

OSLC Requirements Management Version 2.1. Part 1: Specification

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Specification URIs

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(Authoritative)

<http://docs.oasis-open.org/oslc-domains/oslc-rm/v2.1/csprd01/part1-requirements-management-spec/oslc-rm-v2.1-csprd01-part1-requirements-management-spec.pdf>

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This specification is one component of a Work Product that also includes:

- *OSLC Requirements Management Version 2.1. Part 1: Specification (this document)*. <http://docs.oasis-open.org/oslc-domains/oslc-rm/v2.1/csprd01/part1-requirements-management-spec/oslc-rm-v2.1-csprd01-part1-requirements-management-spec.html>
- *OSLC Requirements Management Version 2.1. Part 2: Vocabulary*. <http://docs.oasis-open.org/oslc-domains/oslc-rm/v2.1/csprd01/part2-requirements-management-vocab/oslc-rm-v2.1-csprd01-part2-requirements-management-vocab.html>

Related work:

This specification is related to:

- *Open Services for Lifecycle Collaboration Requirements Management Specification Version 2.0*. <http://open-services.net/bin/view/Main/RmSpecificationV2>

RDF Namespaces:

<http://open-services.net/ns/rm#>

Abstract:

This specification defines the OSLC Requirements Management domain. The specification supports key RESTful web service interfaces for the management of Requirements, Requirements Collections and supporting resources defined in the OSLC Core specification. To support these scenarios, this specification defines a set of HTTP-based RESTful interfaces in terms of HTTP methods: GET, POST, PUT and DELETE, HTTP response codes, content type handling and resource formats.

Status:

This document was last revised or approved by the [OASIS OSLC Lifecycle Integration Domains TC](#) on the above date. The level of approval is also listed above. Check the “Latest version” location noted above for possible later revisions of this document. Any other numbered Versions and other technical work produced by the Technical Committee (TC) are listed at https://www.oasis-open.org/committees/tc_home.php?wg_abbrev=oslc-domains#technical.

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1. Introduction

This section is non-normative.

This specification defines the OSLC Requirements Management domain, also known as OSLC RM. The specification supports key RESTful web service interfaces for software Requirements Management systems. OSLC takes an open, loosely coupled approach to specific lifecycle integration scenarios. The scenarios and this specification were created by the OASIS OSLC Lifecycle Integration for Domains TC.

This specification builds on the Open Services for Lifecycle Collaboration Core Specification [[OSLCCore3](#)] to define the resources, properties and operations supported by an OSLC Requirements Definition and Management (OSLC-RM) server.

Requirements Management resources include Requirements, Requirements Collections and supporting resources defined in the OSLC Core specification. The properties defined describe these resources and the relationships between resources. Operations are defined in terms of HTTP methods and MIME type handling. The resources, properties and operations defined do not form a comprehensive interface to Requirements Definition and Management, but instead target specific integration use cases documented by the OASIS OSLC Lifecycle Integration for Domains TC.

1.1 IPR Policy

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1.2 Terminology

This section is non-normative.

Terminology uses and extends the terminology and capabilities of [[OSLCCore3](#)].

Requirement Resource

Requirements are the basis for defining what the system stakeholders (users,

customers, suppliers and so on) need from a system and also what the system must do in order to meet those needs, and how the surrounding processes must be orchestrated so that quality, scope and timescale objectives are satisfied.

RequirementCollection Resource

A collection of resources which constitute some statement of need.

Client

An implementation of the OSLC Requirement Management specifications as a client. OSLC RM Clients consume services provided by servers.

Server

An implementation of the OSLC Requirement Management specifications as a server. OSLC RM clients consume services provided by Servers. The use of the terms Client and Server are intended to distinguish typical consumers and providers of OSLC resources in a distributed environment based on REST. A particular application component could be a client for some OSLC domain services and a server for the same or another domain.

