

OCF Core Specification

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Part 1



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CONTACT admin@openconnectivity.org

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496 1 Scope

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

- 498 • Core Specification documents: The Core Specification documents specify the Framework, i.e.,
499 the OCF core architecture, interfaces, protocols and services to enable OCF profiles
500 implementation for Internet of Things (IoT) usages and ecosystems.
- 501 • Vertical Profiles Specification documents: The Vertical Profiles Specification documents
502 specify the OCF profiles to enable IoT usages for different market segments such as smart
503 home, industrial, healthcare, and automotive. The Application Profiles Specification is built
504 upon the interfaces and network security of the OCF core architecture defined in the Core
505 Specification.

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

507

508 2 Normative references

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

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

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

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

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

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

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

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

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

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

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

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618 **3 Terms, definitions, symbols and abbreviations**

619 **3.1 Terms and definitions**

620 **3.1.1**

621 **Client**

622 a logical entity that accesses a Resource on a Server

623 **3.1.2**

624 **Collection**

625 a Resource that contains zero or more Links

626 **3.1.3**

627 **Common Properties**

628 Resource Properties specified for all Resources

629 **3.1.4**

630 **Configuration Source**

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

633 **3.1.5**

634 **Core Resources**

635 those Resources that are defined in this specification

636 **3.1.6**

637 **Default Interface**

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

639 **3.1.7**

640 **Device**

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

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

643 **3.1.8**

644 **Device Type**

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

646 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
647 Resource discovery.

648 **3.1.9**

649 **Endpoint**

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

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

652 **3.1.10**

653 **Entity**

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

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

656 **3.1.11**
657 **Framework**
658 a set of related functionalities and interactions defined in this specification, which enable
659 interoperability across a wide range of networked devices, including IoT

660 **3.1.12**
661 **Interface**
662 provides a view and permissible responses on a Resource

663 **3.1.13**
664 **Introspection**
665 mechanism to determine the capabilities of the hosted Resources of a Device

666 **3.1.14**
667 **Introspection Device Data**
668 data that describes the payloads per implemented method of the Resources that makes up the
669 Device

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

671 **3.1.15**
672 **Links**
673 extends typed web links according to IETF RFC 5988

674 **3.1.16**
675 **Non-OCF Device**
676 A device which does not comply with the OCF Device requirements

677 **3.1.17**
678 **Notification**
679 the mechanism to make a Client aware of resource state changes in a Resource

680 **3.1.18**
681 **Observe**
682 the act of monitoring a Resource by sending a RETRIEVE request which is cached by the Server
683 hosting the Resource and reprocessed on every change to that Resource

684 **3.1.19**
685 **Parameter**
686 an element that provides metadata about a Resource referenced by the target URI of a Link

687 **3.1.20**
688 **Partial UPDATE**
689 an UPDATE request to a Resource that includes a subset of the Properties that are visible via the
690 Interface being applied for the Resource Type

691 **3.1.21**
692 **Platform**
693 a physical device containing one or more Devices

694 **3.1.22**
695 **Resource**
696 represents an Entity modelled and exposed by the Framework

697 **3.1.23**
698 **Resource Directory**
699 a set of descriptions of Resources where the actual Resources are held on Servers external to the
700 Device hosting the Resource Directory, allowing lookups to be performed for those resources

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

703 **3.1.24**
704 **Resource Interface**
705 a qualification of the permitted requests on a Resource

706 **3.1.25**
707 **Resource Property**
708 a significant aspect or parameter of a resource, including metadata, that is exposed through the
709 Resource

710 **3.1.26**
711 **Resource Type**
712 a uniquely named definition of a class of Resource Properties and the interactions that are
713 supported by that class

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

715 **3.1.27**
716 **Scene**
717 a static entity that stores a set of defined Resource property values for a collection of Resources

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

720 **3.1.28**
721 **Scene Collection**
722 a collection Resource that contains an enumeration of possible Scene Values and the current
723 Scene Value

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

725 **3.1.29**
726 **Scene Member**
727 a Resource that contains mappings of Scene Values to values of a property in the resource

728 **3.1.30**
729 **Scene Value**
730 a Scene enumerator representing the state in which a Resource can be

731 **3.1.31**
732 **Secure Endpoint**
733 an Endpoint with a secure connection (e.g., CoAP)

734 **3.1.32**
735 **Server**
736 a Device with the role of providing resource state information and facilitating remote interaction
737 with its resources

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

739 **3.1.33**
740 **Unsecure Endpoint**
741 an Endpoint with an unsecure connection (e.g., CoAPS)

742 **3.1.34**
743 **Vertical Resource Type**
744 a Resource Type in a vertical domain specification

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

746 **3.2 Symbols and abbreviations**
747 **3.2.1**
748 **ACL**
749 Access Control List
750 Note 1 to entry: The details are defined in OCF Security.
751 **3.2.2**
752 **BLE**
753 Bluetooth Low Energy
754 **3.2.3**
755 **CBOR**
756 Concise Binary Object Representation
757 **3.2.4**
758 **CoAP**
759 Constrained Application Protocol
760 **3.2.5**
761 **CoAPS**
762 Secure Constrained Application Protocol
763 **3.2.6**
764 **DTLS**
765 Datagram Transport Layer Security
766 Note 1 to entry: The details are defined in IETF RFC 6347.
767 **3.2.7**
768 **EXI**
769 Efficient XML Interchange
770 **3.2.8**
771 **IP**
772 Internet Protocol
773 **3.2.9**
774 **IRI**
775 Internationalized Resource Identifiers
776 **3.2.10**
777 **ISP**
778 Internet Service Provider
779 **3.2.11**
780 **JSON**
781 JavaScript Object Notation
782 **3.2.12**
783 **mDNS**
784 Multicast Domain Name Service
785 **3.2.13**
786 **MTU**
787 Maximum Transmission Unit

788 **3.2.14**
789 **NAT**
790 Network Address Translation

791 **3.2.15**
792 **OCF**
793 Open Connectivity Foundation

794 the organization that created this specification

795 **3.2.16**
796 **RAML**
797 RESTful API Modeling Language

798 **3.2.17**
799 **REST**
800 Representational State Transfer

801 **3.2.18**
802 **RESTfull**
803 REST-compliant Web services

804 **3.2.19**
805 **UDP**
806 User Datagram Protocol

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

808 **3.2.20**
809 **URI**
810 Uniform Resource Identifier

811 **3.2.21**
812 **URN**
813 Uniform Resource Name

814 **3.2.22**
815 **UTC**
816 Coordinated Universal Time

817 **3.2.23**
818 **UUID**
819 Universal Unique Identifier

820 **3.2.24**
821 **XML**
822 Extensible Markup Language

823 **3.3 Conventions**

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

828 **3.4 Data types**

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

832
 833 Among other validation keywords, section 7 in JSON Schema Validation defines a “format”
 834 keyword with a number of format attributes such as “uri” and “date-time”, and a “pattern” keyword
 835 with a regular expression that can be used to validate a string. This section defines patterns that
 836 are available for use in describing OCF Resources. The pattern names can be used in specification
 837 text where JSON format names can occur. The actual JSON schemas shall use the JSON type
 838 and pattern instead.

839
 840 For all rows defined in Table 1 below, the JSON type is string.

841 **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)?))?)\$ ^([P0-9]+W)\$ ^([P0-9]{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])\$ ^([P0-9]{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.

842

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

844

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

848 **4 Document conventions and organization**

849 In this document, features are described as required, recommended, allowed or DEPRECATED as
850 follows:

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

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

855 Recommended (or should)(S).

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

862 Allowed (may or allowed)(O).

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

866 DEPRECATED.

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

873 Conditionally allowed (CA)

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

876 Conditionally required (CR)

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

880

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

882 Words that are emphasized are printed in italic.

883 5 Architecture

884 5.1 Overview

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

889 Specifically, the architecture provides:

- 890 • A communication and interoperability framework for multiple market segments (Consumer,
891 Enterprise, Industrial, Automotive, Health, etc.), OSs, platforms, modes of communication,
892 transports and use cases
- 893 • A common and consistent model for describing the environment and enabling information
894 and semantic interoperability
- 895 • Common communication protocols for discovery and connectivity
- 896 • Common security and identification mechanisms
- 897 • Opportunity for innovation and product differentiation
- 898 • A scalable solution addressing different device capabilities, applicable to smart devices as
899 well as the smallest connected things and wearable devices

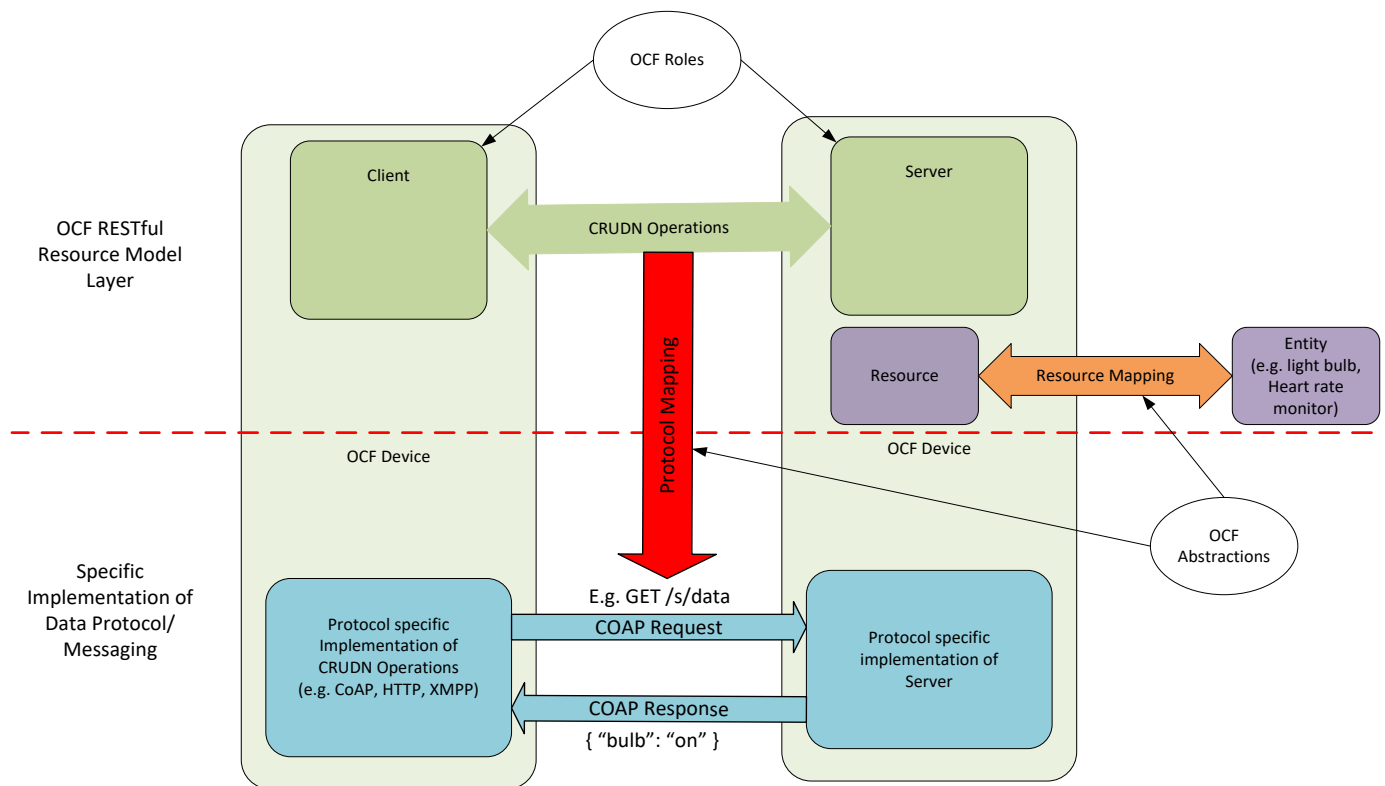
900 The architecture is based on the Resource Oriented Architecture design principles and described
901 in the sections 5.2 through 5.6 respectively. section 5.2 presents the guiding principles for OCF
902 operations. section 5.3 defines the functional block diagram and Framework. section 5.5 provides
903 an example scenario with roles. section 5.6 provides an example scenario of bridging to non- OCF
904 ecosystem.

905 5.2 Principle

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

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

921 Figure 1 depicts the architecture.



922
923

924

925

Figure 1: Architecture - concepts

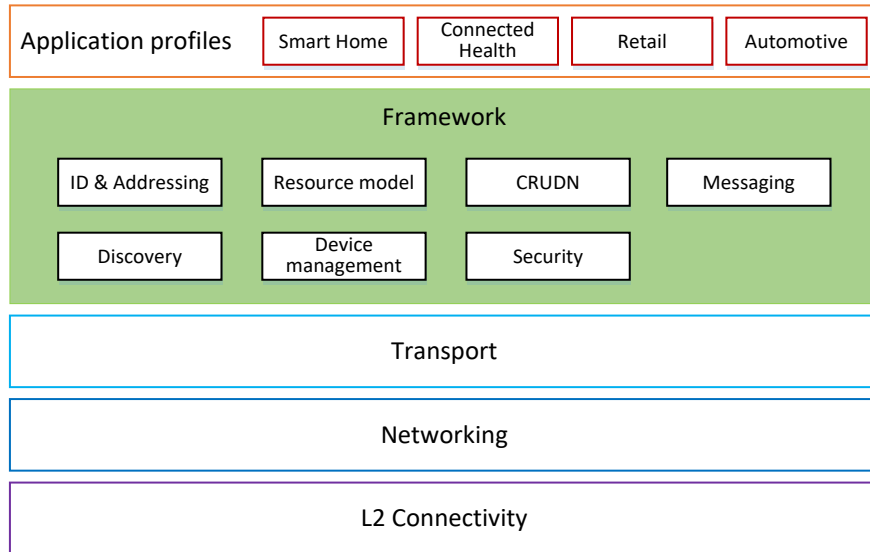
926 The architecture is organized conceptually into three major aspects that provide overall separation
927 of concern: resource model, RESTful operations and abstractions.

- 928 • Resource model: The resource model provides the abstractions and concepts required to
929 logically model, and logically operate on the application and its environment. The core resource
930 model is common and agnostic to any specific application domain such as smart home,
931 industrial or automotive. For example, the resource model defines a Resource which abstracts
932 an Entity and the representation of a Resource maps the Entity's state. Other resource model
933 concepts can be used to model other aspects, for example behaviour.
- 934 • RESTful operations: The generic CRUDN operations are defined using the RESTful paradigm
935 to model the interactions with a Resource in a protocol and technology agnostic way. The
936 specific communication or messaging protocols are part of the protocol abstraction and
937 mapping of Resources to specific protocols is provided in section 11.8.
- 938 • Abstraction: The abstractions in the resource model and the RESTful operations are mapped
939 to concrete elements using abstraction primitives. An entity handler is used to map an Entity
940 to a Resource and connectivity abstraction primitives are used to map logical RESTful
941 operations to data connectivity protocols or technologies. Entity handlers may also be used to
942 map Resources to Entities that are reached over protocols that are not natively supported by
943 OCF.

944

945 **5.3 Functional block diagram**

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



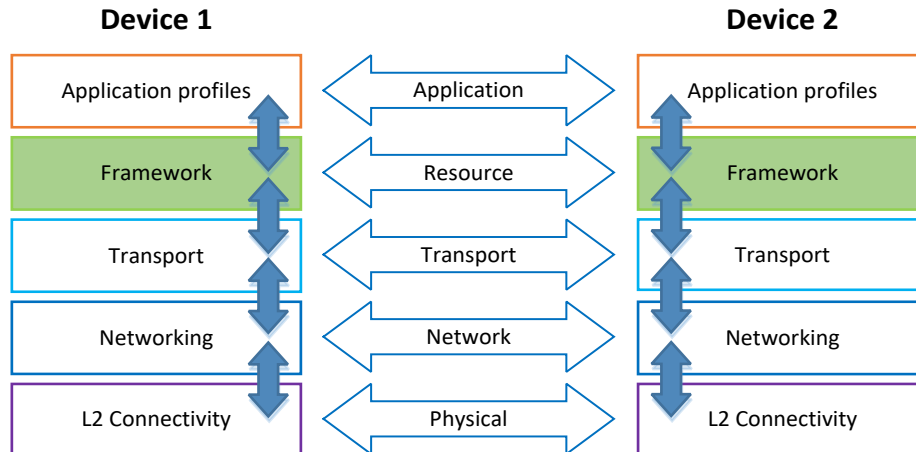
949

950

Figure 2: Functional block diagram

- 951 • **L2 connectivity:** Provides the functionalities required for establishing physical and data
952 link layer connections (e.g., Wi-Fi™ or Bluetooth® connection) to the network.
- 953 • **Networking:** Provides functionalities required for Devices to exchange data among
954 themselves over the network (e.g., Internet).
- 955 • **Transport:** Provides end-to-end flow transport with specific QoS constraints. Examples of
956 a transport protocol include TCP and UDP or new Transport protocols under development
957 in the IETF, e.g., Delay Tolerant Networking (DTN).
- 958 • **Framework:** Provides the core functionalities as defined in this specification. The
959 functional block is the source of requests and responses that are the content of the
960 communication between two Devices.
- 961 • **Application profile:** Provides market segment specific data model and functionalities, e.g.,
962 smart home data model and functions for the smart home market segment.

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



965
966 **Figure 3: Communication layering model**

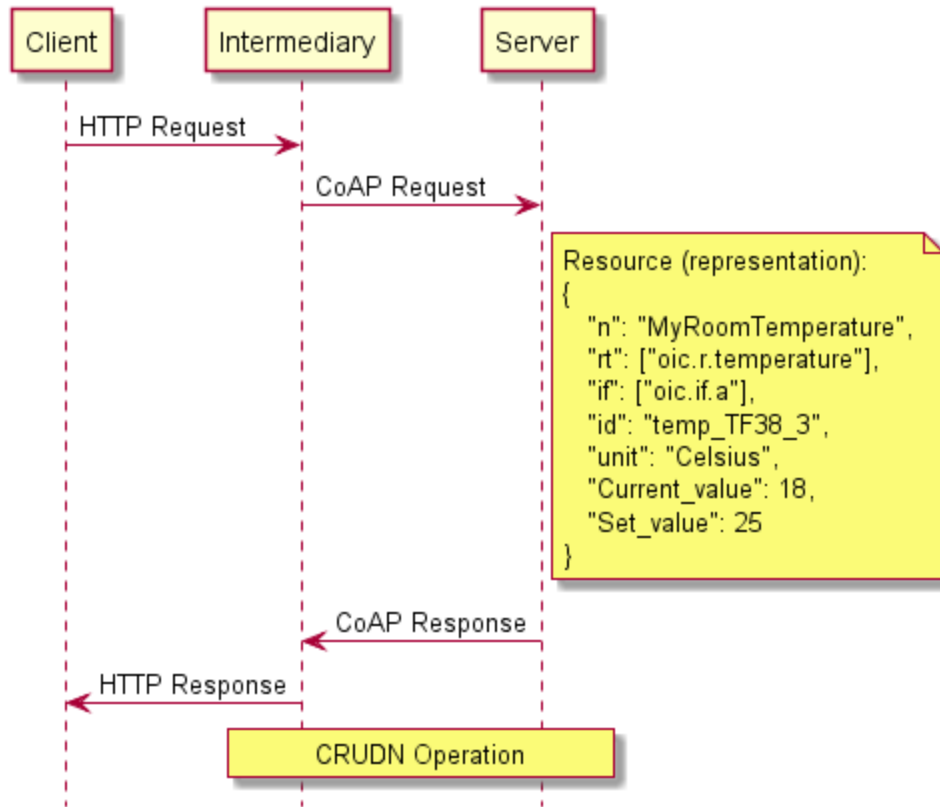
967 **5.4 Framework**

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

- 969 1) **Identification and addressing.** Defines the identifier and addressing capability. The
970 Identification and addressing function is defined in section 6.
- 971 2) **Discovery.** Defines the process for discovering available
972 a) Devices (Endpoint Discovery in section 10) and
973 b) Resources (Resource discovery in section 11.3)
- 974 3) **Resource model.** Specifies the capability for representation of Entities in terms of resources
975 and defines mechanisms for manipulating the resources. The resource model function is
976 defined in section 7.
- 977 4) **CRUDN.** Provides a generic scheme for the interactions between a Client and Server as
978 defined in section 8.
- 979 5) **Messaging.** Provides specific message protocols for RESTful operation, i.e. CRUDN. For
980 example, CoAP is a primary messaging protocol. The messaging function is defined in section
981 11.8.
- 982 6) **Device management.** Specifies the discipline of managing the capabilities of a Device, and
983 includes device provisioning and initial setup as well as device monitoring and diagnostics.
984 The device management function is defined in section 11.5.
- 985 7) **Security.** Includes authentication, authorization, and access control mechanisms required for
986 secure access to Entities. The security function is defined in section 13.

987 **5.5 Example Scenario with roles**

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

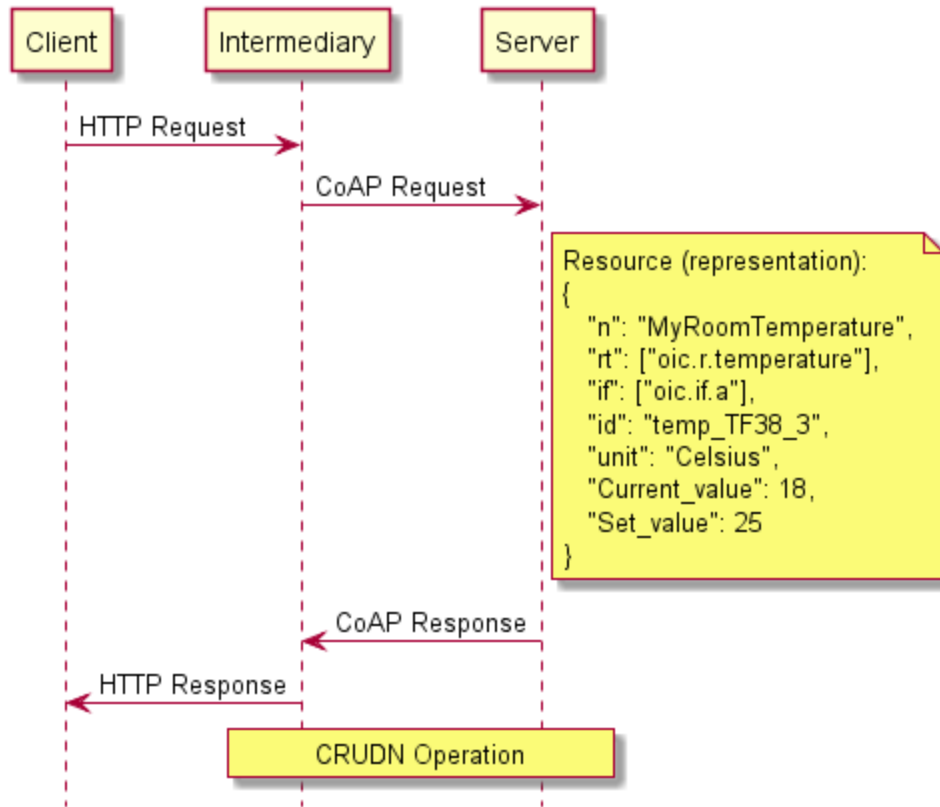


990
991

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



997



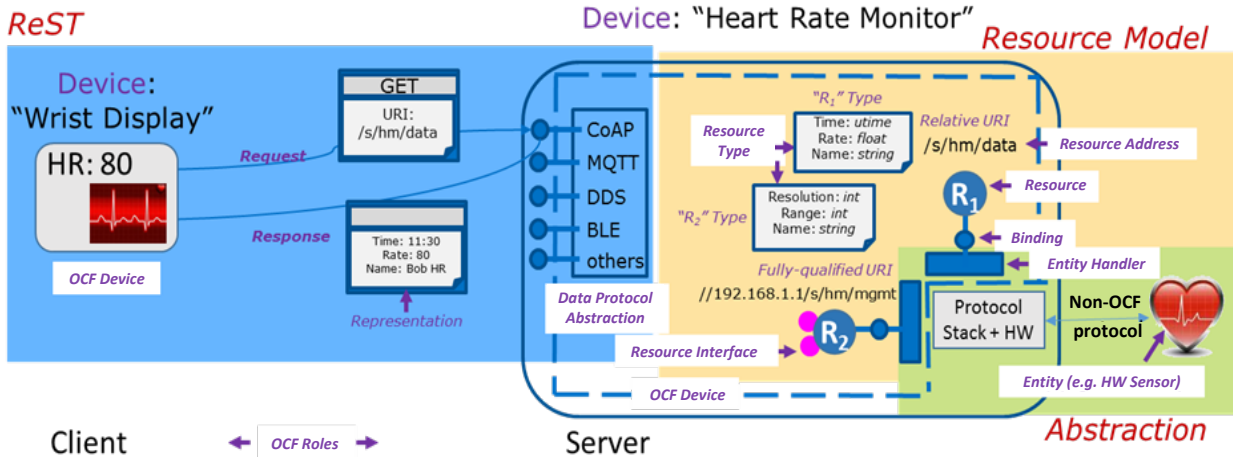
998
999

1000 **Figure 4: Example illustrating the Roles**

1001 **5.6 Example Scenario: Bridging to Non- OCF ecosystem**

1002 The use case for this scenario is a display (like a wrist watch) that is used to monitor a heart rate
1003 sensor that implements a protocol that is not OCF supported.

1004 Figure 5 provides a detailed logical view of the concepts described in Figure 1.

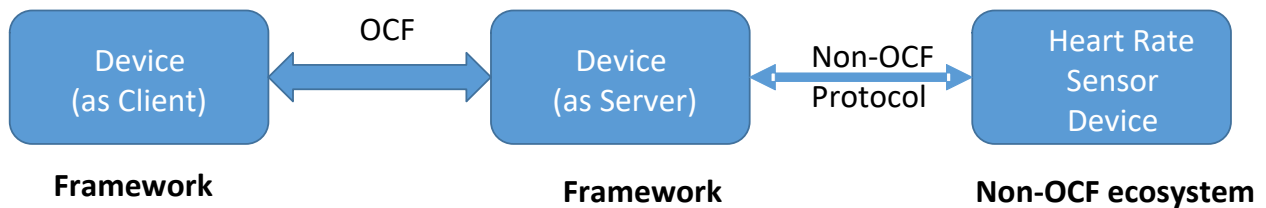


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1007 **Figure 5: Framework - Architecture Detail**

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1009 The details may be implemented in many ways, for example, by using a Server with an entity
1010 handler to interface directly to a non- OCF device as shown in Figure 6.



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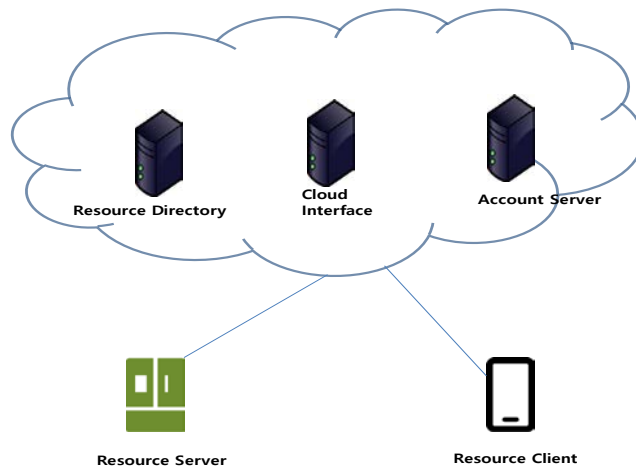
1013 **Figure 6: Server bridging to Non- OCF device**

1014 On start-up the Server runs the entity handlers which discover the non- OCF systems (e.g., Heart
1015 Rate Sensor Device) and create resources for each device or functionality discovered. The entity
1016 handler creates a Resource for each discovered device or functionality and binds itself to that
1017 Resource. These resources are made discoverable by the Server.

1018 Once the resources are created and made discoverable, then the Display Device can discover
1019 these resources and operate on them using the mechanisms described in this specification. The
1020 requests to a resource on the Server are then interpreted by the entity handler and forwarded to
1021 the non- OCF device using the protocol supported by the non-OCF device. The returned
1022 information from the non- OCF device is then mapped to the appropriate response for that resource.

1023 **5.7 OCF Cloud architecture**

1024 This section describes the architecture of OCF Cloud in Figure 7:



1025

1026

Figure 7: OCF Cloud deployment architecture

1027

The Cloud architecture comprises of following three network entities:

1028

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

1029

1030

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

1033

1034

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

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1038

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

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1040

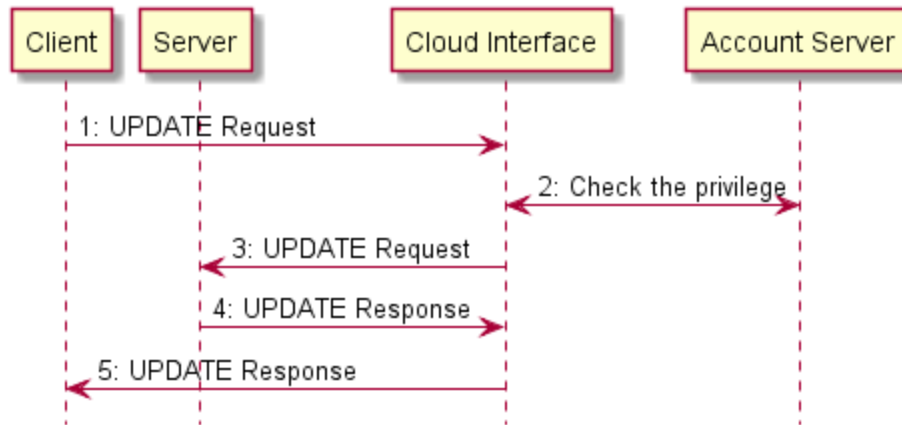


Figure 8: Endpoint routing

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

1073 are guaranteed to be unambiguous across all contexts and domains both spatially and temporally.
1074 The context-specific identifiers could be defined by simple schemes like monotonic enumeration
1075 or may be defined by overloading an address or name, for example an IP address may be an
1076 identifier within the private domain behind a gateway in a smart home. On the other hand, context-
1077 independent identifiers require a stronger scheme that derives universally unique identities, for
1078 example any one of the versions of Universally Unique Identifiers (UUIDs). Context independent
1079 identifier may also be generated using hierarchy of domains where the root of the hierarchy is
1080 identified with a UUID and sub-domains may generate context independent identifier by
1081 concatenating context-specific identifiers for that domain to the context-independent identifier of
1082 their parent.

1083 **6.2.1 Resource identification and addressing**

1084 A resource may be identified using a URI and addressed by the same URI if the URI is a URL. In
1085 some cases a resource may need an identifier that is different from a URI; in this case, the resource
1086 may have a property whose value is the identifier. When the URI is in the form of a URL, then the
1087 URI may be used to address the resource.

1088 An OCF URI is based on the general form of a URI as defined in IETF RFC 3986 as follows:

1089 `<scheme>://<authority>/<path>?<query>`

1090 Specifically the OCF URI is specified in the following form:

1091 `ocf://<authority>/<path>?<query>`

1092 A description of values that each component takes is given below.

1093 The *scheme* for the URI is 'ocf'. The 'ocf' scheme represents the semantics, definitions and use
1094 as defined in this document. If a URI has the portion preceding the '/' (double slash) omitted, then
1095 the 'ocf' scheme shall be assumed.

1096 Each transport binding is responsible for specifying how an OCF URI is converted to a transport
1097 protocol URI before sending over the network by the requestor. Similarly on the receiver side, each
1098 transport binding is responsible for specifying how an OCF URI is converted from a transport
1099 protocol URI before handing over to the resource model layer on the receiver.

1100 The authority of an OCF URI shall be the Device ID ("di") value, as defined in [OCF Security], of
1101 the Server.

1102 The *path* is a string that unambiguously identifies or references a resource within the context of
1103 the Server. In this version of the specification, a path shall not include pct-encoded non-ASCII
1104 characters or NUL characters. A *path* shall be preceded by a '/' (slash). The *path* may have '/'
1105 (slash) separated segments for human readability reasons. In the OCF context, the '/' (slash)
1106 separated segments are treated as a single string that directly references the resources (i.e. a flat
1107 structure) and not parsed as a hierarchy. On the Server, the path or some substring in the path
1108 may be shortened by using hashing or some other scheme provided the resulting reference is
1109 unique within the context of the host.

1110 Once a path is generated, a Client accessing the resource or recipient of the URI should use that
1111 path as an opaque string and should not parse to infer a structure, organization or semantic.

1112 A query string shall contain a list of <name>=<value> segments (aka "name-value pair") each
1113 separated by a '&' (ampersand). The query string will be mapped to the appropriate syntax of the
1114 protocol used for messaging. (e.g., CoAP).

1115 A URI may be either

- 1116 • Fully qualified or
- 1117 • Relative

1118 *Generation of URI:*

1119 A URI may be defined by the Client which is the creator of that resource. Such a URI may be
1120 relative or absolute (fully qualified). A relative URI shall be relative to the Device on which it is
1121 hosted. Alternatively, a URI may be generated by the Server of that resource automatically based
1122 on a pre-defined convention or organization of the resources, based on an interface, based on
1123 some rules or with respect to different roots or bases.

1124 *Use of URI:*

1125 The absolute path reference of a URI is to be treated as an opaque string and a Client should not
1126 infer any explicit or implied structure in the URI – the URI is simply an address. It is also
1127 recommended that Devices hosting a resource treat the URI of each resource as an opaque string
1128 that addresses only that resource. (e.g., URI's /a and /a/b are considered as distinct addresses
1129 and resource b cannot be construed as a child of resource a).

1130 **6.3 Namespace:**

1131 The relative URI prefix “/oic/” is reserved as a namespace for URIs defined in OCF specifications
1132 and shall not be used for URIs that are not defined in OCF specifications.

1133 **6.4 Network addressing**

1134 The following are the addresses used in this specification:

- 1135 • **IP address**

1136 An IP address is used when the device is using an IP configured interface.

1137 When a Device only has the identity information of its peer, a resolution mechanism is needed to
1138 map the identifier to the corresponding address.

1139 **7 Resource model**

1140 **7.1 Introduction**

1141 The Resource Model defines concepts and mechanisms that provide consistency and core
1142 interoperability between devices in the OCF ecosystems. The Resource Model concepts and
1143 mechanisms are then mapped to the transport protocols to enable communication between the
1144 devices – each transport provides the communication protocol interoperability. The Resource
1145 Model, therefore, allows for interoperability to be defined independent of the transports.

1146 In addition, the concepts in the Resource Model support modelling of the primary artefacts and
1147 their relationships to one and another and capture the semantic information required for
1148 interoperability in a context. In this way, OCF goes beyond simple protocol interoperability to
1149 capture the rich semantics required for true interoperability in Wearable and Internet of Things
1150 ecosystems.

1151 The primary concepts in the Resource Model are: Entity, Resources, Uniform Resource Identifiers
1152 (URI), Resource Types, Properties, Representations, Interfaces, Collections and Links. In addition,
1153 the general mechanisms are CREATE, RETRIEVE, UPDATE, DELETE and NOTIFY. These
1154 concepts and mechanisms may be composed in various ways to define the rich semantics and
1155 interoperability needed for a diverse set of use cases that the OCF framework is applied to.

1156 In the OCF Resource Model framework, an Entity needs to be visible, interacted with or
1157 manipulated, it is represented by an abstraction called a Resource. A Resource encapsulates and
1158 represents the state of an Entity. A Resource is identified, addressed and named using URIs.

1159 Properties are "key=value" pairs and represent state of the Resource. A snapshot of these
1160 Properties is the Representation of the Resource. A specific view of the Representation and the
1161 mechanisms applicable in that view are specified as Interfaces. Interactions with a Resource are
1162 done as Requests and Responses containing Representations.

1163 A resource instance is derived from a Resource Type. The uni-directional relationship between
1164 one Resource and another Resource is defined as a Link. A Resource that has Properties and
1165 Links is a Collection.

1166 A set of Properties can be used to define a state of a Resource. This state may be retrieved or
1167 updated using appropriate Representations respectively in the response from and request to that
1168 Resource.

1169 A Resource (and Resource Type) could represent and be used to expose a capability. Interactions
1170 with that Resource can be used to exercise or use that capability. Such capabilities can be used
1171 to define processes like discovery, management, advertisement etc. For example: "discovery of
1172 resources on a device" can be defined as the retrieval of a representation of a specific resource
1173 where a property or properties have values that describe or reference the resources on the device.

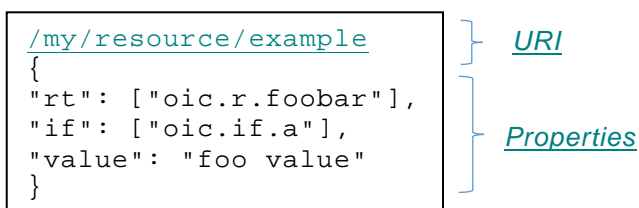
1174 The information for Request or Response with the Representation may be communicated "on the
1175 wire" by serializing using a transfer protocol or encapsulated in the payload of the transport
1176 protocol – the specific method is determined by the normative mapping of the Request or Response
1177 to the transport protocol. See section 11.8 for transport protocols supported.

1178 The RAML definitions used in this document are normative. This also includes that all defined
1179 JSON payloads shall comply with the indicated JSON schema. See Annex D for Resource Types
1180 defined in this specification.

1181 **7.2 Resource**

1182 A Resource shall be defined by one or more Resource Type(s) – see Annex D for Resource Type.
1183 A request to CREATE a Resource shall specify one or more Resource Types that define that
1184 Resource.

1185 A Resource is hosted in a Device. A Resource shall have a URI as defined in section 6. The URI
1186 may be assigned by the Authority at the creation of the Resource or may be pre-defined by the
1187 specification of the Resource Type.



1188
1189 Core Resources are the Resources defined in this specification to enable functional interactions
1190 as defined in section 10 (e.g., Discovery, Device Management, etc). Among the Core Resources,
1191 "/oic/res", "/oic/p", and "/oic/d" shall be supported on all Devices. Devices may support other Core
1192 Resources depending on the functional interactions they support.

1193 7.3 Property

1194 7.3.1 Introduction

1195 A Property describes an aspect that is exposed through a Resource including meta-information
1196 related to that resource.

1197 A Property shall have a name i.e. Property Name and a value i.e. Property Value. The Property is
1198 expressed as a key-value pair where key is the Property Name and value the Property Value like
1199 <Property Name> = <Property Value>. For example if the “temperature” Property has a Property
1200 Name “temp” and a Property Value “30F”, then the Property is expressed as “temp=30F”. The
1201 specific format of the Property depends on the encoding scheme. For example, in JSON, Property
1202 is represented as "key": value (e.g., "temp": 30).

1203 In addition, the Property definition shall have a

- 1204 • **Value Type** – the Value Type defines the values that a Property Value may take. The Value
1205 Type may be a simple data type (e.g. string, Boolean) as defined in section 3.4 or may be a
1206 complex data type defined with a schema. The Value Type may define
 - 1207 ○ Value Rules define the rules for the set of values that the Property Value may take.
1208 Such rules may define the range of values, the min-max, formulas, set of
1209 enumerated values, patterns, conditional values and even dependencies on values
1210 of other Properties. The rules may be used to validate the specific values in a
1211 Property Value and flag errors.
- 1212 • **Mandatory** – specifies if the Property is mandatory or not for a given Resource Type.
- 1213 • **Access modes** – specifies whether the Property may be read, written or both. Updates are
1214 equivalent to a write. “r” is used for read and “w” is used for write – both may be specified.
1215 Write does not automatically imply read.

1216 The definition of a Property may include the following additional information – these items are
1217 informative:

- 1218 • **Property Title** - a human-friendly name to designate the Property; usually not sent over the
1219 wire
- 1220 • **Description** – descriptive text defining the purpose and expected use of this Property.

1221 In general, a Property is meaningful only within the Resource to which it is associated. However a
1222 base set of Properties that may be supported by all Resources, known as Common Properties,
1223 keep their semantics intact across Resources i.e. their “key=value” pair means the same in any
1224 Resource. Detailed tables with the above fields for all Common Properties are defined in section
1225 7.3.2.

1226 7.3.2 Common Properties

1227 7.3.2.1 Introduction

1228 The Common Properties defined in this section may be specified for all Resources. The following
1229 Properties are defined as Common Properties: “Resource Type”, “Resource Interface”, “Name”,
1230 and “Resource Identity”.

1231 The name of a Common Property shall be unique and shall not be used by other properties. When
1232 defining a new Resource Type, its non-common properties shall not use the name of existing
1233 Common Properties (e.g., “rt”, “if”, “n”, “id”). When defining a new “Common Property”, it should
1234 be ensured that its name has not been used by any other properties. The uniqueness of a new
1235 Common Property name can be verified by checking all the Properties of all the existing OCF
1236 defined Resource Types. However, this may become cumbersome as the number of Resource
1237 Types grow. To prevent such name conflicts in the future, OCF may reserve a certain name space
1238 for common property. Potential approaches are (1) a specific prefix (e.g. “oic”) may be designated

1239 and the name preceded by the prefix (e.g. "oic.psize") is only for Common Property; (2) the names
 1240 consisting of one or two letters are reserved for Common Property and all other Properties shall
 1241 have the name with the length larger than the 2 letters; (3) Common Properties may be nested
 1242 under specific object to distinguish themselves.

1243 The ability to UPDATE a Common Property (that supports write as an access mode) is restricted
 1244 to the "oic.if.rw" (read-write) Interface; thus a Common Property shall be updatable using the read-
 1245 write Interface if and only if the Property supports write access as defined by the Property definition
 1246 and the associated schema for the read-write Interface.

1247 The following Common Properties for all Resources are specified in section 7.3.2.2 through section
 1248 7.3.2.6 and summarized as follows:

- 1249 • Resource Type ("rt") – this Property is used to declare the Resource Type of that Resource.
 1250 Since a Resource could be define by more than one Resource Type the Property Value of the
 1251 Resource Type Property can be used to declare more than one Resource type. For example:
 1252 "rt": ["oic.wk.d", "oic.d.airconditioner"] declares that the Resource containing this Property is
 1253 defined by either the "oic.wk.d" Resource Type or the "oic.d.airconditioner" Resource Type.
 1254 See section 7.3.2.3 for details.
- 1255 • Interface ("if") – this Property declares the Interfaces supported by the Resource. The Property
 1256 Value of the Interface Property can be multi-valued and lists all the Interfaces supported. See
 1257 section 7.3.2.4 for details.
- 1258 • Name ("n") – the Property declares "human-readable" name assigned to the Resource. See
 1259 section 7.3.2.5.
- 1260 • Resource Identity ("id"): its Property Value shall be a unique (across the scope of the host
 1261 Server) instance identifier for a specific instance of the Resource. The encoding of this identifier
 1262 is device and implementation dependent. See section 7.3.2.6 for details.

1263 7.3.2.2 Property Name and Property Value definitions

1264 The Property Name and Property Value as used in this specification:

- 1265 • **Property Name**– the key in "key=value" pair. Property Name is case sensitive and its data type
 1266 is "string". Property names shall contain only letters A to Z, a to z, digits 0 to 9, hyphen, and
 1267 dot, and shall not begin with a digit.
- 1268 • **Property Value** – the value in "key=value" pair. Property Value is case sensitive when its data
 1269 type is "string". Any enum values shall contain only letters A to Z, a to z, digits 0-9 and
 1270 underscores, and shall not begin with a digit.

1271 7.3.2.3 Resource Type

1272 Resource Type Property is specified in section 7.4.

1273 7.3.2.4 Interface

1274 Interface Property is specified in section 7.5.

1275 7.3.2.5 Name

1276 A human friendly name for the Resource, i.e. a specific resource instance name (e.g.,
 1277 MyLivingRoomLight), The Name Property is as defined in Table 2

1278 **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.

1279 The 'Name' Property is read-write unless otherwise restricted by the Resource Type (i.e. the
1280 Resource Type does not support UPDATE or does not support UPDATE using read-write).

1281 **7.3.2.6 Resource Identity**

1282 The Resource Identity Property shall be a unique (across the scope of the host Server) instance
1283 identifier for a specific instance of the Resource. The encoding of this identifier is device and
1284 implementation dependent as long as the uniqueness constraint is met, noting that an
1285 implementation may use a uuid as defined in section 3.4. The Resource Identity Property is as
1286 defined in Table 3.

1287 **Table 3. Resource Identity Property Definition**

1288

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)

1289

1290 **7.4 Resource Type**

1291 **7.4.1 Introduction**

1292 Resource Type is a class or category of Resources and a Resource is an instance of one or more
1293 Resource Types.

1294 The Resource Types of a Resource is declared using the Resource Type Common Property as
1295 described in section 7.3.2.3 or in a Link using the Resource Type Parameter.

1296 A Resource Type may either be pre-defined (Core Resource Types in this specification and Vertical
1297 Resource Types in vertical domain specifications) or in custom definitions by manufacturers, end
1298 users, or developers of Devices (vendor-defined Resource Types). Resource Types and their
1299 definition details may be communicated out of band (i.e. in documentation) or be defined explicitly
1300 using a meta-language which may be downloaded and used by APIs or applications. OCF has
1301 adopted RAML and JSON Schema as the specification method for OCF's RESTful interfaces and
1302 Resource definitions.

1303 Every Resource Type shall be identified with a Resource Type ID which shall be represented using
1304 the requirements and ABNF governing the Resource Type attribute in IETF RFC 6690(section 2
1305 for ABNF and section 3.1 for requirements) with the caveat that segments are separated by a "."
1306 (period). The entire string represents the Resource Type ID. When defining the ID each segment
1307 may represent any semantics that are appropriate to the Resource Type. For example, each
1308 segment could represent a namespace. Once the ID has been defined, the ID should be used
1309 opaquely and an implementations should not infer any information from the individual segments.
1310 The string "oic", when used as the first segment in the definition of the Resource Type ID, is
1311 reserved for OCF-defined Resource Types. All OCF defined Resource Types are to be registered
1312 with the IANA Core Parameters registry as described also in IETF RFC 6690.

1313 **7.4.2 Resource Type Property**

1314 A Resource when instantiated or created shall have one or more Resource Types that are the
1315 template for that Resource. The Resource Types that the Resource conforms to shall be declared
1316 using the "rt" Common Property for the Resource. The Property Value for the "rt" Common Property
1317 shall be the list of Resource Type IDs for the Resource Types used as templates (i.e., "rt"=<list of
1318 Resource Type IDs>).

1319

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

1320 Resource Types may be explicitly discovered or implicitly shared between the user (i.e. Client) and
 1321 the host (i.e. Server) of the Resource.

1322 7.4.3 Resource Type definition

1323 Resource Type is specified as follows:

- 1324 • **Pre-defined URI** (optional) – a pre-defined URI may be specified for a specific Resource Type
 1325 in an OCF specification. When a Resource Type has a pre-defined URI, all instances of that
 1326 Resource Type shall use only the pre-defined URI. An instance of a different Resource Type
 1327 shall not use the pre-defined URI.
- 1328 • **Resource Type Title (optional)** – a human friendly name to designate the Resource Type.
- 1329 • **Resource Type ID** – the value of "rt" property which identifies the Resource Type, (e.g.,
 1330 "oic.wk.p").
 - 1331 • **Resource Interfaces** – list of the interfaces that may be supported by the Resource Type.
 - 1332 • **Resource Properties** – definition of all the properties that apply to the Resource Type. The
 1333 Resource Type definition shall define whether a property is mandatory, conditional mandatory,
 1334 or optional.
 - 1335 • **Related Resource Types** (optional) – the specification of other Resource Types that may be
 1336 referenced as part of the Resource Type, applicable to collections.
 - 1337 • **Mime Types** (optional) – mime types supported by the resource including serializations (e.g.,
 1338 application/cbor, application/json, application/xml).

1339 Table 5 and Table 6 provide an example description of an illustrative foobar Resource Type and
 1340 its associated Properties.

1341

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

1342

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

1343

1344 An instance of the foobar Resource Type is as shown below

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

1345

1346 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"]
  }
}
```

1347

1348 7.4.4 Multi-value "rt" Resource

1349 Multi-value "rt" Resource means a Resource with multiple Resource Types. Such a Resource is
1350 associated with multiple Resource Types and so has an "rt" Property Value of multiple Resource
1351 Type IDs (e.g. "rt": ["oic.r.switch.binary", "oic.r.light.brightness"]). The order of the Resource Type
1352 IDs in the "rt" Property Value is meaningless. For example, "rt": ["oic.r.switch.binary",
1353 "oic.r.light.brightness"] and "rt": ["oic.r.light.brightness", "oic.r.switch.binary"] have the same
1354 meaning.

1355 Resource Types for multi-value "rt" Resources shall satisfy the following conditions.

- 1356 • **Property Name** – Property Names for each Resource Type shall be unique (within the scope
1357 of the multi-value "rt" Resource) with the exception of Common Properties, otherwise there will
1358 be conflicting Property semantics. If two Resource Types have a Property with the same
1359 Property Name, a multi-value "rt" Resource shall not be composed of these Resource Types.

1360 A multi-value "rt" Resource satisfies all the requirements for each Resource Type and conforms to
1361 the RAML/JSON definitions for each component Resource Type. Thus the mandatory Properties
1362 of a multi-value "rt" Resource shall be the union of all the mandatory Properties of each Resource

1363 Type. For example, mandatory Properties of a Resource with "rt": ["oic.r.switch.binary",
1364 "oic.r.light.brightness"] are "value" and "brightness", where the former is mandatory for
1365 "oic.r.switch.binary" and the latter for "oic.r.light.brightness".

1366 The multi-value "rt" Resource Interface set shall be the union of the sets of interfaces from the
1367 component Resource Types. The Resource Representation in response to a CRUDN action on an
1368 Interface shall be the union of the schemas that are defined for that Interface. The Default Interface
1369 for a multi-value "rt" Resource shall be the baseline Interface ("oic.if.baseline") as that is the only
1370 guaranteed common Interface between the Resource Types.

1371 For clarity if each Resource Type supports the same set of Interfaces, then the resultant multi-
1372 value "rt" Resource has that same set of Interfaces with a Default Interface of baseline
1373 ("oic.if.baseline").

1374 See section 7.10.3 for the handling of query parameters as applied to a multi-value "rt" Resource.

1375 **7.5 Device Type**

1376 A Device Type is a class of Device. Each Device Type defined will include a list of minimum
1377 Resource Types that a device shall implement for that Device Type. A device may expose
1378 additional standard and vendor defined Resource Types beyond the minimum list. The Device
1379 Type is used in Resource discovery as specified in section 11.3.4.

1380 Like a Resource Type, a Device Type can be used in the Resource Type Common Property or in
1381 a Link using the Resource Type Parameter.

1382 A Device Type may either be pre-defined (in vertical domain specifications) or in custom definitions
1383 by manufacturers, end users, or developers of Devices (vendor-defined Device Types). Device
1384 Types and their definition details may be communicated out of band (like in documentation).

1385 Every Device Type shall be identified with a Resource Type ID using the same syntax constraints
1386 as a Resource Type.

1387 **7.6 Interface**

1388 **7.6.1 Introduction**

1389 An Interface provides first a view into the Resource and then defines the requests and responses
1390 permissible on that view of the Resource. So this view provided by an Interface defines the context
1391 for requests and responses on a Resource. Therefore, the same request to a Resource when
1392 targeted to different Interfaces may result in different responses.

1393 An Interface may be defined by either this specification (a Core Interface), the OCF vertical domain
1394 specifications (a "vertical Interface) or manufacturers, end users or developers of Devices (a
1395 "vendor-defined Interface").

1396 The Interface Property lists all the Interfaces the Resource support. All resources shall have at
1397 least one Interface. The Default Interface shall be defined by an OCF specification and inherited
1398 from the Resource Type definition. The Default Interface associated with all Resource Types
1399 defined in this specification shall be the supported Interface listed first within the applicable
1400 enumeration in the definition of the Resource Type (see Annex D). All Default Interfaces specified
1401 in an OCF specification shall be mandatory.

1402 In addition to any OCF specification defined interface, all Resources shall support the Baseline
1403 Interface ("oic.if.baseline") as defined in section 7.6.3.2.

1404 See section 7.10.4 for the use of queries to enable selection of a specific interface in a request.

1405 An Interface may accept more than one media type. An Interface may respond with more than one
 1406 media type. The accepted media types may be different from the response media types. The media
 1407 types are specified with the appropriate header parameters in the transfer protocol. (NOTE: This
 1408 feature has to be used judiciously and is allowed to optimize representations on the wire) Each
 1409 Interface shall have at least one media type.

1410

1411 7.6.2 Interface Property

1412

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.

1413 The Interfaces supported by a Resource shall be declared using the Interface Common Property
 1414 (Table 7) as "if=<array of Interfaces>". The Property Value of an Interface Property shall be a
 1415 lower case string with segments separated by a "." (dot). The string "oic", when used as the first
 1416 segment in the Interface Property Value, is reserved for OCF-defined Interfaces. The Interface
 1417 Property Value may also be a reference to an authority similar to IANA that may be used to find
 1418 the definition of an Interface. A Resource Type shall support one or more of the Interfaces defined
 1419 in section 7.6.3.

1420 7.6.3 Interface methods

1421 7.6.3.1 Overview

1422 The OCF -defined Interfaces are listed in the table below:

1423

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.

1424

1425 **7.6.3.2 Baseline Interface**

1426 **7.6.3.2.1 Overview**

1427 The Representation that is visible using the "baseline" Interface includes all the Properties of the
 1428 Resource including the Common Properties. The "baseline" Interface shall be defined for all
 1429 Resource Types. All Resources shall support the "baseline" Interface.

1430 **7.6.3.2.2 Use of RETRIEVE**

1431 The "baseline" Interface is used when a Client wants to retrieve all Properties of a Resource; that
 1432 is the Server shall respond with a Resource representation that includes all of the implemented
 1433 Properties of the Resource. When the Server is unable to send back the whole Resource
 1434 representation, it shall reply with an error message. The Server shall not return a partial Resource
 1435 representation.

1436 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]
}

```

1437

1438 **7.6.3.2.3 Use of UPDATE**

1439 Using the baseline Interface, all Properties of a Resource with the exception of Common Properties
 1440 may be modified using an UPDATE request with a list of Properties and their desired values if a
 1441 Resource Type has an associated schema for UPDATE using baseline. If the Interfaces exposed
 1442 by a Resource in addition to the baseline Interface do not support the UPDATE semantic then
 1443 UPDATE using the baseline Interface is also not supported.

1444 **7.6.3.3 Link List Interface**

1445 **7.6.3.3.1 Overview**

1446 The links list Interface provides a view into the list of Links in a Collection (Resource). The
 1447 Representation visible through this Interface has only the Links defined in the Property Value of
 1448 the "links" Property – so this Interface is used to manipulate or interact with the list of Links in a
 1449 Collection. The Links list may be RETRIEVED using this Interface.

1450 The Interface definition and semantics are given as follows:

- 1451 • The links list Interface name shall be "oic.if.ll".
- 1452 • If specified in a request (usually in the request header), the serialization in the response shall
 1453 be in the format expected in the request.
- 1454 • In response to a RETRIEVE request on the "links list" Interface, the URIs of the referenced
 1455 Resources shall be returned as a URI reference.

- 1456 • If there are no links present in a Resource, then an empty list shall be returned.
- 1457 • The Representation determined by this Interface depends on the requesting Client. For a Client
- 1458 that includes an OCF-Accept-Content-Format-Version option as defined in section 12.2.5 in
- 1459 the request the response only includes the Property Value of the “links” Property, hence a
- 1460 Collection or /oic/res response with oic.if.ll is an array of OCF Links. For a Client that does not
- 1461 include an OCF-Accept-Content-Format-Version option the response is as defined in E.5.

1462 7.6.3.3.2 Example: “links list” Interface

1463 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>
--	--

1464

1465 **7.6.3.4 Batch Interface**

1466 **7.6.3.4.1 Overview**

1467 The batch Interface is used to interact with a collection of Resources using a single/same Request.
 1468 The batch Interface can be used to RETRIEVE or UPDATE the Properties of the "linked"
 1469 Resources with a single request.

1470 The batch Interface is defined as follows:

- 1471 • The batch Interface name is "oic.if.b"
- 1472 • A Collection Resource has linked Resources that are represented as URIs. In the "href"
 1473 Property of the batch payload the URI shall be fully qualified for remote Resources and a
 1474 relative reference or local Resources.
- 1475 • The original request is modified to create new requests targeting each of the linked Resources
 1476 in the Collection by substituting the URI in the original request with the URI of the linked
 1477 Resource. The payload in the original request is replicated in the payload of the new requests.
- 1478 • The requests shall be forwarded assuming use of the Default Interface of the linked Resources
 1479 unless otherwise stated.
- 1480 • Requests shall only be forwarded to linked Resources that are identified by relation types "item"
 1481 or "hosts" ("hosts" is the default relation type should the "rel" Link Parameter not be present).
 1482 Requests shall not be forwarded to linked Resources that do not contain the "item" or "hosts"
 1483 relation type values.
- 1484 • The Collection itself may be included in the batch response by exposing a single Link with the
 1485 link relation "self" along with "item" within the Collection (i.e. "rel": ["self","item"], see also the
 1486 example in section 7.6.3.4.2) and ensuring that the "if" Link Parameter of the "self" Link
 1487 contains an Interface(s) that do(-es) not expose the "links" Property, i.e. "oic.if.b" and not
 1488 "oic.if.baseline" or "oic.if.ll", otherwise Link resolution becomes an infinite loop.
- 1489 • Any request forwarded to a linked Resource that is also a Collection (including a "self" Link)
 1490 shall also have the batch Interface applied.
- 1491 • All the responses from the linked Resources shall be aggregated into a single Response to the
 1492 Client. The Server may timeout the response to a time window, the Server may choose any
 1493 appropriate window based on conditions.
- 1494 • If a linked Resource cannot process the request, an empty response, i.e. a JSON object with
 1495 no content ("{}") as the representation for the "rep" Property, or error response should the
 1496 linked Resource Type provide an error schema or diagnostic payload, shall be returned by the
 1497 linked Resource. These empty or error responses for all linked Resources that exhibit an error

1498 shall be included in the aggregated response to the original Client request. See the example
1499 in section 7.6.3.4.2.

- 1500 • If any of the linked Resources returns an error response, the aggregated response sent to the
1501 Client shall also indicate an error (e.g. 4.xx in CoAP). If any of the other linked Resources
1502 returns a successful response, the aggregated response payload shall include that success
1503 response payload.
- 1504 • The aggregated response shall be an array of objects representing the responses from each
1505 linked Resource. Each object in the response shall include at least two items: (1) the URI of
1506 the linked Resource (fully qualified for remote Resources, or a relative reference for local
1507 Resources) as "href": <URI> and (2) the individual response object or array of objects if the
1508 linked Resource is itself a Collection using "rep" as the key, e.g. "rep": { < representation of
1509 individual response> }.
- 1510 • Linked Resources referenced in the Collection may be observed using the batch Interface. The
1511 observe mechanism shall work as defined in 11.4.2 with the observe request forwarded to each
1512 of the linked Resources. All responses to the request shall be aggregated into a single
1513 response to the Client using the same representations and status codes as for RETRIEVE
1514 operations using the batch Interface.
- 1515 • Should any one of the observable linked Resources fail to honour the observe request the
1516 response to the batch observe request shall also indicate that the entire request was not
1517 honoured using the mechanism described in section 11.4.2.3; in this error case the individual
1518 successful observe requests shall be cancelled as described in section 11.4.2.6.
- 1519 • All notifications to the Client that initiated an observe request using the batch Interface shall
1520 use the batch representation for the Collection. This is the aggregation of any individual
1521 observe notifications received by the Device hosting the Collection from the individual observe
1522 requests that were forwarded to the linked Resources.
- 1523 • The Collection itself may be observed by using the links list or baseline Interfaces.
- 1524 • The Client may choose to restrict the linked Resources to which the request is forwarded by
1525 including additional query parameters in the request. The Server should process any additional
1526 query parameters in a request that includes "oic.if.b" as selectors for linked Resources that are
1527 to be processed by the request.
- 1528 • A Client shall perform UPDATE operations using the batch Interface by creating a payload that
1529 is similar to a RETRIEVE response payload from a batch Interface request. The Server shall
1530 send a separate UPDATE request to each of the linked Resources according to each "href"
1531 Property and the corresponding value of the "rep" Property.
- 1532 • If the "href" value is empty, denoted by a zero length string or "" in JSON, the "rep" Property
1533 shall be applied to linked Resources in the Collection.
- 1534 • Items with the empty "href" and link-specific "href" shall not be mixed in the same UPDATE
1535 request.
- 1536 • All of the Properties in the UPDATE request may not be supported by the linked Resource. In
1537 such cases, writable Properties in the UPDATE request that are supported by the linked
1538 Resource shall be modified and Properties that are not supported shall be silently ignored.
- 1539 • The UPDATE response shall contain the updated values using the same payload schema as
1540 RETRIEVE operations if provided by the linked Resource, along with the appropriate status
1541 code. The aggregated response payload shall reflect the known state of the updated Resource
1542 Properties after the batch update was completed. If no payload is provided by the updated
1543 Resource then an empty response (i.e. "rep": {}) shall be provided for that Resource.

1544 **7.6.3.4.2 Examples: Batch Interface**

1545 Note that the examples provided are illustrative and do not include all mandatory schema elements
1546 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": "light-1", "p": {"bm": 2} }, { "href": "/the/light/2", "rel": ["item"], "rt": ["oic.r.switch.binary"], "if": ["oic.if.a", "oic.if.baseline"], "ins": "light-2", "p": {"bm": 2} }, { "href": "/my/fan/1", "rel": ["item"], "rt": ["oic.r.switch.binary"], "if": ["oic.if.a", "oic.if.baseline"], "ins": "fan-1", "p": {"bm": 2} }, { "href": "/his/fan/2", "rel": ["item"], "rt": ["oic.r.switch.binary"], "if": ["oic.if.a", "oic.if.baseline"], "ins": "fan-2", "p": {"bm": 2} }, { "href": "/the/switches/1", "rel": ["item"], "rt": ["oic.wk.col"], "if": ["oic.if.ll", "oic.if.b", "oic.if.baseline"], "ins": "switches-1", "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 "light-1"

```

UPDATE /a/room/1?if=oic.if.b&ins=light-1
[
  {
    "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=light-1 selects only links that have a matching "ins" value, only one link is selected. The payload is applied to the target TRsource of that link, /the/light/1.

Retrieving the item using the same query parameter:

```

RETRIEVE /a/room/1?if=oic.if.b&ins=light-1

```

Response payload:

```

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

```

1548 **7.6.3.5 Actuator Interface**

1549 The actuator Interface is the Interface for viewing Resources that may be actuated i.e. changes
1550 some value within or the state of the entity abstracted by the Resource:

- 1551 • The actuator Interface name shall be "oic.if.a"
- 1552 • The actuator Interface shall expose in the Resource Representation all mandatory Properties
1553 as defined by the applicable JSON; the actuator interface may also expose in the Resource
1554 Representation optional Properties as defined by the applicable JSON schema that are
1555 implemented by the target Device.

1556 "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
}
```

1557 "Actuator" interface in respect to "Heater" Resource (for illustration only):
1558
1559

```
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
  }
```

1560

- 1561 • A RETRIEVE request using this Interface shall return the Representation for this Resource
1562 subject to any query and filter parameters that may also exist
- 1563 • An UPDATE request using this Interface shall provide a payload or body that contains the
1564 Properties that will be updated on the target Resource.

1565 7.6.3.6 Sensor Interface

1566 The sensor Interface is the Interface for retrieving measured, sensed or capability specific
1567 information from a Resource that senses:

- 1568 • The sensor Interface name shall be "oic.if.s"
- 1569 • The sensor Interface shall expose in the Resource Representation all mandatory Properties as
1570 defined by the applicable JSON; the sensor interface may also expose in the Resource
1571 Representation optional Properties as defined by the applicable JSON schema that are
1572 implemented by the target Device.
- 1573 • A RETRIEVE request using this Interface shall return this Representation for the Resource
1574 subject to any query and filter parameters that may also exist
- 1575 •

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
              }
```

1576

1577 **7.6.3.7 Read-only Interface**

1578 The read-only Interface exposes only the Properties that may be “read”. This includes Properties
1579 that may be “read-only”, “read-write” but not Properties that are “write-only” or “set-only”. The
1580 applicable methods that can be applied to a Resource is RETRIEVE only. An attempt by a Client
1581 to apply a method other than RETRIEVE to a Resource shall be rejected with an error response
1582 code.

1583 **7.6.3.8 Read-write Interface**

1584 The read-write Interface exposes only the Properties that may be “read” and “written”. The “read-
1585 only” Properties shall not be included in Representation for the “read-write” Interface. This is a
1586 generic Interface to support “reading” and “setting” Properties in a Resource. The applicable
1587 methods that can be applied to a Resource are RETRIEVE and UPDATE only. An attempt by a
1588 Client to apply a method other than RETRIEVE or UPDATE to a Resource shall be rejected with
1589 an error response code.

1590 **7.7 Resource representation**

1591 Resource representation captures the state of a Resource at a particular time. The resource
1592 representation is exchanged in the request and response interactions with a Resource. A Resource
1593 representation may be used to retrieve or update the state of a resource.

1594 The resource representation shall not be manipulated by the data connectivity protocols and
1595 technologies (e.g., CoAP, UDP/IP or BLE).

1596 **7.8 Structure**

1597 **7.8.1 Introduction**

1598 In many scenarios and contexts, the Resources may have either an implicit or explicit structure
1599 between them. A structure can, for example, be a tree, a mesh, a fan-out or a fan-in. The
1600 Framework provides the means to model and map these structures and the relationships among
1601 Resources. The primary building block for resource structures in Framework is the collection. A
1602 collection represents a container, which is extensible to model complex structures.

1603 **7.8.2 Resource Relationships**

1604 Resource relationships are expressed as Links. A Link embraces and extends typed web links
1605 concept as a means of expressing relationships between Resources. A Link consists of a set of
1606 Parameters that define:

- 1607 • a context URI,
- 1608 • a target URI,
- 1609 • a relation from the context URI to the target URI
- 1610 • elements that provide metadata about the target URI, the relationship or the context of the Link.

1611 The target URI is mandatory and the other items in a Link are optional. Additional items in the Link
1612 may be made mandatory based on the use of the links in different contexts (e.g. in collections, in
1613 discovery, in bridging etc.). Schema for the Link payload is provided in Annex D.

1614 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" }
```

1615 Two Links are distinct from each other when at least one parameter is different. For example the
1616 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}}
```

1617 The specification may mandate Parameters and Parameter values as required for certain
1618 capabilities. For all Links returned in a response to a RETRIEVE on "/oic/res", if a Link does not
1619 explicitly include the "rel" Parameter, a value of "rel"="hosts" shall be assumed. The relation value
1620 of "hosts" is defined by IETF RFC 6690, the value of "item" by IETF RFC 6573, and the value of
1621 "self" by IETF RFC 4287 and all are registered in the IANA Registry for Link Relations defined in
1622 IANA Link Relations.

1623 As shown in D.2.8 the relation between the context URI and target URI in a Link is specified using
1624 the "rel" JSON element and the value of this element specifies the particular relation.

1625 The context URI of the Link shall implicitly be the URI of the Resource (or specifically a Collection)
1626 that contains the Link unless the Link specifies the anchor parameter. The anchor parameter is
1627 used to change the context URI of a Link – the relationship with the target URI is based off the
1628 anchor URI when the anchor is specified. Anchor parameter uses transfer protocol URI for OIC 1.1
1629 Link (e.g. "anchor": "coaps://[fe80::b1d6]:44444") and OCF URI defined in Sec 6 for OCF 1.0 Links
1630 (e.g. "anchor": "ocf://dc70373c-1e8d-4fb3-962e-017eaa863989").

1631 An example of using anchors in the context of Collections – a floor has rooms and rooms have
1632 lights – the lights may be defined in floor as Links but the Links will have the anchor set to the URI
1633 of the rooms that contain the lights (the relation is contains). This allows all lights in a floor to be
1634 turned on or off together while still having the lights defined with respect to the rooms that contain
1635 them (lights may also be turned on by using the room URI too). See example use of anchor in
1636 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"
    }
  ]
}

```

1637

1638 **7.8.2.1 Parameters**

1639 **7.8.2.1.1 "ins" or Link Instance Parameter**

1640 The "ins" parameter identifies a particular Link instance in a list of Links. The "ins" parameter may
 1641 be used to modify or delete a specific Link in a list of Links. The value of the "ins" parameter is set
 1642 at instantiation of the Link by the OCF Device (Server) that is hosting the list of Links – once it has
 1643 been set, the "ins" parameter shall not be modified for as long as the Link is a member of that list.

1644 **7.8.2.1.2 "p" or Policy Parameter**

1645 The Policy Parameter defines various rules for correctly accessing a Resource referenced by a
 1646 target URI. The Policy rules are configured by a set of key-value pairs as defined below.

1647 The policy Parameter "p" is defined by:

- 1648 • "bm" key: The "bm" key corresponds to an integer value that is interpreted as an 8-bit bitmask.
 1649 Each bit in the bitmask corresponds to a specific Policy rule. The following rules are specified
 1650 for "bm":
 1651

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.

1652

1653 Note that if all the bits in "bm" are defined to value 0, then the "bm" key may be omitted entirely
1654 from "p" as an efficiency measure. However, if any bit is set to value 1, then "bm" shall be
1655 included in "p" and all the bits shall be defined appropriately.

1656 • "sec" and "port" in the remaining bullets shall be used only in a response payload when the
1657 request does not include an OCF-Accept-Content-Format-Version option as defined in section
1658 12.2.5. In a payload sent in response to a request that includes an OCF-Accept-Content-
1659 Format-Version option "sec" and "port" shall not be used and instead the "eps" Parameter shall
1660 provide the information for an encrypted connection. See E.2.8 for the schema for the "p"
1661 Parameter that includes "sec" and "port".

1662 • "sec" key: The "sec" key corresponds to a Boolean value that indicates whether the Resource
1663 referenced by the target URI is accessed via an encrypted connection. If "sec" is true, the
1664 resource is accessed via an encrypted connection, using the "port" specified (see below). If
1665 "sec" is false, the resource is accessed via an unencrypted connection, or via an encrypted
1666 connection (if such a connection is made using the "port" settings for another Resource, for
1667 which "sec" is true).

1668 • "port" key: The "port" key corresponds to an integer value that is used to indicate the port
1669 number where the Resource referenced by the target URI may be accessed via an encrypted
1670 connection.

1671 • If the Resource is only available via an encrypted connection (i.e. DTLS over IP), then
1672 o "p" shall include the "sec" key and its value shall be true.
1673 o "p" shall include the "port" key and its value shall be the port number where the
1674 encrypted connection may be established.

1675 • If the Resource is only available via an unencrypted connection, then
1676 o "p" shall include the "sec" key and its value shall be false or "p" shall omit the "sec"
1677 key; the default value of "sec" is false.

1678 o "p" shall omit the "port" key.

1679 • • If the Resource is available via both an encrypted and unencrypted connection, then

- 1680 o "p" shall include the "sec" key and its value shall be false or "p" shall omit the "sec"
 1681 key; the default value of "sec" is false.
- 1682 o "p" may omit the "port" key. If the "port" key is omitted, the Resource shall be
 1683 available using the same "port" information as another Resource on the Device for
 1684 which "sec" is true.
- 1685 • Access to the Resource on the port specified by the "port" key shall be made by an encrypted
 1686 connection (e.g. coaps://). (Note that unencrypted connection to the Resource may be possible
 1687 on a separate port discovered thru multicast discovery).
 - 1688 • Note that access to the Resource is controlled by the ACL for the Resource. A successful
 1689 encrypted connection does not ensure that the requested action will succeed. See
 1690 OCF Security – Access Control section for more information.

1691 Example 1: below shows the Policy Parameter for a Resource that is discoverable but not
 1692 observable, and for which authenticated accesses shall be done via CoAPS port 33275:

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

1694

1695 Example 2: below shows a self-link, i.e. the "/oic/res" Link in itself that is discoverable and
 1696 observable.

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

1703

1704 **7.8.2.1.3 “type” or Media Type Parameter**

1705 The “type” Parameter may be used to specify the various media types that are supported by a
 1706 specific target Resource. The default type of "application/cbor" shall be used when the “type”
 1707 element is omitted. Once a Client discovers this information for each Resource, it may use one of
 1708 the available representations in the appropriate header field of the Request or Response.

1709 **7.8.2.1.4 “di” or Device ID parameter**

1710 The “di” Parameter specifies the device ID of the Device that hosts the target Resource defined in
 1711 the in the “href” Parameter.

1712 The device ID may be used to qualify a relative reference used in the “href” or to lookup endpoint
 1713 information for the relative reference.

1714 **7.8.2.1.5 “eps” Parameter**

1715 The "eps" Parameter indicates the Endpoint information of the target Resource.

1716 "eps" shall have as its value an array of items and each item represents Endpoint information with
 1717 "ep" and "pri" as specified in 10.2. "ep" is mandatory but "pri" is optional.

1718 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 }
]
```

1719

1720 When "eps" is present in a link, the Endpoint information in "eps" can be used to access the target
1721 Resource referred by the "href" Parameter.

1722 Note that the type of Endpoint – Secure or Unsecure – that a Resource exposes merely determines
1723 the connection type(s) guaranteed to be available for sending requests to the Resource. For
1724 example, if a Resource only exposes a single CoAP "ep", it does not guarantee that the Resource
1725 cannot also be accessed via a Secure Endpoint (e.g. via a CoAPS "ep" from another Resource's
1726 "eps" information). Nor does exposing a given type of Endpoint ensure that access to the Resource
1727 will be granted using the "ep" information. Whether requests to the Resource are granted or denied
1728 by the Access Control layer is separate from the "eps" information, and is determined by the
1729 configuration of the /acl2 Resource (see OCF Security specification section 13.4.2 for details).

1730 When present, max-age information (e.g. Max-Age option for CoAP defined in IETF RFC 7252)
1731 determines the maximum time "eps" values may be cached before they are considered stale.

1732 7.8.2.2 Formatting

1733 When formatting in JSON, the list of Links shall be an array.

1734 7.8.2.3 List of Links in a Collection

1735 A list of Links in a Resource shall be included in that Resource as the value of the "links" Property
1736 of that Resource. A Resource that contains Links is a Collection.

1737 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 }  
    }  
  ]  
}
```

1738

1739 **7.8.3 Collections**

1740 **7.8.3.1 Overview**

1741 A Resource that contains one or more references (specified as Links) to other resources is a
1742 Collection. These reference may be related to each other or just be a list; the Collection provides
1743 a means to refer to this set of references with a single handle (i.e. the URI). A simple resource is
1744 kept distinct from a collection. Any Resource may be turned into a Collection by binding resource
1745 references as Links. Collections may be used for creating, defining or specifying hierarchies,
1746 indexes, groups, and so on.

