827 ],
10828 },
10829
10830 "di" :
10831 {
10832     "allof": [
10833     {
10834         "description": "Format pattern according to IETF RFC 4122.",
10835         "pattern": "^[a-fA-F0-9]{8}-[a-fA-F0-9]{4}-[a-fA-F0-9]{4}-[a-fA-F0-9]{4}-[a-fA-F0-9]{12}$",
10836     },
10837     {
10838         "description": "Unique identifier for device",
10839         "readOnly": true
10840     }
10841     ]
10842 },
10843 ],
10844 },
10845
10846 "dmno" :
10847 {
10848     "description": "Model number as designated by manufacturer.",
10849     "maxLength": 64,
10850     "readOnly": true,
10851     "type": "string"
10852 },
10853 ],
10854
10855 "sv" :
10856 {
10857     "description": "Software version.",
10858     "maxLength": 64,
10859     "readOnly": true,
10860     "type": "string"
10861 },

```

```

10862     "dmn" :
10863     {
10864         "description": "Manufacturer Name.",
10865         "items": {
10866             "properties": {
10867                 "language": {
10868                     "allOf": [
10869                         {
10870                             "description": "Format pattern according to IETF RFC 5646 (language tag).",
10871                             "pattern": "^[A-Za-z]{1,8}(-[A-Za-z0-9]{1,8})*$",
10872                             "type": "string"
10873                         },
10874                         {
10875                             "description": "An RFC 5646 language tag.",
10876                             "readOnly": true
10877                         }
10878                     ]
10879                 },
10880                 "value": {
10881                     "description": "Manufacturer name in the indicated language.",
10882                     "maxLength": 64,
10883                     "readOnly": true,
10884                     "type": "string"
10885                 }
10886             },
10887             "type": "object"
10888         },
10889         "minItems": 1,
10890         "readOnly": true,
10891         "type": "array"
10892     },
10893     "icv" :
10894     {
10895         "description": "The version of the OIC Server",
10896         "maxLength": 64,
10897         "readOnly": true,
10898         "type": "string"
10899     },
10900     "dmv" :
10901     {
10902         "description": "Spec versions of the Resource and Device Specifications to which this
10903 device data model is implemented",
10904         "maxLength": 256,
10905         "readOnly": true,
10906         "type": "string"
10907     },
10908     "n" :
10909     {
10910         "description": "Friendly name of the resource",
10911         "maxLength": 64,
10912         "readOnly": true,
10913         "type": "string"
10914     },
10915     "id" :
10916     {
10917         "description": "Instance ID of this specific resource",
10918         "maxLength": 64,
10919         "readOnly": true,
10920         "type": "string"
10921     },
10922     "if" :
10923     {
10924         "description": "The interface set supported by this resource",
10925         "items": {
10926             "enum": [
10927                 "oic.if.baseline",

```

```

10933         "oic.if.ll",
10934         "oic.if.b",
10935         "oic.if.lb",
10936         "oic.if.rw",
10937         "oic.if.r",
10938         "oic.if.a",
10939         "oic.if.s"
10940     ],
10941     "type": "string"
10942 },
10943     "minItems": 1,
10944     "readOnly": true,
10945     "type": "array"
10946 }
10947
10948 },
10949     "required": ["n", "di", "icv", "dmv", "piid"]
10950 }
10951 }
10952 }
10953

```

10954 F.7.5 Property Definition

Property name	Value type	Mandatory	Access mode	Description
dmno	string		Read Only	Model number as designated by manufacturer.
dmv	string	yes	Read Only	Spec versions of the Resource and Device Specifications to which this device data model is implemented
if	array: see schema		Read Only	The interface set supported by this resource
sv	string		Read Only	Software version.
icv	string	yes	Read Only	The version of the OIC Server
piid	multiple types: see schema	yes		
di	multiple types: see schema	yes		
id	string		Read Only	Instance ID of this specific resource
n	string	yes	Read Only	Friendly name of the resource
ld	array: see schema		Read Only	Localized Descriptions.
rt	array: see schema		Read Only	Resource Type of the Resource
dmn	array: see schema		Read Only	Manufacturer Name.

10955 F.7.6 CRUDN behaviour

Resource	Create	Read	Update	Delete	Notify
/oic/d		get			

10956 **F.8 Maintenance**

10957 **F.8.1 Introduction**

10958 The resource through which a Device is maintained and can be used for diagnostic purposes.
10959 fr (Factory Reset) is a boolean.
10960 The value 0 means No action (Default), the value 1 means Start Factory Reset
10961 After factory reset, this value shall be changed back to the default value
10962 rb (Reboot) is a boolean.
10963 The value 0 means No action (Default), the value 1 means Start Reboot
10964 After Reboot, this value shall be changed back to the default value
10965

10966 **F.8.2 Wellknown URI**

10967 /oic/mnt

10968 **F.8.3 Resource Type**

10969 The resource type (rt) is defined as: ['oic.wk.mnt'].

10970 **F.8.4 Swagger2.0 Definition**

```
10971 {
10972   "swagger": "2.0",
10973   "info": {
10974     "title": "Maintenance",
10975     "version": "v1-20160622",
10976     "license": {
10977       "name": "copyright 2016-2017 Open Connectivity Foundation, Inc. All rights reserved.",
10978       "x-description": "Redistribution and use in source and binary forms, with or without
10979 modification, are permitted provided that the following conditions are met:\n      1.
10980 Redistributions of source code must retain the above copyright notice, this list of conditions and
10981 the following disclaimer.\n      2. Redistributions in binary form must reproduce the above
10982 copyright notice, this list of conditions and the following disclaimer in the documentation and/or
10983 other materials provided with the distribution.\n\n      THIS SOFTWARE IS PROVIDED BY THE Open
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10990 ON ANY THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT (INCLUDING NEGLIGENCE OR
10991 OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OF THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY
10992 OF SUCH DAMAGE.\n"
10993     }
10994   },
10995   "schemes": ["http"],
10996   "consumes": ["application/json"],
10997   "produces": ["application/json"],
10998   "paths": {
10999     "/oic/mnt" : {
11000       "get": {
11001         "description": "The resource through which a Device is maintained and can be used for
11002 diagnostic purposes.\nfr (Factory Reset) is a boolean.\n The value 0 means No action (Default),
11003 the value 1 means Start Factory Reset\nAfter factory reset, this value shall be changed back to the
11004 default value\nrb (Reboot) is a boolean.\n The value 0 means No action (Default), the value 1
11005 means Start Reboot\nAfter Reboot, this value shall be changed back to the default value\nRetrieve
11006 the maintenance action status",
11007         "parameters": [
11008           { "$ref": "#/parameters/interface-all" }
11009         ],
11010         "responses": {
11011           "200": {
11012             "description": "",
11013             "x-example":
11014               {
11015                 "rt": ["oic.wk.mnt"],
11016                 "fr": false,
11017                 "rb": false
11018               }
11019           }
11020         }
11021       }
11022     }
11023   }
11024 }
```

```

11018         }
11019     },
11020     "schema": { "$ref": "#/definitions/MNT" }
11021 }
11022 },
11023 },
11024 "post": {
11025     "description": "Set the maintenance action(s)\n",
11026     "parameters": [
11027         { "$ref": "#/parameters/interface-rw" },
11028         {
11029             "name": "body",
11030             "in": "body",
11031             "required": true,
11032             "schema": { "$ref": "#/definitions/MNT" },
11033             "x-example":
11034                 {
11035                     "fr": false,
11036                     "rb": false
11037                 }
11038         }
11039     ],
11040     "responses": {
11041         "200": {
11042             "description": "",
11043             "x-example":
11044                 {
11045                     "fr": false,
11046                     "rb": false
11047                 }
11048             ,
11049             "schema": { "$ref": "#/definitions/MNT" }
11050         }
11051     }
11052 }
11053 },
11054 },
11055 "parameters": {
11056     "interface-rw" : {
11057         "in" : "query",
11058         "name" : "if",
11059         "type" : "string",
11060         "enum" : ["oic.if.rw", "oic.if.baseline"]
11061     },
11062     "interface-all" : {
11063         "in" : "query",
11064         "name" : "if",
11065         "type" : "string",
11066         "enum" : ["oic.if.rw", "oic.if.r", "oic.if.baseline"]
11067     }
11068 },
11069 "definitions": {
11070     "MNT" : {
11071         "properties": {
11072             "rt" :
11073                 {
11074                     "description": "Resource Type of the Resource",
11075                     "items": {
11076                         "maxLength": 64,
11077                         "type": "string"
11078                     },
11079                     "minItems": 1,
11080                     "readOnly": true,
11081                     "type": "array"
11082                 },
11083             "fr" :
11084                 {
11085                     "description": "Factory Reset",
11086                     "type": "boolean"
11087                 }
11088         },

```

```

11089
11090     "n" :
11091         {
11092             "description": "Friendly name of the resource",
11093             "maxLength": 64,
11094             "readOnly": true,
11095             "type": "string"
11096         },
11097
11098     "rb" :
11099         {
11100             "description": "Reboot Action",
11101             "type": "boolean"
11102         },
11103
11104     "id" :
11105         {
11106             "description": "Instance ID of this specific resource",
11107             "maxLength": 64,
11108             "readOnly": true,
11109             "type": "string"
11110         },
11111
11112     "if" :
11113         {
11114             "description": "The interface set supported by this resource",
11115             "items": {
11116                 "enum": [
11117                     "oic.if.baseline",
11118                     "oic.if.ll",
11119                     "oic.if.b",
11120                     "oic.if.lb",
11121                     "oic.if.rw",
11122                     "oic.if.r",
11123                     "oic.if.a",
11124                     "oic.if.s"
11125                 ],
11126                 "type": "string"
11127             },
11128             "minItems": 1,
11129             "readOnly": true,
11130             "type": "array"
11131         }
11132     }
11133 }
11134 }
11135 }
11136 }
11137

```

11138 F.8.5 Property Definition

Property name	Value type	Mandatory	Access mode	Description
n	string		Read Only	Friendly name of the resource
fr	boolean			Factory Reset
if	array: see schema		Read Only	The interface set supported by this resource
rb	boolean			Reboot Action
id	string		Read Only	Instance ID of this specific resource
rt	array: see schema		Read Only	Resource Type of the Resource

11139 **F.8.6 CRUDN behaviour**

Resource	Create	Read	Update	Delete	Notify
/oic/mnt		get	post		

11140 **F.9 Platform**

11141 **F.9.1 Introduction**

11142 Known resource that is defines the platform on which a Server is hosted.
 11143 Allows for platform specific information to be discovered.
 11144

11145 **F.9.2 Wellknown URI**

11146 /oic/p

11147 **F.9.3 Resource Type**

11148 The resource type (rt) is defined as: ['oic.wk.p'].

11149 **F.9.4 Swagger2.0 Definition**

```

11150 {
11151   "swagger": "2.0",
11152   "info": {
11153     "title": "Platform",
11154     "version": "v1-20160622",
11155     "license": {
11156       "name": "copyright 2016-2017 Open Connectivity Foundation, Inc. All rights reserved.",
11157       "x-description": "Redistribution and use in source and binary forms, with or without
11158 modification, are permitted provided that the following conditions are met:\n      1.
11159 Redistributions of source code must retain the above copyright notice, this list of conditions and
11160 the following disclaimer.\n      2. Redistributions in binary form must reproduce the above
11161 copyright notice, this list of conditions and the following disclaimer in the documentation and/or
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11170 OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OF THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY
11171 OF SUCH DAMAGE.\n"
11172   }
11173 },
11174 "schemes": ["http"],
11175 "consumes": ["application/json"],
11176 "produces": ["application/json"],
11177 "paths": {
11178   "/oic/p" : {
11179     "get": {
11180       "description": "Known resource that is defines the platform on which an Server is
11181 hosted.\nAllows for platform specific information to be discovered.\nRetrieve the information about
11182 the Platform\n",
11183       "parameters": [
11184         ],
11185       "responses": {
11186         "200": {
11187           "description": "",
11188           "x-example":
11189             {
11190               "pi": "54919CA5-4101-4AE4-595B-353C51AA983C",
11191               "rt": ["oic.wk.p"],
11192               "mnmn": "Acme, Inc"
11193             }
11194           ,
11195           "schema": { "$ref": "#/definitions/Platform" }
11196         }
11197       }
11198     }
11199   }
12000 }
```



```

11198     }
11199   },
11200 },
11201 "parameters": {
11202   "interface": {
11203     "in": "query",
11204     "name": "if",
11205     "type": "string",
11206     "enum": ["oic.if.r", "oic.if.baseline"]
11207   }
11208 },
11209 "definitions": {
11210   "Platform": {
11211     "properties": {
11212       "rt": {
11213         {
11214           "description": "Resource Type of the Resource",
11215           "items": {
11216             "maxLength": 64,
11217             "type": "string"
11218           },
11219           "minItems": 1,
11220           "readOnly": true,
11221           "type": "array"
11222         },
11223
11224         "pi": {
11225           {
11226             "allof": [
11227               {
11228                 "description": "Format pattern according to IETF RFC 4122.",
11229                 "pattern": "^[a-fA-F0-9]{8}-[a-fA-F0-9]{4}-[a-fA-F0-9]{4}-[a-fA-F0-9]{4}-[a-fA-F0-
11230 9]{12}$",
11231                 "type": "string"
11232               },
11233               {
11234                 "description": "Platform Identifier",
11235                 "readOnly": true
11236               }
11237             ]
11238           },
11239
11240           "mnfv": {
11241             {
11242               "description": "Manufacturer's firmware version",
11243               "maxLength": 64,
11244               "readOnly": true,
11245               "type": "string"
11246             },
11247
11248           "vid": {
11249             {
11250               "description": "Manufacturer's defined information for the platform. The content is
11251 freeform, with population rules up to the manufacturer",
11252               "maxLength": 64,
11253               "readOnly": true,
11254               "type": "string"
11255             },
11256
11257           "mnmn": {
11258             {
11259               "description": "Manufacturer Name",
11260               "maxLength": 64,
11261               "readOnly": true,
11262               "type": "string"
11263             },
11264
11265           "mnmo": {
11266             {
11267               "description": "Model number as designated by the manufacturer",
11268               "maxLength": 64,

```

```

11269         "readOnly": true,
11270         "type": "string"
11271     },
11272
11273     "mnhw" :
11274     {
11275         "description": "Platform Hardware Version",
11276         "maxLength": 64,
11277         "readOnly": true,
11278         "type": "string"
11279     },
11280
11281     "mnos" :
11282     {
11283         "description": "Platform Resident OS Version",
11284         "maxLength": 64,
11285         "readOnly": true,
11286         "type": "string"
11287     },
11288
11289     "mndt" :
11290     {
11291         "allof": [
11292             {
11293                 "description": "Format pattern as defined in ISO 8601. The format is [yyyy]-[mm]-
11294 [dd].",
11295                 "pattern": "^[0-9]{4}-(1[0-2]|0[1-9])-(3[0-1]|2[0-9]|1[0-9]|0[1-9])$",
11296                 "type": "string"
11297             },
11298             {
11299                 "description": "Manufacturing Date in ISO8601 format.",
11300                 "readOnly": true
11301             }
11302         ]
11303     },
11304
11305     "id" :
11306     {
11307         "description": "Instance ID of this specific resource",
11308         "maxLength": 64,
11309         "readOnly": true,
11310         "type": "string"
11311     },
11312
11313     "mns1" :
11314     {
11315         "description": "Manufacturer's Support Information URL",
11316         "format": "uri",
11317         "maxLength": 256,
11318         "readOnly": true,
11319         "type": "string"
11320     },
11321
11322     "mpv" :
11323     {
11324         "description": "Platform Version",
11325         "maxLength": 64,
11326         "readOnly": true,
11327         "type": "string"
11328     },
11329
11330     "st" :
11331     {
11332         "description": "Reference time for the device in ISO8601 format.",
11333         "format": "date-time",
11334         "readOnly": true,
11335         "type": "string"
11336     },
11337
11338     "n" :
11339     {

```

```

11340         "description": "Friendly name of the resource",
11341         "maxLength": 64,
11342         "readOnly": true,
11343         "type": "string"
11344     },
11345
11346     "mnmml" :
11347     {
11348         "description": "Manufacturer's URL",
11349         "format": "uri",
11350         "maxLength": 256,
11351         "readOnly": true,
11352         "type": "string"
11353     },
11354
11355     "if" :
11356     {
11357         "description": "The interface set supported by this resource",
11358         "items": {
11359             "enum": [
11360                 "oic.if.baseline",
11361                 "oic.if.ll",
11362                 "oic.if.b",
11363                 "oic.if.lb",
11364                 "oic.if.rw",
11365                 "oic.if.r",
11366                 "oic.if.a",
11367                 "oic.if.s"
11368             ],
11369             "type": "string"
11370         },
11371         "minItems": 1,
11372         "readOnly": true,
11373         "type": "array"
11374     }
11375 },
11376 "required": ["pi", "mnmn"]
11377 }
11378 }
11379 }
11380 }
11381

```

11382 **F.9.5 Property Definition**

Property name	Value type	Mandatory	Access mode	Description
mnpv	string		Read Only	Platform Version
rt	array: see schema		Read Only	Resource Type of the Resource
mnos	string		Read Only	Platform Resident OS Version
mnmn	string	yes	Read Only	Manufacturer Name
mnmo	string		Read Only	Model number as designated by the manufacturer
st	string		Read Only	Reference time for the device in ISO8601 format.
mnsi	string		Read Only	Manufacturer's Support Information URL
vid	string		Read Only	Manufacturer's defined

				information for the platform. The content is freeform, with population rules up to the manufacturer
mnfv	string		Read Only	Manufacturer's firmware version
mnhw	string		Read Only	Platform Hardware Version
mnml	string		Read Only	Manufacturer's URL
if	array: see schema		Read Only	The interface set supported by this resource
mndt	multiple types: see schema			
n	string		Read Only	Friendly name of the resource
pi	multiple types: see schema	yes		
id	string		Read Only	Instance ID of this specific resource

11383 **F.9.6 CRUDN behaviour**

Resource	Create	Read	Update	Delete	Notify
/oic/p		get			

11384 **F.10 Resource directory resource**

11385 **F.10.1 Introduction**

11386 Resource to be exposed by any Device that can act as a Resource Directory.
 11387 1) Provides selector criteria (e.g., integer) with GET request
 11388 2) Publish a Link in /oic/res with POST request.
 11389

11390 **F.10.2 Wellknown URI**

11391 /oic/rd

11392 **F.10.3 Resource Type**

11393 The resource type (rt) is defined as: ['oic.wk.rd'].

11394 **F.10.4 Swagger2.0 Definition**

```

11395 {
11396   "swagger": "2.0",
11397   "info": {
11398     "title": "Resource directory resource",
11399     "version": "v1-20160622",
11400     "license": {
11401       "name": "copyright 2016-2017 Open Connectivity Foundation, Inc. All rights reserved.",
11402       "x-description": "Redistribution and use in source and binary forms, with or without
11403 modification, are permitted provided that the following conditions are met:\n      1.
11404 Redistributions of source code must retain the above copyright notice, this list of conditions and
11405 the following disclaimer.\n      2. Redistributions in binary form must reproduce the above
11406 copyright notice, this list of conditions and the following disclaimer in the documentation and/or

