



# OSLC Quality Management 2.1. Part 1: Specification

## Project Specification Draft 02

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

- *OSLC Quality Management 2.1. Part 1: Specification (this document)*. [quality-management-spec.html](#)
- *OSLC Quality Management 2.1. Part 2: Vocabulary*. [quality-management-vocab.html](#)

### RDF Namespaces:

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

### Abstract:

This specification defines the OSLC Quality Management domain, a RESTful web services interface for the management of product, service or software quality artefacts, activities, tasks and relationships between those and related resources such as requirements, defects, change requests or architectural resources. 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:

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# 1. Introduction

## 1.1 Overview

*This section is non-normative.*

This specification builds on the OSLC Core Specification to define the resources and operations supported by an Open Services for Lifecycle Collaboration (OSLC) Quality Management (QM) provider.

Quality Management resources define the test plans, test cases, and test results of the software delivery lifecycle. They represent individual resources along with their relationships to other shared resource types such as change requests and requirements. The intent of this specification is to define the set of HTTP-based RESTful interfaces in terms of HTTP methods: GET, POST, PUT and DELETE, HTTP response codes, mime type handling and resource formats. The capabilities of the interface definitions are driven by key integration scenarios and therefore don't represent a complete setup of operations on resources or resource types. The resource formats and operations may not match exactly the native models supported by quality management service providers but are intended to be compatible with them.

A key approach to supporting these scenarios is to delegate operations, as driven by service provider contributed user interfaces, as much as possible and not require a service provider to expose its complete data model and application logic.

## 1.2 Terminology

Terminology is based on OSLC Core Overview [OSLCCore3], W3C Linked Data Platform [LDP], W3C's Architecture of the World Wide Web [WEBARCH], and Hyper-text Transfer Protocol [HTTP11].

### **Service Provider**

An implementation of the OSLC Quality Management specifications as a server. OSLC QM clients consume these services

### **Quality Management Resource**

A resource managed by an OSLC QM service provider. The types of resources defined by this specification are Test Plan, Test Case, Test Script, Test Execution Record, and Test Result.

### **Client**

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

### **Server**

An implementation of the OSLC Quality Management specifications as a server. OSLC QM 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.

### **Test Plan Resource**

Defines the overall process and strategy for testing a system

### **Test Case Resource**

Defines the criteria which determine whether a system exhibits the correct behavior under a specific set of circumstances

### **Test Script Resource**

Defines a program or list of steps used to conduct a test

### Test Execution Record Resource

Planning for execution of a test

### Test Result Resource

Describes the outcome of attempting to execute a test

## 1.3 References

### 1.3.1 Normative references

[OSLCCore2]

Dave Johnson; S. Speicher. *OSLC Core Specification 2.0*. Finalized. URL: <https://archive.open-services.net/bin/view/Main/OslcCoreSpecification>

[OSLCCore3]

Jim Amsden; S. Speicher. *OSLC Core 3.0*. Committee Specification Public Review Draft. URL: <https://docs.oasis-open.org/oslc-core/oslc-core/v3.0/csprd03/part1-overview/oslc-core-v3.0-csprd03-part1-overview.html>

[OSLCCoreVocab]

Jim Amsden; S. Padgett; S. Speicher. *OSLC Core Vocabulary*. Committee Specification Public Review Draft. URL: <https://docs.oasis-open.org/oslc-core/oslc-core/v3.0/csprd03/part7-core-vocabulary/oslc-core-v3.0-csprd03-part7-core-vocabulary.html>

[OSLCPreview]

*OSLC Resource Preview 3.0*. Working Draft. URL: <https://oslc-op.github.io/oslc-specs/specs/core/resource-preview.html>

[OSLCQM1]

Paul McMahan. *OSLC Quality Management 1.0 Specification*. Finalized. URL: <https://archive.open-services.net/bin/view/Main/QmSpecificationV1.html>

[OSLCShapes]

Arthur Ryman; Jim Amsden. *OSLC Resource Shape 3.0*. Committee Specification Public Review Draft. URL: <https://docs.oasis-open.org/oslc-core/oslc-core/v3.0/csprd03/part6-resource-shape/oslc-core-v3.0-csprd03-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

[HTTP11]

R. Fielding, Ed.; J. Reschke, Ed.. *Hypertext Transfer Protocol (HTTP/1.1): Message Syntax and Routing*. June 2014. Proposed Standard. URL: <https://httpwg.org/specs/rfc7230.html>

[LDP]