1747 A Collection shall have at least one Resource Type and at least one Interface bound at all times
1748 during its lifetime. During creation time of a collection the Resource Type and interfaces are
1749 specified. The initial defined Resource Types and interfaces may be updated during its life time.
1750 These initial values may be overridden using mechanism used for overriding in the case of a
1751 Resource. Additional Resource Types and Interfaces may be bound to the Collection at creation
1752 or later during the lifecycle of the Collection.

1753 A Collection shall define the "links" Property. The value of the "links" Property is an array with zero
1754 or more Links. The target URIs in the Links may reference another Collection or another Resource.
1755 The referenced Collection or Resource may reside on the same Device as the Collection that
1756 includes that Link (called a local reference) or may reside on another Device (called a remote
1757 reference). The context URI of the Links in the "links" array shall (implicitly) be the Collection that
1758 contains that "links" property. The (implicit) context URI may be overridden with explicit
1759 specification of the "anchor" parameter in the Link where the value of "anchor" is the new base of
1760 the Link.

1761 A Resource may be referenced in more than one Collection, therefore, a unique parent-child
1762 relationship is not guaranteed. There is no pre-defined relationship between a Collection and the
1763 Resource referenced in the Collection, i.e., the application may use Collections to represent a
1764 relationship but none is automatically implied or defined. The lifecycles of the Collection and the
1765 referenced Resource are also independent of one another.

1766 If the "drel" property is defined for the Collection then all Links that don't explicitly specify a
1767 relationship shall inherit this default relationship in the context of that Collection. The default
1768 relationship defines the implicit relationship between the Collection and the target URI in the Link.

1769 A Property "links" represents the list of Links in a Collection. "links" Property has, as its value, an
1770 array of items and each item is an OCF Link as shown:



1771

1772

1773 A Collection may be:

- 1774 • A pre-defined Collection where the Collection has been defined a priori and the Collection is
1775 static over its lifetime. Such Collections may be used to model, for example, an appliance that
1776 is composed of other devices or fixed set of resource representing fixed functions.
- 1777 • A Device local Collection where the Collection is used only on the Device that hosts the
1778 Collection. Such collections may be used as a short-hand on a client for referring to many
1779 Servers as one.
- 1780 • A centralized Collection where the Collection is hosted on an Device but other Devices may
1781 access or update the Collection
- 1782 • A hosted Collection where the collection is centralized but is managed by an authorized agent
1783 or party.

1784 **7.8.3.2 Collection Properties**

1785 A Collection shall define the "links" Property. In addition, other Properties may be defined for the
1786 Collection by the Resource Type. The mandatory and recommended Common Properties for a
1787 Collection are shown in Table 9. This list of Common Properties is in addition to those defined for
1788 Resources in section 7.3.2.

1789
1790

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

1791

1792 The Properties of a Collection may not be modified.

1793 **7.8.3.3 Default Resource Type**

1794 A default Resource Type, "oic.wk.col", shall be available for Collections. This Resource Type shall
1795 be used only when another type has not been defined on the Collection or when no Resource Type
1796 has been specified at the creation of the Collection.

1797 The default Resource Type provides support for the Common Properties including the "links"
1798 Property. For the default Resource Type, the value of "links" shall be a simple array of Links.

1799 The default Resource Type shall support the 'baseline' and 'links list' Interfaces. The default
1800 Interface shall be the 'links list' Interface.

1801

1802 **7.9 Third (3rd) party specified extensions**

1803 This section describes how a 3rd party may add Device Types, Resource Types, 3rd party defined
1804 Properties to an existing or 3rd party defined Resource Type, 3rd party defined enumeration values
1805 to an existing enumeration and 3rd party defined parameters to an existing defined Property.

1806 A 3rd party may specify additional (non-OCF) Resources within an OCF Device. A 3rd party may
1807 also specify additional Properties within an existing OCF defined Resource Type. Further a 3rd
1808 party may extend an OCF defined enumeration with 3rd party defined values.

1809 A 3rd party defined Device Type may expose both 3rd party and OCF defined Resource Types. A
1810 3rd party defined Device Type must expose the mandatory Resources for all OCF Devices defined
1811 within this specification.

1812 A 3rd party defined Resource Type shall include any mandatory Properties defined in this
1813 specification and also any vertical specified mandatory Properties. All Properties defined within a
1814 3rd party defined Resource Type that are part of the OCF namespace that are not Common
1815 Properties as defined in this specification shall follow the 3rd party defined Property rules in Table
1816 10.

1817 The following table defines the syntax rules for 3rd party defined Resource Type elements. Within
1818 the table the term "Domain_Name" refers to a domain name that is owned by the 3rd party that is
1819 defining the new element.

1820

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>

1821

1822 With respect to the use of the Domain_Name in this scheme the labels are reversed from how they
 1823 appear in DNS or other resolution mechanisms. The 3rd party defined Device Type and Resource
 1824 Type otherwise follow the rules defined in section 7.4.2 Resource Type Property. 3rd party defined
 1825 Resource Types should be registered in the IANA Constrained RESTful Environments (CoRE)
 1826 Parameters registry.

1827 For example:

1828 x.com.samsung.galaxyphone.accelerator

1829 x.com.cisco.ciscorouterport

1830 x.com.hp.printerhead

1831 x.org.allseen.newinterface.newproperty

1832 7.10 Query Parameters

1833 7.10.1 Introduction

1834 Properties and Parameters (including those that are part of a Link) may be used in the query part
 1835 of a URI (see section 6.2.1) as one criterion for selection of a particular Resource. This is done by
 1836 declaring the Property (i.e. <Property Name> = <desired Property Value>) as one of the segments
 1837 of the query. Only ASCII strings are permitted in query filters, and NULL characters are disallowed
 1838 in query filters. This means that only Property Values with ASCII characters may be matched in a
 1839 query filter.

1840 The Resource is selected when all the declared Properties or Link Parameters in the query match
 1841 the corresponding Properties or Link Parameters in the target.

1842 7.10.2 Use of multiple parameters within a query

1843 When a query contains multiple separate query parameters these are delimited by an "&" as
 1844 described in section 6.2.1.

1845 A Client may apply multiple separate query parameters, for
 1846 example "?ins=light&rt=oic.r.switch.binary". If such queries are supported by the Server this shall
 1847 be accomplished by matching "all of" the different query parameter types ("rt", "ins", "if", etc)
 1848 against the target of the query. In the example, this resolves to an instance of oic.r.switch.binary
 1849 that also has an "ins" populated as "light". There is no significance applied to the order of the query
 1850 parameters.

1851

1852 A Client may select more than one Resource Type using repeated query parameters, for example
1853 "?rt=oic.r.switch.binary&rt=oic.r.ramptime". If such queries are supported by the Server this shall
1854 be accomplished by matching "any of" the repeated query parameters against the target of the
1855 query. In the example, any instances of "oic.r.switch.binary" and/or "oic.r.ramptime" that may exist
1856 are selected.

1857
1858 A Client may combine both multiple repeated parameters and multiple separate parameters in a
1859 single query, for example "?if=oic.if.b&ins=light&rt=oic.r.switch.binary&rt=oic.r.ramptime". If such
1860 queries are supported by the Server this shall be accomplished by matching "any of" the repeated
1861 query parameters and then matching "all of" the different query parameter types. In the example
1862 any instances of "oic.r.switch.binary" and/or "oic.r.ramptime" that also have an "ins" of "light" that
1863 may exist are selected in a batch response.
1864

1865 Note that the parameters within a query string are represented within the actual messaging
1866 protocol as defined in section 12.

1867 **7.10.3 Application to multi-value "rt" Resources**

1868 An "rt" query for a multi-value "rt" Resource with the Default Interface of "oic.if.a", "oic.if.s", "oic.if.r",
1869 "oic.if.rw" or "oic.if.baseline" is an extension of a generic "rt" query. When a Server receives a
1870 RETRIEVE request for a multi-value "rt" Resource with an "rt" query, (i.e. GET
1871 /ResExample?rt=oic.r.foo), the Server should respond only when the query value is an item of the
1872 "rt" Property Value of the target Resource and should send back only the Properties associated
1873 with the query value(s). For example, upon receiving GET /ResExample?rt=oic.r.switch.binary
1874 targeting a Resource with "rt": ["oic.r.switch.binary", "oic.r.light.brightness"], the Server responds
1875 with only the Properties of oic.r.switch.binary.

1876 **7.10.4 Interface specific considerations for queries**

1877 **7.10.4.1 Interface selection**

1878 When an Interface is to be selected for a request, it shall be specified as a query parameter in the
1879 URI of the Resource in the request message. If no query parameter is specified, then the Default
1880 Interface shall be used. If the selected Interface is not one of the permitted Interfaces on the
1881 Resource then selecting that Interface is an error and the Server shall respond with an error
1882 response code.

1883 For example, the baseline Interface may be selected by adding "if=oic.if.baseline" to the list of
1884 query parameters in the URI of the target Resource. For example: "GET /oic/res?if=oic.if.baseline".

1885 **7.10.4.2 Batch Interface**

1886 See section 7.6.3.4 for details on the batch Interface itself. Query parameters may be used with
1887 the batch Interface in order to select particular Resources in a Collection for retrieval or update;
1888 these parameters are used to select items in the Collection by matching Link Parameter Values.

1889 When Link selection query parameters are used with RETRIEVE operations applied using the
1890 batch Interface, only the Resources in the Collection with matching Link Parameters should be
1891 returned.

1892 When Link selection query parameters are used with UPDATE operations applied using the batch
1893 Interface, only the Resources having matching Link Parameters should be updated.

1894 See 7.6.3.4.2 for examples of RETRIEVE and UPDATE operations that use Link selection query
1895 parameters.

1896 **8 CRUDN**

1897 **8.1 Overview**

1898 CREATE, RETRIEVE, UPDATE, DELETE, and NOTIFY (CRUDN) are operations defined for
 1899 manipulating Resources. These operations are performed by a Client on the resources contained
 1900 in n Server.

1901 On reception of a valid CRUDN operation n Server hosting the Resource that is the target of the
 1902 request shall generate a response depending on the Interface included in the request; or based
 1903 on the Default Interface for the Resource Type if no Interface is included.

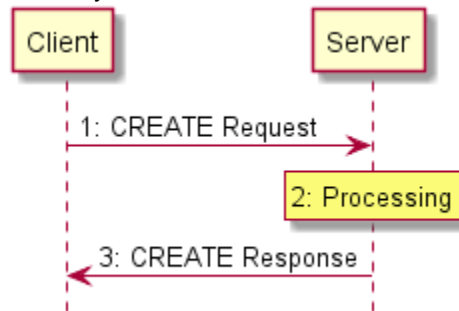
1904 CRUDN operations utilize a set of parameters that are carried in the messages and are defined in
 1905 Table 11. A Device shall use CBOR as the default payload (content) encoding scheme for resource
 1906 representations included in CRUDN operations and operation responses; a Device may negotiate
 1907 a different payload encoding scheme (e.g, see in section 12.2.4 for CoAP messaging). The
 1908 following subsections specify the CRUDN operations and use of the parameters. The type
 1909 definitions for these terms will be mapped in the messaging section for each protocol.

1910 **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.

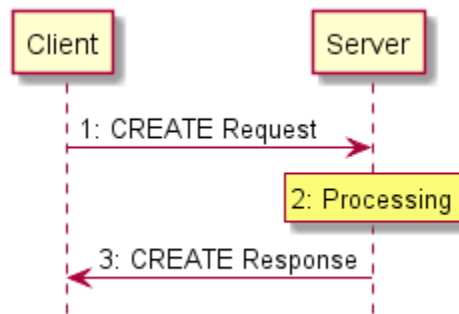
1911 **8.2 CREATE**

1912 The CREATE operation is used to request the creation of new Resources on the Server. The
1913 CREATE operation is initiated by the Client and consists of three steps, as depicted in



1914
1915 Figure 9 and described below.

1916



1917
1918 **Figure 9. CREATE operation**

1919 **8.2.1 CREATE request**

1920 The CREATE request message is transmitted by the Client to the Server to create a new Resource
1921 by the Server. The CREATE request message will carry the following parameters:

- 1922 • *fr*: Unique identifier of the Client
- 1923 • *to*: URI of the target resource responsible for creation of the new resource.
- 1924 • *ri*: Identifier of the CREATE request
- 1925 • *cn*: Information of the resource to be created by the Server
 - 1926 i) *cn* will include the URI and Resource Type property of the resource to be created.
 - 1927 ii) *cn* may include additional properties of the resource to be created.
- 1928 • *op*: CREATE

1929 **8.2.2 Processing by the Server**

1930 Following the receipt of a CREATE request, the Server may validate if the Client has the
1931 appropriate rights for creating the requested resource. If the validation is successful, the Server
1932 creates the requested resource. The Server caches the value of *ri* parameter in the CREATE
1933 request for inclusion in the CREATE response message.

1934 **8.2.3 CREATE response**

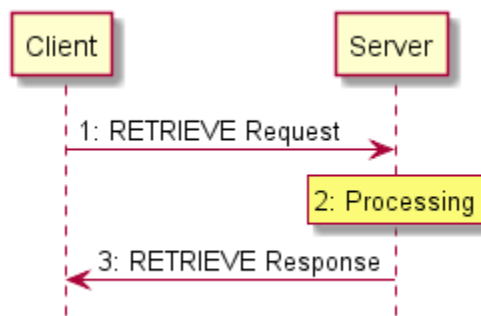
1935 The Server shall transmit a CREATE response message in response to a CREATE request
1936 message from a Client. The CREATE response message will include the following parameters.

- 1937 • *fr*: Unique identifier of the Server
- 1938 • *to*: Unique identifier of the Client
- 1939 • *ri*: Identifier included in the CREATE request
- 1940 • *cn*: Information of the resource as created by the Server.
 - 1941 i) *cn* will include the URI of the created resource.
 - 1942 ii) *cn* will include the resource representation of the created resource.
- 1943 • *rs*: The result of the CREATE operation

1944 **8.3 RETRIEVE**

1945 The RETRIEVE operation is used to request the current state or representation of a Resource.
1946 The RETRIEVE operation is initiated by the Client and consists of three steps, as depicted in
1947 Figure 10 and described below.

1948



1949

1950 **Figure 10. RETRIEVE operation**

1951 **8.3.1 RETRIEVE request**

1952 RETRIEVE request message is transmitted by the Client to the Server to request the
1953 representation of a Resource from a Server. The RETRIEVE request message will carry the
1954 following parameters.

- 1955 • *fr*: Unique identifier of the Client
- 1956 • *to*: URI of the resource the Client is targeting
- 1957 • *ri*: Identifier of the RETRIEVE request
- 1958 • *op*: RETRIEVE

1959 **8.3.2 Processing by the Server**

1960 Following the receipt of a RETRIEVE request, the Server may validate if the Client has the
1961 appropriate rights for retrieving the requested data and the properties are readable. The Server
1962 caches the value of *ri* parameter in the RETRIEVE request for use in the response.

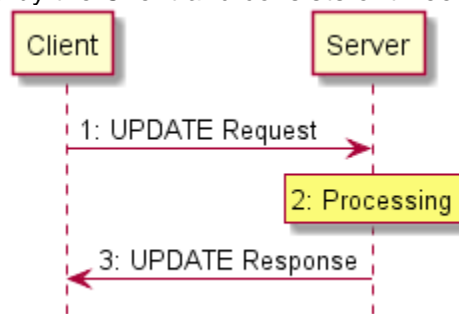
1963 **8.3.3 RETRIEVE response**

1964 The Server shall transmit a RETRIEVE response message in response to a RETRIEVE request
1965 message from a Client. The RETRIEVE response message will include the following parameters.

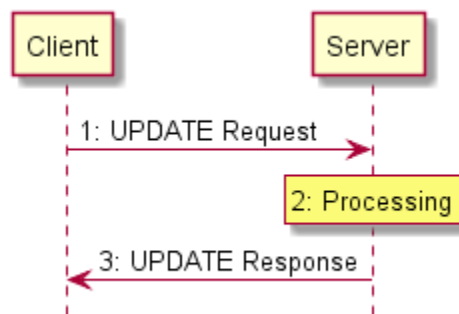
- 1966 • *fr*: Unique identifier of the Server
- 1967 • *to*: Unique identifier of the Client
- 1968 • *ri*: Identifier included in the RETRIEVE request
- 1969 • *cn*: Information of the resource as requested by the Client
- 1970 i) *cn* should include the URI of the resource targeted in the RETRIEVE request
- 1971
- 1972 • *rs*: The result of the RETRIEVE operation

1973 8.4 UPDATE

1974 The UPDATE operation is either a Partial UPDATE or a complete replacement of the information
 1975 in a Resource in conjunction with the interface that is also applied to the operation. The UPDATE
 1976 operation is initiated by the Client and consists of three steps, as depicted in



1977 Figure 11 and described below.



1980 **Figure 11. UPDATE operation**

1982 8.4.1 UPDATE request

1983 The UPDATE request message is transmitted by the Client to the Server to request the update of
 1984 information of a Resource on the Server. The UPDATE request message will carry the following
 1985 parameters.

- 1986 • *fr*: Unique identifier of the Client
- 1987 • *to*: URI of the resource targeted for the information update
- 1988 • *ri*: Identifier of the UPDATE request
- 1989 • *op*: UPDATE
- 1990 • *cn*: Information, including properties, of the resource to be updated at the target resource

1991 **8.4.2 Processing by the Server**

1992 Following the receipt of an UPDATE request, the Server may validate if the Client has the
1993 appropriate rights for updating the requested data. If the validation is successful the Server
1994 updates the target Resource information according to the information carried in *cn* parameter of
1995 the UPDATE request message. The Server caches the value of *ri* parameter in the UPDATE
1996 request for use in the response.

1997 An UPDATE request that includes Properties that are read-only shall be rejected by the Server
1998 with an *rs* indicating a bad request.

1999 An UPDATE request shall be applied only to the Properties in the target resource visible via the
2000 applied interface that support the operation. An UPDATE of non-existent Properties is ignored.

2001 **8.4.3 UPDATE response**

2002 The UPDATE response message will include the following parameters:

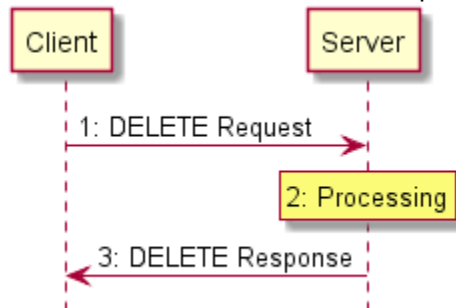
- 2003 • *fr*: Unique identifier of the Server
- 2004 • *to*: Unique identifier of the Client
- 2005 • *ri*: Identifier included in the UPDATE request
- 2006 • *rs*: The result of the UPDATE request

2007 The UPDATE response message may also include the following parameters:

- 2008 • *cn*: The Resource representation following processing of the UPDATE request

2009 **8.5 DELETE**

2010 The DELETE operation is used to request the removal of a Resource. The DELETE operation is
2011 initiated by the Client and consists of three steps, as depicted in



2012
2013 Figure 12 and described below.

2014

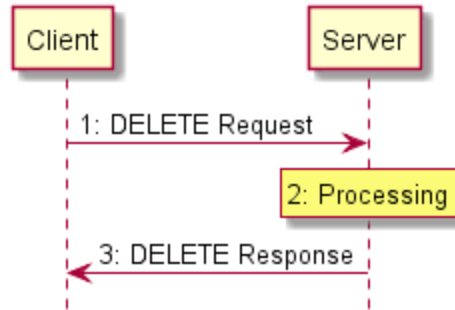


Figure 12. DELETE operation

2015

2016

2017 **8.5.1 DELETE request**

2018 DELETE request message is transmitted by the Client to the Server to delete a Resource on the
 2019 Server. The DELETE request message will carry the following parameters:

- 2020 • *fr*: Unique identifier of the Client
- 2021 • *to*: URI of the target resource which is the target of deletion
- 2022 • *ri*: Identifier of the DELETE request
- 2023 • *op*: DELETE

2024 **8.5.2 Processing by the Server**

2025 Following the receipt of a DELETE request, the Server may validate if the Client has the
 2026 appropriate rights for deleting the identified resource, and whether the identified resource exists.
 2027 If the validation is successful, the Server removes the requested resource and deletes all the
 2028 associated information. The Server caches the value of *ri* parameter in the DELETE request for
 2029 use in the response.

2030 **8.5.3 DELETE response**

2031 The Server shall transmit a DELETE response message in response to a DELETE request
 2032 message from a Client. The DELETE response message will include the following parameters.

- 2033 • *fr*: Unique identifier of the Server
- 2034 • *to*: Unique identifier of the Client
- 2035 • *ri*: Identifier included in the DELETE request
- 2036 • *rs*: The result of the DELETE operation

2037 **8.6 NOTIFY**

2038 The NOTIFY operation is used to request asynchronous notification of state changes. Complete
 2039 description of the NOTIFY operation is provided in section 11.4. The NOTIFY operation uses the
 2040 NOTIFICATION response message which is defined here.

2041 **8.6.1.1 NOTIFICATION response**

2042 The NOTIFICATION response message is sent by a Server to notify the URLs identified by the
 2043 Client of a state change. The NOTIFICATION response message carries the following parameters.

- 2044 • *fr*: Unique identifier of the Server
- 2045 • *to*: URI of the Resource target of the NOTIFICATION message
- 2046 • *ri*: Identifier included in the CREATE request

- 2047 • *op*: NOTIFY
- 2048 • *cn*: The updated state of the resource

2049 **9 Network and connectivity**

2050 **9.1 Introduction**

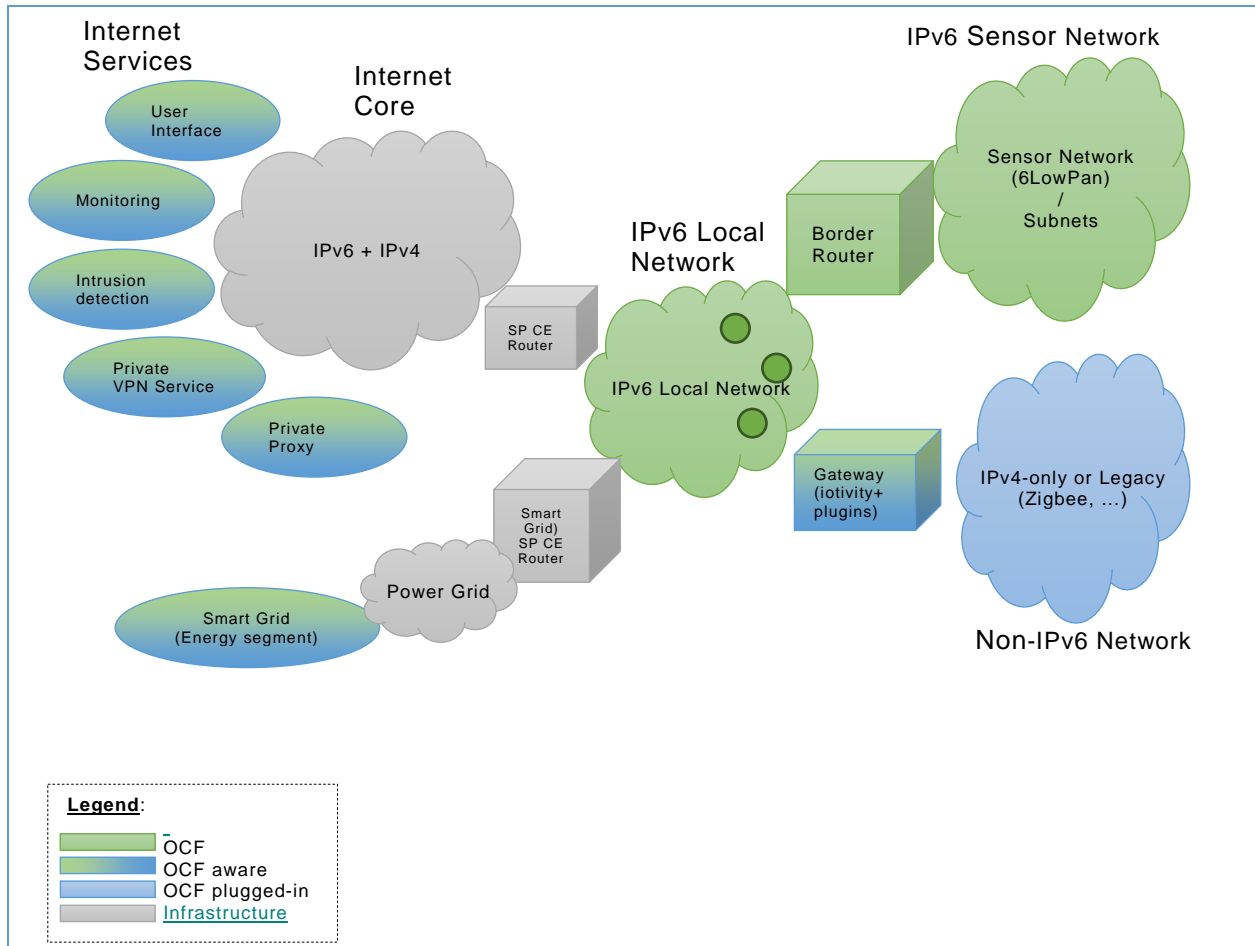
2051 The Internet of Things is comprised of a wide range of applications which sense and actuate the
2052 physical world with a broad spectrum of device and network capabilities: from battery powered
2053 nodes transmitting 100 bytes per day and able to last 10 years on a coin cell battery, to mains
2054 powered nodes able to maintain MBit video streams. It is estimated that many 10s of billions of
2055 IoT devices will be deployed over the coming years.

2056 It is desirable that the connectivity options be adapted to the IP layer. To that end, IETF has
2057 completed considerable work to adapt Bluetooth®, Wi-Fi, 802.15.4, LPWAN, etc. to IPv6. These
2058 adaptations, plus the larger address space and improved address management capabilities, make
2059 IPv6 the clear choice for the OCF network layer technology.

2060 **9.2 Architecture**

2061 While the aging IPv4 centric network has evolved to support complex topologies, its deployment
2062 was primarily provisioned by a single Internet Service Provider (ISP) as a single network. More
2063 complex network topologies, often seen in residential home, are mostly introduced through the
2064 acquisition of additional home network devices, which rely on technologies like private Network
2065 Address Translation (NAT). These technologies require expert assistance to set up correctly and
2066 should be avoided in a home network as they most often result in breakage of constructs like
2067 routing, naming and discovery services.

2068 The multi-segment ecosystem OCF addresses will not only cause a proliferation of new devices
2069 and associated routers, but also new services introducing additional edge routers. All these new
2070 requirements require advance architectural constructs to address complex network topologies like
2071 the one shown in Figure 13.



2072

2073

Figure 13. High Level Network & Connectivity Architecture

2074 In terms of IETF RFC 6434, IPv6 nodes assume either a router or host role. Nodes may further
 2075 implement various specializations of those roles:

- 2076 • A Router may implement Customer Edge Router capabilities as defined in IETF RFC 7084.
- 2077 • Nodes limited in processing power, memory, non-volatile storage or transmission capacity
 2078 requires special IP adaptation layers (6LoWPAN) and/or dedicated routing protocols (RPL).
 2079 Examples include devices transmitting over low power physical layer like IEEE 802.14.5, ITU
 2080 G9959, Bluetooth Low Energy, DECT Ultra Low Energy, Near Field Communication (NFC).
- 2081 • A node may translate and route messaging between IPv6 and non-IPv6 networks.

2082 **9.3 IPv6 network layer requirements**

2083 **9.3.1 Introduction**

2084 Projections indicate that many 10s of billions of new IoT endpoints and related services will be
 2085 brought online in the next few years. These endpoint's capabilities will span from battery powered
 2086 nodes with limited compute, storage, and bandwidth to more richly resourced devices operating
 2087 over Ethernet and WiFi links.

2088 Internet Protocol version 4 (IPv4), deployed some 30 years ago, has matured to support a wide
 2089 variety of applications such as Web browsing, email, voice, video, and critical system monitoring
 2090 and control. However, the capabilities of IPv4 are at the point of exhaustion, not the least of which
 2091 is that available address space has been consumed.

2092 The IETF long ago saw the need for a successor to IPv4, thus the development of IPv6. OCF
2093 recommends IPv6 at the network layer. Amongst the reasons for IPv6 recommendations are:

- 2094 • Larger address space. Side-effect: greatly reduce the need for NATs.
- 2095 • More flexible addressing architecture. Multiple addresses and types per interface: Link-local,
2096 ULA, GUA, variously scoped Multicast addresses, etc. Better ability to support multi-homed
2097 networks, better re-numbering capability, etc.
- 2098 • More capable auto configuration capabilities: DHCPv6, SLAAC, Router Discovery, etc.
- 2099 • Technologies enabling IP connectivity on constrained nodes are based upon IPv6.
- 2100 • All major consumer operating systems (iOS, Android, Windows, Linux) are already IPv6 enabled.
- 2101 • Major Service Providers around the globe are deploying IPv6.

2102 **9.3.2 IPv6 node requirements**

2103 **9.3.2.1 Introduction**

2104 In order to ensure network layer services interoperability from node to node, mandating a common
2105 network layer across all nodes is vital. The protocol should enable the network to be: secure,
2106 manageable, scalable and to include constrained and self-organizing meshed nodes. OCF
2107 mandates IPv6 as the common network layer protocol to ensure interoperability across all Devices.
2108 More capable devices may also include additional protocols creating multiple-stack devices. The
2109 remainder of this section will focus on interoperability requirements for IPv6 hosts, IPv6
2110 constrained hosts and IPv6 routers. The various protocol translation permutations included in
2111 multi-stack gateway devices may be addresses in subsequent addendums of this specification.

2112 **9.3.2.2 IP Layer**

2113 An IPv6 node shall support IPv6 and it shall conform to the requirements as specified in
2114 IETF RFC 6434.

2115

2116 **10 Endpoint**

2117 **10.1 Endpoint definition**

2118 The specific definition of an Endpoint depends on the Transport Protocol Suite being used. For the
2119 example of CoAP over UDP over IPv6, the endpoint is identified by an IPv6 address and UDP port
2120 number.

2121 Each OCF Device shall associate with at least one Endpoint with which it can exchange request
2122 and response messages. When a message is sent to an Endpoint, it shall be delivered to the OCF
2123 Device which is associated with the Endpoint. When a request message is delivered to an Endpoint,
2124 path component is enough to locate the target Resource.

2125 OCF Device can be associated with multiple Endpoints. For example, an OCF Device can have
2126 several IP addresses or port numbers or support both CoAP and HTTP transfer protocol.

2127 On the other hand, an Endpoint can be shared among multiple OCF Devices, only when there is a
2128 way to clearly designate the target Resource with request URI. For example, when multiple CoAP
2129 servers use uniquely different URI paths for all their hosted Resources, and the CoAP
2130 implementation demuxes by path, they can share the same CoAP Endpoint. However, this is not
2131 possible for OIC 1.1 and OCF 1.0 because pre-determined URI (e.g. "/oic/d") is mandatory for
2132 some mandatory Resources (e.g. "oic.wk.d").

2133 **10.2 Endpoint information**

2134 **10.2.1 Introduction**

2135 Endpoint is represented by Endpoint information which consists of two items of key-value pair,
2136 "ep" and "pri".

2137 **10.2.2 “ep”**

2138 "ep" represents Transport Protocol Suite and Endpoint Locator specified as follows:

- 2139 • **Transport Protocol Suite** - a combination of protocols (e.g. CoAP + UDP + IPv6) with which
2140 request and response messages can be exchanged for RESTful transaction (i.e. CRUDN). A
2141 Transport Protocol Suites shall be indicated by a URI scheme name. All OCF-defined schemes
2142 are IANA registered, but URI scheme names in general can be IANA registered or vendor-
2143 defined (e.g., "com.example.foo"), as explained in IETF RFC 7595.
- 2144 • **Endpoint Locator** – an address (e.g. IPv6 address + Port number) through which a message
2145 can be sent to the Endpoint and in turn associated OCF Device. The Endpoint Locator for
2146 "coap", "coaps", "coap+tcp", "coaps+tcp", "http", and "https" shall be specified as "IP address:
2147 port number". Temporary addresses should not be used because Endpoint Locators are for the
2148 purpose of accepting incoming sessions, whereas temporary addresses are for initiating
2149 outgoing sessions (IETF RFC 4941). Moreover its inclusion in "/oic/res" can cause a privacy
2150 concern (IETF RFC 7721).

2151 "ep" shall have as its value a URI (as specified in IETF RFC 3986) with the scheme component
2152 indicating Transport Protocol Suite and the authority component indicating the Endpoint Locator:

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

2153
2154 The current list of "ep" with corresponding Transport Protocol Suite is shown in Table 12:

2155 **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

2156 **10.2.3 “pri”**

2157 When there are multiple Endpoints, "pri" indicates the priority among them.

2158 "pri" shall be represented as a positive integer (e.g. "pri": 1) and the lower the value, the higher
2159 the priority.

2160 The default "pri" value is 1, i.e. when "pri" is not present, it shall be equivalent to "pri": 1.

2161 **10.2.4 Endpoint information in "eps" Parameter**

2162 To carry Endpoint information, a new Link Parameter "eps" is defined in 7.8.2.1.5. "eps" has an
2163 array of items as its value and each item represents Endpoint information with two key-value pairs,
2164 "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"}]
}
```

2165

2166 In the previous example, "anchor" represents the hosting OCF Device, "href", target Resource and
2167 "eps" the two Endpoints for the target Resource.

2168 If the target Resource of a Link requires a secure connection (e.g. CoAPS), "eps" Parameter shall
2169 be used to indicate the necessary information (e.g. port number) in OCF 1.0 payload, because
2170 "sec" and "port" shall be used only in OIC 1.1 payload.

2171 **10.3 Endpoint discovery**

2172 **10.3.1 Introduction**

2173 "Endpoint discovery" is defined as the process for a Client to acquire the Endpoint information for
2174 OCF Device or Resource.

2175 **10.3.2 Implicit discovery**

2176 If a Device is the source of a CoAP message (e.g. "/oic/res" response), the source IP address and
2177 port number can be combined to form the Endpoint Locator for the Device. Along with a "coap"
2178 scheme and default "pri" value, Endpoint information for the Device can be constructed.

2179 In other words, an "/oic/res" response message with CoAP can implicitly carry the Endpoint
2180 information of the responding Device and in turn all the hosted Resources, which can be accessed
2181 with the same transfer protocol of CoAP.

2182 **10.3.3 Explicit discovery with "/oic/res" response**

2183 Endpoint information can be explicitly indicated with the "eps" Parameter of the Links in "/oic/res".

2184 As in 10.3.2, an "/oic/res" response can implicitly indicate the Endpoint information for the target
2185 Resources hosted by the responding Device. However "/oic/res" may expose a target Resource
2186 which belongs to another Device. When the Endpoint for a target Resource of a Link cannot be
2187 implicitly inferred, the "eps" Parameter shall be included to provide explicit Endpoint information
2188 with which a Client can access the target Resource.

2189 This applies to the case of "/oic/res" for a Resource Directory or Bridge Device which usually
2190 carries the Links for Resources which another Device hosts.

2191 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"}]
  }
]

```

2192

2193 The exact format of the "/oic/res" response and a way for a Client to acquire a "/oic/res" response
 2194 message is specified in D.9 and 11.3.5 respectively.

2195 **10.4 CoAP based Endpoint discovery**

2196 The following describes CoAP based Endpoint discovery:

- 2197 a) Advertising or publishing Devices shall join the 'All OCF Nodes' multicast groups (as defined
 2198 in [IANA IPv6 Multicast Address Space Registry]) with scopes 2, 3, and 5 (i.e., ff02::158,
 2199 ff03::158 and ff05::158) and shall listen on the port 5683. For compliance to IETF RFC 7252 a
 2200 Device may additionally join the 'All CoAP Nodes' multicast groups.
- 2201 b) Clients intending to discover resources shall join the multicast groups as defined in a).
- 2202 c) Clients shall send discovery requests (GET request) to the 'All OCF Nodes' multicast group
 2203 address with scope 2 (ff02::158) at port 5683. The requested URI shall be "/oic/res". For
 2204 compliance to IETF RFC 7252 a Client may additionally send to the 'All CoAP Nodes' multicast
 2205 groups.

- 2206 d) If the discovery request is intended for a specific Resource Type, the Query parameter "rt" shall
 2207 be included in the request (section 6.2.1) with its value set to the desired Resource Type. Only
 2208 Devices hosting the Resource Type shall respond to the discovery request.
- 2209 e) When the "rt" Query parameter is omitted, all Devices shall respond to the discovery request.
- 2210 f) Handling of multicast requests shall be as described in section 8 of IETF RFC 7252 and section
 2211 4.1 in IETF RFC 6690.
- 2212 g) Devices which receive the request shall respond using CBOR payload encoding. A Device shall
 2213 indicate support for CBOR payload encoding for multicast discovery as described in section
 2214 12.3.6. Later versions of the specification may support alternate payload encodings (JSON,
 2215 XML/EXI, etc.).
- 2216 Note: Unsecured endpoint is used for multicast discovery.

2217 **11 Functional interactions**

2218 **11.1 Introduction**

2219 The functional interactions between a Client and a Server are described in section 11.2 through
 2220 section 11.6 respectively. The functional interactions use CRUDN messages (section 8) and
 2221 include Discovery, Notification, and Device management. These functions require support of core
 2222 defined resources as defined in Table 13. More details about these resources are provided later
 2223 in this section.

2224 **Table 13. List of Core Resources**

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

2225

2226 **11.2 Onboarding, Provisioning and Configuration**

2227 Onboarding and Provisioning are fully defined by the OCF Security Specification.

2228

2229 Should a Device support Client update of configurable information it shall do so via exposing an
 2230 oic.wk.con Core Resource (Table 14) in "/oic/res";

2231

2232 **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
--------------------	------------------------	----------------	-------------	--	---------------

2233

2234 Table 15 defines the "oic.wk.con" resource type.

2235

2236

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.

2237

2238 Table 16 defines the “oic.wk.con.p” resource type.

2239

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"}]

2240

2241

2242 11.3 Resource discovery

2243 11.3.1 Introduction

2244 Discovery is a function which enables endpoint discovery as well as resource based discovery.
2245 Endpoint discovery is described in detail in section 10. This section mainly describes the resource
2246 based discovery.

2247 11.3.2 Resource based discovery: mechanisms

2248 11.3.2.1 Overview

2249 As part of discovery, a Client may find appropriate information about other OCF peers. This
2250 information could be instances of Resources, Resource Types or any other information
2251 represented in the resource model that an OCF peer would want another OCF peer to discover.

2252 At the minimum, Resource based discovery uses the following:

- 2253 1) A resource to enable discovery shall be defined. The representation of that resource shall
2254 contain the information that can be discovered.

- 2255 2) The resource to enable discovery shall be specified and commonly known a-priori. A Device for
2256 hosting the resource to enable discovery shall be identified.
- 2257 3) A mechanism and process to publish the information that needs to be discovered with the
2258 resource to enable discovery.
- 2259 4) A mechanism and process to access and obtain the information from the resource to enable
2260 discovery. A query may be used in the request to limit the returned information.
- 2261 5) A scope for the publication
- 2262 6) A scope for the access.
- 2263 7) A policy for visibility of the information.
- 2264

2265 Depending on the choice of the base aspects defined above, the Framework defines three resource
2266 based discovery mechanisms:

- 2267 • Direct discovery, where the Resources are published locally at the Device hosting the
2268 resources and are discovered through peer inquiry.
- 2269 • Indirect discovery, where Resources are published at a third party assisting with the
2270 discovery and peers publish and perform discovery against the resource to enable
2271 discovery on the assisting 3rd party.
- 2272 • Advertisement discovery, where the resource to enable discovery is hosted local to the
2273 initiator of the discovery inquiry but remote to the Devices that are publishing discovery
2274 information.

2275 A Device shall support direct discovery.

2276 **11.3.2.2 Direct discovery**

2277 In direct discovery,

- 2278 1) The Device that is providing the information shall host the resource to enable discovery.
 - 2279 2) The Device publishes the information available for discovery with the local resource to
2280 enable discovery (i.e. local scope).
 - 2281 3) Clients interested in discovering information about this Device shall issue RETRIEVE
2282 requests directly to the resource. The request may be made as a unicast or multicast.
2283 The request may be generic or may be qualified or limited by using appropriate queries in
2284 the request.
 - 2285 4) The “server” Device that receives the request shall send a response with the discovered
2286 information directly back to the requesting “client” Device.
 - 2287 5) The information that is included in the request is determined by the policies set for the
2288 resource to be discovered locally on the responding Device.
- 2289

2290 **11.3.2.3 Indirect discovery of Resources (resource directory based discovery)**

2291 In indirect discovery the information about the resource to be discovered is hosted on a Server
2292 that is not hosting the resource. See section 11.3.6 for details on resource directory based
2293 discovery.

2294 In indirect discovery:

- 2295 a) The resource to be discovered is hosted on a Device that is neither the client initiating
2296 the discovery nor the Device that is providing or publishing the information to be
2297 discovered. This Device may use the same resource to provide discovery for multiple
2298 agents looking to discover and for multiple agents with information to be discovered.

- 2299 b) The Device to be discovered or with information to discover, publishes that information
- 2300 with resource to be discovered on a different Device. The policies on the information
- 2301 shared including the lifetime/validity are specified by the publishing Device. The
- 2302 publishing Device may modify these policies as required.
- 2303 c) The client doing the discovery may send a unicast discovery request to the Device
- 2304 hosting the discovery information or send a multicast request that shall be monitored and
- 2305 responded to by the Device. In both cases, the Device hosting the discovery information
- 2306 is acting on behalf of the publishing Device.
- 2307 d) The discovery policies may be set by the Device hosting the discovery information or by
- 2308 the party that is publishing the information to be discovered. The discovery information
- 2309 that is returned in the discovery response shall adhere to the policies that are in effect at
- 2310 the time of the request.

2311

2312 11.3.2.4 Advertisement Discovery

2313 In advertisement discovery:

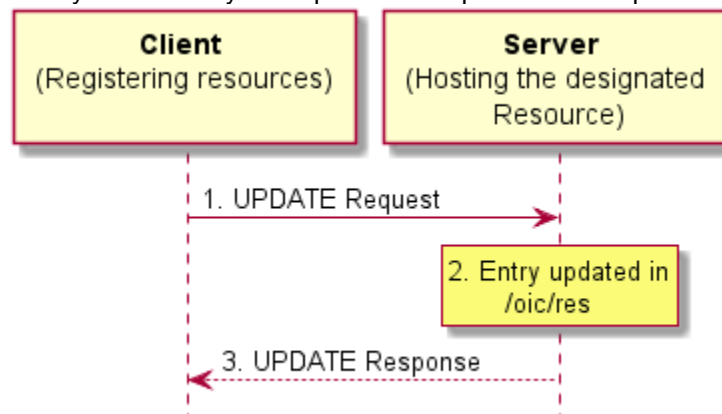
- 2314 a) The resource to enable discovery is hosted local to the Device that is initiating the discovery
- 2315 request (client). The resource to enable discovery may be a Core Resource or discovered
- 2316 as part of a bootstrap.
- 2317 b) The request could be an implementation dependent lookup or be a local RETRIEVE request
- 2318 against the resource that enables discovery.
- 2319 c) The Device with information to be discovered shall publish the appropriate information to
- 2320 the resource that enables discovery.
- 2321 d) The publishing Device is responsible for the published information. The publishing Device
- 2322 may UPDATE the information at the resource to enable discovery based on its needs by
- 2323 sending additional publication requests. The policies on the information that is discovered
- 2324 including lifetime is determined by the publishing Device.

2325

2326 11.3.3 Resource based discovery: Information publication process

2327 The mechanism to publish information with the resource to enable discovery can be done either

2328 locally or remotely. The publication process is depicted in



2329

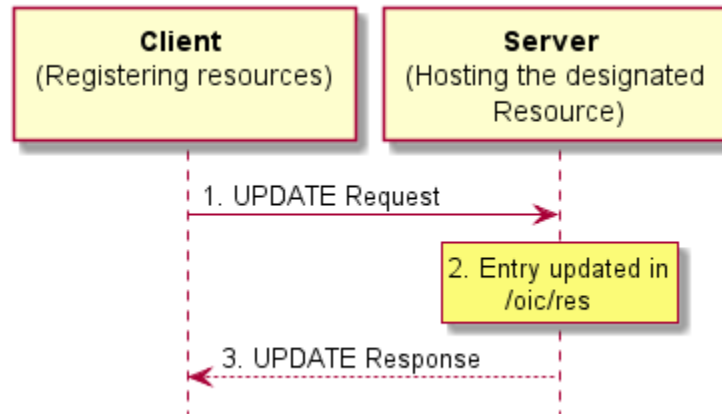
2330 Figure 14. The Device which has discovery information to publish shall a) either update the

2331 resource that enables discovery if hosted locally or b) issue an UPDATE request with the

2332 information to the Device which hosts the resource that enables discovery. The Device hosting the

2333 resource to enable discovery adds/updates the resource to enable discovery with the provided

2334 information and then responds to the Device which has requested the publication of the resource
2335 with an UPDATE response.



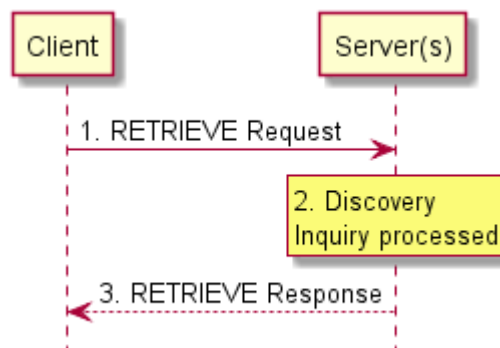
2336

2337

Figure 14. Resource based discovery: Information publication process

2338

11.3.4 Resource based discovery: Finding information

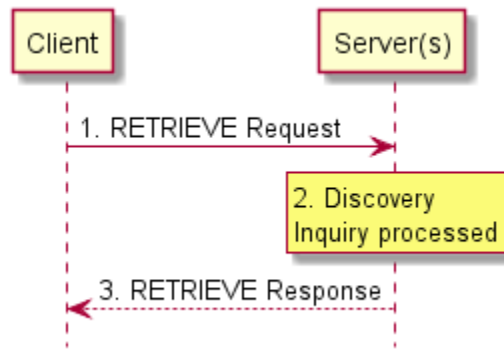


2339

The discovery process (

2340 Figure 15) is initiated as a RETRIEVE request to the resource to enable discovery. The request
2341 may be sent to a single Device (as in a Unicast) or to multiple Devices (as in Multicast). The
2342 specific mechanisms used to do Unicast or Multicast are determined by the support in the data
2343 connectivity layer. The response to the request has the information to be discovered based on the
2344 policies for that information. The policies can determine which information is shared, when and to
2345 which requesting agent. The information that can be discovered can be resources, types,
2346 configuration and many other standards or custom aspects depending on the request to
2347 appropriate resource and the form of request. Optionally the requester may narrow the information
2348 to be returned in the request using query parameters in the URI query.

2349



2350

2351

Figure 15. Resource based discovery: Finding information

2352

2353 **Discovery Resources**

2354 Some of the Core Resources shall be implemented on all Devices to support discovery. The Core
2355 Resources that shall be implemented to support discovery are:

- 2356 ● “/oic/res” for discovery of resources
- 2357 ● “/oic/p” for discovery of platform
- 2358 ● “/oic/d” for discovery of device information

2359 Details for these mandatory Core Resources are described in Table 17

2360 Platform resource –

2361 The OCF recognizes that more than one instance of Device may be hosted on a single platform.
2362 Clients need a way to discover and access the information on the platform. The core resource,
2363 “/oic/p” exposes platform specific properties. All instances of Device on the same Platform shall
2364 have the same values of any properties exposed (i.e. a Device may choose to expose optional
2365 properties within “/oic/p” but when exposed the value of that property should be the same as the
2366 value of that property on all other Devices on that Platform)

2367 Device resource

2368 The device resource shall have the pre-defined URI “/oic/d”. The resource “/oic/d” exposes the
2369 properties pertaining to a Device as defined in Table 17. The properties exposed are determined
2370 by the specific instance of Device and defined by the Resource Type(s) of “/oic/d” on that Device.
2371 Since all the Resource Types of “/oic/d” are not known a priori, the Resource Type(s) of “/oic/d”
2372 shall be determined by discovery through the core resource “/oic/res”. The device resource “/oic/d”
2373 shall have a default Resource Type that helps in bootstrapping the interactions with this device
2374 (the default type is described in Table 17.)

2375

2376 Protocol indication

2377 A Device may need to support different messaging protocols depending on requirements for
2378 different application profiles. For example, the Smart Home profile may use CoAP and the
2379 Industrial profile may use DDS. To enable interoperability, a Device uses the protocol indication
2380 to indicate the transport protocols they support and can communicate over.

2381

2382

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 vertical specifications.	Discovery

2384

2385 Table 18 defines "oic.wk.res" Resource Type.

2386

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.

2387 A Device which wants to indicate its messaging protocol capabilities may add the property 'mpro'
 2388 in response to a request on "/oic/res". A Device shall support CoAP based discovery as the
 2389 baseline discovery mechanism (see section 10.4). A Client which sees this property in a discovery

2390 response can choose any of the supported messaging protocols for communicating with the Server
 2391 for further messages. For example, if a Device supporting multiple protocols indicates it supports
 2392 a value of "1 3" for the 'mpro' property in the discovery response, then it cannot be assumed that
 2393 there is an implied ordering or priority. But a vertical service specification may choose to specify
 2394 an implied ordering or priority. If the 'mpro' property is not present in the response, A Client shall
 2395 use the default messaging protocol as specified in the vertical specification for further
 2396 communication.

2397 The "/oic/res" shall list all Resources that are indicated as discoverable (see section 11.3). Also
 2398 the following architecture Resource Types shall be listed:

- 2399 • Introspection resource indicated with an "rt" value of "oic.wk.introspection"
- 2400 • "/oic/p" indicated with an "rt" value of "oic.wk.p"
- 2401 • "/oic/d" indicated with an "rt" value of "oic.wk.d"
- 2402 • "/oic/sec/doxm" indicated with an "rt" value of "oic.r.doxm" as defined in the OCF Security
 2403 Specification
- 2404 • "/oic/sec/pstat" indicated with an "rt" value of "oic.r.pstat" as defined in the OCF Security
 2405 Specification
- 2406 • "/oic/sec/acl2" indicated with an "rt" value of "oic.r.acl2" as defined in the OCF Security
 2407 Specification
- 2408 • "/oic/sec/cred" indicated with an "rt" value of "oic.r.cred" as defined in the OCF Security
 2409 Specification

2410 Conditionally required:

- 2411 • "/oic/res" with an "rt" value of "oic.wk.res" as self-reference, on the condition that "oic/res" has
 2412 to signal that it is observable by a Client.

2413 The Introspection Resource is only applicable for Devices that host Vertical Resource Types (e.g.
 2414 "oic.r.switch.binary") or vendor-defined Resource Types. Devices that only host Resources
 2415 required to onboard the Device as a Client do not have to implement the Introspection Resource.

2416 Table 19 provides an OCF registry for protocol schemes.

2417 **Table 19. Protocol scheme registry**

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

2418 Note: The discovery of an endpoint used by a specific protocol is out of scope. The mechanism used by a Client to form
 2419 requests in a different messaging protocol other than discovery is out of scope.

2420

2421 The following applies to the use of "/oic/d" as defined above:

- 2422 • A Device may choose to expose its Device Type (e.g., refrigerator or A/C) by adding the Device
 2423 Type to the list of Resource Types associated with "/oic/d".

- 2424 ○ For example; "rt" of "/oic/d" becomes ["oic.wk.d", "oic.d.<thing>"]; where
2425 "oic.d.<thing>" is defined in another spec such as the Smart Home vertical.
- 2426 ○ This implies that the properties exposed by "/oic/d" are by default the mandatory
2427 properties in Table 20.
- 2428 • A vertical may choose to extend the list of properties defined by the Resource Type "oic.wk.d".
2429 In that case, the vertical shall assign a new Device Type specific Resource Type ID. The
2430 mandatory properties defined in Table 20 shall always be present.
 - 2431 • A Device may choose to expose a separate, discoverable Resource with its Resource Type ID
2432 set to an OCF defined Device Type. In this case the Resource is equivalent to an instance of
2433 "oic.wk.d" and adheres to the definition thereof. As such the Resource shall at a minimum
2434 expose the mandatory Resource Properties of "oic.wk.d". In the case where the Resource
2435 tagged in this manner is defined to be an instance of a Collection (i.e. it also includes the "rt"
2436 value of "oic.wk.col") then the Resources that are part of that Collection shall at a minimum
2437 include the Resource Types mandated for the Device Type. For example, if a Resource has an
2438 "rt" value of ["oic.d.light", "oic.wk.col"], that Resource follows the definitions of both "oic.wk.d"
2439 and "oic.wk.col". In this example, the collection includes an instance of "oic.r.switch.binary"
2440 which is mandatory for an "oic.d.light" as per the OCF Smart Home Device specification.

2441 Table 20 "oic.wk.d" Resource Type definition defines the base Resource Type for the "/oic/d"
2442 resource.
2443

2444 **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	no	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.1.0.0".
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.

2445

2446 The additional Resource Type(s) of the "/oic/d" resource are defined by the vertical specification.

2447

2448 Table 21 defines "oic.wk.p" Resource Type.

2449

2450

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

- 2492 • The URI (relative or fully qualified URL) of the resource
- 2493 • The Resource Type(s) of each resource. More than one Resource Type may be returned if the
- 2494 resource enables more than one type. To access resources of multiple types, the specific
- 2495 Resource Type that is targeted shall be specified in the request.
- 2496 • The Interfaces supported by that Resource. Multiple interfaces may be returned. To access a
- 2497 specific interface that interface shall be specified in the request. If the interface is not specified,
- 2498 then the Default Interface is assumed.

2499 Different "/oic/res" responses are returned according to requesting Clients, which indicate their
2500 preference via inclusion or otherwise of an OCF-Accept-Content-Format-Version option.

2501 For Clients that do not include the OCF-Accept-Content-Format-Version option, an "/oic/res"
2502 response shall use "sec" and "port" to provide the information for an encrypted connection. See
2503 E.2.8 for the schema for the Link.

2504 For Clients that do include the OCF-Accept-Content-Format-Version option, an "/oic/res" response
2505 includes an "array of Links" to conform to IETF RFC 6690. Each Link shall use an "eps" Parameter
2506 to provide the information for an encrypted connection and carry "anchor" of the value OCF URI
2507 where the authority component of <deviceId> indicates the Device hosting the target Resource.

2508 The JSON schema for discovery using "/oic/res" is described in **D.9**; the schema that is applicable
2509 to requesting Clients that do not include an OCF-Accept-Content-Format-Version option is
2510 described in E.4 and E.5. Also refer to section 10 (Endpoint Discovery) for details of Multicast
2511 discovery using "/oic/res" on a CoAP transport.

2512 For example, a Light device might return the following to OIC 1.1 clients:

```

2513 [
2514   {
2515     "di": "e61c3e6b-9c54-4b81-8ce5-f9039c1d04d9",
2516     "links": [
2517       {
2518         "href": "coaps://[fe80::b1d6]:44444/oic/res",
2519         "rel": "self",
2520         "rt": ["oic.wk.res"],
2521         "if": ["oic.if.ll", "oic.if.baseline"],
2522         "p": {"bm": 3}
2523       },
2524       {
2525         "href": "/oic/p",
2526         "rt": ["oic.wk.p"],
2527         "if": ["oic.if.r", "oic.if.baseline"],
2528         "p": {"bm": 3, "sec": true, "port": 11111}
2529       },
2530       {
2531         "href": "/oic/d",
2532         "rt": ["oic.wk.d", "oic.d.light"],
2533         "if": ["oic.if.r", "oic.if.baseline"],
2534         "p": {"bm": 3, "sec": true, "port": 11111}
2535       },
2536       {
2537         "href": "/myLight",
2538         "rt": ["oic.r.switch.binary"],
2539         "if": ["oic.if.a", "oic.if.baseline"],
2540         "p": {"bm": 3, "sec": true, "port": 11111}
2541       }
2542     ]
2543   }
2544 ]

```

2545 The light device might return the following to clients that request with the Content Format of
2546 "application/vnd.ocf+cbor" in Accept Option:

```
2547 [
2548   {
2549     "href": "/oic/res",
2550     "anchor": "ocf://dc70373c-1e8d-4fb3-962e-017eaa863989/oic/res",
2551     "rel": "self",
2552     "rt": ["oic.wk.res"],
2553     "if": ["oic.if.ll", "oic.if.baseline"],
2554     "p": {"bm": 3},
2555     "eps": [{"ep": "coap://[fe80::b1d6]:44444"}]
2556   },
2557   {
2558     "href": "/oic/p",
2559     "anchor": "ocf://dc70373c-1e8d-4fb3-962e-017eaa863989",
2560     "rt": ["oic.wk.p"],
2561     "if": ["oic.if.r", "oic.if.baseline"],
2562     "p": {"bm": 3},
2563     "eps": [{"ep": "coap://[fe80::b1d6]:44444"},
2564             {"ep": "coaps://[fe80::b1d6]:11111"}]
2565   },
2566   {
2567     "href": "/oic/d",
2568     "anchor": "ocf://dc70373c-1e8d-4fb3-962e-017eaa863989",
2569     "rt": ["oic.wk.d", "oic.d.light"],
2570     "if": ["oic.if.r", "oic.if.baseline"],
2571     "p": {"bm": 3},
2572     "eps": [{"ep": "coap://[fe80::b1d6]:44444"},
2573             {"ep": "coaps://[fe80::b1d6]:11111"}]
2574   },
2575   {
2576     "href": "/myLight",
2577     "anchor": "ocf://dc70373c-1e8d-4fb3-962e-017eaa863989",
2578     "rt": ["oic.r.switch.binary"],
2579     "if": ["oic.if.a", "oic.if.baseline"],
2580     "p": {"bm": 3},
2581     "eps": [{"ep": "coap://[fe80::b1d6]:44444"},
2582             {"ep": "coaps://[fe80::b1d6]:11111"}]
2583   }
2584 ]
```

2588 After performing discovery using "/oic/res", Clients may discover additional details about Server
2589 by performing discovery using "/oic/p", /oic/rts etc. If a Client already knows about Server it may
2590 discover using other resources without going through the discovery of "/oic/res".

2591 11.3.6 Resource directory (RD) based discovery

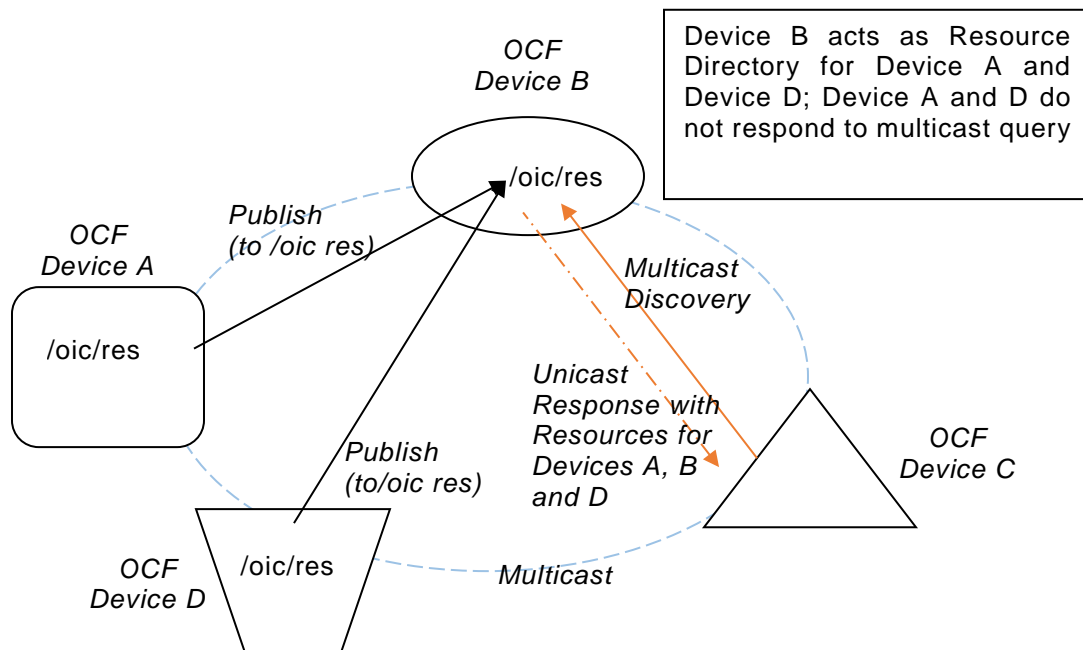
2592 11.3.6.1 Introduction

2593 11.3.6.1.1 Indirect discovery for lookup of the Resources

2594 Direct discovery is the mechanism used currently to find Resources in the network. When needed,
2595 Resources are queried at a particular Device directly or a multicast packet is sent to all Devices.
2596 Each queried Device responds directly with its Resources to the discovering Device. Resources
2597 available locally are registered on the same Device.

2598 In some situations, one of the other mechanisms described in section 11.3.2.3, called indirect
2599 discovery, may be required. Indirect discovery is when a 3rd party Device, other than the

2600 discovering Device and the discovered Device, assists with the discovery process. The 3rd party
 2601 Device, called Resource Directory (RD), only provides information on Resources on behalf of
 2602 another Device but does not host Resources on part of that Device.



2603
 2604 **Figure 16. Indirect discovery of Resources by via an RD**

2605 In Figure 16, Device B acts as Resource Directory for Device A and Device D. Device A and Device
 2606 D publish their Resource information to Device B. Device C may query Device B to acquire the
 2607 Resource information of Device A and Device D. Device A and Device D may not respond to a
 2608 multicast query when Device B, as a Resource Directory, responds to the query on their behalf.

2609 Indirect discovery is useful for a constrained Device that needs to sleep to manage power and
 2610 cannot process every discovery request, or when Devices may not be on the same network and
 2611 requires optimization for discovery. Once Resources are discovered using indirect discovery, i.e.,
 2612 RD query, then the access to the Resource is done by a request sent directly to the Device that
 2613 hosts that Resource.

2614 11.3.6.1.2 Resource directory

2615 A Resource Directory (RD) is a Device that assists with indirect discovery. A Device which acts as
 2616 an RD will be involved in the following operations.

- 2617 • **RD discovery** – the procedure with which publishing Devices discover an RD and acquire the
 2618 criteria to select from among multiple detected RDs.
- 2619 • **Resource publish** – the procedures with which Devices publish their Resource information,
 2620 i.e. Links, subsequently update the published Links or delete the existing ones.
- 2621 • **Resource exposure** – the feature with which RDs expose the Links hosted by the 3rd party
 2622 Devices via their own "/oic/res".

2623 For the above, RDs make use of Resource Type "oic.wk.rd" defined in Table 22 and Table 23. A
 2624 Device that supports the capability to host indirect discovery shall expose an instance of "oic.wk.rd"
 2625 in its "/oic/res" to announce that it serves as an RD. The discoverable instance of "oic.wk.rd" shall
 2626 allow only secure connections (e.g. endpoint with a scheme of "coaps" or "coaps+tcp"). A
 2627 publishing Device may send a RETRIEVE request to "/oic/rd" to acquire the selection criteria

2628 among multiple RDs. Then it may send an UPDATE request to "/oic/rd" with its Links in the
 2629 payload to publish or change the Links in "/oic/res" of the RD. Also the publishing Device may send
 2630 a DELETE request to "/oic/rd" to remove the existing Links from "/oic/res" of the RD. A publishing
 2631 Device is responsible to insure an RD has the correct published Links to expose via its "/oic/res".
 2632 The publishing Device needs to keep the RD updated with any changes (e.g., a new IP address)
 2633 and remove the Links with stale information, which it accomplishes with suitable UPDATE or
 2634 DELETE request.

2635 **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 OCF Devices to publish, update and delete their Links in "/oic/res" of the RD.	Discovery

2636

2637 **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.

2638

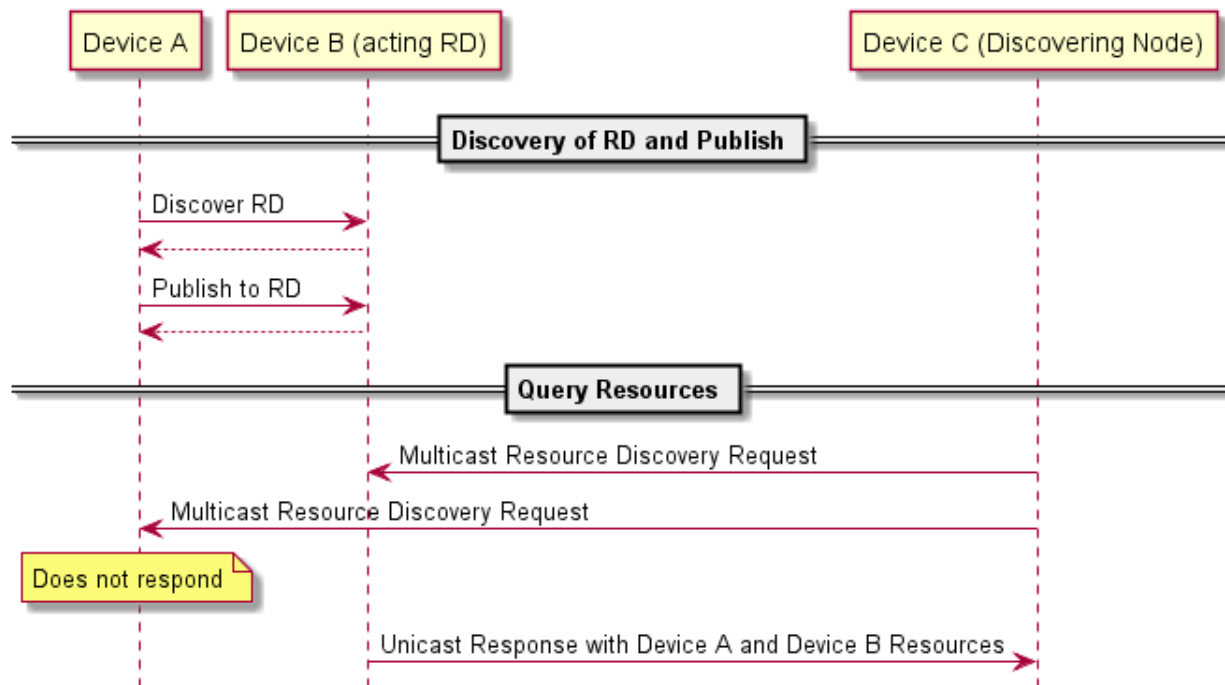
2639 An RD may be queried at its "/oic/res" Resource to find Resources hosted on other Devices. These
 2640 Devices can be sleepy nodes or any other device that cannot or may not respond to discovery
 2641 requests. A publishing Device may publish all or a partial list of Resources they host to an RD.
 2642 The RD then responds to queries for Resource discovery on behalf of the publishing Device (for
 2643 example: when a Device may go to sleep). For general Resource discovery, the RD behaves like
 2644 any other Server in responding to requests to "/oic/res".

2645 The remainder of section 11.3.6 is divided into three parts. The first part covers "RD Discovery"
 2646 (section 11.3.6.2), i.e., discovering and selecting of an RD. The second part covers "Resource
 2647 publish" (section 11.3.6.3), i.e., publishing, updating and deleting of Resources. The third part
 2648 covers "Resource exposure" (section 11.3.6.4) where the RD replies to queries from Devices
 2649 looking to discover Resources.

2650 **11.3.6.2 RD discovery**

2651 **11.3.6.2.1 Discovering an RD**

2652 An RD shall support RD discovery.



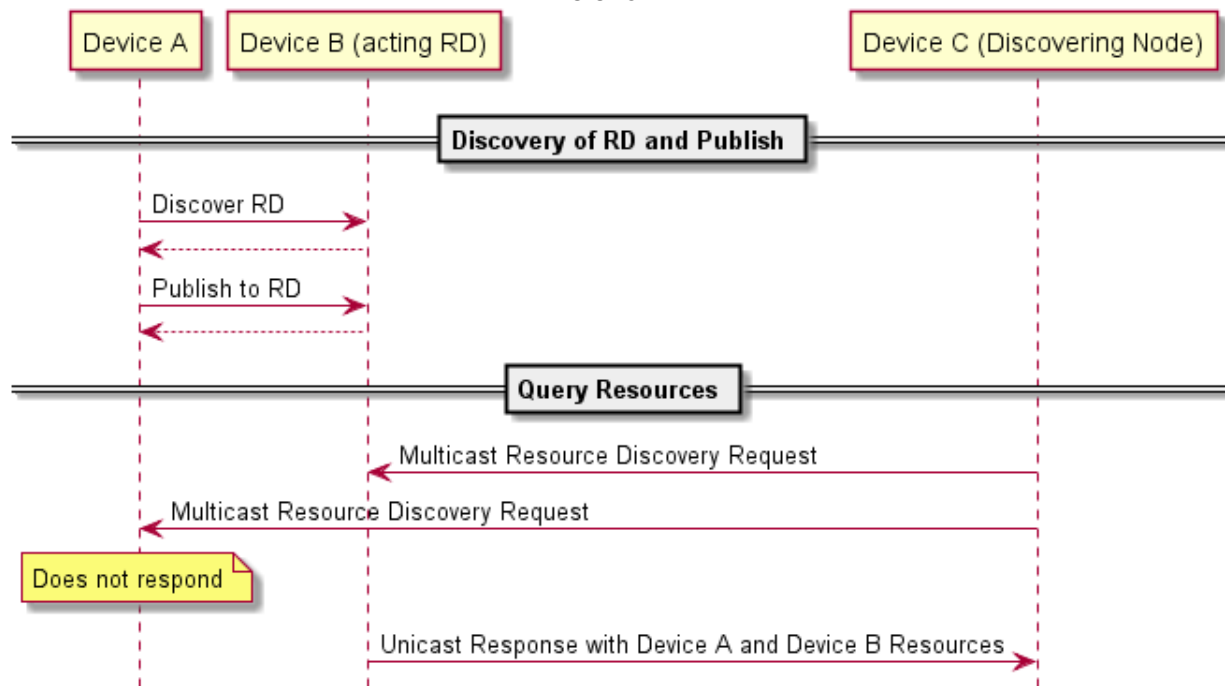
2653

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

2654

2655

As shown in



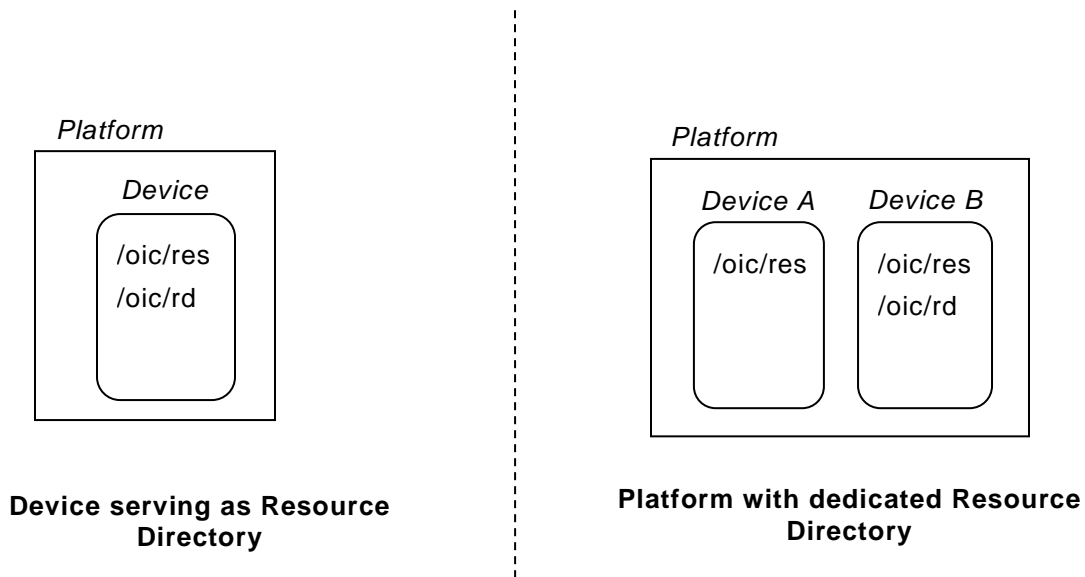
2656

2657 Figure 17, a Device that wishes to publish its Resources first discovers an RD and then publishes
 2658 the desired Resource information. Once a set of Resources have been published to an RD then
 2659 the publishing Device should not respond to multicast Resource discovery queries for those
 2660 published Resources when the RD is on the same multicast domain. In that case, only the RD
 2661 should respond to multicast Resource discovery requests on the Resource published to it.

2662 It is allowed for more than one Device to act as an RD. The reason to have multiple RD support is
2663 to make networks scalable, handle network failures and prevent centralized Device failure
2664 bottlenecks. This does not preclude a scenario where a use case or deployment environment may
2665 require a single Device in the environment to be deployed as the only RD (e.g. gateway model).

2666 Discovering an RD may result in responses from more than one RD. If more than one RD responds,
2667 the discovering Device may select on of them based on the weighting parameter(s) provided in the
2668 response from the RD.

2669 A Client that performs Resource discovery uses an RD just like it uses any other Server for
2670 discovery. It may send a unicast request to the RD when it needs only the Resources published
2671 on the RD or do a multicast query when it does not require or have explicit knowledge of an RD.



2672

2673

Figure 18. Resource Direction Deployment Scenarios

2674 RDs may also be discovered in the following ways:

- 2675 • Pre-configuration: Devices wishing to publish Resource information may be configured a priori
2676 with the information (e.g. IP address, port, transport etc.) of a specific RD. This pre-
2677 configuration may be done at onboarding or may be updated on the Device using an out-of-
2678 band method. This pre-configuration may be done by the manufacturer.
- 2679 • Query-oriented: A publishing Device wanting to discover resource directories using query-
2680 oriented discovery may issue a multicast Resource discovery request for "/oic/res?rt=oic.wk.rd".
2681 Only and all Devices that can be an RD shall respond to this query. The "/oic/rd" response shall
2682 include information about the RD i.e., the presence of "oic.wk.rd" Link (as defined by the
2683 Resource Type) and a subsequent query to "/oic/rd" would produce weighting parameters to
2684 allow the discovering Device to select between RDs (see details in RD selection section
2685 11.3.6.2.2). The "oic.wk.rd" resource shall be instantiated on the Devices acting as RDs. The
2686 "oic.wk.rd" schema is as defined in D.13.