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```

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11414 ON ANY THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT (INCLUDING NEGLIGENCE OR
11415 OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OF THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY
11416 OF SUCH DAMAGE.\n"
11417 }
11418 },
11419 "schemes": ["http"],
11420 "consumes": ["application/json"],
11421 "produces": ["application/json"],
11422 "paths": {
11423   "/oic/rd" : {
11424     "get": {
11425       "description": "Resource to be exposed by any Device that can act as a Resource
11426 Directory.\n1) Provides selector criteria (e.g., integer) with GET request\n2) Publish a Link in
11427 /oic/res with POST request\nGet the attributes of the Resource Directory for selection
11428 purposes.\n",
11429       "parameters": [
11430         {"$ref": "#/parameters/rdgetinterface"}
11431       ],
11432       "responses": {
11433         "200": {
11434           "description" : "Respond with the selector criteria - either the set of attributes or
11435 the bias factor\n",
11436           "x-example":
11437             {
11438               "rt": ["oic.wk.rd"],
11439               "if": ["oic.if.baseline"],
11440               "sel": 50
11441             }
11442           ,
11443           "schema": { "$ref": "#/definitions/rdSelection" }
11444         }
11445       }
11446     },
11447     "post": {
11448       "description": "Publish the resource information for the first time in /oic/res. Updates to
11449 existing entries are not allowed.\nAppropriates parts of the information, i.e., Links of the
11450 published Resources will be discovered through /oic/res.\n1) When a Device first publishes a Link,
11451 the request payload to RD may include the Links without an \ "ins" Parameter.\n2) Upon granting the
11452 request, the RD assigns a unique instance value identifying the Link among all the Links it
11453 advertises\n and sends back the instance value in the \ "ins" Parameter in the Link to the
11454 publishing Device.\n",
11455       "parameters": [
11456         {"$ref": "#/parameters/rdpostinterface"},
11457         {
11458           "name": "body",
11459           "in": "body",
11460           "required": true,
11461           "schema": { "$ref": "#/definitions/rdPublish" } },
11462         "x-example":
11463           {
11464             "di": "e61c3e6b-9c54-4b81-8ce5-f9039c1d04d9",
11465             "links": [
11466               {
11467                 "anchor": "ocf://e61c3e6b-9c54-4b81-8ce5-f9039c1d04d9",
11468                 "href": "/myLightSwitch",
11469                 "rt": ["oic.r.switch.binary"],
11470                 "if": ["oic.if.a", "oic.if.baseline"],
11471                 "p": {"bm": 3},
11472                 "eps": [
11473                   {"ep": "coaps://[2001:db8:a::b1d6]:1111", "pri": 2},
11474                   {"ep": "coaps://[2001:db8:a::b1d6]:1122"},
11475                   {"ep": "coaps+tcp://[2001:db8:a::123]:2222", "pri": 3}
11476                 ]
11477               }
11478             ]
11479           }
11480       ]
11481     }
11482   }
11483 }

```

```

11478         {
11479             "anchor": "ocf://e61c3e6b-9c54-4b81-8ce5-f9039c1d04d9",
11480             "href": "/myLightBrightness",
11481             "rt": ["oic.r.brightness"],
11482             "if": ["oic.if.a", "oic.if.baseline"],
11483             "p": {"bm": 3},
11484             "eps": [
11485                 {"ep": "coaps://[[2001:db8:a::123]:2222"}
11486             ]
11487         }
11488     ],
11489     "ttl": 600
11490 }
11491 }
11492 ],
11493 "responses": {
11494     "200": {
11495         "description": "Respond with the same schema as publish with the additional \"ins\"
11496 Parameter in the Link.\n",
11497         "x-example":
11498         {
11499             "di": "e61c3e6b-9c54-4b81-8ce5-f9039c1d04d9",
11500             "links": [
11501                 {
11502                     "anchor": "ocf://e61c3e6b-9c54-4b81-8ce5-f9039c1d04d9",
11503                     "href": "/myLightSwitch",
11504                     "rt": ["oic.r.switch.binary"],
11505                     "if": ["oic.if.a", "oic.if.baseline"],
11506                     "p": {"bm": 3},
11507                     "eps": [
11508                         {"ep": "coaps://[2001:db8:a::b1d6]:1111", "pri": 2},
11509                         {"ep": "coaps://[2001:db8:a::b1d6]:1122"},
11510                         {"ep": "coaps+tcp://[2001:db8:a::123]:2222", "pri": 3}
11511                     ],
11512                     "ins": 11235
11513                 },
11514                 {
11515                     "anchor": "ocf://e61c3e6b-9c54-4b81-8ce5-f9039c1d04d9",
11516                     "href": "/myLightBrightness",
11517                     "rt": ["oic.r.brightness"],
11518                     "if": ["oic.if.a", "oic.if.baseline"],
11519                     "p": {"bm": 3},
11520                     "eps": [
11521                         {"ep": "coaps://[2001:db8:a::123]:2222"}
11522                     ],
11523                     "ins": 112358
11524                 }
11525             ],
11526             "ttl": 600
11527         }
11528     },
11529     "schema": { "$ref": "#/definitions/rdPublish" }
11530 }
11531 }
11532 }
11533 }
11534 },
11535 "parameters": {
11536     "rdgetinterface": {
11537         "in": "query",
11538         "name": "if",
11539         "type": "string",
11540         "enum": ["oic.if.baseline"],
11541         "description": "enumdescription"
11542     },
11543     "rdpostinterface": {
11544         "in": "query",
11545         "name": "if",
11546         "type": "string",
11547         "enum": ["oic.if.baseline"],
11548         "description": "enumdescription"

```

```

11549     }
11550   },
11551   "definitions": {
11552     "rdSelection": {
11553       "properties": {
11554         "rt": :
11555           {
11556             "description": "Resource Type of the Resource",
11557             "items": {
11558               "maxLength": 64,
11559               "type": "string"
11560             },
11561             "minItems": 1,
11562             "readOnly": true,
11563             "type": "array"
11564           },
11565         "n": :
11566           {
11567             "description": "Friendly name of the resource",
11568             "maxLength": 64,
11569             "readOnly": true,
11570             "type": "string"
11571           },
11572         "sel": :
11573           {
11574             "description": "A bias factor calculated by the Resource directory",
11575             "maximum": 100,
11576             "minimum": 0,
11577             "readOnly": true,
11578             "type": "integer"
11579           },
11580         "id": :
11581           {
11582             "description": "Instance ID of this specific resource",
11583             "maxLength": 64,
11584             "readOnly": true,
11585             "type": "string"
11586           },
11587         "if": :
11588           {
11589             "description": "The interface set supported by this resource",
11590             "items": {
11591               "enum": [
11592                 "oic.if.baseline",
11593                 "oic.if.ll",
11594                 "oic.if.b",
11595                 "oic.if.lb",
11596                 "oic.if.rw",
11597                 "oic.if.r",
11598                 "oic.if.a",
11599                 "oic.if.s"
11600               ],
11601               "type": "string"
11602             },
11603             "minItems": 1,
11604             "readOnly": true,
11605             "type": "array"
11606           }
11607         }
11608       }
11609     },
11610     "rdPublish": {
11611       "properties": {
11612         "rt": :
11613           {
11614             "description": "Resource Type of the Resource",

```

```

11620         "items": {
11621             "maxLength": 64,
11622             "type": "string"
11623         },
11624         "minItems": 1,
11625         "readOnly": true,
11626         "type": "array"
11627     },
11628
11629     "links" :
11630     {
11631         "description": "A set of simple or individual OIC Links.",
11632         "items": {
11633             "properties": {
11634                 "anchor": {
11635                     "description": "This is used to override the context URI e.g. override the URI of
11636 the containing collection.",
11637                     "format": "uri",
11638                     "maxLength": 256,
11639                     "type": "string"
11640                 },
11641                 "di": {
11642                     "description": "Format pattern according to IETF RFC 4122.",
11643                     "pattern": "^[a-fA-F0-9]{8}-[a-fA-F0-9]{4}-[a-fA-F0-9]{4}-[a-fA-F0-9]{4}-[a-fA-F0-
11644 9]{12}$",
11645                     "type": "string"
11646                 },
11647                 "eps": {
11648                     "description": "the Endpoint information of the target Resource",
11649                     "items": {
11650                         "properties": {
11651                             "ep": {
11652                                 "description": "Transport Protocol Suite + Endpoint Locator",
11653                                 "format": "uri",
11654                                 "type": "string"
11655                             },
11656                             "pri": {
11657                                 "description": "The priority among multiple Endpoints",
11658                                 "minimum": 1,
11659                                 "type": "integer"
11660                             }
11661                         },
11662                         "type": "object"
11663                     },
11664                     "type": "array"
11665                 },
11666                 "href": {
11667                     "description": "This is the target URI, it can be specified as a Relative Reference
11668 or fully-qualified URI.",
11669                     "format": "uri",
11670                     "maxLength": 256,
11671                     "type": "string"
11672                 },
11673                 "if": {
11674                     "description": "The interface set supported by this resource",
11675                     "items": {
11676                         "enum": [
11677                             "oic.if.baseline",
11678                             "oic.if.ll",
11679                             "oic.if.b",
11680                             "oic.if.rw",
11681                             "oic.if.r",
11682                             "oic.if.a",
11683                             "oic.if.s"
11684                         ],
11685                         "type": "string"
11686                     },
11687                     "minItems": 1,
11688                     "type": "array"
11689                 },
11690                 "ins": {

```



```

11691         "description": "The instance identifier for this web link in an array of web links
11692 - used in collections",
11693         "type": "integer"
11694     },
11695     "p": {
11696         "description": "Specifies the framework policies on the Resource referenced by the
11697 target URI",
11698         "properties": {
11699             "bm": {
11700                 "description": "Specifies the framework policies on the Resource referenced by
11701 the target URI for e.g. observable and discoverable",
11702                 "type": "integer"
11703             }
11704         },
11705         "required": [
11706             "bm"
11707         ],
11708         "type": "object"
11709     },
11710     "rel": {
11711         "description": "The relation of the target URI referenced by the link to the
11712 context URI",
11713         "oneOf": [
11714             {
11715                 "default": [
11716                     "hosts"
11717                 ],
11718                 "items": {
11719                     "maxLength": 64,
11720                     "type": "string"
11721                 },
11722                 "minItems": 1,
11723                 "type": "array"
11724             },
11725             {
11726                 "default": "hosts",
11727                 "maxLength": 64,
11728                 "type": "string"
11729             }
11730         ]
11731     },
11732     "rt": {
11733         "description": "Resource Type of the Resource",
11734         "items": {
11735             "maxLength": 64,
11736             "type": "string"
11737         },
11738         "minItems": 1,
11739         "type": "array"
11740     },
11741     "title": {
11742         "description": "A title for the link relation. Can be used by the UI to provide a
11743 context.",
11744         "maxLength": 64,
11745         "type": "string"
11746     },
11747     "type": {
11748         "default": "application/cbor",
11749         "description": "A hint at the representation of the resource referenced by the
11750 target URI. This represents the media types that are used for both accepting and emitting.",
11751         "items": {
11752             "maxLength": 64,
11753             "type": "string"
11754         },
11755         "minItems": 1,
11756         "type": "array"
11757     }
11758 },
11759 "required": [
11760     "href",
11761     "rt",

```

```

11762         "if"
11763     ],
11764     "type": "object"
11765 },
11766 "type": "array"
11767 },
11768
11769 "di" :
11770 {
11771     "$ref": "#/definitions/uuid",
11772     "description": "A UUID that is the identifier for the publishing Device"
11773 },
11774
11775 "n" :
11776 {
11777     "description": "Friendly name of the resource",
11778     "maxLength": 64,
11779     "readOnly": true,
11780     "type": "string"
11781 },
11782
11783 "ttl" :
11784 {
11785     "description": "Time to indicate a RD, i.e. how long to keep this published item.",
11786     "type": "integer"
11787 },
11788
11789 "id" :
11790 {
11791     "description": "Instance ID of this specific resource",
11792     "maxLength": 64,
11793     "readOnly": true,
11794     "type": "string"
11795 },
11796
11797 "if" :
11798 {
11799     "description": "The interface set supported by this resource",
11800     "items": {
11801         "enum": [
11802             "oic.if.baseline",
11803             "oic.if.ll",
11804             "oic.if.b",
11805             "oic.if.lb",
11806             "oic.if.rw",
11807             "oic.if.r",
11808             "oic.if.a",
11809             "oic.if.s"
11810         ],
11811         "type": "string"
11812     },
11813     "minItems": 1,
11814     "readOnly": true,
11815     "type": "array"
11816 }
11817 },
11818 "required": ["di", "links", "ttl"]
11819 }
11820 },
11821 "oic.rd.publish" :
11822 {
11823     "properties": {
11824         "di": {
11825             "$ref": "#/definitions/uuid",
11826             "description": "A UUID that is the identifier for the publishing Device"
11827         },
11828         "ttl": {
11829             "description": "Time to indicate a RD, i.e. how long to keep this published item.",
11830             "type": "integer"
11831         }
11832     }

```

```

11833     }
11834
11835     ,"oic.collection.linksexpanded" :
11836     {
11837         "properties": {
11838             "links": {
11839                 "description": "A set of simple or individual OIC Links.",
11840                 "items": {
11841                     "properties": {
11842                         "anchor": {
11843                             "description": "This is used to override the context URI e.g. override the URI of
11844 the containing collection.",
11845                             "format": "uri",
11846                             "maxLength": 256,
11847                             "type": "string"
11848                         },
11849                         "di": {
11850                             "description": "Format pattern according to IETF RFC 4122.",
11851                             "pattern": "^[a-fA-F0-9]{8}-[a-fA-F0-9]{4}-[a-fA-F0-9]{4}-[a-fA-F0-9]{4}-[a-fA-F0-
11852 9]{12}$",
11853                             "type": "string"
11854                         },
11855                         "eps": {
11856                             "description": "the Endpoint information of the target Resource",
11857                             "items": {
11858                                 "properties": {
11859                                     "ep": {
11860                                         "description": "Transport Protocol Suite + Endpoint Locator",
11861                                         "format": "uri",
11862                                         "type": "string"
11863                                     },
11864                                     "pri": {
11865                                         "description": "The priority among multiple Endpoints",
11866                                         "minimum": 1,
11867                                         "type": "integer"
11868                                     }
11869                                 },
11870                                 "type": "object"
11871                             },
11872                             "type": "array"
11873                         },
11874                         "href": {
11875                             "description": "This is the target URI, it can be specified as a Relative Reference
11876 or fully-qualified URI.",
11877                             "format": "uri",
11878                             "maxLength": 256,
11879                             "type": "string"
11880                         },
11881                         "if": {
11882                             "description": "The interface set supported by this resource",
11883                             "items": {
11884                                 "enum": [
11885                                     "oic.if.baseline",
11886                                     "oic.if.ll",
11887                                     "oic.if.b",
11888                                     "oic.if.rw",
11889                                     "oic.if.r",
11890                                     "oic.if.a",
11891                                     "oic.if.s"
11892                                 ],
11893                                 "type": "string"
11894                             },
11895                             "minItems": 1,
11896                             "type": "array"
11897                         },
11898                         "ins": {
11899                             "description": "The instance identifier for this web link in an array of web links
11900 - used in collections",
11901                             "type": "integer"
11902                         },
11903                         "p": {

```

```

11904         "description": "Specifies the framework policies on the Resource referenced by the
11905 target URI",
11906         "properties": {
11907             "bm": {
11908                 "description": "Specifies the framework policies on the Resource referenced by
11909 the target URI for e.g. observable and discoverable",
11910                 "type": "integer"
11911             }
11912         },
11913         "required": [
11914             "bm"
11915         ],
11916         "type": "object"
11917     },
11918     "rel": {
11919         "description": "The relation of the target URI referenced by the link to the
11920 context URI",
11921         "oneOf": [
11922             {
11923                 "default": [
11924                     "hosts"
11925                 ],
11926                 "items": {
11927                     "maxLength": 64,
11928                     "type": "string"
11929                 },
11930                 "minItems": 1,
11931                 "type": "array"
11932             },
11933             {
11934                 "default": "hosts",
11935                 "maxLength": 64,
11936                 "type": "string"
11937             }
11938         ]
11939     },
11940     "rt": {
11941         "description": "Resource Type of the Resource",
11942         "items": {
11943             "maxLength": 64,
11944             "type": "string"
11945         },
11946         "minItems": 1,
11947         "type": "array"
11948     },
11949     "title": {
11950         "description": "A title for the link relation. Can be used by the UI to provide a
11951 context.",
11952         "maxLength": 64,
11953         "type": "string"
11954     },
11955     "type": {
11956         "default": "application/cbor",
11957         "description": "A hint at the representation of the resource referenced by the
11958 target URI. This represents the media types that are used for both accepting and emitting.",
11959         "items": {
11960             "maxLength": 64,
11961             "type": "string"
11962         },
11963         "minItems": 1,
11964         "type": "array"
11965     }
11966 },
11967 "required": [
11968     "href",
11969     "rt",
11970     "if"
11971 ],
11972 "type": "object"
11973 },
11974 "type": "array"

```

```

11975     }
11976   },
11977   "type": "object"
11978 }
11979
11980 , "uuid" :
11981   {
11982     "description": "Format pattern according to IETF RFC 4122.",
11983     "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}$",
11984     "type": "string"
11985   }
11986
11987 , "oic.core" :
11988   {
11989     "properties": {
11990       "id": {
11991         "description": "Instance ID of this specific resource",
11992         "maxLength": 64,
11993         "readOnly": true,
11994         "type": "string"
11995       },
11996       "if": {
11997         "description": "The interface set supported by this resource",
11998         "items": {
11999           "enum": [
12000             "oic.if.baseline",
12001             "oic.if.ll",
12002             "oic.if.b",
12003             "oic.if.lb",
12004             "oic.if.rw",
12005             "oic.if.r",
12006             "oic.if.a",
12007             "oic.if.s"
12008           ],
12009           "type": "string"
12010         },
12011         "minItems": 1,
12012         "readOnly": true,
12013         "type": "array"
12014       },
12015       "n": {
12016         "description": "Friendly name of the resource",
12017         "maxLength": 64,
12018         "readOnly": true,
12019         "type": "string"
12020       },
12021       "rt": {
12022         "description": "Resource Type of the Resource",
12023         "items": {
12024           "maxLength": 64,
12025           "type": "string"
12026         },
12027         "minItems": 1,
12028         "readOnly": true,
12029         "type": "array"
12030       }
12031     },
12032     "type": "object"
12033   }
12034 }
12035 }
12036 }
12037
12038

```

F.10.5 Property Definition

Property name	Value type	Mandatory	Access mode	Description
ttl	integer			Time to indicate a RD, i.e. how

				long to keep this published item.
di	multiple types: see schema			A UUID that is the identifier for the publishing Device
links	array: see schema			A set of simple or individual OIC Links.
rt	array: see schema		Read Only	Resource Type of the Resource
sel	integer		Read Only	A bias factor calculated by the Resource directory
id	string		Read Only	Instance ID of this specific resource
if	array: see schema		Read Only	The interface set supported by this resource
n	string		Read Only	Friendly name of the resource
id	string		Read Only	Instance ID of this specific resource
rt	array: see schema		Read Only	Resource Type of the Resource
if	array: see schema		Read Only	The interface set supported by this resource
n	string		Read Only	Friendly name of the resource
rt	array: see schema		Read Only	Resource Type of the Resource
id	string		Read Only	Instance ID of this specific resource
ttl	integer	yes		Time to indicate a RD, i.e. how long to keep this published item.
if	array: see schema		Read Only	The interface set supported by this resource
links	array: see schema	yes		A set of simple or individual OIC Links.
n	string		Read Only	Friendly name of the resource
di	multiple types: see schema	yes		A UUID that is the identifier for the publishing Device

12039 **F.10.6 CRUDN behaviour**

Resource	Create	Read	Update	Delete	Notify
/oic/rd		get	post		

12040 **F.11 Discoverable Resources**

12041 **F.11.1 Introduction**

12042 Baseline representation of /oic/res; list of discoverable resources
 12043

12044 **F.11.2 Wellknown URI**

12045 /oic/res

12046 **F.11.3 Resource Type**

12047 **F.11.4 Swagger2.0 Definition**