1.3 References

1.3.1 Normative references

[OSLCCore2]

S. Speicher; D. Johnson. *OSLC Core 2.0*. Finalized. URL: <http://open-services.net/bin/view/Main/OslcCoreSpecification>

[OSLCCore3]

Jim Amsden; S. Speicher. *OSLC Core 3.0*. Committee Specification. URL: <http://docs.oasis-open.org/oslc-core/oslc-core/v3.0/oslc-core-v3.0-part1-overview.html>

[OSLCCore3ResourceRepresentations]

Jim Amsden; S. Speicher. *OSLC Core 3.0 - Resource Representations*. Committee Specification. URL: <http://docs.oasis-open.org/oslc-core/oslc-core/v3.0/oslc-core-v3.0-part1-overview.html#resourceRepresentations>

[OSLCCoreVocab]

Jim Amsden; S. Padgett; S. Speicher. *OSLC Core Vocabulary*. Working Draft. URL: <http://docs.oasis-open.org/oslc-core/oslc-core/v3.0/oslc-core-v3.0-part7-core-vocabulary.html>

[OSLCResourcePreview]

Jim Amsden; S. Speicher. *OSLC Core 3.0 Resource Preview*. Committee Specification. URL: <http://docs.oasis-open.org/oslc-core/oslc-core/v3.0/oslc-core-v3.0-part3-resource-preview.html>

[OSLCShapes]

Arthur Ryman; Jim Amsden. *OSLC Resource Shape 3.0*. URL: <http://docs.oasis-open.org/oslc-core/oslc-core/v3.0/oslc-core-v3.0-part6-resource-shape.html>

[OpenIDConnect]

OpenID Connect. URL: <http://openid.net/connect/>

[RFC2119]

S. Bradner. *Key words for use in RFCs to Indicate Requirement Levels*. March 1997. Best Current Practice. URL: <https://tools.ietf.org/html/rfc2119>

1.3.2 Informative references

[LDPPatch]

1.4 Typographical Conventions and Use of RFC Terms

As well as sections marked as non-normative, all authoring guidelines, diagrams, examples, and notes in this specification are non-normative. Everything else in this specification is normative.

The key words **MUST**, **MUST NOT**, **REQUIRED**, **SHOULD**, **SHOULD NOT**, **RECOMMENDED**, **MAY**, and **OPTIONAL** in this specification are to be interpreted as described in [RFC2119].

2. Base Requirements

The following sub-sections define the mandatory and optional requirements for an OSLC Requirements Management (OSLC RM) server.

2.1 Specification Versioning

This specification follows the specification version guidelines given in [OSLCCore3].

2.2 Namespaces

In addition to the namespace URIs and namespace prefixes `oslc`, `rdf`, `dcterms` and `foaf` defined in the [OSLCCore3], OSLC RM defines the namespace URI of `http://open-services.net/ns/rm#` with a preferred namespace prefix of `oslc_rm`.

2.3 Resource Formats

In addition to the requirements for resource representations in [OSLCCore3ResourceRepresentations], this section outlines further refinements and restrictions.

For HTTP GET/PUT/POST requests on all OSLC RM and OSLC Core defined resource types,

- RM Servers **MUST** support RDF/XML representations with media-type `application/rdf+xml`. RM Clients **MUST** be prepared to deal with any valid RDF/XML document.
- RM Servers **MUST** support XML representations with media-type `application/xml`. The XML representations **MUST** follow the guidelines outlined in the [OSLC Core Representations Guidance](#) to maintain compatibility with [OSLCCore2].
- RM Servers **MAY** support JSON representations with media-type `application/json`. The JSON representations **MUST** follow the guidelines outlined in the [OSLC Core Representations Guidance](#) to maintain compatibility with [OSLCCore2].

Additionally, for HTTP GET,

- RM Servers **SHOULD** provide an [X]HTML representation and a user interface (UI) preview as defined by [UI Preview Guidance](#)

For HTTP GET response formats for Query requests,

- RM Servers **MUST** support RDF/XML representations with media-type `application/rdf+xml`.
- RM Servers **MUST** support XML representations with media-type `application/xml`.
- RM Servers **MAY** support JSON representations with media-type `application/json`.

OSLC Servers **MAY** refuse to accept RDF/XML documents which do not have a top-level `rdf:RDF` document element. The OSLC Core describes an example, non-normative algorithm for generating RDF/XML representations of OSLC Defined Resources.

In addition to the resource formats defined above, Servers **MAY** support additional resource formats; the meaning and usage of these resource formats is not defined by this specification.