2687 **11.3.6.2.2 RD selection process**

2688 The Device that wants to use an RD will find zero or more RDs on the network. There may not be
2689 an RD within the network. When discovering RDs, the Device needs to select an RD of all RDs
2690 found on the network. The Device may send a RETRIEVE request to "/oic/rd" of a specific RD, the
2691 RD shall respond with the representation of "/oic/rd/" containing selection criteria as defined by

2692 the "sel" Property. The lower the "sel" Property value is, the more preferable the responding RD
2693 is. The creation of the "sel" value is vendor defined.

2694 For example an "/oic/rd" response may return the following.

2695

2696

2697

2698

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

2699 The selection based on the "sel" Property value will ensure that a Device can judge if the found
2700 RD is suitable for its needs.

2701 The following situations may occur during the selection of an RD:

2702 1) A single or multiple RDs are present in the network

2703 2) No RD is present in the network

2704 3) an additional RD arrives on the network

2705 In the first scenario, the RDs are already present. If a single RD is detected then that RD may be
2706 used. When multiple RDs are detected the Device may use the "sel" Property value to select the
2707 RD.

2708 In the second scenario, the publishing Device may continue looking for an RD until one is found
2709 or give up using an RD altogether.

2710 In the third scenario, the Device has already published its resources to an existing RD, then
2711 discovers a new RD on the network. After judging the "sel" Property value, the Device may choose
2712 to move to the new RD. The Device should delete its Resource information from the currently used
2713 RD and publish the information to the new RD.

2714 **11.3.6.3 Resource publish**

2715 **11.3.6.3.1 Overview**

2716 An RD shall provide the facility to allow Devices to publish their Resource information to a RD, to
2717 update Resource information in an RD and to delete Resource information from an RD. The
2718 following sections describe the requirements for each.

2719 **11.3.6.3.2 Publish resources**

2720 **11.3.6.3.2.1 Overview**

2721 After the selection process of an RD, a device may push its Resource information to the selected
2722 RD, i.e., publish the Links in its "/oic/res" to the "/oic/res" of the RD.

2723 The publishing Device may decide to publish all Resources or just a few of the Resources on the
2724 RD. The publishing Device should only publish Resources that are otherwise published to its own
2725 "/oic/res"; a publishing Device should not publish non-discoverable Resources or Resources
2726 hosted by some other Device. A publishing Device shall respond to discovery requests on its
2727 "/oic/res" resource unless all its discoverable Resources have been published in an RD.

2728 **11.3.6.3.2.2 Publish: Push Resource information**

2729 Resource information may be published using an UPDATE request sent to "/oic/rd".

2730 A Device which hosts a Resource may publish the Resource information, i.e. the Link targeting the
2731 Resource, to an RD by sending an UPDATE request with the Link in the payload. The published
2732 Link shall be exposed through the "/oic/res" of the RD.

2733 When a Device first publishes a Link or Links, it shall send an UPDATE request to the "/oic/rd"
2734 Resource of the RD including the following key-value pairs in the payload:

- 2735 • **di** –its value shall be the Device ID of the publishing Device, i.e. the "di" value of "/oic/d".
- 2736 • **links** –its value shall be the array of Links to be published. Links may omit the "ins" parameter
2737 in which case the RD will assign a value for each Link. The supplied "ins" parameter by the
2738 Client is allowed to be overruled by the RD, e.g. an RD can ignore the supplied "ins" value.
- 2739 • **ttl** –its value indicates how long (in seconds) the publishing Device requests the RD to keep
2740 this published Link.

2741 Take notice that the payload shall carry the appropriate Content-Format of
2742 "application/vnd.ocf+cbor":

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


2743

2744 When an RD receives this initial UPDATE request, it determines whether to grant the request or
2745 not. Upon granting the request, the RD shall send back an UPDATE response to the publishing
2746 Device. The response shall include a payload with the same information as the original UPDATE
2747 request with the following possible differences:

- 2748 • For each Link, an "ins" Parameter shall be included in the response. The RD shall assign a
2749 unique "ins" value identifying the Link among all the Links it advertises. If the publishing Device
2750 included an "ins" value in the UPDATE request, the RD may use it as long as it doesn't match
2751 any existing "ins" value in the published Links. The "ins" value needs to be retained to modify
2752 the newly published Link. The publishing Device may use the "ins" value for further UPDATE
2753 or DELETE of the Link.
- 2754 • The "ttl" Property Value shall be assigned by the RD and it shall be included in the response.
2755 The RD should use the value included in the UPDATE request but may assign a value that is
2756 lower if it is not able to honour the requested "ttl" value. After this time elapses, the RD shall
2757 remove the Links. To keep a Link alive the publishing Device may update the "ttl" using the
2758 UPDATE schema.

2759 The RD shall add the new Links to its "/oic/res" and expose them to a valid discovery query, i.e.
2760 RETRIEVE request:

2761

```
{
  "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
}
```

2762

2763 Once a publishing Device has published Resources to an RD, it may choose not respond to the
2764 multicast discovery queries for the same Resources against its own "/oic/res", especially when
2765 on the same multicast domain as the RD. After publishing Resources, primarily it is the RDs
2766 responsibility to reply to the queries for the published Resources.

2767 There is another possibility that the RD and the publishing Device both respond to the multicast
2768 query from the discovering Device. This will create a duplication of the information but is an
2769 alternative that may be used for non-robust networks. It is not a recommended option but for
2770 industrial scenarios, this is one of the possibilities. Either way, discovering Clients need to always
2771 be prepared to process duplicate information in responses to multicast discovery request. The
2772 "/oic/rd" schema is as defined in D.13 to specify publishing to the "/oic/rd" Resource.

2773 **11.3.6.3.3 UPDATE Resource information**

2774 An RD shall hold the published Link until the time specified in the "ttl" field expires. A publishing
2775 Device may send an UPDATE if it seeks the RD to keep holding the Link or modify the published
2776 Link (e.g. changing Endpoint information). In case of a change in published Resource information
2777 (e.g., IP address change), UPDATE is needed to maintain the published Link up-to-date. An
2778 UPDATE request may be used to modify all Resources that are published on an RD or per
2779 Resource published.

2780 Only the publishing Device may change the Links for the Resources published to an RD. If a Client
2781 sends an UPDATE request to modify Links that belong to a different publishing Device, the RD
2782 shall respond with an appropriate error message. The RD may verify whether the UPDATE request
2783 is from the same publishing Device with the "deviceuuid", i.e., "di", associated with the secured
2784 channel through which the request is received.

2785 Changes are done using the same UPDATE request to "oic/rd". An UPDATE request message
2786 shall use the same payload format but each Link to be modified shall include the "ins" Parameter
2787 which the RD previously provided in the UPDATE response message.

2788 Upon granting the request, the RD shall reflect the change to the Link in its "/oic/res" and sends
2789 back the UPDATE response using the same format as the initial publishing.

2790 **11.3.6.3.4 Delete Resource information**

2791 Resource information held by the RD is only allowed to be removed by the publishing Device. The
2792 removal may occur at any time during the publication of the Links. If a Client sends a DELETE
2793 request to remove Links that belong to a different publishing Device, the RD shall respond with an
2794 appropriate error message. The RD may verify whether the DELETE request is from the same
2795 publishing Device with the "deviceuuid", i.e., "di", associated with the secured channel through
2796 which the request is received. The DELETE request may be either for the whole Device information
2797 or for a particular Resource.

2798 A publishing Device may remove its published Link or Links from an RD by sending a DELETE
2799 request with the query parameter "di" or "ins" indicating the Links to be removed. If the DELETE

2800 request does not contain one of these two query parameters, the RD shall ignore the DELETE
2801 request and send an appropriate error message. Upon granting the request, the RD shall remove
2802 the identified Links and send back a DELETE response.

- 2803 • **di** –When present, the entire set of Links corresponding to the Device ID shall be removed, i.e.
2804 the Links published by the publishing Device with the same Device ID are removed.
- 2805 • **ins** –When present, the Link with the same instance value shall be removed.

```
DELETE /oic/rd?di=0685B960-736F-46F7-BEC0-9E6CBD671ADC1
DELETE /oic/rd?ins=112358
```

2806

2807 11.3.6.3.5 Transfer Resource information from one RD to another

2808 When a publishing Device identifies an RD that is better suited, it may decide to publish to that
2809 RD. The publishing Device may delete previously published information from the currently used
2810 RD before publishing to the newly selected RD. The deletion of the Resource(s) may be done
2811 either by allowing the "ttl" to expire or explicitly sending a DELETE request to remove the
2812 Rresource information. After the publishing Device has removed the Resources from one RD and
2813 before it has added them to another RD, the publishing Device shall respond to any Resource
2814 discovery request. RDs may not transfer Resource information between themselves due to the
2815 restriction on publishable Resources. It is the publishing Device's responsibility to choose the RD
2816 and to manage the published Resources.

2817 11.3.6.4 Resource exposure

2818 11.3.6.4.1 "/oic/res" and retrieving of the Resources

2819 The "/oic/res" based discovery process remains the same as that in the absence of an RD.
2820 Resources may be discovered by retrieving the "/oic/res" Resource by sending a multicast or
2821 unicast request. In the case of a multicast discovery request, an RD shall include in its response
2822 any published Resources on behalf of the Device that hosts the Resources. Clients should be
2823 prepared to process duplicate Resource information from more than one RD responding with the
2824 same information or from an RD and the hosting Ddevice (publishing the Rresource information)
2825 both responding to the request. Interaction with Resources discovered using the RD is done using
2826 the same mechanism and methods as with Resources discovered by retrieving the "/oic/res"
2827 Resource of the Device hosting the Resources (e.g., connect to the hosting Device and perform
2828 CRUDN operations on the Resource).

2829 Resource Directories provide different "/oic/res" responses according to the requesting Clients,
2830 which indicate their preference with content format. OCF 1.0 Clients request with a "Content
2831 Format of "application/vnd.ocf+cbor" in the Accept Option, whereas the the Content-Format
2832 "application/cbor" in the Accept Option indicates OIC 1.1 Clients. For OIC 1.1 Clients, the "/oic/res"
2833 response includes Links conforming to OIC 1.1 specification, which OIC 1.1 Clients can understand.
2834 In this case the Resources hosted by the same Device shall be grouped together within a single
2835 JSON Object with "di" indicating the hosting Device. For a 3rd party Resource, i.e., a Resource
2836 which doesn't belong to the responding RD, its "href" value shall be a fully qualified transfer
2837 protocol URI with an IP address and port number as its authority component (e.g.,
2838 coaps://[2001:db8:b::c2e5]:22222/myLightSwitch).

2839 For example, an RD might return the following to an OIC 1.1 Clients:

```
2840 [
2841   {
2842     "di": "88b7c7f0-4b51-4e0a-9faa-cfb439fd7f49",
2843     "links": [
```

```

2844     {
2845         "href": "/oic/res",
2846         "rel": "self",
2847         "rt": ["oic.wk.res"],
2848         "if": ["oic.if.ll", "oic.if.baseline"],
2849         "p": {"bm": 3, "sec": false}
2850     },
2851     {
2852         "href": "/oic/d",
2853         "rt": ["oic.wk.d", "oic.d.fan"],
2854         "if": ["oic.if.r", "oic.if.baseline"],
2855         "p": {"bm": 3, "sec": false}
2856     },
2857     {
2858         "href": "/oic/p",
2859         "rt": ["oic.wk.p"],
2860         "if": ["oic.if.r", "oic.if.baseline"],
2861         "p": {"bm": 3, "sec": true, "port": 33333}
2862     },
2863     {
2864         "href": "/myFanIntrospection",
2865         "rt": ["oic.wk.introspection"],
2866         "if": ["oic.if.r", "oic.if.baseline"],
2867         "p": {"bm": 3, "sec": true, "port": 33333}
2868     },
2869     {
2870         "href": "/oic/rd",
2871         "rt": ["oic.wk.rd"],
2872         "if": ["oic.if.baseline"],
2873         "p": {"bm": 3, "sec": true, "port": 33333}
2874     },
2875     {
2876         "href": "/myFanSwitch",
2877         "rt": ["oic.r.switch.binary"],
2878         "if": ["oic.if.a", "oic.if.baseline"],
2879         "p": {"bm": 3, "sec": true, "port": 33333}
2880     },
2881     {
2882         "href": "/oic/sec/doxm",
2883         "rt": ["oic.r.doxm"],
2884         "if": ["oic.if.baseline"],
2885         "p": {"bm": 1, "sec": false}
2886     },
2887     {
2888         "href": "/oic/sec/pstat",
2889         "rt": ["oic.r.pstat"],
2890         "if": ["oic.if.baseline"],
2891         "p": {"bm": 1, "sec": true, "port": 33333}
2892     },
2893     {
2894         "href": "/oic/sec/cred",
2895         "rt": ["oic.r.cred"],
2896         "if": ["oic.if.baseline"],
2897         "p": {"bm": 1, "sec": true, "port": 33333}
2898     },
2899     {
2900         "href": "/oic/sec/acl2",
2901         "rt": ["oic.r.acl2"],
2902         "if": ["oic.if.baseline"],
2903         "p": {"bm": 1, "sec": true, "port": 33333}
2904     }
2905 ]
2906 },

```

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```
{
  "di": "dc70373c-1e8d-4fb3-962e-017eaa863989",
  "links": [
    {
      "href": "coap://[2001:db8:b::c2e5]:66666/oic/d",
      "rt": ["oic.wk.d", "oic.d.light", "oic.d.virtual"],
      "if": ["oic.if.r", "oic.if.baseline"],
      "p": {"bm": 3, "sec": false}
    },
    {
      "href": "coaps://[2001:db8:b::c2e5]:22222/oic/p",
      "rt": ["oic.wk.p"],
      "if": ["oic.if.r", "oic.if.baseline"],
      "p": {"bm": 3, "sec": true, "port": 22222}
    },
    {
      "href": "coaps://[2001:db8:b::c2e5]:22222/myLightSwitch",
      "rt": ["oic.r.switch.binary"],
      "if": ["oic.if.a", "oic.if.baseline"],
      "p": {"bm": 3, "sec": true, "port": 22222}
    },
    {
      "href": "coaps://[2001:db8:b::c2e5]:22222/myLightBrightness",
      "rt": ["oic.r.brightness"],
      "if": ["oic.if.a", "oic.if.baseline"],
      "p": {"bm": 3, "sec": true, "port": 22222}
    }
  ]
}
```

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

2942

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

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```
[
  {
    "anchor": "ocf://88b7c7f0-4b51-4e0a-9faa-cfb439fd7f49",
    "href": "/oic/res",
    "rel": "self",
    "rt": ["oic.wk.res"],
    "if": ["oic.if.ll", "oic.if.baseline"],
    "p": {"bm": 3},
    "eps": [{"ep": "coap://[2001:db8:a::b1d4]: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"],
    "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",

```

```

2966     "rt": ["oic.wk.p"],
2967     "if": ["oic.if.r", "oic.if.baseline"],
2968     "p": {"bm": 3},
2969     "eps": [{"ep": "coaps://[2001:db8:a::b1d4]:33333"}]
2970   },
2971   {
2972     "anchor": "ocf://88b7c7f0-4b51-4e0a-9faa-cfb439fd7f49",
2973     "href": "/myFanIntrospection",
2974     "rt": ["oic.wk.introspection"],
2975     "if": ["oic.if.r", "oic.if.baseline"],
2976     "p": {"bm": 3},
2977     "eps": [{"ep": "coaps://[2001:db8:a::b1d4]:33333"}]
2978   },
2979   {
2980     "anchor": "ocf://88b7c7f0-4b51-4e0a-9faa-cfb439fd7f49",
2981     "href": "/oic/rd",
2982     "rt": ["oic.wk.rd"],
2983     "if": ["oic.if.baseline"],
2984     "p": {"bm": 3},
2985     "eps": [{"ep": "coaps://[2001:db8:a::b1d4]:33333"}]
2986   },
2987   {
2988     "anchor": "ocf://88b7c7f0-4b51-4e0a-9faa-cfb439fd7f49",
2989     "href": "/myFanSwitch",
2990     "rt": ["oic.r.switch.binary"],
2991     "if": ["oic.if.a", "oic.if.baseline"],
2992     "p": {"bm": 3},
2993     "eps": [{"ep": "coaps://[2001:db8:a::b1d4]:33333"}]
2994   },
2995   {
2996     "anchor": "ocf://88b7c7f0-4b51-4e0a-9faa-cfb439fd7f49",
2997     "href": "/oic/sec/doxm",
2998     "rt": ["oic.r.doxm"],
2999     "if": ["oic.if.baseline"],
3000     "p": {"bm": 1},
3001     "eps": [{"ep": "coap://[2001:db8:a::b1d4]:77777"},
3002             {"ep": "coaps://[2001:db8:a::b1d4]:33333"}]
3003   },
3004   {
3005     "anchor": "ocf://88b7c7f0-4b51-4e0a-9faa-cfb439fd7f49",
3006     "href": "/oic/sec/pstat",
3007     "rt": ["oic.r.pstat"],
3008     "if": ["oic.if.baseline"],
3009     "p": {"bm": 1},
3010     "eps": [{"ep": "coaps://[2001:db8:a::b1d4]:33333"}]
3011   },
3012   {
3013     "anchor": "ocf://88b7c7f0-4b51-4e0a-9faa-cfb439fd7f49",
3014     "href": "/oic/sec/cred",
3015     "rt": ["oic.r.cred"],
3016     "if": ["oic.if.baseline"],
3017     "p": {"bm": 1},
3018     "eps": [{"ep": "coaps://[2001:db8:a::b1d4]:33333"}]
3019   },
3020   {
3021     "anchor": "ocf://88b7c7f0-4b51-4e0a-9faa-cfb439fd7f49",
3022     "href": "/oic/sec/acl2",
3023     "rt": ["oic.r.acl2"],
3024     "if": ["oic.if.baseline"],
3025     "p": {"bm": 1},
3026     "eps": [{"ep": "coaps://[2001:db8:a::b1d4]:33333"}]
3027   },
3028

```

```

3029 {
3030   "anchor": "ocf://dc70373c-1e8d-4fb3-962e-017eaa863989",
3031   "href": "/oic/d",
3032   "rt": ["oic.wk.d", "oic.d.light"],
3033   "if": ["oic.if.r", "oic.if.baseline"],
3034   "p": {"bm": 3},
3035   "eps": [{"ep": "coap://[2001:db8:b::c2e5]:6666"},
3036           {"ep": "coaps://[2001:db8:b::c2e5]:22222"}]
3037 },
3038 {
3039   "anchor": "ocf://dc70373c-1e8d-4fb3-962e-017eaa863989",
3040   "href": "/oic/p",
3041   "rt": ["oic.wk.p"],
3042   "if": ["oic.if.r", "oic.if.baseline"],
3043   "p": {"bm": 3},
3044   "eps": [{"ep": "coaps://[2001:db8:b::c2e5]:22222"}]
3045 },
3046 {
3047   "anchor": "ocf://dc70373c-1e8d-4fb3-962e-017eaa863989",
3048   "href": "/myLightSwitch",
3049   "rt": ["oic.r.switch.binary"],
3050   "if": ["oic.if.a", "oic.if.baseline"],
3051   "p": {"bm": 3},
3052   "eps": [{"ep": "coaps://[2001:db8:b::c2e5]:22222"}]
3053 },
3054 {
3055   "anchor": "ocf://dc70373c-1e8d-4fb3-962e-017eaa863989",
3056   "href": "/myLightBrightness",
3057   "rt": ["oic.r.brightness"],
3058   "if": ["oic.if.a", "oic.if.baseline"],
3059   "p": {"bm": 3},
3060   "eps": [{"ep": "coaps://[2001:db8:b::c2e5]:22222"}]
3061 }
3062 ]

```

3063

3064 11.4 Notification

3065 11.4.1 Overview

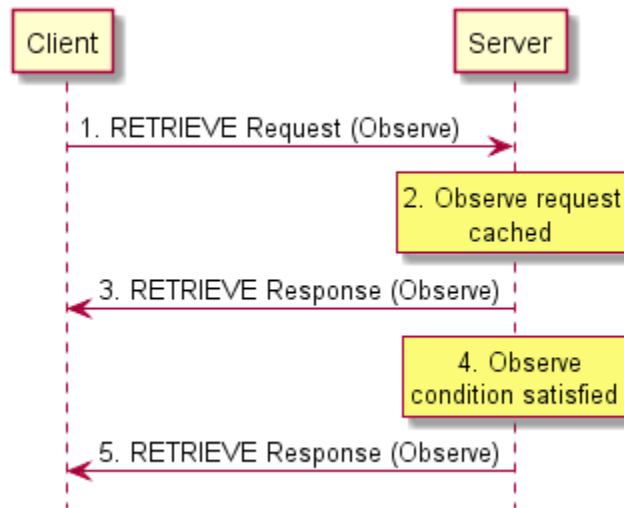
3066 A Server shall support NOTIFY operation to enable a Client to request and be notified of desired
3067 states of one or more Resources in an asynchronous manner. section 11.4.2 specifies the observe
3068 mechanism in which updates are delivered to the requester.

3069 11.4.2 Observe

3070 In observe mechanism the Client utilizes the RETRIEVE operation to require the Server for updates
3071 in case of Resource state changes. The Observe mechanism consists of five steps which are
3072 depicted in Figure 19 and described below.

3073 Note: the observe mechanism can only be used for a resource with a property of observable
3074 (section 7.3.2.2).

3075



3076

3077

3078

Figure 19. Observe Mechanism

3079 **11.4.2.1 RETRIEVE request with observe indication**

3080 The Client transmits a RETRIEVE request message to the Server to request updates for the
3081 Resource on the Server if there is a state change. The RETRIEVE request message carries the
3082 following parameters:

- 3083 • *fr*: Unique identifier of the Client
- 3084 • *to*: Resource that the Client is requesting to observe
- 3085 • *ri*: Identifier of the RETRIEVE request
- 3086 • *op*: RETRIEVE
- 3087 • *obs*: Indication for observe request

3088 **11.4.2.2 Processing by the Server**

3089 Following the receipt of the RETRIEVE request, the Server may validate if the Client has the
3090 appropriate rights for the requested operation and the properties are readable and observable. If
3091 the validation is successful, the Server caches the information related to the observe request. The
3092 Server caches the value of the *ri* parameter from the RETRIEVE request for use in the initial
3093 response and future responses in case of a change of state.

3094 **11.4.2.3 RETRIEVE response with observe indication**

3095 The Server shall transmit a RETRIEVE response message in response to a RETRIEVE request
3096 message from a Client. The RETRIEVE response message shall include the following parameters.
3097 If validation succeeded, the response includes an observe indication. If not, the observe indication
3098 is omitted from the response which signals to the requesting client that registration for notification
3099 was not allowed.

3100 The RETRIEVE response message shall include the following parameters:

- 3101 • *fr*: Unique identifier of the Server
- 3102 • *to*: Unique identifier of the Client

- 3103 • *ri*: Identifier included in the RETRIEVE request
- 3104 • *cn*: Information resource representation as requested by the Client
- 3105 • *rs*: The result of the RETRIEVE operation
- 3106 • *obs*: Indication that the response is made to an observe request

3107 **11.4.2.4 Resource monitoring by the Server**

3108 The Server shall monitor the state the Resource identified in the observe request from the Client.
 3109 Anytime there is a change in the state of the observed resource, the Server sends another
 3110 RETRIEVE response with the observe indication. The mechanism does not allow the client to
 3111 specify any bounds or limits which trigger a notification, the decision is left entirely to the server.

3112 **11.4.2.5 Additional RETRIEVE responses with observe indication**

3113 The Server shall transmit updated RETRIEVE response messages following observed changes in
 3114 the state of the Resources indicated by the Client. The RETRIEVE response message shall include
 3115 the parameters listed in section 11.4.2.3.

3116 **11.4.2.6 Cancelling Observe**

3117 The Client can explicitly cancel observe by sending a RETRIEVE request without the observe
 3118 indication field to the same resource on Server which it was observing. For certain protocol
 3119 mappings, the client may also be able to cancel an observe by ceasing to respond to the
 3120 RETRIEVE responses.

3121 **11.5 Device management**

3122 **11.5.1 Overview**

3123 The Device Management includes the following functions:

- 3124 • Diagnostics and maintenance

3125 The device management functionalities specified in this version of specification are intended to
 3126 address the basic device management features. Addition of new device management features in
 3127 the future versions of the specification is expected.

3128 **11.5.2 Diagnostics and maintenance**

3129 The Diagnostics and Maintenance function is intended for use by administrators to resolve issues
 3130 encountered with the Devices while operating in the field. If diagnostics and maintenance is
 3131 supported by a Device, the Core Resource “/oic/mnt” shall be supported as described in Table 24.

3132 **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

3133

3134 Table 25 defines the “oic.wk.mnt” Resource Type. At least one of the Factory_Reset, and Reboot
 3135 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)

3137

3138 Note: * - Default indicates the value of this property as soon as the device is rebooted or factory reset

3139

3140 **11.6 Scenes**3141 **11.6.1 Introduction**

3142 Scenes are a mechanism for automating certain operations.

3143 A scene is a static entity that stores a set of defined resource property values for a collection of
 3144 resources. Scenes provide a mechanism to store a setting over multiple Resources that may be
 3145 hosted by multiple separate Servers. Scenes, once set up, can be used by multiple Clients to recall
 3146 a setup.

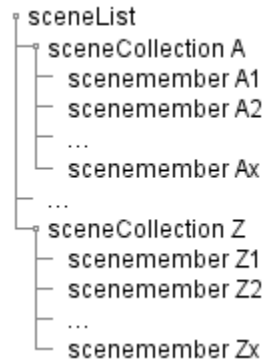
3147 Scenes can be grouped and reused, a group of scenes is also a scene.

3148 In short, scenes are bundled user settings.

3149 **11.6.2 Scenes**3150 **11.6.2.1 Introduction**

3151 Scenes are described by means of resources. The scene resources are hosted by a Server and
 3152 the top level resource is listed in “/oic/res”. This means that a Client can determine if the scene
 3153 functionality is hosted on a Server via Resource discovery as defined in section 11.3. The setup
 3154 of scenes is driven by Client interactions. This includes creating new scenes, and mappings of
 3155 Server resource properties that are part of a scene.

3156 The scene functionality is created by multiple resources and has the structure depicted in Figure
3157 20. The sceneList and sceneCollection resources are overloaded collection resources. The
3158 sceneCollection contains a list of scenes. This list contains zero or more scenes. The
3159 sceneMember resource contains the mapping between a scene and what needs to happen
3160 according to that scene on an indicated resource.

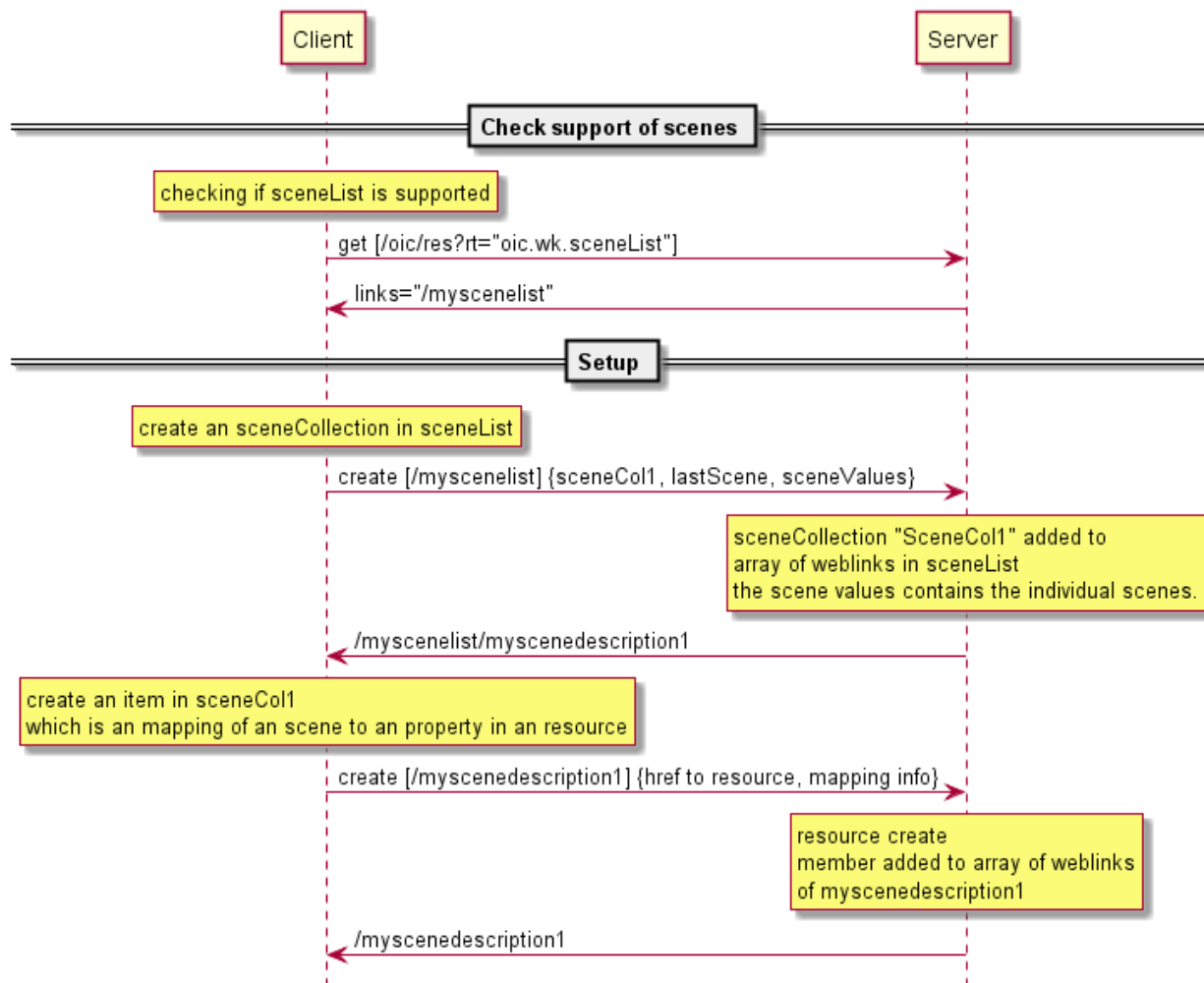


3161

3162 **Figure 20 Generic scene resource structure**

3163 **11.6.2.2 Scene creation**

3164 A Client desiring to interact with scenes needs to first determine if the server supports the scene
3165 feature; the sceneMembers of a scene do not have to be co-located on the server supporting the
3166 scene feature. This can be done by checking if "/oic/res" contains the rt of the sceneList resource.
3167 This is depicted in first steps of Figure 21. The sceneCollection is created by the Server using
3168 some out of bound mechanism, Client creation of scenes is not supported at this time. This will
3169 entail defining the scene with an applicable list of scene values and the mappings for each
3170 Resource being part of the scene. The mapping for each resource being part of the sceneCollection
3171 is described by a resource called sceneMember. The sceneMember resource contains the link to
3172 a resource and the mapping between the scene listed in the sceneValues property and the actual
3173 resource property value of the Resource indicated by the link.



3174

3175

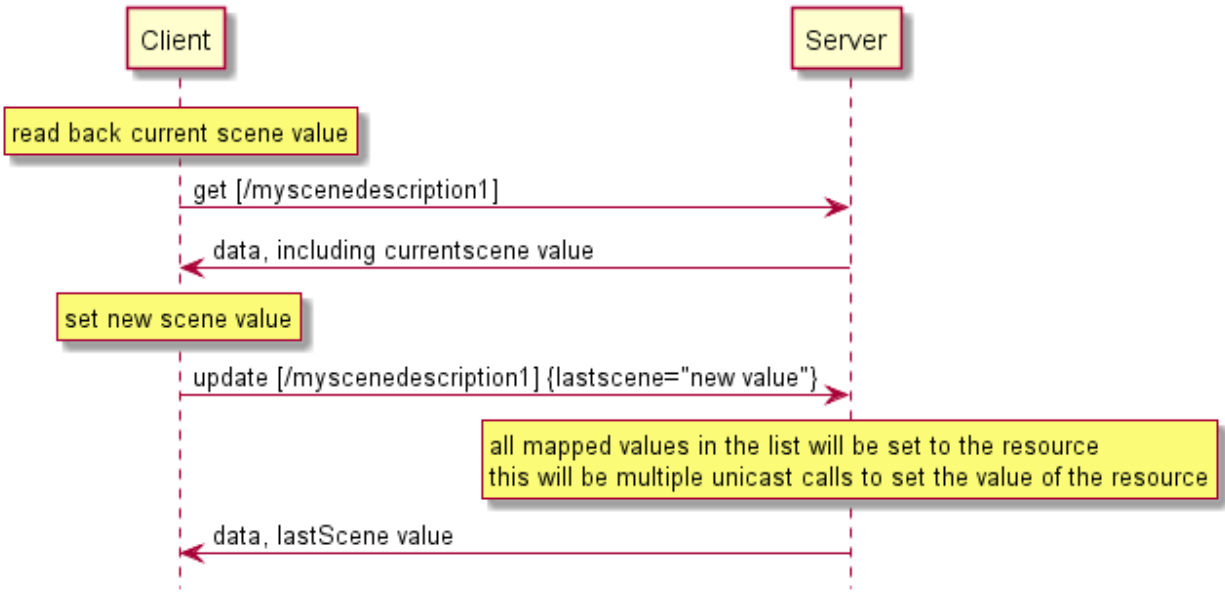
3176

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

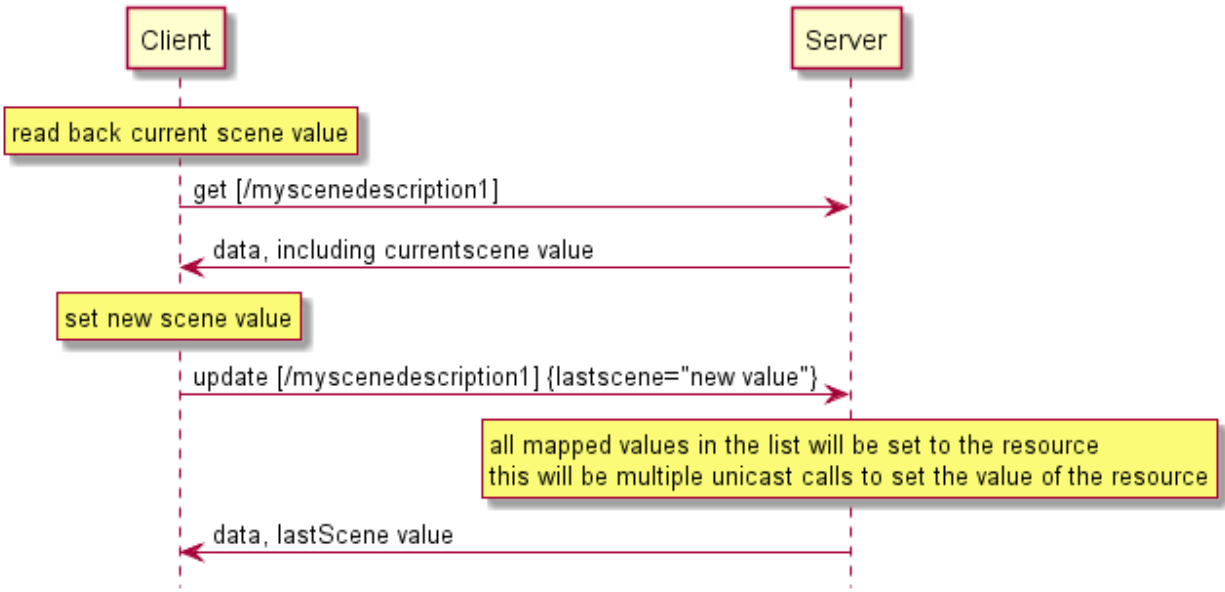
3177

11.6.2.3 Interacting with Scenes

3178 All capable Clients can interact with scenes. The allowed scene values and the last applied scene
 3179 value can be retrieved from the server hosting the scene. The scene value shall be changed by
 3180 issuing an UPDATE operation with a payload that sets the lastScene property to one of the listed
 3181 allowed scene values. These steps are depicted in Figure 22. Note that the lastScene value does
 3182 not imply that the current state of all resources that are part of the scene will be at the mapped
 3183 value. This is due to that the setting the scene values are not modelled as actual states of the
 3184 system. This means that another Client can change just one resource being part of the scene
 3185 without having feedback that the state of the scene is changed.



3186

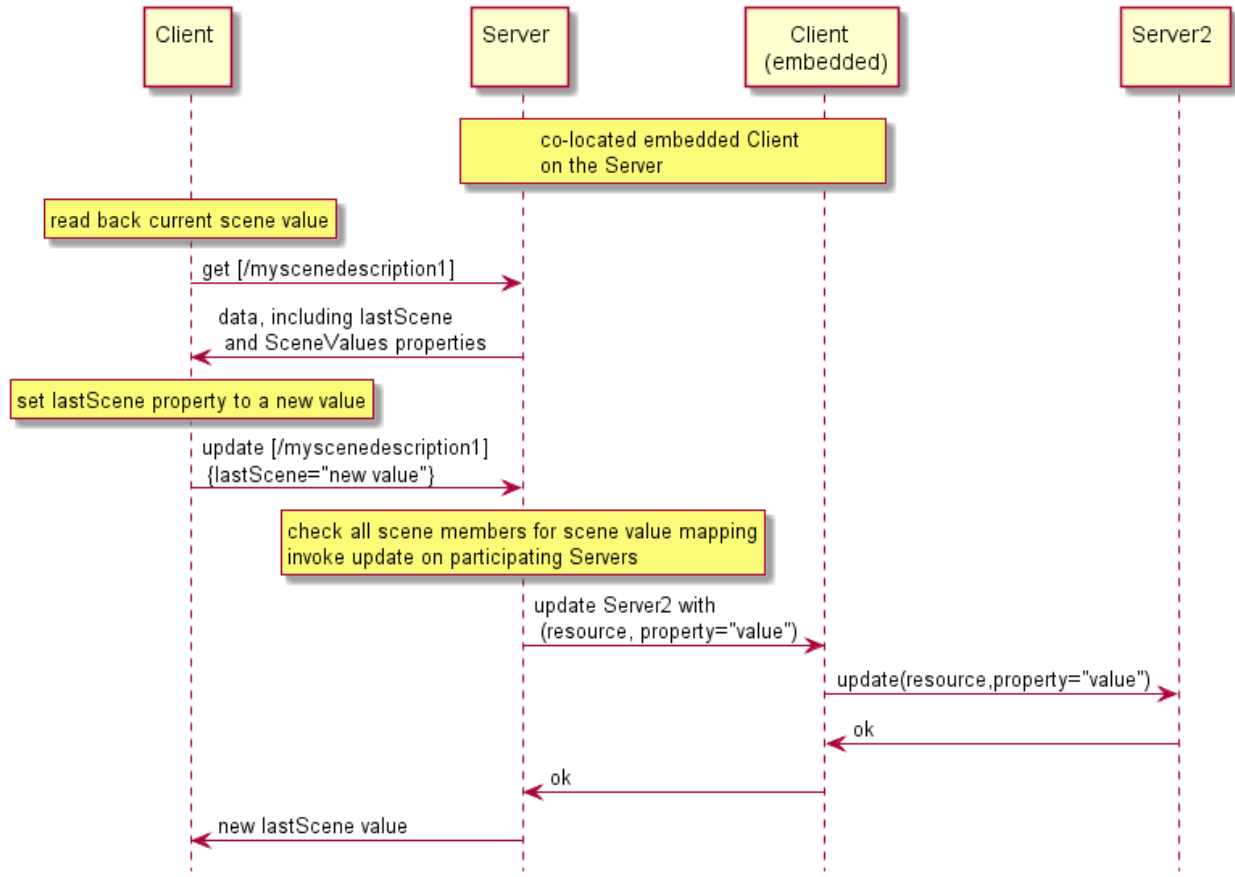


3187

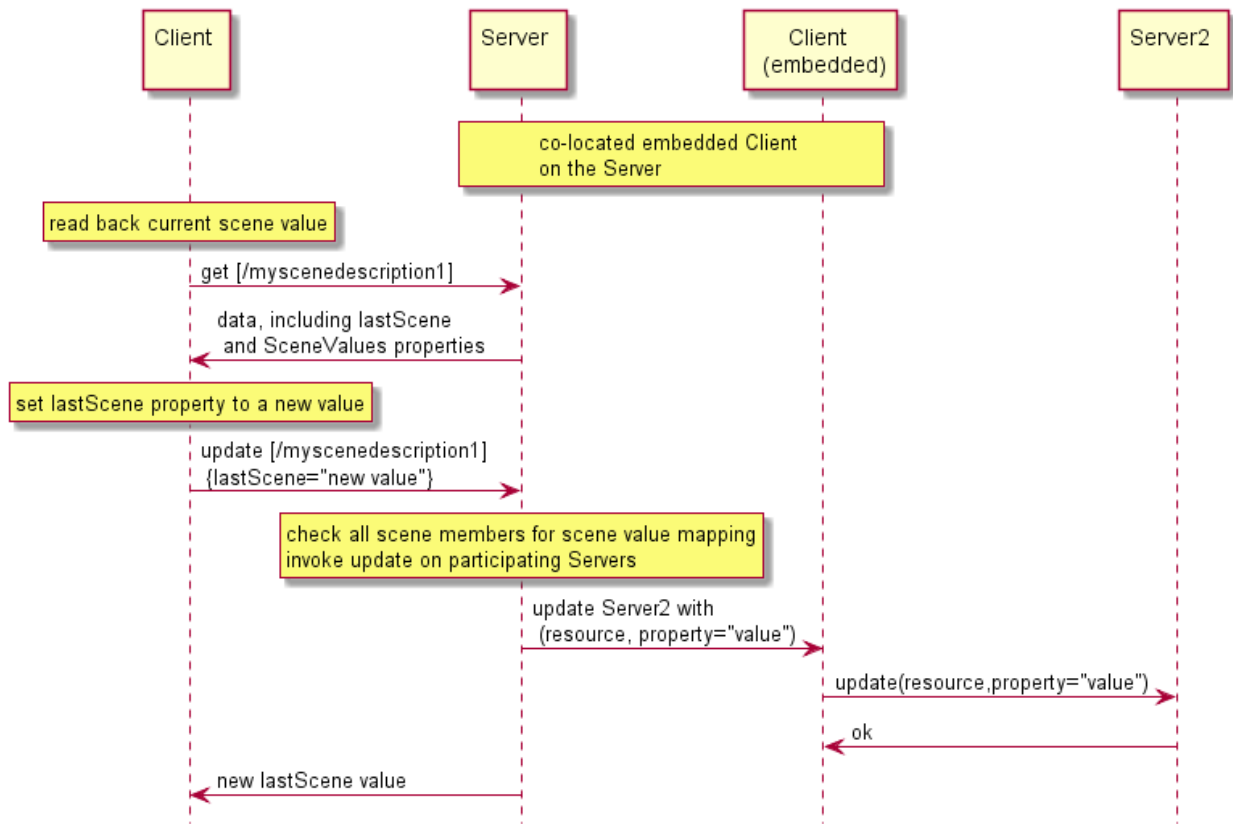
3188

Figure 22 Client interactions on a specific scene

3189 As described previously, a scene can reference one or more resources (i.e, sceneMembers) that
 3190 are present on one or more Servers. The scene members are re-evaluated each time a scene
 3191 change takes place. This evaluation is triggered by a Client that is either embedded as part of the
 3192 Server hosting the scene, or separate to the server having knowledge of the scene via a RETRIEVE
 3193 operation, observing the referenced resources using the mechanism described in section 11.4.2.
 3194 The embedded Client located in the same Device with the Server is a general Client but interacts
 3195 only with scene functionalities. During the evaluation the mappings for the new scene value will be
 3196 applied to the Server. This behaviour is depicted in Figure 23.



3197



3198

Figure 23 Interaction overview due to a Scene change

3199

11.6.2.4 Summary of Resource Types defined for Scene functionality

3200

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

3201

Table 26 list of Resource Types for Scenes

3202

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

3203

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.

3204

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

3209

3210

3211

3212 **11.7 Icons**

3213 **11.7.1 Overview**

3214 Icons are a primitive that are needed by various OCF subsystems, such as bridging. An optional
 3215 Resource Type of “oic.r.icon” has been defined to provide a common representation of an icon
 3216 Resource that can be used by Devices.

3217 **11.7.2 Resource**

3218 The icon Resource is as defined in Table 27.

3219 **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

3220

3221 Table 28 defines the details for the “oic.r.icon” Resource Type.

3222 **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.

3223

3224 **11.8 Introspection**

3225 **11.8.1 Overview**

3226 Introspection is a mechanism to announce the capabilities of Resources hosted on the Device.

3227 The intended usage of the Introspection Device Data is to enable dynamic clients. E.g. clients that
 3228 can use the Introspection Device Data to generate dynamically an UI or dynamically create
 3229 translations of the hosted Resources to another eco-system. Other usages of the Introspection is
 3230 that the information can be used to generate client code. The Introspection Device Data is designed
 3231 to augment the existing data already on the wire. This means that existing mechanism needs to
 3232 be used to get a full overview of what is implemented in the Device. For example the Introspection
 3233 Device Data does not convey information about observe, since that is already conveyed with the
 3234 “p” property on the links in “/oic/res” (see section 7.8.2.1.2).

3235 The Introspection Device Data is recommended to be conveyed as "static" data. Meaning that the
3236 data does not change during the uptime of a Device. However when the data is not static the
3237 Introspection Resource shall indicate to be observable and the url property value of
3238 "oic.wk.introspection" Resource shall change to indicate that the Introspection Device Data is
3239 changed.

3240 The Introspection Device Data describes the Resources that make up the Device. For the complete
3241 list of included Resources Table 13. The Introspection Device Data is described as a swagger2.0
3242 in JSON format file. The swagger2.0 file will contain the description of the Resources as defined
3243 below: All Resources with the next remarks:

- 3244 • The Introspection Device Data will use the HTTP syntax, e.g., define the CRUDN operation as
3245 HTTP methods and use the HTTP status codes.
- 3246 • The Introspection Device Data does not have to define all the status codes that indicate an
3247 error situation.
- 3248 • The Introspection Device Data does not have to define a schema when the status code
3249 indicates that there is no payload (see HTTP status code 204 as an example)
- 3250 • The URLs of the Resources in the Introspection Device Data shall be without the endpoint
3251 description, e.g. it shall not be a full URL but only the relative path from the endpoint. The
3252 relative path shall be the same as being conveyed by "/oic/res".
- 3253 • "/oic/res" Resource shall not be listed in the Introspection Device Data.
- 3254 • The Resources "/oic/d", "/oic/p" and the security Resources are allowed to be present in the
3255 Introspection Device Data, but are not required. The "/oic/d", "/oic/p", "/oic/res" and the security
3256 Resources shall be included when vendor defined or optional properties are implemented.
- 3257 • All other Resources are required to be listed in the Introspection Device Data.
- 3258 • Per Resource it will include:
 - 3259 ○ All Implemented Methods
 - 3260 ○ Per Supported Method:
 - 3261 ▪ Implemented queryParameters per Method.
 - 3262 • This includes the supported interfaces ("if") as enum value.
 - 3263 ▪ Schemas of the payload for the request and response bodies of the Method
 - 3264 ▪ The schema data shall be conveyed by the swagger schema object as
3265 defined in the parameters section.
 - 3266 ▪ The swagger2.0 schema object shall comply with:
 - 3267 • The schemas shall be fully resolved, e.g. no references shall exist
3268 outside the swagger file.
 - 3269 • The schemas shall list which interfaces are supported on the method.
 - 3270 • The schemas shall list if a property is optional or required.
 - 3271 • The schemas shall indicate if an property is read only or read-write
 - 3272 ○ By means of the readOnly schema tag belonging to the
3273 property
 - 3274 • The default value of the "rt" property shall be used to indicate the
3275 supported Resource Types.
 - 3276 • oneOf and anyOf constructs are allowed to be used as part of an
3277 swagger2.0 schema object. The swagger2.0 schema with oneOf and
3278 anyOf constructs can be found in Annex G.1.

3279 Dynamic Resources (e.g. Resources that can be created up on a request by a Client) shall have
 3280 an URL definition which contains a URL identifier (e.g. using the {} syntax). An URL with {} identifies
 3281 that the Resource definition applies to the whole group of Resources that can be created. The
 3282 actual path can contain the collection node that links to the Resource.

3283 Example of an URL with identifiers:

3284 /SceneListResURI/{SceneCollectionResURI}/{SceneMemberResURI}:

3285 When different Resource Types are allowed to be created in a collection, then the different
 3286 schemas for the create method shall define all possible Resource Types that can be created. The
 3287 schema construct oneOf allows the definition of a schema with selectable Resources. The oneOf
 3288 construct allows the integration of all schemas and that only one existing sub schemas shall be
 3289 used to indicate the definition of the Resource that can be created.

3290 Example usage of oneOf JSON schema construct:

```
3291 {
3292   "oneOf": [
3293     { <<subschema 1 definition>> },
3294     { << sub schema 2 definition >> }
3295   ...
3296   ]
3297 }
```

3298
 3299 A Client using the Introspection Device Data of a Device should check the version of the supported
 3300 Introspection Device Data of the Device. The swagger version is indicated in each file with the tag
 3301 "swagger". Example of the 2.0 supported version of the tag is: "swagger": "2.0". Later versions of
 3302 the spec may reference newer versions of the swagger specification, for example 3.0.

3303 A Server shall support one Resource with a Resource Type of “oic.wk.introspection” as defined in
 3304 Table 29. The Resource with a Resource Type of “oic.wk.introspection” shall be included in the
 3305 Resource “/oic/res”.

3306 **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

3307
 3308 Table 30 defines “oic.wk.introspection” Resource Type.

3309 **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

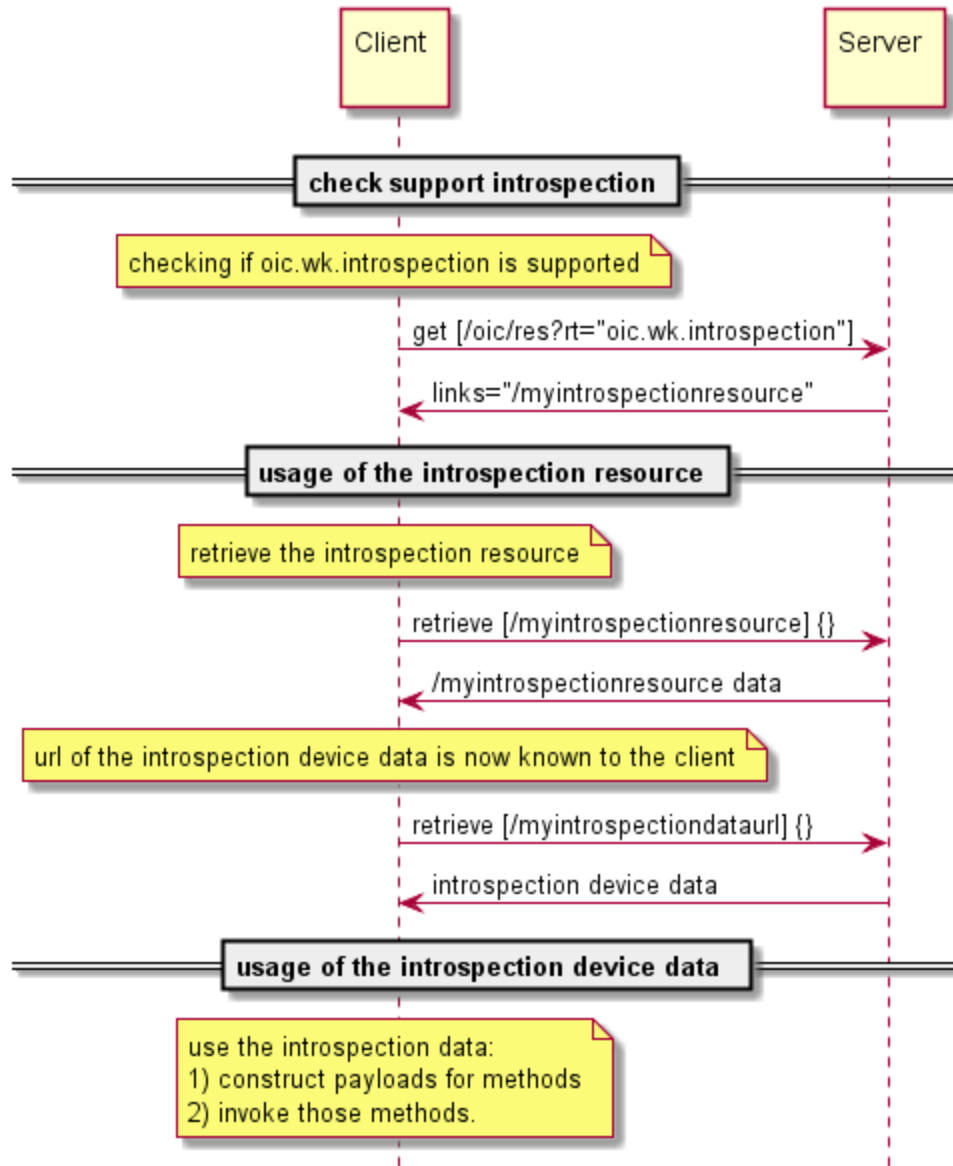
url	url	string	uri		R	yes	URL to the hosted payload
protocol	protocol	string	enum		R	yes	Protocol definition to retrieve the Introspection Device Data from the url.
content-type	content-type	string	enum		R	no	content type of the url.
version	version	integer	enum		R	no	Version of the Introspection protocol, indicates which rules are applied on the Introspection Device Data regarding the content of the RAML file. Current value is 1.

3310 **11.8.2 Usage of introspection**

3311 The Introspection Device Data is retrieved in the following steps:

- 3312 1) Check if the Introspection Resource is supported and retrieve the URL of the Resource.
- 3313 2) Retrieve the contents of the Introspection Resource
- 3314 3) Download the Introspection Device Data from the URL specified the Introspection Resource.
- 3315 4) Usage of the Introspection Device Data by the Client

3316



3317

3318 **Figure 24 Interactions to check Introspection support and download the Introspection**
 3319 **Device Data.**

3320 **12 Messaging**

3321 **12.1 Introduction**

3322 This section specifies the protocol messaging mapping to the CRUDN messaging operations
 3323 (section 8) for each messaging protocol specified (e.g., CoAP.). Mapping to additional protocols is
 3324 expected in later version of this specification. All the property information from the resource model
 3325 shall be carried within the message payload. This payload shall be generated in the resource
 3326 model layer and shall be encapsulated in the data connectivity layer. The message header shall
 3327 only be used to describe the message payload (e.g., verb, mime-type, message payload format),
 3328 in addition to the mandatory header fields defined in messaging protocol (e.g., CoAP)
 3329 specification. If the message header does not support this, then this information shall also be
 3330 carried in the message payload. Resource model information shall not be included in the message

3331 header structure unless the message header field is mandatory in the messaging protocol
 3332 specification.

3333 When a Resource is specified with a restful description language like RAML or Swagger2.0 then
 3334 the HTTP syntax definitions are used in the description (e.g., HTTP syntax for the CRUDN
 3335 operations, status codes, etc). The HTTP syntax will be mapped to the actual used web transfer
 3336 protocol (e.g., CoAP).

3337 **12.2 Mapping of CRUDN to CoAP**

3338 **12.2.1 Overview**

3339 A Device implementing CoAP shall conform to IETF RFC 7252 for the methods specified in section
 3340 12.2.3. A Device implementing CoAP shall conform to IETF RFC 7641 to implement the CoAP
 3341 Observe option. Support for CoAP block transfer when the payload is larger than the MTU is
 3342 defined in section 12.2.8.

3343 **12.2.2 URIs**

3344 An OCF: URI is mapped to a coap: URI by replacing the scheme name "ocf" with "coap" if unsecure
 3345 or 'coaps' if secure before sending over the network by the requestor. Similarly on the receiver
 3346 side, the scheme name is replaced with "ocf".

3347 Any query string that is present within the URI is encoded as one or more URI-Query Options as
 3348 defined in IETF RFC 7252 section 6.4.

3349

3350 **12.2.3 CoAP method with request and response**

3351 **12.2.3.1 Overview**

3352 Every request has a CoAP method that realizes the request. The primary methods and their
 3353 meanings are shown in Table 31, which provides the mapping of GET/PUT/POST/DELETE
 3354 methods to CREATE, RETRIEVE, UPDATE, and DELETE operations. The associated text provides
 3355 the generic behaviours when using these methods, however resource interfaces may modify these
 3356 generic semantics. The HTTP codes in the restful descriptions will be translated as described in
 3357 IETF RFC 8075 section 7 Response Code Mapping.
 3358

3359 **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) 	<ul style="list-style-type: none"> - Response Code: success (2.xx) or error (4.xx or 5.xx)

	- Request URI: an existing URI for the Resource to be updated. - Payload: representation of the Resource to be updated.	
DELETE for DELETE	- Method code: DELETE (0.04) - Request URI: an existing URI for the Resource to be deleted.	- Response code: success (2.xx) or error (4.xx or 5.xx)

3360

3361 **12.2.3.2 CREATE with POST or PUT**

3362 **12.2.3.2.1 With POST**

3363 POST shall be used only in situations where the request URI is valid, that is it is the URI of an
3364 existing Resource on the Server that is processing the request. If no such Resource is present,
3365 the Server shall respond with an error response code of 4.xx. The use of POST for CREATE shall
3366 use an existing request URI which identifies the Resource on the Server responsible for creation.
3367 The URI of the created Resource is determined by the Server and provided to the Client in the
3368 response.

3369 A Client shall include the representation of the new Resource in the request payload. The new
3370 resource representation in the payload shall have all the necessary properties to create a valid
3371 Resource instance, i.e. the created Resource should be able to properly respond to the valid
3372 Request with mandatory Interface (e.g., "GET with ?if=oic.if.baseline").

3373 Upon receiving the POST request, the Server shall either

- 3374 • create the new Resource with a new URI, respond with the new URI for the newly created
3375 Resource and a success response code (2.xx); or
- 3376 • respond with an error response code (4.xx or 5.xx).

3377 POST is unsafe and is the supported method when idempotent behaviour cannot be expected or
3378 guaranteed.

3379 **12.2.3.2.2 With PUT**

3380 PUT shall be used to create a new Resource or completely replace the entire representation of an
3381 existing Resource. The resource representation in the payload of the PUT request shall be the
3382 complete representation. PUT for CREATE shall use a new request URI identifying the new
3383 Resource to be created.

3384 The new resource representation in the payload shall have all the necessary properties to create
3385 a valid Resource instance, i.e. the created Resource should be able to properly respond to the
3386 valid Request with mandatory Interface (e.g. "GET with ?if=oic.if.baseline").

3387 Upon receiving the PUT request, the Server shall either

- 3388 • create the new Resource with the request URI provided in the PUT request and send back a
3389 response with a success response code (2.xx); or
- 3390 • respond with an error response code (4.xx or 5.xx).

3391 PUT is an unsafe method but it is idempotent, thus when a PUT request is repeated the outcome
3392 is the same each time.

3393 **12.2.3.3 RETRIEVE with GET**

3394 GET shall be used for the RETRIEVE operation. The GET method retrieves the representation of
3395 the target Resource identified by the request URI.

3396 Upon receiving the GET request, the Server shall either

- 3397 • send back the response with the representation of the target Resource with a success response
3398 code (2.xx); or
- 3399 • respond with an error response code (4.xx or 5.xx) or ignore it (e.g. non-applicable multicast
3400 GET).

3401 GET is a safe method and is idempotent.

3402 **12.2.3.4 UPDATE with POST**

3403 POST shall be used only in situations where the request URI is valid, that is it is the URI of an
3404 existing Resource on the Server that is processing the request. If no such Resource is present,
3405 the Server shall respond with an error response code of 4.xx. A client shall use POST to UPDATE
3406 Property values of an existing Resource (see sections 3.1.32 and 8.4.2).

3407 Upon receiving the request, the Server shall either

- 3408 • apply the request to the Resource identified by the request URI in accordance with the applied
3409 interface (i.e. POST for non-existent Properties is ignored) and send back a response with a
3410 success response code (2.xx); or
- 3411 • respond with an error response code (4.xx or 5.xx). Note that if the representation in the
3412 payload is incompatible with the target Resource for POST using the applied interface (i.e. the
3413 "overwrite" semantic cannot be honored because of read-only property in the payload), then
3414 the error response code 4.xx shall be returned.

3415 POST is unsafe and is the supported method when idempotent behaviour cannot be expected or
3416 guaranteed.

3417 **12.2.3.5 DELETE with DELETE**

3418 DELETE shall be used for DELETE operation. The DELETE method requests that the resource
3419 identified by the request URI be deleted.

3420 Upon receiving the DELETE request, the Server shall either

- 3421 • delete the target Resource and send back a response with a success response code (2.xx); or
- 3422 • respond with an error response code (4.xx or 5.xx).

3423 DELETE is unsafe but idempotent (unless URIs are recycled for new instances).

3424
3425

3426 **12.2.4 Content-Format negotiation**

3427 The OCF Framework mandates support of CBOR, however it allows for negotiation of the payload
3428 body if more than one Content-Format (e.g. CBOR and JSON) is supported by an implementation.
3429 In this case the Accept Option defined in section 5.10.4 of IETF RFC 7252 shall be used to indicate
3430 which Content-Format (e.g. JSON) is requested by the Client.

3431 The Content-Formats supported are shown in Table 32.

3432

Table 32. OCF Content-Formats

Media Type	ID
"application/cbor"	60

“application/vnd.ocf+cbor”	10000
----------------------------	-------

3433 Clients shall include a Content-Format Option in every message that contains a payload. Servers
 3434 shall include a Content-Format Option for all success (2.xx) responses with a payload body. Per
 3435 IETF RFC 7252 section 5.5.1, Servers shall include a Content-Format Option for all error (4.xx or
 3436 5.xx) responses with a payload body unless they include a Diagnostic Payload; error responses
 3437 with a Diagnostic Payload do not include a Content-Format Option. The Content-Format Option
 3438 shall use the ID column numeric value from Table 32. An OCF vertical may mandate a specific
 3439 Content-Format Option.

3440 Clients shall also include an Accept Option in every request message. The Accept Option shall
 3441 indicate the required Content-Format as defined in Table 32 for response messages. The Server
 3442 shall return the required Content-Format if available. If the required Content-Format cannot be
 3443 returned, then the Server shall respond with an appropriate error message.

3444 12.2.5 OCF-Content-Format-Version information

3445 Servers and Clients shall include the OCF-Content-Format-Version Option in both request and
 3446 response messages with a payload. Clients shall include the OCF-Accept-Content-Format-Version
 3447 Option in request messages. The OCF-Content-Format-Version Option and OCF-Accept-Content-
 3448 Format-Version Option are specified as Option Numbers in the CoAP header as shown in Table
 3449 33.

3450 **Table 33. OCF-Content-Format-Version and OCF-Accept-Content-Format-Version Option**
 3451 **Numbers**

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

3452 The value of both the OCF-Accept-Content-Format-Version Option and the OCF-Content-Format-
 3453 Version Option is a two-byte unsigned integer that is used to define the major, minor and sub
 3454 versions. The major and minor versions are represented by 5 bits and the sub version is
 3455 represented by 6 bits as shown in Table 34.

3456 **Table 34. OCF-Accept-Content-Format-Version and OCF-Content-Format-Version**
 3457 **Representation**

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

3458 Table 35 illustrates several examples:

3459 **Table 35. Examples of OCF-Content-Format-Version and OCF-Accept-Content-Format-**
 3460 **Version Representation**

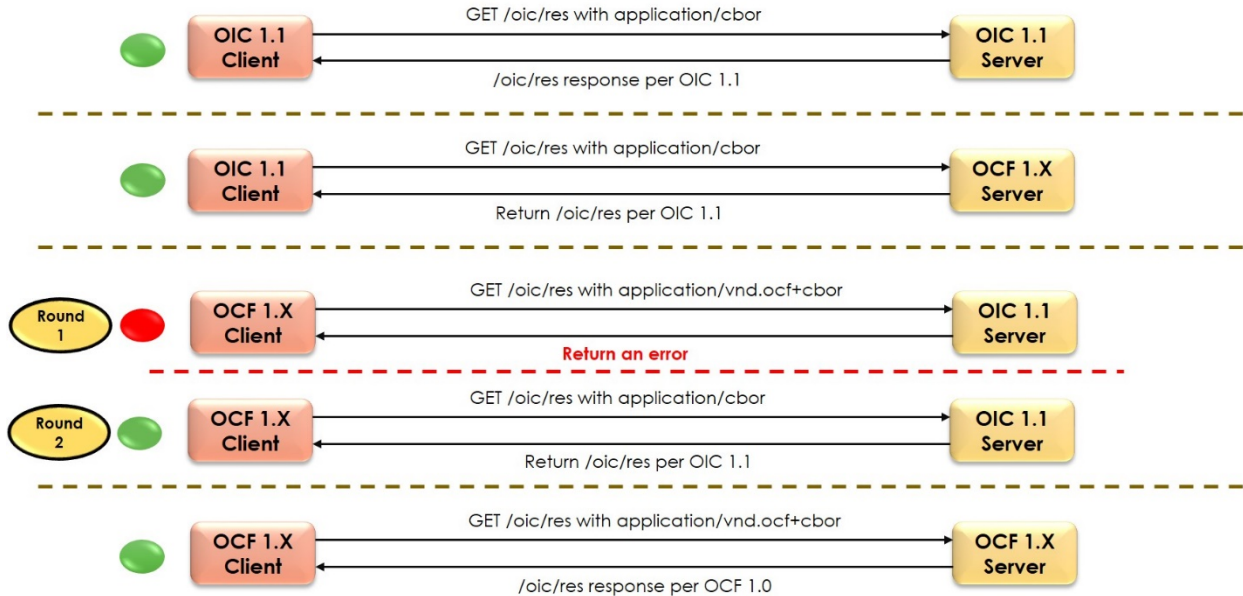
OCF version	Binary representation	Integer value
1.0.0	0000 1000 0000 0000	2048
1.1.0	0000 1000 0100 0000	2112

3461 The OCF-Accept-Content-Format-Version Option and OCF-Content-Format-Version Option for this
 3462 version of the specification shall be 1.0.0 (i.e. 0b0000 1000 0000 0000).

3463 **12.2.6 Content-Format policy**

3464 To maintain compatibility between devices implemented to different versions of this specification,
 3465 Devices shall follow the policy as described in Figure 25.

3466



3467

3468

Figure 25 Content-Format Policy

3469 All Devices shall support the current and all previous Content-Format Option and Versions. Clients
 3470 shall send discovery request messages with the current and all previous Content-Format and
 3471 Versions until it discovers all Servers in the network.

3472 **12.2.7 CRUDN to CoAP response codes**

3473 The mapping of CRUDN operations response codes to CoAP response codes are identical to the
 3474 response codes defined in IETF RFC 7252.

3475 **12.2.8 CoAP block transfer**

3476 Basic CoAP messages work well for the small payloads typical of light-weight, constrained IoT
 3477 devices. However scenarios can be envisioned in which an application needs to transfer larger
 3478 payloads.

3479 CoAP block-wise transfer as defined in IETF RFC 7959 shall be used by all Servers which
 3480 generate a content payload that would exceed the size of a CoAP datagram as the result of
 3481 handling any defined CRUDN operation.

3482 Similarly, CoAP block-wise transfer as defined in IETF RFC 7959 shall be supported by all
 3483 Clients. The use of block-wise transfer is applied to both the reception of payloads as well as
 3484 transmission of payloads that would exceed the size of a CoAP datagram.

3485 All blocks that are sent using this mechanism for a single instance of a transfer shall all have the
 3486 same reliability setting (i.e. all confirmable or all non-confirmable).

3487 A Client may support both the block1 (as descriptive) and block2 (as control) options as
 3488 described by IETF RFC 7959. A Server may support both the block1 (as control) and block2 (as
 3489 descriptive) options as described by IETF RFC 7959.

3490 **12.3 CoAP serialization over TCP**

3491 **12.3.1 Introduction**

3492 In environments where TCP is already available, CoAP can take advantage of it to provide
3493 reliability. Also in some environments UDP traffic is blocked, so deployments may use TCP. For
3494 example, consider a cloud application acting as a Client and the Server is located at the user's
3495 home. The Server which already support CoAP as a messaging protocol (e.g., Smart Home vertical
3496 profile) could easily support CoAP serialization over TCP rather than adding another messaging
3497 protocol. A Device implementing CoAP Serialization over TCP should conform to IETF draft-ietf-
3498 core-coap-tcp-tls-07.

3499 **12.3.2 Indication of support**

3500 If UDP is blocked, clients depend on the pre-configured details on the device to find support for
3501 CoAP over TCP. If UDP is not-blocked, a Device which supports CoAP serialization over TCP shall
3502 populate the Messaging Protocol ("mpro") property in "/oic/res" with the value "coap+tcp" or
3503 "coaps+tcp" to indicate that the device supports messaging protocol as specified by section 11.3.4.

3504 **12.3.3 Message type and header**

3505 The message type transported between Client and Server shall be a non-confirmable message
3506 (NON). The protocol stack used in this scenario should be as described in section 3 in IETF draft-
3507 ietf-core-coap-tcp-tls-07.

3508 The CoAP header as described in figure 6 in IETF draft-ietf-core-coap-tcp-tls-07 should be used
3509 for messages transmitted between a Client and a Server. A Device should use "Alternative L3" as
3510 defined in IETF draft-ietf-core-coap-tcp-tls-07.

3511 **12.3.4 URI scheme**

3512 The URI scheme used shall be as defined in section 6 in IETF draft-ietf-core-coap-tcp-tls-07.

3513 For the "coaps+tcp" URI scheme the "TLS Application Layer Protocol Negotiation Extension"
3514 IETF RFC 7301 shall be used.

3515 **12.3.5 KeepAlive**

3516 **12.3.5.1 Overview**

3517 In order to ensure that the connection between a Devices is maintained, when using CoAP
3518 serialization over TCP, a Device that initiated the connection should send application layer
3519 KeepAlive messages. The reasons to support application layer KeepAlive are as follows:

- 3520 • TCP KeepAlive only guarantees that a connection is alive at the network layer, but not at the
3521 application layer
- 3522 • Interval of TCP KeepAlive is configurable only using kernel parameters, and is OS dependent
3523 (e.g., 2 hours by default in Linux)

3524 **12.3.5.2 KeepAlive Mechanism**

3525 Devices supporting CoAP over TCP should use Ping and Pong messages as described in
3526 IETF draft-ietf-core-coap-tcp-tls-07.

3527 **12.3.6 CoAP native Cloud**

3528 **12.3.6.1 Overview**

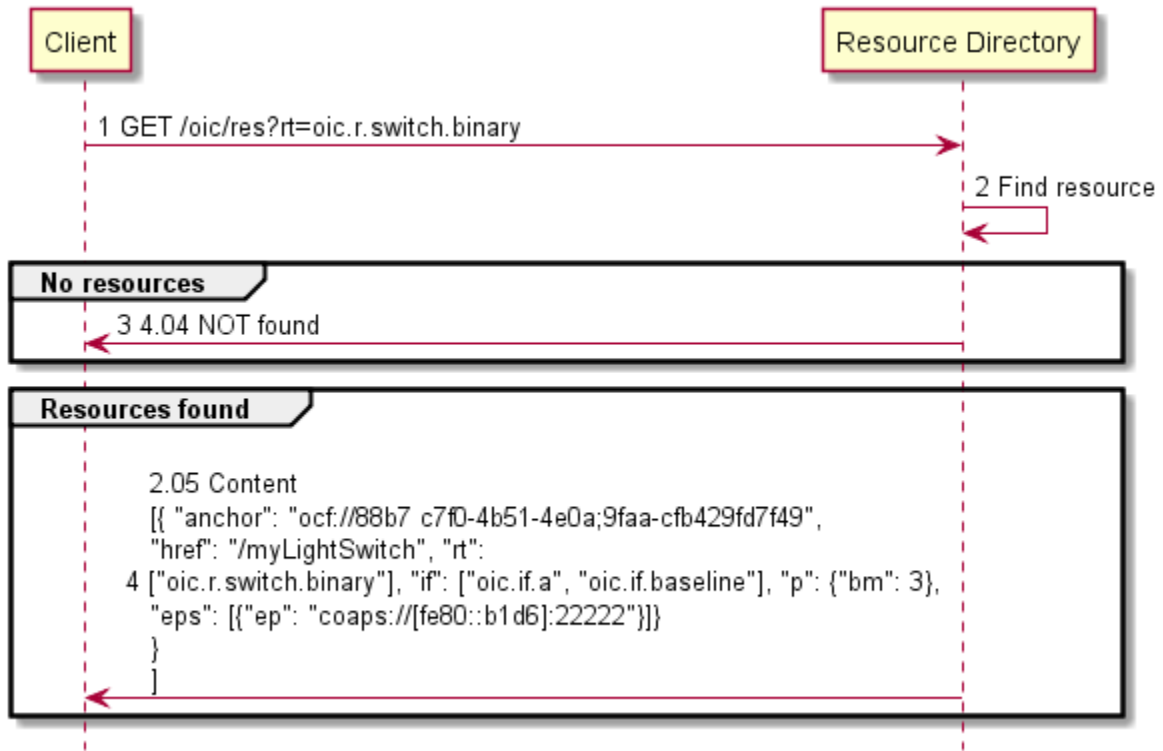
3529 CoAP native Cloud extends the use of CoAP to reach a native Cloud service without the need of
3530 a hub or gateway by utilizing following features

- 3531 • CoAP over TCP protocol defined in section 12.3

- 3532 • Keep-Alive defined in section 12.3.5
- 3533 • Resource Directory defined in section 11.3.6

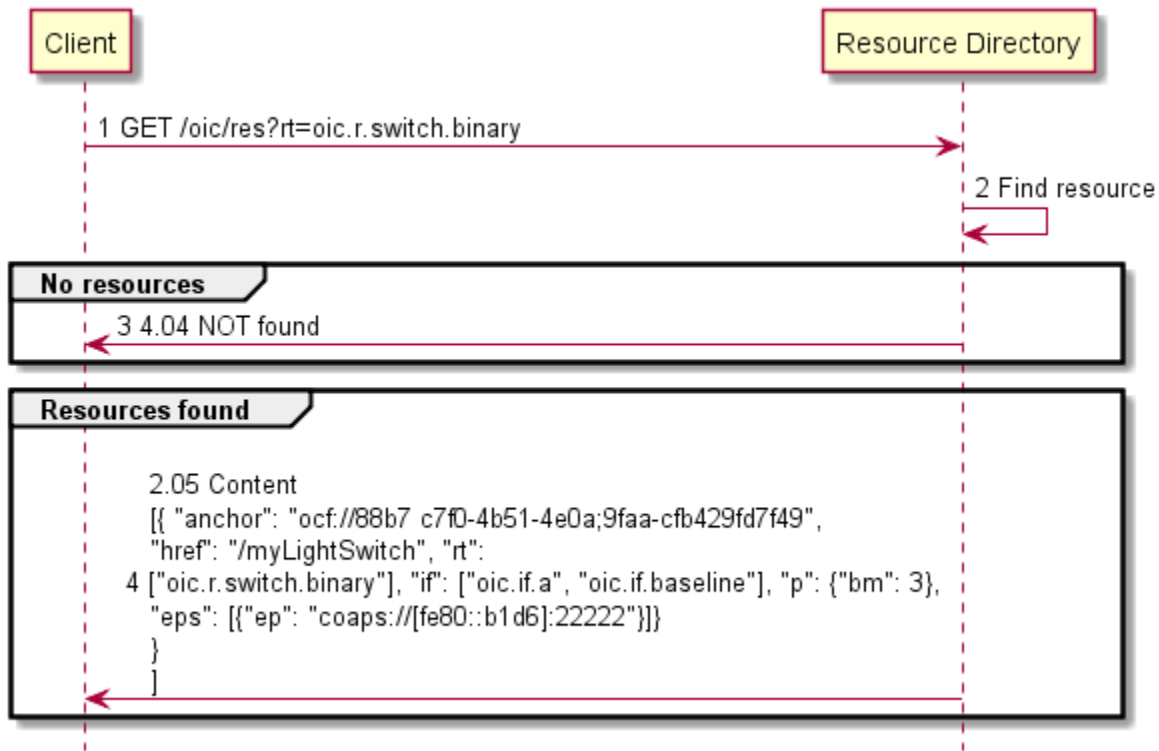
3534 12.3.6.2 Architecture flow

3535 This section describes the operational flow utilizing CoAP native Cloud for Resource discovery
 3536 and endpoint routing.