```

12048 {
12049   "swagger": "2.0",
12050   "info": {
12051     "title": "Discoverable Resources Link List interface",
12052     "version": "v1-20160622",
12053     "license": {
12054       "name": "copyright 2016-2017 Open Connectivity Foundation, Inc. All rights reserved.",
12055       "x-description": "Redistribution and use in source and binary forms, with or without
12056 modification, are permitted provided that the following conditions are met:\n      1.
12057 Redistributions of source code must retain the above copyright notice, this list of conditions and
12058 the following disclaimer.\n      2. Redistributions in binary form must reproduce the above
12059 copyright notice, this list of conditions and the following disclaimer in the documentation and/or
12060 other materials provided with the distribution.\n\n      THIS SOFTWARE IS PROVIDED BY THE Open
12061 Connectivity Foundation, INC. \\"AS IS\\" AND ANY EXPRESS OR IMPLIED WARRANTIES, INCLUDING, BUT NOT
12062 LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE OR
12063 WARRANTIES OF NON-INFRINGEMENT, ARE DISCLAIMED.\n\n      IN NO EVENT SHALL THE Open Connectivity
12064 Foundation, INC. OR CONTRIBUTORS BE LIABLE FOR ANY DIRECT, INDIRECT, INCIDENTAL, SPECIAL,
12065 EXEMPLARY, OR CONSEQUENTIAL DAMAGES (INCLUDING, BUT NOT LIMITED TO, PROCUREMENT OF SUBSTITUTE GOODS
12066 OR SERVICES; LOSS OF USE, DATA, OR PROFITS; OR BUSINESS INTERRUPTION)\n\n      HOWEVER CAUSED AND
12067 ON ANY THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT (INCLUDING NEGLIGENCE OR
12068 OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OF THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY
12069 OF SUCH DAMAGE.\n"
12070     }
12071   },
12072   "schemes": ["http"],
12073   "consumes": ["application/json"],
12074   "produces": ["application/json"],
12075   "paths": {
12076     "/oic/res?if=oic.if.ll" : {
12077       "get": {
12078         "description": "Link list representation of /oic/res; list of discoverable
12079 resources\nRetrieve the discoverable resource set, link list interface\n",
12080         "parameters": [
12081           ],
12082         "responses": {
12083           "200": {
12084             "description": "",
12085             "x-example":
12086               [
12087                 {
12088                   "href": "/humidity",
12089                   "rt": ["oic.r.humidity"],
12090                   "if": ["oic.if.s"],
12091                   "p": {"bm": 3},
12092                   "eps": [
12093                     {"ep": "coaps://[fe80::b1d6]:1111", "pri": 2},
12094                     {"ep": "coaps://[fe80::b1d6]:1122"},
12095                     {"ep": "coaps+tcp://[2001:db8:a::123]:2222", "pri": 3}
12096                   ]
12097                 }
12098               ]
12099         }
12100       }
12101     }
12102   }
12103 }

```

```

12099         "href": "/temperature",
12100         "rt": ["oic.r.temperature"],
12101         "if": ["oic.if.s"],
12102         "p": {"bm": 3},
12103         "eps": [
12104             {"ep": "coaps://[[2001:db8:a::123]:2222"}
12105         ]
12106     }
12107 ]
12108 ,
12109     "schema": { "$ref": "#/definitions/slinklist" }
12110 }
12111 }
12112 },
12113 },
12114 "/oic/res?if=oic.if.baseline" : {
12115     "get": {
12116         "description": "Baseline representation of /oic/res; list of discoverable
12117 resources\nRetrieve the discoverable resource set, baseline interface\n",
12118         "parameters": [
12119             ],
12120         "responses": {
12121             "200": {
12122                 "description": "",
12123                 "x-example":
12124                 [
12125                     {
12126                         "rt": ["oic.wk.res"],
12127                         "if": ["oic.if.baseline", "oic.if.ll" ],
12128                         "links":
12129                         [
12130                             {
12131                                 "href": "/humidity",
12132                                 "rt": ["oic.r.humidity"],
12133                                 "if": ["oic.if.s"],
12134                                 "p": {"bm": 3},
12135                                 "eps": [
12136                                     {"ep": "coaps://[fe80::b1d6]:1111", "pri": 2},
12137                                     {"ep": "coaps://[fe80::b1d6]:1122"},
12138                                     {"ep": "coap+tcp://[2001:db8:a::123]:2222", "pri": 3}
12139                                 ]
12140                             },
12141                             {
12142                                 "href": "/temperature",
12143                                 "rt": ["oic.r.temperature"],
12144                                 "if": ["oic.if.s"],
12145                                 "p": {"bm": 3},
12146                                 "eps": [
12147                                     {"ep": "coaps://[[2001:db8:a::123]:2222"}
12148                                 ]
12149                             }
12150                         ]
12151                     }
12152                 ]
12153             },
12154             "schema": { "$ref": "#/definitions/sbaseline" }
12155         }
12156     }
12157 }
12158 },
12159 "parameters": {
12160     "interface-ll" : {
12161         "in" : "query",
12162         "name" : "if",
12163         "type" : "string",
12164         "enum" : ["oic.if.ll"]
12165     },
12166     "interface-baseline" : {
12167         "in" : "query",
12168         "name" : "if",
12169

```



```

12170         "type" : "string",
12171         "enum" : ["oic.if.baseline"]
12172     },
12173     "interface-all" : {
12174         "in" : "query",
12175         "name" : "if",
12176         "type" : "string",
12177         "enum" : ["oic.if.ll", "oic.if.baseline"]
12178     }
12179 },
12180 "definitions": {
12181     "slinklist" : {
12182         "items" :
12183         {
12184             "properties": {
12185                 "anchor": {
12186                     "description": "This is used to override the context URI e.g. override the URI of the
12187 containing collection.",
12188                     "format": "uri",
12189                     "maxLength": 256,
12190                     "type": "string"
12191                 },
12192                 "di": {
12193                     "allOf": [
12194                         {
12195                             "description": "Format pattern according to IETF RFC 4122.",
12196                             "pattern": "^[a-fA-F0-9]{8}-[a-fA-F0-9]{4}-[a-fA-F0-9]{4}-[a-fA-F0-9]{4}-[a-fA-F0-
12197 9]{12}$",
12198                             "type": "string"
12199                         },
12200                         {
12201                             "description": "The device ID"
12202                         }
12203                     ]
12204                 },
12205                 "eps": {
12206                     "description": "the Endpoint information of the target Resource",
12207                     "items": {
12208                         "properties": {
12209                             "ep": {
12210                                 "description": "Transport Protocol Suite + Endpoint Locator",
12211                                 "format": "uri",
12212                                 "type": "string"
12213                             },
12214                             "pri": {
12215                                 "description": "The priority among multiple Endpoints",
12216                                 "minimum": 1,
12217                                 "type": "integer"
12218                             }
12219                         },
12220                         "type": "object"
12221                     },
12222                     "type": "array"
12223                 },
12224                 "href": {
12225                     "description": "This is the target URI, it can be specified as a Relative Reference or
12226 fully-qualified URI.",
12227                     "format": "uri",
12228                     "maxLength": 256,
12229                     "type": "string"
12230                 },
12231                 "if": {
12232                     "description": "The interface set supported by this resource",
12233                     "items": {
12234                         "enum": [
12235                             "oic.if.baseline",
12236                             "oic.if.ll",
12237                             "oic.if.b",
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     "type": "array"
12247 },
12248     "ins": {
12249         "description": "The instance identifier for this web link in an array of web links -
12250 used in collections",
12251         "type": "integer"
12252     },
12253     "p": {
12254         "description": "Specifies the framework policies on the Resource referenced by the
12255 target URI",
12256         "properties": {
12257             "bm": {
12258                 "description": "Specifies the framework policies on the Resource referenced by the
12259 target URI for e.g. observable and discoverable",
12260                 "type": "integer"
12261             }
12262         },
12263         "required": [
12264             "bm"
12265         ],
12266         "type": "object"
12267     },
12268     "rel": {
12269         "description": "The relation of the target URI referenced by the link to the context
12270 URI",
12271         "oneOf": [
12272             {
12273                 "default": [
12274                     "hosts"
12275                 ],
12276                 "items": {
12277                     "maxLength": 64,
12278                     "type": "string"
12279                 },
12280                 "minItems": 1,
12281                 "type": "array"
12282             },
12283             {
12284                 "default": "hosts",
12285                 "maxLength": 64,
12286                 "type": "string"
12287             }
12288         ]
12289     },
12290     "rt": {
12291         "description": "Resource Type of the Resource",
12292         "items": {
12293             "maxLength": 64,
12294             "type": "string"
12295         },
12296         "minItems": 1,
12297         "type": "array"
12298     },
12299     "title": {
12300         "description": "A title for the link relation. Can be used by the UI to provide a
12301 context.",
12302         "maxLength": 64,
12303         "type": "string"
12304     },
12305     "type": {
12306         "default": "application/cbor",
12307         "description": "A hint at the representation of the resource referenced by the target
12308 URI. This represents the media types that are used for both accepting and emitting.",
12309         "items": {
12310             "maxLength": 64,
12311             "type": "string"

```

```

12312         },
12313         "minItems": 1,
12314         "type": "array"
12315     }
12316 },
12317 "required": [
12318     "href",
12319     "rt",
12320     "if"
12321 ],
12322 "type": "object"
12323 }
12324
12325 , "type" :
12326     "array"
12327
12328 }
12329
12330 'sbaseline' : {
12331     "items" :
12332     {
12333         "properties": {
12334             "if": {
12335                 "description": "The interface set supported by this resource",
12336                 "items": {
12337                     "enum": [
12338                         "oic.if.baseline",
12339                         "oic.if.ll"
12340                     ],
12341                     "type": "string"
12342                 },
12343                 "minItems": 1,
12344                 "readOnly": true,
12345                 "type": "array"
12346             },
12347             "links": {
12348                 "items": {
12349                     "properties": {
12350                         "anchor": {
12351                             "description": "This is used to override the context URI e.g. override the URI of
12352 the containing collection.",
12353                             "format": "uri",
12354                             "maxLength": 256,
12355                             "type": "string"
12356                         },
12357                         "di": {
12358                             "allOf": [
12359                                 {
12360                                     "description": "Format pattern according to IETF RFC 4122.",
12361                                     "pattern": "^[a-fA-F0-9]{8}-[a-fA-F0-9]{4}-[a-fA-F0-9]{4}-[a-fA-F0-9]{4}-[a-
12362 fA-F0-9]{12}$",
12363                                     "type": "string"
12364                                 },
12365                                 {
12366                                     "description": "The device ID"
12367                                 }
12368                             ]
12369                         },
12370                         "eps": {
12371                             "description": "the Endpoint information of the target Resource",
12372                             "items": {
12373                                 "properties": {
12374                                     "ep": {
12375                                         "description": "Transport Protocol Suite + Endpoint Locator",
12376                                         "format": "uri",
12377                                         "type": "string"
12378                                     },
12379                                     "pri": {
12380                                         "description": "The priority among multiple Endpoints",
12381                                         "minimum": 1,
12382                                         "type": "integer"

```

```

12383         }
12384     },
12385     "type": "object"
12386 },
12387 "type": "array"
12388 },
12389 "href": {
12390     "description": "This is the target URI, it can be specified as a Relative
12391 Reference or fully-qualified URI.",
12392     "format": "uri",
12393     "maxLength": 256,
12394     "type": "string"
12395 },
12396 "if": {
12397     "description": "The interface set supported by this resource",
12398     "items": {
12399         "enum": [
12400             "oic.if.baseline",
12401             "oic.if.ll",
12402             "oic.if.b",
12403             "oic.if.rw",
12404             "oic.if.r",
12405             "oic.if.a",
12406             "oic.if.s"
12407         ],
12408         "type": "string"
12409     },
12410     "minItems": 1,
12411     "type": "array"
12412 },
12413 "ins": {
12414     "description": "The instance identifier for this web link in an array of web
12415 links - used in collections",
12416     "type": "integer"
12417 },
12418 "p": {
12419     "description": "Specifies the framework policies on the Resource referenced by
12420 the target URI",
12421     "properties": {
12422         "bm": {
12423             "description": "Specifies the framework policies on the Resource referenced
12424 by the target URI for e.g. observable and discoverable",
12425             "type": "integer"
12426         }
12427     },
12428     "required": [
12429         "bm"
12430     ],
12431     "type": "object"
12432 },
12433 "rel": {
12434     "description": "The relation of the target URI referenced by the link to the
12435 context URI",
12436     "oneOf": [
12437         {
12438             "default": [
12439                 "hosts"
12440             ],
12441             "items": {
12442                 "maxLength": 64,
12443                 "type": "string"
12444             },
12445             "minItems": 1,
12446             "type": "array"
12447         },
12448         {
12449             "default": "hosts",
12450             "maxLength": 64,
12451             "type": "string"
12452         }
12453     ]

```

```

12454     },
12455     "rt": {
12456         "description": "Resource Type of the Resource",
12457         "items": {
12458             "maxLength": 64,
12459             "type": "string"
12460         },
12461         "minItems": 1,
12462         "type": "array"
12463     },
12464     "title": {
12465         "description": "A title for the link relation. Can be used by the UI to provide a
context.",
12466         "maxLength": 64,
12467         "type": "string"
12468     },
12469     },
12470     "type": {
12471         "default": "application/cbor",
12472         "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.",
12473         "items": {
12474             "maxLength": 64,
12475             "type": "string"
12476         },
12477     },
12478     "minItems": 1,
12479     "type": "array"
12480     }
12481 },
12482 "required": [
12483     "href",
12484     "rt",
12485     "if"
12486 ],
12487 "type": "object"
12488 },
12489 "type": "array"
12490 },
12491 "mpro": {
12492     "description": "Supported messaging protocols",
12493     "maxLength": 64,
12494     "readOnly": true,
12495     "type": "string"
12496 },
12497 "n": {
12498     "description": "Human friendly name",
12499     "maxLength": 64,
12500     "readOnly": true,
12501     "type": "string"
12502 },
12503 "rt": {
12504     "description": "Resource Type of the Resource",
12505     "items": {
12506         "maxLength": 64,
12507         "type": "string"
12508     },
12509     "minItems": 1,
12510     "readOnly": true,
12511     "type": "array"
12512     }
12513 },
12514 "required": [
12515     "rt",
12516     "if",
12517     "links"
12518 ],
12519 "type": "object"
12520 }
12521
12522 , "type" :
12523     "array"
12524

```

12525 }
 12526 }
 12527 }
 12528 }

12529 **F.11.5 Property Definition**

Property name	Value type	Mandatory	Access mode	Description
rt	array: see schema	yes	Read Only	Resource Type of the Resource
mpro	string		Read Only	Supported messaging protocols
links	array: see schema	yes		
if	array: see schema	yes	Read Only	The interface set supported by this resource
n	string		Read Only	Human friendly name
rel	multiple types: see schema			The relation of the target URI referenced by the link to the context URI
title	string			A title for the link relation. Can be used by the UI to provide a context.
anchor	string			This is used to override the context URI e.g. override the URI of the containing collection.
di	multiple types: see schema			
if	array: see schema	yes		The interface set supported by this resource
type	array: see schema			A hint at the representation of the resource referenced by the target URI. This represents the media types that are used for both accepting and emitting.
ins	integer			The instance identifier for this web link in an array of web links - used in collections

href	string	yes		This is the target URI, it can be specified as a Relative Reference or fully-qualified URI.
p	object: schema	see		Specifies the framework policies on the Resource referenced by the target URI
rt	array: schema	see	yes	Resource Type of the Resource
eps	array: schema	see		the Endpoint information of the target Resource

12530 **F.11.6 CRUDN behaviour**

Resource	Create	Read	Update	Delete	Notify
/oic/res		get			

12531 **F.12 Scene List**

12532 **F.12.1 Introduction**

12533 Toplevel Scene resource.
 12534 This resource is a generic collection resource.
 12535 The rts value shall contain oic.wk.scenecollection resource types.
 12536

12537 **F.12.2 Example URI**

12538 /SceneListResURI

12539 **F.12.3 Resource Type**

12540 The resource type (rt) is defined as: ['oic.wk.scenelist'].

12541 **F.12.4 Swagger2.0 Definition**

```

12542 {
12543   "swagger": "2.0",
12544   "info": {
12545     "title": "Scenes (Top level)",
12546     "version": "v1-20160622",
12547     "license": {
12548       "name": "copyright 2016-2017 Open Connectivity Foundation, Inc. All rights reserved.",
12549       "x-description": "Redistribution and use in source and binary forms, with or without
12550 modification, are permitted provided that the following conditions are met:\n      1.
12551 Redistributions of source code must retain the above copyright notice, this list of conditions and
12552 the following disclaimer.\n      2. Redistributions in binary form must reproduce the above
12553 copyright notice, this list of conditions and the following disclaimer in the documentation and/or
12554 other materials provided with the distribution.\n\n      THIS SOFTWARE IS PROVIDED BY THE Open
12555 Connectivity Foundation, INC. \AS IS\ AND ANY EXPRESS OR IMPLIED WARRANTIES, INCLUDING, BUT NOT
12556 LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE OR
12557 WARRANTIES OF NON-INFRINGEMENT, ARE DISCLAIMED.\n\n      IN NO EVENT SHALL THE Open Connectivity
12558 Foundation, INC. OR CONTRIBUTORS BE LIABLE FOR ANY DIRECT, INDIRECT, INCIDENTAL, SPECIAL,
12559 EXEMPLARY, OR CONSEQUENTIAL DAMAGES (INCLUDING, BUT NOT LIMITED TO, PROCUREMENT OF SUBSTITUTE GOODS
12560 OR SERVICES; LOSS OF USE, DATA, OR PROFITS; OR BUSINESS INTERRUPTION)\n\n      HOWEVER CAUSED AND
12561 ON ANY THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT (INCLUDING NEGLIGENCE OR
12562 OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OF THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY
  
```