Steve Speicher; John Arwe; Ashok Malhotra. [Linked Data Platform 1.0](#). 26 February 2015. W3C Recommendation. URL: <https://www.w3.org/TR/ldp/>

[LDPPatch]

[Linked Data Patch Format](#). Working Group Note. URL: <http://www.w3.org/TR/ldpatch/>

[OSLCCM20]

Steve Speicher. [Open Services for Lifecycle Collaboration Change Management Specification Version 2.0](#). Finalized. URL: <https://archive.open-services.net/bin/view/Main/CmSpecificationV2>

[OSLCQM2]

Paul McMahan. [OSLC Quality Management Specification Version 2.0](#). Finalized. URL: <https://archive.open-services.net/bin/view/Main/QmSpecificationV2.html>

[OSLCRM20]

Ian Green. [Open Services for Lifecycle Collaboration Requirements Management Specification Version 2.0](#). Finalized. URL: <https://archive.open-services.net/bin/view/Main/RmSpecificationV2>

[WEBARCH]

Ian Jacobs; Norman Walsh. [Architecture of the World Wide Web, Volume One](#). 15 December 2004. W3C Recommendation. URL: <https://www.w3.org/TR/webarch/>

## 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].

## Conventions

## 2. Base Requirements

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

### 2.1 Base Requirements

This specification is based on [OSLCCore3]. OSLC QM 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. [qm-1]

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

The following table summarizes the requirements from OSLC Core Specification as well as some additional requirements specific to the QM domain. Note that this specification further restricts some of the requirements for OSLC Core Specification. See subsequent sections in this specification or the OSLC Core Specification to get further details on each of these requirements.

Requirement	Meaning
Unknown properties and content	OSLC services <b>MAY</b> ignore unknown content and OSLC clients <b>MUST</b> preserve unknown content [qm-3]
Resource Operations	OSLC service <b>MUST</b> support resource operations via standard HTTP operations [qm-4]
Resource Paging	OSLC services <b>MAY</b> provide paging for resources but only when specifically requested by client [qm-5]
Partial Resource Representations	OSLC services <b>MUST</b> support request for a subset of a resource's properties via the osc.properties URL parameter retrieval via HTTP GET [qm-6]
Partial Update	OSLC services <b>MAY</b> support partial update of resources using patch semantics and <b>MAY</b> support via HTTP PUT [qm-7]
Discovery	OSLC servers <b>MUST</b> support OSLC Core 3.0 Discovery, <b>MAY</b> provide a ServiceProviderCatalog and <b>SHOULD</b> provide a ServiceProvider resource for Core v2 compatibility. [qm-8]
Creation Factories	OSLC servers <b>MUST</b> provide LDPC creation factories to enable resource creation of Quality Management resources via HTTP POST [qm-9]
Query Capabilities	OSLC servers <b>MUST</b> provide query capabilities to enable clients to query for resources [qm-10]
Query Syntax	OSLC query capabilities <b>MUST</b> support the OSLC Core Query Syntax and <b>MAY</b> use other query syntax [qm-11]
Delegated UI Dialogs	OSLC Services <b>MUST</b> offer delegated UI dialogs (creation and selections) specified via OSLC Core 3.0 Delegated Dialogs and <b>SHOULD</b> include discovery through a ServiceProvider resource for OSLC v2 compatibility [qm-12]
UI Preview	OSLC Services <b>SHOULD</b> offer UI previews for resources that may be referenced by other resources specified via OSLC Core 3.0 Preview and <b>SHOULD</b> include discovery through a server resource for OSLC v2 compatibility [qm-13]



Requirement	Meaning
HTTP Basic Authentication	OSLC Services <b>MAY</b> support Basic Auth and should do so only over HTTPS [qm-14]
OAuth Authentication	OSLC Services <b>SHOULD</b> support OAuth and can indicate the required OAuth URLs via the ServiceProviderCatalog or ServiceProvider resources [qm-15]
Error Responses	OSLC Services <b>SHOULD</b> provide error responses using OSLC Core 3.0 defined error formats [qm-16]
Turtle Representations	OSLC services <b>MUST</b> provide a Turtle representation for HTTP GET requests and <b>SHOULD</b> support Turtle representations on POST and PUT requests. [qm-17]
RDF/XML Representations	OSLC services <b>SHOULD</b> provide an RDF/XML representation for HTTP GET requests and <b>SHOULD</b> support RDF/XML representations on POST and PUT requests [qm-18]
XML Representations	OSLC services <b>SHOULD</b> provide a XML representation for HTTP GET, POST and PUT requests that conform to the Core 2.0 Guidelines for XML. [qm-19]
JSON Representations	OSLC services <b>MUST</b> provide JSON-LD representations for HTTP GET, POST and PUT requests that conform to the Core Guidelines for JSON-LD [qm-20]
HTML Representations	OSLC services <b>SHOULD</b> provide HTML representations for HTTP GET requests [qm-21]
QM 1.0 response compatibility	OSLC QM servers <b>MAY</b> use <code>application/x-oslq-qm-*</code> media types in responses for compatibility with [OSLCQM1] [qm-22]