3537
 3538 Figure 26 illustrates the case when a Client discovers the published Resources on a Resource
 3539 Directory (RD). The RD responds with Links for the Resources on the Server. The "anchor"
 3540 Property and the "eps" Property in the response message imply the value of the Cloud Interface.
 3541 The value of the "eps" Property can be the address of Cloud Interface.

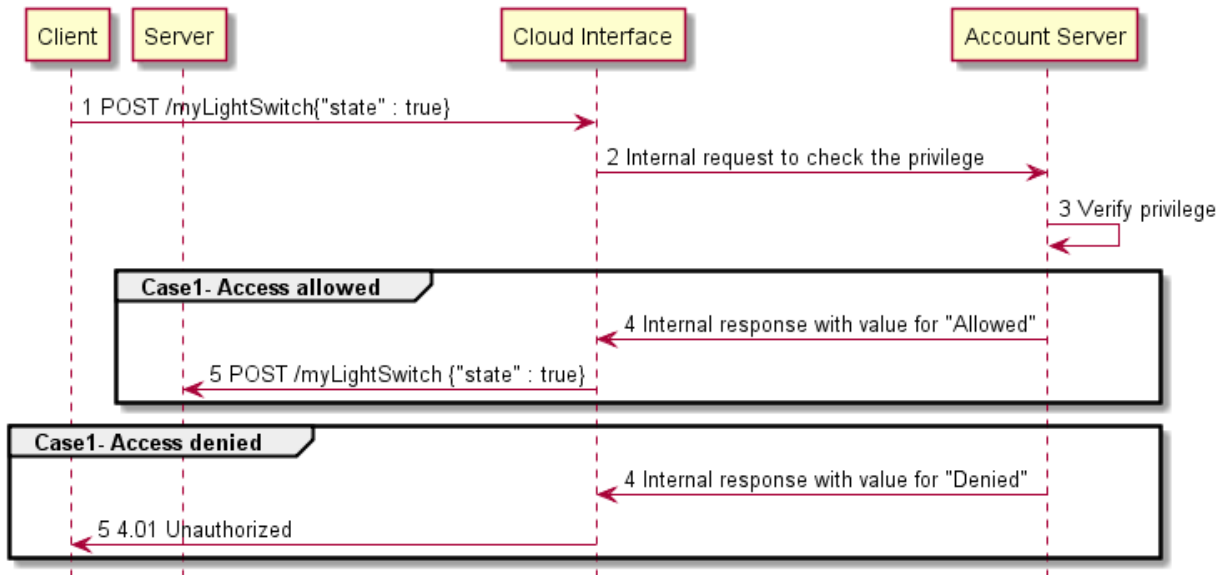
3542



3543

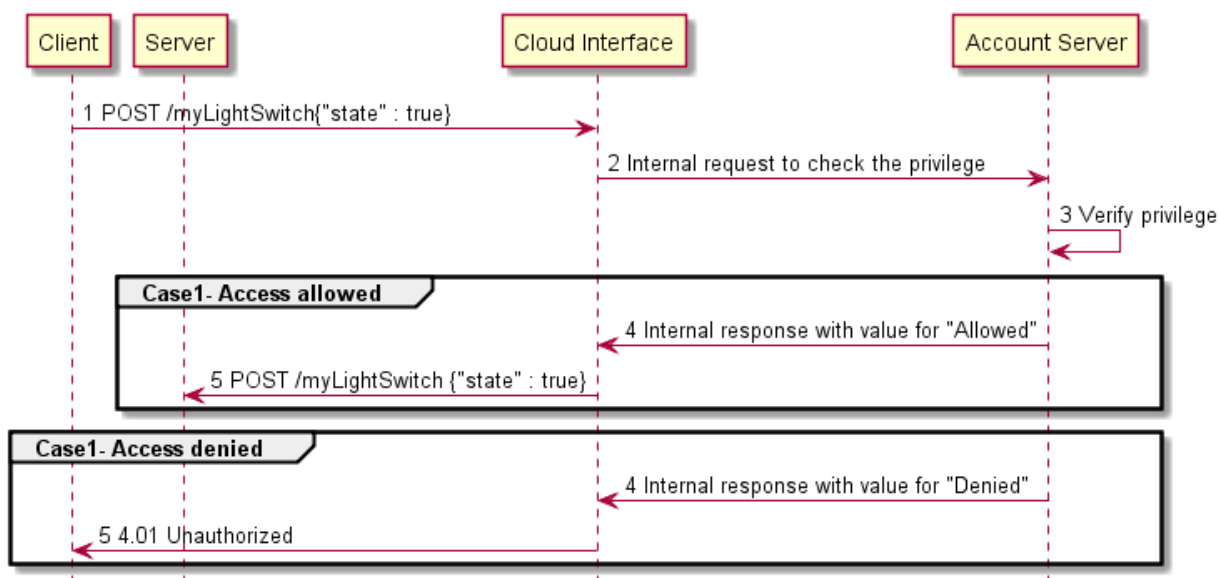
3544

Figure 26 Resource discovery through OCF Cloud



3545

3546 Figure 27 illustrates the case when a Client accesses a Server. The Client sends message to
 3547 Cloud Interface, then the Cloud Interface will route the packets to the Server. The Cloud Interface
 3548 maintains mapping table between URI and packet addressing information (ex, port number, socket
 3549 id, etc).



3550

3551

Figure 27 Endpoint routing through OCF Cloud

3552

12.4 Payload Encoding in CBOR

3553 OCF implementations shall perform the conversion to CBOR from JSON defined schemas and to
 3554 JSON from CBOR in accordance with IETF RFC 7049 section 4 unless otherwise specified in this
 3555 section.

3556 Properties defined as a JSON integer shall be encoded in CBOR as an integer (CBOR major types
 3557 0 and 1). Properties defined as a JSON number shall be encoded as an integer, single- or double-
 3558 precision floating point (CBOR major type 7, sub-types 26 and 27); the choice is implementation
 3559 dependent. Half-precision floating point (CBOR major 7, sub-type 25) shall not be used. Integer
 3560 numbers shall be within the closed interval $[-2^{53}, 2^{53}]$. Properties defined as a JSON number
 3561 should be encoded as integers whenever possible; if this is not possible Properties defined as a
 3562 JSON number should use single-precision if the loss of precision does not affect the quality of
 3563 service, otherwise the Property shall use double-precision.

3564

3565 On receipt of a CBOR payload, an implementation shall be able to interpret CBOR integer values
 3566 in any position. If a property defined as a JSON integer is received encoded other than as an
 3567 integer, the implementation may reject this encoding using a final response as appropriate for the
 3568 underlying transport (e.g. 4.00 for CoAP) and thus optimise for the integer case. If a property is
 3569 defined as a JSON number an implementation shall accept integers, single- and double-precision
 3570 floating point.

3571

13 Security

3572 The details for handling security and privacy are specified in [OCF Security].

3573

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3577

Annex A (informative)

Operation Examples

3578 A.1 Introduction

3579 This section describes some example scenarios using sequence of operations between the entities
3580 involved. In all the examples below “Light” is a Server and “Smartphone” is a Client. In one of the
3581 scenario “Garage” additionally acts as a Server. All the examples are based on the following
3582 example resource definitions:

3583 rt=oic.example.light with Resource Type definition as illustration in Table 36.

3584 **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

3585

3586 rt=oic.example.garagedoor with Resource Type definition as illustration in Table 37.

3587 **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

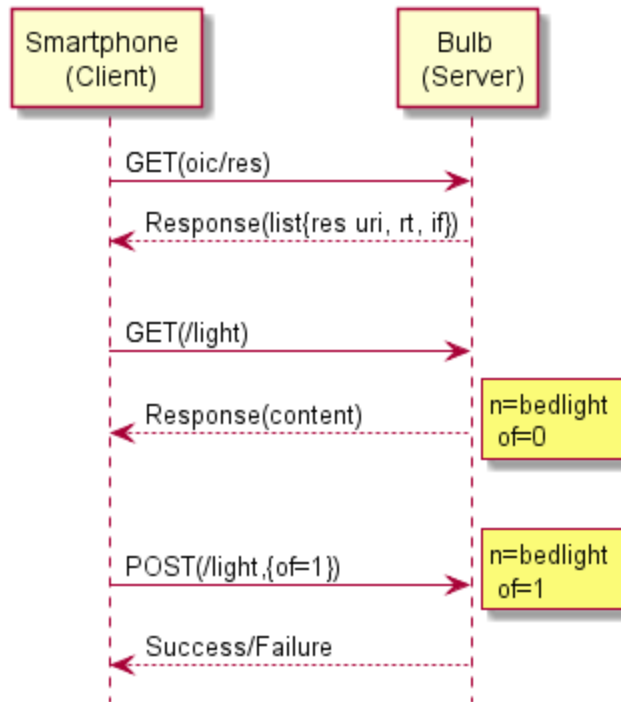
3588

3589 “/oic/mnt” (“rt=oic.wk.mnt”) used in below examples is defined in section 11.5.2.

3590 A.2 When at home: From smartphone turn on a single light

3591 This sequence highlights (Figure 28) the discovery and control of an OCF light resource from an
3592 OCF smartphone.

3593



3594

3595

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

3596

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.

3597

3598

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

3599

3600

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)

3601

3602

3603

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

3604

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

3605

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

3606

3607

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.

3608

3609

3610

A.3 GroupAction execution

3611

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

3612

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

3613

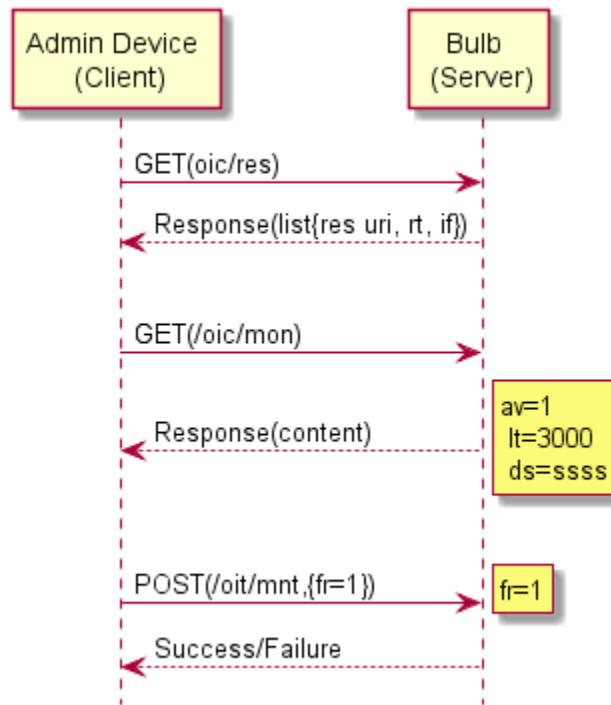
This example will be added when scripts feature is added in later version of specification

3614

A.5 Device management

3615

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



3617

3618

Figure 29. Device management (maintenance)

3619 **Pre-Condition:** Admin device has different security permissions and hence can perform device
3620 management operations on the Device

3621 1) Admin device sends a GET request to `/oic/res` resource to discover all resources hosted on
3622 a targeted end point (in this case Bulb)

3623 10) The end point (bulb) responds with the list of Resource URI, Resource Type and Interfaces
3624 supported on the end point (one of the resources is `/oic/mnt` whose `rt=oic.wk.mnt`)

3625 11) Admin Device changes the `fr` property of the maintenance resource by
3626 sending a POST request to `/oic/mnt` resource (`{fr=1}`). This triggers a factory reset of the
3627 end point (bulb)

3628 12) On successful execution of the request, the end point responds with the changed
3629 resource representation. Else, error code is returned. Details of the error codes are defined
3630 in section 12.2.7.

3631
3632
3633
3634

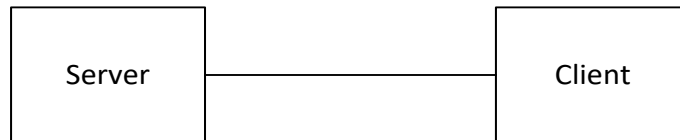
Annex B (informative)

OCF interaction scenarios and deployment models

B.1 OCF interaction scenarios

3636 A Client connects to one or multiple Servers in order to access the resources provided by those
3637 Servers. The following are scenarios representing possible interactions among Roles:

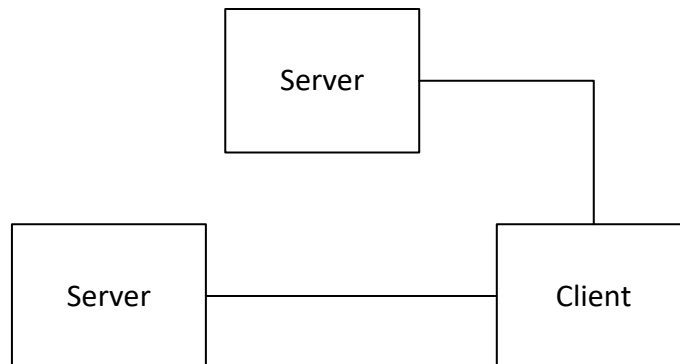
- 3638 • Direct interaction between Client and Server (Figure 30). In this scenario the Client and the
3639 Server directly communicate without involvement of any other Device. A smartphone which
3640 controls an actuator directly uses this scenario.



3641

3642 **Figure 30. Direct interaction between Server and Client**

- 3643 • Interaction between Client and Server using another server (Figure 31). In this scenario,
3644 another Server provides the support needed for the Client to directly access the desired
3645 resource on a specific Server. This scenario is used for example, when a smartphone first
3646 accesses a discovery server to find the addressing information of a specific appliance, and
3647 then directly accesses the appliance to control it.



3648

3649 **Figure 31. Interaction between Client and Server using another Server**

- 3650 • Interaction between Client and Server using Intermediary (Figure 32). In this scenario an
3651 Intermediary facilitates the interaction between the Client and the Server. A smartphone which
3652 controls appliances in a smart home via MQTT broker uses this scenario.

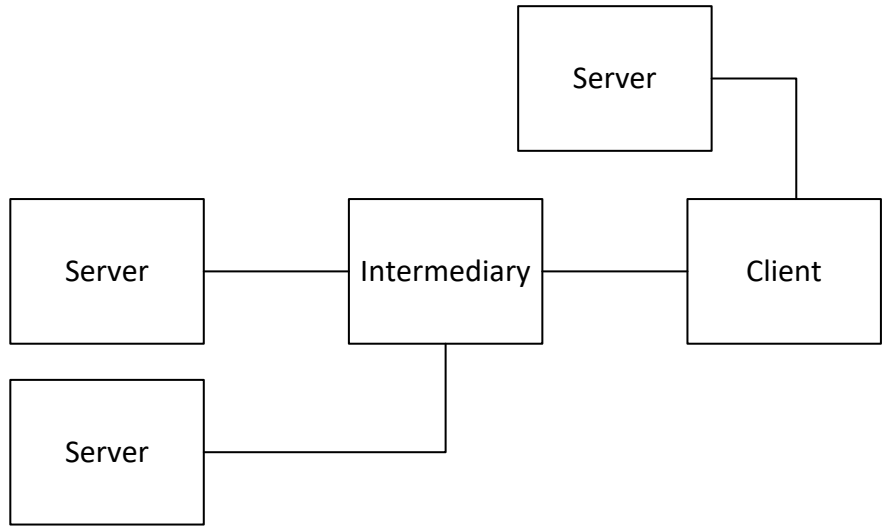


3653

3654 **Figure 32. Interaction between Client and Server using Intermediary**

- 3655 • Interaction between Client and Server using support from multiple Servers and intermediary
3656 (Figure 33). In this scenario, both Server and Intermediary roles are present to facilitate the
3657 transaction between the Client and a specific Server. An example scenario is when a

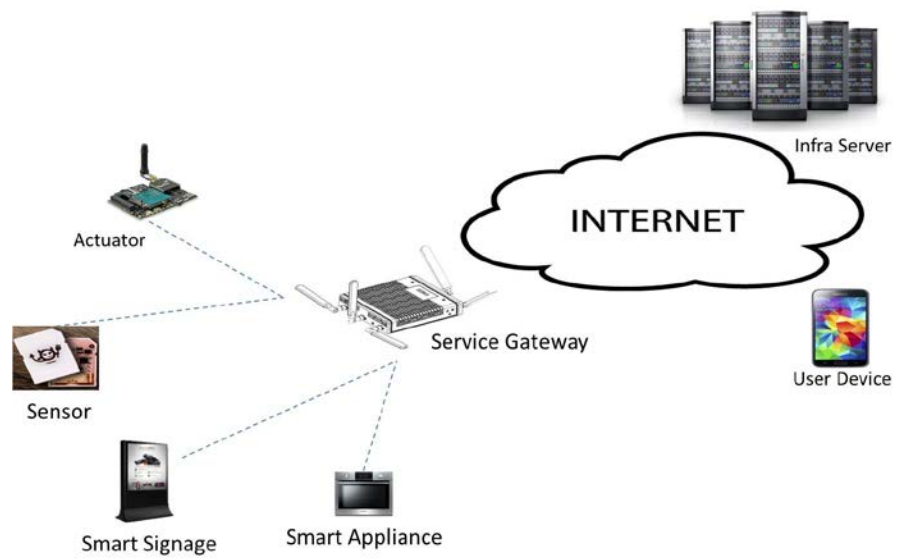
3658 smartphone first accesses a Resource Directory (RD) server to find the address to a specific
 3659 appliance, then utilizes MQTT broker to deliver a command message to the appliance. The
 3660 smartphone can utilize the mechanisms defined in CoRE Resource Directory such as default
 3661 location, anycast address or DHCP to discover the Resource Directory information.



3662
 3663 **Figure 33. Interaction between Client and Server using support from multiple Servers and**
 3664 **Intermediary**

3665 **B.2 Deployment model**

3666 In deployment, Devices are deployed and interact via either wired or wireless connections. Devices
 3667 are the physical entities that may host resources and play one or more Roles. There is no constraint
 3668 on the structure of a deployment or number of Devices in it. Architecture is flexible and scalable
 3669 and capable of addressing large number of devices with different device capabilities, including
 3670 constrained devices which have limited memory and capabilities. Constrained devices are defined
 3671 and categorized in [TCNN].



3672
 3673 **Figure 34. Example of Devices**

3674 Figure 34 depicts a typical deployment and set of Devices, which may be divided in the following
3675 categories:

- 3676 • **Things:** Networked devices which are able to interface with physical environments. Things are
3677 the devices which are primarily controlled and monitored. Examples include smart appliances,
3678 sensors, and actuators. Things mostly take the role of Server but they may also take the role of
3679 Client, for example in machine-to-machine communications.
- 3680 • **User Devices:** Devices employed by the users enabling the users to access resources and
3681 services. Examples include smart phones, tablets, and wearable devices. User Devices mainly
3682 take the role of Client, but may also take the role of Server or Intermediary.
- 3683 • **Service Gateways:** Network equipment which take the role of Intermediary. Examples are
3684 home gateways.
- 3685 • **Infra Servers:** Data centers residing in cloud infrastructure, which facilitate the interaction
3686 among Devices by providing network services such as AAA, NAT traversal or discovery. It can
3687 also play the role of Client or Intermediary

3688
3689
3690
3691

Annex C (informative)

Other Resource Models and OCF Mapping

3692

C.1 Multiple resource models

3693 RESTful interactions are defined dependent on the resource model; hence, Devices require a
3694 common understanding of the resource model for interoperability.

3695 There are multiple resource models defined by different organizations including OCF, IPSO
3696 Alliance and oneM2M, and used in the industry, which may restrict interoperability among
3697 respective ecosystems. The main differences from Resource model are as follows:

- 3698 • **Resource structure:** Resources may be defined to have properties (e.g., oneM2M defined
3699 resources), or may be defined as an atomic entity and not be decomposable into properties
3700 (e.g., IPSO alliance defined resources). For example, a smart light may be represented as a
3701 resource with an on-off property or a resource collection containing an on-off resource. In the
3702 former, on-off property doesn't have a URI of its own and can only be accessed indirectly via
3703 the resource. In the latter, being a resource itself, on-off resource is assigned its own URI and
3704 can be directly manipulated.
- 3705 • **Resource name & type:** Resources may be allowed to be named freely and have their
3706 characteristics indicated using a Resource Type property (e.g., as defined in oneM2M).
3707 Alternatively, the name of resources may be defined a priori in a way that the name by itself is
3708 indicative of its characteristic (e.g., as defined by IPSO alliance). For example, in oneM2M
3709 resource model, a smart light can be named with no restrictions, such as 'LivingRoomLight_1'
3710 but in IPSO alliance resource model it is required to have the fixed Object name with numerical
3711 Object ID of "IPSO Light Control (3311)". Consequently, it's likely that in the former case the
3712 data path in URI is freely defined and in the latter case it is predetermined.
- 3713 • **Resource hierarchy:** Resources may be allowed to be organized in hierarchy where a resource
3714 contains another resource with a parent-child relationship (e.g., in oneM2M definition of
3715 resource model). Resources may also be required to have a flat structure and associate with
3716 other resources only by referencing their links.

3717 In addition to the above, different organizations use different syntax and define different features
3718 (e.g., resource interface), which preclude interoperability.

3719

C.2 OCF approach for support of multiple resource models

3720 In order to expand the IoT ecosystem the Framework takes an inclusive approach for interworking
3721 with existing resource models. Specifically, the Framework defines a resource model while
3722 providing a mechanism to easily map to other models. By embracing existing resource models
3723 OCF is inclusive of existing ecosystems while allowing for the transition toward definition of a
3724 comprehensive resource model integrating all ecosystems.

3725 The following OCF characteristics enable support of other resource models:

- 3726 • **resource model is the superset of multiple models:** the resource model is defined as the
3727 superset of existing resource models. In other words, any existing resource model can be
3728 mapped to a subset of resource model concepts.
- 3729 • **Framework may allow for resource model negotiation:** the Client and Server exchange the
3730 information about what resource model(s) each supports. Based on the exchanged information,
3731 the Client and Server choose a resource model to perform RESTful interactions or to perform
3732 translation. This feature is out of scope of the current version of this specification, however,
3733 the following is a high level description for resource model negotiation.

3734 **C.3 Resource model indication**

3735 The Client and server exchange the information about what resource model(s) each supports.
3736 Based on the exchanged information, the Client and Server choose a resource model to perform
3737 RESTful interactions or to perform translation. The exchange could be part of discovery and
3738 negotiation. Based on the exchange, the Client and Server follow a procedure to ensure
3739 interoperability among them. They may choose a common resource model or execute translation
3740 between resource models.

- 3741 • **Resource model schema exchange:** The Client and Server may share the resource model
3742 information when they initiate a RESTful interaction. They may exchange the information about
3743 which resource model they support as part of session establishment procedures. Alternatively,
3744 each request or response message may carry the indication of which resource model it is using.
3745 For example, [COAP] defines “Content-Format option” to indicate the “representation format”
3746 such as “application/json”. It’s possible to extend the Content-Format Option to indicate the
3747 resource model used with the representation format such as “application/ipsso-json”.
- 3748 • **Ensuing procedures:** After the Client and Server exchange the resource model information,
3749 they perform a suitable procedure to ensure interoperability among them. The simplest way is
3750 to choose a resource model supported by both the Client and Server. In case there is no
3751 common resource model, the Client and Server may interact through a 3rd party.

3752 In addition to translation which can be resource intensive, a method based on profiles can be used
3753 in which an OCF implementation can accommodate multiple profiles and hence multiple
3754 ecosystems.

- 3755 • **Resource Model Profile:** the Framework defines resource model profiles and implementers or
3756 users choose the active profile. The chosen profile constraints the Device to strict rules in how
3757 resources are defined, instantiated and interacted with. This would allow for interoperability with
3758 devices from the ecosystem identified by the profile (e.g., IPSO, OneM2M etc.). Although this
3759 enables a Device to participate in and be part of any given ecosystem, this scheme does not
3760 allow for generic interoperability at runtime. While this approach may be suitable for resource
3761 constrained devices, more resource capable devices are expected to support more than one
3762 profile.

3763 **C.4 An Example Profile (IPSO profile)**

3764 IPSO defines smart objects that have specific resources and they take values determined by the
3765 data type of that resource. The smart object specification defines a category of such objects. Each
3766 resource represents a characteristic of the smart object being modelled.

3767 While the terms may be different, there are equivalent concepts in OCF to represent these terms.
3768 This section provides the equivalent OCF terms and then frames the IPSO smart object in OCF
3769 terms.

3770 The IPSO object Light Control defined in section 16 of the IPSO Smart Objects 1.0 is used as the
3771 reference example.

3772 **C.4.1 Conceptual equivalence**

3773 The IPSO smart object definition is equivalent to an Resource Type definition which defines the
3774 relevant characteristics of an entity being modelled. The specific IPSO Resource is equivalent to
3775 a Property that like an IPSO Resource has a defined data type, enumeration of acceptable values,
3776 units, a general description and access modes (based on the Interface).

3777 The general method for developing the equivalent Resource Type from an IPSO Smart Object
3778 definition is to ignore the Object ID and replace the Object URN with an OCF ‘.’ (dot) separated
3779 name that incorporates the IPSO object. Alternatively the Object URN can be used as the Resource

3780 Type ID as is (as long as the URN does not contain any '.' (dots)) – using the same Object URN
 3781 as the Resource Type ID allows for compatibility when interacting with an IPSO compliant device.
 3782 The object URN based naming does not have any bearing for OCF to OCF interoperability and so
 3783 the OCF format is preferred – for OCF to OCF interoperability only the data model consistency is
 3784 required.

3785 Two models are available to render IPSO objects into OCF.

3786 1) One is where the IPSO Smart Object represents a Resource. In this case, the IP Smart Object
 3787 is regarded as a resource with the Resource Type matching the description of the Smart Object.
 3788 Furthermore, each resource in the IPSO definition is represented as a Property in the Resource
 3789 Type (the IPSO Resource ID is replaced with a string representing the Property). This is the
 3790 preferred approach when the IPSO Data Model is expressed in the Resource Model.

3791 13) The other approach is to model an IPSO Smart Object as a Collection. Each IPSO
 3792 Resource is then modelled as a Resource with an Resource Type that matches the
 3793 definition of the IPSO Resource. Each of these resource instances are then bound to the
 3794 Collection that represents this IPSO Smart Object.

3795

3796 Below is an example showing how an IPSO LightControl Object is modelled as a Resource.

3797 **Resource Type: Light Control**

3798 Description: This Object is used to control a light source, such as a LED or other light. It allows a
 3799 light to be turned on or off and its dimmer setting to be controlled as a percentage value between
 3800 0 and 100. An optional colour setting enables a string to be used to indicate the desired colour.
 3801 Table 38 and Table 39 define the Resource Type and its properties, respectively.

3802 **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

3803

3804 **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

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Annex D (normative)

Resource Type definitions

3811 D.1 List of Resource Type definitions

3812 Table 40 contains the list of defined core resources in this specification.

3813 **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

3814

3815 D.2 OCF Collection

3816 D.2.1 Introduction

3817 OCF Collection Resource Type contains properties and links. The oic.if.baseline interface exposes
3818 a representation of the links and the properties of the collection resource itself

3819 D.2.2 Example URI

3820 /CollectionBaselineInterfaceURI

3821 D.2.3 Resource Type

3822 The resource type (rt) is defined as: oic.wk.col.

3823 D.2.4 RAML Definition

```
3824 #%RAML 0.8
3825 title: Collections
3826 version: 1.0
3827 traits:
3828   - interface-ll :
3829     queryParameters:
3830       if:
3831         enum: ["oic.if.ll"]
3832   - interface-b :
3833     queryParameters:
3834       if:
3835         enum: ["oic.if.b"]
3836   - interface-baseline :
3837     queryParameters:
3838       if:
3839         enum: ["oic.if.baseline"]
3840   - interface-all :
3841     queryParameters:
3842       if:
3843         enum: ["oic.if.ll", "oic.if.baseline", "oic.if.b"]
3844
3845 /CollectionBaselineInterfaceURI:
3846   description: |
3847     OCF Collection Resource Type contains properties and links.
3848     The oic.if.baseline interface exposes a representation of
3849     the links and the properties of the collection resource itself
3850
3851   is : ['interface-baseline']
3852   get:
3853     description: |
3854       Retrieve on Baseline Interface
3855
3856   responses :
3857     200:
3858       body:
3859         application/json:
3860           schema: /
3861             {
3862               "$schema": "http://json-schema.org/draft-04/schema#",
3863               "description" : "Copyright (c) 2016 Open Connectivity Foundation, Inc. All rights
3864 reserved.",
3865               "id": "http://www.openconnectivity.org/ocf-apis/core/schemas/oic.collection-
3866 schema.json#",
```

```

3867     "title": "Collection",
3868     "definitions": {
3869         "oic.collection.setoflinks": {
3870             "description": "A set of simple or individual OIC Links.",
3871             "type": "array",
3872             "items": {
3873                 "$ref": "oic.oic-link-schema.json#/definitions/oic.oic-link"
3874             }
3875         },
3876         "oic.collection.alllinks": {
3877             "description": "All forms of links in a collection.",
3878             "oneOf": [
3879                 {
3880                     "$ref": "#/definitions/oic.collection.setoflinks"
3881                 }
3882             ]
3883         },
3884         "oic.collection": {
3885             "type": "object",
3886             "description": "A collection is a set of links along with additional
3887 properties to describe the collection itself",
3888             "properties": {
3889                 "rts": {
3890                     "allOf": [
3891                         {
3892                             "$ref": "oic.core-
3893 schema.json#/definitions/oic.core/properties/rt"
3894                         },
3895                         {
3896                             "description": "The list of allowable resource types (for
3897 Target and anchors) in links included in the collection"
3898                         }
3899                     ]
3900                 },
3901                 "links": {
3902                     "$ref": "#/definitions/oic.collection.alllinks"
3903                 }
3904             }
3905         }
3906     },
3907     "type": "object",
3908     "allOf": [
3909         {"$ref": "oic.core-schema.json#/definitions/oic.core"},
3910         {"$ref": "#/definitions/oic.collection"}
3911     ]
3912 }
3913
3914 example: /
3915 {
3916     "rt": ["oic.wk.col"],
3917     "id": "unique_example_id",
3918     "rts": [ "oic.r.switch.binary", "oic.r.airflow" ],
3919     "links": [
3920         {
3921             "href": "switch",
3922             "rt": [ "oic.r.switch.binary" ],
3923             "if": [ "oic.if.a", "oic.if.baseline" ],
3924             "eps": [
3925                 { "ep": "coap://[fe80::b1d6]:1111", "pri": 2 },
3926                 { "ep": "coaps://[fe80::b1d6]:1122" },
3927                 { "ep": "coap+tcp://[2001:db8:a::123]:2222", "pri": 3 }
3928             ]
3929         },
3930         {
3931             "href": "airFlow",
3932             "rt": [ "oic.r.airflow" ],
3933             "if": [ "oic.if.a", "oic.if.baseline" ],
3934             "eps": [
3935                 { "ep": "coap://[fe80::b1d6]:1111", "pri": 2 },
3936                 { "ep": "coaps://[fe80::b1d6]:1122" },

```

```

3937         {"ep": "coap+tcp://[2001:db8:a::123]:2222", "pri": 3}
3938     ]
3939 }
3940 ]
3941 }
3942
3943 post:
3944     description: |
3945         Update on Baseline Interface
3946
3947     body:
3948         application/json:
3949             schema: /
3950                 {
3951                     "$schema": "http://json-schema.org/draft-04/schema#",
3952                     "description": "Copyright (c) 2016 Open Connectivity Foundation, Inc. All rights
3953 reserved.",
3954                     "id": "http://www.openconnectivity.org/ocf-apis/core/schemas/oic.collection-
3955 schema.json#",
3956                     "title": "Collection",
3957                     "definitions": {
3958                         "oic.collection.setoflinks": {
3959                             "description": "A set of simple or individual OIC Links.",
3960                             "type": "array",
3961                             "items": {
3962                                 "$ref": "oic.oic-link-schema.json#/definitions/oic.oic-link"
3963                             }
3964                         },
3965                         "oic.collection.alllinks": {
3966                             "description": "All forms of links in a collection.",
3967                             "oneOf": [
3968                                 {
3969                                     "$ref": "#/definitions/oic.collection.setoflinks"
3970                                 }
3971                             ]
3972                         },
3973                         "oic.collection": {
3974                             "type": "object",
3975                             "description": "A collection is a set of links along with additional
3976 properties to describe the collection itself",
3977                             "properties": {
3978                                 "rts": {
3979                                     "allOf": [
3980                                         {
3981                                             "$ref": "oic.core-schema.json#/definitions/oic.core/properties/rt"
3982                                         },
3983                                         {
3984                                             "description": "The list of allowable resource types (for Target
3985 and anchors) in links included in the collection"
3986                                         }
3987                                     ]
3988                                 },
3989                                 "links": {
3990                                     "$ref": "#/definitions/oic.collection.alllinks"
3991                                 }
3992                             }
3993                         }
3994                     },
3995                     "type": "object",
3996                     "allOf": [
3997                         {"$ref": "oic.core-schema.json#/definitions/oic.core"},
3998                         {"$ref": "#/definitions/oic.collection"}
3999                     ]
4000                 }
4001
4002     responses :
4003         200:

```

```

4004     body:
4005         application/json:
4006             schema: /
4007                 {
4008                     "$schema": "http://json-schema.org/draft-04/schema#",
4009                     "description": "Copyright (c) 2016 Open Connectivity Foundation, Inc. All rights
4010 reserved.",
4011                     "id": "http://www.openconnectivity.org/ocf-apis/core/schemas/oic.collection-
4012 schema.json#",
4013                     "title": "Collection",
4014                     "definitions": {
4015                         "oic.collection.setoflinks": {
4016                             "description": "A set of simple or individual OIC Links.",
4017                             "type": "array",
4018                             "items": {
4019                                 "$ref": "oic.oic-link-schema.json#/definitions/oic.oic-link"
4020                             }
4021                         },
4022                         "oic.collection.alllinks": {
4023                             "description": "All forms of links in a collection.",
4024                             "oneOf": [
4025                                 {
4026                                     "$ref": "#/definitions/oic.collection.setoflinks"
4027                                 }
4028                             ]
4029                         },
4030                         "oic.collection": {
4031                             "type": "object",
4032                             "description": "A collection is a set of links along with additional
4033 properties to describe the collection itself",
4034                             "properties": {
4035                                 "rts": {
4036                                     "allOf": [
4037                                         {
4038                                             "$ref": "oic.core-
4039 schema.json#/definitions/oic.core/properties/rt"
4040                                         },
4041                                         {
4042                                             "description": "The list of allowable resource types (for
4043 Target and anchors) in links included in the collection"
4044                                         }
4045                                     ]
4046                                 },
4047                                 "links": {
4048                                     "$ref": "#/definitions/oic.collection.alllinks"
4049                                 }
4050                             }
4051                         }
4052                     },
4053                     "type": "object",
4054                     "allOf": [
4055                         {"$ref": "oic.core-schema.json#/definitions/oic.core"},
4056                         {"$ref": "#/definitions/oic.collection"}
4057                     ]
4058                 }
4059

```

4060 D.2.5 Property Definition

Property name	Value type	Mandatory	Access mode	Description
rt	array: see schema	yes	Read Write	Resource Type of the Resource
di	multiple types: see schema		Read Write	
tag-pos-desc	multiple types: see schema		Read Write	
title	string		Read Write	A title for the link relation. Can be

				used by the UI to provide a context.
eps	array: see schema		Read Write	the Endpoint information of the target Resource
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.
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.
tag-locn	multiple types: see schema		Read Write	
if	array: see schema	yes	Read Write	The interface set supported by this resource

4061 **D.2.6 CRUDN behavior**

Resource	Create	Read	Update	Delete	Notify
-----------------	---------------	-------------	---------------	---------------	---------------

/CollectionBaselineInterfaceURI		get	post		
---------------------------------	--	-----	------	--	--

4062 D.2.7 Referenced JSON schemas

4063 D.2.8 oic.oic-link-schema.json

```

4064 {
4065   "$schema": "http://json-schema.org/draft-04/schema#",
4066   "description": "Copyright (c) 2016, 2017 Open Connectivity Foundation, Inc. All rights
4067 reserved.",
4068   "id": "http://www.openconnectivity.org/ocf-apis/core/schemas/oic.oic-link-schema.json#",
4069   "definitions": {
4070     "oic.oic-link": {
4071       "type": "object",
4072       "properties": {
4073         "href": {
4074           "type": "string",
4075           "maxLength": 256,
4076           "description": "This is the target URI, it can be specified as a Relative Reference or
4077 fully-qualified URI.",
4078           "format": "uri"
4079         },
4080         "rel": {
4081           "oneOf": [
4082             {
4083               "type": "array",
4084               "items": {
4085                 "type": "string",
4086                 "maxLength": 64
4087               },
4088               "minItems": 1,
4089               "default": ["hosts"]
4090             },
4091             {
4092               "type": "string",
4093               "maxLength": 64,
4094               "default": "hosts"
4095             }
4096           ],
4097           "description": "The relation of the target URI referenced by the link to the context URI"
4098         },
4099         "rt": {
4100           "type": "array",
4101           "items": {
4102             "type": "string",
4103             "maxLength": 64
4104           },
4105           "minItems": 1,
4106           "description": "Resource Type of the Resource"
4107         },
4108         "if": {
4109           "type": "array",
4110           "items": {
4111             "type": "string",
4112             "enum": ["oic.if.baseline", "oic.if.ll", "oic.if.b", "oic.if.rw", "oic.if.r",
4113 "oic.if.a", "oic.if.s" ]
4114           },
4115           "minItems": 1,
4116           "description": "The interface set supported by this resource"
4117         },
4118         "di": {
4119           "allOf": [
4120             {
4121               "$ref": "oic.types-schema.json#/definitions/uuid"
4122             },
4123             {
4124               "description": "The device ID"
4125             }
4126           ]
4127         },
4128         "p": {

```

```

4129         "description": "Specifies the framework policies on the Resource referenced by the target
4130 URI",
4131         "type": "object",
4132         "properties": {
4133             "bm": {
4134                 "description": "Specifies the framework policies on the Resource referenced by the
4135 target URI for e.g. observable and discoverable",
4136                 "type": "integer"
4137             }
4138         },
4139         "required" : ["bm"]
4140     },
4141     "title": {
4142         "type": "string",
4143         "maxLength": 64,
4144         "description": "A title for the link relation. Can be used by the UI to provide a
4145 context."
4146     },
4147     "anchor": {
4148         "type": "string",
4149         "maxLength": 256,
4150         "description": "This is used to override the context URI e.g. override the URI of the
4151 containing collection.",
4152         "format": "uri"
4153     },
4154     "ins": {
4155         "oneOf": [
4156             {
4157                 "type": "integer",
4158                 "description": "An ordinal number that is not repeated - must be unique in the
4159 collection context."
4160             },
4161             {
4162                 "type": "string",
4163                 "maxLength": 256,
4164                 "format" : "uri",
4165                 "description": "A unique string"
4166             },
4167             {
4168                 "allOf": [
4169                     {
4170                         "$ref": "oic.types-schema.json#/definitions/uuid"
4171                     },
4172                     {
4173                         "description": "A UUID"
4174                     }
4175                 ]
4176             }
4177         ],
4178         "description": "The instance identifier for this web link in an array of web links - used
4179 in collections"
4180     },
4181     "type": {
4182         "type": "array",
4183         "description": "A hint at the representation of the resource referenced by the target
4184 URI. This represents the media types that are used for both accepting and emitting.",
4185         "items" : {
4186             "type": "string",
4187             "maxLength": 64
4188         },
4189         "minItems": 1,
4190         "default": "application/cbor"
4191     },
4192     "eps": {
4193         "type": "array",
4194         "description": "the Endpoint information of the target Resource",
4195         "items": {
4196             "type": "object",
4197             "properties": {
4198                 "ep": {
4199                     "type": "string",

```

```

4200         "format": "uri",
4201         "description": "Transport Protocol Suite + Endpoint Locator"
4202     },
4203     "pri": {
4204         "type": "integer",
4205         "minimum": 1,
4206         "description": "The priority among multiple Endpoints"
4207     }
4208 }
4209 },
4210 "tag-locn": {
4211     "allof": [
4212         {
4213             "$ref": "oic.types-schema.json#/definitions/locn-room-list"
4214         },
4215         {
4216             "description": "Location of the Resource or Device"
4217         }
4218     ]
4219 }
4220 },
4221 "tag-pos-desc": {
4222     "oneOf": [
4223         {
4224             "$ref": "oic.types-schema.json#/definitions/pos-descriptions"
4225         },
4226         {
4227             "type": "array",
4228             "readOnly": true,
4229             "description": "Relative position; as defined by UPnP relpos, relative position
4230 against a known [0,0,0] point.",
4231             "minItems": 3,
4232             "maxItems": 3,
4233             "items": {
4234                 "type": "number"
4235             }
4236         }
4237     ]
4238 }
4239 },
4240 },
4241 },
4242 "required": [ "href", "rt", "if" ]
4243 }
4244 },
4245 "type": "object",
4246 "allof": [
4247     { "$ref": "#/definitions/oic.oic-link" }
4248 ]
4249 }
4250 }

```

4251 D.3 Device Configuration

4252 D.3.1 Introduction

4253 Resource that allows for Device specific information to be configured.

4254 D.3.2 Example URI

4255 /example/DeviceConfigurationResURI

4256 D.3.3 Resource Type

4257 The resource type (rt) is defined as: oic.wk.con.

4258 D.3.4 RAML Definition

4259 *##RAML 0.8*

4260 *title: OCF Configuration*

4261 *version: v1-20160622*


```

4262 traits:
4263   - interface-rw :
4264     queryParameters:
4265       if:
4266         enum: ["oic.if.rw"]
4267   - interface-all :
4268     queryParameters:
4269       if:
4270         enum: ["oic.if.rw", "oic.if.baseline"]
4271
4272 /example/DeviceConfigurationResURI:
4273   description: |
4274     Resource that allows for Device specific information to be configured.
4275
4276   get:
4277     description: |
4278       Retrieves the current Device configuration settings
4279
4280     is : ['interface-all']
4281     responses :
4282       200:
4283         body:
4284           application/json:
4285             schema: /
4286               {
4287                 "id": "http://www.openconnectivity.org/ocf-apis/core/schemas/oic.wk.con-
4288 schema.json#",
4289                 "$schema": "http://json-schema.org/draft-04/schema#",
4290                 "description" : "Copyright (c) 2016, 2017 Open Connectivity Foundation, Inc. All
4291 rights reserved.",
4292                 "definitions": {
4293                   "oic.wk.con": {
4294                     "type": "object",
4295                     "properties": {
4296                       "loc": {
4297                         "type": "array",
4298                         "description": "Location information (lat, long)",
4299                         "items": {
4300                           "type": "number"
4301                         },
4302                         "minItems": 2,
4303                         "maxItems": 2
4304                       },
4305                       "locn": {
4306                         "type": "string",
4307                         "maxLength": 64,
4308                         "description": "Human Friendly Name for location"
4309                       },
4310                       "c": {
4311                         "type": "string",
4312                         "maxLength": 64,
4313                         "description": "Currency"
4314                       },
4315                       "r": {
4316                         "type": "string",
4317                         "maxLength": 64,
4318                         "description": "Region"
4319                       },
4320                       "ln": {
4321                         "type": "array",
4322                         "items" :
4323                           {
4324                             "type": "object",

```

```

4325         "properties": {
4326             "language": {
4327                 "allOf": [
4328                     {
4329                         "$ref": "oic.types-schema.json#/definitions/language-tag"
4330                     },
4331                     {
4332                         "description": "An RFC 5646 language tag."
4333                     }
4334                 ]
4335             },
4336             "value": {
4337                 "type": "string",
4338                 "maxLength": 64,
4339                 "description": "The Device name in the indicated language."
4340             }
4341         }
4342     },
4343     "minItems" : 1,
4344     "description": "Localized names"
4345 },
4346 "dl": {
4347     "allOf": [
4348         {
4349             "$ref": "oic.types-schema.json#/definitions/language-tag"
4350         },
4351         {
4352             "description": "Default Language as an RFC 5646 language tag."
4353         }
4354     ]
4355 }
4356 }
4357 }
4358 },
4359 "type": "object",
4360 "allOf": [
4361     { "$ref": "oic.core-schema.json#/definitions/oic.core"},
4362     { "$ref": "#/definitions/oic.wk.con" }
4363 ],
4364 "required": ["n"]
4365 }
4366

```

4367 example: /

```

4368     {
4369         "n": "My Friendly Device Name",
4370         "rt": ["oic.wk.con"],
4371         "loc": [32.777,-96.797],
4372         "locn": "My Location Name",
4373         "c": "USD",
4374         "r": "MyRegion",
4375         "dl": "en"
4376     }
4377

```

4378 post:

```

4379     description: |
4380         Update the information about the Device
4381

```

4382 is : ['interface-rw']

4383 body:

4384 application/json:

4385 schema: /

```

4386     {
4387         "id": "http://www.openconnectivity.org/ocf-apis/core/schemas/oic.wk.con-Update-
4388 schema.json#",
4389         "$schema": "http://json-schema.org/draft-04/schema#",
4390         "description" : "Copyright (c) 2016 Open Connectivity Foundation, Inc. All rights
4391 reserved.",

```

```

4392     "definitions": {
4393         "oic.wk.con": {
4394             "type": "object",
4395             "properties": {
4396                 "loc": {
4397                     "type": "array",
4398                     "description": "Location information (lat, long)",
4399                     "items": {
4400                         "type": "number"
4401                     },
4402                     "minItems": 2,
4403                     "maxItems": 2
4404                 },
4405                 "locn": {
4406                     "type": "string",
4407                     "maxLength": 64,
4408                     "description": "Human Friendly Name for location"
4409                 },
4410                 "c": {
4411                     "type": "string",
4412                     "maxLength": 64,
4413                     "description": "Currency"
4414                 },
4415                 "r": {
4416                     "type": "string",
4417                     "maxLength": 64,
4418                     "description": "Region"
4419                 },
4420                 "ln": {
4421                     "type": "array",
4422                     "items": :
4423                     {
4424                         "type": "object",
4425                         "properties": {
4426                             "language": {
4427                                 "allOf": [
4428                                     {
4429                                         "$ref": "oic.types-schema.json#/definitions/language-tag"
4430                                     },
4431                                     {
4432                                         "description": "An RFC 5646 language tag."
4433                                     }
4434                                 ]
4435                             },
4436                             "value": {
4437                                 "type": "string",
4438                                 "maxLength": 64,
4439                                 "description": "The Device name in the indicated language."
4440                             }
4441                         }
4442                     },
4443                     "minItems" : 1,
4444                     "description": "Localized names"
4445                 },
4446                 "dl": {
4447                     "allOf": [
4448                         {
4449                             "$ref": "oic.types-schema.json#/definitions/language-tag"
4450                         },
4451                         {
4452                             "description": "Default Language as an RFC 5646 language tag."
4453                         }
4454                     ]
4455                 }
4456             }
4457         },
4458     },
4459     "type": "object",
4460     "allOf": [
4461         { "$ref": "oic.core-schema.rw.json#/definitions/oic.core" },
4462         { "$ref": "#/definitions/oic.wk.con" }

```

```

4463         ],
4464         "required": ["n"]
4465     }
4466
4467     example: /
4468     {
4469         "n": "Nuevo Nombre Amistoso",
4470         "r": "MyNewRegion",
4471         "ln": [ { "language": "es", "value": "Nuevo Nombre Amistoso" } ],
4472         "dl": "es"
4473     }
4474
4475     responses :
4476     200:
4477         body:
4478             application/json:
4479             schema: /
4480             {
4481                 "id": "http://www.openconnectivity.org/ocf-apis/core/schemas/oic.wk.con-Update-
4482 schema.json#",
4483                 "$schema": "http://json-schema.org/draft-04/schema#",
4484                 "description" : "Copyright (c) 2016 Open Connectivity Foundation, Inc. All rights
4485 reserved.",
4486                 "definitions": {
4487                     "oic.wk.con": {
4488                         "type": "object",
4489                         "properties": {
4490                             "loc": {
4491                                 "type": "array",
4492                                 "description": "Location information (lat, long)",
4493                                 "items": {
4494                                     "type": "number"
4495                                 },
4496                                 "minItems": 2,
4497                                 "maxItems": 2
4498                             },
4499                             "locn": {
4500                                 "type": "string",
4501                                 "maxLength": 64,
4502                                 "description": "Human Friendly Name for location"
4503                             },
4504                             "c": {
4505                                 "type": "string",
4506                                 "maxLength": 64,
4507                                 "description": "Currency"
4508                             },
4509                             "r": {
4510                                 "type": "string",
4511                                 "maxLength": 64,
4512                                 "description": "Region"
4513                             },
4514                             "ln": {
4515                                 "type": "array",
4516                                 "items" :
4517                                 {
4518                                     "type": "object",
4519                                     "properties": {
4520                                         "language": {
4521                                             "allOf": [
4522                                                 {
4523                                                     "$ref": "oic.types-schema.json#/definitions/language-tag"
4524                                                 },
4525                                                 {
4526                                                     "description": "An RFC 5646 language tag."
4527                                                 }
4528                                             ]
4529                                         }

```

```

4530         "value": {
4531             "type": "string",
4532             "maxLength": 64,
4533             "description": "The Device name in the indicated language."
4534         }
4535     },
4536     },
4537     "minItems" : 1,
4538     "description": "Localized names"
4539 },
4540 "dl": {
4541     "allOf": [
4542         {
4543             "$ref": "oic.types-schema.json#/definitions/language-tag"
4544         },
4545         {
4546             "description": "Default Language as an RFC 5646 language tag."
4547         }
4548     ]
4549 }
4550 }
4551 }
4552 },
4553 "type": "object",
4554 "allOf": [
4555     { "$ref": "oic.core-schema.rw.json#/definitions/oic.core" },
4556     { "$ref": "#/definitions/oic.wk.con" }
4557 ],
4558 "required": ["n"]
4559 }
4560
4561 example: /
4562 {
4563     "n": "Nuevo Nombre Amistoso",
4564     "r": "MyNewRegion",
4565     "ln": [ { "language": "es", "value": "Nuevo Nombre Amistoso" } ],
4566     "dl": "es"
4567 }
4568

```

D.3.5 Property Definition

Property name	Value type	Mandatory	Access mode	Description
loc	array: see schema		Read Write	Location information (lat, long)
c	string		Read Write	Currency
ln	array: see schema		Read Write	Localized names
locn	string		Read Write	Human Friendly Name for location
dl	multiple types: see schema		Read Write	
r	string		Read Write	Region

D.3.6 CRUDN behavior

Resource	Create	Read	Update	Delete	Notify
/example/DeviceConfigurationResURI		get	post		

D.4 Platform Configuration

D.4.1 Introduction

Resource that allows for platform specific information to be configured.

```

4574 D.4.2 Example URI
4575 /example/PlatformConfigurationResURI
4576 D.4.3 Resource Type
4577 The resource type (rt) is defined as: oic.wk.con.p.
4578 D.4.4 RAML Definition
4579 #%RAML 0.8
4580 title: OCF Platform Configuration
4581 version: v1-20160622
4582 traits:
4583   - interface-rw :
4584     queryParameters:
4585       if:
4586         enum: ["oic.if.rw"]
4587   - interface-all :
4588     queryParameters:
4589       if:
4590         enum: ["oic.if.rw", "oic.if.baseline"]
4591
4592 /example/PlatformConfigurationResURI:
4593   description: |
4594     Resource that allows for platform specific information to be configured.
4595
4596   get:
4597     description: |
4598       Retrieves the current platform configuration settings
4599
4600   is : ['interface-all']
4601   responses :
4602     200:
4603       body:
4604         application/json:
4605           schema: /
4606             {
4607               "id": "http://www.openconnectivity.org/ocf-apis/core/schemas/oic.wk.con.p-
4608 schema.json#",
4609               "$schema": "http://json-schema.org/draft-04/schema#",
4610               "description" : "Copyright (c) 2017 Open Connectivity Foundation, Inc. All rights
4611 reserved.",
4612               "definitions": {
4613                 "oic.wk.con.p": {
4614                   "type": "object",
4615                   "properties": {
4616                     "mnpn": {
4617                       "type": "array",
4618                       "items" :
4619                         {
4620                           "type": "object",
4621                           "properties": {
4622                             "language": {
4623                               "allOf": [
4624                                 {
4625                                   "$ref": "oic.types-schema.json#/definitions/language-tag"
4626                                 },
4627                                 {
4628                                   "description": "An RFC 5646 language tag."
4629                                 }
4630                               ]
4631                             }
4632                           }
4633                         }
4634                   }
4635                 }
4636             }

```

```

4632         "value": {
4633             "type": "string",
4634             "maxLength": 64,
4635             "description": "The Platform description in the indicated
4636 language."
4637         }
4638     },
4639     },
4640     "minItems" : 1,
4641     "description": "Platform names"
4642 }
4643 }
4644 },
4645 },
4646 "type": "object",
4647 "allOf": [
4648     { "$ref": "oic.core-schema.json#/definitions/oic.core"},
4649     { "$ref": "#/definitions/oic.wk.con.p" }
4650 ]
4651 }
4652
4653 example: /
4654 {
4655     "rt": [ "oic.wk.con.p"],
4656     "mnpn": [ { "language": "en", "value": "My Friendly Device Name" } ]
4657 }
4658
4659 post:
4660     description: |
4661     Update the information about the platform
4662
4663     is : ['interface-rw']
4664     body:
4665     application/json:
4666     schema: /
4667     {
4668     "id": "http://www.openconnectivity.org/ocf-apis/core/schemas/oic.wk.con.p-Update-
4669 schema.json#",
4670     "$schema": "http://json-schema.org/draft-04/schema#",
4671     "description" : "Copyright (c) 2017 Open Connectivity Foundation, Inc. All rights
4672 reserved.",
4673     "definitions": {
4674     "oic.wk.con.p": {
4675     "type": "object",
4676     "properties": {
4677     "mnpn": {
4678     "type": "array",
4679     "items" :
4680     {
4681     "type": "object",
4682     "properties": {
4683     "language": {
4684     "allOf": [
4685     {
4686     "$ref": "oic.types-schema.json#/definitions/language-tag"
4687     },
4688     {
4689     "description": "An RFC 5646 language tag."
4690     }
4691     ]
4692     },
4693     "value": {
4694     "type": "string",
4695     "maxLength": 64,
4696     "description": "The Platform description in the indicated language."
4697     }
4698     }
4699     }
4700     }
4701     }

```

```

4699         },
4700         "minItems" : 1,
4701         "description": "Platform names"
4702     }
4703 }
4704 }
4705 },
4706 "type": "object",
4707 "allOf": [
4708     { "$ref": "oic.core-schema.rw.json#/definitions/oic.core" },
4709     { "$ref": "#/definitions/oic.wk.con.p" }
4710 ],
4711 "required": ["mnpn"]
4712 }
4713
4714 example: /
4715 {
4716     "n": "Nuevo nombre",
4717     "mnpn": [ { "language": "es", "value": "Nuevo nombre de Plataforma Amigable" } ]
4718 }
4719
4720 responses :
4721 200:
4722     body:
4723     application/json:
4724         schema: /
4725         {
4726             "id": "http://www.openconnectivity.org/ocf-apis/core/schemas/oic.wk.con.p-Update-
4727 schema.json#",
4728             "$schema": "http://json-schema.org/draft-04/schema#",
4729             "description" : "Copyright (c) 2017 Open Connectivity Foundation, Inc. All rights
4730 reserved.",
4731             "definitions": {
4732                 "oic.wk.con.p": {
4733                     "type": "object",
4734                     "properties": {
4735                         "mnpn": {
4736                             "type": "array",
4737                             "items" :
4738                                 {
4739                                     "type": "object",
4740                                     "properties": {
4741                                         "language": {
4742                                             "allOf": [
4743                                                 {
4744                                                     "$ref": "oic.types-schema.json#/definitions/language-tag"
4745                                                 },
4746                                                 {
4747                                                     "description": "An RFC 5646 language tag."
4748                                                 }
4749                                             ]
4750                                         },
4751                                         "value": {
4752                                             "type": "string",
4753                                             "maxLength": 64,
4754                                             "description": "The Platform description in the indicated
4755 language."
4756                                         }
4757                                     }
4758                                 },
4759                     "minItems" : 1,
4760                     "description": "Platform names"
4761                 }
4762             }
4763         }
4764     },
4765     "type": "object",

```



```

4766     "allOf": [
4767       { "$ref": "oic.core-schema.rw.json#/definitions/oic.core" },
4768       { "$ref": "#/definitions/oic.wk.con.p" }
4769     ],
4770     "required": [ "mnpn" ]
4771   }
4772
4773   example: /
4774     {
4775       "n": "Nuevo nombre",
4776       "mnpn": [ { "language": "es", "value": "Nuevo nombre de Plataforma Amigable" } ]
4777     }
4778

```

4779 D.4.5 Property Definition

Property name	Value type	Mandatory	Access mode	Description
mnpn	array: see schema		Read Write	Platform names

4780 D.4.6 CRUDN behavior

Resource	Create	Read	Update	Delete	Notify
/example/PlatformConfigurationResURI		get	post		

4781 D.5 Device

4782 D.5.1 Introduction

4783 Known resource that is hosted by every Server. Allows for logical device specific information to be
 4784 discovered.

4785 D.5.2 Wellknown URI

4786 /oic/d

4787 D.5.3 Resource Type

4788 The resource type (rt) is defined as: oic.wk.d.

4789 D.5.4 RAML Definition

```

4790 #%RAML 0.8
4791 title: OIC Root Device
4792 version: v1-20160622
4793 traits:
4794   - interface :
4795     queryParameters:
4796       if:
4797         enum: ["oic.if.r", "oic.if.baseline"]
4798
4799 /oic/d:
4800   description: |
4801     Known resource that is hosted by every Server.
4802     Allows for logical device specific information to be discovered.
4803
4804   is : ['interface']
4805   get:
4806     description: |
4807       Retrieve the information about the Device
4808
4809   responses :
4810     200:

```

```

4811     body:
4812     application/json:
4813         schema: /
4814         {
4815             "$schema": "http://json-schemas.org/draft-04/schema#",
4816             "description": "Copyright (c) 2016, 2017 Open Connectivity Foundation, Inc. All
4817 rights reserved.",
4818             "id": "http://www.openconnectivity.org/ocf-apis/core/schemas/oic.wk.d-
4819 schema.json#",
4820             "definitions": {
4821                 "oic.wk.d": {
4822                     "type": "object",
4823                     "properties": {
4824                         "di": {
4825                             "allOf": [
4826                                 {
4827                                     "$ref": "oic.types-schema.json#/definitions/uuid"
4828                                 },
4829                                 {
4830                                     "readOnly": true,
4831                                     "description": "Unique identifier for device"
4832                                 }
4833                             ]
4834                         },
4835                         "icv": {
4836                             "type": "string",
4837                             "maxLength": 64,
4838                             "readOnly": true,
4839                             "description": "The version of the OIC Server"
4840                         },
4841                         "dmv": {
4842                             "type": "string",
4843                             "maxLength": 256,
4844                             "readOnly": true,
4845                             "description": "Spec versions of the Resource and Device Specifications to
4846 which this device data model is implemented"
4847                         },
4848                         "ld": {
4849                             "type": "array",
4850                             "items": :
4851                                 {
4852                                     "type": "object",
4853                                     "properties": {
4854                                         "language": {
4855                                             "allOf": [
4856                                                 {
4857                                                     "$ref": "oic.types-schema.json#/definitions/language-tag"
4858                                                 },
4859                                                 {
4860                                                     "readOnly": true,
4861                                                     "description": "An RFC 5646 language tag."
4862                                                 }
4863                                             ]
4864                                         },
4865                                         "value": {
4866                                             "type": "string",
4867                                             "maxLength": 64,
4868                                             "readOnly": true,
4869                                             "description": "Device description in the indicated language."
4870                                         }
4871                                     }
4872                                 }
4873                             ],
4874                             "minItems": 1,
4875                             "readOnly": true,
4876                             "description": "Localized Descriptions."
4877                         },
4878                         "sv": {
4879                             "type": "string",
4880                             "maxLength": 64,
4881                             "readOnly": true,

```

```

4881         "description": "Software version."
4882     },
4883     "dmn": {
4884         "type": "array",
4885         "items" :
4886         {
4887             "type": "object",
4888             "properties": {
4889                 "language": {
4890                     "allOf": [
4891                         {
4892                             "$ref": "oic.types-schema.json#/definitions/language-tag"
4893                         },
4894                         {
4895                             "readOnly": true,
4896                             "description": "An RFC 5646 language tag."
4897                         }
4898                     ]
4899                 },
4900                 "value": {
4901                     "type": "string",
4902                     "maxLength": 64,
4903                     "readOnly": true,
4904                     "description": "Manufacturer name in the indicated language."
4905                 }
4906             }
4907         },
4908         "minItems" : 1,
4909         "readOnly": true,
4910         "description": "Manufacturer Name."
4911     },
4912     "dmno": {
4913         "type": "string",
4914         "maxLength": 64,
4915         "readOnly": true,
4916         "description": "Model number as designated by manufacturer."
4917     },
4918     "piid": {
4919         "allOf": [
4920             {
4921                 "$ref": "oic.types-schema.json#/definitions/uuid"
4922             },
4923             {
4924                 "readOnly": true,
4925                 "description": "Protocol independent unique identifier for device that
4926 is immutable."
4927             }
4928         ]
4929     }
4930 }
4931 }
4932 },
4933 "type": "object",
4934 "allOf": [
4935     { "$ref": "oic.core-schema.json#/definitions/oic.core" },
4936     { "$ref": "#/definitions/oic.wk.d" }
4937 ],
4938 "required": [ "n", "di", "icv", "dmv", "piid" ]
4939 }
4940
4941 example: /
4942 {
4943     "n": "Device 1",
4944     "rt": ["oic.wk.d"],
4945     "di": "54919CA5-4101-4AE4-595B-353C51AA983C",
4946     "icv": "ocf.1.0.0",
4947     "dmv": "ocf.res.1.0.0, ocf.sh.1.0.0",
4948     "piid": "6F0AAC04-2BB0-468D-B57C-16570A26AE48"
4949 }
4950

```

4951

D.5.5 Property Definition

Property name	Value type	Mandatory	Access mode	Description
ld	array: see schema		Read Only	Localized Descriptions.
piid	multiple types: see schema	yes	Read Write	
di	multiple types: see schema	yes	Read Write	
dmno	string		Read Only	Model number as designated by manufacturer.
sv	string		Read Only	Software version.
dmn	array: see schema		Read Only	Manufacturer Name.
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

4952

D.5.6 CRUDN behavior

Resource	Create	Read	Update	Delete	Notify
/oic/d		get			

4953

D.6 Maintenance

4954

D.6.1 Introduction

4955 The resource through which a Device is maintained and can be used for diagnostic purposes. fr
 4956 (Factory Reset) is a boolean. The value 0 means No action (Default), the value 1 means Start
 4957 Factory Reset After factory reset, this value shall be changed back to the default value rb (Reboot)
 4958 is a boolean. The value 0 means No action (Default), the value 1 means Start Reboot After Reboot,
 4959 this value shall be changed back to the default value

4960

D.6.2 Wellknown URI

4961

/oic/mnt

4962

D.6.3 Resource Type

4963

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

4964

D.6.4 RAML Definition

4965

```
##RAML 0.8
```

4966

```
title: Maintenance
```

4967

```
version: v1-20160622
```

4968

```
traits:
```

4969

```
- interface-rw :
```

4970

```
  queryParameters:
```

4971

```
    if:
```

4972

```
      enum: ["oic.if.rw", "oic.if.baseline"]
```

4973

```
- interface-all :
```

4974

```
  queryParameters:
```

```

4975     if:
4976         enum: ["oic.if.rw", "oic.if.r", "oic.if.baseline"]
4977
4978 /oic/mnt:
4979     description: |
4980     The resource through which a Device is maintained and can be used for diagnostic purposes.
4981     fr (Factory Reset) is a boolean.
4982     The value 0 means No action (Default), the value 1 means Start Factory Reset
4983     After factory reset, this value shall be changed back to the default value
4984     rb (Reboot) is a boolean.
4985     The value 0 means No action (Default), the value 1 means Start Reboot
4986     After Reboot, this value shall be changed back to the default value
4987
4988     get:
4989         description: |
4990         Retrieve the maintenance action status
4991
4992     is : ['interface-all']
4993     responses :
4994         200:
4995             body:
4996                 application/json:
4997                     schema: /
4998                         {
4999                             "$schema": "http://json-schemas.org/draft-04/schema#",
5000                             "description" : "Copyright (c) 2016, 2017 Open Connectivity Foundation, Inc. All
5001 rights reserved.",
5002                             "id": "http://www.openconnectivity.org/ocf-apis/core/schemas/oic.wk.mnt-
5003 schema.json#",
5004                             "definitions": {
5005                                 "oic.wk.mnt": {
5006                                     "type": "object",
5007                                     "anyOf": [
5008                                         {"required": ["fr"]},
5009                                         {"required": ["rb"]}
5010                                     ],
5011                                     "properties": {
5012                                         "fr": {
5013                                             "type": "boolean",
5014                                             "description": "Factory Reset"
5015                                         },
5016                                         "rb": {
5017                                             "type": "boolean",
5018                                             "description": "Reboot Action"
5019                                         }
5020                                     }
5021                                 }
5022                             },
5023                             "type": "object",
5024                             "allOf": [
5025                                 { "$ref": "oic.core-schema.json#/definitions/oic.core" },
5026                                 { "$ref": "#/definitions/oic.wk.mnt" }
5027                             ]
5028                         }
5029
5030         example: /
5031             {
5032                 "rt": ["oic.wk.mnt"],
5033                 "fr": false,
5034                 "rb": false
5035             }
5036
5037     post:

```

```

5038     description: |
5039         Set the maintenance action(s)
5040
5041     is : ['interface-rw']
5042     body:
5043         application/json:
5044             schema: /
5045                 {
5046                     "$schema": "http://json-schemas.org/draft-04/schema#",
5047                     "description" : "Copyright (c) 2016, 2017 Open Connectivity Foundation, Inc. All rights
5048 reserved.",
5049                     "id": "http://www.openconnectivity.org/ocf-apis/core/schemas/oic.wk.mnt-schema.json#",
5050                     "definitions": {
5051                         "oic.wk.mnt": {
5052                             "type": "object",
5053                             "anyOf": [
5054                                 {"required": ["fr"]},
5055                                 {"required": ["rb"]}
5056                             ],
5057                             "properties": {
5058                                 "fr": {
5059                                     "type": "boolean",
5060                                     "description": "Factory Reset"
5061                                 },
5062                                 "rb": {
5063                                     "type": "boolean",
5064                                     "description": "Reboot Action"
5065                                 }
5066                             }
5067                         }
5068                     },
5069                     "type": "object",
5070                     "allOf": [
5071                         { "$ref": "oic.core-schema.json#/definitions/oic.core"},
5072                         { "$ref": "#/definitions/oic.wk.mnt" }
5073                     ]
5074                 }
5075
5076     example: /
5077         {
5078             "fr": false,
5079             "rb": false
5080         }
5081
5082     responses :
5083         200:
5084             body:
5085                 application/json:
5086                     schema: /
5087                         {
5088                             "$schema": "http://json-schemas.org/draft-04/schema#",
5089                             "description" : "Copyright (c) 2016, 2017 Open Connectivity Foundation, Inc. All
5090 rights reserved.",
5091                             "id": "http://www.openconnectivity.org/ocf-apis/core/schemas/oic.wk.mnt-
5092 schema.json#",
5093                             "definitions": {
5094                                 "oic.wk.mnt": {
5095                                     "type": "object",
5096                                     "anyOf": [
5097                                         {"required": ["fr"]},
5098                                         {"required": ["rb"]}
5099                                     ],
5100                                     "properties": {
5101                                         "fr": {
5102                                             "type": "boolean",

```

```

5103         "description": "Factory Reset"
5104     },
5105     "rb": {
5106         "type": "boolean",
5107         "description": "Reboot Action"
5108     }
5109 }
5110 }
5111 },
5112 "type": "object",
5113 "allof": [
5114     { "$ref": "oic.core-schema.json#/definitions/oic.core"},
5115     { "$ref": "#/definitions/oic.wk.mnt" }
5116 ]
5117 }
5118
5119 example: /
5120 {
5121     "fr": false,
5122     "rb": false
5123 }
5124

```

5125 D.6.5 Property Definition

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

5126 D.6.6 CRUDN behavior

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

5127 D.7 Platform

5128 D.7.1 Introduction

5129 Known resource that is defines the platform on which an Server is hosted. Allows for platform
5130 specific information to be discovered.