```

12563 OF SUCH DAMAGE.\n"
12564 }
12565 },
12566 "schemes": ["http"],
12567 "consumes": ["application/json"],
12568 "produces": ["application/json"],
12569 "paths": {
12570   "/SceneListResURI" : {
12571     "get": {
12572       "description": "Toplevel Scene resource.\nThis resource is a generic collection
12573 resource.\nThe rts value shall contain oic.wk.scenecollection resource types.\nProvides the current
12574 list of web links pointing to scenes\n",
12575       "parameters": [
12576         ],
12577       "responses": {
12578         "200": {
12579           "description": "",
12580           "x-example":
12581             {
12582               "rt": ["oic.wk.scenelist"],
12583               "n": "list of scene Collections",
12584               "rts": ["oic.wk.scenecollection"],
12585               "links": [
12586                 ]
12587             }
12588           ,
12589           "schema": { "$ref": "#/definitions/Collection" }
12590         }
12591       }
12592     }
12593   },
12594   "/SceneMemberResURI" : {
12595     "get": {
12596       "description": "Collection that models a scene member.\nProvides the scene member\n",
12597       "parameters": [
12598         ],
12599       "responses": {
12600         "200": {
12601           "description": "",
12602           "x-example":
12603             {
12604               "rt": ["oic.wk.scenemember"],
12605               "id": "0685B960-FFFF-46F7-BEC0-9E6234671ADC1",
12606               "n": "my binary switch (for light bulb) mappings",
12607               "link": {
12608                 "href": "binarySwitch",
12609                 "rt": ["oic.r.switch.binary"],
12610                 "if": ["oic.if.a", "oic.if.baseline"],
12611                 "eps": [
12612                   {"ep": "coap://[fe80::b1d6]:1111", "pri": 2},
12613                   {"ep": "coaps://[fe80::b1d6]:1122"},
12614                   {"ep": "coap+tcp://[2001:db8:a::123]:2222", "pri": 3}
12615                 ]
12616               },
12617               "sceneMappings": [
12618                 {
12619                   "scene": "off",
12620                   "memberProperty": "value",
12621                   "memberValue": true
12622                 },
12623                 {
12624                   "scene": "Reading",
12625                   "memberProperty": "value",
12626                   "memberValue": false
12627                 },
12628                 {
12629                   "scene": "TVWatching",
12630                   "memberProperty": "value",
12631                   "memberValue": true
12632                 }
12633               ]
12634             }
12635         }
12636       }
12637     }
12638   }
12639 }

```



```

12634         }
12635     },
12636     "schema": { "$ref": "#/definitions/SceneMember" }
12637 }
12638 }
12639 },
12640 "/SceneCollectionResURI" : {
12641     "get": {
12642         "description": "Collection that models a set of Scenes.\nThis resource is a generic
12643 collection resource with additional parameters.\nThe rts value shall contain oic.scenemember
12644 resource types.\nThe additional parameters are\n lastScene, this is the scene value last set by
12645 any OCF Client\n sceneValues, this is the list of available scenes\n lastScene shall be listed in
12646 sceneValues.\nProvides the current list of web links pointing to scenes\n",
12647         "parameters": [
12648             ],
12649         "responses": {
12650             "200": {
12651                 "description": "",
12652                 "x-example":
12653                 {
12654                     "lastScene": "off",
12655                     "sceneValues": ["off","Reading","TVWatching"],
12656                     "rt": ["oic.wk.scenecollection"],
12657                     "n": "My Scenes for my living room",
12658                     "id": "0685B960-736F-46F7-BEC0-9E6CBD671ADC1",
12659                     "rts": ["oic.wk.scenemember"],
12660                     "links": [
12661                         ]
12662                 }
12663             },
12664             "schema": { "$ref": "#/definitions/SceneCollection" }
12665         }
12666     },
12667 },
12668 "post": {
12669     "description": "Provides the action to change the last set scene selection.\nCalling this
12670 method shall update all scene members to the prescribed membervalue.\nWhen this method is called
12671 with the same value as the current lastScene value\nthen all scene members shall be updated.\n",
12672     "parameters": [
12673         {
12674             "name": "body",
12675             "in": "body",
12676             "required": true,
12677             "schema": { "$ref": "#/definitions/SceneCollectionUpdate" },
12678             "x-example":
12679             {
12680                 "lastScene": "Reading"
12681             }
12682         }
12683     ],
12684     "responses": {
12685         "200": {
12686             "description": "Indicates that the value is changed.\nThe changed properties are
12687 provided in the response.\n",
12688             "x-example":
12689             {
12690                 "lastScene": "Reading"
12691             }
12692         },
12693         "schema": { "$ref": "#/definitions/SceneCollectionUpdate" }
12694     }
12695 },
12696 },
12697 },
12698 },
12699 },
12700 "parameters": {
12701     "interface": {
12702         "in": "query",
12703         "name": "if",
12704         "type": "string",

```

```

12705     "enum" : ["oic.if.a", "oic.if.ll", "oic.if.baseline"]
12706   },
12707 },
12708 "definitions": {
12709   "Collection" : {
12710     "properties": {
12711       "links" :
12712         {
12713           "description": "A set of simple or individual OIC Links.",
12714           "items": {
12715             "$ref": "#/definitions/oic.oic-link"
12716           },
12717           "type": "array"
12718         }
12719     }
12720   }
12721 },
12722 /
12723 "SceneMember" : {
12724   "properties": {
12725     "rt" :
12726       {
12727         "description": "Resource Type of the Resource",
12728         "items": {
12729           "maxLength": 64,
12730           "type": "string"
12731         },
12732         "minItems": 1,
12733         "readOnly": true,
12734         "type": "array"
12735       },
12736
12737     "SceneMappings" :
12738       {
12739         "description": "array of mappings per scene, can be one(1)",
12740         "items": {
12741           "properties": {
12742             "memberProperty": {
12743               "description": "property name that will be mapped",
12744               "readOnly": true,
12745               "type": "string"
12746             },
12747             "memberValue": {
12748               "description": "value of the Member Property",
12749               "readOnly": true,
12750               "type": "string"
12751             },
12752             "scene": {
12753               "description": "Specifies a scene value that will be acted upon",
12754               "type": "string"
12755             }
12756           },
12757           "required": [
12758             "scene",
12759             "memberProperty",
12760             "memberValue"
12761           ],
12762           "type": "object"
12763         },
12764         "type": "array"
12765       },
12766
12767     "n" :
12768       {
12769         "description": "Friendly name of the resource",
12770         "maxLength": 64,
12771         "readOnly": true,
12772         "type": "string"
12773       },
12774
12775     "link" :

```

```

12776     {
12777     "allOf": [
12778     {
12779         "properties": {
12780             "anchor": {
12781                 "description": "This is used to override the context URI e.g. override the URI of
12782 the containing collection.",
12783                 "format": "uri",
12784                 "maxLength": 256,
12785                 "type": "string"
12786             },
12787             "di": {
12788                 "allOf": [
12789                     {
12790                         "description": "Format pattern according to IETF RFC 4122.",
12791                         "pattern": "^[a-fA-F0-9]{8}-[a-fA-F0-9]{4}-[a-fA-F0-9]{4}-[a-fA-F0-9]{4}-[a-
12792 fA-F0-9]{12}$",
12793                         "type": "string"
12794                     },
12795                     {
12796                         "description": "The device ID"
12797                     }
12798                 ]
12799             },
12800             "eps": {
12801                 "description": "the Endpoint information of the target Resource",
12802                 "items": {
12803                     "properties": {
12804                         "ep": {
12805                             "description": "Transport Protocol Suite + Endpoint Locator",
12806                             "format": "uri",
12807                             "type": "string"
12808                         },
12809                         "pri": {
12810                             "description": "The priority among multiple Endpoints",
12811                             "minimum": 1,
12812                             "type": "integer"
12813                         }
12814                     },
12815                     "type": "object"
12816                 },
12817                 "type": "array"
12818             },
12819             "href": {
12820                 "description": "This is the target URI, it can be specified as a Relative
12821 Reference or fully-qualified URI.",
12822                 "format": "uri",
12823                 "maxLength": 256,
12824                 "type": "string"
12825             },
12826             "if": {
12827                 "description": "The interface set supported by this resource",
12828                 "items": {
12829                     "enum": [
12830                         "oic.if.baseline",
12831                         "oic.if.ll",
12832                         "oic.if.b",
12833                         "oic.if.rw",
12834                         "oic.if.r",
12835                         "oic.if.a",
12836                         "oic.if.s"
12837                     ],
12838                     "type": "string"
12839                 },
12840                 "minItems": 1,
12841                 "type": "array"
12842             },
12843             "ins": {
12844                 "description": "The instance identifier for this web link in an array of web
12845 links - used in collections",
12846                 "type": "integer"

```

```

12847     },
12848     "p": {
12849         "description": "Specifies the framework policies on the Resource referenced by
12850 the target URI",
12851         "properties": {
12852             "bm": {
12853                 "description": "Specifies the framework policies on the Resource referenced
12854 by the target URI for e.g. observable and discoverable",
12855                 "type": "integer"
12856             }
12857         },
12858         "required": [
12859             "bm"
12860         ],
12861         "type": "object"
12862     },
12863     "rel": {
12864         "description": "The relation of the target URI referenced by the link to the
12865 context URI",
12866         "oneOf": [
12867             {
12868                 "default": [
12869                     "hosts"
12870                 ],
12871                 "items": {
12872                     "maxLength": 64,
12873                     "type": "string"
12874                 },
12875                 "minItems": 1,
12876                 "type": "array"
12877             },
12878             {
12879                 "default": "hosts",
12880                 "maxLength": 64,
12881                 "type": "string"
12882             }
12883         ]
12884     },
12885     "rt": {
12886         "description": "Resource Type of the Resource",
12887         "items": {
12888             "maxLength": 64,
12889             "type": "string"
12890         },
12891         "minItems": 1,
12892         "type": "array"
12893     },
12894     "title": {
12895         "description": "A title for the link relation. Can be used by the UI to provide a
12896 context.",
12897         "maxLength": 64,
12898         "type": "string"
12899     },
12900     "type": {
12901         "default": "application/cbor",
12902         "description": "A hint at the representation of the resource referenced by the
12903 target URI. This represents the media types that are used for both accepting and emitting.",
12904         "items": {
12905             "maxLength": 64,
12906             "type": "string"
12907         },
12908         "minItems": 1,
12909         "type": "array"
12910     }
12911 },
12912 "required": [
12913     "href",
12914     "rt",
12915     "if"
12916 ],
12917 "type": "object"

```

```

12918         },
12919         {
12920             "description": "OCF link that points to a resource"
12921         }
12922     ]
12923 },
12924
12925     "id" :
12926     {
12927         "description": "Instance ID of this specific resource",
12928         "maxLength": 64,
12929         "readOnly": true,
12930         "type": "string"
12931     },
12932
12933     "if" :
12934     {
12935         "description": "The interface set supported by this resource",
12936         "items": {
12937             "enum": [
12938                 "oic.if.baseline",
12939                 "oic.if.ll",
12940                 "oic.if.b",
12941                 "oic.if.lb",
12942                 "oic.if.rw",
12943                 "oic.if.r",
12944                 "oic.if.a",
12945                 "oic.if.s"
12946             ],
12947             "type": "string"
12948         },
12949         "minItems": 1,
12950         "readOnly": true,
12951         "type": "array"
12952     }
12953 }
12954 }
12955 },
12956
12957 "SceneCollection" : {
12958     "properties": {
12959         "rt" :
12960         {
12961             "description": "Resource Type of the Resource",
12962             "items": {
12963                 "maxLength": 64,
12964                 "type": "string"
12965             },
12966             "minItems": 1,
12967             "readOnly": true,
12968             "type": "array"
12969         },
12970
12971         "lastScene" :
12972         {
12973             "description": "Last selected Scene from the set of sceneValues",
12974             "type": "string"
12975         },
12976
12977         "links" :
12978         {
12979             "description": "A set of simple or individual OIC Links.",
12980             "items": {
12981                 "properties": {
12982                     "anchor": {
12983                         "description": "This is used to override the context URI e.g. override the URI of
12984 the containing collection.",
12985                         "format": "uri",
12986                         "maxLength": 256,
12987                         "type": "string"
12988                     },

```

```

12989     "di": {
12990         "description": "Format pattern according to IETF RFC 4122.",
12991         "pattern": "^[a-fA-F0-9]{8}-[a-fA-F0-9]{4}-[a-fA-F0-9]{4}-[a-fA-F0-9]{4}-[a-fA-F0-
12992 9]{12}$",
12993         "type": "string"
12994     },
12995     "eps": {
12996         "description": "the Endpoint information of the target Resource",
12997         "items": {
12998             "properties": {
12999                 "ep": {
13000                     "description": "Transport Protocol Suite + Endpoint Locator",
13001                     "format": "uri",
13002                     "type": "string"
13003                 },
13004                 "pri": {
13005                     "description": "The priority among multiple Endpoints",
13006                     "minimum": 1,
13007                     "type": "integer"
13008                 }
13009             },
13010             "type": "object"
13011         },
13012         "type": "array"
13013     },
13014     "href": {
13015         "description": "This is the target URI, it can be specified as a Relative Reference
13016 or fully-qualified URI.",
13017         "format": "uri",
13018         "maxLength": 256,
13019         "type": "string"
13020     },
13021     "if": {
13022         "description": "The interface set supported by this resource",
13023         "items": {
13024             "enum": [
13025                 "oic.if.baseline",
13026                 "oic.if.ll",
13027                 "oic.if.b",
13028                 "oic.if.rw",
13029                 "oic.if.r",
13030                 "oic.if.a",
13031                 "oic.if.s"
13032             ],
13033             "type": "string"
13034         },
13035         "minItems": 1,
13036         "type": "array"
13037     },
13038     "ins": {
13039         "description": "The instance identifier for this web link in an array of web links
13040 - used in collections",
13041         "type": "integer"
13042     },
13043     "p": {
13044         "description": "Specifies the framework policies on the Resource referenced by the
13045 target URI",
13046         "properties": {
13047             "bm": {
13048                 "description": "Specifies the framework policies on the Resource referenced by
13049 the target URI for e.g. observable and discoverable",
13050                 "type": "integer"
13051             }
13052         },
13053         "required": [
13054             "bm"
13055         ],
13056         "type": "object"
13057     },
13058     "rel": {
13059         "description": "The relation of the target URI referenced by the link to the

```

```

13060 context URI",
13061     "oneOf": [
13062         {
13063             "default": [
13064                 "hosts"
13065             ],
13066             "items": {
13067                 "maxLength": 64,
13068                 "type": "string"
13069             },
13070             "minItems": 1,
13071             "type": "array"
13072         },
13073         {
13074             "default": "hosts",
13075             "maxLength": 64,
13076             "type": "string"
13077         }
13078     ],
13079 },
13080 "rt": {
13081     "description": "Resource Type of the Resource",
13082     "items": {
13083         "maxLength": 64,
13084         "type": "string"
13085     },
13086     "minItems": 1,
13087     "type": "array"
13088 },
13089 "title": {
13090     "description": "A title for the link relation. Can be used by the UI to provide a
13091 context.",
13092     "maxLength": 64,
13093     "type": "string"
13094 },
13095 "type": {
13096     "default": "application/cbor",
13097     "description": "A hint at the representation of the resource referenced by the
13098 target URI. This represents the media types that are used for both accepting and emitting.",
13099     "items": {
13100         "maxLength": 64,
13101         "type": "string"
13102     },
13103     "minItems": 1,
13104     "type": "array"
13105 },
13106 },
13107 "required": [
13108     "href",
13109     "rt",
13110     "if"
13111 ],
13112 "type": "object"
13113 },
13114 "type": "array"
13115 },
13116 "sceneValues" :
13117 {
13118     "description": "All available scene values",
13119     "items": {
13120         "type": "string"
13121     },
13122     "readOnly": true,
13123     "type": "array"
13124 },
13125 },
13126 "n" :
13127 {
13128     "description": "Friendly name of the resource",
13129     "maxLength": 64,
13130

```

```

13131         "readOnly": true,
13132         "type": "string"
13133     },
13134
13135     "rts" :
13136     {
13137         "description": "Resource Type of the Resource",
13138         "items": {
13139             "maxLength": 64,
13140             "type": "string"
13141         },
13142         "minItems": 1,
13143         "readOnly": true,
13144         "type": "array"
13145     },
13146
13147     "id" :
13148     {
13149         "description": "Instance ID of this specific resource",
13150         "maxLength": 64,
13151         "readOnly": true,
13152         "type": "string"
13153     },
13154
13155     "if" :
13156     {
13157         "description": "The interface set supported by this resource",
13158         "items": {
13159             "enum": [
13160                 "oic.if.baseline",
13161                 "oic.if.ll",
13162                 "oic.if.b",
13163                 "oic.if.lb",
13164                 "oic.if.rw",
13165                 "oic.if.r",
13166                 "oic.if.a",
13167                 "oic.if.s"
13168             ],
13169             "type": "string"
13170         },
13171         "minItems": 1,
13172         "readOnly": true,
13173         "type": "array"
13174     }
13175 }
13176 }
13177 }
13178 ,
13179 "SceneCollectionUpdate" : {
13180     "properties": {
13181         "rt" :
13182         {
13183             "description": "Resource Type of the Resource",
13184             "items": {
13185                 "maxLength": 64,
13186                 "type": "string"
13187             },
13188             "minItems": 1,
13189             "readOnly": true,
13190             "type": "array"
13191         },
13192
13193         "lastScene" :
13194         {
13195             "description": "Last selected Scene from the set of sceneValues",
13196             "type": "string"
13197         },
13198
13199         "n" :
13200         {
13201             "description": "Friendly name of the resource",

```



```

13202         "maxLength": 64,
13203         "readOnly": true,
13204         "type": "string"
13205     },
13206
13207     "id" :
13208     {
13209         "description": "Instance ID of this specific resource",
13210         "maxLength": 64,
13211         "readOnly": true,
13212         "type": "string"
13213     },
13214
13215     "if" :
13216     {
13217         "description": "The interface set supported by this resource",
13218         "items": {
13219             "enum": [
13220                 "oic.if.baseline",
13221                 "oic.if.ll",
13222                 "oic.if.b",
13223                 "oic.if.lb",
13224                 "oic.if.rw",
13225                 "oic.if.r",
13226                 "oic.if.a",
13227                 "oic.if.s"
13228             ],
13229             "type": "string"
13230         },
13231         "minItems": 1,
13232         "readOnly": true,
13233         "type": "array"
13234     }
13235
13236     }
13237 }
13238 , "uuid" :
13239 {
13240     "description": "Format pattern according to IETF RFC 4122.",
13241     "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}$",
13242     "type": "string"
13243 }
13244
13245 , "oic.collection.properties" :
13246 {
13247     "description": "A collection is a set of links along with additional properties to describe
13248 the collection itself",
13249     "properties": {
13250         "rts": {
13251             "$ref": "#/definitions/oic.core/properties/rt",
13252             "description": "The list of allowable resource types (for Target and anchors) in links
13253 included in the collection"
13254         }
13255     },
13256     "type": "object"
13257 }
13258
13259 , "oic.core" :
13260 {
13261     "properties": {
13262         "rt": {
13263             "description": "Resource Type of the Resource",
13264             "items": {
13265                 "maxLength": 64,
13266                 "type": "string"
13267             },
13268             "minItems": 1,
13269             "readOnly": true,
13270             "type": "array"
13271         }
13272     },

```