2.4 Authentication

[[OSLCCore3](#)] specifies the recommended OSLC authentication mechanisms. In addition to the OSLC Core authentication requirements, OSLC RM servers **SHOULD** support [[OpenIDConnect](#)].

2.5 Error Responses

[[OSLCCoreVocab](#)] specifies the OSLC Core error responses. OSLC RM puts no additional constraints on error responses.

2.6 Pagination

OSLC RM servers **SHOULD** support pagination of query results and **MAY** support pagination of a single resource's properties as defined by [[OSLCCore3](#)].

2.7 Requesting and Updating Properties

2.7.1 Requesting a Subset of Properties

A client **MAY** request a subset of a resource's properties as well as properties from a referenced resource. In order to support this behavior a server **MUST** support the `oslc.properties` and `oslc.prefix` URL parameter on a HTTP GET request on individual resource request or a collection of resources by query. If the `oslc.properties` parameter is omitted on the request, then all resource properties **MUST** be provided in the response.

2.7.2 Updating a Subset of Properties

A client **MAY** request that a subset of a resource's properties be updated by using the [[LDPPatch](#)] `PATCH` method.

For compatibility with [[OSLCCore2](#)], a Server **MAY** also support partial update by identifying those properties to be modified using the `oslc.properties` URL parameter on a HTTP PUT request.

If the parameter `oslc.properties` contains a valid resource property on the request that is not

provided in the content, the server **MUST** set the resource's property to a null or empty value. If the parameter `oslc.properties` contains an invalid resource property, then a **409 Conflict** **MUST** be returned.

2.7.3 Updating Multi-Valued Properties

For multi-valued properties that contain a large number of values, it may be difficult and inefficient to add or remove property values. OSLC RM servers **MAY** provide support for a partial update of the multi-valued properties as defined by draft specification [LDPPatch]. RM servers **MAY** also support partial updates through HTTP PUT where only the updated properties are included in the entity request body.

2.8 Labels for Relationships

This section is non-normative.

Requirement Management relationships to other resources are represented by RDF properties. Instances of a relationship - often called links - are RDF triples with a subject URI, a predicate that is the property, and a value (or object) that is the URI of target resource. When a link is to be presented in a user interface, it may be helpful to display an informative and useful textual label instead of, or in addition to, the URI of the predicate and/or object. There are three items that clients could display:

- **The property:** OSLC recommends using the `rdfs:label` property of the `rdf:Property` from the vocabulary to display the property.
- **The value, or object of the triple:** OSLC recommends using OSLC resource preview [OSLCResourcePreview] to obtain an appropriate icon and label, and possibly a small and/or large dialog for displaying the object.
- **The link:** The link is a combination of the subject, predicate and object of the triple (RDF statement or assertion). Where the link requires a unique label that is not available from the target resource, OSLC servers may support a `dcterms:title` on a reified statement to provide a label for a link that describes the assertion itself.

Turtle example using a reified statement:

EXAMPLE 1

```
@prefix oslc_rm: <http://open-services.net/ns/rm#> .
@prefix rdf: <http://www.w3.org/1999/02/22-rdf-syntax-ns#> .
@prefix dcterms: <http://purl.org/dc/terms/> .

<http://example.com/requ/4321>
  a <http://open-services.net/ns/rm#Requirement> ;
  oslc_rm:elaboratedBy <http://anotherexample.com/requ/123> .

<http://njh.me/#link1>
  a rdf:Statement ;
  rdf:subject <http://example.com/requ/4321> ;
  rdf:predicate oslc_rm:elaboratedBy ;
  rdf:object <http://anotherexample.com/requ/123> ;
  dcterms:title "Requirement 123: The system shall be robust" .
```

JSON-LD example using reified statement:

EXAMPLE 2

```

{
  "@context": {
    "dcterms": "http://purl.org/dc/terms/",
    "rdf": "http://www.w3.org/1999/02/22-rdf-syntax-ns#",
    "oslc": "http://open-services.net/ns/core#",
    "oslc_rm": "http://open-services.net/ns/rm#"
  },
  "@id": "http://example.com/requ/4321",
  "@type": "oslc_rm:Requirement",
  "oslc_rm:elaboratedBy": {
    "@id": "http://anotherexample.com/requ/123",
    "dcterms:title": "Requirement 123: The system shall be robust"
  }
}

```

3. Vocabulary Terms and Constraints

[OSLC Requirements Management Version 2.1. Part 2: Vocabulary](#) defines the vocabulary terms and constraints for OSLC Requirements Management resources. These terms and constraints are specified according to [\[OSLCCoreVocab\]](#).