5131 D.7.2 Wellknown URI

5132 /oic/p

5133 D.7.3 Resource Type

5134 The resource type (rt) is defined as: oic.wk.p.

5135 D.7.4 RAML Definition

```

5136 #%RAML 0.8
5137 title: Platform
5138 version: v1-20160622
5139 traits:
5140   - interface :
5141       queryParameters:
5142           if:
5143               enum: ["oic.if.r", "oic.if.baseline"]
5144
5145 /oic/p:
5146   description: |
5147       Known resource that is defines the platform on which an Server is hosted.
5148       Allows for platform specific information to be discovered.
5149
5150   is : ['interface']

```

```

5151  get:
5152      description: |
5153          Retrieve the information about the Platform
5154
5155      responses :
5156          200:
5157              body:
5158                  application/json:
5159                      schema: /
5160                          {
5161                              "$schema": "http://json-schemas.org/draft-04/schema#",
5162                              "description" : "Copyright (c) 2016, 2017 Open Connectivity Foundation, Inc. All
5163 rights reserved.",
5164                              "id": "http://www.openconnectivity.org/ocf-apis/core/schemas/oic.wk.p-
5165 schema.json#",
5166                              "definitions": {
5167                                  "oic.wk.p": {
5168                                      "type": "object",
5169                                      "properties": {
5170                                          "pi": {
5171                                              "allOf": [
5172                                                  {
5173                                                      "$ref": "oic.types-schema.json#/definitions/uuid"
5174                                                  },
5175                                                  {
5176                                                      "readOnly": true,
5177                                                      "description": "Platform Identifier"
5178                                                  }
5179                                              ]
5180                                          },
5181                                          "mnmn": {
5182                                              "type": "string",
5183                                              "readOnly": true,
5184                                              "description": "Manufacturer Name",
5185                                              "maxLength": 64
5186                                          },
5187                                          "mnml": {
5188                                              "type": "string",
5189                                              "readOnly": true,
5190                                              "description": "Manufacturer's URL",
5191                                              "maxLength": 256,
5192                                              "format": "uri"
5193                                          },
5194                                          "mnmo": {
5195                                              "type": "string",
5196                                              "maxLength": 64,
5197                                              "readOnly": true,
5198                                              "description": "Model number as designated by the manufacturer"
5199                                          },
5200                                          "mndt": {
5201                                              "allOf": [
5202                                                  {
5203                                                      "$ref": "oic.types-schema.json#/definitions/date"
5204                                                  },
5205                                                  {
5206                                                      "readOnly": true,
5207                                                      "description": "Manufacturing Date in ISO8601 format."
5208                                                  }
5209                                              ]
5210                                          },
5211                                          "mnpv": {
5212                                              "type": "string",
5213                                              "maxLength": 64,
5214                                              "readOnly": true,
5215                                              "description": "Platform Version"
5216                                          },
5217                                          "mnos": {
5218                                              "type": "string",

```



```

5219         "maxLength": 64,
5220         "readOnly": true,
5221         "description": "Platform Resident OS Version"
5222     },
5223     "mnhw": {
5224         "type": "string",
5225         "maxLength": 64,
5226         "readOnly": true,
5227         "description": "Platform Hardware Version"
5228     },
5229     "mnfv": {
5230         "type": "string",
5231         "maxLength": 64,
5232         "readOnly": true,
5233         "description": "Manufacturer's firmware version"
5234     },
5235     "mns1": {
5236         "type": "string",
5237         "readOnly": true,
5238         "description": "Manufacturer's Support Information URL",
5239         "maxLength": 256,
5240         "format": "uri"
5241     },
5242     "st": {
5243         "type": "string",
5244         "readOnly": true,
5245         "description": "Reference time for the device in ISO8601 format.",
5246         "format": "date-time"
5247     },
5248     "vid": {
5249         "type": "string",
5250         "maxLength": 64,
5251         "readOnly": true,
5252         "description": "Manufacturer's defined information for the platform. The
5253 content is freeform, with population rules up to the manufacturer"
5254     }
5255 }
5256 },
5257 },
5258 "type": "object",
5259 "allOf": [
5260     { "$ref": "oic.core-schema.json#/definitions/oic.core" },
5261     { "$ref": "#/definitions/oic.wk.p" }
5262 ],
5263 "required": [ "pi", "mnmn" ]
5264 }
5265
5266 example: /
5267 {
5268     "pi": "54919CA5-4101-4AE4-595B-353C51AA983C",
5269     "rt": [ "oic.wk.p" ],
5270     "mnmn": "Acme, Inc"
5271 }
5272

```

5273 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		Read Write	
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	Read Write	
mnhw	string		Read Only	Platform Hardware Version

5274 **D.7.6 CRUDN behavior**

Resource	Create	Read	Update	Delete	Notify
/oic/p		get			

5275 **D.8 Discoverable Resources Baseline Interface**

5276 **D.8.1 Introduction**

5277 Baseline representation of /oic/res; list of discoverable resources

5278 **D.8.2 Wellknown URI**

5279 /oic/res

5280 **D.8.3 Resource Type**

5281 The resource type (rt) is defined as: oic.wk.res.

5282 **D.8.4 RAML Definition**

```

5283 #%RAML 0.8
5284 title: Discoverable Resources
5285 version: v1-20160622
5286 traits:
5287   - interface-ll :
5288     queryParameters:
5289       if:
5290         enum: ["oic.if.ll"]
5291   - interface-baseline :
5292     queryParameters:
5293       if:
5294         enum: ["oic.if.baseline"]
5295   - interface-all :
```

```

5296     queryParameters:
5297         if:
5298             enum: ["oic.if.ll", "oic.if.baseline"]
5299
5300 /oic-res-BaselineInterfaceURI:
5301     description: |
5302         Baseline representation of /oic/res; list of discoverable resources
5303
5304     is : ['interface-baseline']
5305     get:
5306         description: |
5307             Retrieve the discoverable resource set, baseline interface
5308
5309     responses :
5310         200:
5311             body:
5312                 application/json:
5313                     schema: /
5314                         {
5315                             "$schema": "http://json-schema.org/draft-v4/schema#",
5316                             "description" : "Copyright (c) 2016, 2017 Open Connectivity Foundation, Inc. All
5317 rights reserved.",
5318                             "id": "http://www.openconnectivity.org/ocf-apis/core/schemas/oic.wk.res-
5319 schema.json#",
5320                             "definitions": {
5321                                 "oic.res-baseline": {
5322                                     "type": "object",
5323                                     "properties": {
5324                                         "rt": {
5325                                             "type": "array",
5326                                             "items" : {
5327                                                 "type" : "string",
5328                                                 "maxLength": 64
5329                                             },
5330                                             "minItems" : 1,
5331                                             "readOnly": true,
5332                                             "description": "Resource Type of the Resource"
5333                                         },
5334                                         "if": {
5335                                             "type": "array",
5336                                             "items": {
5337                                                 "type" : "string",
5338                                                 "enum" : ["oic.if.baseline", "oic.if.ll"]
5339                                             },
5340                                             "minItems": 1,
5341                                             "readOnly": true,
5342                                             "description": "The interface set supported by this resource"
5343                                         },
5344                                         "n": {
5345                                             "type": "string",
5346                                             "maxLength": 64,
5347                                             "readOnly": true,
5348                                             "description": "Human friendly name"
5349                                         },
5350                                         "mpro": {
5351                                             "readOnly": true,
5352                                             "description": "Supported messaging protocols",
5353                                             "type": "string",
5354                                             "maxLength": 64
5355                                         },
5356                                         "links": {
5357                                             "type": "array",
5358                                             "items": {
5359                                                 "$ref": "oic.oic-link-schema.json#/definitions/oic.oic-link"

```

```

5360     }
5361   },
5362 },
5363   "required": ["rt", "if", "links"]
5364 },
5365 },
5366   "description": "The list of resources expressed as Links",
5367   "type": "array",
5368   "items": {
5369     "$ref": "#/definitions/oic.res-baseline"
5370   }
5371 }
5372
5373 example: /
5374 [
5375   {
5376     "rt": ["oic.wk.res"],
5377     "if": ["oic.if.baseline", "oic.if.ll" ],
5378     "links":
5379     [
5380       {
5381         "href": "/humidity",
5382         "rt": ["oic.r.humidity"],
5383         "if": ["oic.if.s"],
5384         "p": {"bm": 3},
5385         "eps": [
5386           {"ep": "coaps://[fe80::b1d6]:1111", "pri": 2},
5387           {"ep": "coaps://[fe80::b1d6]:1122"},
5388           {"ep": "coap+tcp://[2001:db8:a::123]:2222", "pri": 3}
5389         ]
5390       },
5391       {
5392         "href": "/temperature",
5393         "rt": ["oic.r.temperature"],
5394         "if": ["oic.if.s"],
5395         "p": {"bm": 3},
5396         "eps": [
5397           {"ep": "coaps://[[2001:db8:a::123]:2222"}
5398         ]
5399       }
5400     ]
5401   }
5402 ]
5403
5404

```

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	Read Write	
mpro	string		Read Only	Supported messaging protocols
if	array: see schema	yes	Read Only	The interface set supported by this resource

D.8.6 CRUDN behavior

Resource	Create	Read	Update	Delete	Notify
/oic/res		get			

5406 D.9 Discoverable Resources Link List interface

5407 D.9.1 Introduction

5408 Link list representation of /oic/res; list of discoverable resources

5409 D.9.2 Wellknown URI

5410 /oic/res

5411 D.9.3 Resource Type

5412 The resource type (rt) is defined as: oic.wk.res.

5413 D.9.4 RAML Definition

5414 `##RAML 0.8`

5415 `title: Discoverable Resources`

5416 `version: v1-20160622`

5417 `traits:`

5418 `- interface-ll :`

5419 `queryParameters:`

5420 `if:`

5421 `enum: ["oic.if.ll"]`

5422 `- interface-baseline :`

5423 `queryParameters:`

5424 `if:`

5425 `enum: ["oic.if.baseline"]`

5426 `- interface-all :`

5427 `queryParameters:`

5428 `if:`

5429 `enum: ["oic.if.ll", "oic.if.baseline"]`

5430

5431 `/oic-res-llInterfaceURI:`

5432 `description: |`

5433 `Link list representation of /oic/res; list of discoverable resources`

5434

5435 `is : ['interface-ll']`

5436 `get:`

5437 `description: |`

5438 `Retrieve the discoverable resource set, link list interface`

5439

5440 `responses :`

5441 `200:`

5442 `body:`

5443 `application/json:`

5444 `schema: /`

5445 `{`

5446 `"$schema": "http://json-schema.org/draft-v4/schema#",`

5447 `"description" : "Copyright (c) 2016, 2017 Open Connectivity Foundation, Inc. All`

5448 `rights reserved.",`

5449 `"id": "http://www.openconnectivity.org/ocf-apis/core/schemas/oic.wk.res-schema-`

5450 `ll.json#",`

5451 `"description": "The list of resources expressed as OCF links without di",`

5452 `"definitions": {`

5453 `"oic.res-ll": {`

5454 `"$ref": "oic.oic-link-schema.json#/definitions/oic.oic-link"`

5455 `}`

5456 `},`

5457 `"type": "array",`

5458 `"items": {`

5459 `"$ref": "#/definitions/oic.res-ll"`

```

5460     }
5461   }
5462
5463   example: /
5464   [
5465     {
5466       "href": "/humidity",
5467       "rt": ["oic.r.humidity"],
5468       "if": ["oic.if.s"],
5469       "p": {"bm": 3},
5470       "eps": [
5471         {"ep": "coaps://[fe80::b1d6]:1111", "pri": 2},
5472         {"ep": "coaps://[fe80::b1d6]:1122"},
5473         {"ep": "coaps+tcp://[2001:db8:a::123]:2222", "pri": 3}
5474       ]
5475     },
5476     {
5477       "href": "/temperature",
5478       "rt": ["oic.r.temperature"],
5479       "if": ["oic.if.s"],
5480       "p": {"bm": 3},
5481       "eps": [
5482         {"ep": "coaps://[2001:db8:a::123]:2222"}
5483       ]
5484     }
5485   ]
5486

```

5487 D.9.5 Property Definition

Property name	Value type	Mandatory	Access mode	Description
rt	array: see schema	yes	Read Write	Resource Type of the Resource
di	multiple types: see schema		Read Write	
tag-pos-desc	multiple types: see schema		Read Write	
title	string		Read Write	A title for the link relation. Can be used by the UI to provide a context.
eps	array: see schema		Read Write	the Endpoint information of the target Resource
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.
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.
tag-locn	multiple types: see schema		Read Write	
if	array: see schema	yes	Read Write	The interface set supported by this resource

5488 **D.9.6 CRUDN behavior**

Resource	Create	Read	Update	Delete	Notify
/oic/res		get			

5489 **D.9.7 Referenced JSON schemas**

5490 **D.9.8 oic.oic-link-schema.json**

```

5491 {
5492   "$schema": "http://json-schema.org/draft-04/schema#",
5493   "description": "Copyright (c) 2016, 2017 Open Connectivity Foundation, Inc. All rights
5494 reserved.",
5495   "id": "http://www.openconnectivity.org/ocf-apis/core/schemas/oic.oic-link-schema.json#",
5496   "definitions": {
5497     "oic.oic-link": {
5498       "type": "object",
5499       "properties": {
5500         "href": {
5501           "type": "string",
5502           "maxLength": 256,
5503           "description": "This is the target URI, it can be specified as a Relative Reference or
5504 fully-qualified URI.",
5505           "format": "uri"
5506         },
5507         "rel": {
5508           "oneOf": [
5509             {
5510               "type": "array",
5511               "items": {
5512                 "type": "string",
5513                 "maxLength": 64

```

```

5514         },
5515         "minItems": 1,
5516         "default": ["hosts"]
5517     },
5518     {
5519         "type": "string",
5520         "maxLength": 64,
5521         "default": "hosts"
5522     }
5523 ],
5524 "description": "The relation of the target URI referenced by the link to the context URI"
5525 },
5526 "rt": {
5527     "type": "array",
5528     "items": {
5529         "type": "string",
5530         "maxLength": 64
5531     },
5532     "minItems": 1,
5533     "description": "Resource Type of the Resource"
5534 },
5535 "if": {
5536     "type": "array",
5537     "items": {
5538         "type": "string",
5539         "enum": ["oic.if.baseline", "oic.if.ll", "oic.if.b", "oic.if.rw", "oic.if.r",
5540 "oic.if.a", "oic.if.s" ]
5541     },
5542     "minItems": 1,
5543     "description": "The interface set supported by this resource"
5544 },
5545 "di": {
5546     "allOf": [
5547         {
5548             "$ref": "oic.types-schema.json#/definitions/uuid"
5549         },
5550         {
5551             "description": "The device ID"
5552         }
5553     ]
5554 },
5555 "p": {
5556     "description": "Specifies the framework policies on the Resource referenced by the target
5557 URI",
5558     "type": "object",
5559     "properties": {
5560         "bm": {
5561             "description": "Specifies the framework policies on the Resource referenced by the
5562 target URI for e.g. observable and discoverable",
5563             "type": "integer"
5564         }
5565     },
5566     "required": ["bm"]
5567 },
5568 "title": {
5569     "type": "string",
5570     "maxLength": 64,
5571     "description": "A title for the link relation. Can be used by the UI to provide a
5572 context."
5573 },
5574 "anchor": {
5575     "type": "string",
5576     "maxLength": 256,
5577     "description": "This is used to override the context URI e.g. override the URI of the
5578 containing collection.",
5579     "format": "uri"
5580 },
5581 "ins": {
5582     "oneOf": [
5583         {
5584             "type": "integer",

```



```

5585         "description": "An ordinal number that is not repeated - must be unique in the
5586 collection context."
5587     },
5588     {
5589         "type": "string",
5590         "maxLength": 256,
5591         "format": "uri",
5592         "description": "A unique string"
5593     },
5594     {
5595         "allof": [
5596             {
5597                 "$ref": "oic.types-schema.json#/definitions/uuid"
5598             },
5599             {
5600                 "description": "A UUID"
5601             }
5602         ]
5603     }
5604 ],
5605 "description": "The instance identifier for this web link in an array of web links - used
5606 in collections"
5607 },
5608 "type": {
5609     "type": "array",
5610     "description": "A hint at the representation of the resource referenced by the target
5611 URI. This represents the media types that are used for both accepting and emitting.",
5612     "items": {
5613         "type": "string",
5614         "maxLength": 64
5615     },
5616     "minItems": 1,
5617     "default": "application/cbor"
5618 },
5619 "eps": {
5620     "type": "array",
5621     "description": "the Endpoint information of the target Resource",
5622     "items": {
5623         "type": "object",
5624         "properties": {
5625             "ep": {
5626                 "type": "string",
5627                 "format": "uri",
5628                 "description": "Transport Protocol Suite + Endpoint Locator"
5629             },
5630             "pri": {
5631                 "type": "integer",
5632                 "minimum": 1,
5633                 "description": "The priority among multiple Endpoints"
5634             }
5635         }
5636     }
5637 },
5638 "tag-locn": {
5639     "allof": [
5640         {
5641             "$ref": "oic.types-schema.json#/definitions/locn-room-list"
5642         },
5643         {
5644             "description": "Location of the Resource or Device"
5645         }
5646     ]
5647 },
5648 "tag-pos-desc": {
5649     "oneOf": [
5650         {
5651             "$ref": "oic.types-schema.json#/definitions/pos-descriptions"
5652         },
5653         {
5654             "type": "array",
5655

```

```

5656         "readOnly": true,
5657         "description": "Relative position; as defined by UPNP relpos, relative position
5658 against a known [0,0,0] point.",
5659         "minItems": 3,
5660         "maxItems": 3,
5661         "items": {
5662             "type": "number"
5663         }
5664     }
5665 ]
5666 },
5667 },
5668 },
5669 "required": [ "href", "rt", "if" ]
5670 }
5671 },
5672 "type": "object",
5673 "allOf": [
5674     { "$ref": "#/definitions/oic.oic-link" }
5675 ]
5676 }
5677

```

5678 **D.10 Scenes (Top level)**

5679 **D.10.1 Introduction**

5680 Toplevel Scene resource. This resource is a generic collection resource. The rts value shall contain
5681 oic.wk.scenecollection resource types.

5682 **D.10.2 Example URI**

5683 /SceneListResURI

5684 **D.10.3 Resource Type**

5685 The resource type (rt) is defined as: oic.wk.scenelist.

5686 **D.10.4 RAML Definition**

```

5687 #%RAML 0.8
5688 title: Scene
5689 version: v1-20160622
5690 traits:
5691   - interface :
5692     queryParameters:
5693       if:
5694         enum: ["oic.if.a", "oic.if.ll", "oic.if.baseline"]
5695
5696 /SceneListResURI:
5697   description: |
5698     Toplevel Scene resource.
5699     This resource is a generic collection resource.
5700     The rts value shall contain oic.wk.scenecollection resource types.
5701
5702   get:
5703     description: |
5704       Provides the current list of web links pointing to scenes
5705
5706     responses :
5707       200:
5708         body:
5709           application/json:
5710             schema: /

```

```

5711     {
5712         "$schema": "http://json-schema.org/draft-04/schema#",
5713         "description": "Copyright (c) 2016 Open Connectivity Foundation, Inc. All rights
5714 reserved.",
5715         "id": "http://www.openconnectivity.org/ocf-apis/core/schemas/oic.collection-
5716 schema.json#",
5717         "title": "Collection",
5718         "definitions": {
5719             "oic.collection.setoflinks": {
5720                 "description": "A set of simple or individual OIC Links.",
5721                 "type": "array",
5722                 "items": {
5723                     "$ref": "oic.oic-link-schema.json#/definitions/oic.oic-link"
5724                 }
5725             },
5726             "oic.collection.alllinks": {
5727                 "description": "All forms of links in a collection.",
5728                 "oneOf": [
5729                     {
5730                         "$ref": "#/definitions/oic.collection.setoflinks"
5731                     }
5732                 ]
5733             },
5734             "oic.collection": {
5735                 "type": "object",
5736                 "description": "A collection is a set of links along with additional
5737 properties to describe the collection itself",
5738                 "properties": {
5739                     "rts": {
5740                         "allOf": [
5741                             {
5742                                 "$ref": "oic.core-
5743 schema.json#/definitions/oic.core/properties/rt"
5744                             },
5745                             {
5746                                 "description": "The list of allowable resource types (for
5747 Target and anchors) in links included in the collection"
5748                             }
5749                         ]
5750                     },
5751                     "links": {
5752                         "$ref": "#/definitions/oic.collection.alllinks"
5753                     }
5754                 }
5755             }
5756         },
5757         "type": "object",
5758         "allOf": [
5759             {"$ref": "oic.core-schema.json#/definitions/oic.core"},
5760             {"$ref": "#/definitions/oic.collection"}
5761         ]
5762     }
5763
5764     example: /
5765     {
5766         "rt": ["oic.wk.scenelist"],
5767         "n": "list of scene Collections",
5768         "rts": ["oic.wk.scenecollection"],
5769         "links": [
5770             ]
5771     }
5772

```

5773 D.10.5 Property Definition

Property name	Value type	Mandatory	Access mode	Description
links	multiple types: see schema		Read Write	

rts	multiple types: see schema		Read Write	
-----	-------------------------------	--	------------	--

5774 **D.10.6 CRUDN behavior**

Resource	Create	Read	Update	Delete	Notify
/SceneListResURI		get			

5775 **D.11 Scene Collections**

5776 **D.11.1 Introduction**

5777 Collection that models a set of Scenes. This resource is a generic collection resource with
5778 additional parameters. The rts value shall contain oic.scenemember resource types. The additional
5779 parameters are lastScene, this is the scene value last set by any OCF Client sceneValues, this
5780 is the list of available scenes lastScene shall be listed in sceneValues.

5781 **D.11.2 Example URI**

5782 /SceneCollectionResURI

5783 **D.11.3 Resource Type**

5784 The resource type (rt) is defined as: oic.wk.scenecollection.

5785 **D.11.4 RAML Definition**

```

5786 #%RAML 0.8
5787 title: Scene
5788 version: v1-20160622
5789 traits:
5790   - interface :
5791       queryParameters:
5792           if:
5793               enum: ["oic.if.a", "oic.if.ll", "oic.if.baseline"]
5794
5795 /SceneCollectionResURI:
5796   description: |
5797     Collection that models a set of Scenes.
5798     This resource is a generic collection resource with additional parameters.
5799     The rts value shall contain oic.scenemember resource types.
5800     The additional parameters are
5801     lastScene, this is the scene value last set by any OCF Client
5802     sceneValues, this is the list of available scenes
5803     lastScene shall be listed in sceneValues.
5804
5805   get:
5806     description: |
5807       Provides the current list of web links pointing to scenes
5808
5809   responses :
5810     200:
5811       body:
5812         application/json:
5813           schema: /
5814             {
5815               "$schema": "http://json-schema.org/draft-04/schema#",
5816               "description" : "Copyright (c) 2016, 2017 Open Connectivity Foundation, Inc. All
5817 rights reserved.",
5818               "id": "http://www.openconnectivity.org/ocf-apis/core/schemas/oic.sceneCollection-
5819 schema.json#",
5820               "title" : "Scene Collection",
5821               "definitions": {

```

```

5822         "oic.sceneCollection": {
5823             "type": "object",
5824             "allOf": [
5825                 {
5826                     "$ref": "oic.collection-schema.json#/definitions/oic.collection"
5827                 },
5828                 {
5829                     "properties": {
5830                         "lastScene": {
5831                             "type": "string",
5832                             "description": "Last selected Scene from the set of sceneValues"
5833                         },
5834                         "sceneValues": {
5835                             "type": "array",
5836                             "readOnly": true,
5837                             "description": "All available scene values",
5838                             "items": {
5839                                 "type": "string"
5840                             }
5841                         }
5842                     }
5843                 },
5844             ],
5845             "required": [ "lastScene","sceneValues","rts","id" ]
5846         },
5847         "type": "object",
5848         "allOf": [
5849             { "$ref": "oic.core-schema.json#/definitions/oic.core" },
5850             { "$ref": "#/definitions/oic.sceneCollection" }
5851         ]
5852     }
5853 }
5854
5855 example: /
5856 {
5857     "lastScene": "off",
5858     "sceneValues": ["off","Reading","TVWatching"],
5859     "rt":          ["oic.wk.scenecollection"],
5860     "n":           "My Scenes for my living room",
5861     "id":          "0685B960-736F-46F7-BEC0-9E6CBD671ADCl",
5862     "rts":         ["oic.wk.scenemember"],
5863     "links": [
5864     ]
5865 }
5866
5867 post:
5868 description: |
5869     Provides the action to change the last set scene selection.
5870     Calling this method shall update all scene members to the prescribed membervalue.
5871     When this method is called with the same value as the current lastScene value
5872     then all scene members shall be updated.
5873
5874 body:
5875 application/json:
5876 schema: /
5877 {
5878     "$schema": "http://json-schema.org/draft-04/schema#",
5879     "description": "Copyright (c) 2016, 2017 Open Connectivity Foundation, Inc. All rights
5880 reserved.",
5881     "id": "http://www.openconnectivity.org/ocf-apis/core/schemas/oic.sceneCollection-
5882 Update-schema.json#",
5883     "title": "Scene Collection",
5884     "definitions": {
5885         "oic.sceneCollection-Update": {
5886             "type": "object",
5887             "allOf": [
5888                 {

```

```

5889         "$ref": "oic.collection-schema.json#/definitions/oic.collection"
5890     },
5891     {
5892         "properties": {
5893             "lastScene": {
5894                 "type": "string",
5895                 "description": "Last selected Scene from the set of sceneValues"
5896             }
5897         }
5898     }
5899 ],
5900     "required": [ "lastScene" ]
5901 },
5902 },
5903 "type": "object",
5904 "allOf" : [
5905     { "$ref": "oic.core-schema.json#/definitions/oic.core" },
5906     { "$ref": "#/definitions/oic.sceneCollection-Update" }
5907 ]
5908 }
5909
5910 example: /
5911     {
5912         "lastScene": "Reading"
5913     }
5914
5915 responses :
5916     200:
5917         description: |
5918             Indicates that the value is changed.
5919             The changed properties are provided in the response.
5920
5921         body:
5922             application/json:
5923                 schema: /
5924                     {
5925                         "$schema": "http://json-schema.org/draft-04/schema#",
5926                         "description" : "Copyright (c) 2016, 2017 Open Connectivity Foundation, Inc. All
5927 rights reserved.",
5928                         "id": "http://www.openconnectivity.org/ocf-apis/core/schemas/oic.sceneCollection-
5929 Update-schema.json#",
5930                         "title" : "Scene Collection",
5931                         "definitions": {
5932                             "oic.sceneCollection-Update": {
5933                                 "type": "object",
5934                                 "allOf": [
5935                                     {
5936                                         "$ref": "oic.collection-schema.json#/definitions/oic.collection"
5937                                     },
5938                                     {
5939                                         "properties": {
5940                                             "lastScene": {
5941                                                 "type": "string",
5942                                                 "description": "Last selected Scene from the set of sceneValues"
5943                                             }
5944                                         }
5945                                     }
5946                                 ],
5947                                 "required": [ "lastScene" ]
5948                             }
5949                         },
5950                         "type": "object",
5951                         "allOf" : [
5952                             { "$ref": "oic.core-schema.json#/definitions/oic.core" },
5953                             { "$ref": "#/definitions/oic.sceneCollection-Update" }
5954                         ]

```

```

5955     }
5956
5957     example: /
5958     {
5959         "lastScene": "Reading"
5960     }
5961

```

5962 D.11.5 Property Definition

Property name	Value type	Mandatory	Access mode	Description
lastScene	string	yes	Read Write	Last selected Scene from the set of sceneValues
sceneValues	array: see schema	yes	Read Only	All available scene values

5963 D.11.6 CRUDN behavior

Resource	Create	Read	Update	Delete	Notify
/SceneCollectionResURI		get	post		

5964 D.12 Scene Member

5965 D.12.1 Introduction

5966 Collection that models a scene member.

5967 D.12.2 Example URI

5968 /SceneMemberResURI

5969 D.12.3 Resource Type

5970 The resource type (rt) is defined as: oic.wk.scenemember.

5971 D.12.4 RAML Definition

```

5972 #%RAML 0.8
5973 title: Scene
5974 version: v1-20160622
5975 traits:
5976   - interface :
5977       queryParams:
5978         if:
5979           enum: ["oic.if.a", "oic.if.ll", "oic.if.baseline"]
5980
5981 /SceneMemberResURI:
5982   description: |
5983     Collection that models a scene member.
5984
5985   get:
5986     description: |
5987       Provides the scene member
5988
5989     responses :
5990       200:
5991         body:
5992           application/json:
5993             schema: /

```

```

5994     {
5995         "$schema": "http://json-schema.org/draft-04/schema#",
5996         "description": "Copyright (c) 2016, 2017 Open Connectivity Foundation, Inc. All
5997 rights reserved.",
5998         "id": "http://www.openconnectivity.org/ocf-apis/core/schemas/oic.sceneMember-
5999 schema.json#",
6000         "title": "Scene Member",
6001         "definitions": {
6002             "oic.sceneMember": {
6003                 "type": "object",
6004                 "properties": {
6005                     "SceneMappings": {
6006                         "type": "array",
6007                         "description": "array of mappings per scene, can be one(1)",
6008                         "items": {
6009                             "type": "object",
6010                             "properties": {
6011                                 "scene": {
6012                                     "type": "string",
6013                                     "description": "Specifies a scene value that will be acted upon"
6014                                 },
6015                                 "memberProperty": {
6016                                     "type": "string",
6017                                     "readOnly": true,
6018                                     "description": "property name that will be mapped"
6019                                 },
6020                                 "memberValue": {
6021                                     "type": "string",
6022                                     "readOnly": true,
6023                                     "description": "value of the Member Property"
6024                                 }
6025                             },
6026                             "required": [ "scene", "memberProperty", "memberValue" ]
6027                         }
6028                     },
6029                     "link": {
6030                         "allOf": [
6031                             {
6032                                 "$ref": "oic.oic-link-schema.json#/definitions/oic.oic-link"
6033                             },
6034                             {
6035                                 "description": "OCF link that points to a resource"
6036                             }
6037                         ]
6038                     }
6039                 },
6040                 "required": [ "link" ]
6041             }
6042         },
6043         "type": "object",
6044         "allOf": [
6045             { "$ref": "oic.core-schema.json#/definitions/oic.core" },
6046             { "$ref": "#/definitions/oic.sceneMember" }
6047         ]
6048     }
6049 }
6050
6051 example: /
6052 {
6053     "rt": ["oic.wk.scenemember"],
6054     "id": "0685B960-FFFF-46F7-BEC0-9E6234671ADC1",
6055     "n": "my binary switch (for light bulb) mappings",
6056     "link": {
6057         "href": "binarySwitch",
6058         "rt": ["oic.r.switch.binary"],
6059         "if": ["oic.if.a", "oic.if.baseline"],
6060         "eps": [
6061             { "ep": "coap://[fe80::b1d6]:1111", "pri": 2 },
6062             { "ep": "coaps://[fe80::b1d6]:1122" },
6063             { "ep": "coap+tcp://[2001:db8:a::123]:2222", "pri": 3 }

```



```

6064     ],
6065   },
6066   "sceneMappings": [
6067     {
6068       "scene":      "off",
6069       "memberProperty": "value",
6070       "memberValue": true
6071     },
6072     {
6073       "scene":      "Reading",
6074       "memberProperty": "value",
6075       "memberValue": false
6076     },
6077     {
6078       "scene":      "TVWatching",
6079       "memberProperty": "value",
6080       "memberValue": true
6081     }
6082   ]
6083 }
6084

```

6085 D.12.5 Property Definition

Property name	Value type	Mandatory	Access mode	Description
SceneMappings	array: see schema		Read Write	array of mappings per scene, can be one(1)
link	multiple types: see schema	yes	Read Write	

6086 D.12.6 CRUDN behavior

Resource	Create	Read	Update	Delete	Notify
/SceneMemberResURI		get			

6087 D.13 Resource directory resource

6088 D.13.1 Introduction

6089 Resource to be exposed by any Device that can act as a Resource Directory. 1) Provides selector
6090 criteria (e.g., integer) with GET request 2) Publish or Update a Link in /oic/res with POST request
6091 3) Delete a Link in /oic/res with DELETE request

6092 D.13.2 Wellknown URI

6093 /oic/rd

6094 D.13.3 Resource Type

6095 The resource type (rt) is defined as: oic.wk.rd.

6096 D.13.4 RAML Definition

```

6097 #%RAML 0.8
6098 title: Resource Directory
6099 version: v1-20160622
6100 traits:
6101   - rddelete-di :
6102     queryParameters:
6103       di:
6104         description: This is used to determine which set of links to operata on. (Need
6105 authentication to ensure that there is no spoofing). If instance is ommitted then the entire set of
6106 links from this device ID is deleted
6107 Example: DELETE /oic/rd?di="0685B960-736F-46F7-BEC0-9E6CBD671ADC1"
6108

```

```

6109 - rddelete-ins :
6110     queryParameters:
6111         ins:
6112             description: Instance of the link to delete
6113 Value of parameter is a string where instance to be deleted are comma separated
6114 Example: DELETE /oic/rd?di="0685B960-736F-46F7-BEC0-9E6CBD671ADC1";ins="20"
6115
6116 - rdgetinterface :
6117     queryParameters:
6118         if:
6119             enum: ["oic.if.baseline"]
6120             description: Interface is optional since there is only one interface supported for the
6121 Resource Type
6122 Both for RD selection and for publish.
6123 Example: GET /oic/rd?if=oic.if.baseline
6124
6125 - rdpostinterface :
6126     queryParameters:
6127         if:
6128             enum: ["oic.if.baseline"]
6129             description: Interface is optional since there is only one interface supported for the
6130 Resource Type
6131 Both for RD selection and for publish.
6132 Example: POST /oic/rd?if=oic.if.baseline
6133
6134
6135 /oic/rd:
6136     description: |
6137 Resource to be exposed by any Device that can act as a Resource Directory.
6138 1) Provides selector criteria (e.g., integer) with GET request
6139 2) Publish or Update a Link in /oic/res with POST request
6140 3) Delete a Link in /oic/res with DELETE request
6141
6142     get:
6143         description: |
6144 Get the attributes of the Resource Directory for selection purposes.
6145
6146         is : ['rdgetinterface']
6147         responses :
6148             200:
6149                 description: |
6150 Respond with the selector criteria - either the set of attributes or the bias factor
6151
6152                 body:
6153                     application/json:
6154                         schema: /
6155                             {
6156                                 "$schema": "http://json-schema.org/draft-04/schema#",
6157                                 "description" : "Copyright (c) 2016, 2017 Open Connectivity Foundation, Inc. All
6158 rights reserved.",
6159                                 "id": "http://www.openconnectivity.org/ocf-apis/core/schemas/oic.rd.selection-
6160 schema.json#",
6161                                 "title" : "RD Selection",
6162                                 "definitions": {
6163                                     "oic.rd.attributes": {
6164                                         "type": "object",
6165                                         "properties": {
6166                                             "sel": {
6167                                                 "type": "integer",
6168                                                 "minimum": 0,
6169                                                 "maximum": 100,

```

```

6170         "readOnly": true,
6171         "description": "A bias factor calculated by the Resource directory"
6172     },
6173 },
6174     "required": ["sel"]
6175 }
6176 },
6177     "type": "object",
6178     "allOf": [
6179         { "$ref": "oic.core-schema.json#/definitions/oic.core" },
6180         { "$ref": "#/definitions/oic.rd.attributes" }
6181     ]
6182 }
6183
6184     example: /
6185     {
6186         "rt": ["oic.wk.rd"],
6187         "if": ["oic.if.baseline"],
6188         "sel": 50
6189     }
6190
6191     post:
6192         description: |
6193             Publish the resource information for the first time or Update the existing one in /oic/res.
6194             Appropriates parts of the information, i.e., Links of the published Resources will be
6195             discovered through /oic/res.
6196             1) When a Device first publishes a Link, the request payload to RD may include the Links
6197             without "ins" Parameter.
6198             2) Upon granting the request, the RD assigns a unique instance value identifying the Link
6199             among all the Links it advertises
6200             and sends back the instance value in "ins" Parameter in the Link to the publishing Device.
6201             3) When later the publishing Device updates the existing Link, i.e., changing its Endpoint
6202             information,
6203             the request payload to RD needs to include the instance value in "ins" Parameter to
6204             identify the Link to update.
6205
6206         is : ['rdpostinterface']
6207         body:
6208             application/json:
6209                 schema: /
6210                 {
6211                     "$schema": "http://json-schema.org/draft-04/schema#",
6212                     "description": "Copyright (c) 2016,2017 Open Connectivity Foundation, Inc. All rights
6213                     reserved.",
6214                     "id": "http://www.openconnectivity.org/ocf-apis/core/schemas/oic.rd.publish-
6215                     schema.json#",
6216                     "title": "RD Publish & Update",
6217                     "definitions": {
6218                         "oic.rd.publish": {
6219                             "description": "Publishes resources as OIC Links into the resource directory",
6220                             "properties": {
6221                                 "di": {
6222                                     "allOf": [
6223                                         {
6224                                             "$ref": "oic.types-schema.json#/definitions/uuid"
6225                                         },
6226                                         {
6227                                             "description": "A UUID that is the identifier for the publishing Device"
6228                                         }
6229                                     ]
6230                                 },
6231                                 "links": {
6232                                     "$ref": "oic.collection-schema.json#/definitions/oic.collection.setoflinks"
6233                                 },
6234                                 "ttl": {
6235                                     "type": "integer",
6236                                     "description": "Time to indicate a RD, i.e. how long to keep this published

```

```

6237 item."
6238     }
6239     }
6240     }
6241     },
6242     "type": "object",
6243     "allof": [
6244     {
6245         "$ref": "oic.core-schema.json#/definitions/oic.core"
6246     },
6247     {
6248         "$ref": "#/definitions/oic.rd.publish"
6249     }
6250     ],
6251     "required": [
6252         "di",
6253         "links",
6254         "ttl"
6255     ]
6256 }
6257
6258 example: /
6259 {
6260     "di": "e61c3e6b-9c54-4b81-8ce5-f9039c1d04d9",
6261     "links": [
6262     {
6263         "anchor": "ocf://e61c3e6b-9c54-4b81-8ce5-f9039c1d04d9",
6264         "href": "/myLightSwitch",
6265         "rt": ["oic.r.switch.binary"],
6266         "if": ["oic.if.a", "oic.if.baseline"],
6267         "p": {"bm": 3},
6268         "eps": [
6269             {"ep": "coaps://[2001:db8:a::b1d6]:1111", "pri": 2},
6270             {"ep": "coaps://[2001:db8:a::b1d6]:1122"},
6271             {"ep": "coaps+tcp://[2001:db8:a::123]:2222", "pri": 3}
6272         ]
6273     },
6274     {
6275         "anchor": "ocf://e61c3e6b-9c54-4b81-8ce5-f9039c1d04d9",
6276         "href": "/myLightBrightness",
6277         "rt": ["oic.r.brightness"],
6278         "if": ["oic.if.a", "oic.if.baseline"],
6279         "p": {"bm": 3},
6280         "eps": [
6281             {"ep": "coaps://[2001:db8:a::123]:2222"}
6282         ]
6283     }
6284     ],
6285     "ttl": 600
6286 }
6287
6288 responses :
6289 200:
6290 description: |
6291 Respond with the same schema as publish but, when a Link is first published,
6292 with the additional "ins" Parameter in the Link.
6293 This value is used by the receiver to manage that OCF Link instance.
6294
6295 body:
6296 application/json:
6297 schema: /
6298 {
6299     "$schema": "http://json-schema.org/draft-04/schema#",
6300     "description": "Copyright (c) 2016,2017 Open Connectivity Foundation, Inc. All
6301 rights reserved.",
6302     "id": "http://www.openconnectivity.org/ocf-apis/core/schemas/oic.rd.publish-
6303 schema.json#",

```

```

6304     "title": "RD Publish & Update",
6305     "definitions": {
6306         "oic.rd.publish": {
6307             "description": "Publishes resources as OIC Links into the resource directory",
6308             "properties": {
6309                 "di": {
6310                     "allOf": [
6311                         {
6312                             "$ref": "oic.types-schema.json#/definitions/uuid"
6313                         },
6314                         {
6315                             "description": "A UUID that is the identifier for the publishing
6316 Device"
6317                         }
6318                     ]
6319                 },
6320                 "links": {
6321                     "$ref": "oic.collection-schema.json#/definitions/oic.collection.setoflinks"
6322                 },
6323                 "ttl": {
6324                     "type": "integer",
6325                     "description": "Time to indicate a RD, i.e. how long to keep this published
6326 item."
6327                 }
6328             }
6329         },
6330     },
6331     "type": "object",
6332     "allOf": [
6333         {
6334             "$ref": "oic.core-schema.json#/definitions/oic.core"
6335         },
6336         {
6337             "$ref": "#/definitions/oic.rd.publish"
6338         }
6339     ],
6340     "required": [
6341         "di",
6342         "links",
6343         "ttl"
6344     ]
6345 }
6346
6347 example: /
6348 {
6349     "di": "e61c3e6b-9c54-4b81-8ce5-f9039c1d04d9",
6350     "links": [
6351         {
6352             "anchor": "ocf://e61c3e6b-9c54-4b81-8ce5-f9039c1d04d9",
6353             "href": "/myLightSwitch",
6354             "rt": ["oic.r.switch.binary"],
6355             "if": ["oic.if.a", "oic.if.baseline"],
6356             "p": {"bm": 3},
6357             "eps": [
6358                 {"ep": "coaps://[2001:db8:a::b1d6]:1111", "pri": 2},
6359                 {"ep": "coaps://[2001:db8:a::b1d6]:1122"},
6360                 {"ep": "coaps+tcp://[2001:db8:a::123]:2222", "pri": 3}
6361             ],
6362             "ins": "11235"
6363         },
6364         {
6365             "anchor": "ocf://e61c3e6b-9c54-4b81-8ce5-f9039c1d04d9",
6366             "href": "/myLightBrightness",
6367             "rt": ["oic.r.brightness"],
6368             "if": ["oic.if.a", "oic.if.baseline"],
6369             "p": {"bm": 3},
6370             "eps": [
6371                 {"ep": "coaps://[2001:db8:a::123]:2222"}
6372             ],
6373             "ins": "112358"

```

```

6374     }
6375     ],
6376     "ttl": 600
6377   }
6378

```

```

6379   delete:
6380     description: |
6381       Delete a particular OIC Link - the link may be a simple link or a link in a tagged set.
6382
6383     is : ['rddelete-di','rddelete-ins']
6384     responses :
6385       200:
6386         description: |
6387           The delete succeeded
6388

```

6389 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

6390 D.13.6 CRUDN behavior

Resource	Create	Read	Update	Delete	Notify
/oic/rd		get	post	delete	

6391 D.14 Icon

6392 D.14.1 Introduction

6393 This resource describes the attributes associated with an Icon.

6394 D.14.2 Example URI

6395 /IconResURI

6396 D.14.3 Resource Type

6397 The resource type (rt) is defined as: oic.r.icon.

6398 D.14.4 RAML Definition

```

6399 #%RAML 0.8
6400 title: OICIcon
6401 version: v1.1.0-20161107
6402 traits:
6403   - interface :
6404     queryParameters:
6405       if:
6406         enum: ["oic.if.r", "oic.if.baseline"]
6407
6408 /IconResURI:
6409   description: |
6410     This resource describes the attributes associated with an Icon.
6411
6412   is : ['interface']
6413   get:
6414     description: |

```

```

6415     Retrieves the current icon properties.
6416
6417     responses :
6418         200:
6419             body:
6420                 application/json:
6421                     schema: /
6422                         {
6423                             "id": "http://www.openconnectivity.org/ocf-apis/core/schemas/oic.r.icon.json#",
6424                             "$schema": "http://json-schema.org/draft-04/schema#",
6425                             "description" : "Copyright (c) 2017 Open Connectivity Foundation, Inc. All rights
6426 reserved.",
6427                             "title": "Icon",
6428                             "definitions": {
6429                                 "oic.r.icon": {
6430                                     "properties": {
6431                                         "mimetype": {
6432                                             "type": "string",
6433                                             "maxLength": 64,
6434                                             "readOnly": true,
6435                                             "description": "The Media Type of the icon"
6436                                         },
6437                                         "width": {
6438                                             "type": "integer",
6439                                             "minimum": 1,
6440                                             "readOnly": true,
6441                                             "description": "The width in pixels"
6442                                         },
6443                                         "height": {
6444                                             "type": "integer",
6445                                             "minimum": 1,
6446                                             "readOnly": true,
6447                                             "description": "The height in pixels"
6448                                         },
6449                                         "media": {
6450                                             "type": "string",
6451                                             "maxLength": 256,
6452                                             "format": "uri",
6453                                             "readOnly": true,
6454                                             "description": "Specifies the URI to the icon"
6455                                         }
6456                                     }
6457                                 }
6458                             },
6459                             "type": "object",
6460                             "allOf": [
6461                                 { "$ref": "oic.core-schema.json#/definitions/oic.core"},
6462                                 { "$ref": "#/definitions/oic.r.icon" }
6463                             ],
6464                             "required": ["mimetype","width","height","media"]
6465                         }
6466
6467                     example: /
6468                         {
6469                             "rt": ["oic.r.icon"],
6470                             "id": "unique_example_id",
6471                             "mimetype": "image/png",
6472                             "width": 256,
6473                             "height": 256,
6474                             "media": "http://findbetter.ru/public/uploads/1481662800/2043.png"
6475                         }
6476

```

6477 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

6478 **D.14.6 CRUDN behavior**

Resource	Create	Read	Update	Delete	Notify
/IconResURI		get			

6479 **D.15 Introspection Resource**

6480 **D.15.1 Introduction**

6481 This resource provides the means to get the device introspection data specifying all the endpoints
6482 of the device. The url hosted by this resource is either a local or an external url.

6483 **D.15.2 Example URI**

6484 /IntrospectionResURI

6485 **D.15.3 Resource Type**

6486 The resource type (rt) is defined as: oic.wk.introspection.

6487 **D.15.4 RAML Definition**

```
6488 #%RAML 0.8
6489 title: OICIntrospection
6490 version: v1.0.0-20160707
6491 traits:
6492   - interface :
6493     queryParameters:
6494       if:
6495         enum: ["oic.if.r", "oic.if.baseline"]
6496
6497 /IntrospectionResURI:
6498   description: |
6499     This resource provides the means to get the device introspection data specifying all the
6500     endpoints of the device.
6501     The url hosted by this resource is either a local or an external url.
6502
6503   is : ['interface']
6504   get:
6505     responses :
6506       200:
6507         body:
6508           application/json:
6509             schema: /
6510             {
6511               "id": "http://www.openconnectivity.org/ocf-
6512 apis/core/schemas/oic.wk.introspectionInfo.json#",
6513               "$schema": "http://json-schema.org/draft-04/schema#",
6514               "description" : "Copyright (c) 2017 Open Interconnect Consortium, Inc. All rights
6515 reserved.",
6516               "title": "introspection resource",
6517               "definitions": {
6518                 "oic.wk.introspectionInfo": {
```



```

6519         "type": "object",
6520         "properties": {
6521             "urlInfo": {
6522                 "type": "array",
6523                 "description": "Information on the location of the introspection data.",
6524                 "readOnly": true,
6525                 "minItems": 1,
6526                 "items": {
6527                     "type": "object",
6528                     "properties": {
6529                         "url": {
6530                             "type": "string",
6531                             "format": "uri",
6532                             "description": "The URL of the introspection information."
6533                         },
6534                         "protocol": {
6535                             "type": "string",
6536                             "enum": [ "coap", "coaps", "http", "https", "coap+tcp",
6537 "coaps+tcp" ],
6538                             "description": "Identifier for the protocol to be used to obtain the
6539 introspection information"
6540                         },
6541                         "content-type": {
6542                             "type": "string",
6543                             "enum": [ "application/json", "application/cbor" ],
6544                             "default": "application/cbor",
6545                             "description": "content-type of the introspection data"
6546                         },
6547                         "version": {
6548                             "type": "integer",
6549                             "enum": [ 1 ],
6550                             "default": 1,
6551                             "description": "The version of the introspection data that can be
6552 downloaded"
6553                         }
6554                     },
6555                     "required": [ "url","protocol" ]
6556                 }
6557             },
6558             "required": [ "urlInfo" ]
6559         }
6560     },
6561     "type": "object",
6562     "allOf": [
6563         { "$ref": "#/definitions/oic.wk.introspectionInfo" },
6564         { "$ref": "oic.core-schema.json#/definitions/oic.core" }
6565     ]
6566 }
6567 }
6568
6569     example: /
6570     {
6571         "rt" : ["oic.wk.introspection"],
6572         "urlInfo" : [
6573             {
6574                 "content-type" : "application/cbor",
6575                 "protocol" : "coap",
6576                 "url" : "coap://[fe80::1]:1234/IntrospectionExampleURI"
6577             }
6578         ]
6579     }
6580

```

6581 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.
--	--	--	--	-------------------------

6582 **D.15.6 CRUDN behavior**

Resource	Create	Read	Update	Delete	Notify
/IntrospectionResURI		get			

6583

6584
6585
6586
6587

Annex E (normative)

OIC 1.1 Resource Type definitions

6588 E.1 List of Resource Type Definitions

6589 Table 41 contains the list of OIC 1.1 defined core resources that are referenced in this specification
6590 and so included herein to enable backwards compatibility. These definitions are only to be used
6591 when communicating with OIC 1.1 Devices where specifically referenced in this specification.

6592 **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

6593

6594 E.2 Collection, baseline interface

6595 E.2.1 Introduction

6596 OCF Collection Resource Type contains properties and links. The oic.if.baseline interface exposes
6597 a representation of the links and the properties of the collection resource itself

6598 E.2.2 Example URI

6599 /CollectionBaselineInterfaceURI

6600 E.2.3 Resource Type

6601 The resource type (rt) is defined as: oic.wk.col.

6602 E.2.4 RAML Definition

```
6603 #%RAML 0.8  
6604 title: Collections  
6605 version: 1.0  
6606 traits:  
6607 - interface-11 :  
6608     queryParameters:
```

```

6609         if:
6610             enum: ["oic.if.ll"]
6611     - interface-b :
6612         queryParameters:
6613             if:
6614                 enum: ["oic.if.b"]
6615     - interface-baseline :
6616         queryParameters:
6617             if:
6618                 enum: ["oic.if.baseline"]
6619
6620 /CollectionBaselineInterfaceURI:
6621     description: |
6622         OCF Collection Resource Type contains properties and links.
6623         The oic.if.baseline interface exposes a representation of
6624         the links and the properties of the collection resource itself
6625
6626     is : ['interface-baseline']
6627     get:
6628         description: |
6629             Retrieve on Baseline Interface
6630
6631     responses :
6632         200:
6633             body:
6634                 application/json:
6635                 schema: /
6636                     {
6637                         "$schema": "http://json-schema.org/draft-04/schema#",
6638                         "description" : "Copyright (c) 2016 Open Connectivity Foundation, Inc. All rights
6639 reserved.",
6640                         "id": "http://www.openconnectivity.org/ocf-apis/core/schemas/oic.collection-
6641 schema.json#",
6642                         "title": "Collection",
6643                         "definitions": {
6644                             "oic.collection.setoflinks": {
6645                                 "description": "A set (array) of simple or individual OIC Links. In
6646 addition to properties required for an OIC Link, the identifier for that link in this set is also
6647 required",
6648                                 "type": "array",
6649                                 "items": {
6650                                     "$ref": "oic.oic-link-schema.json#/definitions/oic.oic-link"
6651                                 }
6652                             },
6653                             "oic.collection.alllinks": {
6654                                 "description": "All forms of links in a collection",
6655                                 "oneOf": [
6656                                     {
6657                                         "$ref": "#/definitions/oic.collection.setoflinks"
6658                                     }
6659                                 ]
6660                             },
6661                             "oic.collection": {
6662                                 "type": "object",
6663                                 "description": "A collection is a set (array) of tagged-link or set
6664 (array) of simple links along with additional properties to describe the collection itself",
6665                                 "properties": {
6666                                     "n": {
6667                                         "type": "string",
6668                                         "description": "User friendly name of the
6669 collection"
6670                                     },
6671                                     "id": {

```

```

6671         "anyOf": [
6672             {
6673                 "type": "integer",
6674                 "description": "A number that is unique to that
6675 collection; like an ordinal number that is not repeated"
6676             },
6677             {
6678                 "type": "string",
6679                 "description": "A unique string that could be a hash or
6680 similarly unique"
6681             },
6682             {
6683                 "$ref": "oic.types-schema.json#/definitions/uuid",
6684                 "description": "A unique string that could be a UUIDv4"
6685             }
6686         ],
6687         "description": "ID for the collection. Can be a value that is
6688 unique to the use context or a UUIDv4"
6689     },
6690     "di": {
6691         "$ref": "oic.types-schema.json#/definitions/uuid",
6692         "description": "The device ID which is an UUIDv4 string; used for
6693 backward compatibility with Spec A definition of /oic/res"
6694     },
6695     "rts": {
6696         "$ref": "oic.core-
6697 schema.json#/definitions/oic.core/properties/rt",
6698         "description": "Defines the list of allowable resource types (for
6699 Target and anchors) in links included in the collection; new links being created can only be from
6700 this list"
6701     },
6702     "drel": {
6703         "type": "string",
6704         "description": "When specified this is the default relationship
6705 to use when an OIC Link does not specify an explicit relationship with *rel* parameter"
6706     },
6707     "links": {
6708         "$ref": "#/definitions/oic.collection.alllinks"
6709     }
6710 },
6711 },
6712 "type": "object",
6713 "allOf": [
6714     {"$ref": "oic.core-schema.json#/definitions/oic.core"},
6715     {"$ref": "#/definitions/oic.collection"}
6716 ]
6717 }
6718
6719 example: /
6720 {
6721     "rt": ["oic.wk.col"],
6722     "id": "unique_example_id",
6723     "rts": ["oic.r.switch.binary", "oic.r.airflow"],
6724     "links": [
6725         {
6726             "href": "switch",
6727             "rt": ["oic.r.switch.binary"],
6728             "if": ["oic.if.a", "oic.if.baseline"]
6729         },
6730         {
6731             "href": "airFlow",
6732             "rt": ["oic.r.airflow"],
6733             "if": ["oic.if.a", "oic.if.baseline"]
6734         }
6735     ]
6736 }
6737
6738 post:
6739     description: |

```

6740 Update on Baseline Interface

6741

6742 body:

6743 application/json:

6744 schema: /

```
6745 {
6746   "$schema": "http://json-schema.org/draft-04/schema#",
6747   "description": "Copyright (c) 2016 Open Connectivity Foundation, Inc. All rights
6748 reserved.",
6749   "id": "http://www.openconnectivity.org/ocf-apis/core/schemas/oic.collection-
6750 schema.json#",
6751   "title": "Collection",
6752   "definitions": {
6753     "oic.collection.setoflinks": {
6754       "description": "A set (array) of simple or individual OIC Links. In addition
6755 to properties required for an OIC Link, the identifier for that link in this set is also required",
6756       "type": "array",
6757       "items": {
6758         "$ref": "oic.oic-link-schema.json#/definitions/oic.oic-link"
6759       }
6760     },
6761     "oic.collection.alllinks": {
6762       "description": "All forms of links in a collection",
6763       "oneOf": [
6764         {
6765           "$ref": "#/definitions/oic.collection.setoflinks"
6766         }
6767       ]
6768     },
6769     "oic.collection": {
6770       "type": "object",
6771       "description": "A collection is a set (array) of tagged-link or set (array)
6772 of simple links along with additional properties to describe the collection itself",
6773       "properties": {
6774         "n": {
6775           "type": "string",
6776           "description": "User friendly name of the
6777 collection"
6778         },
6779         "id": {
6780           "anyOf": [
6781             {
6782               "type": "integer",
6783               "description": "A number that is unique to that collection;
6784 like an ordinal number that is not repeated"
6785             },
6786             {
6787               "type": "string",
6788               "description": "A unique string that could be a hash or
6789 similarly unique"
6790             },
6791             {
6792               "$ref": "oic.types-schema.json#/definitions/uuid",
6793               "description": "A unique string that could be a UUIDv4"
6794             }
6795           ],
6796           "description": "ID for the collection. Can be an value that is unique
6797 to the use context or a UUIDv4"
6798         },
6799         "di": {
6800           "$ref": "oic.types-schema.json#/definitions/uuid",
6801           "description": "The device ID which is an UUIDv4 string; used for
6802 backward compatibility with Spec A definition of /oic/res"
6803         },
6804         "rts": {
6805           "$ref": "oic.core-schema.json#/definitions/oic.core.properties/rt",
6806           "description": "Defines the list of allowable resource types (for
6807 Target and anchors) in links included in the collection; new links being created can only be from
6808 this list"
6809         },
6810         "drel": {
```

```

6809         "type": "string",
6810         "description": "When specified this is the default relationship to
use when an OIC Link does not specify an explicit relationship with *rel* parameter"
6811     },
6812     "links": {
6813         "$ref": "#/definitions/oic.collection.alllinks"
6814     }
6815 }
6816 }
6817 }
6818 },
6819 "type": "object",
6820 "allOf": [
6821     {"$ref": "oic.core-schema.json#/definitions/oic.core"},
6822     {"$ref": "#/definitions/oic.collection"}
6823 ]
6824 }
6825
6826 responses :
6827     200:
6828         body:
6829             application/json:
6830                 schema: /
6831                 {
6832                     "$schema": "http://json-schema.org/draft-04/schema#",
6833                     "description" : "Copyright (c) 2016 Open Connectivity Foundation, Inc. All rights
reserved.",
6834                     "id": "http://www.openconnectivity.org/ocf-apis/core/schemas/oic.collection-
schema.json#",
6835                     "title": "Collection",
6836                     "definitions": {
6837                         "oic.collection.setoflinks": {
6838                             "description": "A set (array) of simple or individual OIC Links. In
addition to properties required for an OIC Link, the identifier for that link in this set is also
required",
6839                             "type": "array",
6840                             "items": {
6841                                 "$ref": "oic.oic-link-schema.json#/definitions/oic.oic-link"
6842                             }
6843                         },
6844                         "oic.collection.alllinks": {
6845                             "description": "All forms of links in a collection",
6846                             "oneOf": [
6847                                 {
6848                                     "$ref": "#/definitions/oic.collection.setoflinks"
6849                                 }
6850                             ]
6851                         },
6852                         "oic.collection": {
6853                             "type": "object",
6854                             "description": "A collection is a set (array) of tagged-link or set
(array) of simple links along with additional properties to describe the collection itself",
6855                             "properties": {
6856                                 "n": {
6857                                     "type": "string",
6858                                     "description": "User friendly name of the
collection"
6859                                 },
6860                                 "id": {
6861                                     "anyOf": [
6862                                         {
6863                                             "type": "integer",
6864                                             "description": "A number that is unique to that
collection; like an ordinal number that is not repeated"
6865                                         },
6866                                         {
6867                                             "type": "string",
6868                                             "description": "A unique string that could be a hash or
similarly unique"
6869                                         }
6870                                     ],
6871                                     "type": "string",
6872                                     "description": "A unique string that could be a hash or
similarly unique"
6873                                 }
6874                             }
6875                         }
6876                 },

```

```

6877         {
6878             "$ref": "oic.types-schema.json#/definitions/uuid",
6879             "description": "A unique string that could be a UUIDv4"
6880         }
6881     ],
6882     "description": "ID for the collection. Can be an value that is
6883 unique to the use context or a UUIDv4"
6884 },
6885     "di": {
6886         "$ref": "oic.types-schema.json#/definitions/uuid",
6887         "description": "The device ID which is an UUIDv4 string; used for
6888 backward compatibility with Spec A definition of /oic/res"
6889     },
6890     "rts": {
6891         "$ref": "oic.core-
6892 schema.json#/definitions/oic.core/properties/rt",
6893         "description": "Defines the list of allowable resource types (for
6894 Target and anchors) in links included in the collection; new links being created can only be from
6895 this list"
6896     },
6897     "drel": {
6898         "type": "string",
6899         "description": "When specified this is the default relationship
6900 to use when an OIC Link does not specify an explicit relationship with *rel* parameter"
6901     },
6902     "links": {
6903         "$ref": "#/definitions/oic.collection.alllinks"
6904     }
6905 },
6906 },
6907     "type": "object",
6908     "allOf": [
6909         {"$ref": "oic.core-schema.json#/definitions/oic.core"},
6910         {"$ref": "#/definitions/oic.collection"}
6911     ]
6912 }
6913

```

6914 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

6915 **E.2.6 CRUDN behavior**

Resource	Create	Read	Update	Delete	Notify
/CollectionBaselineInterfaceURI		get	post		

6916 **E.2.7 Referenced JSON schemas**

6917 **E.2.8 oic.oic-link-schema.json**

```

6918 {
6919   "$schema": "http://json-schema.org/draft-04/schema#",
6920   "description": "Copyright (c) 2016 Open Connectivity Foundation, Inc. All rights reserved.",
6921   "id": "http://www.openconnectivity.org/ocf-apis/core/schemas/oic.oic-link-schema.json#",
6922   "definitions": {
6923     "oic.oic-link": {
6924       "type": "object",
6925       "properties": {
6926         "href": {
6927           "type": "string",
6928           "maxLength": 256,

```

```

6929         "description": "This is the target URI, it can be specified as a Relative Reference or
6930 fully-qualified URI. Relative Reference should be used along with the di parameter to make it
6931 unique.",
6932         "format": "uri"
6933     },
6934     "rel": {
6935         "oneOf": [
6936             {
6937                 "type": "array",
6938                 "items": {
6939                     "type": "string",
6940                     "maxLength": 64
6941                 },
6942                 "minItems": 1,
6943                 "default": ["hosts"]
6944             },
6945             {
6946                 "type": "string",
6947                 "maxLength": 64,
6948                 "default": "hosts"
6949             }
6950         ],
6951         "description": "The relation of the target URI referenced by the link to the context URI"
6952     },
6953     "rt": {
6954         "type": "array",
6955         "items": {
6956             "type": "string",
6957             "maxLength": 64
6958         },
6959         "minItems": 1,
6960         "description": "Resource Type"
6961     },
6962     "if": {
6963         "type": "array",
6964         "items": {
6965             "type": "string",
6966             "enum": ["oic.if.baseline", "oic.if.ll", "oic.if.b", "oic.if.rw", "oic.if.r",
6967 "oic.if.a", "oic.if.s" ]
6968         },
6969         "minItems": 1,
6970         "description": "The interface set supported by this resource"
6971     },
6972     "di": {
6973         "$ref": "oic.types-schema.json#/definitions/uuid",
6974         "description": "Unique identifier for device (UUID)"
6975     },
6976     "buri": {
6977         "type": "string",
6978         "description": "The base URI used to fully qualify a Relative Reference in the href
6979 parameter. Use the OCF Schema for URI",
6980         "maxLength": 256,
6981         "format": "uri"
6982     },
6983     "p": {
6984         "description": "Specifies the framework policies on the Resource referenced by the target
6985 URI",
6986         "type": "object",
6987         "properties": {
6988             "bm": {
6989                 "description": "Specifies the framework policies on the Resource referenced by the
6990 target URI for e.g. observable and discoverable",
6991                 "type": "integer"
6992             },
6993             "sec": {
6994                 "description": "Specifies if security needs to be turned on when looking to interact
6995 with the Resource",
6996                 "default": false,
6997                 "type": "boolean"
6998             },
6999             "port": {

```

```

7000         "description": "Secure port to be used for connection",
7001         "type": "integer"
7002     },
7003 },
7004 "required" : ["bm"]
7005 },
7006 "title": {
7007     "type": "string",
7008     "maxLength": 64,
7009     "description": "A title for the link relation. Can be used by the UI to provide a
7010 context"
7011 },
7012 "anchor": {
7013     "type": "string",
7014     "maxLength": 256,
7015     "description": "This is used to override the context URI e.g. override the URI of the
7016 containing collection",
7017     "format": "uri"
7018 },
7019 "ins": {
7020     "oneOf": [
7021         {
7022             "type": "integer",
7023             "description": "An ordinal number that is not repeated - must be unique in the
7024 collection context"
7025         },
7026         {
7027             "type": "string",
7028             "maxLength": 256,
7029             "format": "uri",
7030             "description": "Any unique string including a URI"
7031         },
7032         {
7033             "$ref": "oic.types-schema.json#/definitions/uuid",
7034             "description": "Unique identifier (UUID)"
7035         }
7036     ],
7037     "description": "The instance identifier for this web link in an array of web links - used
7038 in collections"
7039 },
7040 "type": {
7041     "type": "array",
7042     "description": "A hint at the representation of the resource referenced by the target
7043 URI. This represents the media types that are used for both accepting and emitting",
7044     "items" : {
7045         "type": "string",
7046         "maxLength": 64
7047     },
7048     "minItems": 1,
7049     "default": "application/cbor"
7050 },
7051 },
7052 "required": [ "href", "rt", "if" ]
7053 }
7054 },
7055 "type": "object",
7056 "allOf": [
7057     { "$ref": "#/definitions/oic.oic-link" }
7058 ]
7059 }
7060
7061

```

7062 E.3 Collection, link list interface

7063 E.3.1 Introduction

7064 OCF Collection Resource Type contains properties and links. The oic.if.ll interface exposes a
7065 representation of the links

```

7066 E.3.2 Example URI
7067 /CollectionLinkListInterfaceURI
7068 E.3.3 Resource Type
7069 The resource type (rt) is defined as: oic.wk.col.
7070 E.3.4 RAML Definition
7071 #%RAML 0.8
7072 title: Collections
7073 version: 1.0
7074 traits:
7075   - interface-ll :
7076     queryParameters:
7077       if:
7078         enum: ["oic.if.ll"]
7079   - interface-b :
7080     queryParameters:
7081       if:
7082         enum: ["oic.if.b"]
7083   - interface-baseline :
7084     queryParameters:
7085       if:
7086         enum: ["oic.if.baseline"]
7087
7088 /CollectionLinkListInterfaceURI:
7089   description: |
7090     OCF Collection Resource Type contains properties and links.
7091     The oic.if.ll interface exposes a representation of the links
7092
7093   is : ['interface-ll']
7094   get:
7095     description: |
7096       Retrieve on Link List Interface
7097
7098   responses :
7099     200:
7100       body:
7101         application/json:
7102           schema: /
7103             {
7104               "$schema": "http://json-schema.org/draft-v4/schema#",
7105               "description" : "Copyright (c) 2016 Open Connectivity Foundation, Inc. All rights
7106 reserved.",
7107               "id": "http://www.openconnectivity.org/ocf-
7108 apis/core/schemas/oic.collection.linkslist-schema.json#",
7109               "definitions": {
7110                 "oic.collection.alllinks": {
7111                   "$ref": "oic.collection-
7112 schema.json#/definitions/oic.collection.alllinks"
7113                 }
7114               },
7115               "type": "object",
7116               "properties": {
7117                 "links": {
7118                   "$ref": "#/definitions/oic.collection.alllinks"
7119                 }
7120               }
7121             }
7122

```

```

7123     example: /
7124         {
7125             "links":
7126                 [
7127                     {
7128                         "href": "switch",
7129                         "rt": ["oic.r.switch.binary"],
7130                         "if": ["oic.if.a", "oic.if.baseline"]
7131                     },
7132                     {
7133                         "href": "airFlow",
7134                         "rt": ["oic.r.airflow"],
7135                         "if": ["oic.if.a", "oic.if.baseline"]
7136                     }
7137                 ]
7138         }
7139

```

7140 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	yes	Read Write	The interface set supported by this resource

7141 **E.3.6 CRUDN behavior**

Resource	Create	Read	Update	Delete	Notify
/CollectionLinkListInterfaceURI		get			

7142 **E.3.7 Referenced JSON schemas**

7143 **E.3.8 oic.oic-link-schema.json**

```

7144 {
7145   "$schema": "http://json-schema.org/draft-04/schema#",
7146   "description": "Copyright (c) 2016 Open Connectivity Foundation, Inc. All rights reserved.",
7147   "id": "http://www.openconnectivity.org/ocf-apis/core/schemas/oic.oic-link-schema.json#",
7148   "definitions": {
7149     "oic.oic-link": {
7150       "type": "object",
7151       "properties": {
7152         "href": {
7153           "type": "string",
7154           "maxLength": 256,
7155           "description": "This is the target URI, it can be specified as a Relative Reference or
7156 fully-qualified URI. Relative Reference should be used along with the di parameter to make it
7157 unique.",
7158           "format": "uri"
7159         },
7160         "rel": {
7161           "oneOf": [
7162             {
7163               "type": "array",
7164               "items": {
7165                 "type": "string",
7166                 "maxLength": 64
7167               },
7168               "minItems": 1,
7169               "default": ["hosts"]
7170             },
7171             {
7172               "type": "string",
7173               "maxLength": 64,
7174               "default": "hosts"

```

```

7175     }
7176   ],
7177   "description": "The relation of the target URI referenced by the link to the context URI"
7178 },
7179 "rt": {
7180   "type": "array",
7181   "items": {
7182     "type": "string",
7183     "maxLength": 64
7184   },
7185   "minItems": 1,
7186   "description": "Resource Type"
7187 },
7188 "if": {
7189   "type": "array",
7190   "items": {
7191     "type": "string",
7192     "enum": ["oic.if.baseline", "oic.if.ll", "oic.if.b", "oic.if.rw", "oic.if.r",
7193 "oic.if.a", "oic.if.s" ]
7194   },
7195   "minItems": 1,
7196   "description": "The interface set supported by this resource"
7197 },
7198 "di": {
7199   "$ref": "oic.types-schema.json#/definitions/uuid",
7200   "description": "Unique identifier for device (UUID)"
7201 },
7202 "buri": {
7203   "type": "string",
7204   "description": "The base URI used to fully qualify a Relative Reference in the href
7205 parameter. Use the OCF Schema for URI",
7206   "maxLength": 256,
7207   "format": "uri"
7208 },
7209 "p": {
7210   "description": "Specifies the framework policies on the Resource referenced by the target
7211 URI",
7212   "type": "object",
7213   "properties": {
7214     "bm": {
7215       "description": "Specifies the framework policies on the Resource referenced by the
7216 target URI for e.g. observable and discoverable",
7217       "type": "integer"
7218     },
7219     "sec": {
7220       "description": "Specifies if security needs to be turned on when looking to interact
7221 with the Resource",
7222       "default": false,
7223       "type": "boolean"
7224     },
7225     "port": {
7226       "description": "Secure port to be used for connection",
7227       "type": "integer"
7228     }
7229   },
7230   "required": ["bm"]
7231 },
7232 "title": {
7233   "type": "string",
7234   "maxLength": 64,
7235   "description": "A title for the link relation. Can be used by the UI to provide a
7236 context"
7237 },
7238 "anchor": {
7239   "type": "string",
7240   "maxLength": 256,
7241   "description": "This is used to override the context URI e.g. override the URI of the
7242 containing collection",
7243   "format": "uri"
7244 },
7245 "ins": {

```

```

7246         "oneOf": [
7247             {
7248                 "type": "integer",
7249                 "description": "An ordinal number that is not repeated - must be unique in the
7250 collection context"
7251             },
7252             {
7253                 "type": "string",
7254                 "maxLength": 256,
7255                 "format": "uri",
7256                 "description": "Any unique string including a URI"
7257             },
7258             {
7259                 "$ref": "oic.types-schema.json#/definitions/uuid",
7260                 "description": "Unique identifier (UUID)"
7261             }
7262         ],
7263         "description": "The instance identifier for this web link in an array of web links - used
7264 in collections"
7265     },
7266     "type": {
7267         "type": "array",
7268         "description": "A hint at the representation of the resource referenced by the target
7269 URI. This represents the media types that are used for both accepting and emitting",
7270         "items": {
7271             "type": "string",
7272             "maxLength": 64
7273         },
7274         "minItems": 1,
7275         "default": "application/cbor"
7276     }
7277 },
7278 "required": [ "href", "rt", "if" ]
7279 }
7280 },
7281 "type": "object",
7282 "allOf": [
7283     { "$ref": "#/definitions/oic.oic-link" }
7284 ]
7285 }
7286
7287

```

7288 E.4 Discoverable Resources, baseline interface

7289 E.4.1 Introduction

7290 Baseline representation of /oic/res; list of discoverable resources

7291 E.4.2 Wellknown URI

7292 /oic/res

7293 E.4.3 Resource Type

7294 The resource type (rt) is defined as: oic.wk.res.

7295 E.4.4 RAML Definition

```

7296 ##RAML 0.8
7297 title: Discoverable Resources
7298 version: v1-20160622
7299 traits:
7300 - interface-ll :
7301     queryParameters:
7302         if:
7303             enum: ["oic.if.ll"]
7304 - interface-baseline :
7305     queryParameters:

```



```

7306         if:
7307             enum: ["oic.if.baseline"]
7308
7309 /oic-res-baseline-URI:
7310     description: |
7311         Baseline representation of /oic/res; list of discoverable resources
7312
7313     is : ['interface-baseline']
7314     get:
7315         description: |
7316             Retrieve the discoverable resource set, baseline interface
7317
7318     responses :
7319         200:
7320             body:
7321                 application/json:
7322                     schema: /
7323                         {
7324                             "$schema": "http://json-schema.org/draft-v4/schema#",
7325                             "description" : "Copyright (c) 2016 Open Connectivity Foundation, Inc. All rights
7326 reserved.",
7327                             "id": "http://www.openconnectivity.org/ocf-apis/core/schemas/oic.wk.res-
7328 schema.json#",
7329                             "definitions": {
7330                                 "oic.res-baseline": {
7331                                     "type": "object",
7332                                     "properties": {
7333                                         "rt": {
7334                                             "type": "array",
7335                                             "items" : {
7336                                                 "type" : "string",
7337                                                 "maxLength": 64
7338                                             },
7339                                             "minItems" : 1,
7340                                             "readOnly": true,
7341                                             "description": "Resource Type"
7342                                         },
7343                                         "if": {
7344                                             "type": "array",
7345                                             "items": {
7346                                                 "type" : "string",
7347                                                 "enum" : ["oic.if.baseline", "oic.if.ll"]
7348                                             },
7349                                             "minItems": 1,
7350                                             "readOnly": true,
7351                                             "description": "The interface set supported by this resource"
7352                                         },
7353                                         "n": {
7354                                             "type": "string",
7355                                             "maxLength": 64,
7356                                             "readOnly": true,
7357                                             "description": "Human friendly name"
7358                                         },
7359                                         "di": {
7360                                             "$ref": "oic.types-schema.json#/definitions/uuid",
7361                                             "readOnly": true,
7362                                             "description": "Unique identifier for device (UUID) as indicated by the
7363 /oic/d resource of the device"
7364                                         },
7365                                         "mpro": {
7366                                             "readOnly": true,
7367                                             "description": "Supported messaging protocols",
7368                                             "type": "string",
7369                                             "maxLength": 64
7370                                         },

```

```

7371         "links": {
7372             "type": "array",
7373             "items": {
7374                 "$ref": "oic.oic-link-schema.json#/definitions/oic.oic-link"
7375             }
7376         },
7377     },
7378     "required": ["rt", "if", "di", "links"]
7379 }
7380 },
7381 "description": "The list of resources expressed as OIC links",
7382 "type": "array",
7383 "items": {
7384     "$ref": "#/definitions/oic.res-baseline"
7385 }
7386 }
7387
7388 example: /
7389 [
7390     {
7391         "rt": ["oic.wk.res"],
7392         "if": ["oic.if.baseline", "oic.if.ll" ],
7393         "di": "0685B960-736F-46F7-BE60-9E6CBD61ADC1",
7394         "links":
7395         [
7396             {
7397                 "href": "/humidity",
7398                 "rt": ["oic.r.humidity"],
7399                 "if": ["oic.if.s"]
7400             },
7401             {
7402                 "href": "/temperature",
7403                 "rt": ["oic.r.temperature"],
7404                 "if": ["oic.if.s"]
7405             }
7406         ]
7407     }
7408 ]
7409

```

7410 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

7411 E.4.6 CRUDN behavior

Resource	Create	Read	Update	Delete	Notify
----------	--------	------	--------	--------	--------

/oic/res		get			
----------	--	-----	--	--	--

7412 **E.5 Discoverable Resources, link list interface**

7413 **E.5.1 Introduction**

7414 Link list representation of /oic/res; list of discoverable resources

7415 **E.5.2 Wellknown URI**

7416 /oic/res

7417 **E.5.3 Resource Type**

7418 The resource type (rt) is defined as: oic.wk.res.

7419 **E.5.4 RAML Definition**

7420 `##RAML 0.8`

7421 `title: Discoverable Resources`

7422 `version: v1-20160622`

7423 `traits:`

7424 `- interface-ll :`

7425 `queryParameters:`

7426 `if:`

7427 `enum: ["oic.if.ll"]`

7428 `- interface-baseline :`

7429 `queryParameters:`

7430 `if:`

7431 `enum: ["oic.if.baseline"]`

7432

7433 `/oic-res-ll-URI:`

7434 `description: |`

7435 `Link list representation of /oic/res; list of discoverable resources`

7436

7437 `is : ['interface-ll']`

7438 `get:`

7439 `description: |`

7440 `Retrieve the discoverable resource set, link list interface`

7441

7442 `responses :`

7443 `200:`

7444 `body:`

7445 `application/json:`

7446 `schema: |`

7447 `{`

7448 `"$schema": "http://json-schema.org/draft-v4/schema#",`

7449 `"description" : "Copyright (c) 2016 Open Connectivity Foundation, Inc. All rights`

7450 `reserved.",`

7451 `"id": "http://www.openconnectivity.org/ocf-apis/core/schemas/oic.wk.res-schema-`

7452 `ll.json#",`

7453 `"definitions": {`

7454 `"oic.res-ll": {`

7455 `"type": "object",`

7456 `"properties": {`

7457 `"di": {`

7458 `"$ref": "oic.types-schema.json#/definitions/uuid",`

7459 `"readOnly": true,`

7460 `"description": "Unique identifier for device (UUID) as indicated by the`

7461 `/oic/d resource of the device"`

7462 `},`

7463 `"links": {`

```

7464         "type": "array",
7465         "items": {
7466             "$ref": "oic.oic-link-schema.json#/definitions/oic.oic-link"
7467         }
7468     },
7469     },
7470     "required": ["di", "links"]
7471 }
7472 },
7473 "description": "The list of resources expressed as OIC links with di ",
7474 "type": "array",
7475 "items": {
7476     "$ref": "#/definitions/oic.res-ll"
7477 }
7478 }
7479
7480 example: /
7481 [
7482     {
7483         "di": "0685B960-736F-46F7-BEC0-9E6CBD61ADC1",
7484         "links":
7485             [
7486                 {
7487                     "href": "/humidity",
7488                     "rt": ["oic.r.humidity"],
7489                     "if": ["oic.if.s"]
7490                 },
7491                 {
7492                     "href": "/temperature",
7493                     "rt": ["oic.r.temperature"],
7494                     "if": ["oic.if.s"]
7495                 }
7496             ]
7497     }
7498 ]
7499
7500

```

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

7501

E.5.6 CRUDN behavior

Resource	Create	Read	Update	Delete	Notify
/oic/res		get			

7502 E.5.7 Referenced JSON schemas

7503 E.5.8 oic.oic-link-schema.json

```
7504 {
7505   "$schema": "http://json-schema.org/draft-04/schema#",
7506   "description": "Copyright (c) 2016 Open Connectivity Foundation, Inc. All rights reserved.",
7507   "id": "http://www.openconnectivity.org/ocf-apis/core/schemas/oic.oic-link-schema.json#",
7508   "definitions": {
7509     "oic.oic-link": {
7510       "type": "object",
7511       "properties": {
7512         "href": {
7513           "type": "string",
7514           "maxLength": 256,
7515           "description": "This is the target URI, it can be specified as a Relative Reference or
7516 fully-qualified URI. Relative Reference should be used along with the di parameter to make it
7517 unique.",
7518           "format": "uri"
7519         },
7520         "rel": {
7521           "oneOf": [
7522             {
7523               "type": "array",
7524               "items": {
7525                 "type": "string",
7526                 "maxLength": 64
7527               },
7528               "minItems": 1,
7529               "default": ["hosts"]
7530             },
7531             {
7532               "type": "string",
7533               "maxLength": 64,
7534               "default": "hosts"
7535             }
7536           ],
7537           "description": "The relation of the target URI referenced by the link to the context URI"
7538         },
7539         "rt": {
7540           "type": "array",
7541           "items": {
7542             "type": "string",
7543             "maxLength": 64
7544           },
7545           "minItems": 1,
7546           "description": "Resource Type"
7547         },
7548         "if": {
7549           "type": "array",
7550           "items": {
7551             "type": "string",
7552             "enum": ["oic.if.baseline", "oic.if.ll", "oic.if.b", "oic.if.rw", "oic.if.r",
7553 "oic.if.a", "oic.if.s" ]
7554           },
7555           "minItems": 1,
7556           "description": "The interface set supported by this resource"
7557         },
7558         "di": {
7559           "$ref": "oic.types-schema.json#/definitions/uuid",
7560           "description": "Unique identifier for device (UUID)"
7561         },
7562         "buri": {
7563           "type": "string",
7564           "description": "The base URI used to fully qualify a Relative Reference in the href
7565 parameter. Use the OCF Schema for URI",
7566           "maxLength": 256,
7567           "format": "uri"
7568         },
7569         "p": {
7570           "description": "Specifies the framework policies on the Resource referenced by the target
```

```

7571 URI",
7572     "type": "object",
7573     "properties": {
7574         "bm": {
7575             "description": "Specifies the framework policies on the Resource referenced by the
7576 target URI for e.g. observable and discoverable",
7577             "type": "integer"
7578         },
7579         "sec": {
7580             "description": "Specifies if security needs to be turned on when looking to interact
7581 with the Resource",
7582             "default": false,
7583             "type": "boolean"
7584         },
7585         "port": {
7586             "description": "Secure port to be used for connection",
7587             "type": "integer"
7588         }
7589     },
7590     "required" : ["bm"]
7591 },
7592 "title": {
7593     "type": "string",
7594     "maxLength": 64,
7595     "description": "A title for the link relation. Can be used by the UI to provide a
7596 context"
7597 },
7598 "anchor": {
7599     "type": "string",
7600     "maxLength": 256,
7601     "description": "This is used to override the context URI e.g. override the URI of the
7602 containing collection",
7603     "format": "uri"
7604 },
7605 "ins": {
7606     "oneOf": [
7607         {
7608             "type": "integer",
7609             "description": "An ordinal number that is not repeated - must be unique in the
7610 collection context"
7611         },
7612         {
7613             "type": "string",
7614             "maxLength": 256,
7615             "format": "uri",
7616             "description": "Any unique string including a URI"
7617         },
7618         {
7619             "$ref": "oic.types-schema.json#/definitions/uuid",
7620             "description": "Unique identifier (UUID)"
7621         }
7622     ],
7623     "description": "The instance identifier for this web link in an array of web links - used
7624 in collections"
7625 },
7626 "type": {
7627     "type": "array",
7628     "description": "A hint at the representation of the resource referenced by the target
7629 URI. This represents the media types that are used for both accepting and emitting",
7630     "items": {
7631         "type": "string",
7632         "maxLength": 64
7633     },
7634     "minItems": 1,
7635     "default": "application/cbor"
7636 },
7637 },
7638 "required": [ "href", "rt", "if" ]
7639 }
7640 },
7641 "type": "object",

```

```
7642     "allOf": [  
7643       { "$ref": "#/definitions/oic.oic-link" }  
7644     ]  
7645   }  
7646
```

7647

Annex F (informative)

Swagger2.0 definitions

F.1 Icon

F.1.1 Introduction

This resource describes the attributes associated with an Icon. Retrieves the current icon properties.