```

13273     "type": "object"
13274   }
13275
13276   , "oic.collection.linksexpanded" :
13277     {
13278       "properties": {
13279         "links": {
13280           "description": "A set of simple or individual OIC Links.",
13281           "items": {
13282             "properties": {
13283               "anchor": {
13284                 "description": "This is used to override the context URI e.g. override the URI of
13285 the containing collection.",
13286                 "format": "uri",
13287                 "maxLength": 256,
13288                 "type": "string"
13289               },
13290               "di": {
13291                 "description": "Format pattern according to IETF RFC 4122.",
13292                 "pattern": "^[a-fA-F0-9]{8}-[a-fA-F0-9]{4}-[a-fA-F0-9]{4}-[a-fA-F0-9]{4}-[a-fA-F0-
13293 9]{12}$",
13294                 "type": "string"
13295               },
13296               "eps": {
13297                 "description": "the Endpoint information of the target Resource",
13298                 "items": {
13299                   "properties": {
13300                     "ep": {
13301                       "description": "Transport Protocol Suite + Endpoint Locator",
13302                       "format": "uri",
13303                       "type": "string"
13304                     },
13305                     "pri": {
13306                       "description": "The priority among multiple Endpoints",
13307                       "minimum": 1,
13308                       "type": "integer"
13309                     }
13310                   },
13311                   "type": "object"
13312                 },
13313                 "type": "array"
13314               },
13315               "href": {
13316                 "description": "This is the target URI, it can be specified as a Relative Reference
13317 or fully-qualified URI.",
13318                 "format": "uri",
13319                 "maxLength": 256,
13320                 "type": "string"
13321               },
13322               "if": {
13323                 "description": "The interface set supported by this resource",
13324                 "items": {
13325                   "enum": [
13326                     "oic.if.baseline",
13327                     "oic.if.ll",
13328                     "oic.if.b",
13329                     "oic.if.rw",
13330                     "oic.if.r",
13331                     "oic.if.a",
13332                     "oic.if.s"
13333                   ],
13334                   "type": "string"
13335                 },
13336                 "minItems": 1,
13337                 "type": "array"
13338               },
13339               "ins": {
13340                 "description": "The instance identifier for this web link in an array of web links
13341 - used in collections",
13342                 "type": "integer"
13343               },

```

```

13344         "p": {
13345             "description": "Specifies the framework policies on the Resource referenced by the
13346 target URI",
13347             "properties": {
13348                 "bm": {
13349                     "description": "Specifies the framework policies on the Resource referenced by
13350 the target URI for e.g. observable and discoverable",
13351                     "type": "integer"
13352                 }
13353             },
13354             "required": [
13355                 "bm"
13356             ],
13357             "type": "object"
13358         },
13359         "rel": {
13360             "description": "The relation of the target URI referenced by the link to the
13361 context URI",
13362             "oneOf": [
13363                 {
13364                     "default": [
13365                         "hosts"
13366                     ],
13367                     "items": {
13368                         "maxLength": 64,
13369                         "type": "string"
13370                     },
13371                     "minItems": 1,
13372                     "type": "array"
13373                 },
13374                 {
13375                     "default": "hosts",
13376                     "maxLength": 64,
13377                     "type": "string"
13378                 }
13379             ],
13380         },
13381         "rt": {
13382             "description": "Resource Type of the Resource",
13383             "items": {
13384                 "maxLength": 64,
13385                 "type": "string"
13386             },
13387             "minItems": 1,
13388             "type": "array"
13389         },
13390         "title": {
13391             "description": "A title for the link relation. Can be used by the UI to provide a
13392 context.",
13393             "maxLength": 64,
13394             "type": "string"
13395         },
13396         "type": {
13397             "default": "application/cbor",
13398             "description": "A hint at the representation of the resource referenced by the
13399 target URI. This represents the media types that are used for both accepting and emitting.",
13400             "items": {
13401                 "maxLength": 64,
13402                 "type": "string"
13403             },
13404             "minItems": 1,
13405             "type": "array"
13406         }
13407     },
13408     "required": [
13409         "href",
13410         "rt",
13411         "if"
13412     ],
13413     "type": "object"
13414 },

```

```

13415         "type": "array"
13416     },
13417 },
13418 "type": "object"
13419 }
13420
13421 , "oic.collection.links" :
13422 {
13423     "properties": {
13424         "links": {
13425             "description": "A set of simple or individual OIC Links.",
13426             "items": {
13427                 "$ref": "#/definitions/oic.oic-link"
13428             },
13429             "type": "array"
13430         }
13431     },
13432     "type": "object"
13433 }
13434
13435 , "oic.oic-link" :
13436 {
13437     "properties": {
13438         "anchor": {
13439             "description": "This is used to override the context URI e.g. override the URI of the
13440 containing collection.",
13441             "format": "uri",
13442             "maxLength": 256,
13443             "type": "string"
13444         },
13445         "di": {
13446             "$ref": "#/definitions/uuid",
13447             "description": "The device ID"
13448         },
13449         "eps": {
13450             "description": "the Endpoint information of the target Resource",
13451             "items": {
13452                 "properties": {
13453                     "ep": {
13454                         "description": "Transport Protocol Suite + Endpoint Locator",
13455                         "format": "uri",
13456                         "type": "string"
13457                     },
13458                     "pri": {
13459                         "description": "The priority among multiple Endpoints",
13460                         "minimum": 1,
13461                         "type": "integer"
13462                     }
13463                 },
13464                 "type": "object"
13465             },
13466             "type": "array"
13467         },
13468         "href": {
13469             "description": "This is the target URI, it can be specified as a Relative Reference or
13470 fully-qualified URI.",
13471             "format": "uri",
13472             "maxLength": 256,
13473             "type": "string"
13474         },
13475         "if": {
13476             "description": "The interface set supported by this resource",
13477             "items": {
13478                 "enum": [
13479                     "oic.if.baseline",
13480                     "oic.if.ll",
13481                     "oic.if.b",
13482                     "oic.if.rw",
13483                     "oic.if.r",
13484                     "oic.if.a",
13485                     "oic.if.s"

```

```

13486         ],
13487         "type": "string"
13488     },
13489     "minItems": 1,
13490     "type": "array"
13491 },
13492 "ins": {
13493     "description": "The instance identifier for this web link in an array of web links - used
13494 in collections",
13495     "type": "integer"
13496 },
13497 "p": {
13498     "description": "Specifies the framework policies on the Resource referenced by the target
13499 URI",
13500     "properties": {
13501         "bm": {
13502             "description": "Specifies the framework policies on the Resource referenced by the
13503 target URI for e.g. observable and discoverable",
13504             "type": "integer"
13505         }
13506     },
13507     "required": [
13508         "bm"
13509     ],
13510     "type": "object"
13511 },
13512 "rel": {
13513     "description": "The relation of the target URI referenced by the link to the context
13514 URI",
13515     "oneOf": [
13516         {
13517             "default": [
13518                 "hosts"
13519             ],
13520             "items": {
13521                 "maxLength": 64,
13522                 "type": "string"
13523             },
13524             "minItems": 1,
13525             "type": "array"
13526         },
13527         {
13528             "default": "hosts",
13529             "maxLength": 64,
13530             "type": "string"
13531         }
13532     ]
13533 },
13534 "rt": {
13535     "description": "Resource Type of the Resource",
13536     "items": {
13537         "maxLength": 64,
13538         "type": "string"
13539     },
13540     "minItems": 1,
13541     "type": "array"
13542 },
13543 "title": {
13544     "description": "A title for the link relation. Can be used by the UI to provide a
13545 context.",
13546     "maxLength": 64,
13547     "type": "string"
13548 },
13549 "type": {
13550     "default": "application/cbor",
13551     "description": "A hint at the representation of the resource referenced by the target
13552 URI. This represents the media types that are used for both accepting and emitting.",
13553     "items": {
13554         "maxLength": 64,
13555         "type": "string"
13556     },

```

```

13557         "minItems": 1,
13558         "type": "array"
13559     },
13560 },
13561 "required": [
13562     "href",
13563     "rt",
13564     "if"
13565 ],
13566 "type": "object"
13567 }
13568 }
13569 }
13570 }
13571

```

F.12.5 Property Definition

Property name	Value type	Mandatory	Access mode	Description
n	string		Read Only	Friendly name of the resource
if	array: see schema		Read Only	The interface set supported by this resource
id	string		Read Only	Instance ID of this specific resource
lastScene	string			Last selected Scene from the set of sceneValues
rt	array: see schema		Read Only	Resource Type of the Resource
rts	multiple types: see schema			The list of allowable resource types (for Target and anchors) in links included in the collection
rel	multiple types: see schema			The relation of the target URI referenced by the link to the context URI
eps	array: see schema			the Endpoint information of the target Resource
p	object: see schema			Specifies the framework policies on the Resource referenced by the target URI
di	multiple types: see schema			The device ID
rt	array: see schema	yes		Resource Type of the Resource

ins	integer				The instance identifier for this web link in an array of web links - used in collections
type	array: schema	see			A hint at the representation of the resource referenced by the target URI. This represents the media types that are used for both accepting and emitting.
title	string				A title for the link relation. Can be used by the UI to provide a context.
if	array: schema	see	yes		The interface set supported by this resource
anchor	string				This is used to override the context URI e.g. override the URI of the containing collection.
href	string		yes		This is the target URI, it can be specified as a Relative Reference or fully-qualified URI.
links	array: schema	see			A set of simple or individual OIC Links.
rt	array: schema	see		Read Only	Resource Type of the Resource
links	array: schema	see			A set of simple or individual OIC Links.
n	string			Read Only	Friendly name of the resource
if	array: schema	see	yes	Read Only	The interface set supported by this resource
lastScene	string				Last selected Scene from the set of sceneValues

rt	array: schema	see	yes	Read Only	Resource Type of the Resource
id	string			Read Only	Instance ID of this specific resource
rts	array: schema	see		Read Only	Resource Type of the Resource
sceneValues	array: schema	see		Read Only	All available scene values
n	string			Read Only	Friendly name of the resource
SceneMappings	array: schema	see			array of mappings per scene, can be one(1)
rt	array: schema	see		Read Only	Resource Type of the Resource
link	multiple types: see schema				
id	string			Read Only	Instance ID of this specific resource
if	array: schema	see		Read Only	The interface set supported by this resource
links	array: schema	see			A set of simple or individual OIC Links.
links	array: schema	see			A set of simple or individual OIC Links.

13573 **F.12.6 CRUDN behaviour**

Resource	Create	Read	Update	Delete	Notify
/SceneListResURI		get			

13574 **F.13 Scene Collection**

13575 **F.13.1 Introduction**

13576 Collection that models a set of Scenes.
 13577 This resource is a generic collection resource with additional parameters.
 13578 The rts value shall contain oic.scenemember resource types.
 13579 The additional parameters are
 13580 lastScene, this is the scene value last set by any OCF Client
 13581 sceneValues, this is the list of available scenes
 13582 lastScene shall be listed in sceneValues.
 13583

13584 **F.13.2 Example URI**

13585 /SceneCollectionResURI

13586 **F.13.3 Resource Type**

13587 The resource type (rt) is defined as: ['oic.wk.scenecollection'].

13588 **F.13.4 Swagger2.0 Definition**

```
13589 {
13590   "swagger": "2.0",
13591   "info": {
13592     "title": "Scenes (Top level)",
13593     "version": "v1-20160622",
13594     "license": {
13595       "name": "copyright 2016-2017 Open Connectivity Foundation, Inc. All rights reserved.",
13596       "x-description": "Redistribution and use in source and binary forms, with or without
13597 modification, are permitted provided that the following conditions are met:\n      1.
13598 Redistributions of source code must retain the above copyright notice, this list of conditions and
13599 the following disclaimer.\n      2. Redistributions in binary form must reproduce the above
13600 copyright notice, this list of conditions and the following disclaimer in the documentation and/or
13601 other materials provided with the distribution.\n\n      THIS SOFTWARE IS PROVIDED BY THE Open
13602 Connectivity Foundation, INC. \AS IS\ AND ANY EXPRESS OR IMPLIED WARRANTIES, INCLUDING, BUT NOT
13603 LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE OR
13604 WARRANTIES OF NON-INFRINGEMENT, ARE DISCLAIMED.\n      IN NO EVENT SHALL THE Open Connectivity
13605 Foundation, INC. OR CONTRIBUTORS BE LIABLE FOR ANY DIRECT, INDIRECT, INCIDENTAL, SPECIAL,
13606 EXEMPLARY, OR CONSEQUENTIAL DAMAGES (INCLUDING, BUT NOT LIMITED TO, PROCUREMENT OF SUBSTITUTE GOODS
13607 OR SERVICES; LOSS OF USE, DATA, OR PROFITS; OR BUSINESS INTERRUPTION)\n      HOWEVER CAUSED AND
13608 ON ANY THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT (INCLUDING NEGLIGENCE OR
13609 OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OF THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY
13610 OF SUCH DAMAGE.\n"
13611     }
13612   },
13613   "schemes": ["http"],
13614   "consumes": ["application/json"],
13615   "produces": ["application/json"],
13616   "paths": {
13617     "/SceneListResURI" : {
13618       "get": {
13619         "description": "Toplevel Scene resource.\nThis resource is a generic collection
13620 resource.\nThe rts value shall contain oic.wk.scenecollection resource types.\nProvides the current
13621 list of web links pointing to scenes\n",
13622         "parameters": [
13623           ],
13624         "responses": {
13625           "200": {
13626             "description": "",
13627             "x-example":
13628               {
13629                 "rt": ["oic.wk.scenelist"],
13630                 "n": "list of scene Collections",
13631                 "rts": ["oic.wk.scenecollection"],
13632                 "links": [
13633                   ]
13634               }
13635             ,
13636             "schema": { "$ref": "#/definitions/Collection" }
13637           }
13638         }
13639       }
13640     },
13641     "/SceneMemberResURI" : {
13642       "get": {
13643         "description": "Collection that models a scene member.\nProvides the scene member\n",
13644         "parameters": [
13645           ],
13646         "responses": {
13647           "200": {
13648             "description": "",
13649             "x-example":
13650               {
13651                 "rt": ["oic.wk.scenemember"],
13652                 "id": "0685B960-FFFF-46F7-BEC0-9E6234671ADC1",
13653                 "n": "my binary switch (for light bulb) mappings",
13654                 "link": {
13655                   "href": "binarySwitch",
13656                   "rt": ["oic.r.switch.binary"],
13657                   "if": ["oic.if.a", "oic.if.baseline"],
```

```

13658         "eps": [
13659             { "ep": "coap://[fe80::b1d6]:1111", "pri": 2 },
13660             { "ep": "coaps://[fe80::b1d6]:1122" },
13661             { "ep": "coap+tcp://[2001:db8:a::123]:2222", "pri": 3 }
13662         ]
13663     },
13664     "sceneMappings": [
13665         {
13666             "scene": "off",
13667             "memberProperty": "value",
13668             "memberValue": true
13669         },
13670         {
13671             "scene": "Reading",
13672             "memberProperty": "value",
13673             "memberValue": false
13674         },
13675         {
13676             "scene": "TVWatching",
13677             "memberProperty": "value",
13678             "memberValue": true
13679         }
13680     ]
13681 },
13682 ,
13683 "schema": { "$ref": "#/definitions/SceneMember" }
13684 }
13685 }
13686 },
13687 },
13688 "/SceneCollectionResURI" : {
13689     "get": {
13690         "description": "Collection that models a set of Scenes.\nThis resource is a generic
13691 collection resource with additional parameters.\nThe rts value shall contain oic.scenemember
13692 resource types.\nThe additional parameters are\n lastScene, this is the scene value last set by
13693 any OCF Client\n sceneValues, this is the list of available scenes\n lastScene shall be listed in
13694 sceneValues.\nProvides the current list of web links pointing to scenes\n",
13695         "parameters": [
13696         ],
13697         "responses": {
13698             "200": {
13699                 "description": "",
13700                 "x-example":
13701                 {
13702                     "lastScene": "off",
13703                     "sceneValues": ["off","Reading","TVWatching"],
13704                     "rt": ["oic.wk.sceneCollection"],
13705                     "n": "My Scenes for my living room",
13706                     "id": "0685B960-736F-46F7-BEC0-9E6CBD671ADC1",
13707                     "rts": ["oic.wk.scenemember"],
13708                     "links": [
13709                     ]
13710                 }
13711             },
13712             "schema": { "$ref": "#/definitions/SceneCollection" }
13713         }
13714     },
13715     },
13716     "post": {
13717         "description": "Provides the action to change the last set scene selection.\nCalling this
13718 method shall update all scene members to the prescribed membervalue.\nWhen this method is called
13719 with the same value as the current lastScene value\nthen all scene members shall be updated.\n",
13720         "parameters": [
13721             {
13722                 "name": "body",
13723                 "in": "body",
13724                 "required": true,
13725                 "schema": { "$ref": "#/definitions/SceneCollectionUpdate" },
13726                 "x-example":
13727                 {
13728                     "lastScene": "Reading"

```

```

13729         }
13730     },
13731 ],
13732     "responses": {
13733         "200": {
13734             "description": "Indicates that the value is changed.\n\nThe changed properties are
13735 provided in the response.\n",
13736             "x-example":
13737                 {
13738                     "lastScene": "Reading"
13739                 }
13740             ,
13741             "schema": { "$ref": "#/definitions/SceneCollectionUpdate" }
13742         }
13743     }
13744 },
13745 },
13746 },
13747 "parameters": {
13748     "interface" : {
13749         "in" : "query",
13750         "name" : "if",
13751         "type" : "string",
13752         "enum" : ["oic.if.a", "oic.if.ll", "oic.if.baseline"]
13753     }
13754 },
13755 "definitions": {
13756     "Collection" : {
13757         "properties": {
13758             "links" :
13759                 {
13760                     "description": "A set of simple or individual OIC Links.",
13761                     "items": {
13762                         "$ref": "#/definitions/oic.oic-link"
13763                     },
13764                     "type": "array"
13765                 }
13766         }
13767     }
13768 },
13769 ,
13770 "SceneMember" : {
13771     "properties": {
13772         "rt" :
13773             {
13774                 "description": "Resource Type of the Resource",
13775                 "items": {
13776                     "maxLength": 64,
13777                     "type": "string"
13778                 },
13779                 "minItems": 1,
13780                 "readOnly": true,
13781                 "type": "array"
13782             },
13783     },
13784     "SceneMappings" :
13785         {
13786             "description": "array of mappings per scene, can be one(1)",
13787             "items": {
13788                 "properties": {
13789                     "memberProperty": {
13790                         "description": "property name that will be mapped",
13791                         "readOnly": true,
13792                         "type": "string"
13793                     },
13794                     "memberValue": {
13795                         "description": "value of the Member Property",
13796                         "readOnly": true,
13797                         "type": "string"
13798                     },
13799                 }

```