4. RM Server Capabilities

4.1 Server Resources

RM Servers **MUST** provide one or more `oslc:ServiceProvider` resources. Discovery of OSLC Service Provider Resources **MAY** be via one or more OSLC Service Provider Catalog Resources, or may be discovered by some other and/or additional Provider-specific means beyond the scope of this specification. The `oslc:Service` resources referenced by this `oslc:ServiceProvider` **MUST** have an `oslc:domain` of `http://open-services.net/ns/rm#`.

RM servers **MAY** provide other forms of discovery described in Core 3.0 Discovery.

RM Servers **MAY** provide one more more `oslc:ServiceProviderCatalog` resources. Any such catalog resources **MUST** include at least one `oslc:domain` of `http://open-services.net/ns/rm#`. Discovery of top-level OSLC Service Provider Catalog Resources is beyond the scope of this specification.

Service providers **MUST** give an `oslc:serviceProvider` property on all OSLC Defined Resources. This property **MUST** refer to an appropriate `oslc:ServiceProvider` resource.

4.2 Creation Factories

RM Servers supporting resource creation **MUST** do so through `oslc:CreationFactory` resources, as defined by [\[OSLCCore3\]](#). Any such factory resources **MUST** be discoverable through `oslc:Service` resources. Servers **SHOULD** provide `oslc:ResourceShape` resources on `oslc:CreationFactory` resources as defined by [\[OSLCShapes\]](#).

4.3 Query Capabilities

RM Servers **MUST** support query capabilities, as defined by [\[OSLCCore3\]](#). Servers **SHOULD** provide `oslc:ResourceShape` on `oslc:QueryCapability` resources as defined by

[[OSLCShapes](#)].

The Query Capability, if supported, **MUST** support these parameters:

- `oslc.where`
- `oslc.select`
- `oslc.properties`
- `oslc.prefix`

Where `oslc:ResourceShape` is not supported by the Query Capability, Servers **SHOULD** use the following guidance to represent query results:

- For RDF/XML and XML, use `rdf:Description` and `rdfs:member` as defined by [Core Specification Appendix B: Representations and Examples - RDF/XML Examples](#).
- For JSON the query results are contained within `oslc:results` array. See [Core Specification Appendix B: Representations and Examples - Guidelines for JSON](#).

The stability of query results is **OPTIONAL** (see [Core Specification Version 2.0 - Stable Paging](#)).

4.4 Delegated UIs

RM Servers **MUST** support the selection and creation of resources by delegated web-based user interface dialogs [Delegated Dialogs](#) as defined by [[OSLCCore3](#)].

RM Servers **MAY** support the pre-filling of creation dialogs based on the definition at [Delegated Dialogs](#).

4.5 Usage Identifiers

RM Servers **MAY** identify the usage of various services with additional property values for the [OSLC Core Discovery](#) defined `oslc:usage` property on `oslc:Dialog`, `CreationFactory` and `QueryCapability`. The `oslc:usage` property value of `http://open-services.net/ns/core#default` **SHOULD** be used to designate the default or primary service to be used by consumers when multiple entries are found.

There are no additional usage identifiers defined by this specification. RM Servers **MAY** provide their own usage URIs. Such usage URIs **MUST** be in a non-OSLC namespace.

5. Conformance

This specification is based on [[OSLCCore3](#)]. OSLC RM servers **MUST** be compliant with both the core specification, **MUST** follow all the mandatory requirements in the normative sections of this specification, and **SHOULD** follow all the guidelines and recommendations in both these specifications.