F.1.2 Example URI

/IconResURI

F.1.3 Resource Type

The resource type (rt) is defined as: ['oic.r.icon'].

F.1.4 Swagger2.0 Definition

```
{
  "swagger": "2.0",
  "info": {
    "title": "Icon",
    "version": "v1.1.0-20161107",
    "license": {
      "name": "copyright 2016-2017 Open Connectivity Foundation, Inc. All rights reserved.",
      "x-description": "Redistribution and use in source and binary forms, with or without
modification, are permitted provided that the following conditions are met:\n      1.
Redistributions of source code must retain the above copyright notice, this list of conditions and
the following disclaimer.\n      2. Redistributions in binary form must reproduce the above
copyright notice, this list of conditions and the following disclaimer in the documentation and/or
other materials provided with the distribution.\n\n      THIS SOFTWARE IS PROVIDED BY THE Open
Connectivity Foundation, INC. \\"AS IS\\" AND ANY EXPRESS OR IMPLIED WARRANTIES, INCLUDING, BUT NOT
LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE OR
WARRANTIES OF NON-INFRINGEMENT, ARE DISCLAIMED.\n      IN NO EVENT SHALL THE Open Connectivity
Foundation, INC. OR CONTRIBUTORS BE LIABLE FOR ANY DIRECT, INDIRECT, INCIDENTAL, SPECIAL,
EXEMPLARY, OR CONSEQUENTIAL DAMAGES (INCLUDING, BUT NOT LIMITED TO, PROCUREMENT OF SUBSTITUTE GOODS
OR SERVICES; LOSS OF USE, DATA, OR PROFITS; OR BUSINESS INTERRUPTION)\n      HOWEVER CAUSED AND
ON ANY THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT (INCLUDING NEGLIGENCE OR
OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OF THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY
OF SUCH DAMAGE.\n"
    }
  },
  "schemes": ["http"],
  "consumes": ["application/json"],
  "produces": ["application/json"],
  "paths": {
    "/IconResURI" : {
      "get": {
        "description": "This resource describes the attributes associated with an Icon.\nRetrieves
the current icon properties.\n",
        "parameters": [
          {"$ref": "#/parameters/interface"}
        ],
        "responses": {
          "200": {
            "description": "",
            "x-example":
            {
              "rt": ["oic.r.icon"],
              "id": "unique_example_id",
              "mimetype": "image/png",
              "width": 256,
              "height": 256,
              "media": "http://findbetter.ru/public/uploads/1481662800/2043.png"
            }
          }
        }
      }
    }
  }
}
```

```

7708         }
7709     },
7710     "schema": { "$ref": "#/definitions/Icon" }
7711 }
7712 }
7713 }
7714 }
7715 },
7716 "parameters": {
7717     "interface": {
7718         "in": "query",
7719         "name": "if",
7720         "type": "string",
7721         "enum": ["oic.if.r", "oic.if.baseline"]
7722     }
7723 },
7724 "definitions": {
7725     "Icon": {
7726         {
7727         "properties": {
7728             "height": {
7729                 "description": "The height in pixels",
7730                 "minimum": 1,
7731                 "readOnly": true,
7732                 "type": "integer"
7733             },
7734             "media": {
7735                 "description": "Specifies the URI to the icon",
7736                 "format": "uri",
7737                 "maxLength": 256,
7738                 "readOnly": true,
7739                 "type": "string"
7740             },
7741             "mimetype": {
7742                 "description": "The Media Type of the icon",
7743                 "maxLength": 64,
7744                 "readOnly": true,
7745                 "type": "string"
7746             },
7747             "width": {
7748                 "description": "The width in pixels",
7749                 "minimum": 1,
7750                 "readOnly": true,
7751                 "type": "integer"
7752             }
7753         },
7754         "required": [
7755             "mimetype",
7756             "width",
7757             "height",
7758             "media"
7759         ]
7760     }
7761 }
7762 }
7763 }
7764 }

```

7765 F.1.5 Property Definition

Property name	Value type	Mandatory	Access mode	Description
media	string	yes	Read Only	Specifies the URI to the icon
width	integer	yes	Read Only	The width in pixels
mimetype	string	yes	Read Only	The Media Type of the icon
height	integer	yes	Read Only	The height in pixels

7766 **F.1.6 CRUDN behaviour**

Resource	Create	Read	Update	Delete	Notify
/IconResURI		get			

7767 **F.2 Introspection Resource**

7768 **F.2.1 Introduction**

7769 This resource provides the means to get the device introspection data specifying all the endpoints
 7770 of the device.
 7771 The url hosted by this resource is either a local or an external url.
 7772

7773 **F.2.2 Wellknown URI**

7774 /IntrospectionResURI

7775 **F.2.3 Resource Type**

7776 The resource type (rt) is defined as: ['oic.wk.introspection'].

7777 **F.2.4 Swagger2.0 Definition**

```

7778 {
7779   "swagger": "2.0",
7780   "info": {
7781     "title": "Introspection Resource",
7782     "version": "v1.0.0-20160707",
7783     "license": {
7784       "name": "copyright 2016-2017 Open Connectivity Foundation, Inc. All rights reserved.",
7785       "x-description": "Redistribution and use in source and binary forms, with or without
7786 modification, are permitted provided that the following conditions are met:\n      1.
7787 Redistributions of source code must retain the above copyright notice, this list of conditions and
7788 the following disclaimer.\n      2. Redistributions in binary form must reproduce the above
7789 copyright notice, this list of conditions and the following disclaimer in the documentation and/or
7790 other materials provided with the distribution.\n\n      THIS SOFTWARE IS PROVIDED BY THE Open
7791 Connectivity Foundation, INC. \AS IS\ AND ANY EXPRESS OR IMPLIED WARRANTIES, INCLUDING, BUT NOT
7792 LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE OR
7793 WARRANTIES OF NON-INFRINGEMENT, ARE DISCLAIMED.\n      IN NO EVENT SHALL THE Open Connectivity
7794 Foundation, INC. OR CONTRIBUTORS BE LIABLE FOR ANY DIRECT, INDIRECT, INCIDENTAL, SPECIAL,
7795 EXEMPLARY, OR CONSEQUENTIAL DAMAGES (INCLUDING, BUT NOT LIMITED TO, PROCUREMENT OF SUBSTITUTE GOODS
7796 OR SERVICES; LOSS OF USE, DATA, OR PROFITS; OR BUSINESS INTERRUPTION)\n      HOWEVER CAUSED AND
7797 ON ANY THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT (INCLUDING NEGLIGENCE OR
7798 OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OF THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY
7799 OF SUCH DAMAGE.\n"
7800     }
7801   },
7802   "schemes": ["http"],
7803   "consumes": ["application/json"],
7804   "produces": ["application/json"],
7805   "paths": {
7806     "/IntrospectionResURI" : {
7807       "get": {
7808         "description": "This resource provides the means to get the device introspection data
7809 specifying all the endpoints of the device.\nThe url hosted by this resource is either a local or
7810 an external url.\n",
7811         "parameters": [
7812           {"$ref": "#/parameters/interface"}
7813         ],
7814         "responses": {
7815           "200": {
7816             "description": "",
7817             "x-example":
7818               {
7819                 "rt": ["oic.wk.introspection"],
7820                 "urlInfo": [
7821                   {
7822                     "content-type": "application/cbor",
7823                     "protocol": "coap",

```

```

7824         "url" : "coap://[fe80::1]:1234/IntrospectionExampleURI"
7825     }
7826     ]
7827 }
7828 ,
7829 "schema": { "$ref": "#/definitions/oic.wk.introspectionInfo" }
7830 }
7831 }
7832 }
7833 }
7834 },
7835 "parameters": {
7836     "interface" : {
7837         "in" : "query",
7838         "name" : "if",
7839         "type" : "string",
7840         "enum" : ["oic.if.r", "oic.if.baseline"]
7841     }
7842 },
7843 "definitions": {
7844     "oic.wk.introspectionInfo" :
7845     {
7846         "properties": {
7847             "urlInfo": {
7848                 "description": "Information on the location of the introspection data.",
7849                 "items": {
7850                     "properties": {
7851                         "content-type": {
7852                             "default": "application/cbor",
7853                             "description": "content-type of the introspection data",
7854                             "enum": [
7855                                 "application/json",
7856                                 "application/cbor"
7857                             ],
7858                             "type": "string"
7859                         },
7860                         "protocol": {
7861                             "description": "Identifier for the protocol to be used to obtain the
7862 introspection information",
7863                             "enum": [
7864                                 "coap",
7865                                 "coaps",
7866                                 "http",
7867                                 "https",
7868                                 "coap+tcp",
7869                                 "coaps+tcp"
7870                             ],
7871                             "type": "string"
7872                         },
7873                         "url": {
7874                             "description": "The URL of the introspection information.",
7875                             "format": "uri",
7876                             "type": "string"
7877                         },
7878                         "version": {
7879                             "default": 1,
7880                             "description": "The version of the introspection data that can be downloaded",
7881                             "enum": [
7882                                 1
7883                             ],
7884                             "type": "integer"
7885                         }
7886                     },
7887                     "required": [
7888                         "url",
7889                         "protocol"
7890                     ],
7891                     "type": "object"
7892                 },
7893                 "minItems": 1,
7894                 "readOnly": true,

```

```

7895         "type": "array"
7896     }
7897 },
7898     "required": [
7899         "urlInfo"
7900     ],
7901     "type": "object"
7902 }
7903
7904 }
7905 }
7906

```

7907 F.2.5 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.

7908 F.2.6 CRUDN behaviour

Resource	Create	Read	Update	Delete	Notify
/IntrospectionResURI		get			

7909 F.3 OCF Collection

7910 F.3.1 Introduction

7911 OCF Collection Resource Type contains properties and links.
7912 The oic.if.baseline interface exposes a representation of
7913 the links and the properties of the collection resource itself
7914 Retrieve on Baseline Interface
7915

7916 F.3.2 Example URI

7917 /CollectionBaselineInterfaceURI

7918 F.3.3 Resource Type

7919 The resource type (rt) is defined as: ['oic.wk.col'].

7920 F.3.4 Swagger2.0 Definition

```

7921 {
7922     "swagger": "2.0",
7923     "info": {
7924         "title": "OCF Collection",
7925         "version": "1.0",
7926         "license": {
7927             "name": "copyright 2016-2017 Open Connectivity Foundation, Inc. All rights reserved.",
7928             "x-description": "Redistribution and use in source and binary forms, with or without
7929 modification, are permitted provided that the following conditions are met:\n
7930 1.
7931 Redistributions of source code must retain the above copyright notice, this list of conditions and
7932 the following disclaimer.\n
7933 2. Redistributions in binary form must reproduce the above
7934 copyright notice, this list of conditions and the following disclaimer in the documentation and/or
7935 other materials provided with the distribution.\n\n
7936 THIS SOFTWARE IS PROVIDED BY THE Open
7937 Connectivity Foundation, INC. \AS IS\ AND ANY EXPRESS OR IMPLIED WARRANTIES, INCLUDING, BUT NOT
7938 LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE OR
7939 WARRANTIES OF NON-INFRINGEMENT, ARE DISCLAIMED.\n
7940 IN NO EVENT SHALL THE Open Connectivity
7941 Foundation, INC. OR CONTRIBUTORS BE LIABLE FOR ANY DIRECT, INDIRECT, INCIDENTAL, SPECIAL,
7942 EXEMPLARY, OR CONSEQUENTIAL DAMAGES (INCLUDING, BUT NOT LIMITED TO, PROCUREMENT OF SUBSTITUTE GOODS
7943 OR SERVICES; LOSS OF USE, DATA, OR PROFITS; OR BUSINESS INTERRUPTION)\n
7944 HOWEVER CAUSED AND
7945 ON ANY THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT (INCLUDING NEGLIGENCE OR
7946 OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OF THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY
7947 OF SUCH DAMAGE.\n"
7948         }
7949     }
7950 },

```

```

7945     "schemes": ["http"],
7946     "consumes": ["application/json"],
7947     "produces": ["application/json"],
7948     "paths": {
7949         "/CollectionBaselineInterfaceURI" : {
7950             "get": {
7951                 "description": "OCF Collection Resource Type contains properties and links.\nThe
7952 oic.if.baseline interface exposes a representation of\nthe links and the properties of the
7953 collection resource itself\nRetrieve on Baseline Interface\n",
7954                 "parameters": [
7955                     { "$ref": "#/parameters/interface-baseline" }
7956                 ],
7957                 "responses": {
7958                     "200": {
7959                         "description": "",
7960                         "x-example":
7961                         {
7962                             "rt": ["oic.wk.col"],
7963                             "id": "unique_example_id",
7964                             "rts": [ "oic.r.switch.binary", "oic.r.airflow" ],
7965                             "links": [
7966                                 {
7967                                     "href": "switch",
7968                                     "rt": [ "oic.r.switch.binary" ],
7969                                     "if": [ "oic.if.a", "oic.if.baseline" ],
7970                                     "eps": [
7971                                         { "ep": "coap://[fe80::bld6]:1111", "pri": 2 },
7972                                         { "ep": "coaps://[fe80::bld6]:1122" },
7973                                         { "ep": "coap+tcp://[2001:db8:a::123]:2222", "pri": 3 }
7974                                     ]
7975                                 },
7976                                 {
7977                                     "href": "airFlow",
7978                                     "rt": [ "oic.r.airflow" ],
7979                                     "if": [ "oic.if.a", "oic.if.baseline" ],
7980                                     "eps": [
7981                                         { "ep": "coap://[fe80::bld6]:1111", "pri": 2 },
7982                                         { "ep": "coaps://[fe80::bld6]:1122" },
7983                                         { "ep": "coap+tcp://[2001:db8:a::123]:2222", "pri": 3 }
7984                                     ]
7985                                 }
7986                             ]
7987                         }
7988                     },
7989                     "schema": { "$ref": "#/definitions/sbaseline" }
7990                 }
7991             }
7992         },
7993         "post": {
7994             "description": "Update on Baseline Interface\n",
7995             "parameters": [
7996                 { "$ref": "#/parameters/interface-baseline" },
7997                 {
7998                     "name": "body",
7999                     "in": "body",
8000                     "required": true,
8001                     "schema": { "$ref": "#/definitions/sbaseline" }
8002                 }
8003             ],
8004             "responses": {
8005                 "200": {
8006                     "description": "",
8007                     "schema": { "$ref": "#/definitions/sbaseline" }
8008                 }
8009             }
8010         }
8011     },
8012     "/CollectionBatchInterfaceURI" : {
8013         "get": {
8014             "description": "OCF Collection Resource Type contains properties and links.\nThe oic.if.b
8015 interface exposes a composite representation of the\nresources pointed to by the links\nRetrieve

```

```

8016 on Batch Interface\n",
8017   "parameters": [
8018     {"$ref": "#/parameters/interface-b"}
8019   ],
8020   "responses": {
8021     "200": {
8022       "description": "All targets returned OK status (HTTP 200 or CoAP 2.05 Content)",
8023       "x-example":
8024         [
8025           {
8026             "href": "switch",
8027             "rep":
8028               {
8029                 "value": true
8030               }
8031           },
8032           {
8033             "href": "airFlow",
8034             "rep":
8035               {
8036                 "direction": "floor",
8037                 "speed": 3
8038               }
8039           }
8040         ]
8041       ,
8042       "schema": { "$ref": "#/definitions/sbatch-retrieve" }
8043     },
8044     "404": {
8045       "description": "One or more targets did not return an OK status, return a
8046 representation containing returned properties from the targets that returned OK",
8047       "x-example":
8048         [
8049           {
8050             "href": "switch",
8051             "rep":
8052               {
8053                 "value": true
8054               }
8055           }
8056         ]
8057       ,
8058       "schema": { "$ref": "#/definitions/sbatch-retrieve" }
8059     }
8060   }
8061 },
8062 "post": {
8063   "description": "Update on Batch Interface\n",
8064   "parameters": [
8065     {"$ref": "#/parameters/interface-b"},
8066     {
8067       "name": "body",
8068       "in": "body",
8069       "required": true,
8070       "schema": { "$ref": "#/definitions/sbatch-update" },
8071       "x-example":
8072         [
8073           {
8074             "href": "switch",
8075             "rep":
8076               {
8077                 "value": true
8078               }
8079           },
8080           {
8081             "href": "airFlow",
8082             "rep":
8083               {
8084                 "direction": "floor",
8085                 "speed": 3
8086               }

```

```

8087     }
8088   ]
8089 }
8090 ],
8091 "responses": {
8092   "200": {
8093     "description" : "all targets returned OK status (HTTP 200 or CoAP 2.04 Changed)
8094 return a representation of the current state of all targets",
8095     "x-example":
8096     [
8097       {
8098         "href": "switch",
8099         "rep":
8100         {
8101           "value": true
8102         }
8103       },
8104       {
8105         "href": "airFlow",
8106         "rep":
8107         {
8108           "direction": "demist",
8109           "speed": 5
8110         }
8111       }
8112     ],
8113     ,
8114     "schema": { "$ref": "#/definitions/sbatch-retrieve" }
8115   },
8116   "403": {
8117     "description" : "one or more targets did not return OK status; return a retrieve
8118 representation of the current state of all targets in the batch",
8119     "x-example":
8120     [
8121       {
8122         "href": "switch",
8123         "rep":
8124         {
8125           "value": true
8126         }
8127       },
8128       {
8129         "href": "airFlow",
8130         "rep":
8131         {
8132           "direction": "floor",
8133           "speed": 3
8134         }
8135       }
8136     ],
8137     ,
8138     "schema": { "$ref": "#/definitions/sbatch-retrieve" }
8139   }
8140 }
8141 },
8142 "/CollectionLinkListInterfaceURI" : {
8143   "get": {
8144     "description": "OCF Collection Resource Type contains properties and links.\nThe oic.if.ll
8145 interface exposes a representation of the links\nRetrieve on Link List Interface\n",
8146     "parameters": [
8147       { "$ref": "#/parameters/interface-ll" }
8148     ],
8149     "responses": {
8150       "200": {
8151         "description" : "",
8152         "x-example":
8153         [
8154           {
8155             "href": "switch",
8156             "rt": ["oic.r.switch.binary"],
8157

```



```

8158         "if": ["oic.if.a", "oic.if.baseline"],
8159         "eps": [
8160             {"ep": "coap://[fe80::b1d6]:1111", "pri": 2},
8161             {"ep": "coaps://[fe80::b1d6]:1122"},
8162             {"ep": "coap+tcp://[2001:db8:a::123]:2222", "pri": 3}
8163         ]
8164     },
8165     {
8166         "href": "airFlow",
8167         "rt": ["oic.r.airflow"],
8168         "if": ["oic.if.a", "oic.if.baseline"],
8169         "eps": [
8170             {"ep": "coap://[fe80::b1d6]:1111", "pri": 2},
8171             {"ep": "coaps://[fe80::b1d6]:1122"},
8172             {"ep": "coap+tcp://[2001:db8:a::123]:2222", "pri": 3}
8173         ]
8174     }
8175 ]
8176 ,
8177 "schema": { "$ref": "#/definitions/slinks" }
8178 }
8179 }
8180 }
8181 }
8182 },
8183 "parameters": {
8184     "interface-ll" : {
8185         "in" : "query",
8186         "name" : "if",
8187         "type" : "string",
8188         "enum" : ["oic.if.ll"]
8189     },
8190     "interface-b" : {
8191         "in" : "query",
8192         "name" : "if",
8193         "type" : "string",
8194         "enum" : ["oic.if.b"]
8195     },
8196     "interface-baseline" : {
8197         "in" : "query",
8198         "name" : "if",
8199         "type" : "string",
8200         "enum" : ["oic.if.baseline"]
8201     },
8202     "interface-all" : {
8203         "in" : "query",
8204         "name" : "if",
8205         "type" : "string",
8206         "enum" : ["oic.if.ll", "oic.if.baseline", "oic.if.b"]
8207     }
8208 },
8209 "definitions": {
8210     "sbaseline" :
8211     {
8212         "description": "A set of simple or individual OIC Links.",
8213         "items": {
8214             "properties": {
8215                 "anchor": {
8216                     "description": "This is used to override the context URI e.g. override the URI of the
8217 containing collection.",
8218                     "format": "uri",
8219                     "maxLength": 256,
8220                     "type": "string"
8221                 },
8222                 "di": {
8223                     "description": "The device ID",
8224                     "pattern": "^[a-fA-F0-9]{8}-[a-fA-F0-9]{4}-[a-fA-F0-9]{4}-[a-fA-F0-9]{4}-[a-fA-F0-
8225 9]{12}$",
8226                     "type": "string"
8227                 },
8228                 "eps": {

```

```

8229         "description": "the Endpoint information of the target Resource",
8230     "items": {
8231         "properties": {
8232             "ep": {
8233                 "description": "Transport Protocol Suite + Endpoint Locator",
8234                 "format": "uri",
8235                 "type": "string"
8236             },
8237             "pri": {
8238                 "description": "The priority among multiple Endpoints",
8239                 "minimum": 1,
8240                 "type": "integer"
8241             }
8242         },
8243         "type": "object"
8244     },
8245     "type": "array"
8246 },
8247 "href": {
8248     "description": "This is the target URI, it can be specified as a Relative Reference
8249 or fully-qualified URI.",
8250     "format": "uri",
8251     "maxLength": 256,
8252     "type": "string"
8253 },
8254 "if": {
8255     "description": "The interface set supported by this resource",
8256     "items": {
8257         "enum": [
8258             "oic.if.baseline",
8259             "oic.if.ll",
8260             "oic.if.b",
8261             "oic.if.rw",
8262             "oic.if.r",
8263             "oic.if.a",
8264             "oic.if.s"
8265         ],
8266         "type": "string"
8267     },
8268     "minItems": 1,
8269     "type": "array"
8270 },
8271 "ins": {
8272     "description": "The instance identifier for this web link in an array of web links -
8273 used in collections",
8274     "oneOf": [
8275         {
8276             "description": "An ordinal number that is not repeated - must be unique in the
8277 collection context.",
8278             "type": "integer"
8279         },
8280         {
8281             "description": "A unique string",
8282             "format": "uri",
8283             "maxLength": 256,
8284             "type": "string"
8285         },
8286         {
8287             "description": "A UUID",
8288             "pattern": "[a-fA-F0-9]{8}-[a-fA-F0-9]{4}-[a-fA-F0-9]{4}-[a-fA-F0-9]{4}-[a-fA-
8289 F0-9]{12}$",
8290             "type": "string"
8291         }
8292     ]
8293 },
8294 "p": {
8295     "description": "Specifies the framework policies on the Resource referenced by the
8296 target URI",
8297     "properties": {
8298         "bm": {
8299             "description": "Specifies the framework policies on the Resource referenced by

```

```

8300 the target URI for e.g. observable and discoverable",
8301     "type": "integer"
8302     },
8303   },
8304   "required": [
8305     "bm"
8306   ],
8307   "type": "object"
8308 },
8309 "rel": {
8310   "description": "The relation of the target URI referenced by the link to the context
8311 URI",
8312   "oneOf": [
8313     {
8314       "default": [
8315         "hosts"
8316       ],
8317       "items": {
8318         "maxLength": 64,
8319         "type": "string"
8320       },
8321       "minItems": 1,
8322       "type": "array"
8323     },
8324     {
8325       "default": "hosts",
8326       "maxLength": 64,
8327       "type": "string"
8328     }
8329   ]
8330 },
8331 "rt": {
8332   "description": "Resource Type of the Resource",
8333   "items": {
8334     "maxLength": 64,
8335     "type": "string"
8336   },
8337   "minItems": 1,
8338   "type": "array"
8339 },
8340 "tag-locn": {
8341   "description": "Location of the Resource or Device",
8342   "enum": [
8343     "attic",
8344     "balcony",
8345     "ballroom",
8346     "bathroom",
8347     "bedroom",
8348     "border",
8349     "boxroom",
8350     "cellar",
8351     "cloakroom",
8352     "conservatory",
8353     "corridor",
8354     "deck",
8355     "den",
8356     "diningroom",
8357     "drawingroom",
8358     "driveway",
8359     "dungeon",
8360     "ensuite",
8361     "entrance",
8362     "familyroom",
8363     "garage",
8364     "garden",
8365     "guestroom",
8366     "hall",
8367     "kitchen",
8368     "larder",
8369     "lawn",
8370     "library",

```

```

8371         "livingroom",
8372         "lounge",
8373         "mancave",
8374         "masterbedroom",
8375         "musicroom",
8376         "office",
8377         "pantry",
8378         "parkinglot",
8379         "parlour",
8380         "patio",
8381         "receptionroom",
8382         "roof",
8383         "roofterrace",
8384         "sauna",
8385         "shed",
8386         "sittingroom",
8387         "snug",
8388         "spa",
8389         "studio",
8390         "suite",
8391         "swimmingpool",
8392         "toilet",
8393         "utilityroom",
8394         "ward",
8395         "vegetableplot",
8396         "terrace"
8397     ]
8398 },
8399     "tag-pos-desc": {
8400         "oneOf": [
8401             {
8402                 "enum": [
8403                     "top",
8404                     "bottom",
8405                     "left",
8406                     "right",
8407                     "centre",
8408                     "topleft",
8409                     "bottomleft",
8410                     "centrelleft",
8411                     "centreright",
8412                     "bottomright",
8413                     "topright"
8414                 ]
8415             },
8416             {
8417                 "description": "Relative position; as defined by UPnP relpos, relative position
8418 against a known [0,0,0] point.",
8419                 "items": {
8420                     "type": "number"
8421                 },
8422                 "maxItems": 3,
8423                 "minItems": 3,
8424                 "readOnly": true,
8425                 "type": "array"
8426             }
8427         ]
8428     },
8429     "title": {
8430         "description": "A title for the link relation. Can be used by the UI to provide a
8431 context.",
8432         "maxLength": 64,
8433         "type": "string"
8434     },
8435     "type": {
8436         "default": "application/cbor",
8437         "description": "A hint at the representation of the resource referenced by the target
8438 URI. This represents the media types that are used for both accepting and emitting.",
8439         "items": {
8440             "maxLength": 64,
8441             "type": "string"

```

```

8442         },
8443         "minItems": 1,
8444         "type": "array"
8445     }
8446 },
8447 "required": [
8448     "href",
8449     "rt",
8450     "if"
8451 ],
8452 "type": "object"
8453 },
8454 "type": "array"
8455 }
8456
8457 ,
8458 "sbatch-retrieve" :
8459 {
8460     "items": {
8461         "additionalProperties": true,
8462         "properties": {
8463             "href": {
8464                 "description": "URI of the target resource relative assuming the collection URI as
8465 anchor",
8466                 "format": "uri",
8467                 "maxLength": 256,
8468                 "type": "string"
8469             },
8470             "rep": {
8471                 "oneOf": [
8472                     {
8473                         "description": "The response payload from a single resource",
8474                         "type": "object"
8475                     },
8476                     {
8477                         "description": " The response payload from a collection (batch) resource",
8478                         "type": "array"
8479                     }
8480                 ]
8481             }
8482         },
8483         "required": [
8484             "href",
8485             "rep"
8486         ],
8487         "type": "object"
8488     },
8489     "minItems": 1,
8490     "type": "array"
8491 }
8492
8493 ,
8494 "sbatch-update" :
8495 {
8496     "description": "array of resource representations to apply to the batch collection, using
8497 href to indicate which resource(s) in the batch to update. If the href property is empty,
8498 effectively making the URI reference to the collection itself, the representation is to be applied
8499 to all resources in the batch",
8500     "items": {
8501         "additionalProperties": true,
8502         "properties": {
8503             "href": {
8504                 "description": "URI of the target resource relative assuming the collection URI as
8505 anchor",
8506                 "format": "uri",
8507                 "maxLength": 256,
8508                 "type": "string"
8509             },
8510             "rep": {
8511                 "oneOf": [
8512

```

```

8513         "description": "The response payload from a single resource",
8514         "type": "object"
8515     },
8516     {
8517         "description": " The response payload from a collection (batch) resource",
8518         "type": "array"
8519     }
8520 ]
8521 }
8522 },
8523 "required": [
8524     "href",
8525     "rep"
8526 ],
8527 "type": "object"
8528 },
8529 "minItems": 1,
8530 "type": "array"
8531 }
8532
8533 ,
8534 "slinks" :
8535 {
8536     "description": "All forms of links in a collection.",
8537     "oneOf": [
8538         {
8539             "description": "A set of simple or individual OIC Links.",
8540             "items": {
8541                 "properties": {
8542                     "anchor": {
8543                         "description": "This is used to override the context URI e.g. override the URI of
8544 the containing collection.",
8545                         "format": "uri",
8546                         "maxLength": 256,
8547                         "type": "string"
8548                     },
8549                     "di": {
8550                         "description": "The device ID",
8551                         "pattern": "^[a-fA-F0-9]{8}-[a-fA-F0-9]{4}-[a-fA-F0-9]{4}-[a-fA-
8552 F0-9]{12}$",
8553                         "type": "string"
8554                     },
8555                     "eps": {
8556                         "description": "the Endpoint information of the target Resource",
8557                         "items": {
8558                             "properties": {
8559                                 "ep": {
8560                                     "description": "Transport Protocol Suite + Endpoint Locator",
8561                                     "format": "uri",
8562                                     "type": "string"
8563                                 },
8564                                 "pri": {
8565                                     "description": "The priority among multiple Endpoints",
8566                                     "minimum": 1,
8567                                     "type": "integer"
8568                                 }
8569                             }
8570                         },
8571                         "type": "object"
8572                     },
8573                     "type": "array"
8574                 },
8575                 "href": {
8576                     "description": "This is the target URI, it can be specified as a Relative
8577 Reference or fully-qualified URI.",
8578                     "format": "uri",
8579                     "maxLength": 256,
8580                     "type": "string"
8581                 },
8582                 "if": {
8583                     "description": "The interface set supported by this resource",
8584                     "items": {

```

```

8584         "enum": [
8585             "oic.if.baseline",
8586             "oic.if.ll",
8587             "oic.if.b",
8588             "oic.if.rw",
8589             "oic.if.r",
8590             "oic.if.a",
8591             "oic.if.s"
8592         ],
8593         "type": "string"
8594     },
8595     "minItems": 1,
8596     "type": "array"
8597 },
8598     "ins": {
8599         "description": "The instance identifier for this web link in an array of web
8600 links - used in collections",
8601         "oneOf": [
8602             {
8603                 "description": "An ordinal number that is not repeated - must be unique in
8604 the collection context.",
8605                 "type": "integer"
8606             },
8607             {
8608                 "description": "A unique string",
8609                 "format": "uri",
8610                 "maxLength": 256,
8611                 "type": "string"
8612             },
8613             {
8614                 "description": "A UUID",
8615                 "pattern": "^[a-fA-F0-9]{8}-[a-fA-F0-9]{4}-[a-fA-F0-9]{4}-[a-fA-F0-9]{4}-[a-
8616 fA-F0-9]{12}$",
8617                 "type": "string"
8618             }
8619         ]
8620     },
8621     "p": {
8622         "description": "Specifies the framework policies on the Resource referenced by
8623 the target URI",
8624         "properties": {
8625             "bm": {
8626                 "description": "Specifies the framework policies on the Resource referenced
8627 by the target URI for e.g. observable and discoverable",
8628                 "type": "integer"
8629             }
8630         },
8631         "required": [
8632             "bm"
8633         ],
8634         "type": "object"
8635     },
8636     "rel": {
8637         "description": "The relation of the target URI referenced by the link to the
8638 context URI",
8639         "oneOf": [
8640             {
8641                 "default": [
8642                     "hosts"
8643                 ],
8644                 "items": {
8645                     "maxLength": 64,
8646                     "type": "string"
8647                 },
8648                 "minItems": 1,
8649                 "type": "array"
8650             },
8651             {
8652                 "default": "hosts",
8653                 "maxLength": 64,
8654                 "type": "string"

```

```

8655     }
8656   ]
8657 },
8658 "rt": {
8659   "description": "Resource Type of the Resource",
8660   "items": {
8661     "maxLength": 64,
8662     "type": "string"
8663   },
8664   "minItems": 1,
8665   "type": "array"
8666 },
8667 "tag-locn": {
8668   "description": "Location of the Resource or Device",
8669   "enum": [
8670     "attic",
8671     "balcony",
8672     "ballroom",
8673     "bathroom",
8674     "bedroom",
8675     "border",
8676     "boxroom",
8677     "cellar",
8678     "cloakroom",
8679     "conservatory",
8680     "corridor",
8681     "deck",
8682     "den",
8683     "diningroom",
8684     "drawingroom",
8685     "driveway",
8686     "dungeon",
8687     "ensuite",
8688     "entrance",
8689     "familyroom",
8690     "garage",
8691     "garden",
8692     "guestroom",
8693     "hall",
8694     "kitchen",
8695     "larder",
8696     "lawn",
8697     "library",
8698     "livingroom",
8699     "lounge",
8700     "mancave",
8701     "masterbedroom",
8702     "musicroom",
8703     "office",
8704     "pantry",
8705     "parkinglot",
8706     "parlour",
8707     "patio",
8708     "receptionroom",
8709     "roof",
8710     "roofterrace",
8711     "sauna",
8712     "shed",
8713     "sittingroom",
8714     "snug",
8715     "spa",
8716     "studio",
8717     "suite",
8718     "swimmingpool",
8719     "toilet",
8720     "utilityroom",
8721     "ward",
8722     "vegetableplot",
8723     "terrace"
8724   ]
8725 },

```



```

8726     "tag-pos-desc": {
8727         "oneOf": [
8728             {
8729                 "enum": [
8730                     "top",
8731                     "bottom",
8732                     "left",
8733                     "right",
8734                     "centre",
8735                     "topleft",
8736                     "bottomleft",
8737                     "centreleft",
8738                     "centreright",
8739                     "bottomright",
8740                     "topright"
8741                 ]
8742             },
8743             {
8744                 "description": "Relative position; as defined by UPnP relpos, relative
8745 position against a known [0,0,0] point.",
8746                 "items": {
8747                     "type": "number"
8748                 },
8749                 "maxItems": 3,
8750                 "minItems": 3,
8751                 "readOnly": true,
8752                 "type": "array"
8753             }
8754         ]
8755     },
8756     "title": {
8757         "description": "A title for the link relation. Can be used by the UI to provide a
8758 context.",
8759         "maxLength": 64,
8760         "type": "string"
8761     },
8762     "type": {
8763         "default": "application/cbor",
8764         "description": "A hint at the representation of the resource referenced by the
8765 target URI. This represents the media types that are used for both accepting and emitting.",
8766         "items": {
8767             "maxLength": 64,
8768             "type": "string"
8769         },
8770         "minItems": 1,
8771         "type": "array"
8772     }
8773 },
8774 "required": [
8775     "href",
8776     "rt",
8777     "if"
8778 ],
8779 "type": "object"
8780 },
8781 "type": "array"
8782 }
8783 ]
8784 }
8785 }
8786 }
8787 }
8788

```

8789 F.3.5 Property Definition

Property name	Value type	Mandatory	Access mode	Description
href	string	yes		URI of the target resource relative assuming the

				collection URI as anchor
rep	multiple types: see schema	yes		
href	string	yes		URI of the target resource relative assuming the collection URI as anchor
rep	multiple types: see schema	yes		
di	string			The device ID
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
tag-locn	multiple types: see schema			Location of the Resource or Device
tag-pos-desc	multiple types: see schema			
eps	array: see schema			the Endpoint information of the target Resource
ins	multiple types: see schema			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.
anchor	string			This is used to override the context URI e.g. override the URI of the containing collection.

rt	array: see schema	yes		Resource Type of the Resource
if	array: see schema	yes		The interface set supported by this resource
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
di	string			The device ID
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
tag-locn	multiple types: see schema			Location of the Resource or Device
tag-pos-desc	multiple types: see schema			
eps	array: see schema			the Endpoint information of the target Resource
ins	multiple types: see schema			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.

anchor	string			This is used to override the context URI e.g. override the URI of the containing collection.
rt	array: see schema	yes		Resource Type of the Resource
if	array: see schema	yes		The interface set supported by this resource
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

8790 **F.3.6 CRUDN behaviour**

Resource	Create	Read	Update	Delete	Notify
/CollectionBaselineInterfaceURI		get	post		

8791 **F.4 Platform Configuration**

8792 **F.4.1 Introduction**

8793 Resource that allows for platform specific information to be configured.
8794 Retrieves the current platform configuration settings
8795

8796 **F.4.2 Example URI**

8797 /example/PlatformConfigurationResURI

8798 **F.4.3 Resource Type**

8799 The resource type (rt) is defined as: ['oic.wk.con.p'].

8800 **F.4.4 Swagger2.0 Definition**

```

8801 {
8802   "swagger": "2.0",
8803   "info": {
8804     "title": "Platform Configuration",
8805     "version": "v1-20160622",
8806     "license": {
8807       "name": "copyright 2016-2017 Open Connectivity Foundation, Inc. All rights reserved.",
8808       "x-description": "Redistribution and use in source and binary forms, with or without
8809 modification, are permitted provided that the following conditions are met:\n      1.
8810 Redistributions of source code must retain the above copyright notice, this list of conditions and
8811 the following disclaimer.\n      2. Redistributions in binary form must reproduce the above
8812 copyright notice, this list of conditions and the following disclaimer in the documentation and/or
8813 other materials provided with the distribution.\n\n      THIS SOFTWARE IS PROVIDED BY THE Open
8814 Connectivity Foundation, INC. \AS IS\ AND ANY EXPRESS OR IMPLIED WARRANTIES, INCLUDING, BUT NOT
8815 LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE OR
8816 WARRANTIES OF NON-INFRINGEMENT, ARE DISCLAIMED.\n      IN NO EVENT SHALL THE Open Connectivity
8817 Foundation, INC. OR CONTRIBUTORS BE LIABLE FOR ANY DIRECT, INDIRECT, INCIDENTAL, SPECIAL,
8818 EXEMPLARY, OR CONSEQUENTIAL DAMAGES (INCLUDING, BUT NOT LIMITED TO, PROCUREMENT OF SUBSTITUTE GOODS

```

```

8819 OR SERVICES; LOSS OF USE, DATA, OR PROFITS; OR BUSINESS INTERRUPTION)\n          HOWEVER CAUSED AND
8820 ON ANY THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT (INCLUDING NEGLIGENCE OR
8821 OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OF THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY
8822 OF SUCH DAMAGE.\n"
8823 }
8824 },
8825 "schemes": ["http"],
8826 "consumes": ["application/json"],
8827 "produces": ["application/json"],
8828 "paths": {
8829   "/example/PlatformConfigurationResURI" : {
8830     "get": {
8831       "description": "Resource that allows for platform specific information to be
8832 configured.\nRetrieves the current platform configuration settings\n",
8833       "parameters": [
8834         { "$ref": "#/parameters/interface-all" }
8835       ],
8836       "responses": {
8837         "200": {
8838           "description": "",
8839           "x-example":
8840             {
8841               "rt": ["oic.wk.con.p"],
8842               "mnpn": [ { "language": "en", "value": "My Friendly Device Name" } ]
8843             }
8844           ,
8845           "schema": { "$ref": "#/definitions/Conf_Platform" }
8846         }
8847       }
8848     },
8849     "post": {
8850       "description": "Update the information about the platform\n",
8851       "parameters": [
8852         { "$ref": "#/parameters/interface-rw" },
8853         {
8854           "name": "body",
8855           "in": "body",
8856           "required": true,
8857           "schema": { "$ref": "#/definitions/Update_Platform" },
8858           "x-example":
8859             {
8860               "n": "Nuevo nombre",
8861               "mnpn": [ { "language": "es", "value": "Nuevo nombre de Plataforma Amigable" } ]
8862             }
8863         }
8864       ],
8865       "responses": {
8866         "200": {
8867           "description": "",
8868           "x-example":
8869             {
8870               "n": "Nuevo nombre",
8871               "mnpn": [ { "language": "es", "value": "Nuevo nombre de Plataforma Amigable" } ]
8872             }
8873           ,
8874           "schema": { "$ref": "#/definitions/Update_Platform" }
8875         }
8876       }
8877     }
8878   }
8879 },
8880 "parameters": {
8881   "interface-rw" : {
8882     "in" : "query",
8883     "name" : "if",
8884     "type" : "string",
8885     "enum" : ["oic.if.rw"]
8886   },
8887   "interface-all" : {
8888     "in" : "query",
8889     "name" : "if",

```

```

8890     "type" : "string",
8891     "enum" : ["oic.if.rw", "oic.if.baseline"]
8892   },
8893 },
8894 "definitions": {
8895   "Conf_Platform" :
8896   {
8897     "properties": {
8898       "mnpn": {
8899         "description": "Platform names",
8900         "items": {
8901           "properties": {
8902             "language": {
8903               "description": "An RFC 5646 language tag.",
8904               "pattern": "^[A-Za-z]{1,8}(-[A-Za-z0-9]{1,8})*$",
8905               "type": "string"
8906             },
8907             "value": {
8908               "description": "The Platform description in the indicated language.",
8909               "maxLength": 64,
8910               "type": "string"
8911             }
8912           },
8913           "type": "object"
8914         },
8915         "minItems": 1,
8916         "type": "array"
8917       }
8918     },
8919     "type": "object"
8920   }
8921 },
8922 "Update_Platform" :
8923 {
8924   "properties": {
8925     "mnpn": {
8926       "description": "Platform names",
8927       "items": {
8928         "properties": {
8929           "language": {
8930             "description": "An RFC 5646 language tag.",
8931             "pattern": "^[A-Za-z]{1,8}(-[A-Za-z0-9]{1,8})*$",
8932             "type": "string"
8933           },
8934           "value": {
8935             "description": "The Platform description in the indicated language.",
8936             "maxLength": 64,
8937             "type": "string"
8938           }
8939         },
8940         "type": "object"
8941       },
8942       "minItems": 1,
8943       "type": "array"
8944     }
8945   },
8946   "required": [
8947     "mnpn"
8948   ],
8949   "type": "object"
8950 }
8951 }
8952 }
8953 }
8954 }
8955 }

```

8956 F.4.5 Property Definition

Property name	Value type	Mandatory	Access mode	Description
---------------	------------	-----------	-------------	-------------

mnpn	array: schema	see	yes		Platform names
mnpn	array: schema	see			Platform names

8957 **F.4.6 CRUDN behaviour**

Resource	Create	Read	Update	Delete	Notify
/example/PlatformConfigurationResURI		get	post		

8958 **F.5 Device Configuration**

8959 **F.5.1 Introduction**

8960 Resource that allows for Device specific information to be configured.
 8961 Retrieves the current Device configuration settings
 8962

8963 **F.5.2 Example URI**

8964 /example/DeviceConfigurationResURI

8965 **F.5.3 Resource Type**

8966 The resource type (rt) is defined as: ['oic.wk.con'].

8967 **F.5.4 Swagger2.0 Definition**

```

8968 {
8969   "swagger": "2.0",
8970   "info": {
8971     "title": "Device Configuration",
8972     "version": "v1-20160622",
8973     "license": {
8974       "name": "copyright 2016-2017 Open Connectivity Foundation, Inc. All rights reserved.",
8975       "x-description": "Redistribution and use in source and binary forms, with or without
8976 modification, are permitted provided that the following conditions are met:\n      1.
8977 Redistributions of source code must retain the above copyright notice, this list of conditions and
8978 the following disclaimer.\n      2. Redistributions in binary form must reproduce the above
8979 copyright notice, this list of conditions and the following disclaimer in the documentation and/or
8980 other materials provided with the distribution.\n\n      THIS SOFTWARE IS PROVIDED BY THE Open
8981 Connectivity Foundation, INC. \AS IS\ AND ANY EXPRESS OR IMPLIED WARRANTIES, INCLUDING, BUT NOT
8982 LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE OR
8983 WARRANTIES OF NON-INFRINGEMENT, ARE DISCLAIMED.\n      IN NO EVENT SHALL THE Open Connectivity
8984 Foundation, INC. OR CONTRIBUTORS BE LIABLE FOR ANY DIRECT, INDIRECT, INCIDENTAL, SPECIAL,
8985 EXEMPLARY, OR CONSEQUENTIAL DAMAGES (INCLUDING, BUT NOT LIMITED TO, PROCUREMENT OF SUBSTITUTE GOODS
8986 OR SERVICES; LOSS OF USE, DATA, OR PROFITS; OR BUSINESS INTERRUPTION)\n      HOWEVER CAUSED AND
8987 ON ANY THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT (INCLUDING NEGLIGENCE OR
8988 OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OF THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY
8989 OF SUCH DAMAGE.\n"
8990     }
8991   },
8992   "schemes": ["http"],
8993   "consumes": ["application/json"],
8994   "produces": ["application/json"],
8995   "paths": {
8996     "/example/DeviceConfigurationResURI" : {
8997       "get": {
8998         "description": "Resource that allows for Device specific information to be
8999 configured.\nRetrieves the current Device configuration settings\n",
9000         "parameters": [
9001           {"$ref": "#/parameters/interface-all"}
9002         ],
9003         "responses": {
9004           "200": {
9005             "description": "",
9006             "x-example":
9007               {
9008                 "n": "My Friendly Device Name",
9009                 "rt": ["oic.wk.con"],

```

```

9010         "loc": [32.777,-96.797],
9011         "locn": "My Location Name",
9012         "c": "USD",
9013         "r": "MyRegion",
9014         "dl": "en"
9015     }
9016     },
9017     "schema": { "$ref": "#/definitions/Configuration" }
9018 }
9019 },
9020 },
9021 "post": {
9022     "description": "Update the information about the Device\n",
9023     "parameters": [
9024         { "$ref": "#/parameters/interface-rw" },
9025         {
9026             "name": "body",
9027             "in": "body",
9028             "required": true,
9029             "schema": { "$ref": "#/definitions/Update" },
9030             "x-example":
9031                 {
9032                     "n": "Nuevo Nombre Amistoso",
9033                     "r": "MyNewRegion",
9034                     "ln": [ { "language": "es", "value": "Nuevo Nombre Amistoso" } ],
9035                     "dl": "es"
9036                 }
9037         }
9038     ],
9039     "responses": {
9040         "200": {
9041             "description": "",
9042             "x-example":
9043                 {
9044                     "n": "Nuevo Nombre Amistoso",
9045                     "r": "MyNewRegion",
9046                     "ln": [ { "language": "es", "value": "Nuevo Nombre Amistoso" } ],
9047                     "dl": "es"
9048                 }
9049         },
9050         "schema": { "$ref": "#/definitions/Update" }
9051     }
9052 }
9053 },
9054 },
9055 },
9056 "parameters": {
9057     "interface-rw" : {
9058         "in" : "query",
9059         "name" : "if",
9060         "type" : "string",
9061         "enum" : ["oic.if.rw"]
9062     },
9063     "interface-all" : {
9064         "in" : "query",
9065         "name" : "if",
9066         "type" : "string",
9067         "enum" : ["oic.if.rw", "oic.if.baseline"]
9068     }
9069 },
9070 "definitions": {
9071     "Configuration" :
9072     {
9073         "properties": {
9074             "c": {
9075                 "description": "Currency",
9076                 "maxLength": 64,
9077                 "type": "string"
9078             },
9079             "dl": {
9080                 "description": "Default Language as an RFC 5646 language tag.",

```



```

9081         "pattern": "^[A-Za-z]{1,8}(-[A-Za-z0-9]{1,8})*$",
9082         "type": "string"
9083     },
9084     "ln": {
9085         "description": "Localized names",
9086         "items": {
9087             "properties": {
9088                 "language": {
9089                     "description": "An RFC 5646 language tag.",
9090                     "pattern": "^[A-Za-z]{1,8}(-[A-Za-z0-9]{1,8})*$",
9091                     "type": "string"
9092                 },
9093                 "value": {
9094                     "description": "The Device name in the indicated language.",
9095                     "maxLength": 64,
9096                     "type": "string"
9097                 }
9098             },
9099             "type": "object"
9100         },
9101         "minItems": 1,
9102         "type": "array"
9103     },
9104     "loc": {
9105         "description": "Location information (lat, long)",
9106         "items": {
9107             "type": "number"
9108         },
9109         "maxItems": 2,
9110         "minItems": 2,
9111         "type": "array"
9112     },
9113     "locn": {
9114         "description": "Human Friendly Name for location",
9115         "maxLength": 64,
9116         "type": "string"
9117     },
9118     "r": {
9119         "description": "Region",
9120         "maxLength": 64,
9121         "type": "string"
9122     }
9123 },
9124 "required": [
9125     "n"
9126 ],
9127 "type": "object"
9128 }
9129
9130 'Update' :
9131 {
9132     "properties": {
9133         "c": {
9134             "description": "Currency",
9135             "maxLength": 64,
9136             "type": "string"
9137         },
9138         "dl": {
9139             "description": "Default Language as an RFC 5646 language tag.",
9140             "pattern": "^[A-Za-z]{1,8}(-[A-Za-z0-9]{1,8})*$",
9141             "type": "string"
9142         },
9143         "ln": {
9144             "description": "Localized names",
9145             "items": {
9146                 "properties": {
9147                     "language": {
9148                         "description": "An RFC 5646 language tag.",
9149                         "pattern": "^[A-Za-z]{1,8}(-[A-Za-z0-9]{1,8})*$",
9150                         "type": "string"
9151                     }

```

```

9152         },
9153         "value": {
9154             "description": "The Device name in the indicated language.",
9155             "maxLength": 64,
9156             "type": "string"
9157         }
9158     },
9159     "type": "object"
9160 },
9161 "minItems": 1,
9162 "type": "array"
9163 },
9164 "loc": {
9165     "description": "Location information (lat, long)",
9166     "items": {
9167         "type": "number"
9168     },
9169     "maxItems": 2,
9170     "minItems": 2,
9171     "type": "array"
9172 },
9173 "locn": {
9174     "description": "Human Friendly Name for location",
9175     "maxLength": 64,
9176     "type": "string"
9177 },
9178 "r": {
9179     "description": "Region",
9180     "maxLength": 64,
9181     "type": "string"
9182 }
9183 },
9184 "required": [
9185     "n"
9186 ],
9187 "type": "object"
9188 }
9189 }
9190 }
9191 }
9192 }

```

9193 F.5.5 Property Definition

Property name	Value type	Mandatory	Access mode	Description
locn	string			Human Friendly Name for location
dl	string			Default Language as an RFC 5646 language tag.
loc	array: see schema			Location information (lat, long)
c	string			Currency
r	string			Region
ln	array: see schema			Localized names
locn	string			Human Friendly Name for location
dl	string			Default Language as an

				RFC 5646 language tag.
loc	array: see schema			Location information (lat, long)
c	string			Currency
r	string			Region
ln	array: see schema			Localized names

9194 **F.5.6 CRUDN behaviour**

Resource	Create	Read	Update	Delete	Notify
/example/DeviceConfigurationResURI		get	post		

9195 **F.6 Device**

9196 **F.6.1 Introduction**

9197 Known resource that is hosted by every Server.
 9198 Allows for logical device specific information to be discovered.
 9199 Retrieve the information about the Device
 9200

9201 **F.6.2 Wellknown URI**

9202 /oic/d

9203 **F.6.3 Resource Type**

9204 The resource type (rt) is defined as: ['oic.wk.d'].

9205 **F.6.4 Swagger2.0 Definition**

```

9206 {
9207   "swagger": "2.0",
9208   "info": {
9209     "title": "Device",
9210     "version": "v1-20160622",
9211     "license": {
9212       "name": "copyright 2016-2017 Open Connectivity Foundation, Inc. All rights reserved.",
9213       "x-description": "Redistribution and use in source and binary forms, with or without
9214 modification, are permitted provided that the following conditions are met:\n      1.
9215 Redistributions of source code must retain the above copyright notice, this list of conditions and
9216 the following disclaimer.\n      2. Redistributions in binary form must reproduce the above
9217 copyright notice, this list of conditions and the following disclaimer in the documentation and/or
9218 other materials provided with the distribution.\n\n      THIS SOFTWARE IS PROVIDED BY THE Open
9219 Connectivity Foundation, INC. \ "AS IS\ " AND ANY EXPRESS OR IMPLIED WARRANTIES, INCLUDING, BUT NOT
9220 LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE OR
9221 WARRANTIES OF NON-INFRINGEMENT, ARE DISCLAIMED.\n      IN NO EVENT SHALL THE Open Connectivity
9222 Foundation, INC. OR CONTRIBUTORS BE LIABLE FOR ANY DIRECT, INDIRECT, INCIDENTAL, SPECIAL,
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9224 OR SERVICES; LOSS OF USE, DATA, OR PROFITS; OR BUSINESS INTERRUPTION)\n      HOWEVER CAUSED AND
9225 ON ANY THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT (INCLUDING NEGLIGENCE OR
9226 OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OF THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY
9227 OF SUCH DAMAGE.\n"
9228     }
9229   },
9230   "schemes": ["http"],
9231   "consumes": ["application/json"],
9232   "produces": ["application/json"],
9233   "paths": {
9234     "/oic/d" : {
9235       "get": {
9236         "description": "Known resource that is hosted by every Server.\nAllows for logical device
9237 specific information to be discovered.\nRetrieve the information about the Device\n",
9238         "parameters": [
9239           {"$ref": "#/parameters/interface"}
9240         ]
9241       }
9242     }
9243   }
9244 }
```

```

9240     ],
9241     "responses": {
9242         "200": {
9243             "description": "",
9244             "x-example":
9245                 {
9246                     "n": "Device 1",
9247                     "rt": ["oic.wk.d"],
9248                     "di": "54919CA5-4101-4AE4-595B-353C51AA983C",
9249                     "icv": "ocf.1.0.0",
9250                     "dmv": "ocf.res.1.0.0, ocf.sh.1.0.0",
9251                     "piid": "6F0AAC04-2BB0-468D-B57C-16570A26AE48"
9252                 }
9253             ,
9254             "schema": { "$ref": "#/definitions/Device" }
9255         }
9256     }
9257 },
9258 },
9259 },
9260 "parameters": {
9261     "interface": {
9262         "in": "query",
9263         "name": "if",
9264         "type": "string",
9265         "enum": ["oic.if.r", "oic.if.baseline"]
9266     }
9267 },
9268 "definitions": {
9269     "Device": {
9270         "properties": {
9271             "di": {
9272                 "description": "Unique identifier for device",
9273                 "pattern": "^[a-fA-F0-9]{8}-[a-fA-F0-9]{4}-[a-fA-F0-9]{4}-[a-fA-F0-
9274 9]{12}$",
9275                 "readOnly": true,
9276                 "type": "string"
9277             },
9278             "dmn": {
9279                 "description": "Manufacturer Name.",
9280                 "items": {
9281                     "properties": {
9282                         "language": {
9283                             "description": "An RFC 5646 language tag.",
9284                             "pattern": "^[A-Za-z]{1,8}(-[A-Za-z0-9]{1,8})*$",
9285                             "readOnly": true,
9286                             "type": "string"
9287                         },
9288                     },
9289                     "value": {
9290                         "description": "Manufacturer name in the indicated language.",
9291                         "maxLength": 64,
9292                         "readOnly": true,
9293                         "type": "string"
9294                     }
9295                 },
9296                 "type": "object"
9297             },
9298             "minItems": 1,
9299             "readOnly": true,
9300             "type": "array"
9301         },
9302         "dmno": {
9303             "description": "Model number as designated by manufacturer.",
9304             "maxLength": 64,
9305             "readOnly": true,
9306             "type": "string"
9307         },
9308         "dmv": {
9309             "description": "Spec versions of the Resource and Device Specifications to which this
9310 device data model is implemented",

```

```

9311         "maxLength": 256,
9312         "readOnly": true,
9313         "type": "string"
9314     },
9315     "icv": {
9316         "description": "The version of the OIC Server",
9317         "maxLength": 64,
9318         "readOnly": true,
9319         "type": "string"
9320     },
9321     "ld": {
9322         "description": "Localized Descriptions.",
9323         "items": {
9324             "properties": {
9325                 "language": {
9326                     "description": "An RFC 5646 language tag.",
9327                     "pattern": "^[A-Za-z]{1,8}(-[A-Za-z0-9]{1,8})*$",
9328                     "readOnly": true,
9329                     "type": "string"
9330                 },
9331                 "value": {
9332                     "description": "Device description in the indicated language.",
9333                     "maxLength": 64,
9334                     "readOnly": true,
9335                     "type": "string"
9336                 }
9337             },
9338             "type": "object"
9339         },
9340         "minItems": 1,
9341         "readOnly": true,
9342         "type": "array"
9343     },
9344     "piid": {
9345         "description": "Protocol independent unique identifier for device that is immutable.",
9346         "pattern": "^[a-fA-F0-9]{8}-[a-fA-F0-9]{4}-[a-fA-F0-9]{4}-[a-fA-F0-9]{4}-[a-fA-F0-
9347 9]{12}$",
9348         "readOnly": true,
9349         "type": "string"
9350     },
9351     "sv": {
9352         "description": "Software version.",
9353         "maxLength": 64,
9354         "readOnly": true,
9355         "type": "string"
9356     }
9357 },
9358 "required": [
9359     "n",
9360     "di",
9361     "icv",
9362     "dmv",
9363     "piid"
9364 ],
9365 "type": "object"
9366 }
9367 }
9368 }
9369 }
9370

```

9371 **F.6.5 Property Definition**

Property name	Value type	Mandatory	Access mode	Description
ld	array: see schema		Read Only	Localized Descriptions.
icv	string	yes	Read Only	The version of the OIC Server

sv	string		Read Only	Software version.
piid	string	yes	Read Only	Protocol independent unique identifier for device that is immutable.
di	string	yes	Read Only	Unique identifier for device
dmv	string	yes	Read Only	Spec versions of the Resource and Device Specifications to which this device data model is implemented
dmno	string		Read Only	Model number as designated by manufacturer.
dmn	array: see schema		Read Only	Manufacturer Name.