```

13800         "description": "Specifies a scene value that will be acted upon",
13801         "type": "string"
13802     },
13803 },
13804     "required": [
13805         "scene",
13806         "memberProperty",
13807         "memberValue"
13808     ],
13809     "type": "object"
13810 },
13811 "type": "array"
13812 },
13813
13814 "n" :
13815     {
13816         "description": "Friendly name of the resource",
13817         "maxLength": 64,
13818         "readOnly": true,
13819         "type": "string"
13820     },
13821
13822 "link" :
13823     {
13824         "allOf": [
13825             {
13826                 "properties": {
13827                     "anchor": {
13828                         "description": "This is used to override the context URI e.g. override the URI of
13829 the containing collection.",
13830                         "format": "uri",
13831                         "maxLength": 256,
13832                         "type": "string"
13833                     },
13834                     "di": {
13835                         "allOf": [
13836                             {
13837                                 "description": "Format pattern according to IETF RFC 4122.",
13838                                 "pattern": "^[a-fA-F0-9]{8}-[a-fA-F0-9]{4}-[a-fA-F0-9]{4}-[a-fA-F0-9]{4}-[a-
13839 fA-F0-9]{12}$",
13840                                 "type": "string"
13841                             },
13842                             {
13843                                 "description": "The device ID"
13844                             }
13845                         ]
13846                     },
13847                     "eps": {
13848                         "description": "the Endpoint information of the target Resource",
13849                         "items": {
13850                             "properties": {
13851                                 "ep": {
13852                                     "description": "Transport Protocol Suite + Endpoint Locator",
13853                                     "format": "uri",
13854                                     "type": "string"
13855                                 },
13856                                 "pri": {
13857                                     "description": "The priority among multiple Endpoints",
13858                                     "minimum": 1,
13859                                     "type": "integer"
13860                                 }
13861                             },
13862                             "type": "object"
13863                         },
13864                         "type": "array"
13865                     },
13866                     "href": {
13867                         "description": "This is the target URI, it can be specified as a Relative
13868 Reference or fully-qualified URI.",
13869                         "format": "uri",
13870                         "maxLength": 256,

```

```

13871         "type": "string"
13872     },
13873     "if": {
13874         "description": "The interface set supported by this resource",
13875         "items": {
13876             "enum": [
13877                 "oic.if.baseline",
13878                 "oic.if.ll",
13879                 "oic.if.b",
13880                 "oic.if.rw",
13881                 "oic.if.r",
13882                 "oic.if.a",
13883                 "oic.if.s"
13884             ],
13885             "type": "string"
13886         },
13887         "minItems": 1,
13888         "type": "array"
13889     },
13890     "ins": {
13891         "description": "The instance identifier for this web link in an array of web
13892 links - used in collections",
13893         "type": "integer"
13894     },
13895     "p": {
13896         "description": "Specifies the framework policies on the Resource referenced by
13897 the target URI",
13898         "properties": {
13899             "bm": {
13900                 "description": "Specifies the framework policies on the Resource referenced
13901 by the target URI for e.g. observable and discoverable",
13902                 "type": "integer"
13903             }
13904         },
13905         "required": [
13906             "bm"
13907         ],
13908         "type": "object"
13909     },
13910     "rel": {
13911         "description": "The relation of the target URI referenced by the link to the
13912 context URI",
13913         "oneOf": [
13914             {
13915                 "default": [
13916                     "hosts"
13917                 ],
13918                 "items": {
13919                     "maxLength": 64,
13920                     "type": "string"
13921                 },
13922                 "minItems": 1,
13923                 "type": "array"
13924             },
13925             {
13926                 "default": "hosts",
13927                 "maxLength": 64,
13928                 "type": "string"
13929             }
13930         ]
13931     },
13932     "rt": {
13933         "description": "Resource Type of the Resource",
13934         "items": {
13935             "maxLength": 64,
13936             "type": "string"
13937         },
13938         "minItems": 1,
13939         "type": "array"
13940     },
13941     "title": {

```

```

13942         "description": "A title for the link relation. Can be used by the UI to provide a
13943 context.",
13944         "maxLength": 64,
13945         "type": "string"
13946     },
13947     "type": {
13948         "default": "application/cbor",
13949         "description": "A hint at the representation of the resource referenced by the
13950 target URI. This represents the media types that are used for both accepting and emitting.",
13951         "items": {
13952             "maxLength": 64,
13953             "type": "string"
13954         },
13955         "minItems": 1,
13956         "type": "array"
13957     }
13958 },
13959 "required": [
13960     "href",
13961     "rt",
13962     "if"
13963 ],
13964 "type": "object"
13965 },
13966 {
13967     "description": "OCF link that points to a resource"
13968 }
13969 ]
13970 },
13971 "id" :
13972 {
13973     "description": "Instance ID of this specific resource",
13974     "maxLength": 64,
13975     "readOnly": true,
13976     "type": "string"
13977 },
13978 },
13979 "if" :
13980 {
13981     "description": "The interface set supported by this resource",
13982     "items": {
13983         "enum": [
13984             "oic.if.baseline",
13985             "oic.if.ll",
13986             "oic.if.b",
13987             "oic.if.lb",
13988             "oic.if.rw",
13989             "oic.if.r",
13990             "oic.if.a",
13991             "oic.if.s"
13992         ],
13993         "type": "string"
13994     },
13995     "minItems": 1,
13996     "readOnly": true,
13997     "type": "array"
13998 }
13999 }
14000 }
14001 }
14002 },
14003 "SceneCollection" : {
14004     "properties": {
14005         "rt" :
14006         {
14007             "description": "Resource Type of the Resource",
14008             "items": {
14009                 "maxLength": 64,
14010                 "type": "string"
14011             },
14012         },

```

```

14013         "minItems": 1,
14014         "readOnly": true,
14015         "type": "array"
14016     },
14017
14018     "lastScene" :
14019     {
14020         "description": "Last selected Scene from the set of sceneValues",
14021         "type": "string"
14022     },
14023
14024     "links" :
14025     {
14026         "description": "A set of simple or individual OIC Links.",
14027         "items": {
14028             "properties": {
14029                 "anchor": {
14030                     "description": "This is used to override the context URI e.g. override the URI of
14031 the containing collection.",
14032                     "format": "uri",
14033                     "maxLength": 256,
14034                     "type": "string"
14035                 },
14036                 "di": {
14037                     "description": "Format pattern according to IETF RFC 4122.",
14038                     "pattern": "^[a-fA-F0-9]{8}-[a-fA-F0-9]{4}-[a-fA-F0-9]{4}-[a-fA-F0-
14039 9]{12}$",
14040                     "type": "string"
14041                 },
14042                 "eps": {
14043                     "description": "the Endpoint information of the target Resource",
14044                     "items": {
14045                         "properties": {
14046                             "ep": {
14047                                 "description": "Transport Protocol Suite + Endpoint Locator",
14048                                 "format": "uri",
14049                                 "type": "string"
14050                             },
14051                             "pri": {
14052                                 "description": "The priority among multiple Endpoints",
14053                                 "minimum": 1,
14054                                 "type": "integer"
14055                             }
14056                         },
14057                         "type": "object"
14058                     },
14059                     "type": "array"
14060                 },
14061                 "href": {
14062                     "description": "This is the target URI, it can be specified as a Relative Reference
14063 or fully-qualified URI.",
14064                     "format": "uri",
14065                     "maxLength": 256,
14066                     "type": "string"
14067                 },
14068                 "if": {
14069                     "description": "The interface set supported by this resource",
14070                     "items": {
14071                         "enum": [
14072                             "oic.if.baseline",
14073                             "oic.if.ll",
14074                             "oic.if.b",
14075                             "oic.if.rw",
14076                             "oic.if.r",
14077                             "oic.if.a",
14078                             "oic.if.s"
14079                         ],
14080                         "type": "string"
14081                     },
14082                     "minItems": 1,
14083                     "type": "array"

```

```

14084         },
14085         "ins": {
14086             "description": "The instance identifier for this web link in an array of web links
14087 - used in collections",
14088             "type": "integer"
14089         },
14090         "p": {
14091             "description": "Specifies the framework policies on the Resource referenced by the
14092 target URI",
14093             "properties": {
14094                 "bm": {
14095                     "description": "Specifies the framework policies on the Resource referenced by
14096 the target URI for e.g. observable and discoverable",
14097                     "type": "integer"
14098                 }
14099             },
14100             "required": [
14101                 "bm"
14102             ],
14103             "type": "object"
14104         },
14105         "rel": {
14106             "description": "The relation of the target URI referenced by the link to the
14107 context URI",
14108             "oneOf": [
14109                 {
14110                     "default": [
14111                         "hosts"
14112                     ],
14113                     "items": {
14114                         "maxLength": 64,
14115                         "type": "string"
14116                     },
14117                     "minItems": 1,
14118                     "type": "array"
14119                 },
14120                 {
14121                     "default": "hosts",
14122                     "maxLength": 64,
14123                     "type": "string"
14124                 }
14125             ]
14126         },
14127         "rt": {
14128             "description": "Resource Type of the Resource",
14129             "items": {
14130                 "maxLength": 64,
14131                 "type": "string"
14132             },
14133             "minItems": 1,
14134             "type": "array"
14135         },
14136         "title": {
14137             "description": "A title for the link relation. Can be used by the UI to provide a
14138 context.",
14139             "maxLength": 64,
14140             "type": "string"
14141         },
14142         "type": {
14143             "default": "application/cbor",
14144             "description": "A hint at the representation of the resource referenced by the
14145 target URI. This represents the media types that are used for both accepting and emitting.",
14146             "items": {
14147                 "maxLength": 64,
14148                 "type": "string"
14149             },
14150             "minItems": 1,
14151             "type": "array"
14152         }
14153     },
14154     "required": [

```



```

14155         "href",
14156         "rt",
14157         "if"
14158     ],
14159     "type": "object"
14160 },
14161     "type": "array"
14162 },
14163
14164     "sceneValues" :
14165     {
14166         "description": "All available scene values",
14167         "items": {
14168             "type": "string"
14169         },
14170         "readOnly": true,
14171         "type": "array"
14172     },
14173
14174     "n" :
14175     {
14176         "description": "Friendly name of the resource",
14177         "maxLength": 64,
14178         "readOnly": true,
14179         "type": "string"
14180     },
14181
14182     "rts" :
14183     {
14184         "description": "Resource Type of the Resource",
14185         "items": {
14186             "maxLength": 64,
14187             "type": "string"
14188         },
14189         "minItems": 1,
14190         "readOnly": true,
14191         "type": "array"
14192     },
14193
14194     "id" :
14195     {
14196         "description": "Instance ID of this specific resource",
14197         "maxLength": 64,
14198         "readOnly": true,
14199         "type": "string"
14200     },
14201
14202     "if" :
14203     {
14204         "description": "The interface set supported by this resource",
14205         "items": {
14206             "enum": [
14207                 "oic.if.baseline",
14208                 "oic.if.ll",
14209                 "oic.if.b",
14210                 "oic.if.lb",
14211                 "oic.if.rw",
14212                 "oic.if.r",
14213                 "oic.if.a",
14214                 "oic.if.s"
14215             ],
14216             "type": "string"
14217         },
14218         "minItems": 1,
14219         "readOnly": true,
14220         "type": "array"
14221     }
14222 }
14223 }
14224 }
14225 ,

```

```

14226 "SceneCollectionUpdate" : {
14227   "properties": {
14228     "rt" :
14229     {
14230       "description": "Resource Type of the Resource",
14231       "items": {
14232         "maxLength": 64,
14233         "type": "string"
14234       },
14235       "minItems": 1,
14236       "readOnly": true,
14237       "type": "array"
14238     },
14239
14240     "lastScene" :
14241     {
14242       "description": "Last selected Scene from the set of sceneValues",
14243       "type": "string"
14244     },
14245
14246     "n" :
14247     {
14248       "description": "Friendly name of the resource",
14249       "maxLength": 64,
14250       "readOnly": true,
14251       "type": "string"
14252     },
14253
14254     "id" :
14255     {
14256       "description": "Instance ID of this specific resource",
14257       "maxLength": 64,
14258       "readOnly": true,
14259       "type": "string"
14260     },
14261
14262     "if" :
14263     {
14264       "description": "The interface set supported by this resource",
14265       "items": {
14266         "enum": [
14267           "oic.if.baseline",
14268           "oic.if.ll",
14269           "oic.if.b",
14270           "oic.if.lb",
14271           "oic.if.rw",
14272           "oic.if.r",
14273           "oic.if.a",
14274           "oic.if.s"
14275         ],
14276         "type": "string"
14277       },
14278       "minItems": 1,
14279       "readOnly": true,
14280       "type": "array"
14281     }
14282   }
14283 }
14284
14285 , "uuid" :
14286 {
14287   "description": "Format pattern according to IETF RFC 4122.",
14288   "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}$",
14289   "type": "string"
14290 }
14291
14292 , "oic.collection.properties" :
14293 {
14294   "description": "A collection is a set of links along with additional properties to describe
14295 the collection itself",
14296   "properties": {

```

```

14297     "rts": {
14298         "$ref": "#/definitions/oic.core/properties/rt",
14299         "description": "The list of allowable resource types (for Target and anchors) in links
14300 included in the collection"
14301     },
14302 },
14303 "type": "object"
14304 }
14305
14306 , "oic.core" :
14307 {
14308     "properties": {
14309         "rt": {
14310             "description": "Resource Type of the Resource",
14311             "items": {
14312                 "maxLength": 64,
14313                 "type": "string"
14314             },
14315             "minItems": 1,
14316             "readOnly": true,
14317             "type": "array"
14318         },
14319     },
14320     "type": "object"
14321 }
14322
14323 , "oic.collection.linksexpanded" :
14324 {
14325     "properties": {
14326         "links": {
14327             "description": "A set of simple or individual OIC Links.",
14328             "items": {
14329                 "properties": {
14330                     "anchor": {
14331                         "description": "This is used to override the context URI e.g. override the URI of
14332 the containing collection.",
14333                         "format": "uri",
14334                         "maxLength": 256,
14335                         "type": "string"
14336                     },
14337                     "di": {
14338                         "description": "Format pattern according to IETF RFC 4122.",
14339                         "pattern": "^[a-fA-F0-9]{8}-[a-fA-F0-9]{4}-[a-fA-F0-9]{4}-[a-fA-F0-
14340 9]{12}$",
14341                         "type": "string"
14342                     },
14343                     "eps": {
14344                         "description": "the Endpoint information of the target Resource",
14345                         "items": {
14346                             "properties": {
14347                                 "ep": {
14348                                     "description": "Transport Protocol Suite + Endpoint Locator",
14349                                     "format": "uri",
14350                                     "type": "string"
14351                                 },
14352                                 "pri": {
14353                                     "description": "The priority among multiple Endpoints",
14354                                     "minimum": 1,
14355                                     "type": "integer"
14356                                 }
14357                             },
14358                             "type": "object"
14359                         },
14360                         "type": "array"
14361                     },
14362                     "href": {
14363                         "description": "This is the target URI, it can be specified as a Relative Reference
14364 or fully-qualified URI.",
14365                         "format": "uri",
14366                         "maxLength": 256,
14367                         "type": "string"

```

```

14368     },
14369     "if": {
14370         "description": "The interface set supported by this resource",
14371         "items": {
14372             "enum": [
14373                 "oic.if.baseline",
14374                 "oic.if.ll",
14375                 "oic.if.b",
14376                 "oic.if.rw",
14377                 "oic.if.r",
14378                 "oic.if.a",
14379                 "oic.if.s"
14380             ],
14381             "type": "string"
14382         },
14383         "minItems": 1,
14384         "type": "array"
14385     },
14386     "ins": {
14387         "description": "The instance identifier for this web link in an array of web links
14388 - used in collections",
14389         "type": "integer"
14390     },
14391     "p": {
14392         "description": "Specifies the framework policies on the Resource referenced by the
14393 target URI",
14394         "properties": {
14395             "bm": {
14396                 "description": "Specifies the framework policies on the Resource referenced by
14397 the target URI for e.g. observable and discoverable",
14398                 "type": "integer"
14399             }
14400         },
14401         "required": [
14402             "bm"
14403         ],
14404         "type": "object"
14405     },
14406     "rel": {
14407         "description": "The relation of the target URI referenced by the link to the
14408 context URI",
14409         "oneOf": [
14410             {
14411                 "default": [
14412                     "hosts"
14413                 ],
14414                 "items": {
14415                     "maxLength": 64,
14416                     "type": "string"
14417                 },
14418                 "minItems": 1,
14419                 "type": "array"
14420             },
14421             {
14422                 "default": "hosts",
14423                 "maxLength": 64,
14424                 "type": "string"
14425             }
14426         ]
14427     },
14428     "rt": {
14429         "description": "Resource Type of the Resource",
14430         "items": {
14431             "maxLength": 64,
14432             "type": "string"
14433         },
14434         "minItems": 1,
14435         "type": "array"
14436     },
14437     "title": {
14438         "description": "A title for the link relation. Can be used by the UI to provide a

```

```

14439 context.",
14440         "maxLength": 64,
14441         "type": "string"
14442     },
14443     "type": {
14444         "default": "application/cbor",
14445         "description": "A hint at the representation of the resource referenced by the
14446 target URI. This represents the media types that are used for both accepting and emitting.",
14447         "items": {
14448             "maxLength": 64,
14449             "type": "string"
14450         },
14451         "minItems": 1,
14452         "type": "array"
14453     }
14454 },
14455 "required": [
14456     "href",
14457     "rt",
14458     "if"
14459 ],
14460 "type": "object"
14461 },
14462 "type": "array"
14463 }
14464 },
14465 "type": "object"
14466 }
14467
14468 ,"oic.collection.links" :
14469 {
14470     "properties": {
14471         "links": {
14472             "description": "A set of simple or individual OIC Links.",
14473             "items": {
14474                 "$ref": "#/definitions/oic.oic-link"
14475             },
14476             "type": "array"
14477         }
14478     },
14479     "type": "object"
14480 }
14481
14482 ,"oic.oic-link" :
14483 {
14484     "properties": {
14485         "anchor": {
14486             "description": "This is used to override the context URI e.g. override the URI of the
14487 containing collection.",
14488             "format": "uri",
14489             "maxLength": 256,
14490             "type": "string"
14491         },
14492         "di": {
14493             "$ref": "#/definitions/uuid",
14494             "description": "The device ID"
14495         },
14496         "eps": {
14497             "description": "the Endpoint information of the target Resource",
14498             "items": {
14499                 "properties": {
14500                     "ep": {
14501                         "description": "Transport Protocol Suite + Endpoint Locator",
14502                         "format": "uri",
14503                         "type": "string"
14504                     },
14505                     "pri": {
14506                         "description": "The priority among multiple Endpoints",
14507                         "minimum": 1,
14508                         "type": "integer"
14509                     }

```