An OSLC RM server **MUST** implement the domain vocabulary defined in [OSLC Requirements Management Version 2.1. Part 2: Vocabulary](#)

The following table summarizes the requirements from OSLC Core Specification as well as some additional requirements specific to the RM domain. Note that this specification further restricts some of the requirements for OSLC Core Specification. See the previous sections in

this specification or the OSLC Core Specification to get further details on each of these requirements.

Number	Requirement	Level	Meaning
RM-1	Unknown properties and content	MAY/MUST	OSLC servers MAY ignore unknown content and OSLC clients MUST preserve unknown content
RM-2	Resource Operations	MUST	OSLC servers MUST support resource operations via standard HTTP operations
RM-3	Resource Paging	MAY	OSLC servers MAY provide paging for resources but only when specifically requested by client
RM-4	Partial Resource Representations	MUST/MAY	OSLC servers MUST support request for a subset of a resource's properties via the oslc.properties URL parameter retrieval via HTTP GET and MAY support via HTTP PUT
RM-5	Partial Update	MAY	OSLC servers MAY support partial update of resources using [LDPPatch].
RM-6	Discovery	MAY/MUST	OSLC servers MAY provide a Service Provider Catalog, MUST provide a Service Provider resource, and MAY provide other forms of discovery described in Core 3.0 Discovery.
RM-7	Creation Factories	MUST/MAY	OSLC servers MUST provide at least one creation factory resource for requirements and MAY provide creation factory resources for requirement collections
RM-8	Query Capabilities	MUST	OSLC servers MUST provide query capabilities to enable clients to query for resources
RM-9	Query Syntax	MUST	OSLC query capabilities MUST support the OSLC Core Query Syntax
RM-10	Delegated UI Dialogs	MUST	OSLC Services MUST offer delegated UI dialogs (for both creation and selection) specified via service provider resource
RM-11	UI Preview	SHOULD	OSLC Services SHOULD offer UI previews for resources that may be referenced by other resources
RM-12	HTTP Basic Authentication	MAY	OSLC Servers MAY support Basic Authentication and SHOULD only do so only over HTTPS
RM-13	OAuth Authentication	MAY	OSLC Server MAY support OAuth and MAY indicate the required OAuth URLs via the service provider resource
RM-14	Error Responses	MAY	OSLC Servers MAY provide error responses using Core defined error formats

RM-15	RDF/XML Representations	MUST	OSLC servers MUST support RDF/XML representations for OSLC Defined Resources
RM-16	XML Representations	MUST	OSLC servers MUST support XML representations that conform to the OSLC Core Guidelines for XML
RM-17	JSON Representations	MAY/MUST	OSLC servers MAY support JSON representations; those which do MUST conform to the OSLC Core Guidelines for JSON
RM-18	HTML Representations	MAY	OSLC servers MAY provide HTML representations for GET requests

Appendix A. Version Compatibility

A.1 Version Compatibility with 2.0 Specifications

This section is non-normative.

The specification is updated to be based on the [OSLCCore3] Specification. The changes are all upward compatible additions and therefore do not introduce incompatibilities with version 2.0.

A.2 Version Compatibility with 1.0 Specifications

This section is non-normative.

The goal is to provide a smooth transition to 2.0 for both Clients and Servers. This section will clarify the usage of 1.0 media types so that Servers can support both 1.0 and 2.0 Clients when HTTP requests are made for a resource with the same URI.

Network addressable resource URIs used for 1.0 resources for these types: Requirement, RequirementCollection, ServiceDescriptor and ServiceProviderCatalog, should not have to change. Clients who support both 1.0 and 2.0, should only preserve these resource URIs. When a Server starts to serve 2.0 resource formats, for instance the ServiceProvider resource, it is recommended to update its locally stored or cached information about the contents of the ServiceProvider resource as the URIs to various capabilities may have changed (query, delegated UIs, factories, etc.).

Appendix B. Acknowledgements

This section is non-normative.

The following individuals have participated in the creation of this specification and are gratefully acknowledged:

Participants:

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Matthew Stone, Stoneworks
Dominic Tulley, IBM
Simon Wills, Integrate

Appendix C. Change History

This section is non-normative.

Revision	Date	Editor	Changes Made
01	2018-05-22	Jad El-khoury	Initial Committee Specification Draft migrated from open-services.net