9372 **F.6.6 CRUDN behaviour**

Resource	Create	Read	Update	Delete	Notify
/oic/d		get			

9373 **F.7 Maintenance**

9374 **F.7.1 Introduction**

9375 The resource through which a Device is maintained and can be used for diagnostic purposes.
9376 fr (Factory Reset) is a boolean.
9377 The value 0 means No action (Default), the value 1 means Start Factory Reset
9378 After factory reset, this value shall be changed back to the default value
9379 rb (Reboot) is a boolean.
9380 The value 0 means No action (Default), the value 1 means Start Reboot
9381 After Reboot, this value shall be changed back to the default value
9382 Retrieve the maintenance action status

9383 **F.7.2 Wellknown URI**

9384 /oic/mt

9385 **F.7.3 Resource Type**

9386 The resource type (rt) is defined as: ['oic.wk.mnt'].

9387 **F.7.4 Swagger2.0 Definition**

```

9388 {
9389   "swagger": "2.0",
9390   "info": {
9391     "title": "Maintenance",
9392     "version": "v1-20160622",
9393     "license": {
9394       "name": "copyright 2016-2017 Open Connectivity Foundation, Inc. All rights reserved.",
9395       "x-description": "Redistribution and use in source and binary forms, with or without
9396 modification, are permitted provided that the following conditions are met:\n      1.
9397 Redistributions of source code must retain the above copyright notice, this list of conditions and
9398 the following disclaimer.\n      2. Redistributions in binary form must reproduce the above
9399 copyright notice, this list of conditions and the following disclaimer in the documentation and/or
9400 other materials provided with the distribution.\n\n      THIS SOFTWARE IS PROVIDED BY THE Open
9401 Connectivity Foundation, INC. \"AS IS\" AND ANY EXPRESS OR IMPLIED WARRANTIES, INCLUDING, BUT NOT

```

```

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9407 ON ANY THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT (INCLUDING NEGLIGENCE OR
9408 OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OF THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY
9409 OF SUCH DAMAGE.\n"
9410 }
9411 },
9412 "schemes": ["http"],
9413 "consumes": ["application/json"],
9414 "produces": ["application/json"],
9415 "paths": {
9416   "/oic/mnt" : {
9417     "get": {
9418       "description": "The resource through which a Device is maintained and can be used for
9419 diagnostic purposes.\nfr (Factory Reset) is a boolean.\n The value 0 means No action (Default),
9420 the value 1 means Start Factory Reset\nAfter factory reset, this value shall be changed back to the
9421 default value\nrb (Reboot) is a boolean.\n The value 0 means No action (Default), the value 1
9422 means Start Reboot\nAfter Reboot, this value shall be changed back to the default value\nRetrieve
9423 the maintenance action status",
9424     "parameters": [
9425       { "$ref": "#/parameters/interface-all" }
9426     ],
9427     "responses": {
9428       "200": {
9429         "description": "",
9430         "x-example":
9431           {
9432             "rt": ["oic.wk.mnt"],
9433             "fr": false,
9434             "rb": false
9435           }
9436         ,
9437         "schema": { "$ref": "#/definitions/MNT" }
9438       }
9439     }
9440   },
9441   "post": {
9442     "description": "Set the maintenance action(s)\n",
9443     "parameters": [
9444       { "$ref": "#/parameters/interface-rw" },
9445       {
9446         "name": "body",
9447         "in": "body",
9448         "required": true,
9449         "schema": { "$ref": "#/definitions/MNT" },
9450         "x-example":
9451           {
9452             "fr": false,
9453             "rb": false
9454           }
9455       }
9456     ],
9457     "responses": {
9458       "200": {
9459         "description": "",
9460         "x-example":
9461           {
9462             "fr": false,
9463             "rb": false
9464           }
9465         ,
9466         "schema": { "$ref": "#/definitions/MNT" }
9467       }
9468     }
9469   }
9470 }
9471 },
9472 "parameters": {

```

```

9473     "interface-rw" : {
9474         "in" : "query",
9475         "name" : "if",
9476         "type" : "string",
9477         "enum" : ["oic.if.rw", "oic.if.baseline"]
9478     },
9479     "interface-all" : {
9480         "in" : "query",
9481         "name" : "if",
9482         "type" : "string",
9483         "enum" : ["oic.if.rw", "oic.if.r", "oic.if.baseline"]
9484     }
9485 },
9486 "definitions": {
9487     "MNT" :
9488     {
9489         "anyOf": [
9490             {
9491                 "required": [
9492                     "fr"
9493                 ]
9494             },
9495             {
9496                 "required": [
9497                     "rb"
9498                 ]
9499             }
9500         ],
9501         "properties": {
9502             "fr": {
9503                 "description": "Factory Reset",
9504                 "type": "boolean"
9505             },
9506             "rb": {
9507                 "description": "Reboot Action",
9508                 "type": "boolean"
9509             }
9510         },
9511         "type": "object"
9512     }
9513 }
9514 }
9515 }
9516

```

9517 F.7.5 Property Definition

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

9518 F.7.6 CRUDN behaviour

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

9519 F.8 Platform

9520 F.8.1 Introduction

9521 Known resource that is defines the platform on which an Server is hosted.
9522 Allows for platform specific information to be discovered.
9523 Retrieve the information about the Platform
9524

9525 F.8.2 Wellknown URI

9526 /oic/p

9527 F.8.3 Resource Type

9528 The resource type (rt) is defined as: ['oic.wk.p'].

9529 F.8.4 Swagger2.0 Definition

```
9530 {
9531   "swagger": "2.0",
9532   "info": {
9533     "title": "Platform",
9534     "version": "v1-20160622",
9535     "license": {
9536       "name": "copyright 2016-2017 Open Connectivity Foundation, Inc. All rights reserved.",
9537       "x-description": "Redistribution and use in source and binary forms, with or without
9538 modification, are permitted provided that the following conditions are met:\n      1.
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9540 the following disclaimer.\n      2. Redistributions in binary form must reproduce the above
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9549 ON ANY THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT (INCLUDING NEGLIGENCE OR
9550 OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OF THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY
9551 OF SUCH DAMAGE.\n"
9552   }
9553 },
9554 "schemes": ["http"],
9555 "consumes": ["application/json"],
9556 "produces": ["application/json"],
9557 "paths": {
9558   "/oic/p" : {
9559     "get": {
9560       "description": "Known resource that is defines the platform on which an Server is
9561 hosted.\nAllows for platform specific information to be discovered.\nRetrieve the information about
9562 the Platform\n",
9563       "parameters": [
9564         { "$ref": "#/parameters/interface" }
9565       ],
9566       "responses": {
9567         "200": {
9568           "description": "",
9569           "x-example":
9570             {
9571               "pi": "54919CA5-4101-4AE4-595B-353C51AA983C",
9572               "rt": ["oic.wk.p"],
9573               "mnmn": "Acme, Inc"
9574             }
9575           },
9576       "schema": { "$ref": "#/definitions/Platform" }
9577     }
9578   }
9579 },
9580 },
9581 },
9582 "parameters": {
9583   "interface" : {
9584     "in" : "query",
9585     "name" : "if",
9586     "type" : "string",
9587     "enum" : ["oic.if.r", "oic.if.baseline"]
9588   }
9589 },
9590 "definitions": {
9591   "Platform" :
9592     {
9593       "properties": {
9594         "mndt": {
9595           "description": "Manufacturing Date in ISO8601 format.",
```

```

9596         "pattern": "^[0-9]{4}-(1[0-2]|0[1-9])-(3[0-1]|2[0-9]|1[0-9]|0[1-9])$",
9597         "readOnly": true,
9598         "type": "string"
9599     },
9600     "mnfv": {
9601         "description": "Manufacturer's firmware version",
9602         "maxLength": 64,
9603         "readOnly": true,
9604         "type": "string"
9605     },
9606     "mnhw": {
9607         "description": "Platform Hardware Version",
9608         "maxLength": 64,
9609         "readOnly": true,
9610         "type": "string"
9611     },
9612     "mnml": {
9613         "description": "Manufacturer's URL",
9614         "format": "uri",
9615         "maxLength": 256,
9616         "readOnly": true,
9617         "type": "string"
9618     },
9619     "mnmn": {
9620         "description": "Manufacturer Name",
9621         "maxLength": 64,
9622         "readOnly": true,
9623         "type": "string"
9624     },
9625     "mnmo": {
9626         "description": "Model number as designated by the manufacturer",
9627         "maxLength": 64,
9628         "readOnly": true,
9629         "type": "string"
9630     },
9631     "mnos": {
9632         "description": "Platform Resident OS Version",
9633         "maxLength": 64,
9634         "readOnly": true,
9635         "type": "string"
9636     },
9637     "mnpv": {
9638         "description": "Platform Version",
9639         "maxLength": 64,
9640         "readOnly": true,
9641         "type": "string"
9642     },
9643     "mns1": {
9644         "description": "Manufacturer's Support Information URL",
9645         "format": "uri",
9646         "maxLength": 256,
9647         "readOnly": true,
9648         "type": "string"
9649     },
9650     "pi": {
9651         "description": "Platform Identifier",
9652         "pattern": "^[a-fA-F0-9]{8}-[a-fA-F0-9]{4}-[a-fA-F0-9]{4}-[a-fA-F0-9]{4}-[a-fA-F0-9]{4}$",
9653         "readOnly": true,
9654         "type": "string"
9655     },
9656     "st": {
9657         "description": "Reference time for the device in ISO8601 format.",
9658         "format": "date-time",
9659         "readOnly": true,
9660         "type": "string"
9661     },
9662     "vid": {
9663         "description": "Manufacturer's defined information for the platform. The content is
9664         freeform, with population rules up to the manufacturer",
9665         "maxLength": 64,

```

```

9667         "readOnly": true,
9668         "type": "string"
9669     },
9670 },
9671 "required": [
9672     "pi",
9673     "mnmn"
9674 ],
9675 "type": "object"
9676 }
9677 }
9678 }
9679 }
9680

```

9681 **F.8.5 Property Definition**

Property name	Value type	Mandatory	Access mode	Description
mnfv	string		Read Only	Manufacturer's firmware version
mnmn	string	yes	Read Only	Manufacturer Name
vid	string		Read Only	Manufacturer's defined information for the platform. The content is freeform, with population rules up to the manufacturer
mnsI	string		Read Only	Manufacturer's Support Information URL
mndt	string		Read Only	Manufacturing Date in ISO8601 format.
st	string		Read Only	Reference time for the device in ISO8601 format.
mnml	string		Read Only	Manufacturer's URL
mpv	string		Read Only	Platform Version
mnhw	string		Read Only	Platform Hardware Version
pi	string	yes	Read Only	Platform Identifier
mnos	string		Read Only	Platform Resident OS Version
mnmo	string		Read Only	Model number as designated by the manufacturer

9682 **F.8.6 CRUDN behaviour**

Resource	Create	Read	Update	Delete	Notify
/oic/p		get			

9683 F.9 Resource directory resource

9684 F.9.1 Introduction

9685 Resource to be exposed by any Device that can act as a Resource Directory.
9686 1) Provides selector criteria (e.g., integer) with GET request
9687 2) Publish or Update a Link in /oic/res with POST request
9688 3) Delete a Link in /oic/res with DELETE request
9689 Get the attributes of the Resource Directory for selection purposes.
9690

9691 F.9.2 Wellknown URI

9692 /oic/rd

9693 F.9.3 Resource Type

9694 The resource type (rt) is defined as: ['oic.wk.rd'].

9695 F.9.4 Swagger2.0 Definition

```
9696 {
9697   "swagger": "2.0",
9698   "info": {
9699     "title": "Resource directory resource",
9700     "version": "v1-20160622",
9701     "license": {
9702       "name": "copyright 2016-2017 Open Connectivity Foundation, Inc. All rights reserved.",
9703       "x-description": "Redistribution and use in source and binary forms, with or without
9704 modification, are permitted provided that the following conditions are met:\n      1.
9705 Redistributions of source code must retain the above copyright notice, this list of conditions and
9706 the following disclaimer.\n      2. Redistributions in binary form must reproduce the above
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9715 ON ANY THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT (INCLUDING NEGLIGENCE OR
9716 OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OF THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY
9717 OF SUCH DAMAGE.\n"
9718   }
9719 },
9720 "schemes": ["http"],
9721 "consumes": ["application/json"],
9722 "produces": ["application/json"],
9723 "paths": {
9724   "/oic/rd" : {
9725     "get": {
9726       "description": "Resource to be exposed by any Device that can act as a Resource
9727 Directory.\n\n1) Provides selector criteria (e.g., integer) with GET request\n2) Publish or Update a
9728 Link in /oic/res with POST request\n3) Delete a Link in /oic/res with DELETE request\n4) Get the
9729 attributes of the Resource Directory for selection purposes.\n",
9730       "parameters": [
9731         { "$ref": "#/parameters/rdgetinterface" }
9732       ],
9733       "responses": {
9734         "200": {
9735           "description": "Respond with the selector criteria - either the set of attributes or
9736 the bias factor\n",
9737           "x-example":
9738             {
9739               "rt": ["oic.wk.rd"],
9740               "if": ["oic.if.baseline"],
9741               "sel": 50
9742             }
9743         },
9744         "schema": { "$ref": "#/definitions/rdSelection" }
9745       }
9746     }
9747   }
9748 }
```

```

9745     }
9746   },
9747 },
9748 "post": {
9749   "description": "Publish the resource information for the first time or Update the existing
9750 one in /oic/res.\nAppropriate parts of the information, i.e., Links of the published Resources
9751 will be discovered through /oic/res.\n1) When a Device first publishes a Link, the request payload
9752 to RD may include the Links without \"ins\" Parameter.\n2) Upon granting the request, the RD
9753 assigns a unique instance value identifying the Link among all the Links it advertises\n and
9754 sends back the instance value in \"ins\" Parameter in the Link to the publishing Device.\n3) When
9755 later the publishing Device updates the existing Link, i.e., changing its Endpoint information,\n
9756 the request payload to RD needs to include the instance value in \"ins\" Parameter to identify the
9757 Link to update.\n",
9758   "parameters": [
9759     { "$ref": "#/parameters/rdpostinterface" },
9760     {
9761       "name": "body",
9762       "in": "body",
9763       "required": true,
9764       "schema": { "$ref": "#/definitions/rdPublish" },
9765       "x-example":
9766         {
9767           "di": "e61c3e6b-9c54-4b81-8ce5-f9039c1d04d9",
9768           "links": [
9769             {
9770               "anchor": "ocf://e61c3e6b-9c54-4b81-8ce5-f9039c1d04d9",
9771               "href": "/myLightSwitch",
9772               "rt": ["oic.r.switch.binary"],
9773               "if": ["oic.if.a", "oic.if.baseline"],
9774               "p": {"bm": 3},
9775               "eps": [
9776                 {"ep": "coaps://[2001:db8:a::b1d6]:1111", "pri": 2},
9777                 {"ep": "coaps://[2001:db8:a::b1d6]:1122"},
9778                 {"ep": "coaps+tcp://[2001:db8:a::123]:2222", "pri": 3}
9779               ]
9780             },
9781             {
9782               "anchor": "ocf://e61c3e6b-9c54-4b81-8ce5-f9039c1d04d9",
9783               "href": "/myLightBrightness",
9784               "rt": ["oic.r.brightness"],
9785               "if": ["oic.if.a", "oic.if.baseline"],
9786               "p": {"bm": 3},
9787               "eps": [
9788                 {"ep": "coaps://[2001:db8:a::123]:2222"}
9789               ]
9790             }
9791           ],
9792           "ttl": 600
9793         }
9794     }
9795   ],
9796   "responses": {
9797     "200": {
9798       "description": "Respond with the same schema as publish but, when a Link is first
9799 published,\nwith the additional \"ins\" Parameter in the Link.\nThis value is used by the receiver
9800 to manage that OCF Link instance.\n",
9801       "x-example":
9802         {
9803           "di": "e61c3e6b-9c54-4b81-8ce5-f9039c1d04d9",
9804           "links": [
9805             {
9806               "anchor": "ocf://e61c3e6b-9c54-4b81-8ce5-f9039c1d04d9",
9807               "href": "/myLightSwitch",
9808               "rt": ["oic.r.switch.binary"],
9809               "if": ["oic.if.a", "oic.if.baseline"],
9810               "p": {"bm": 3},
9811               "eps": [
9812                 {"ep": "coaps://[2001:db8:a::b1d6]:1111", "pri": 2},
9813                 {"ep": "coaps://[2001:db8:a::b1d6]:1122"},
9814                 {"ep": "coaps+tcp://[2001:db8:a::123]:2222", "pri": 3}
9815               ]
9816             },

```

```

9816         "ins": "11235"
9817     },
9818     {
9819         "anchor": "ocf://e61c3e6b-9c54-4b81-8ce5-f9039c1d04d9",
9820         "href": "/myLightBrightness",
9821         "rt": ["oic.r.brightness"],
9822         "if": ["oic.if.a", "oic.if.baseline"],
9823         "p": {"bm": 3},
9824         "eps": [
9825             {"ep": "coaps://[2001:db8:a::123]:2222"}
9826         ],
9827         "ins": "112358"
9828     }
9829 ],
9830     "ttl": 600
9831 }
9832 ,
9833     "schema": { "$ref": "#/definitions/rdPublish" }
9834 }
9835 }
9836 },
9837     "delete": {
9838         "description": "Delete a particular OIC Link - the link may be a simple link or a link in a
9839 tagged set.\n",
9840         "parameters": [
9841             {"$ref": "#/parameters/rdddelete-di"},
9842             {"$ref": "#/parameters/rdddelete-ins"}
9843         ],
9844         "responses": {
9845             "200": {
9846                 "description": "The delete succeeded",
9847                 "x-example":
9848                 {}
9849             }
9850         }
9851     }
9852 }
9853 },
9854     "parameters": {
9855         "rdddelete-di": {
9856             "in": "query",
9857             "name": "di",
9858             "type": "string",
9859             "description": "description"
9860         },
9861         "rdddelete-ins": {
9862             "in": "query",
9863             "name": "ins",
9864             "type": "string",
9865             "description": "description"
9866         },
9867         "rdgetinterface": {
9868             "in": "query",
9869             "name": "if",
9870             "type": "string",
9871             "enum": ["oic.if.baseline"],
9872             "description": "enumdescription"
9873         },
9874         "rdpostinterface": {
9875             "in": "query",
9876             "name": "if",
9877             "type": "string",
9878             "enum": ["oic.if.baseline"],
9879             "description": "enumdescription"
9880         }
9881     },
9882     "definitions": {
9883         "rdSelection": {
9884             {
9885                 "properties": {
9886                     "sel": {

```

```

9887         "description": "A bias factor calculated by the Resource directory",
9888         "maximum": 100,
9889         "minimum": 0,
9890         "readOnly": true,
9891         "type": "integer"
9892     },
9893 },
9894     "required": [
9895         "sel"
9896     ],
9897     "type": "object"
9898 }
9899
9900 '
9901 "rdPublish" :
9902     {
9903         "description": "Publishes resources as OIC Links into the resource directory",
9904         "properties": {
9905             "di": {
9906                 "description": "A UUID that is the identifier for the publishing Device",
9907                 "pattern": "^[a-fA-F0-9]{8}-[a-fA-F0-9]{4}-[a-fA-F0-9]{4}-[a-fA-F0-9]{4}-[a-fA-F0-
9908 9]{12}$",
9909                 "type": "string"
9910             },
9911             "links": {
9912                 "description": "A set of simple or individual OIC Links.",
9913                 "items": {
9914                     "properties": {
9915                         "anchor": {
9916                 the containing collection.",
9917                 "description": "This is used to override the context URI e.g. override the URI of
9918                 "format": "uri",
9919                 "maxLength": 256,
9920                 "type": "string"
9921             },
9922             "di": {
9923                 "description": "The device ID",
9924                 "pattern": "^[a-fA-F0-9]{8}-[a-fA-F0-9]{4}-[a-fA-F0-9]{4}-[a-fA-F0-9]{4}-[a-fA-
9925 F0-9]{12}$",
9926                 "type": "string"
9927             },
9928             "eps": {
9929                 "description": "the Endpoint information of the target Resource",
9930                 "items": {
9931                     "properties": {
9932                         "ep": {
9933                 "description": "Transport Protocol Suite + Endpoint Locator",
9934                 "format": "uri",
9935                 "type": "string"
9936             },
9937             "pri": {
9938                 "description": "The priority among multiple Endpoints",
9939                 "minimum": 1,
9940                 "type": "integer"
9941             }
9942         },
9943         "type": "object"
9944     },
9945     "type": "array"
9946 },
9947     "href": {
9948         "description": "This is the target URI, it can be specified as a Relative
9949 Reference or fully-qualified URI.",
9950         "format": "uri",
9951         "maxLength": 256,
9952         "type": "string"
9953     },
9954     "if": {
9955         "description": "The interface set supported by this resource",
9956         "items": {
9957             "enum": [

```

```

9958         "oic.if.baseline",
9959         "oic.if.ll",
9960         "oic.if.b",
9961         "oic.if.rw",
9962         "oic.if.r",
9963         "oic.if.a",
9964         "oic.if.s"
9965     ],
9966     "type": "string"
9967 },
9968     "minItems": 1,
9969     "type": "array"
9970 },
9971     "ins": {
9972         "description": "The instance identifier for this web link in an array of web
9973 links - used in collections",
9974         "oneOf": [
9975             {
9976                 "description": "An ordinal number that is not repeated - must be unique in
9977 the collection context.",
9978                 "type": "integer"
9979             },
9980             {
9981                 "description": "A unique string",
9982                 "format": "uri",
9983                 "maxLength": 256,
9984                 "type": "string"
9985             },
9986             {
9987                 "description": "A UUID",
9988                 "pattern": "^[a-fA-F0-9]{8}-[a-fA-F0-9]{4}-[a-fA-F0-9]{4}-[a-fA-F0-9]{4}-[a-
9989 fA-F0-9]{12}$",
9990                 "type": "string"
9991             }
9992         ]
9993     },
9994     "p": {
9995         "description": "Specifies the framework policies on the Resource referenced by
9996 the target URI",
9997         "properties": {
9998             "bm": {
9999                 "description": "Specifies the framework policies on the Resource referenced
10000 by the target URI for e.g. observable and discoverable",
10001                 "type": "integer"
10002             }
10003         },
10004         "required": [
10005             "bm"
10006         ],
10007         "type": "object"
10008     },
10009     "rel": {
10010         "description": "The relation of the target URI referenced by the link to the
10011 context URI",
10012         "oneOf": [
10013             {
10014                 "default": [
10015                     "hosts"
10016                 ],
10017                 "items": {
10018                     "maxLength": 64,
10019                     "type": "string"
10020                 },
10021                 "minItems": 1,
10022                 "type": "array"
10023             },
10024             {
10025                 "default": "hosts",
10026                 "maxLength": 64,
10027                 "type": "string"
10028             }

```



```

10029     ]
10030   },
10031   "rt": {
10032     "description": "Resource Type of the Resource",
10033     "items": {
10034       "maxLength": 64,
10035       "type": "string"
10036     },
10037     "minItems": 1,
10038     "type": "array"
10039   },
10040   "tag-locn": {
10041     "description": "Location of the Resource or Device",
10042     "enum": [
10043       "attic",
10044       "balcony",
10045       "ballroom",
10046       "bathroom",
10047       "bedroom",
10048       "border",
10049       "boxroom",
10050       "cellar",
10051       "cloakroom",
10052       "conservatory",
10053       "corridor",
10054       "deck",
10055       "den",
10056       "diningroom",
10057       "drawingroom",
10058       "driveway",
10059       "dungeon",
10060       "ensuite",
10061       "entrance",
10062       "familyroom",
10063       "garage",
10064       "garden",
10065       "guestroom",
10066       "hall",
10067       "kitchen",
10068       "larder",
10069       "lawn",
10070       "library",
10071       "livingroom",
10072       "lounge",
10073       "mancave",
10074       "masterbedroom",
10075       "musicroom",
10076       "office",
10077       "pantry",
10078       "parkinglot",
10079       "parlour",
10080       "patio",
10081       "receptionroom",
10082       "roof",
10083       "roofterrace",
10084       "sauna",
10085       "shed",
10086       "sittingroom",
10087       "snug",
10088       "spa",
10089       "studio",
10090       "suite",
10091       "swimmingpool",
10092       "toilet",
10093       "utilityroom",
10094       "ward",
10095       "vegetableplot",
10096       "terrace"
10097     ]
10098   },
10099   "tag-pos-desc": {

```

```

10100         "oneOf": [
10101             {
10102                 "enum": [
10103                     "top",
10104                     "bottom",
10105                     "left",
10106                     "right",
10107                     "centre",
10108                     "topleft",
10109                     "bottomleft",
10110                     "centreleft",
10111                     "centreright",
10112                     "bottomright",
10113                     "topright"
10114                 ]
10115             },
10116             {
10117                 "description": "Relative position; as defined by UPnP relpos, relative
10118 position against a known [0,0,0] point.",
10119                 "items": {
10120                     "type": "number"
10121                 },
10122                 "maxItems": 3,
10123                 "minItems": 3,
10124                 "readOnly": true,
10125                 "type": "array"
10126             }
10127         ],
10128     },
10129     "title": {
10130         "description": "A title for the link relation. Can be used by the UI to provide a
10131 context.",
10132         "maxLength": 64,
10133         "type": "string"
10134     },
10135     "type": {
10136         "default": "application/cbor",
10137         "description": "A hint at the representation of the resource referenced by the
10138 target URI. This represents the media types that are used for both accepting and emitting.",
10139         "items": {
10140             "maxLength": 64,
10141             "type": "string"
10142         },
10143         "minItems": 1,
10144         "type": "array"
10145     }
10146 },
10147 "required": [
10148     "href",
10149     "rt",
10150     "if"
10151 ],
10152 "type": "object"
10153 },
10154 "type": "array"
10155 },
10156 "ttl": {
10157     "description": "Time to indicate a RD, i.e. how long to keep this published item.",
10158     "type": "integer"
10159 }
10160 }
10161 }
10162 }
10163 }
10164 }
10165 }

```

10166 F.9.5 Property Definition

Property name	Value type	Mandatory	Access mode	Description
---------------	------------	-----------	-------------	-------------

sel	integer	yes	Read Only	A bias factor calculated by the Resource directory
links	array: see schema			A set of simple or individual OIC Links.
ttl	integer			Time to indicate a RD, i.e. how long to keep this published item.
di	string			A UUID that is the identifier for the publishing Device

10167 **F.9.6 CRUDN behaviour**

Resource	Create	Read	Update	Delete	Notify
/oic/rd		get	post	delete	

10168 **F.10 Discoverable Resources**

10169 **F.10.1 Introduction**

10170 Link list representation of /oic/res; list of discoverable resources
 10171 Retrieve the discoverable resource set, link list interface
 10172

10173 **F.10.2 Wellknown URI**

10174 /oic-res-IIIInterfaceURI

10175 **F.10.3 Resource Type**

10176 **F.10.4 Swagger2.0 Definition**

```

10177 {
10178   "swagger": "2.0",
10179   "info": {
10180     "title": "Discoverable Resources Baseline Interface",
10181     "version": "v1-20160622",
10182     "license": {
10183       "name": "copyright 2016-2017 Open Connectivity Foundation, Inc. All rights reserved.",
10184       "x-description": "Redistribution and use in source and binary forms, with or without
10185 modification, are permitted provided that the following conditions are met:\n      1.
10186 Redistributions of source code must retain the above copyright notice, this list of conditions and
10187 the following disclaimer.\n      2. Redistributions in binary form must reproduce the above
10188 copyright notice, this list of conditions and the following disclaimer in the documentation and/or
10189 other materials provided with the distribution.\n\n      THIS SOFTWARE IS PROVIDED BY THE Open
10190 Connectivity Foundation, INC. \\"AS IS\\" AND ANY EXPRESS OR IMPLIED WARRANTIES, INCLUDING, BUT NOT
10191 LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE OR
10192 WARRANTIES OF NON-INFRINGEMENT, ARE DISCLAIMED.\n\n      IN NO EVENT SHALL THE Open Connectivity
10193 Foundation, INC. OR CONTRIBUTORS BE LIABLE FOR ANY DIRECT, INDIRECT, INCIDENTAL, SPECIAL,
10194 EXEMPLARY, OR CONSEQUENTIAL DAMAGES (INCLUDING, BUT NOT LIMITED TO, PROCUREMENT OF SUBSTITUTE GOODS
10195 OR SERVICES; LOSS OF USE, DATA, OR PROFITS; OR BUSINESS INTERRUPTION)\n\n      HOWEVER CAUSED AND
10196 ON ANY THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT (INCLUDING NEGLIGENCE OR
10197 OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OF THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY
10198 OF SUCH DAMAGE.\n"
10199     }
10200   },
10201   "schemes": ["http"],
10202   "consumes": ["application/json"],
10203   "produces": ["application/json"],
10204   "paths": {
10205     "/oic-res-BaselineInterfaceURI" : {
10206     "get": {

```

```

10207     "description": "Baseline representation of /oic/res; list of discoverable
10208 resources\nRetrieve the discoverable resource set, baseline interface\n",
10209     "parameters": [
10210       {"$ref": "#/parameters/interface-baseline"}
10211     ],
10212     "responses": {
10213       "200": {
10214         "description": "",
10215         "x-example":
10216           [
10217             {
10218               "rt": ["oic.wk.res"],
10219               "if": ["oic.if.baseline", "oic.if.ll" ],
10220               "links":
10221                 [
10222                   {
10223                     "href": "/humidity",
10224                     "rt": ["oic.r.humidity"],
10225                     "if": ["oic.if.s"],
10226                     "p": {"bm": 3},
10227                     "eps": [
10228                       {"ep": "coaps://[fe80::b1d6]:1111", "pri": 2},
10229                       {"ep": "coaps://[fe80::b1d6]:1122"},
10230                       {"ep": "coaps+tcp://[2001:db8:a::123]:2222", "pri": 3}
10231                     ]
10232                   },
10233                   {
10234                     "href": "/temperature",
10235                     "rt": ["oic.r.temperature"],
10236                     "if": ["oic.if.s"],
10237                     "p": {"bm": 3},
10238                     "eps": [
10239                       {"ep": "coaps://[[2001:db8:a::123]:2222}
10240                     ]
10241                   }
10242                 ]
10243             }
10244           ]
10245         ,
10246         "schema": {"$ref": "#/definitions/sbaseline" }
10247       }
10248     }
10249   },
10250 },
10251 "/oic-res-llInterfaceURI" : {
10252   "get": {
10253     "description": "Link list representation of /oic/res; list of discoverable
10254 resources\nRetrieve the discoverable resource set, link list interface\n",
10255     "parameters": [
10256       {"$ref": "#/parameters/interface-ll"}
10257     ],
10258     "responses": {
10259       "200": {
10260         "description": "",
10261         "x-example":
10262           [
10263             {
10264               "href": "/humidity",
10265               "rt": ["oic.r.humidity"],
10266               "if": ["oic.if.s"],
10267               "p": {"bm": 3},
10268               "eps": [
10269                 {"ep": "coaps://[fe80::b1d6]:1111", "pri": 2},
10270                 {"ep": "coaps://[fe80::b1d6]:1122"},
10271                 {"ep": "coaps+tcp://[2001:db8:a::123]:2222", "pri": 3}
10272               ]
10273             },
10274             {
10275               "href": "/temperature",
10276               "rt": ["oic.r.temperature"],
10277               "if": ["oic.if.s"],

```

```

10278         "p": { "bm": 3},
10279         "eps": [
10280             { "ep": "coaps://[[2001:db8:a::123]:2222" }
10281         ]
10282     }
10283 }
10284 ,
10285 "schema": { "$ref": "#/definitions/slinklist" }
10286 }
10287 }
10288 }
10289 }
10290 },
10291 "parameters": {
10292     "interface-ll" : {
10293         "in" : "query",
10294         "name" : "if",
10295         "type" : "string",
10296         "enum" : [ "oic.if.ll" ]
10297     },
10298     "interface-baseline" : {
10299         "in" : "query",
10300         "name" : "if",
10301         "type" : "string",
10302         "enum" : [ "oic.if.baseline" ]
10303     },
10304     "interface-all" : {
10305         "in" : "query",
10306         "name" : "if",
10307         "type" : "string",
10308         "enum" : [ "oic.if.ll", "oic.if.baseline" ]
10309     }
10310 },
10311 "definitions": {
10312     "sbaseline" :
10313     {
10314         "properties": {
10315             "if": {
10316                 "description": "The interface set supported by this resource",
10317                 "items": {
10318                     "enum": [
10319                         "oic.if.baseline",
10320                         "oic.if.ll"
10321                     ],
10322                     "type": "string"
10323                 },
10324                 "minItems": 1,
10325                 "readOnly": true,
10326                 "type": "array"
10327             },
10328             "links": {
10329                 "items": {
10330                     "properties": {
10331                         "anchor": {
10332                             "description": "This is used to override the context URI e.g. override the URI of
10333 the containing collection.",
10334                             "format": "uri",
10335                             "maxLength": 256,
10336                             "type": "string"
10337                         },
10338                         "di": {
10339                             "description": "The device ID",
10340                             "pattern": "[a-fA-F0-9]{8}-[a-fA-F0-9]{4}-[a-fA-F0-9]{4}-[a-fA-
10341 F0-9]{12}$",
10342                             "type": "string"
10343                         },
10344                         "eps": {
10345                             "description": "the Endpoint information of the target Resource",
10346                             "items": {
10347                                 "properties": {
10348                                     "ep": {

```

```

10349         "description": "Transport Protocol Suite + Endpoint Locator",
10350         "format": "uri",
10351         "type": "string"
10352     },
10353     "pri": {
10354         "description": "The priority among multiple Endpoints",
10355         "minimum": 1,
10356         "type": "integer"
10357     }
10358 },
10359     "type": "object"
10360 },
10361     "type": "array"
10362 },
10363     "href": {
10364         "description": "This is the target URI, it can be specified as a Relative
10365 Reference or fully-qualified URI.",
10366         "format": "uri",
10367         "maxLength": 256,
10368         "type": "string"
10369     },
10370     "if": {
10371         "description": "The interface set supported by this resource",
10372         "items": {
10373             "enum": [
10374                 "oic.if.baseline",
10375                 "oic.if.ll",
10376                 "oic.if.b",
10377                 "oic.if.rw",
10378                 "oic.if.r",
10379                 "oic.if.a",
10380                 "oic.if.s"
10381             ],
10382             "type": "string"
10383         },
10384         "minItems": 1,
10385         "type": "array"
10386     },
10387     "ins": {
10388         "description": "The instance identifier for this web link in an array of web
10389 links - used in collections",
10390         "oneOf": [
10391             {
10392                 "description": "An ordinal number that is not repeated - must be unique in
10393 the collection context.",
10394                 "type": "integer"
10395             },
10396             {
10397                 "description": "A unique string",
10398                 "format": "uri",
10399                 "maxLength": 256,
10400                 "type": "string"
10401             },
10402             {
10403                 "description": "A UUID",
10404                 "pattern": "^[a-fA-F0-9]{8}-[a-fA-F0-9]{4}-[a-fA-F0-9]{4}-[a-fA-F0-9]{4}-[a-
10405 fA-F0-9]{12}$",
10406                 "type": "string"
10407             }
10408         ]
10409     },
10410     "p": {
10411         "description": "Specifies the framework policies on the Resource referenced by
10412 the target URI",
10413         "properties": {
10414             "bm": {
10415                 "description": "Specifies the framework policies on the Resource referenced
10416 by the target URI for e.g. observable and discoverable",
10417                 "type": "integer"
10418             }
10419         }
10420     },

```

```

10420         "required": [
10421             "bm"
10422         ],
10423         "type": "object"
10424     },
10425     "rel": {
10426         "description": "The relation of the target URI referenced by the link to the
10427 context URI",
10428         "oneOf": [
10429             {
10430                 "default": [
10431                     "hosts"
10432                 ],
10433                 "items": {
10434                     "maxLength": 64,
10435                     "type": "string"
10436                 },
10437                 "minItems": 1,
10438                 "type": "array"
10439             },
10440             {
10441                 "default": "hosts",
10442                 "maxLength": 64,
10443                 "type": "string"
10444             }
10445         ]
10446     },
10447     "rt": {
10448         "description": "Resource Type of the Resource",
10449         "items": {
10450             "maxLength": 64,
10451             "type": "string"
10452         },
10453         "minItems": 1,
10454         "type": "array"
10455     },
10456     "tag-locn": {
10457         "description": "Location of the Resource or Device",
10458         "enum": [
10459             "attic",
10460             "balcony",
10461             "ballroom",
10462             "bathroom",
10463             "bedroom",
10464             "border",
10465             "boxroom",
10466             "cellar",
10467             "cloakroom",
10468             "conservatory",
10469             "corridor",
10470             "deck",
10471             "den",
10472             "diningroom",
10473             "drawingroom",
10474             "driveway",
10475             "dungeon",
10476             "ensuite",
10477             "entrance",
10478             "familyroom",
10479             "garage",
10480             "garden",
10481             "guestroom",
10482             "hall",
10483             "kitchen",
10484             "larder",
10485             "lawn",
10486             "library",
10487             "livingroom",
10488             "lounge",
10489             "mancave",
10490             "masterbedroom",

```

```

10491         "musicroom",
10492         "office",
10493         "pantry",
10494         "parkinglot",
10495         "parlour",
10496         "patio",
10497         "receptionroom",
10498         "roof",
10499         "roofterrace",
10500         "sauna",
10501         "shed",
10502         "sittingroom",
10503         "snug",
10504         "spa",
10505         "studio",
10506         "suite",
10507         "swimmingpool",
10508         "toilet",
10509         "utilityroom",
10510         "ward",
10511         "vegetableplot",
10512         "terrace"
10513     ]
10514 },
10515 "tag-pos-desc": {
10516     "oneOf": [
10517         {
10518             "enum": [
10519                 "top",
10520                 "bottom",
10521                 "left",
10522                 "right",
10523                 "centre",
10524                 "topleft",
10525                 "bottomleft",
10526                 "centrelleft",
10527                 "centreright",
10528                 "bottomright",
10529                 "topright"
10530             ]
10531         },
10532         {
10533             "description": "Relative position; as defined by UPnP relpos, relative
10534 position against a known [0,0,0] point.",
10535             "items": {
10536                 "type": "number"
10537             },
10538             "maxItems": 3,
10539             "minItems": 3,
10540             "readOnly": true,
10541             "type": "array"
10542         }
10543     ]
10544 },
10545 "title": {
10546     "description": "A title for the link relation. Can be used by the UI to provide a
10547 context.",
10548     "maxLength": 64,
10549     "type": "string"
10550 },
10551 "type": {
10552     "default": "application/cbor",
10553     "description": "A hint at the representation of the resource referenced by the
10554 target URI. This represents the media types that are used for both accepting and emitting.",
10555     "items": {
10556         "maxLength": 64,
10557         "type": "string"
10558     },
10559     "minItems": 1,
10560     "type": "array"
10561 }

```



```

10562         },
10563         "required": [
10564             "href",
10565             "rt",
10566             "if"
10567         ],
10568         "type": "object"
10569     },
10570     "type": "array"
10571 },
10572 "mpro": {
10573     "description": "Supported messaging protocols",
10574     "maxLength": 64,
10575     "readOnly": true,
10576     "type": "string"
10577 },
10578 "n": {
10579     "description": "Human friendly name",
10580     "maxLength": 64,
10581     "readOnly": true,
10582     "type": "string"
10583 },
10584 "rt": {
10585     "description": "Resource Type of the Resource",
10586     "items": {
10587         "maxLength": 64,
10588         "type": "string"
10589     },
10590     "minItems": 1,
10591     "readOnly": true,
10592     "type": "array"
10593 }
10594 },
10595 "required": [
10596     "rt",
10597     "if",
10598     "links"
10599 ],
10600 "type": "object"
10601 }
10602
10603 ,
10604 "slinklist" :
10605     {
10606         "properties": {
10607             "anchor": {
10608                 "description": "This is used to override the context URI e.g. override the URI of the
10609 containing collection.",
10610                 "format": "uri",
10611                 "maxLength": 256,
10612                 "type": "string"
10613             },
10614             "di": {
10615                 "description": "The device ID",
10616                 "pattern": "^[a-fA-F0-9]{8}-[a-fA-F0-9]{4}-[a-fA-F0-9]{4}-[a-fA-F0-
10617 9]{12}$",
10618                 "type": "string"
10619             },
10620             "eps": {
10621                 "description": "the Endpoint information of the target Resource",
10622                 "items": {
10623                     "properties": {
10624                         "ep": {
10625                             "description": "Transport Protocol Suite + Endpoint Locator",
10626                             "format": "uri",
10627                             "type": "string"
10628                         },
10629                         "pri": {
10630                             "description": "The priority among multiple Endpoints",
10631                             "minimum": 1,
10632                             "type": "integer"

```

```

10633     }
10634     },
10635     "type": "object"
10636   },
10637   "type": "array"
10638 },
10639 "href": {
10640   "description": "This is the target URI, it can be specified as a Relative Reference or
10641 fully-qualified URI.",
10642   "format": "uri",
10643   "maxLength": 256,
10644   "type": "string"
10645 },
10646 "if": {
10647   "description": "The interface set supported by this resource",
10648   "items": {
10649     "enum": [
10650       "oic.if.baseline",
10651       "oic.if.ll",
10652       "oic.if.b",
10653       "oic.if.rw",
10654       "oic.if.x",
10655       "oic.if.a",
10656       "oic.if.s"
10657     ],
10658     "type": "string"
10659   },
10660   "minItems": 1,
10661   "type": "array"
10662 },
10663 "ins": {
10664   "description": "The instance identifier for this web link in an array of web links -
10665 used in collections",
10666   "oneOf": [
10667     {
10668       "description": "An ordinal number that is not repeated - must be unique in the
10669 collection context.",
10670       "type": "integer"
10671     },
10672     {
10673       "description": "A unique string",
10674       "format": "uri",
10675       "maxLength": 256,
10676       "type": "string"
10677     },
10678     {
10679       "description": "A UUID",
10680       "pattern": "^[a-fA-F0-9]{8}-[a-fA-F0-9]{4}-[a-fA-F0-9]{4}-[a-fA-F0-9]{4}-[a-fA-F0-
10681 9]{12}$",
10682       "type": "string"
10683     }
10684   ]
10685 },
10686 "p": {
10687   "description": "Specifies the framework policies on the Resource referenced by the
10688 target URI",
10689   "properties": {
10690     "bm": {
10691       "description": "Specifies the framework policies on the Resource referenced by the
10692 target URI for e.g. observable and discoverable",
10693       "type": "integer"
10694     }
10695   },
10696   "required": [
10697     "bm"
10698   ],
10699   "type": "object"
10700 },
10701 "rel": {
10702   "description": "The relation of the target URI referenced by the link to the context
10703 URI",

```

```

10704     "oneOf": [
10705         {
10706             "default": [
10707                 "hosts"
10708             ],
10709             "items": {
10710                 "maxLength": 64,
10711                 "type": "string"
10712             },
10713             "minItems": 1,
10714             "type": "array"
10715         },
10716         {
10717             "default": "hosts",
10718             "maxLength": 64,
10719             "type": "string"
10720         }
10721     ]
10722 },
10723 "rt": {
10724     "description": "Resource Type of the Resource",
10725     "items": {
10726         "maxLength": 64,
10727         "type": "string"
10728     },
10729     "minItems": 1,
10730     "type": "array"
10731 },
10732 "tag-locn": {
10733     "description": "Location of the Resource or Device",
10734     "enum": [
10735         "attic",
10736         "balcony",
10737         "ballroom",
10738         "bathroom",
10739         "bedroom",
10740         "border",
10741         "boxroom",
10742         "cellar",
10743         "cloakroom",
10744         "conservatory",
10745         "corridor",
10746         "deck",
10747         "den",
10748         "diningroom",
10749         "drawingroom",
10750         "driveway",
10751         "dungeon",
10752         "ensuite",
10753         "entrance",
10754         "familyroom",
10755         "garage",
10756         "garden",
10757         "guestroom",
10758         "hall",
10759         "kitchen",
10760         "larder",
10761         "lawn",
10762         "library",
10763         "livingroom",
10764         "lounge",
10765         "mancave",
10766         "masterbedroom",
10767         "musicroom",
10768         "office",
10769         "pantry",
10770         "parkinglot",
10771         "parlour",
10772         "patio",
10773         "receptionroom",
10774         "roof",

```

```

10775         "roofterrace",
10776         "sauna",
10777         "shed",
10778         "sittingroom",
10779         "snug",
10780         "spa",
10781         "studio",
10782         "suite",
10783         "swimmingpool",
10784         "toilet",
10785         "utilityroom",
10786         "ward",
10787         "vegetableplot",
10788         "terrace"
10789     ]
10790 },
10791 "tag-pos-desc": {
10792     "oneOf": [
10793         {
10794             "enum": [
10795                 "top",
10796                 "bottom",
10797                 "left",
10798                 "right",
10799                 "centre",
10800                 "topleft",
10801                 "bottomleft",
10802                 "centrelleft",
10803                 "centreright",
10804                 "bottomright",
10805                 "topright"
10806             ]
10807         },
10808         {
10809             "description": "Relative position; as defined by UPnP relpos, relative position
10810 against a known [0,0,0] point.",
10811             "items": {
10812                 "type": "number"
10813             },
10814             "maxItems": 3,
10815             "minItems": 3,
10816             "readOnly": true,
10817             "type": "array"
10818         }
10819     ]
10820 },
10821 "title": {
10822     "description": "A title for the link relation. Can be used by the UI to provide a
10823 context.",
10824     "maxLength": 64,
10825     "type": "string"
10826 },
10827 "type": {
10828     "default": "application/cbor",
10829     "description": "A hint at the representation of the resource referenced by the target
10830 URI. This represents the media types that are used for both accepting and emitting.",
10831     "items": {
10832         "maxLength": 64,
10833         "type": "string"
10834     },
10835     "minItems": 1,
10836     "type": "array"
10837 }
10838 },
10839 "required": [
10840     "href",
10841     "rt",
10842     "if"
10843 ],
10844 "type": "object"
10845 }

```

10846
 10847 }
 10848 }
 10849 }

10850 **F.10.5 Property Definition**

Property name	Value type	Mandatory	Access mode	Description
if	array: see schema	yes		The interface set supported by this resource
title	string			A title for the link relation. Can be used by the UI to provide a context.
tag-pos-desc	multiple types: see schema			
eps	array: see schema			the Endpoint information of the target 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.
p	object: see schema			Specifies the framework policies on the Resource referenced by the target URI
rt	array: see schema	yes		Resource Type of the Resource
tag-locn	multiple types: see schema			Location of the Resource or Device
anchor	string			This is used to override the context URI e.g. override the URI of the containing collection.
rel	multiple types: see schema			The relation of the target URI referenced by the link to the context URI
href	string	yes		This is the target URI, it can be specified as a

				Relative Reference or fully-qualified URI.
di	string			The device ID
ins	multiple types: see schema			The instance identifier for this web link in an array of web links - used in collections
if	array: see schema	yes	Read Only	The interface set supported by this resource
n	string		Read Only	Human friendly name
links	array: see schema	yes		
rt	array: see schema	yes	Read Only	Resource Type of the Resource
mpro	string		Read Only	Supported messaging protocols

10851 **F.10.6 CRUDN behaviour**

Resource	Create	Read	Update	Delete	Notify
/oic-res-IIIInterfaceURI		get			

10852 **F.11 Scene List**

10853 **F.11.1 Introduction**

10854 Toplevel Scene resource.
 10855 This resource is a generic collection resource.
 10856 The rts value shall contain oic.wk.scenecollection resource types.
 10857 Provides the current list of web links pointing to scenes
 10858

10859 **F.11.2 Example URI**

10860 /SceneListResURI

10861 **F.11.3 Resource Type**

10862 The resource type (rt) is defined as: ['oic.wk.scenelist'].

10863 **F.11.4 Swagger2.0 Definition**

```

10864 {
10865   "swagger": "2.0",
10866   "info": {
10867     "title": "Scenes (Top level)",
10868     "version": "v1-20160622",
10869     "license": {
10870       "name": "copyright 2016-2017 Open Connectivity Foundation, Inc. All rights reserved.",
10871       "x-description": "Redistribution and use in source and binary forms, with or without
10872 modification, are permitted provided that the following conditions are met:\n      1.
10873 Redistributions of source code must retain the above copyright notice, this list of conditions and
10874 the following disclaimer.\n      2. Redistributions in binary form must reproduce the above
10875 copyright notice, this list of conditions and the following disclaimer in the documentation and/or
10876 other materials provided with the distribution.\n\n      THIS SOFTWARE IS PROVIDED BY THE Open
10877 Connectivity Foundation, INC. \\"AS IS\\" AND ANY EXPRESS OR IMPLIED WARRANTIES, INCLUDING, BUT NOT

```

```

10878 LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE OR
10879 WARRANTIES OF NON-INFRINGEMENT, ARE DISCLAIMED.\n          IN NO EVENT SHALL THE Open Connectivity
10880 Foundation, INC. OR CONTRIBUTORS BE LIABLE FOR ANY DIRECT, INDIRECT, INCIDENTAL, SPECIAL,
10881 EXEMPLARY, OR CONSEQUENTIAL DAMAGES (INCLUDING, BUT NOT LIMITED TO, PROCUREMENT OF SUBSTITUTE GOODS
10882 OR SERVICES; LOSS OF USE, DATA, OR PROFITS; OR BUSINESS INTERRUPTION)\n          HOWEVER CAUSED AND
10883 ON ANY THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT (INCLUDING NEGLIGENCE OR
10884 OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OF THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY
10885 OF SUCH DAMAGE.\n"
10886 }
10887 },
10888 "schemes": ["http"],
10889 "consumes": ["application/json"],
10890 "produces": ["application/json"],
10891 "paths": {
10892   "/SceneListResURI" : {
10893     "get": {
10894       "description": "Toplevel Scene resource.\nThis resource is a generic collection
10895 resource.\nThe rts value shall contain oic.wk.scenecollection resource types.\nProvides the current
10896 list of web links pointing to scenes\n",
10897       "parameters": [
10898         ],
10899       "responses": {
10900         "200": {
10901           "description": "",
10902           "x-example":
10903             {
10904               "rt": ["oic.wk.scenelist"],
10905               "n": "list of scene Collections",
10906               "rts": ["oic.wk.scenecollection"],
10907               "links": [
10908                 ]
10909             }
10910           ,
10911           "schema": { "$ref": "#/definitions/Collection" }
10912         }
10913       }
10914     }
10915   },
10916   "/SceneMemberResURI" : {
10917     "get": {
10918       "description": "Collection that models a scene member.\nProvides the scene member\n",
10919       "parameters": [
10920         ],
10921       "responses": {
10922         "200": {
10923           "description": "",
10924           "x-example":
10925             {
10926               "rt": ["oic.wk.scenemember"],
10927               "id": "0685B960-FFFF-46F7-BEC0-9E6234671ADC1",
10928               "n": "my binary switch (for light bulb) mappings",
10929               "link": {
10930                 "href": "binarySwitch",
10931                 "rt": ["oic.r.switch.binary"],
10932                 "if": ["oic.if.a", "oic.if.baseline"],
10933                 "eps": [
10934                   {"ep": "coap://[fe80:b1d6]:1111", "pri": 2},
10935                   {"ep": "coaps://[fe80:b1d6]:1122"},
10936                   {"ep": "coap+tcp://[2001:db8:a::123]:2222", "pri": 3}
10937                 ]
10938               },
10939               "sceneMappings": [
10940                 {
10941                   "scene": "off",
10942                   "memberProperty": "value",
10943                   "memberValue": true
10944                 },
10945                 {
10946                   "scene": "Reading",
10947                   "memberProperty": "value",
10948                   "memberValue": false

```

```

10949         },
10950         {
10951             "scene":          "TVWatching",
10952             "memberProperty": "value",
10953             "memberValue":   true
10954         }
10955     ]
10956 }
10957 ,
10958 "schema": { "$ref": "#/definitions/SceneMember" }
10959 }
10960 }
10961 },
10962 },
10963 "/SceneCollectionResURI" : {
10964     "get": {
10965         "description": "Collection that models a set of Scenes.\nThis resource is a generic
10966 collection resource with additional parameters.\nThe rts value shall contain oic.scenemember
10967 resource types.\nThe additional parameters are\n lastScene, this is the scene value last set by
10968 any OCF Client\n sceneValues, this is the list of available scenes\n lastScene shall be listed in
10969 sceneValues.\nProvides the current list of web links pointing to scenes\n",
10970         "parameters": [
10971         ],
10972         "responses": {
10973             "200": {
10974                 "description": "",
10975                 "x-example":
10976                 {
10977                     "lastScene": "off",
10978                     "sceneValues": ["off","Reading","TVWatching"],
10979                     "rt":          ["oic.wk.scenecollection"],
10980                     "n":           "My Scenes for my living room",
10981                     "id":          "0685B960-736F-46F7-BEC0-9E6CBD671ADC1",
10982                     "rts":         ["oic.wk.scenemember"],
10983                     "links": [
10984                     ]
10985                 }
10986             },
10987             "schema": { "$ref": "#/definitions/SceneCollection" }
10988         }
10989     },
10990 },
10991 "post": {
10992     "description": "Provides the action to change the last set scene selection.\nCalling this
10993 method shall update all scene members to the prescribed membervalue.\nWhen this method is called
10994 with the same value as the current lastScene value\nthen all scene members shall be updated.\n",
10995     "parameters": [
10996         {
10997             "name": "body",
10998             "in": "body",
10999             "required": true,
11000             "schema": { "$ref": "#/definitions/SceneCollectionUpdate" },
11001             "x-example":
11002             {
11003                 "lastScene": "Reading"
11004             }
11005         }
11006     ],
11007     "responses": {
11008         "200": {
11009             "description": "Indicates that the value is changed.\nThe changed properties are
11010 provided in the response.\n",
11011             "x-example":
11012             {
11013                 "lastScene": "Reading"
11014             }
11015         },
11016         "schema": { "$ref": "#/definitions/SceneCollectionUpdate" }
11017     }
11018 }
11019 }

```



```

11020     }
11021   },
11022   "parameters": {
11023     "interface" : {
11024       "in" : "query",
11025       "name" : "if",
11026       "type" : "string",
11027       "enum" : ["oic.if.a", "oic.if.ll", "oic.if.baseline"]
11028     }
11029   },
11030   "definitions": {
11031     "Collection" :
11032     {
11033       "description": "A set of simple or individual OIC Links.",
11034       "items": {
11035         "properties": {
11036           "anchor": {
11037             "description": "This is used to override the context URI e.g. override the URI of the
11038 containing collection.",
11039             "format": "uri",
11040             "maxLength": 256,
11041             "type": "string"
11042           },
11043           "di": {
11044             "description": "The device ID",
11045             "pattern": "^[a-fA-F0-9]{8}-[a-fA-F0-9]{4}-[a-fA-F0-9]{4}-[a-fA-F0-
11046 9]{12}$",
11047             "type": "string"
11048           },
11049           "eps": {
11050             "description": "the Endpoint information of the target Resource",
11051             "items": {
11052               "properties": {
11053                 "ep": {
11054                   "description": "Transport Protocol Suite + Endpoint Locator",
11055                   "format": "uri",
11056                   "type": "string"
11057                 },
11058                 "pri": {
11059                   "description": "The priority among multiple Endpoints",
11060                   "minimum": 1,
11061                   "type": "integer"
11062                 }
11063               },
11064               "type": "object"
11065             },
11066             "type": "array"
11067           },
11068           "href": {
11069             "description": "This is the target URI, it can be specified as a Relative Reference
11070 or fully-qualified URI.",
11071             "format": "uri",
11072             "maxLength": 256,
11073             "type": "string"
11074           },
11075           "if": {
11076             "description": "The interface set supported by this resource",
11077             "items": {
11078               "enum": [
11079                 "oic.if.baseline",
11080                 "oic.if.ll",
11081                 "oic.if.b",
11082                 "oic.if.rw",
11083                 "oic.if.r",
11084                 "oic.if.a",
11085                 "oic.if.s"
11086               ],
11087               "type": "string"
11088             },
11089             "minItems": 1,
11090             "type": "array"

```

```

11091         },
11092         "ins": {
11093             "description": "The instance identifier for this web link in an array of web links -
11094 used in collections",
11095             "oneOf": [
11096                 {
11097                     "description": "An ordinal number that is not repeated - must be unique in the
11098 collection context.",
11099                     "type": "integer"
11100                 },
11101                 {
11102                     "description": "A unique string",
11103                     "format": "uri",
11104                     "maxLength": 256,
11105                     "type": "string"
11106                 },
11107                 {
11108                     "description": "A UUID",
11109                     "pattern": "^[a-fA-F0-9]{8}-[a-fA-F0-9]{4}-[a-fA-F0-9]{4}-[a-fA-F0-9]{4}-[a-fA-
11110 F0-9]{12}$",
11111                     "type": "string"
11112                 }
11113             ]
11114         },
11115         "p": {
11116             "description": "Specifies the framework policies on the Resource referenced by the
11117 target URI",
11118             "properties": {
11119                 "bm": {
11120                     "description": "Specifies the framework policies on the Resource referenced by
11121 the target URI for e.g. observable and discoverable",
11122                     "type": "integer"
11123                 }
11124             },
11125             "required": [
11126                 "bm"
11127             ],
11128             "type": "object"
11129         },
11130         "rel": {
11131             "description": "The relation of the target URI referenced by the link to the context
11132 URI",
11133             "oneOf": [
11134                 {
11135                     "default": [
11136                         "hosts"
11137                     ],
11138                     "items": {
11139                         "maxLength": 64,
11140                         "type": "string"
11141                     },
11142                     "minItems": 1,
11143                     "type": "array"
11144                 },
11145                 {
11146                     "default": "hosts",
11147                     "maxLength": 64,
11148                     "type": "string"
11149                 }
11150             ]
11151         },
11152         "rt": {
11153             "description": "Resource Type of the Resource",
11154             "items": {
11155                 "maxLength": 64,
11156                 "type": "string"
11157             },
11158             "minItems": 1,
11159             "type": "array"
11160         },
11161         "tag-locn": {

```

```

11162 "description": "Location of the Resource or Device",
11163 "enum": [
11164     "attic",
11165     "balcony",
11166     "ballroom",
11167     "bathroom",
11168     "bedroom",
11169     "border",
11170     "boxroom",
11171     "cellar",
11172     "cloakroom",
11173     "conservatory",
11174     "corridor",
11175     "deck",
11176     "den",
11177     "diningroom",
11178     "drawingroom",
11179     "driveway",
11180     "dungeon",
11181     "ensuite",
11182     "entrance",
11183     "familyroom",
11184     "garage",
11185     "garden",
11186     "guestroom",
11187     "hall",
11188     "kitchen",
11189     "larder",
11190     "lawn",
11191     "library",
11192     "livingroom",
11193     "lounge",
11194     "mancave",
11195     "masterbedroom",
11196     "musicroom",
11197     "office",
11198     "pantry",
11199     "parkinglot",
11200     "parlour",
11201     "patio",
11202     "receptionroom",
11203     "roof",
11204     "roofterrace",
11205     "sauna",
11206     "shed",
11207     "sittingroom",
11208     "snug",
11209     "spa",
11210     "studio",
11211     "suite",
11212     "swimmingpool",
11213     "toilet",
11214     "utilityroom",
11215     "ward",
11216     "vegetableplot",
11217     "terrace"
11218 ]
11219 },
11220 "tag-pos-desc": {
11221     "oneOf": [
11222         {
11223             "enum": [
11224                 "top",
11225                 "bottom",
11226                 "left",
11227                 "right",
11228                 "centre",
11229                 "topleft",
11230                 "bottomleft",
11231                 "centreleft",
11232                 "centreright",

```

```

11233         "bottomright",
11234         "topright"
11235     ]
11236 },
11237 {
11238     "description": "Relative position; as defined by UPnP relpos, relative position
11239 against a known [0,0,0] point.",
11240     "items": {
11241         "type": "number"
11242     },
11243     "maxItems": 3,
11244     "minItems": 3,
11245     "readOnly": true,
11246     "type": "array"
11247 }
11248 ]
11249 },
11250 "title": {
11251     "description": "A title for the link relation. Can be used by the UI to provide a
11252 context.",
11253     "maxLength": 64,
11254     "type": "string"
11255 },
11256 "type": {
11257     "default": "application/cbor",
11258     "description": "A hint at the representation of the resource referenced by the target
11259 URI. This represents the media types that are used for both accepting and emitting.",
11260     "items": {
11261         "maxLength": 64,
11262         "type": "string"
11263     },
11264     "minItems": 1,
11265     "type": "array"
11266 }
11267 },
11268 "required": [
11269     "href",
11270     "rt",
11271     "if"
11272 ],
11273 "type": "object"
11274 },
11275 "type": "array"
11276 }
11277
11278 'SceneMember' :
11279 {
11280     "properties": {
11281         "SceneMappings": {
11282             "description": "array of mappings per scene, can be one(1)",
11283             "items": {
11284                 "properties": {
11285                     "memberProperty": {
11286                         "description": "property name that will be mapped",
11287                         "readOnly": true,
11288                         "type": "string"
11289                     },
11290                     "memberValue": {
11291                         "description": "value of the Member Property",
11292                         "readOnly": true,
11293                         "type": "string"
11294                     },
11295                 },
11296                 "scene": {
11297                     "description": "Specifies a scene value that will be acted upon",
11298                     "type": "string"
11299                 }
11300             },
11301             "required": [
11302                 "scene",
11303                 "memberProperty",

```

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11304         "memberValue"
11305     ],
11306     "type": "object"
11307 },
11308     "type": "array"
11309 },
11310     "link": {
11311         "description": "OCF link that points to a resource",
11312         "properties": {
11313             "anchor": {
11314                 "description": "This is used to override the context URI e.g. override the URI of
11315 the containing collection.",
11316                 "format": "uri",
11317                 "maxLength": 256,
11318                 "type": "string"
11319             },
11320             "di": {
11321                 "description": "The device ID",
11322                 "pattern": "^[a-fA-F0-9]{8}-[a-fA-F0-9]{4}-[a-fA-F0-9]{4}-[a-fA-F0-
11323 9]{12}$",
11324                 "type": "string"
11325             },
11326             "eps": {
11327                 "description": "the Endpoint information of the target Resource",
11328                 "items": {
11329                     "properties": {
11330                         "ep": {
11331                             "description": "Transport Protocol Suite + Endpoint Locator",
11332                             "format": "uri",
11333                             "type": "string"
11334                         },
11335                         "pri": {
11336                             "description": "The priority among multiple Endpoints",
11337                             "minimum": 1,
11338                             "type": "integer"
11339                         }
11340                     },
11341                     "type": "object"
11342                 },
11343                 "type": "array"
11344             },
11345             "href": {
11346                 "description": "This is the target URI, it can be specified as a Relative Reference
11347 or fully-qualified URI.",
11348                 "format": "uri",
11349                 "maxLength": 256,
11350                 "type": "string"
11351             },
11352             "if": {
11353                 "description": "The interface set supported by this resource",
11354                 "items": {
11355                     "enum": [
11356                         "oic.if.baseline",
11357                         "oic.if.ll",
11358                         "oic.if.b",
11359                         "oic.if.rw",
11360                         "oic.if.r",
11361                         "oic.if.a",
11362                         "oic.if.s"
11363                     ],
11364                     "type": "string"
11365                 },
11366                 "minItems": 1,
11367                 "type": "array"
11368             },
11369             "ins": {
11370                 "description": "The instance identifier for this web link in an array of web links
11371 - used in collections",
11372                 "oneOf": [
11373                     {
11374                         "description": "An ordinal number that is not repeated - must be unique in the

```

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11375 collection context.",
11376         "type": "integer"
11377     },
11378     {
11379         "description": "A unique string",
11380         "format": "uri",
11381         "maxLength": 256,
11382         "type": "string"
11383     },
11384     {
11385         "description": "A UUID",
11386         "pattern": "^[a-fA-F0-9]{8}-[a-fA-F0-9]{4}-[a-fA-F0-9]{4}-[a-fA-F0-9]{4}-[a-fA-
11387 F0-9]{12}$",
11388         "type": "string"
11389     }
11390 ]
11391 },
11392 "p": {
11393     "description": "Specifies the framework policies on the Resource referenced by the
11394 target URI",
11395     "properties": {
11396         "bm": {
11397             "description": "Specifies the framework policies on the Resource referenced by
11398 the target URI for e.g. observable and discoverable",
11399             "type": "integer"
11400         }
11401     },
11402     "required": [
11403         "bm"
11404     ],
11405     "type": "object"
11406 },
11407 "rel": {
11408     "description": "The relation of the target URI referenced by the link to the
11409 context URI",
11410     "oneOf": [
11411         {
11412             "default": [
11413                 "hosts"
11414             ],
11415             "items": {
11416                 "maxLength": 64,
11417                 "type": "string"
11418             },
11419             "minItems": 1,
11420             "type": "array"
11421         },
11422         {
11423             "default": "hosts",
11424             "maxLength": 64,
11425             "type": "string"
11426         }
11427     ]
11428 },
11429 "rt": {
11430     "description": "Resource Type of the Resource",
11431     "items": {
11432         "maxLength": 64,
11433         "type": "string"
11434     },
11435     "minItems": 1,
11436     "type": "array"
11437 },
11438 "tag-locn": {
11439     "description": "Location of the Resource or Device",
11440     "enum": [
11441         "attic",
11442         "balcony",
11443         "ballroom",
11444         "bathroom",
11445         "bedroom",

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11446         "border",
11447         "boxroom",
11448         "cellar",
11449         "cloakroom",
11450         "conservatory",
11451         "corridor",
11452         "deck",
11453         "den",
11454         "diningroom",
11455         "drawingroom",
11456         "driveway",
11457         "dungeon",
11458         "ensuite",
11459         "entrance",
11460         "familyroom",
11461         "garage",
11462         "garden",
11463         "guestroom",
11464         "hall",
11465         "kitchen",
11466         "larder",
11467         "lawn",
11468         "library",
11469         "livingroom",
11470         "lounge",
11471         "mancave",
11472         "masterbedroom",
11473         "musicroom",
11474         "office",
11475         "pantry",
11476         "parkinglot",
11477         "parlour",
11478         "patio",
11479         "receptionroom",
11480         "roof",
11481         "roofterrace",
11482         "sauna",
11483         "shed",
11484         "sittingroom",
11485         "snug",
11486         "spa",
11487         "studio",
11488         "suite",
11489         "swimmingpool",
11490         "toilet",
11491         "utilityroom",
11492         "ward",
11493         "vegetableplot",
11494         "terrace"
11495     ]
11496 },
11497 "tag-pos-desc": {
11498     "oneOf": [
11499         {
11500             "enum": [
11501                 "top",
11502                 "bottom",
11503                 "left",
11504                 "right",
11505                 "centre",
11506                 "topleft",
11507                 "bottomleft",
11508                 "centreleft",
11509                 "centreright",
11510                 "bottomright",
11511                 "topright"
11512             ]
11513         },
11514     ]
11515     "description": "Relative position; as defined by UPnP relpos, relative position
11516     against a known [0,0,0] point.",

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11517         "items": {
11518             "type": "number"
11519         },
11520         "maxItems": 3,
11521         "minItems": 3,
11522         "readOnly": true,
11523         "type": "array"
11524     }
11525 ]
11526 },
11527 "title": {
11528     "description": "A title for the link relation. Can be used by the UI to provide a
11529 context.",
11530     "maxLength": 64,
11531     "type": "string"
11532 },
11533 "type": {
11534     "default": "application/cbor",
11535     "description": "A hint at the representation of the resource referenced by the
11536 target URI. This represents the media types that are used for both accepting and emitting.",
11537     "items": {
11538         "maxLength": 64,
11539         "type": "string"
11540     },
11541     "minItems": 1,
11542     "type": "array"
11543 }
11544 },
11545 "required": [
11546     "href",
11547     "rt",
11548     "if"
11549 ],
11550 "type": "object"
11551 }
11552 },
11553 "required": [
11554     "link"
11555 ],
11556 "type": "object"
11557 }
11558
11559 "SceneCollection" :
11560 {
11561     "description": "A collection is a set of links along with additional properties to describe
11562 the collection itself",
11563     "properties": {
11564         "lastScene": {
11565             "description": "Last selected Scene from the set of sceneValues",
11566             "type": "string"
11567         },
11568         "links": {
11569             "description": "All forms of links in a collection.",
11570             "oneOf": [
11571                 {
11572                     "description": "A set of simple or individual OIC Links.",
11573                     "items": {
11574                         "properties": {
11575                             "anchor": {
11576                                 "description": "This is used to override the context URI e.g. override the
11577 URI of the containing collection.",
11578                                 "format": "uri",
11579                                 "maxLength": 256,
11580                                 "type": "string"
11581                             },
11582                         },
11583                         "di": {
11584                             "description": "The device ID",
11585                             "pattern": "^[a-fA-F0-9]{8}-[a-fA-F0-9]{4}-[a-fA-F0-9]{4}-[a-fA-F0-9]{4}-[a-
11586 fA-F0-9]{12}$",
11587                             "type": "string"

```



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11588     },
11589     "eps": {
11590         "description": "the Endpoint information of the target Resource",
11591         "items": {
11592             "properties": {
11593                 "ep": {
11594                     "description": "Transport Protocol Suite + Endpoint Locator",
11595                     "format": "uri",
11596                     "type": "string"
11597                 },
11598                 "pri": {
11599                     "description": "The priority among multiple Endpoints",
11600                     "minimum": 1,
11601                     "type": "integer"
11602                 }
11603             },
11604             "type": "object"
11605         },
11606         "type": "array"
11607     },
11608     "href": {
11609         "description": "This is the target URI, it can be specified as a Relative
11610 Reference or fully-qualified URI.",
11611         "format": "uri",
11612         "maxLength": 256,
11613         "type": "string"
11614     },
11615     "if": {
11616         "description": "The interface set supported by this resource",
11617         "items": {
11618             "enum": [
11619                 "oic.if.baseline",
11620                 "oic.if.ll",
11621                 "oic.if.b",
11622                 "oic.if.rw",
11623                 "oic.if.r",
11624                 "oic.if.a",
11625                 "oic.if.s"
11626             ],
11627             "type": "string"
11628         },
11629         "minItems": 1,
11630         "type": "array"
11631     },
11632     "ins": {
11633         "description": "The instance identifier for this web link in an array of web
11634 links - used in collections",
11635         "oneOf": [
11636             {
11637                 "description": "An ordinal number that is not repeated - must be unique
11638 in the collection context.",
11639                 "type": "integer"
11640             },
11641             {
11642                 "description": "A unique string",
11643                 "format": "uri",
11644                 "maxLength": 256,
11645                 "type": "string"
11646             },
11647             {
11648                 "description": "A UUID",
11649                 "pattern": "^[a-fA-F0-9]{8}-[a-fA-F0-9]{4}-[a-fA-F0-9]{4}-[a-fA-F0-9]{4}-
11650 [a-fA-F0-9]{12}$",
11651                 "type": "string"
11652             }
11653         ]
11654     },
11655     "p": {
11656         "description": "Specifies the framework policies on the Resource referenced
11657 by the target URI",
11658         "properties": {

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```

11659         "bm": {
11660             "description": "Specifies the framework policies on the Resource
11661 referenced by the target URI for e.g. observable and discoverable",
11662             "type": "integer"
11663         }
11664     },
11665     "required": [
11666         "bm"
11667     ],
11668     "type": "object"
11669 },
11670 "rel": {
11671     "description": "The relation of the target URI referenced by the link to the
11672 context URI",
11673     "oneOf": [
11674         {
11675             "default": [
11676                 "hosts"
11677             ],
11678             "items": {
11679                 "maxLength": 64,
11680                 "type": "string"
11681             },
11682             "minItems": 1,
11683             "type": "array"
11684         },
11685         {
11686             "default": "hosts",
11687             "maxLength": 64,
11688             "type": "string"
11689         }
11690     ]
11691 },
11692 "rt": {
11693     "description": "Resource Type of the Resource",
11694     "items": {
11695         "maxLength": 64,
11696         "type": "string"
11697     },
11698     "minItems": 1,
11699     "type": "array"
11700 },
11701 "tag-locn": {
11702     "description": "Location of the Resource or Device",
11703     "enum": [
11704         "attic",
11705         "balcony",
11706         "ballroom",
11707         "bathroom",
11708         "bedroom",
11709         "border",
11710         "boxroom",
11711         "cellar",
11712         "cloakroom",
11713         "conservatory",
11714         "corridor",
11715         "deck",
11716         "den",
11717         "diningroom",
11718         "drawingroom",
11719         "driveway",
11720         "dungeon",
11721         "ensuite",
11722         "entrance",
11723         "familyroom",
11724         "garage",
11725         "garden",
11726         "guestroom",
11727         "hall",
11728         "kitchen",
11729         "larder",

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```

11730         "lawn",
11731         "library",
11732         "livingroom",
11733         "lounge",
11734         "mancave",
11735         "masterbedroom",
11736         "musicroom",
11737         "office",
11738         "pantry",
11739         "parkinglot",
11740         "parlour",
11741         "patio",
11742         "receptionroom",
11743         "roof",
11744         "roofterrace",
11745         "sauna",
11746         "shed",
11747         "sittingroom",
11748         "snug",
11749         "spa",
11750         "studio",
11751         "suite",
11752         "swimmingpool",
11753         "toilet",
11754         "utilityroom",
11755         "ward",
11756         "vegetableplot",
11757         "terrace"
11758     ]
11759 },
11760     "tag-pos-desc": {
11761         "oneOf": [
11762             {
11763                 "enum": [
11764                     "top",
11765                     "bottom",
11766                     "left",
11767                     "right",
11768                     "centre",
11769                     "topleft",
11770                     "bottomleft",
11771                     "centrelleft",
11772                     "centreright",
11773                     "bottomright",
11774                     "topright"
11775                 ]
11776             },
11777             {
11778                 "description": "Relative position; as defined by UPnP relpos, relative
11779 position against a known [0,0,0] point.",
11780                 "items": {
11781                     "type": "number"
11782                 },
11783                 "maxItems": 3,
11784                 "minItems": 3,
11785                 "readOnly": true,
11786                 "type": "array"
11787             }
11788         ]
11789     },
11790     "title": {
11791         "description": "A title for the link relation. Can be used by the UI to
11792 provide a context.",
11793         "maxLength": 64,
11794         "type": "string"
11795     },
11796     "type": {
11797         "default": "application/cbor",
11798         "description": "A hint at the representation of the resource referenced by
11799 the target URI. This represents the media types that are used for both accepting and emitting.",
11800         "items": {

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11801         "maxLength": 64,
11802         "type": "string"
11803     },
11804     "minItems": 1,
11805     "type": "array"
11806 }
11807 },
11808 "required": [
11809     "href",
11810     "rt",
11811     "if"
11812 ],
11813 "type": "object"
11814 },
11815 "type": "array"
11816 }
11817 ]
11818 },
11819 "rts": {
11820     "description": "The list of allowable resource types (for Target and anchors) in links
11821 included in the collection",
11822     "items": {
11823         "maxLength": 64,
11824         "type": "string"
11825     },
11826     "minItems": 1,
11827     "readOnly": true,
11828     "type": "array"
11829 },
11830 "sceneValues": {
11831     "description": "All available scene values",
11832     "items": {
11833         "type": "string"
11834     },
11835     "readOnly": true,
11836     "type": "array"
11837 }
11838 },
11839 "required": [
11840     "lastScene",
11841     "sceneValues",
11842     "rts",
11843     "id"
11844 ],
11845 "type": "object"
11846 }
11847
11848 'SceneCollectionUpdate' :
11849 {
11850     "description": "A collection is a set of links along with additional properties to describe
11851 the collection itself",
11852     "properties": {
11853         "lastScene": {
11854             "description": "Last selected Scene from the set of sceneValues",
11855             "type": "string"
11856         },
11857     },
11858     "links": {
11859         "description": "All forms of links in a collection.",
11860         "oneOf": [
11861             {
11862                 "description": "A set of simple or individual OIC Links.",
11863                 "items": {
11864                     "properties": {
11865                         "anchor": {
11866                             "description": "This is used to override the context URI e.g. override the
11867 URI of the containing collection.",
11868                             "format": "uri",
11869                             "maxLength": 256,
11870                             "type": "string"
11871                         }

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11872         "di": {
11873             "description": "The device ID",
11874             "pattern": "^[a-fA-F0-9]{8}-[a-fA-F0-9]{4}-[a-fA-F0-9]{4}-[a-fA-F0-9]{4}-[a-
11875 fa-F0-9]{12}$",
11876             "type": "string"
11877         },
11878         "eps": {
11879             "description": "the Endpoint information of the target Resource",
11880             "items": {
11881                 "properties": {
11882                     "ep": {
11883                         "description": "Transport Protocol Suite + Endpoint Locator",
11884                         "format": "uri",
11885                         "type": "string"
11886                     },
11887                     "pri": {
11888                         "description": "The priority among multiple Endpoints",
11889                         "minimum": 1,
11890                         "type": "integer"
11891                     }
11892                 },
11893                 "type": "object"
11894             },
11895             "type": "array"
11896         },
11897         "href": {
11898             "description": "This is the target URI, it can be specified as a Relative
11899 Reference or fully-qualified URI.",
11900             "format": "uri",
11901             "maxLength": 256,
11902             "type": "string"
11903         },
11904         "if": {
11905             "description": "The interface set supported by this resource",
11906             "items": {
11907                 "enum": [
11908                     "oic.if.baseline",
11909                     "oic.if.ll",
11910                     "oic.if.b",
11911                     "oic.if.rw",
11912                     "oic.if.r",
11913                     "oic.if.a",
11914                     "oic.if.s"
11915                 ],
11916                 "type": "string"
11917             },
11918             "minItems": 1,
11919             "type": "array"
11920         },
11921         "ins": {
11922             "description": "The instance identifier for this web link in an array of web
11923 links - used in collections",
11924             "oneOf": [
11925                 {
11926                     "description": "An ordinal number that is not repeated - must be unique
11927 in the collection context.",
11928                     "type": "integer"
11929                 },
11930                 {
11931                     "description": "A unique string",
11932                     "format": "uri",
11933                     "maxLength": 256,
11934                     "type": "string"
11935                 },
11936                 {
11937                     "description": "A UUID",
11938                     "pattern": "^[a-fA-F0-9]{8}-[a-fA-F0-9]{4}-[a-fA-F0-9]{4}-[a-fA-F0-9]{4}-
11939 [a-fA-F0-9]{12}$",
11940                     "type": "string"
11941                 }
11942             ]

```

```

11943         },
11944         "p": {
11945             "description": "Specifies the framework policies on the Resource referenced
11946 by the target URI",
11947             "properties": {
11948                 "bm": {
11949                     "description": "Specifies the framework policies on the Resource
11950 referenced by the target URI for e.g. observable and discoverable",
11951                     "type": "integer"
11952                 }
11953             },
11954             "required": [
11955                 "bm"
11956             ],
11957             "type": "object"
11958         },
11959         "rel": {
11960             "description": "The relation of the target URI referenced by the link to the
11961 context URI",
11962             "oneOf": [
11963                 {
11964                     "default": [
11965                         "hosts"
11966                     ],
11967                     "items": {
11968                         "maxLength": 64,
11969                         "type": "string"
11970                     },
11971                     "minItems": 1,
11972                     "type": "array"
11973                 },
11974                 {
11975                     "default": "hosts",
11976                     "maxLength": 64,
11977                     "type": "string"
11978                 }
11979             ]
11980         },
11981         "rt": {
11982             "description": "Resource Type of the Resource",
11983             "items": {
11984                 "maxLength": 64,
11985                 "type": "string"
11986             },
11987             "minItems": 1,
11988             "type": "array"
11989         },
11990         "tag-locn": {
11991             "description": "Location of the Resource or Device",
11992             "enum": [
11993                 "attic",
11994                 "balcony",
11995                 "ballroom",
11996                 "bathroom",
11997                 "bedroom",
11998                 "border",
11999                 "boxroom",
12000                 "cellar",
12001                 "cloakroom",
12002                 "conservatory",
12003                 "corridor",
12004                 "deck",
12005                 "den",
12006                 "diningroom",
12007                 "drawingroom",
12008                 "driveway",
12009                 "dungeon",
12010                 "ensuite",
12011                 "entrance",
12012                 "familyroom",
12013                 "garage",

```

```

12014         "garden",
12015         "guestroom",
12016         "hall",
12017         "kitchen",
12018         "larder",
12019         "lawn",
12020         "library",
12021         "livingroom",
12022         "lounge",
12023         "mancave",
12024         "masterbedroom",
12025         "musicroom",
12026         "office",
12027         "pantry",
12028         "parkinglot",
12029         "parlour",
12030         "patio",
12031         "receptionroom",
12032         "roof",
12033         "roofterrace",
12034         "sauna",
12035         "shed",
12036         "sittingroom",
12037         "snug",
12038         "spa",
12039         "studio",
12040         "suite",
12041         "swimmingpool",
12042         "toilet",
12043         "utilityroom",
12044         "ward",
12045         "vegetableplot",
12046         "terrace"
12047     ]
12048 },
12049     "tag-pos-desc": {
12050         "oneOf": [
12051             {
12052                 "enum": [
12053                     "top",
12054                     "bottom",
12055                     "left",
12056                     "right",
12057                     "centre",
12058                     "topleft",
12059                     "bottomleft",
12060                     "centrelleft",
12061                     "centreright",
12062                     "bottomright",
12063                     "topright"
12064                 ]
12065             },
12066             {
12067                 "description": "Relative position; as defined by UPnP relpos, relative
12068 position against a known [0,0,0] point.",
12069                 "items": {
12070                     "type": "number"
12071                 },
12072                 "maxItems": 3,
12073                 "minItems": 3,
12074                 "readOnly": true,
12075                 "type": "array"
12076             }
12077         ]
12078     },
12079     "title": {
12080         "description": "A title for the link relation. Can be used by the UI to
12081 provide a context.",
12082         "maxLength": 64,
12083         "type": "string"
12084     },

```

```

12085         "type": {
12086             "default": "application/cbor",
12087             "description": "A hint at the representation of the resource referenced by
12088 the target URI. This represents the media types that are used for both accepting and emitting.",
12089             "items": {
12090                 "maxLength": 64,
12091                 "type": "string"
12092             },
12093             "minItems": 1,
12094             "type": "array"
12095         }
12096     },
12097     "required": [
12098         "href",
12099         "rt",
12100         "if"
12101     ],
12102     "type": "object"
12103 },
12104 "type": "array"
12105 }
12106 ]
12107 },
12108 "rts": {
12109     "description": "The list of allowable resource types (for Target and anchors) in links
12110 included in the collection",
12111     "items": {
12112         "maxLength": 64,
12113         "type": "string"
12114     },
12115     "minItems": 1,
12116     "readOnly": true,
12117     "type": "array"
12118 },
12119 },
12120 "required": [
12121     "lastScene"
12122 ],
12123 "type": "object"
12124 }
12125 }
12126 }
12127 }
12128

```

F.11.5 Property Definition

Property name	Value type	Mandatory	Access mode	Description
sceneValues	array: see schema	yes	Read Only	All available scene values
lastScene	string	yes		Last selected Scene from the set of sceneValues
rts	array: see schema	yes	Read Only	The list of allowable resource types (for Target and anchors) in links included in the collection
links	multiple types: see schema			All forms of links in a collection.
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
href	string	yes		This is the target URI, it can be specified as a Relative Reference or fully-qualified URI.
title	string			A title for the link relation. Can be used by the UI to provide a context.
rel	multiple types: see schema			The relation of the target URI referenced by the link to the context URI
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.
tag-pos-desc	multiple types: see schema			
di	string			The device ID
ins	multiple types: see schema			The instance identifier for this web link in an array of web links - used in collections
eps	array: see schema			the Endpoint information of the target Resource
tag-locn	multiple types: see schema			Location of the Resource or Device

rt	array: schema	see	yes		Resource Type of the Resource
lastScene	string		yes		Last selected Scene from the set of sceneValues
rts	array: schema	see		Read Only	The list of allowable resource types (for Target and anchors) in links included in the collection
links	multiple types: see schema				All forms of links in a collection.
SceneMappings	array: schema	see			array of mappings per scene, can be one(1)
link	object: schema	see	yes		OCF link that points to a resource

12130 **F.11.6 CRUDN behaviour**

Resource	Create	Read	Update	Delete	Notify
/SceneListResURI		get			

12131 **F.12 Scene Collection**

12132 **F.12.1 Introduction**

12133 Collection that models a set of Scenes.
 12134 This resource is a generic collection resource with additional parameters.
 12135 The rts value shall contain oic.scenemember resource types.
 12136 The additional parameters are
 12137 lastScene, this is the scene value last set by any OCF Client
 12138 sceneValues, this is the list of available scenes
 12139 lastScene shall be listed in sceneValues.
 12140 Provides the current list of web links pointing to scenes
 12141

12142 **F.12.2 Example URI**

12143 /SceneCollectionResURI

12144 **F.12.3 Resource Type**

12145 The resource type (rt) is defined as: ['oic.wk.scenecollection'].

12146 **F.12.4 Swagger2.0 Definition**