```

14510         },
14511         "type": "object"
14512     },
14513     "type": "array"
14514 },
14515 "href": {
14516     "description": "This is the target URI, it can be specified as a Relative Reference or
14517 fully-qualified URI.",
14518     "format": "uri",
14519     "maxLength": 256,
14520     "type": "string"
14521 },
14522 "if": {
14523     "description": "The interface set supported by this resource",
14524     "items": {
14525         "enum": [
14526             "oic.if.baseline",
14527             "oic.if.ll",
14528             "oic.if.b",
14529             "oic.if.rw",
14530             "oic.if.r",
14531             "oic.if.a",
14532             "oic.if.s"
14533         ],
14534         "type": "string"
14535     },
14536     "minItems": 1,
14537     "type": "array"
14538 },
14539 "ins": {
14540     "description": "The instance identifier for this web link in an array of web links - used
14541 in collections",
14542     "type": "integer"
14543 },
14544 "p": {
14545     "description": "Specifies the framework policies on the Resource referenced by the target
14546 URI",
14547     "properties": {
14548         "bm": {
14549             "description": "Specifies the framework policies on the Resource referenced by the
14550 target URI for e.g. observable and discoverable",
14551             "type": "integer"
14552         }
14553     },
14554     "required": [
14555         "bm"
14556     ],
14557     "type": "object"
14558 },
14559 "rel": {
14560     "description": "The relation of the target URI referenced by the link to the context
14561 URI",
14562     "oneOf": [
14563         {
14564             "default": [
14565                 "hosts"
14566             ],
14567             "items": {
14568                 "maxLength": 64,
14569                 "type": "string"
14570             },
14571             "minItems": 1,
14572             "type": "array"
14573         },
14574         {
14575             "default": "hosts",
14576             "maxLength": 64,
14577             "type": "string"
14578         }
14579     ]
14580 },

```

```

14581     "rt": {
14582         "description": "Resource Type of the Resource",
14583         "items": {
14584             "maxLength": 64,
14585             "type": "string"
14586         },
14587         "minItems": 1,
14588         "type": "array"
14589     },
14590     "title": {
14591         "description": "A title for the link relation. Can be used by the UI to provide a
14592 context.",
14593         "maxLength": 64,
14594         "type": "string"
14595     },
14596     "type": {
14597         "default": "application/cbor",
14598         "description": "A hint at the representation of the resource referenced by the target
14599 URI. This represents the media types that are used for both accepting and emitting.",
14600         "items": {
14601             "maxLength": 64,
14602             "type": "string"
14603         },
14604         "minItems": 1,
14605         "type": "array"
14606     }
14607 },
14608 "required": [
14609     "href",
14610     "rt",
14611     "if"
14612 ],
14613 "type": "object"
14614 }
14615 }
14616 }
14617 }
14618 }

```

14619 **F.13.5 Property Definition**

Property name	Value type	Mandatory	Access mode	Description
id	string		Read Only	Instance ID of this specific resource
n	string		Read Only	Friendly name of the resource
SceneMappings	array: see schema			array of mappings per scene, can be one(1)
if	array: see schema		Read Only	The interface set supported by this resource
rt	array: see schema		Read Only	Resource Type of the Resource
link	multiple types: see schema			
rt	array: see schema		Read Only	Resource Type of the Resource
id	string		Read Only	Instance ID of this specific resource

links	array: see schema				A set of simple or individual OIC Links.
sceneValues	array: see schema			Read Only	All available scene values
n	string			Read Only	Friendly name of the resource
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
lastScene	string				Last selected Scene from the set of sceneValues
rts	array: see schema			Read Only	Resource Type of the Resource
if	array: see schema	yes			The interface set supported by this resource
di	multiple types: see schema				The device ID
anchor	string				This is used to override the context URI e.g. override the URI of the containing collection.
href	string	yes			This is the target URI, it can be specified as a Relative Reference or fully-qualified URI.
rel	multiple types: see schema				The relation of the target URI referenced by the link to the context URI
eps	array: see schema				the Endpoint information of the target Resource
rt	array: see schema	yes			Resource Type of the Resource
type	array: see schema				A hint at the representation of the resource referenced by the target URI. This represents the media types that are used for

				both accepting and emitting.
title	string			A title for the link relation. Can be used by the UI to provide a context.
ins	integer			The instance identifier for this web link in an array of web links - used in collections
p	object: see schema			Specifies the framework policies on the Resource referenced by the target URI
links	array: see schema			A set of simple or individual OIC Links.
links	array: see schema			A set of simple or individual OIC Links.
id	string		Read Only	Instance ID of this specific resource
rt	array: see schema		Read Only	Resource Type of the Resource
if	array: see schema		Read Only	The interface set supported by this resource
lastScene	string			Last selected Scene from the set of sceneValues
n	string		Read Only	Friendly name of the resource
rts	multiple types: see schema			The list of allowable resource types (for Target and anchors) in links included in the collection
links	array: see schema			A set of simple or individual OIC Links.

14620

F.13.6 CRUDN behaviour

Resource	Create	Read	Update	Delete	Notify
/SceneCollectionResURI		get	post		

14621 **F.14 Scene Member**

14622 **F.14.1 Introduction**

14623 Collection that models a scene member.
14624

14625 **F.14.2 Example URI**

14626 /SceneMemberResURI

14627 **F.14.3 Resource Type**

14628 The resource type (rt) is defined as: ['oic.wk.scenemember'].

14629 **F.14.4 Swagger2.0 Definition**

```
14630 {  
14631   "swagger": "2.0",  
14632   "info": {  
14633     "title": "Scenes (Top level)",  
14634     "version": "v1-20160622",  
14635     "license": {  
14636       "name": "copyright 2016-2017 Open Connectivity Foundation, Inc. All rights reserved.",  
14637       "x-description": "Redistribution and use in source and binary forms, with or without  
14638 modification, are permitted provided that the following conditions are met:\n      1.  
14639 Redistributions of source code must retain the above copyright notice, this list of conditions and  
14640 the following disclaimer.\n      2. Redistributions in binary form must reproduce the above  
14641 copyright notice, this list of conditions and the following disclaimer in the documentation and/or  
14642 other materials provided with the distribution.\n      THIS SOFTWARE IS PROVIDED BY THE Open  
14643 Connectivity Foundation, INC. \AS IS\ AND ANY EXPRESS OR IMPLIED WARRANTIES, INCLUDING, BUT NOT  
14644 LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE OR  
14645 WARRANTIES OF NON-INFRINGEMENT, ARE DISCLAIMED.\n      IN NO EVENT SHALL THE Open Connectivity  
14646 Foundation, INC. OR CONTRIBUTORS BE LIABLE FOR ANY DIRECT, INDIRECT, INCIDENTAL, SPECIAL,  
14647 EXEMPLARY, OR CONSEQUENTIAL DAMAGES (INCLUDING, BUT NOT LIMITED TO, PROCUREMENT OF SUBSTITUTE GOODS  
14648 OR SERVICES; LOSS OF USE, DATA, OR PROFITS; OR BUSINESS INTERRUPTION)\n      HOWEVER CAUSED AND  
14649 ON ANY THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT (INCLUDING NEGLIGENCE OR  
14650 OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OF THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY  
14651 OF SUCH DAMAGE.\n    }  
14652   },  
14653   "schemes": ["http"],  
14654   "consumes": ["application/json"],  
14655   "produces": ["application/json"],  
14656   "paths": {  
14657     "/SceneListResURI" : {  
14658       "get": {  
14659         "description": "Toplevel Scene resource.\nThis resource is a generic collection  
14660 resource.\nThe rts value shall contain oic.wk.scenecollection resource types.\nProvides the current  
14661 list of web links pointing to scenes\n",  
14662         "parameters": [  
14663           ],  
14664         "responses": {  
14665           "200": {  
14666             "description": "",  
14667             "x-example":  
14668               {  
14669                 "rt": ["oic.wk.scenelist"],  
14670                 "n": "list of scene Collections",  
14671                 "rts": ["oic.wk.scenecollection"],  
14672                 "links": [  
14673                   ]  
14674               }  
14675             },  
14676             "schema": { "$ref": "#/definitions/Collection" }  
14677           }  
14678         }  
14679       }  
14680     }  
14681   },  
14682   "/SceneMemberResURI" : {  
14683     "get": {
```

```

14684     "description": "Collection that models a scene member.\nProvides the scene member\n",
14685     "parameters": [
14686     ],
14687     "responses": {
14688         "200": {
14689             "description": "",
14690             "x-example":
14691             {
14692                 "rt": ["oic.wk.scenemember"],
14693                 "id": "0685B960-FFFF-46F7-BEC0-9E6234671ADC1",
14694                 "n": "my binary switch (for light bulb) mappings",
14695                 "link": {
14696                     "href": "binarySwitch",
14697                     "rt": ["oic.r.switch.binary"],
14698                     "if": ["oic.if.a", "oic.if.baseline"],
14699                     "eps": [
14700                         {"ep": "coap://[fe80::b1d6]:1111", "pri": 2},
14701                         {"ep": "coaps://[fe80::b1d6]:1122"},
14702                         {"ep": "coap+tcp://[2001:db8:a::123]:2222", "pri": 3}
14703                     ]
14704                 },
14705                 "sceneMappings": [
14706                 {
14707                     "scene": "off",
14708                     "memberProperty": "value",
14709                     "memberValue": true
14710                 },
14711                 {
14712                     "scene": "Reading",
14713                     "memberProperty": "value",
14714                     "memberValue": false
14715                 },
14716                 {
14717                     "scene": "TVWatching",
14718                     "memberProperty": "value",
14719                     "memberValue": true
14720                 }
14721                 ]
14722             }
14723         },
14724         "schema": { "$ref": "#/definitions/SceneMember" }
14725     }
14726 }
14727 }
14728 },
14729 "/SceneCollectionResURI" : {
14730     "get": {
14731         "description": "Collection that models a set of Scenes.\nThis resource is a generic
14732 collection resource with additional parameters.\nThe rts value shall contain oic.scenemember
14733 resource types.\nThe additional parameters are\n lastScene, this is the scene value last set by
14734 any OCF Client\n sceneValues, this is the list of available scenes\n lastScene shall be listed in
14735 sceneValues.\nProvides the current list of web links pointing to scenes\n",
14736         "parameters": [
14737         ],
14738         "responses": {
14739             "200": {
14740                 "description": "",
14741                 "x-example":
14742                 {
14743                     "lastScene": "off",
14744                     "sceneValues": ["off", "Reading", "TVWatching"],
14745                     "rt": ["oic.wk.scenecollection"],
14746                     "n": "My Scenes for my living room",
14747                     "id": "0685B960-736F-46F7-BEC0-9E6CBD671ADC1",
14748                     "rts": ["oic.wk.scenemember"],
14749                     "links": [
14750                     ]
14751                 }
14752             },
14753             "schema": { "$ref": "#/definitions/SceneCollection" }
14754         }
14755     }
14756 }

```

```

14755     }
14756   },
14757   "post": {
14758     "description": "Provides the action to change the last set scene selection.\nCalling this
14759 method shall update all scene members to the prescribed membervalue.\nWhen this method is called
14760 with the same value as the current lastScene value\nthen all scene members shall be updated.\n",
14761     "parameters": [
14762       {
14763         "name": "body",
14764         "in": "body",
14765         "required": true,
14766         "schema": { "$ref": "#/definitions/SceneCollectionUpdate" },
14767         "x-example":
14768           {
14769             "lastScene": "Reading"
14770           }
14771       }
14772     ],
14773     "responses": {
14774       "200": {
14775         "description": "Indicates that the value is changed.\nThe changed properties are
14776 provided in the response.\n",
14777         "x-example":
14778           {
14779             "lastScene": "Reading"
14780           }
14781         ,
14782         "schema": { "$ref": "#/definitions/SceneCollectionUpdate" }
14783       }
14784     }
14785   }
14786 },
14787 "parameters": {
14788   "interface": {
14789     "in": "query",
14790     "name": "if",
14791     "type": "string",
14792     "enum": ["oic.if.a", "oic.if.ll", "oic.if.baseline"]
14793   }
14794 },
14795 "definitions": {
14796   "Collection": {
14797     "properties": {
14798       "links": {
14799         {
14800           "description": "A set of simple or individual OIC Links.",
14801           "items": {
14802             "$ref": "#/definitions/oic.oic-link"
14803           },
14804           "type": "array"
14805         }
14806       }
14807     }
14808   }
14809 },
14810 "SceneMember": {
14811   "properties": {
14812     "rt": {
14813       {
14814         "description": "Resource Type of the Resource",
14815         "items": {
14816           "maxLength": 64,
14817           "type": "string"
14818         },
14819         "minItems": 1,
14820         "readOnly": true,
14821         "type": "array"
14822       }
14823     },
14824     "SceneMappings":

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```

14826         {
14827         "description": "array of mappings per scene, can be one(1)",
14828         "items": {
14829             "properties": {
14830                 "memberProperty": {
14831                     "description": "property name that will be mapped",
14832                     "readOnly": true,
14833                     "type": "string"
14834                 },
14835                 "memberValue": {
14836                     "description": "value of the Member Property",
14837                     "readOnly": true,
14838                     "type": "string"
14839                 },
14840                 "scene": {
14841                     "description": "Specifies a scene value that will be acted upon",
14842                     "type": "string"
14843                 }
14844             },
14845             "required": [
14846                 "scene",
14847                 "memberProperty",
14848                 "memberValue"
14849             ],
14850             "type": "object"
14851         },
14852         "type": "array"
14853     },
14854
14855     "n" :
14856     {
14857         "description": "Friendly name of the resource",
14858         "maxLength": 64,
14859         "readOnly": true,
14860         "type": "string"
14861     },
14862
14863     "link" :
14864     {
14865         "allof": [
14866             {
14867                 "properties": {
14868                     "anchor": {
14869                         "description": "This is used to override the context URI e.g. override the URI of
14870 the containing collection.",
14871                         "format": "uri",
14872                         "maxLength": 256,
14873                         "type": "string"
14874                     },
14875                     "di": {
14876                         "allof": [
14877                             {
14878                                 "description": "Format pattern according to IETF RFC 4122.",
14879                                 "pattern": "^[a-fA-F0-9]{8}-[a-fA-F0-9]{4}-[a-fA-F0-9]{4}-[a-fA-F0-9]{4}-[a-
14880 fA-F0-9]{12}$",
14881                                 "type": "string"
14882                             },
14883                             {
14884                                 "description": "The device ID"
14885                             }
14886                         ]
14887                     },
14888                     "eps": {
14889                         "description": "the Endpoint information of the target Resource",
14890                         "items": {
14891                             "properties": {
14892                                 "ep": {
14893                                     "description": "Transport Protocol Suite + Endpoint Locator",
14894                                     "format": "uri",
14895                                     "type": "string"
14896                                 },

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14887         "pri": {
14888             "description": "The priority among multiple Endpoints",
14889             "minimum": 1,
14900             "type": "integer"
14901         }
14902     },
14903     "type": "object"
14904 },
14905 "type": "array"
14906 },
14907 "href": {
14908     "description": "This is the target URI, it can be specified as a Relative
14909 Reference or fully-qualified URI.",
14910     "format": "uri",
14911     "maxLength": 256,
14912     "type": "string"
14913 },
14914 "if": {
14915     "description": "The interface set supported by this resource",
14916     "items": {
14917         "enum": [
14918             "oic.if.baseline",
14919             "oic.if.ll",
14920             "oic.if.b",
14921             "oic.if.rw",
14922             "oic.if.r",
14923             "oic.if.a",
14924             "oic.if.s"
14925         ],
14926         "type": "string"
14927     },
14928     "minItems": 1,
14929     "type": "array"
14930 },
14931 "ins": {
14932     "description": "The instance identifier for this web link in an array of web
14933 links - used in collections",
14934     "type": "integer"
14935 },
14936 "p": {
14937     "description": "Specifies the framework policies on the Resource referenced by
14938 the target URI",
14939     "properties": {
14940         "bm": {
14941             "description": "Specifies the framework policies on the Resource referenced
14942 by the target URI for e.g. observable and discoverable",
14943             "type": "integer"
14944         }
14945     },
14946     "required": [
14947         "bm"
14948     ],
14949     "type": "object"
14950 },
14951 "rel": {
14952     "description": "The relation of the target URI referenced by the link to the
14953 context URI",
14954     "oneOf": [
14955         {
14956             "default": [
14957                 "hosts"
14958             ],
14959             "items": {
14960                 "maxLength": 64,
14961                 "type": "string"
14962             },
14963             "minItems": 1,
14964             "type": "array"
14965         },
14966         {
14967             "default": "hosts",

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```

14968         "maxLength": 64,
14969         "type": "string"
14970     }
14971 ]
14972 },
14973 "rt": {
14974     "description": "Resource Type of the Resource",
14975     "items": {
14976         "maxLength": 64,
14977         "type": "string"
14978     },
14979     "minItems": 1,
14980     "type": "array"
14981 },
14982 "title": {
14983     "description": "A title for the link relation. Can be used by the UI to provide a
14984 context.",
14985     "maxLength": 64,
14986     "type": "string"
14987 },
14988 "type": {
14989     "default": "application/cbor",
14990     "description": "A hint at the representation of the resource referenced by the
14991 target URI. This represents the media types that are used for both accepting and emitting.",
14992     "items": {
14993         "maxLength": 64,
14994         "type": "string"
14995     },
14996     "minItems": 1,
14997     "type": "array"
14998 }
14999 },
15000 "required": [
15001     "href",
15002     "rt",
15003     "if"
15004 ],
15005 "type": "object"
15006 },
15007 {
15008     "description": "OCF link that points to a resource"
15009 }
15010 ]
15011 },
15012 "id" :
15013 {
15014     "description": "Instance ID of this specific resource",
15015     "maxLength": 64,
15016     "readOnly": true,
15017     "type": "string"
15018 },
15019 },
15020 "if" :
15021 {
15022     "description": "The interface set supported by this resource",
15023     "items": {
15024         "enum": [
15025             "oic.if.baseline",
15026             "oic.if.ll",
15027             "oic.if.b",
15028             "oic.if.lb",
15029             "oic.if.rw",
15030             "oic.if.r",
15031             "oic.if.a",
15032             "oic.if.s"
15033         ],
15034     },
15035     "type": "string"
15036 },
15037 "minItems": 1,
15038 "readOnly": true,

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```

15039         "type": "array"
15040     }
15041
15042     }
15043 }
15044 ,
15045 "SceneCollection" : {
15046     "properties": {
15047         "rt" :
15048         {
15049             "description": "Resource Type of the Resource",
15050             "items": {
15051                 "maxLength": 64,
15052                 "type": "string"
15053             },
15054             "minItems": 1,
15055             "readOnly": true,
15056             "type": "array"
15057         },
15058
15059         "lastScene" :
15060         {
15061             "description": "Last selected Scene from the set of sceneValues",
15062             "type": "string"
15063         },
15064
15065         "links" :
15066         {
15067             "description": "A set of simple or individual OIC Links.",
15068             "items": {
15069                 "properties": {
15070                     "anchor": {
15071                         "description": "This is used to override the context URI e.g. override the URI of
15072 the containing collection.",
15073                         "format": "uri",
15074                         "maxLength": 256,
15075                         "type": "string"
15076                     },
15077                     "di": {
15078                         "description": "Format pattern according to IETF RFC 4122.",
15079                         "pattern": "^[a-fA-F0-9]{8}-[a-fA-F0-9]{4}-[a-fA-F0-9]{4}-[a-fA-F0-9]{4}-[a-fA-F0-
15080 9]{12}$",
15081                         "type": "string"
15082                     },
15083                     "eps": {
15084                         "description": "the Endpoint information of the target Resource",
15085                         "items": {
15086                             "properties": {
15087                                 "ep": {
15088                                     "description": "Transport Protocol Suite + Endpoint Locator",
15089                                     "format": "uri",
15090                                     "type": "string"
15091                                 },
15092                                 "pri": {
15093                                     "description": "The priority among multiple Endpoints",
15094                                     "minimum": 1,
15095                                     "type": "integer"
15096                                 }
15097                             },
15098                             "type": "object"
15099                         },
15100                         "type": "array"
15101                     },
15102                     "href": {
15103                         "description": "This is the target URI, it can be specified as a Relative Reference
15104 or fully-qualified URI.",
15105                         "format": "uri",
15106                         "maxLength": 256,
15107                         "type": "string"
15108                     },
15109                     "if": {

```



```

15110         "description": "The interface set supported by this resource",
15111         "items": {
15112             "enum": [
15113                 "oic.if.baseline",
15114                 "oic.if.ll",
15115                 "oic.if.b",
15116                 "oic.if.rw",
15117                 "oic.if.r",
15118                 "oic.if.a",
15119                 "oic.if.s"
15120             ],
15121             "type": "string"
15122         },
15123         "minItems": 1,
15124         "type": "array"
15125     },
15126     "ins": {
15127         "description": "The instance identifier for this web link in an array of web links
15128 - used in collections",
15129         "type": "integer"
15130     },
15131     "p": {
15132         "description": "Specifies the framework policies on the Resource referenced by the
15133 target URI",
15134         "properties": {
15135             "bm": {
15136                 "description": "Specifies the framework policies on the Resource referenced by
15137 the target URI for e.g. observable and discoverable",
15138                 "type": "integer"
15139             }
15140         },
15141         "required": [
15142             "bm"
15143         ],
15144         "type": "object"
15145     },
15146     "rel": {
15147         "description": "The relation of the target URI referenced by the link to the
15148 context URI",
15149         "oneOf": [
15150             {
15151                 "default": [
15152                     "hosts"
15153                 ],
15154                 "items": {
15155                     "maxLength": 64,
15156                     "type": "string"
15157                 },
15158                 "minItems": 1,
15159                 "type": "array"
15160             },
15161             {
15162                 "default": "hosts",
15163                 "maxLength": 64,
15164                 "type": "string"
15165             }
15166         ]
15167     },
15168     "rt": {
15169         "description": "Resource Type of the Resource",
15170         "items": {
15171             "maxLength": 64,
15172             "type": "string"
15173         },
15174         "minItems": 1,
15175         "type": "array"
15176     },
15177     "title": {
15178         "description": "A title for the link relation. Can be used by the UI to provide a
15179 context.",
15180         "maxLength": 64,

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```

15181         "type": "string"
15182     },
15183     "type": {
15184         "default": "application/cbor",
15185         "description": "A hint at the representation of the resource referenced by the
15186 target URI. This represents the media types that are used for both accepting and emitting.",
15187         "items": {
15188             "maxLength": 64,
15189             "type": "string"
15190         },
15191         "minItems": 1,
15192         "type": "array"
15193     },
15194 },
15195 "required": [
15196     "href",
15197     "rt",
15198     "if"
15199 ],
15200 "type": "object"
15201 },
15202 "type": "array"
15203 },
15204
15205 "sceneValues" :
15206 {
15207     "description": "All available scene values",
15208     "items": {
15209         "type": "string"
15210     },
15211     "readOnly": true,
15212     "type": "array"
15213 },
15214
15215 "n" :
15216 {
15217     "description": "Friendly name of the resource",
15218     "maxLength": 64,
15219     "readOnly": true,
15220     "type": "string"
15221 },
15222
15223 "rts" :
15224 {
15225     "description": "Resource Type of the Resource",
15226     "items": {
15227         "maxLength": 64,
15228         "type": "string"
15229     },
15230     "minItems": 1,
15231     "readOnly": true,
15232     "type": "array"
15233 },
15234
15235 "id" :
15236 {
15237     "description": "Instance ID of this specific resource",
15238     "maxLength": 64,
15239     "readOnly": true,
15240     "type": "string"
15241 },
15242
15243 "if" :
15244 {
15245     "description": "The interface set supported by this resource",
15246     "items": {
15247         "enum": [
15248             "oic.if.baseline",
15249             "oic.if.ll",
15250             "oic.if.b",
15251             "oic.if.lb",

```

```

15252         "oic.if.rw",
15253         "oic.if.r",
15254         "oic.if.a",
15255         "oic.if.s"
15256     ],
15257     "type": "string"
15258 },
15259     "minItems": 1,
15260     "readOnly": true,
15261     "type": "array"
15262 }
15263 }
15264 }
15265 }
15266 ,
15267 "SceneCollectionUpdate" : {
15268     "properties": {
15269         "rt" :
15270         {
15271             "description": "Resource Type of the Resource",
15272             "items": {
15273                 "maxLength": 64,
15274                 "type": "string"
15275             },
15276             "minItems": 1,
15277             "readOnly": true,
15278             "type": "array"
15279         },
15280         "lastScene" :
15281         {
15282             "description": "Last selected Scene from the set of sceneValues",
15283             "type": "string"
15284         },
15285     },
15286     "n" :
15287     {
15288         "description": "Friendly name of the resource",
15289         "maxLength": 64,
15290         "readOnly": true,
15291         "type": "string"
15292     },
15293 },
15294     "id" :
15295     {
15296         "description": "Instance ID of this specific resource",
15297         "maxLength": 64,
15298         "readOnly": true,
15299         "type": "string"
15300     },
15301 },
15302     "if" :
15303     {
15304         "description": "The interface set supported by this resource",
15305         "items": {
15306             "enum": [
15307                 "oic.if.baseline",
15308                 "oic.if.ll",
15309                 "oic.if.b",
15310                 "oic.if.lb",
15311                 "oic.if.rw",
15312                 "oic.if.r",
15313                 "oic.if.a",
15314                 "oic.if.s"
15315             ],
15316             "type": "string"
15317         },
15318     },
15319     "minItems": 1,
15320     "readOnly": true,
15321     "type": "array"
15322 }

```

```

15323     }
15324   }
15325 }
15326   , "uuid" :
15327   {
15328     "description": "Format pattern according to IETF RFC 4122.",
15329     "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}$",
15330     "type": "string"
15331   }
15332
15333   , "oic.collection.properties" :
15334   {
15335     "description": "A collection is a set of links along with additional properties to describe
15336 the collection itself",
15337     "properties": {
15338       "rts": {
15339         "$ref": "#/definitions/oic.core/properties/rt",
15340         "description": "The list of allowable resource types (for Target and anchors) in links
15341 included in the collection"
15342       }
15343     },
15344     "type": "object"
15345   }
15346
15347   , "oic.core" :
15348   {
15349     "properties": {
15350       "rt": {
15351         "description": "Resource Type of the Resource",
15352         "items": {
15353           "maxLength": 64,
15354           "type": "string"
15355         },
15356         "minItems": 1,
15357         "readOnly": true,
15358         "type": "array"
15359       }
15360     },
15361     "type": "object"
15362   }
15363
15364   , "oic.collection.linksexpanded" :
15365   {
15366     "properties": {
15367       "links": {
15368         "description": "A set of simple or individual OIC Links.",
15369         "items": {
15370           "properties": {
15371             "anchor": {
15372               "description": "This is used to override the context URI e.g. override the URI of
15373 the containing collection.",
15374               "format": "uri",
15375               "maxLength": 256,
15376               "type": "string"
15377             },
15378             "di": {
15379               "description": "Format pattern according to IETF RFC 4122.",
15380               "pattern": "^[a-fA-F0-9]{8}-[a-fA-F0-9]{4}-[a-fA-F0-9]{4}-[a-fA-F0-9]{4}-[a-fA-F0-
15381 9]{12}$",
15382               "type": "string"
15383             },
15384             "eps": {
15385               "description": "the Endpoint information of the target Resource",
15386               "items": {
15387                 "properties": {
15388                   "ep": {
15389                     "description": "Transport Protocol Suite + Endpoint Locator",
15390                     "format": "uri",
15391                     "type": "string"
15392                   },
15393                   "pri": {

```

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15394         "description": "The priority among multiple Endpoints",
15395         "minimum": 1,
15396         "type": "integer"
15397     }
15398 },
15399     "type": "object"
15400 },
15401     "type": "array"
15402 },
15403     "href": {
15404         "description": "This is the target URI, it can be specified as a Relative Reference
15405 or fully-qualified URI.",
15406         "format": "uri",
15407         "maxLength": 256,
15408         "type": "string"
15409     },
15410     "if": {
15411         "description": "The interface set supported by this resource",
15412         "items": {
15413             "enum": [
15414                 "oic.if.baseline",
15415                 "oic.if.ll",
15416                 "oic.if.b",
15417                 "oic.if.rw",
15418                 "oic.if.r",
15419                 "oic.if.a",
15420                 "oic.if.s"
15421             ],
15422             "type": "string"
15423         },
15424         "minItems": 1,
15425         "type": "array"
15426     },
15427     "ins": {
15428         "description": "The instance identifier for this web link in an array of web links
15429 - used in collections",
15430         "type": "integer"
15431     },
15432     "p": {
15433         "description": "Specifies the framework policies on the Resource referenced by the
15434 target URI",
15435         "properties": {
15436             "bm": {
15437                 "description": "Specifies the framework policies on the Resource referenced by
15438 the target URI for e.g. observable and discoverable",
15439                 "type": "integer"
15440             }
15441         },
15442         "required": [
15443             "bm"
15444         ],
15445         "type": "object"
15446     },
15447     "rel": {
15448         "description": "The relation of the target URI referenced by the link to the
15449 context URI",
15450         "oneOf": [
15451             {
15452                 "default": [
15453                     "hosts"
15454                 ],
15455                 "items": {
15456                     "maxLength": 64,
15457                     "type": "string"
15458                 },
15459                 "minItems": 1,
15460                 "type": "array"
15461             },
15462             {
15463                 "default": "hosts",
15464                 "maxLength": 64,

```

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15465         "type": "string"
15466     }
15467 ]
15468 },
15469 "rt": {
15470     "description": "Resource Type of the Resource",
15471     "items": {
15472         "maxLength": 64,
15473         "type": "string"
15474     },
15475     "minItems": 1,
15476     "type": "array"
15477 },
15478 "title": {
15479     "description": "A title for the link relation. Can be used by the UI to provide a
15480 context.",
15481     "maxLength": 64,
15482     "type": "string"
15483 },
15484 "type": {
15485     "default": "application/cbor",
15486     "description": "A hint at the representation of the resource referenced by the
15487 target URI. This represents the media types that are used for both accepting and emitting.",
15488     "items": {
15489         "maxLength": 64,
15490         "type": "string"
15491     },
15492     "minItems": 1,
15493     "type": "array"
15494 }
15495 },
15496 "required": [
15497     "href",
15498     "rt",
15499     "if"
15500 ],
15501 "type": "object"
15502 },
15503 "type": "array"
15504 }
15505 },
15506 "type": "object"
15507 }
15508
15509 , "oic.collection.links" :
15510 {
15511     "properties": {
15512         "links": {
15513             "description": "A set of simple or individual OIC Links.",
15514             "items": {
15515                 "$ref": "#/definitions/oic.oic-link"
15516             },
15517             "type": "array"
15518         }
15519     },
15520     "type": "object"
15521 }
15522
15523 , "oic.oic-link" :
15524 {
15525     "properties": {
15526         "anchor": {
15527             "description": "This is used to override the context URI e.g. override the URI of the
15528 containing collection.",
15529             "format": "uri",
15530             "maxLength": 256,
15531             "type": "string"
15532         },
15533         "di": {
15534             "$ref": "#/definitions/uuid",
15535             "description": "The device ID"

```

```

15536     },
15537     "eps": {
15538         "description": "the Endpoint information of the target Resource",
15539         "items": {
15540             "properties": {
15541                 "ep": {
15542                     "description": "Transport Protocol Suite + Endpoint Locator",
15543                     "format": "uri",
15544                     "type": "string"
15545                 },
15546                 "pri": {
15547                     "description": "The priority among multiple Endpoints",
15548                     "minimum": 1,
15549                     "type": "integer"
15550                 }
15551             },
15552             "type": "object"
15553         },
15554         "type": "array"
15555     },
15556     "href": {
15557         "description": "This is the target URI, it can be specified as a Relative Reference or
15558 fully-qualified URI.",
15559         "format": "uri",
15560         "maxLength": 256,
15561         "type": "string"
15562     },
15563     "if": {
15564         "description": "The interface set supported by this resource",
15565         "items": {
15566             "enum": [
15567                 "oic.if.baseline",
15568                 "oic.if.ll",
15569                 "oic.if.b",
15570                 "oic.if.rw",
15571                 "oic.if.r",
15572                 "oic.if.a",
15573                 "oic.if.s"
15574             ],
15575             "type": "string"
15576         },
15577         "minItems": 1,
15578         "type": "array"
15579     },
15580     "ins": {
15581         "description": "The instance identifier for this web link in an array of web links - used
15582 in collections",
15583         "type": "integer"
15584     },
15585     "p": {
15586         "description": "Specifies the framework policies on the Resource referenced by the target
15587 URI",
15588         "properties": {
15589             "bm": {
15590                 "description": "Specifies the framework policies on the Resource referenced by the
15591 target URI for e.g. observable and discoverable",
15592                 "type": "integer"
15593             }
15594         },
15595         "required": [
15596             "bm"
15597         ],
15598         "type": "object"
15599     },
15600     "rel": {
15601         "description": "The relation of the target URI referenced by the link to the context
15602 URI",
15603         "oneOf": [
15604             {
15605                 "default": [
15606                     "hosts"

```

```

15607         ],
15608         "items": {
15609             "maxLength": 64,
15610             "type": "string"
15611         },
15612         "minItems": 1,
15613         "type": "array"
15614     },
15615     {
15616         "default": "hosts",
15617         "maxLength": 64,
15618         "type": "string"
15619     }
15620 ],
15621 },
15622 "rt": {
15623     "description": "Resource Type of the Resource",
15624     "items": {
15625         "maxLength": 64,
15626         "type": "string"
15627     },
15628     "minItems": 1,
15629     "type": "array"
15630 },
15631 "title": {
15632     "description": "A title for the link relation. Can be used by the UI to provide a
15633 context.",
15634     "maxLength": 64,
15635     "type": "string"
15636 },
15637 "type": {
15638     "default": "application/cbor",
15639     "description": "A hint at the representation of the resource referenced by the target
15640 URI. This represents the media types that are used for both accepting and emitting.",
15641     "items": {
15642         "maxLength": 64,
15643         "type": "string"
15644     },
15645     "minItems": 1,
15646     "type": "array"
15647 }
15648 },
15649 "required": [
15650     "href",
15651     "rt",
15652     "if"
15653 ],
15654 "type": "object"
15655 }
15656 }
15657 }
15658 }
15659

```

15660 **F.14.5 Property Definition**

Property name	Value type	Mandatory	Access mode	Description
rt	array: see schema	yes	Read Only	Resource Type of the Resource
lastScene	string			Last selected Scene from the set of sceneValues
rts	array: see schema		Read Only	Resource Type of the Resource
links	array: see schema			A set of simple or individual OIC Links.

if	array: see schema	yes	Read Only	The interface set supported by this resource
sceneValues	array: see schema		Read Only	All available scene values
id	string		Read Only	Instance ID of this specific resource
n	string		Read Only	Friendly name of the resource
rt	array: see schema		Read Only	Resource Type of the Resource
lastScene	string			Last selected Scene from the set of sceneValues
n	string		Read Only	Friendly name of the resource
id	string		Read Only	Instance ID of this specific resource
if	array: see schema		Read Only	The interface set supported by this resource
links	array: see schema			A set of simple or individual OIC Links.
links	array: see schema			A set of simple or individual OIC Links.
rts	multiple types: see schema			The list of allowable resource types (for Target and anchors) in links included in the collection
rt	array: see schema	yes		Resource Type of the Resource
di	multiple types: see schema			The device ID
anchor	string			This is used to override the context URI e.g. override the URI of the containing collection.
type	array: see schema			A hint at the representation of the resource referenced by the target URI. This represents the media types that are used for

				both accepting and emitting.
title	string			A title for the link relation. Can be used by the UI to provide a context.
ins	integer			The instance identifier for this web link in an array of web links - used in collections
href	string	yes		This is the target URI, it can be specified as a Relative Reference or fully-qualified URI.
eps	array: see schema			the Endpoint information of the target Resource
rel	multiple types: see schema			The relation of the target URI referenced by the link to the context URI
p	object: see schema			Specifies the framework policies on the Resource referenced by the target URI
if	array: see schema	yes		The interface set supported by this resource
rt	array: see schema	yes	Read Only	Resource Type of the Resource
link	multiple types: see schema			
SceneMappings	array: see schema			array of mappings per scene, can be one(1)
n	string		Read Only	Friendly name of the resource
id	string		Read Only	Instance ID of this specific resource
if	array: see schema	yes	Read Only	The interface set supported by this resource

rt	array: schema	see		Read Only	Resource Type of the Resource
links	array: schema	see			A set of simple or individual OIC Links.

15661

F.14.6 CRUDN behaviour

Resource	Create	Read	Update	Delete	Notify
/SceneMemberResURI		get			

15662

15663
15664
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15666

Annex G (informative)

Swagger2.0 Schema Extension

15667

G.1 Swagger 2.0 Schema Reference

15668 Swagger 2.0 does not support allOf and anyOf JSON schema validation constructs; this
15669 specification has extended the underlying Swagger 2.0 schema to enable these, all Swagger 2.0
15670 files are valid against the extended schema. Please reference the following location for a copy of
15671 the extended schema:

15672 <https://github.com/openconnectivityfoundation/OCFswagger2.0-schema>

15673

G.2 Swagger 2.0 Introspection empty file

15674 Reference the following location for a copy of an empty Swagger2.0 file:

15675 <https://github.com/openconnectivityfoundation/DeviceBuilder/blob/master/examples/introspection>
15676 [-empty.txt](#)