```

12147 {
12148   "swagger": "2.0",
12149   "info": {
12150     "title": "Scenes (Top level)",
12151     "version": "v1-20160622",
12152     "license": {
12153       "name": "copyright 2016-2017 Open Connectivity Foundation, Inc. All rights reserved.",
12154       "x-description": "Redistribution and use in source and binary forms, with or without
12155 modification, are permitted provided that the following conditions are met:\n      1.
12156 Redistributions of source code must retain the above copyright notice, this list of conditions and
12157 the following disclaimer.\n      2. Redistributions in binary form must reproduce the above

```

```

12158 copyright notice, this list of conditions and the following disclaimer in the documentation and/or
12159 other materials provided with the distribution.\n\n THIS SOFTWARE IS PROVIDED BY THE Open
12160 Connectivity Foundation, INC. \ "AS IS\ " AND ANY EXPRESS OR IMPLIED WARRANTIES, INCLUDING, BUT NOT
12161 LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE OR
12162 WARRANTIES OF NON-INFRINGEMENT, ARE DISCLAIMED.\n IN NO EVENT SHALL THE Open Connectivity
12163 Foundation, INC. OR CONTRIBUTORS BE LIABLE FOR ANY DIRECT, INDIRECT, INCIDENTAL, SPECIAL,
12164 EXEMPLARY, OR CONSEQUENTIAL DAMAGES (INCLUDING, BUT NOT LIMITED TO, PROCUREMENT OF SUBSTITUTE GOODS
12165 OR SERVICES; LOSS OF USE, DATA, OR PROFITS; OR BUSINESS INTERRUPTION)\n HOWEVER CAUSED AND
12166 ON ANY THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT (INCLUDING NEGLIGENCE OR
12167 OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OF THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY
12168 OF SUCH DAMAGE.\n"
12169 }
12170 },
12171 "schemes": ["http"],
12172 "consumes": ["application/json"],
12173 "produces": ["application/json"],
12174 "paths": {
12175 "/SceneListResURI" : {
12176 "get": {
12177 "description": "Toplevel Scene resource.\nThis resource is a generic collection
12178 resource.\nThe rts value shall contain oic.wk.scenecollection resource types.\nProvides the current
12179 list of web links pointing to scenes\n",
12180 "parameters": [
12181 ],
12182 "responses": {
12183 "200": {
12184 "description" : "",
12185 "x-example":
12186 {
12187 "rt": ["oic.wk.scenelist"],
12188 "n": "list of scene Collections",
12189 "rts": ["oic.wk.scenecollection"],
12190 "links": [
12191 ]
12192 }
12193 },
12194 "schema": { "$ref": "#/definitions/Collection" }
12195 }
12196 }
12197 },
12198 },
12199 "/SceneMemberResURI" : {
12200 "get": {
12201 "description": "Collection that models a scene member.\nProvides the scene member\n",
12202 "parameters": [
12203 ],
12204 "responses": {
12205 "200": {
12206 "description" : "",
12207 "x-example":
12208 {
12209 "rt": ["oic.wk.scenemember"],
12210 "id": "0685B960-FFFF-46F7-BEC0-9E6234671ADC1",
12211 "n": "my binary switch (for light bulb) mappings",
12212 "link": {
12213 "href": "binarySwitch",
12214 "rt": ["oic.r.switch.binary"],
12215 "if": ["oic.if.a", "oic.if.baseline"],
12216 "eps": [
12217 {"ep": "coap://[fe80::bld6]:1111", "pri": 2},
12218 {"ep": "coaps://[fe80::bld6]:1122"},
12219 {"ep": "coap+tcp://[2001:db8:a::123]:2222", "pri": 3}
12220 ]
12221 }
12222 },
12223 "sceneMappings": [
12224 {
12225 "scene": "off",
12226 "memberProperty": "value",
12227 "memberValue": true
12228 }

```

```

12229         "scene":          "Reading",
12230         "memberProperty": "value",
12231         "memberValue":    false
12232     },
12233     {
12234         "scene":          "TVWatching",
12235         "memberProperty": "value",
12236         "memberValue":    true
12237     }
12238     ]
12239     },
12240     ,
12241     "schema": { "$ref": "#/definitions/SceneMember" }
12242     }
12243     },
12244     },
12245     },
12246     "/SceneCollectionResURI" : {
12247         "get": {
12248             "description": "Collection that models a set of Scenes.\nThis resource is a generic
12249 collection resource with additional parameters.\nThe rts value shall contain oic.scenemember
12250 resource types.\nThe additional parameters are\n lastScene, this is the scene value last set by
12251 any OCF Client\n sceneValues, this is the list of available scenes\n lastScene shall be listed in
12252 sceneValues.\nProvides the current list of web links pointing to scenes\n",
12253             "parameters": [
12254             ],
12255             "responses": {
12256                 "200": {
12257                     "description": "",
12258                     "x-example":
12259                     {
12260                         "lastScene": "off",
12261                         "sceneValues": ["off","Reading","TVWatching"],
12262                         "rt":          ["oic.wk.scenecollection"],
12263                         "n":           "My Scenes for my living room",
12264                         "id":          "0685B960-736F-46F7-BEC0-9E6CBD671ADC1",
12265                         "rts":         ["oic.wk.scenemember"],
12266                         "links": [
12267                         ]
12268                     }
12269                 },
12270                 "schema": { "$ref": "#/definitions/SceneCollection" }
12271             }
12272         },
12273     },
12274     "post": {
12275         "description": "Provides the action to change the last set scene selection.\nCalling this
12276 method shall update all scene members to the prescribed membervalue.\nWhen this method is called
12277 with the same value as the current lastScene value\nthen all scene members shall be updated.\n",
12278         "parameters": [
12279             {
12280                 "name": "body",
12281                 "in": "body",
12282                 "required": true,
12283                 "schema": { "$ref": "#/definitions/SceneCollectionUpdate" },
12284                 "x-example":
12285                 {
12286                     "lastScene": "Reading"
12287                 }
12288             }
12289         ],
12290         "responses": {
12291             "200": {
12292                 "description": "Indicates that the value is changed.\nThe changed properties are
12293 provided in the response.\n",
12294                 "x-example":
12295                 {
12296                     "lastScene": "Reading"
12297                 }
12298             },
12299             "schema": { "$ref": "#/definitions/SceneCollectionUpdate" }

```

```

12300     }
12301     }
12302   }
12303 }
12304 },
12305 "parameters": {
12306   "interface" : {
12307     "in" : "query",
12308     "name" : "if",
12309     "type" : "string",
12310     "enum" : ["oic.if.a", "oic.if.ll", "oic.if.baseline"]
12311   }
12312 },
12313 "definitions": {
12314   "Collection" :
12315     {
12316     "description": "A set of simple or individual OIC Links.",
12317     "items": {
12318       "properties": {
12319         "anchor": {
12320           "description": "This is used to override the context URI e.g. override the URI of the
12321 containing collection.",
12322           "format": "uri",
12323           "maxLength": 256,
12324           "type": "string"
12325         },
12326         "di": {
12327           "description": "The device ID",
12328           "pattern": "^[a-fA-F0-9]{8}-[a-fA-F0-9]{4}-[a-fA-F0-9]{4}-[a-fA-F0-9]{4}-[a-fA-F0-
12329 9]{12}$",
12330           "type": "string"
12331         },
12332         "eps": {
12333           "description": "the Endpoint information of the target Resource",
12334           "items": {
12335             "properties": {
12336               "ep": {
12337                 "description": "Transport Protocol Suite + Endpoint Locator",
12338                 "format": "uri",
12339                 "type": "string"
12340               },
12341               "pri": {
12342                 "description": "The priority among multiple Endpoints",
12343                 "minimum": 1,
12344                 "type": "integer"
12345               }
12346             },
12347             "type": "object"
12348           },
12349           "type": "array"
12350         },
12351         "href": {
12352           "description": "This is the target URI, it can be specified as a Relative Reference
12353 or fully-qualified URI.",
12354           "format": "uri",
12355           "maxLength": 256,
12356           "type": "string"
12357         },
12358         "if": {
12359           "description": "The interface set supported by this resource",
12360           "items": {
12361             "enum": [
12362               "oic.if.baseline",
12363               "oic.if.ll",
12364               "oic.if.b",
12365               "oic.if.rw",
12366               "oic.if.r",
12367               "oic.if.a",
12368               "oic.if.s"
12369             ],
12370           "type": "string"

```

```

12371         },
12372         "minItems": 1,
12373         "type": "array"
12374     },
12375     "ins": {
12376         "description": "The instance identifier for this web link in an array of web links -
12377 used in collections",
12378         "oneOf": [
12379             {
12380                 "description": "An ordinal number that is not repeated - must be unique in the
12381 collection context.",
12382                 "type": "integer"
12383             },
12384             {
12385                 "description": "A unique string",
12386                 "format": "uri",
12387                 "maxLength": 256,
12388                 "type": "string"
12389             },
12390             {
12391                 "description": "A UUID",
12392                 "pattern": "^[a-fA-F0-9]{8}-[a-fA-F0-9]{4}-[a-fA-F0-9]{4}-[a-fA-F0-9]{4}-[a-fA-
12393 F0-9]{12}$",
12394                 "type": "string"
12395             }
12396         ]
12397     },
12398     "p": {
12399         "description": "Specifies the framework policies on the Resource referenced by the
12400 target URI",
12401         "properties": {
12402             "bm": {
12403                 "description": "Specifies the framework policies on the Resource referenced by
12404 the target URI for e.g. observable and discoverable",
12405                 "type": "integer"
12406             }
12407         },
12408         "required": [
12409             "bm"
12410         ],
12411         "type": "object"
12412     },
12413     "rel": {
12414         "description": "The relation of the target URI referenced by the link to the context
12415 URI",
12416         "oneOf": [
12417             {
12418                 "default": [
12419                     "hosts"
12420                 ],
12421                 "items": {
12422                     "maxLength": 64,
12423                     "type": "string"
12424                 },
12425                 "minItems": 1,
12426                 "type": "array"
12427             },
12428             {
12429                 "default": "hosts",
12430                 "maxLength": 64,
12431                 "type": "string"
12432             }
12433         ]
12434     },
12435     "rt": {
12436         "description": "Resource Type of the Resource",
12437         "items": {
12438             "maxLength": 64,
12439             "type": "string"
12440         },
12441         "minItems": 1,

```

```

12442     "type": "array"
12443   },
12444   "tag-locn": {
12445     "description": "Location of the Resource or Device",
12446     "enum": [
12447       "attic",
12448       "balcony",
12449       "ballroom",
12450       "bathroom",
12451       "bedroom",
12452       "border",
12453       "boxroom",
12454       "cellar",
12455       "cloakroom",
12456       "conservatory",
12457       "corridor",
12458       "deck",
12459       "den",
12460       "diningroom",
12461       "drawingroom",
12462       "driveway",
12463       "dungeon",
12464       "ensuite",
12465       "entrance",
12466       "familyroom",
12467       "garage",
12468       "garden",
12469       "guestroom",
12470       "hall",
12471       "kitchen",
12472       "larder",
12473       "lawn",
12474       "library",
12475       "livingroom",
12476       "lounge",
12477       "mancave",
12478       "masterbedroom",
12479       "musicroom",
12480       "office",
12481       "pantry",
12482       "parkinglot",
12483       "parlour",
12484       "patio",
12485       "receptionroom",
12486       "roof",
12487       "roofterrace",
12488       "sauna",
12489       "shed",
12490       "sittingroom",
12491       "snug",
12492       "spa",
12493       "studio",
12494       "suite",
12495       "swimmingpool",
12496       "toilet",
12497       "utilityroom",
12498       "ward",
12499       "vegetableplot",
12500       "terrace"
12501     ]
12502   },
12503   "tag-pos-desc": {
12504     "oneOf": [
12505       {
12506         "enum": [
12507           "top",
12508           "bottom",
12509           "left",
12510           "right",
12511           "centre",
12512           "topleft",

```

```

12513         "bottomleft",
12514         "centreleft",
12515         "centreright",
12516         "bottomright",
12517         "topright"
12518     ]
12519 },
12520 {
12521     "description": "Relative position; as defined by UPnP relpos, relative position
12522 against a known [0,0,0] point.",
12523     "items": {
12524         "type": "number"
12525     },
12526     "maxItems": 3,
12527     "minItems": 3,
12528     "readOnly": true,
12529     "type": "array"
12530 }
12531 ]
12532 },
12533 "title": {
12534     "description": "A title for the link relation. Can be used by the UI to provide a
12535 context.",
12536     "maxLength": 64,
12537     "type": "string"
12538 },
12539 "type": {
12540     "default": "application/cbor",
12541     "description": "A hint at the representation of the resource referenced by the target
12542 URI. This represents the media types that are used for both accepting and emitting.",
12543     "items": {
12544         "maxLength": 64,
12545         "type": "string"
12546     },
12547     "minItems": 1,
12548     "type": "array"
12549 }
12550 },
12551 "required": [
12552     "href",
12553     "rt",
12554     "if"
12555 ],
12556 "type": "object"
12557 },
12558 "type": "array"
12559 }
12560
12561 ,
12562 "SceneMember" :
12563 {
12564     "properties": {
12565         "SceneMappings": {
12566             "description": "array of mappings per scene, can be one(1)",
12567             "items": {
12568                 "properties": {
12569                     "memberProperty": {
12570                         "description": "property name that will be mapped",
12571                         "readOnly": true,
12572                         "type": "string"
12573                     },
12574                     "memberValue": {
12575                         "description": "value of the Member Property",
12576                         "readOnly": true,
12577                         "type": "string"
12578                     },
12579                     "scene": {
12580                         "description": "Specifies a scene value that will be acted upon",
12581                         "type": "string"
12582                     }
12583                 }
12584             }
12585         }
12586     }
12587 }

```



```

12584         "required": [
12585             "scene",
12586             "memberProperty",
12587             "memberValue"
12588         ],
12589         "type": "object"
12590     },
12591     "type": "array"
12592 },
12593 "link": {
12594     "description": "OCF link that points to a resource",
12595     "properties": {
12596         "anchor": {
12597             "description": "This is used to override the context URI e.g. override the URI of
12598 the containing collection.",
12599             "format": "uri",
12600             "maxLength": 256,
12601             "type": "string"
12602         },
12603         "di": {
12604             "description": "The device ID",
12605             "pattern": "^[a-fA-F0-9]{8}-[a-fA-F0-9]{4}-[a-fA-F0-9]{4}-[a-fA-F0-
12606 9]{12}$",
12607             "type": "string"
12608         },
12609         "eps": {
12610             "description": "the Endpoint information of the target Resource",
12611             "items": {
12612                 "properties": {
12613                     "ep": {
12614                         "description": "Transport Protocol Suite + Endpoint Locator",
12615                         "format": "uri",
12616                         "type": "string"
12617                     },
12618                     "pri": {
12619                         "description": "The priority among multiple Endpoints",
12620                         "minimum": 1,
12621                         "type": "integer"
12622                     }
12623                 },
12624                 "type": "object"
12625             },
12626             "type": "array"
12627         },
12628         "href": {
12629             "description": "This is the target URI, it can be specified as a Relative Reference
12630 or fully-qualified URI.",
12631             "format": "uri",
12632             "maxLength": 256,
12633             "type": "string"
12634         },
12635         "if": {
12636             "description": "The interface set supported by this resource",
12637             "items": {
12638                 "enum": [
12639                     "oic.if.baseline",
12640                     "oic.if.ll",
12641                     "oic.if.b",
12642                     "oic.if.rw",
12643                     "oic.if.r",
12644                     "oic.if.a",
12645                     "oic.if.s"
12646                 ],
12647                 "type": "string"
12648             },
12649             "minItems": 1,
12650             "type": "array"
12651         },
12652         "ins": {
12653             "description": "The instance identifier for this web link in an array of web links
12654 - used in collections",

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12655         "oneOf": [
12656             {
12657                 "description": "An ordinal number that is not repeated - must be unique in the
12658 collection context.",
12659                 "type": "integer"
12660             },
12661             {
12662                 "description": "A unique string",
12663                 "format": "uri",
12664                 "maxLength": 256,
12665                 "type": "string"
12666             },
12667             {
12668                 "description": "A UUID",
12669                 "pattern": "^[a-fA-F0-9]{8}-[a-fA-F0-9]{4}-[a-fA-F0-9]{4}-[a-fA-F0-9]{4}-[a-fA-
12670 F0-9]{12}$",
12671                 "type": "string"
12672             }
12673         ]
12674     },
12675     "p": {
12676         "description": "Specifies the framework policies on the Resource referenced by the
12677 target URI",
12678         "properties": {
12679             "bm": {
12680                 "description": "Specifies the framework policies on the Resource referenced by
12681 the target URI for e.g. observable and discoverable",
12682                 "type": "integer"
12683             }
12684         },
12685         "required": [
12686             "bm"
12687         ],
12688         "type": "object"
12689     },
12690     "rel": {
12691         "description": "The relation of the target URI referenced by the link to the
12692 context URI",
12693         "oneOf": [
12694             {
12695                 "default": [
12696                     "hosts"
12697                 ],
12698                 "items": {
12699                     "maxLength": 64,
12700                     "type": "string"
12701                 },
12702                 "minItems": 1,
12703                 "type": "array"
12704             },
12705             {
12706                 "default": "hosts",
12707                 "maxLength": 64,
12708                 "type": "string"
12709             }
12710         ]
12711     },
12712     "rt": {
12713         "description": "Resource Type of the Resource",
12714         "items": {
12715             "maxLength": 64,
12716             "type": "string"
12717         },
12718         "minItems": 1,
12719         "type": "array"
12720     },
12721     "tag-locn": {
12722         "description": "Location of the Resource or Device",
12723         "enum": [
12724             "attic",
12725             "balcony",

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12726     "ballroom",
12727     "bathroom",
12728     "bedroom",
12729     "border",
12730     "boxroom",
12731     "cellar",
12732     "cloakroom",
12733     "conservatory",
12734     "corridor",
12735     "deck",
12736     "den",
12737     "diningroom",
12738     "drawingroom",
12739     "driveway",
12740     "dungeon",
12741     "ensuite",
12742     "entrance",
12743     "familyroom",
12744     "garage",
12745     "garden",
12746     "guestroom",
12747     "hall",
12748     "kitchen",
12749     "larder",
12750     "lawn",
12751     "library",
12752     "livingroom",
12753     "lounge",
12754     "mancave",
12755     "masterbedroom",
12756     "musicroom",
12757     "office",
12758     "pantry",
12759     "parkinglot",
12760     "parlour",
12761     "patio",
12762     "receptionroom",
12763     "roof",
12764     "roofterrace",
12765     "sauna",
12766     "shed",
12767     "sittingroom",
12768     "snug",
12769     "spa",
12770     "studio",
12771     "suite",
12772     "swimmingpool",
12773     "toilet",
12774     "utilityroom",
12775     "ward",
12776     "vegetableplot",
12777     "terrace"
12778   ]
12779 },
12780 "tag-pos-desc": {
12781   "oneOf": [
12782     {
12783       "enum": [
12784         "top",
12785         "bottom",
12786         "left",
12787         "right",
12788         "centre",
12789         "topleft",
12790         "bottomleft",
12791         "centrelleft",
12792         "centreright",
12793         "bottomright",
12794         "topright"
12795       ]
12796     },

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12797         {
12798             "description": "Relative position; as defined by UPnP relpos, relative position
12799 against a known [0,0,0] point.",
12800             "items": {
12801                 "type": "number"
12802             },
12803             "maxItems": 3,
12804             "minItems": 3,
12805             "readOnly": true,
12806             "type": "array"
12807         }
12808     ],
12809 },
12810     "title": {
12811         "description": "A title for the link relation. Can be used by the UI to provide a
12812 context.",
12813         "maxLength": 64,
12814         "type": "string"
12815     },
12816     "type": {
12817         "default": "application/cbor",
12818         "description": "A hint at the representation of the resource referenced by the
12819 target URI. This represents the media types that are used for both accepting and emitting.",
12820         "items": {
12821             "maxLength": 64,
12822             "type": "string"
12823         },
12824         "minItems": 1,
12825         "type": "array"
12826     }
12827 },
12828     "required": [
12829         "href",
12830         "rt",
12831         "if"
12832     ],
12833     "type": "object"
12834 }
12835 },
12836     "required": [
12837         "link"
12838     ],
12839     "type": "object"
12840 }
12841
12842 'SceneCollection' :
12843 {
12844     "description": "A collection is a set of links along with additional properties to describe
12845 the collection itself",
12846     "properties": {
12847         "lastScene": {
12848             "description": "Last selected Scene from the set of sceneValues",
12849             "type": "string"
12850         },
12851     },
12852     "links": {
12853         "description": "All forms of links in a collection.",
12854         "oneOf": [
12855             {
12856                 "description": "A set of simple or individual OIC Links.",
12857                 "items": {
12858                     "properties": {
12859                         "anchor": {
12860                             "description": "This is used to override the context URI e.g. override the
12861 URI of the containing collection.",
12862                             "format": "uri",
12863                             "maxLength": 256,
12864                             "type": "string"
12865                         },
12866                         "di": {
12867                             "description": "The device ID",

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12868         "pattern": "[a-fA-F0-9]{8}-[a-fA-F0-9]{4}-[a-fA-F0-9]{4}-[a-fA-F0-9]{4}-[a-
12869 fa-F0-9]{12}$",
12870         "type": "string"
12871     },
12872     "eps": {
12873         "description": "the Endpoint information of the target Resource",
12874         "items": {
12875             "properties": {
12876                 "ep": {
12877                     "description": "Transport Protocol Suite + Endpoint Locator",
12878                     "format": "uri",
12879                     "type": "string"
12880                 },
12881                 "pri": {
12882                     "description": "The priority among multiple Endpoints",
12883                     "minimum": 1,
12884                     "type": "integer"
12885                 }
12886             },
12887             "type": "object"
12888         },
12889         "type": "array"
12890     },
12891     "href": {
12892         "description": "This is the target URI, it can be specified as a Relative
12893 Reference or fully-qualified URI.",
12894         "format": "uri",
12895         "maxLength": 256,
12896         "type": "string"
12897     },
12898     "if": {
12899         "description": "The interface set supported by this resource",
12900         "items": {
12901             "enum": [
12902                 "oic.if.baseline",
12903                 "oic.if.ll",
12904                 "oic.if.b",
12905                 "oic.if.rw",
12906                 "oic.if.r",
12907                 "oic.if.a",
12908                 "oic.if.s"
12909             ],
12910             "type": "string"
12911         },
12912         "minItems": 1,
12913         "type": "array"
12914     },
12915     "ins": {
12916         "description": "The instance identifier for this web link in an array of web
12917 links - used in collections",
12918         "oneOf": [
12919             {
12920                 "description": "An ordinal number that is not repeated - must be unique
12921 in the collection context.",
12922                 "type": "integer"
12923             },
12924             {
12925                 "description": "A unique string",
12926                 "format": "uri",
12927                 "maxLength": 256,
12928                 "type": "string"
12929             },
12930             {
12931                 "description": "A UUID",
12932                 "pattern": "[a-fA-F0-9]{8}-[a-fA-F0-9]{4}-[a-fA-F0-9]{4}-[a-fA-F0-9]{4}-
12933 [a-fA-F0-9]{12}$",
12934                 "type": "string"
12935             }
12936         ]
12937     },
12938     "p": {

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12939         "description": "Specifies the framework policies on the Resource referenced
12940 by the target URI",
12941         "properties": {
12942             "bm": {
12943                 "description": "Specifies the framework policies on the Resource
12944 referenced by the target URI for e.g. observable and discoverable",
12945                 "type": "integer"
12946             }
12947         },
12948         "required": [
12949             "bm"
12950         ],
12951         "type": "object"
12952     },
12953     "rel": {
12954         "description": "The relation of the target URI referenced by the link to the
12955 context URI",
12956         "oneOf": [
12957             {
12958                 "default": [
12959                     "hosts"
12960                 ],
12961                 "items": {
12962                     "maxLength": 64,
12963                     "type": "string"
12964                 },
12965                 "minItems": 1,
12966                 "type": "array"
12967             },
12968             {
12969                 "default": "hosts",
12970                 "maxLength": 64,
12971                 "type": "string"
12972             }
12973         ]
12974     },
12975     "rt": {
12976         "description": "Resource Type of the Resource",
12977         "items": {
12978             "maxLength": 64,
12979             "type": "string"
12980         },
12981         "minItems": 1,
12982         "type": "array"
12983     },
12984     "tag-locn": {
12985         "description": "Location of the Resource or Device",
12986         "enum": [
12987             "attic",
12988             "balcony",
12989             "ballroom",
12990             "bathroom",
12991             "bedroom",
12992             "border",
12993             "boxroom",
12994             "cellar",
12995             "cloakroom",
12996             "conservatory",
12997             "corridor",
12998             "deck",
12999             "den",
13000             "diningroom",
13001             "drawingroom",
13002             "driveway",
13003             "dungeon",
13004             "ensuite",
13005             "entrance",
13006             "familyroom",
13007             "garage",
13008             "garden",
13009             "guestroom",

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13010         "hall",
13011         "kitchen",
13012         "larder",
13013         "lawn",
13014         "library",
13015         "livingroom",
13016         "lounge",
13017         "mancave",
13018         "masterbedroom",
13019         "musicroom",
13020         "office",
13021         "pantry",
13022         "parkinglot",
13023         "parlour",
13024         "patio",
13025         "receptionroom",
13026         "roof",
13027         "roofterrace",
13028         "sauna",
13029         "shed",
13030         "sittingroom",
13031         "snug",
13032         "spa",
13033         "studio",
13034         "suite",
13035         "swimmingpool",
13036         "toilet",
13037         "utilityroom",
13038         "ward",
13039         "vegetableplot",
13040         "terrace"
13041     ]
13042 },
13043 "tag-pos-desc": {
13044     "oneOf": [
13045         {
13046             "enum": [
13047                 "top",
13048                 "bottom",
13049                 "left",
13050                 "right",
13051                 "centre",
13052                 "topleft",
13053                 "bottomleft",
13054                 "centrelleft",
13055                 "centreright",
13056                 "bottomright",
13057                 "topright"
13058             ]
13059         },
13060         {
13061             "description": "Relative position; as defined by UPnP relpos, relative
13062 position against a known [0,0,0] point.",
13063             "items": {
13064                 "type": "number"
13065             },
13066             "maxItems": 3,
13067             "minItems": 3,
13068             "readOnly": true,
13069             "type": "array"
13070         }
13071     ]
13072 },
13073 "title": {
13074     "description": "A title for the link relation. Can be used by the UI to
13075 provide a context.",
13076     "maxLength": 64,
13077     "type": "string"
13078 },
13079 "type": {
13080     "default": "application/cbor",

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13081         "description": "A hint at the representation of the resource referenced by
13082 the target URI. This represents the media types that are used for both accepting and emitting.",
13083         "items": {
13084             "maxLength": 64,
13085             "type": "string"
13086         },
13087         "minItems": 1,
13088         "type": "array"
13089     }
13090 },
13091     "required": [
13092         "href",
13093         "rt",
13094         "if"
13095     ],
13096     "type": "object"
13097 },
13098     "type": "array"
13099 }
13100 ]
13101 },
13102     "rts": {
13103         "description": "The list of allowable resource types (for Target and anchors) in links
13104 included in the collection",
13105         "items": {
13106             "maxLength": 64,
13107             "type": "string"
13108         },
13109         "minItems": 1,
13110         "readOnly": true,
13111         "type": "array"
13112     },
13113     "sceneValues": {
13114         "description": "All available scene values",
13115         "items": {
13116             "type": "string"
13117         },
13118         "readOnly": true,
13119         "type": "array"
13120     }
13121 },
13122     "required": [
13123         "lastScene",
13124         "sceneValues",
13125         "rts",
13126         "id"
13127     ],
13128     "type": "object"
13129 }
13130
13131 ,
13132 "SceneCollectionUpdate" :
13133 {
13134     "description": "A collection is a set of links along with additional properties to describe
13135 the collection itself",
13136     "properties": {
13137         "lastScene": {
13138             "description": "Last selected Scene from the set of sceneValues",
13139             "type": "string"
13140         },
13141         "links": {
13142             "description": "All forms of links in a collection.",
13143             "oneOf": [
13144                 {
13145                     "description": "A set of simple or individual OIC Links.",
13146                     "items": {
13147                         "properties": {
13148                             "anchor": {
13149                                 "description": "This is used to override the context URI e.g. override the
13150 URI of the containing collection.",
13151                                 "format": "uri",

```



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13152         "maxLength": 256,
13153         "type": "string"
13154     },
13155     "di": {
13156         "description": "The device ID",
13157         "pattern": "^[a-fA-F0-9]{8}-[a-fA-F0-9]{4}-[a-fA-F0-9]{4}-[a-fA-F0-9]{4}-[a-
13158 fa-F0-9]{12}$",
13159         "type": "string"
13160     },
13161     "eps": {
13162         "description": "the Endpoint information of the target Resource",
13163         "items": {
13164             "properties": {
13165                 "ep": {
13166                     "description": "Transport Protocol Suite + Endpoint Locator",
13167                     "format": "uri",
13168                     "type": "string"
13169                 },
13170                 "pri": {
13171                     "description": "The priority among multiple Endpoints",
13172                     "minimum": 1,
13173                     "type": "integer"
13174                 }
13175             },
13176             "type": "object"
13177         },
13178         "type": "array"
13179     },
13180     "href": {
13181         "description": "This is the target URI, it can be specified as a Relative
13182 Reference or fully-qualified URI.",
13183         "format": "uri",
13184         "maxLength": 256,
13185         "type": "string"
13186     },
13187     "if": {
13188         "description": "The interface set supported by this resource",
13189         "items": {
13190             "enum": [
13191                 "oic.if.baseline",
13192                 "oic.if.ll",
13193                 "oic.if.b",
13194                 "oic.if.rw",
13195                 "oic.if.r",
13196                 "oic.if.a",
13197                 "oic.if.s"
13198             ],
13199             "type": "string"
13200         },
13201         "minItems": 1,
13202         "type": "array"
13203     },
13204     "ins": {
13205         "description": "The instance identifier for this web link in an array of web
13206 links - used in collections",
13207         "oneOf": [
13208             {
13209                 "description": "An ordinal number that is not repeated - must be unique
13210 in the collection context.",
13211                 "type": "integer"
13212             },
13213             {
13214                 "description": "A unique string",
13215                 "format": "uri",
13216                 "maxLength": 256,
13217                 "type": "string"
13218             },
13219             {
13220                 "description": "A UUID",
13221                 "pattern": "^[a-fA-F0-9]{8}-[a-fA-F0-9]{4}-[a-fA-F0-9]{4}-[a-fA-F0-9]{4}-
13222 [a-fA-F0-9]{12}$",

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13223         "type": "string"
13224     }
13225 ]
13226 },
13227 "p": {
13228     "description": "Specifies the framework policies on the Resource referenced
13229 by the target URI",
13230     "properties": {
13231         "bm": {
13232             "description": "Specifies the framework policies on the Resource
13233 referenced by the target URI for e.g. observable and discoverable",
13234             "type": "integer"
13235         }
13236     },
13237     "required": [
13238         "bm"
13239     ],
13240     "type": "object"
13241 },
13242 "rel": {
13243     "description": "The relation of the target URI referenced by the link to the
13244 context URI",
13245     "oneOf": [
13246         {
13247             "default": [
13248                 "hosts"
13249             ],
13250             "items": {
13251                 "maxLength": 64,
13252                 "type": "string"
13253             },
13254             "minItems": 1,
13255             "type": "array"
13256         },
13257         {
13258             "default": "hosts",
13259             "maxLength": 64,
13260             "type": "string"
13261         }
13262     ]
13263 },
13264 "rt": {
13265     "description": "Resource Type of the Resource",
13266     "items": {
13267         "maxLength": 64,
13268         "type": "string"
13269     },
13270     "minItems": 1,
13271     "type": "array"
13272 },
13273 "tag-locn": {
13274     "description": "Location of the Resource or Device",
13275     "enum": [
13276         "attic",
13277         "balcony",
13278         "ballroom",
13279         "bathroom",
13280         "bedroom",
13281         "border",
13282         "boxroom",
13283         "cellar",
13284         "cloakroom",
13285         "conservatory",
13286         "corridor",
13287         "deck",
13288         "den",
13289         "diningroom",
13290         "drawingroom",
13291         "driveway",
13292         "dungeon",
13293         "ensuite",

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13294         "entrance",
13295         "familyroom",
13296         "garage",
13297         "garden",
13298         "guestroom",
13299         "hall",
13300         "kitchen",
13301         "larder",
13302         "lawn",
13303         "library",
13304         "livingroom",
13305         "lounge",
13306         "mancave",
13307         "masterbedroom",
13308         "musicroom",
13309         "office",
13310         "pantry",
13311         "parkinglot",
13312         "parlour",
13313         "patio",
13314         "receptionroom",
13315         "roof",
13316         "roofterrace",
13317         "sauna",
13318         "shed",
13319         "sittingroom",
13320         "snug",
13321         "spa",
13322         "studio",
13323         "suite",
13324         "swimmingpool",
13325         "toilet",
13326         "utilityroom",
13327         "ward",
13328         "vegetableplot",
13329         "terrace"
13330     ]
13331 },
13332     "tag-pos-desc": {
13333         "oneOf": [
13334             {
13335                 "enum": [
13336                     "top",
13337                     "bottom",
13338                     "left",
13339                     "right",
13340                     "centre",
13341                     "topleft",
13342                     "bottomleft",
13343                     "centreleft",
13344                     "centreright",
13345                     "bottomright",
13346                     "topright"
13347                 ]
13348             },
13349             {
13350                 "description": "Relative position; as defined by UPnP relpos, relative
13351 position against a known [0,0,0] point.",
13352                 "items": {
13353                     "type": "number"
13354                 },
13355                 "maxItems": 3,
13356                 "minItems": 3,
13357                 "readOnly": true,
13358                 "type": "array"
13359             }
13360         ]
13361     },
13362     "title": {
13363         "description": "A title for the link relation. Can be used by the UI to
13364 provide a context.",

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13365         "maxLength": 64,
13366         "type": "string"
13367     },
13368     "type": {
13369         "default": "application/cbor",
13370         "description": "A hint at the representation of the resource referenced by
13371 the target URI. This represents the media types that are used for both accepting and emitting.",
13372         "items": {
13373             "maxLength": 64,
13374             "type": "string"
13375         },
13376         "minItems": 1,
13377         "type": "array"
13378     }
13379 },
13380 "required": [
13381     "href",
13382     "rt",
13383     "if"
13384 ],
13385 "type": "object"
13386 },
13387 "type": "array"
13388 }
13389 ]
13390 },
13391 "rts": {
13392     "description": "The list of allowable resource types (for Target and anchors) in links
13393 included in the collection",
13394     "items": {
13395         "maxLength": 64,
13396         "type": "string"
13397     },
13398     "minItems": 1,
13399     "readOnly": true,
13400     "type": "array"
13401 }
13402 },
13403 "required": [
13404     "lastScene"
13405 ],
13406 "type": "object"
13407 }
13408 }
13409 }
13410 }
13411 }

```

13412 **F.12.5 Property Definition**

Property name	Value type	Mandatory	Access mode	Description
links	multiple types: see schema			All forms of links in a collection.
rts	array: see schema	yes	Read Only	The list of allowable resource types (for Target and anchors) in links included in the collection
lastScene	string	yes		Last selected Scene from the set of sceneValues
sceneValues	array: see schema	yes	Read Only	All available scene values

SceneMappings	array: see schema			array of mappings per scene, can be one(1)
link	object: see schema	yes		OCF link that points to a resource
eps	array: see schema			the Endpoint information of the target 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.
tag-pos-desc	multiple types: see schema			
tag-locn	multiple types: see schema			Location of the Resource or Device
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
title	string			A title for the link relation. Can be used by the UI to provide a context.
rt	array: see schema	yes		Resource Type of the Resource
href	string	yes		This is the target URI, it can be specified as a Relative Reference or fully-qualified URI.
p	object: see schema			Specifies the framework policies on the Resource referenced by the target URI

ins	multiple types: see schema			The instance identifier for this web link in an array of web links - used in collections
di	string			The device ID
rel	multiple types: see schema			The relation of the target URI referenced by the link to the context URI
links	multiple types: see schema			All forms of links in a collection.
rts	array: see schema		Read Only	The list of allowable resource types (for Target and anchors) in links included in the collection
lastScene	string	yes		Last selected Scene from the set of sceneValues

13413 **F.12.6 CRUDN behaviour**

Resource	Create	Read	Update	Delete	Notify
/SceneCollectionResURI		get	post		

13414 **F.13 Scene Member**

13415 **F.13.1 Introduction**

13416 Collection that models a scene member.
 13417 Provides the scene member
 13418

13419 **F.13.2 Example URI**

13420 /SceneMemberResURI

13421 **F.13.3 Resource Type**

13422 The resource type (rt) is defined as: ['oic.wk.scenemember'].

13423 **F.13.4 Swagger2.0 Definition**

```

13424 {
13425   "swagger": "2.0",
13426   "info": {
13427     "title": "Scenes (Top level)",
13428     "version": "v1-20160622",
13429     "license": {
13430       "name": "copyright 2016-2017 Open Connectivity Foundation, Inc. All rights reserved.",
13431       "x-description": "Redistribution and use in source and binary forms, with or without
13432 modification, are permitted provided that the following conditions are met:\n      1.
13433 Redistributions of source code must retain the above copyright notice, this list of conditions and/or
13434 the following disclaimer.\n      2. Redistributions in binary form must reproduce the above
13435 copyright notice, this list of conditions and the following disclaimer in the documentation and/or
13436 other materials provided with the distribution.\n\n      THIS SOFTWARE IS PROVIDED BY THE Open
13437 Connectivity Foundation, INC. \AS IS\ AND ANY EXPRESS OR IMPLIED WARRANTIES, INCLUDING, BUT NOT
13438 LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE OR

```

```

13439 WARRANTIES OF NON-INFRINGEMENT, ARE DISCLAIMED.\n          IN NO EVENT SHALL THE Open Connectivity
13440 Foundation, INC. OR CONTRIBUTORS BE LIABLE FOR ANY DIRECT, INDIRECT, INCIDENTAL, SPECIAL,
13441 EXEMPLARY, OR CONSEQUENTIAL DAMAGES (INCLUDING, BUT NOT LIMITED TO, PROCUREMENT OF SUBSTITUTE GOODS
13442 OR SERVICES; LOSS OF USE, DATA, OR PROFITS; OR BUSINESS INTERRUPTION)\n          HOWEVER CAUSED AND
13443 ON ANY THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT (INCLUDING NEGLIGENCE OR
13444 OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OF THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY
13445 OF SUCH DAMAGE.\n"
13446 }
13447 },
13448 "schemes": ["http"],
13449 "consumes": ["application/json"],
13450 "produces": ["application/json"],
13451 "paths": {
13452   "/SceneListResURI" : {
13453     "get": {
13454       "description": "Toplevel Scene resource.\nThis resource is a generic collection
13455 resource.\nThe rts value shall contain oic.wk.scenecollection resource types.\nProvides the current
13456 list of web links pointing to scenes\n",
13457       "parameters": [
13458         ],
13459       "responses": {
13460         "200": {
13461           "description" : "",
13462           "x-example":
13463             {
13464               "rt":      ["oic.wk.scenelist"],
13465               "n":      "list of scene Collections",
13466               "rts":    ["oic.wk.scenecollection"],
13467               "links": [
13468                 ]
13469             }
13470           ,
13471           "schema": { "$ref": "#/definitions/Collection" }
13472         }
13473       }
13474     }
13475   },
13476   "/SceneMemberResURI" : {
13477     "get": {
13478       "description": "Collection that models a scene member.\nProvides the scene member\n",
13479       "parameters": [
13480         ],
13481       "responses": {
13482         "200": {
13483           "description" : "",
13484           "x-example":
13485             {
13486               "rt": ["oic.wk.scenemember"],
13487               "id": "0685B960-FFFF-46F7-BEC0-9E6234671ADC1",
13488               "n": "my binary switch (for light bulb) mappings",
13489               "link": {
13490                 "href": "binarySwitch",
13491                 "rt": ["oic.r.switch.binary"],
13492                 "if": ["oic.if.a", "oic.if.baseline"],
13493                 "eps": [
13494                   {"ep": "coap://[fe80::bld6]:1111", "pri": 2},
13495                   {"ep": "coaps://[fe80::bld6]:1122"},
13496                   {"ep": "coap+tcp://[2001:db8:a::123]:2222", "pri": 3}
13497                 ]
13498               },
13499               "sceneMappings": [
13500                 {
13501                   "scene": "off",
13502                   "memberProperty": "value",
13503                   "memberValue": true
13504                 },
13505                 {
13506                   "scene": "Reading",
13507                   "memberProperty": "value",
13508                   "memberValue": false
13509                 }
13510               ]
13511             }
13512         }
13513       }
13514     }
13515   }
13516 }

```

```

13510         {
13511             "scene":          "TVWatching",
13512             "memberProperty": "value",
13513             "memberValue":   true
13514         }
13515     ]
13516 }
13517 ,
13518 "schema": { "$ref": "#/definitions/SceneMember" }
13519 }
13520 }
13521 },
13522 "/SceneCollectionResURI" : {
13523     "get": {
13524         "description": "Collection that models a set of Scenes.\nThis resource is a generic
13525 collection resource with additional parameters.\nThe rts value shall contain oic.scenemember
13526 resource types.\nThe additional parameters are\n lastScene, this is the scene value last set by
13527 any OCF Client\n sceneValues, this is the list of available scenes\n lastScene shall be listed in
13528 sceneValues.\nProvides the current list of web links pointing to scenes\n",
13529         "parameters": [
13530             ],
13531         "responses": {
13532             "200": {
13533                 "description": "",
13534                 "x-example":
13535                 {
13536                     "lastScene": "off",
13537                     "sceneValues": ["off","Reading","TVWatching"],
13538                     "rt":          ["oic.wk.scenecollection"],
13539                     "n":           "My Scenes for my living room",
13540                     "id":          "0685B960-736F-46F7-BEC0-9E6CBD671ADC1",
13541                     "rts":         ["oic.wk.scenemember"],
13542                     "links": [
13543                         ]
13544                 }
13545             },
13546             "schema": { "$ref": "#/definitions/SceneCollection" }
13547         }
13548     }
13549 },
13550 },
13551 "post": {
13552     "description": "Provides the action to change the last set scene selection.\nCalling this
13553 method shall update all scene members to the prescribed membervalue.\nWhen this method is called
13554 with the same value as the current lastScene value\nthen all scene members shall be updated.\n",
13555     "parameters": [
13556         {
13557             "name": "body",
13558             "in": "body",
13559             "required": true,
13560             "schema": { "$ref": "#/definitions/SceneCollectionUpdate" },
13561             "x-example":
13562             {
13563                 "lastScene": "Reading"
13564             }
13565         }
13566     ],
13567     "responses": {
13568         "200": {
13569             "description": "Indicates that the value is changed.\nThe changed properties are
13570 provided in the response.\n",
13571             "x-example":
13572             {
13573                 "lastScene": "Reading"
13574             }
13575         },
13576         "schema": { "$ref": "#/definitions/SceneCollectionUpdate" }
13577     }
13578 }
13579 }
13580 }

```



```

13581 },
13582 "parameters": {
13583   "interface" : {
13584     "in" : "query",
13585     "name" : "if",
13586     "type" : "string",
13587     "enum" : ["oic.if.a", "oic.if.ll", "oic.if.baseline"]
13588   }
13589 },
13590 "definitions": {
13591   "Collection" :
13592     {
13593       "description": "A set of simple or individual OIC Links.",
13594       "items": {
13595         "properties": {
13596           "anchor": {
13597             "description": "This is used to override the context URI e.g. override the URI of the
13598 containing collection.",
13599             "format": "uri",
13600             "maxLength": 256,
13601             "type": "string"
13602           },
13603           "di": {
13604             "description": "The device ID",
13605             "pattern": "^[a-fA-F0-9]{8}-[a-fA-F0-9]{4}-[a-fA-F0-9]{4}-[a-fA-F0-
13606 9]{12}$",
13607             "type": "string"
13608           },
13609           "eps": {
13610             "description": "the Endpoint information of the target Resource",
13611             "items": {
13612               "properties": {
13613                 "ep": {
13614                   "description": "Transport Protocol Suite + Endpoint Locator",
13615                   "format": "uri",
13616                   "type": "string"
13617                 },
13618                 "pri": {
13619                   "description": "The priority among multiple Endpoints",
13620                   "minimum": 1,
13621                   "type": "integer"
13622                 }
13623               },
13624               "type": "object"
13625             },
13626             "type": "array"
13627           },
13628           "href": {
13629             "description": "This is the target URI, it can be specified as a Relative Reference
13630 or fully-qualified URI.",
13631             "format": "uri",
13632             "maxLength": 256,
13633             "type": "string"
13634           },
13635           "if": {
13636             "description": "The interface set supported by this resource",
13637             "items": {
13638               "enum": [
13639                 "oic.if.baseline",
13640                 "oic.if.ll",
13641                 "oic.if.b",
13642                 "oic.if.rw",
13643                 "oic.if.r",
13644                 "oic.if.a",
13645                 "oic.if.s"
13646               ],
13647               "type": "string"
13648             },
13649             "minItems": 1,
13650             "type": "array"
13651           },

```

```

13652         "ins": {
13653             "description": "The instance identifier for this web link in an array of web links -
13654 used in collections",
13655             "oneOf": [
13656                 {
13657                     "description": "An ordinal number that is not repeated - must be unique in the
13658 collection context.",
13659                     "type": "integer"
13660                 },
13661                 {
13662                     "description": "A unique string",
13663                     "format": "uri",
13664                     "maxLength": 256,
13665                     "type": "string"
13666                 },
13667                 {
13668                     "description": "A UUID",
13669                     "pattern": "^[a-fA-F0-9]{8}-[a-fA-F0-9]{4}-[a-fA-F0-9]{4}-[a-fA-F0-9]{4}-[a-fA-
13670 F0-9]{12}$",
13671                     "type": "string"
13672                 }
13673             ]
13674         },
13675         "p": {
13676             "description": "Specifies the framework policies on the Resource referenced by the
13677 target URI",
13678             "properties": {
13679                 "bm": {
13680                     "description": "Specifies the framework policies on the Resource referenced by
13681 the target URI for e.g. observable and discoverable",
13682                     "type": "integer"
13683                 }
13684             },
13685             "required": [
13686                 "bm"
13687             ],
13688             "type": "object"
13689         },
13690         "rel": {
13691             "description": "The relation of the target URI referenced by the link to the context
13692 URI",
13693             "oneOf": [
13694                 {
13695                     "default": [
13696                         "hosts"
13697                     ],
13698                     "items": {
13699                         "maxLength": 64,
13700                         "type": "string"
13701                     },
13702                     "minItems": 1,
13703                     "type": "array"
13704                 },
13705                 {
13706                     "default": "hosts",
13707                     "maxLength": 64,
13708                     "type": "string"
13709                 }
13710             ]
13711         },
13712         "rt": {
13713             "description": "Resource Type of the Resource",
13714             "items": {
13715                 "maxLength": 64,
13716                 "type": "string"
13717             },
13718             "minItems": 1,
13719             "type": "array"
13720         },
13721         "tag-locn": {
13722             "description": "Location of the Resource or Device",

```

```

13723 "enum": [
13724     "attic",
13725     "balcony",
13726     "ballroom",
13727     "bathroom",
13728     "bedroom",
13729     "border",
13730     "boxroom",
13731     "cellar",
13732     "cloakroom",
13733     "conservatory",
13734     "corridor",
13735     "deck",
13736     "den",
13737     "diningroom",
13738     "drawingroom",
13739     "driveway",
13740     "dungeon",
13741     "ensuite",
13742     "entrance",
13743     "familyroom",
13744     "garage",
13745     "garden",
13746     "guestroom",
13747     "hall",
13748     "kitchen",
13749     "larder",
13750     "lawn",
13751     "library",
13752     "livingroom",
13753     "lounge",
13754     "mancave",
13755     "masterbedroom",
13756     "musicroom",
13757     "office",
13758     "pantry",
13759     "parkinglot",
13760     "parlour",
13761     "patio",
13762     "receptionroom",
13763     "roof",
13764     "roofterrace",
13765     "sauna",
13766     "shed",
13767     "sittingroom",
13768     "snug",
13769     "spa",
13770     "studio",
13771     "suite",
13772     "swimmingpool",
13773     "toilet",
13774     "utilityroom",
13775     "ward",
13776     "vegetableplot",
13777     "terrace"
13778 ]
13779 },
13780 "tag-pos-desc": {
13781     "oneOf": [
13782         {
13783             "enum": [
13784                 "top",
13785                 "bottom",
13786                 "left",
13787                 "right",
13788                 "centre",
13789                 "topleft",
13790                 "bottomleft",
13791                 "centrelleft",
13792                 "centreright",
13793                 "bottomright",

```

```

13794         "topright"
13795     ]
13796     },
13797     {
13798         "description": "Relative position; as defined by UPnP relpos, relative position
13799 against a known [0,0,0] point.",
13800         "items": {
13801             "type": "number"
13802         },
13803         "maxItems": 3,
13804         "minItems": 3,
13805         "readOnly": true,
13806         "type": "array"
13807     }
13808 ]
13809 },
13810 "title": {
13811     "description": "A title for the link relation. Can be used by the UI to provide a
13812 context.",
13813     "maxLength": 64,
13814     "type": "string"
13815 },
13816 "type": {
13817     "default": "application/cbor",
13818     "description": "A hint at the representation of the resource referenced by the target
13819 URI. This represents the media types that are used for both accepting and emitting.",
13820     "items": {
13821         "maxLength": 64,
13822         "type": "string"
13823     },
13824     "minItems": 1,
13825     "type": "array"
13826 }
13827 },
13828 "required": [
13829     "href",
13830     "rt",
13831     "if"
13832 ],
13833 "type": "object"
13834 },
13835 "type": "array"
13836 }
13837
13838 ,
13839 "SceneMember" :
13840 {
13841     "properties": {
13842         "SceneMappings": {
13843             "description": "array of mappings per scene, can be one(1)",
13844             "items": {
13845                 "properties": {
13846                     "memberProperty": {
13847                         "description": "property name that will be mapped",
13848                         "readOnly": true,
13849                         "type": "string"
13850                     },
13851                     "memberValue": {
13852                         "description": "value of the Member Property",
13853                         "readOnly": true,
13854                         "type": "string"
13855                     },
13856                     "scene": {
13857                         "description": "Specifies a scene value that will be acted upon",
13858                         "type": "string"
13859                     }
13860                 },
13861                 "required": [
13862                     "scene",
13863                     "memberProperty",
13864                     "memberValue"

```

```

13865         ],
13866         "type": "object"
13867     },
13868     "type": "array"
13869 },
13870 "link": {
13871     "description": "OCF link that points to a resource",
13872     "properties": {
13873         "anchor": {
13874             "description": "This is used to override the context URI e.g. override the URI of
13875 the containing collection.",
13876             "format": "uri",
13877             "maxLength": 256,
13878             "type": "string"
13879         },
13880         "di": {
13881             "description": "The device ID",
13882             "pattern": "^[a-fA-F0-9]{8}-[a-fA-F0-9]{4}-[a-fA-F0-9]{4}-[a-fA-F0-
13883 9]{12}$",
13884             "type": "string"
13885         },
13886         "eps": {
13887             "description": "the Endpoint information of the target Resource",
13888             "items": {
13889                 "properties": {
13890                     "ep": {
13891                         "description": "Transport Protocol Suite + Endpoint Locator",
13892                         "format": "uri",
13893                         "type": "string"
13894                     },
13895                     "pri": {
13896                         "description": "The priority among multiple Endpoints",
13897                         "minimum": 1,
13898                         "type": "integer"
13899                     }
13900                 },
13901                 "type": "object"
13902             },
13903             "type": "array"
13904         },
13905         "href": {
13906             "description": "This is the target URI, it can be specified as a Relative Reference
13907 or fully-qualified URI.",
13908             "format": "uri",
13909             "maxLength": 256,
13910             "type": "string"
13911         },
13912         "if": {
13913             "description": "The interface set supported by this resource",
13914             "items": {
13915                 "enum": [
13916                     "oic.if.baseline",
13917                     "oic.if.ll",
13918                     "oic.if.b",
13919                     "oic.if.rw",
13920                     "oic.if.r",
13921                     "oic.if.a",
13922                     "oic.if.s"
13923                 ],
13924                 "type": "string"
13925             },
13926             "minItems": 1,
13927             "type": "array"
13928         },
13929         "ins": {
13930             "description": "The instance identifier for this web link in an array of web links
13931 - used in collections",
13932             "oneOf": [
13933                 {
13934                     "description": "An ordinal number that is not repeated - must be unique in the
13935 collection context.",

```

```

13936         "type": "integer"
13937     },
13938     {
13939         "description": "A unique string",
13940         "format": "uri",
13941         "maxLength": 256,
13942         "type": "string"
13943     },
13944     {
13945         "description": "A UUID",
13946         "pattern": "^[a-fA-F0-9]{8}-[a-fA-F0-9]{4}-[a-fA-F0-9]{4}-[a-fA-F0-9]{4}-[a-fA-
13947 F0-9]{12}$",
13948         "type": "string"
13949     }
13950 ]
13951 },
13952 "p": {
13953     "description": "Specifies the framework policies on the Resource referenced by the
13954 target URI",
13955     "properties": {
13956         "bm": {
13957             "description": "Specifies the framework policies on the Resource referenced by
13958 the target URI for e.g. observable and discoverable",
13959             "type": "integer"
13960         }
13961     },
13962     "required": [
13963         "bm"
13964     ],
13965     "type": "object"
13966 },
13967 "rel": {
13968     "description": "The relation of the target URI referenced by the link to the
13969 context URI",
13970     "oneOf": [
13971         {
13972             "default": [
13973                 "hosts"
13974             ],
13975             "items": {
13976                 "maxLength": 64,
13977                 "type": "string"
13978             },
13979             "minItems": 1,
13980             "type": "array"
13981         },
13982         {
13983             "default": "hosts",
13984             "maxLength": 64,
13985             "type": "string"
13986         }
13987     ]
13988 },
13989 "rt": {
13990     "description": "Resource Type of the Resource",
13991     "items": {
13992         "maxLength": 64,
13993         "type": "string"
13994     },
13995     "minItems": 1,
13996     "type": "array"
13997 },
13998 "tag-locn": {
13999     "description": "Location of the Resource or Device",
14000     "enum": [
14001         "attic",
14002         "balcony",
14003         "ballroom",
14004         "bathroom",
14005         "bedroom",
14006         "border",

```

```

14007         "boxroom",
14008         "cellar",
14009         "cloakroom",
14010         "conservatory",
14011         "corridor",
14012         "deck",
14013         "den",
14014         "diningroom",
14015         "drawingroom",
14016         "driveway",
14017         "dungeon",
14018         "ensuite",
14019         "entrance",
14020         "familyroom",
14021         "garage",
14022         "garden",
14023         "guestroom",
14024         "hall",
14025         "kitchen",
14026         "larder",
14027         "lawn",
14028         "library",
14029         "livingroom",
14030         "lounge",
14031         "mancafe",
14032         "masterbedroom",
14033         "musicroom",
14034         "office",
14035         "pantry",
14036         "parkinglot",
14037         "parlour",
14038         "patio",
14039         "receptionroom",
14040         "roof",
14041         "roofterrace",
14042         "sauna",
14043         "shed",
14044         "sittingroom",
14045         "snug",
14046         "spa",
14047         "studio",
14048         "suite",
14049         "swimmingpool",
14050         "toilet",
14051         "utilityroom",
14052         "ward",
14053         "vegetableplot",
14054         "terrace"
14055     ]
14056 },
14057 "tag-pos-desc": {
14058     "oneOf": [
14059         {
14060             "enum": [
14061                 "top",
14062                 "bottom",
14063                 "left",
14064                 "right",
14065                 "centre",
14066                 "topleft",
14067                 "bottomleft",
14068                 "centrelleft",
14069                 "centreright",
14070                 "bottomright",
14071                 "topright"
14072             ]
14073         },
14074         {
14075             "description": "Relative position: as defined by UPnP relpos, relative position
14076 against a known [0,0,0] point.",
14077             "items": {

```

```

14078         "type": "number"
14079     },
14080     "maxItems": 3,
14081     "minItems": 3,
14082     "readOnly": true,
14083     "type": "array"
14084     }
14085     ],
14086     },
14087     "title": {
14088         "description": "A title for the link relation. Can be used by the UI to provide a
14089 context.",
14090         "maxLength": 64,
14091         "type": "string"
14092     },
14093     "type": {
14094         "default": "application/cbor",
14095         "description": "A hint at the representation of the resource referenced by the
14096 target URI. This represents the media types that are used for both accepting and emitting.",
14097         "items": {
14098             "maxLength": 64,
14099             "type": "string"
14100         },
14101         "minItems": 1,
14102         "type": "array"
14103     }
14104     },
14105     "required": [
14106         "href",
14107         "rt",
14108         "if"
14109     ],
14110     "type": "object"
14111     }
14112     },
14113     "required": [
14114         "link"
14115     ],
14116     "type": "object"
14117     }
14118     ],
14119     ,
14120     "SceneCollection" :
14121     {
14122         "description": "A collection is a set of links along with additional properties to describe
14123 the collection itself",
14124         "properties": {
14125             "lastScene": {
14126                 "description": "Last selected Scene from the set of sceneValues",
14127                 "type": "string"
14128             },
14129             "links": {
14130                 "description": "All forms of links in a collection.",
14131                 "oneOf": [
14132                     {
14133                         "description": "A set of simple or individual OIC Links.",
14134                         "items": {
14135                             "properties": {
14136                                 "anchor": {
14137                                     "description": "This is used to override the context URI e.g. override the
14138 URI of the containing collection.",
14139                                     "format": "uri",
14140                                     "maxLength": 256,
14141                                     "type": "string"
14142                                 },
14143                                 "di": {
14144                                     "description": "The device ID",
14145                                     "pattern": "^[a-fA-F0-9]{8}-[a-fA-F0-9]{4}-[a-fA-F0-9]{4}-[a-fA-F0-9]{4}-[a-
14146 fA-F0-9]{12}$",
14147                                     "type": "string"
14148                                 }
14149                             }
14150                         }
14151                     }
14152                 ]
14153             }
14154         }
14155     }

```



```

14149         "eps": {
14150             "description": "the Endpoint information of the target Resource",
14151             "items": {
14152                 "properties": {
14153                     "ep": {
14154                         "description": "Transport Protocol Suite + Endpoint Locator",
14155                         "format": "uri",
14156                         "type": "string"
14157                     },
14158                     "pri": {
14159                         "description": "The priority among multiple Endpoints",
14160                         "minimum": 1,
14161                         "type": "integer"
14162                     }
14163                 },
14164                 "type": "object"
14165             },
14166             "type": "array"
14167         },
14168         "href": {
14169             "description": "This is the target URI, it can be specified as a Relative
14170 Reference or fully-qualified URI.",
14171             "format": "uri",
14172             "maxLength": 256,
14173             "type": "string"
14174         },
14175         "if": {
14176             "description": "The interface set supported by this resource",
14177             "items": {
14178                 "enum": [
14179                     "oic.if.baseline",
14180                     "oic.if.ll",
14181                     "oic.if.b",
14182                     "oic.if.rw",
14183                     "oic.if.r",
14184                     "oic.if.a",
14185                     "oic.if.s"
14186                 ],
14187                 "type": "string"
14188             },
14189             "minItems": 1,
14190             "type": "array"
14191         },
14192         "ins": {
14193             "description": "The instance identifier for this web link in an array of web
14194 links - used in collections",
14195             "oneOf": [
14196                 {
14197                     "description": "An ordinal number that is not repeated - must be unique
14198 in the collection context.",
14199                     "type": "integer"
14200                 },
14201                 {
14202                     "description": "A unique string",
14203                     "format": "uri",
14204                     "maxLength": 256,
14205                     "type": "string"
14206                 },
14207                 {
14208                     "description": "A UUID",
14209                     "pattern": "^[a-fA-F0-9]{8}-[a-fA-F0-9]{4}-[a-fA-F0-9]{4}-[a-fA-F0-9]{4}-
14210 [a-fA-F0-9]{12}$",
14211                     "type": "string"
14212                 }
14213             ]
14214         },
14215         "p": {
14216             "description": "Specifies the framework policies on the Resource referenced
14217 by the target URI",
14218             "properties": {
14219                 "bm": {

```

```

14220         "description": "Specifies the framework policies on the Resource
14221 referenced by the target URI for e.g. observable and discoverable",
14222         "type": "integer"
14223     }
14224 },
14225     "required": [
14226         "bm"
14227     ],
14228     "type": "object"
14229 },
14230     "rel": {
14231         "description": "The relation of the target URI referenced by the link to the
14232 context URI",
14233         "oneOf": [
14234             {
14235                 "default": [
14236                     "hosts"
14237                 ],
14238                 "items": {
14239                     "maxLength": 64,
14240                     "type": "string"
14241                 },
14242                 "minItems": 1,
14243                 "type": "array"
14244             },
14245             {
14246                 "default": "hosts",
14247                 "maxLength": 64,
14248                 "type": "string"
14249             }
14250         ]
14251     },
14252     "rt": {
14253         "description": "Resource Type of the Resource",
14254         "items": {
14255             "maxLength": 64,
14256             "type": "string"
14257         },
14258         "minItems": 1,
14259         "type": "array"
14260     },
14261     "tag-locn": {
14262         "description": "Location of the Resource or Device",
14263         "enum": [
14264             "attic",
14265             "balcony",
14266             "ballroom",
14267             "bathroom",
14268             "bedroom",
14269             "border",
14270             "boxroom",
14271             "cellar",
14272             "cloakroom",
14273             "conservatory",
14274             "corridor",
14275             "deck",
14276             "den",
14277             "diningroom",
14278             "drawingroom",
14279             "driveway",
14280             "dungeon",
14281             "ensuite",
14282             "entrance",
14283             "familyroom",
14284             "garage",
14285             "garden",
14286             "guestroom",
14287             "hall",
14288             "kitchen",
14289             "larder",
14290             "lawn",

```

```

14291         "library",
14292         "livingroom",
14293         "lounge",
14294         "mancafe",
14295         "masterbedroom",
14296         "musicroom",
14297         "office",
14298         "pantry",
14299         "parkinglot",
14300         "parlour",
14301         "patio",
14302         "receptionroom",
14303         "roof",
14304         "roofterrace",
14305         "sauna",
14306         "shed",
14307         "sittingroom",
14308         "snug",
14309         "spa",
14310         "studio",
14311         "suite",
14312         "swimmingpool",
14313         "toilet",
14314         "utilityroom",
14315         "ward",
14316         "vegetableplot",
14317         "terrace"
14318     ]
14319 },
14320 "tag-pos-desc": {
14321     "oneOf": [
14322         {
14323             "enum": [
14324                 "top",
14325                 "bottom",
14326                 "left",
14327                 "right",
14328                 "centre",
14329                 "topleft",
14330                 "bottomleft",
14331                 "centrelft",
14332                 "centreright",
14333                 "bottomright",
14334                 "topright"
14335             ]
14336         },
14337         {
14338             "description": "Relative position; as defined by UPnP relpos, relative
14339 position against a known [0,0,0] point.",
14340             "items": {
14341                 "type": "number"
14342             },
14343             "maxItems": 3,
14344             "minItems": 3,
14345             "readOnly": true,
14346             "type": "array"
14347         }
14348     ]
14349 },
14350 "title": {
14351     "description": "A title for the link relation. Can be used by the UI to
14352 provide a context.",
14353     "maxLength": 64,
14354     "type": "string"
14355 },
14356 "type": {
14357     "default": "application/cbor",
14358     "description": "A hint at the representation of the resource referenced by
14359 the target URI. This represents the media types that are used for both accepting and emitting.",
14360     "items": {
14361         "maxLength": 64,

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14362         "type": "string"
14363     },
14364     "minItems": 1,
14365     "type": "array"
14366 }
14367 },
14368 "required": [
14369     "href",
14370     "rt",
14371     "if"
14372 ],
14373 "type": "object"
14374 },
14375 "type": "array"
14376 }
14377 ]
14378 },
14379 "rts": {
14380     "description": "The list of allowable resource types (for Target and anchors) in links
14381 included in the collection",
14382     "items": {
14383         "maxLength": 64,
14384         "type": "string"
14385     },
14386     "minItems": 1,
14387     "readOnly": true,
14388     "type": "array"
14389 },
14390 "sceneValues": {
14391     "description": "All available scene values",
14392     "items": {
14393         "type": "string"
14394     },
14395     "readOnly": true,
14396     "type": "array"
14397 }
14398 },
14399 "required": [
14400     "lastScene",
14401     "sceneValues",
14402     "rts",
14403     "id"
14404 ],
14405 "type": "object"
14406 }
14407
14408 ,
14409 "SceneCollectionUpdate" :
14410 {
14411     "description": "A collection is a set of links along with additional properties to describe
14412 the collection itself",
14413     "properties": {
14414         "lastScene": {
14415             "description": "Last selected Scene from the set of sceneValues",
14416             "type": "string"
14417         },
14418         "links": {
14419             "description": "All forms of links in a collection.",
14420             "oneOf": [
14421                 {
14422                     "description": "A set of simple or individual OIC Links.",
14423                     "items": {
14424                         "properties": {
14425                             "anchor": {
14426                                 "description": "This is used to override the context URI e.g. override the
14427 URI of the containing collection.",
14428                                 "format": "uri",
14429                                 "maxLength": 256,
14430                                 "type": "string"
14431                             },
14432                             "di": {

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14433         "description": "The device ID",
14434         "pattern": "^[a-fA-F0-9]{8}-[a-fA-F0-9]{4}-[a-fA-F0-9]{4}-[a-fA-F0-9]{4}-[a-
14435 fa-F0-9]{12}$",
14436         "type": "string"
14437     },
14438     "eps": {
14439         "description": "the Endpoint information of the target Resource",
14440         "items": {
14441             "properties": {
14442                 "ep": {
14443                     "description": "Transport Protocol Suite + Endpoint Locator",
14444                     "format": "uri",
14445                     "type": "string"
14446                 },
14447                 "pri": {
14448                     "description": "The priority among multiple Endpoints",
14449                     "minimum": 1,
14450                     "type": "integer"
14451                 }
14452             },
14453             "type": "object"
14454         },
14455         "type": "array"
14456     },
14457     "href": {
14458         "description": "This is the target URI, it can be specified as a Relative
14459 Reference or fully-qualified URI.",
14460         "format": "uri",
14461         "maxLength": 256,
14462         "type": "string"
14463     },
14464     "if": {
14465         "description": "The interface set supported by this resource",
14466         "items": {
14467             "enum": [
14468                 "oic.if.baseline",
14469                 "oic.if.ll",
14470                 "oic.if.b",
14471                 "oic.if.rw",
14472                 "oic.if.r",
14473                 "oic.if.a",
14474                 "oic.if.s"
14475             ],
14476             "type": "string"
14477         },
14478         "minItems": 1,
14479         "type": "array"
14480     },
14481     "ins": {
14482         "description": "The instance identifier for this web link in an array of web
14483 links - used in collections",
14484         "oneOf": [
14485             {
14486                 "description": "An ordinal number that is not repeated - must be unique
14487 in the collection context.",
14488                 "type": "integer"
14489             },
14490             {
14491                 "description": "A unique string",
14492                 "format": "uri",
14493                 "maxLength": 256,
14494                 "type": "string"
14495             },
14496             {
14497                 "description": "A UUID",
14498                 "pattern": "^[a-fA-F0-9]{8}-[a-fA-F0-9]{4}-[a-fA-F0-9]{4}-[a-fA-F0-9]{4}-
14499 [a-fA-F0-9]{12}$",
14500                 "type": "string"
14501             }
14502         ]
14503     },

```

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14504         "p": {
14505             "description": "Specifies the framework policies on the Resource referenced
14506 by the target URI",
14507             "properties": {
14508                 "bm": {
14509                     "description": "Specifies the framework policies on the Resource
14510 referenced by the target URI for e.g. observable and discoverable",
14511                     "type": "integer"
14512                 }
14513             },
14514             "required": [
14515                 "bm"
14516             ],
14517             "type": "object"
14518         },
14519         "rel": {
14520             "description": "The relation of the target URI referenced by the link to the
14521 context URI",
14522             "oneOf": [
14523                 {
14524                     "default": [
14525                         "hosts"
14526                     ],
14527                     "items": {
14528                         "maxLength": 64,
14529                         "type": "string"
14530                     },
14531                     "minItems": 1,
14532                     "type": "array"
14533                 },
14534                 {
14535                     "default": "hosts",
14536                     "maxLength": 64,
14537                     "type": "string"
14538                 }
14539             ]
14540         },
14541         "rt": {
14542             "description": "Resource Type of the Resource",
14543             "items": {
14544                 "maxLength": 64,
14545                 "type": "string"
14546             },
14547             "minItems": 1,
14548             "type": "array"
14549         },
14550         "tag-locn": {
14551             "description": "Location of the Resource or Device",
14552             "enum": [
14553                 "attic",
14554                 "balcony",
14555                 "ballroom",
14556                 "bathroom",
14557                 "bedroom",
14558                 "border",
14559                 "boxroom",
14560                 "cellar",
14561                 "cloakroom",
14562                 "conservatory",
14563                 "corridor",
14564                 "deck",
14565                 "den",
14566                 "diningroom",
14567                 "drawingroom",
14568                 "driveway",
14569                 "dungeon",
14570                 "ensuite",
14571                 "entrance",
14572                 "familyroom",
14573                 "garage",
14574                 "garden",

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14575         "guestroom",
14576         "hall",
14577         "kitchen",
14578         "larder",
14579         "lawn",
14580         "library",
14581         "livingroom",
14582         "lounge",
14583         "mancave",
14584         "masterbedroom",
14585         "musicroom",
14586         "office",
14587         "pantry",
14588         "parkinglot",
14589         "parlour",
14590         "patio",
14591         "receptionroom",
14592         "roof",
14593         "roofterrace",
14594         "sauna",
14595         "shed",
14596         "sittingroom",
14597         "snug",
14598         "spa",
14599         "studio",
14600         "suite",
14601         "swimmingpool",
14602         "toilet",
14603         "utilityroom",
14604         "ward",
14605         "vegetableplot",
14606         "terrace"
14607     ]
14608 },
14609     "tag-pos-desc": {
14610         "oneOf": [
14611             {
14612                 "enum": [
14613                     "top",
14614                     "bottom",
14615                     "left",
14616                     "right",
14617                     "centre",
14618                     "topleft",
14619                     "bottomleft",
14620                     "centrelleft",
14621                     "centreright",
14622                     "bottomright",
14623                     "topright"
14624                 ]
14625             },
14626             {
14627                 "description": "Relative position; as defined by UPnP relpos, relative
14628 position against a known [0,0,0] point.",
14629                 "items": {
14630                     "type": "number"
14631                 },
14632                 "maxItems": 3,
14633                 "minItems": 3,
14634                 "readOnly": true,
14635                 "type": "array"
14636             }
14637         ]
14638     },
14639     "title": {
14640         "description": "A title for the link relation. Can be used by the UI to
14641 provide a context.",
14642         "maxLength": 64,
14643         "type": "string"
14644     },
14645     "type": {

```

```

14646         "default": "application/cbor",
14647         "description": "A hint at the representation of the resource referenced by
14648 the target URI. This represents the media types that are used for both accepting and emitting.",
14649         "items": {
14650             "maxLength": 64,
14651             "type": "string"
14652         },
14653         "minItems": 1,
14654         "type": "array"
14655     },
14656     },
14657     "required": [
14658         "href",
14659         "rt",
14660         "if"
14661     ],
14662     "type": "object"
14663 },
14664 "type": "array"
14665 }
14666 ]
14667 },
14668 "rts": {
14669     "description": "The list of allowable resource types (for Target and anchors) in links
14670 included in the collection",
14671     "items": {
14672         "maxLength": 64,
14673         "type": "string"
14674     },
14675     "minItems": 1,
14676     "readOnly": true,
14677     "type": "array"
14678 },
14679 },
14680 "required": [
14681     "lastScene"
14682 ],
14683 "type": "object"
14684 }
14685 }
14686 }
14687 }
14688 }

```

F.13.5 Property Definition

Property name	Value type	Mandatory	Access mode	Description
SceneMappings	array: see schema			array of mappings per scene, can be one(1)
link	object: see schema	yes		OCF link that points to a resource
links	multiple types: see schema			All forms of links in a collection.
lastScene	string	yes		Last selected Scene from the set of sceneValues
rts	array: see schema		Read Only	The list of allowable resource types (for Target and anchors) in links

				included in the collection
links	multiple types: see schema			All forms of links in a collection.
sceneValues	array: see schema	yes	Read Only	All available scene values
lastScene	string	yes		Last selected Scene from the set of sceneValues
rts	array: see schema	yes	Read Only	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
rt	array: see schema	yes		Resource Type of the Resource
href	string	yes		This is the target URI, it can be specified as a Relative Reference or fully-qualified URI.
di	string			The device ID
title	string			A title for the link relation. Can be used by the UI to provide a context.
tag-pos-desc	multiple types: see schema			
ins	multiple types: see schema			The instance identifier for this web link in an array of web links - used in collections
if	array: see schema	yes		The interface set supported by this resource
eps	array: see schema			the Endpoint information of the target 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.
p	object: see schema			Specifies the framework policies on the Resource referenced by the target URI
anchor	string			This is used to override the context URI e.g. override the URI of the containing collection.
tag-locn	multiple types: see schema			Location of the Resource or Device

14690

F.13.6 CRUDN behaviour

Resource	Create	Read	Update	Delete	Notify
/SceneMemberResURI		get			

14691 **Annex G**
14692 **(informative)**

14693 **Swagger2.0 Schema Extension**
14694

14695 **G.1 Swagger 2.0 Schema Reference**

14696 Swagger 2.0 does not support allOf and anyOf JSON schema validation constructs; this
14697 specification has extended the underlying Swagger 2.0 schema to enable these, all Swagger 2.0
14698 files are valid against the extended schema. Please reference the following location for a copy of
14699 the extended schema:

14700 <https://github.com/openconnectivityfoundation/OCFswagger2.0-schema>