## 2.2 Specification Versioning

This specification follows the specification version guidelines given in [OSLC Core Version 3.0. Part 1: Overview](#) ([OSLCCore3], section 5). There are no substantive changes from [OSLC Quality Management Specification Version 2.0](#) [OSLCQM2]. All changes are all upward compatible additions and do not introduce incompatibilities with Version 2.0.

## 2.3 Namespaces

In addition to the namespace URIs and namespace prefixes `oslq`, `rdf`, `dcterms` and `foaf` defined in the [OSLCCore3], OSLC QM defines the namespace URI of `http://open-services.net/ns/qm#` with a namespace prefix of `oslq_qm`.

This specification also uses these namespace prefix definitions:

- `oslq_cm` : `http://open-services.net/ns/cm#` [OSLCCM20]
- `oslq_rm` : `http://open-services.net/ns/rm#` [OSLCRM20]

## 2.4 Resource Formats

In addition to the requirements for resource representations in [OSLCCore3], this section outlines further refinements and restrictions.

For HTTP GET requests on all OSLC QM and OSLC Core defined resource types,

- QM servers **MUST** provide Turtle and JSON-LD, and **SHOULD** provide RDF/XML and XML representations. The XML and JSON representations **SHOULD** follow the guidelines outlined in the [OSLC Core Representations Guidance](#) to maintain compatibility with [OSLCCore2]. [qm-23]
- QM clients requesting RDF/XML **SHOULD** be prepared for any valid RDF/XML document. QM clients requesting XML **SHOULD** be prepared for representations that follow the guidelines outlined in the [OSLC Core Representations Guidance](#).

[qm-24]

- QM servers **SHOULD** support an [X]HTML representation and a user interface (UI) preview as defined by [UI Preview Guidance](#) [qm-25]

For HTTP PUT/POST request formats for resource type of TestPlan, TestCase, TestScript, TestExecutionRecord and TestResult :

- QM servers **MUST** accept Turtle and JSON-LD representations and **SHOULD** accept RDF/XML and XML representations. QM servers accepting RDF/XML **SHOULD** be prepared for any valid RDF/XML document. For XML, QM servers **SHOULD** be prepared for representations that follow the guidelines outlined in the [OSLC Core Representations Guidance](#). [qm-26]

For HTTP GET response formats for Query requests,

QM servers **MUST** provide Turtle and JSON-LD, **SHOULD** provide RDF/XML, XML, and **MAY** provide Atom Syndication Format XML representations. [qm-27]

When QM clients request:

- `text/turtle` QM servers **MUST** respond with Turtle representation. [qm-28]
- `application/ld+json` QM servers **MUST** respond with JSON-LD representation. [qm-29]
- `application/rdf+xml` QM servers **SHOULD** respond with RDF/XML representation without restrictions. [qm-30]
- `application/xml` QM servers **SHOULD** respond with OSLC-defined abbreviated XML representation as defined in the [OSLC Core Representations Guidance](#) [qm-31]
- `application/atom+xml` QM servers **MAY** support Atom Syndication Format XML representation as defined in the [OSLC Core Representations Guidance](#) to maintain integrations with the legacy applications. [qm-32]
- The Atom Syndication Format XML representation **SHOULD** use RDF/XML representation without restrictions for the `atom:content` entries representing the resource representations.

See Query Capabilities for additional information when Resource Shapes affect representation.

## 2.4.1 Content Negotiation

[OSLCCore3] specifies RDF representations (and specifically Turtle and JSON-LD) as a convention that all OSLC server implementations minimally provide and accept. OSLC QM server implementations are strongly encouraged to adopt this convention. Future versions of this specification are expected to require RDF representations for all operations and relax requirements for specialized XML representations.

**XML Representation** - identified by the `application/xml` content type. Format representation rules are outlined in Core [OSLC Core Resource Formats section](#)

**RDF/XML Representation** - identified by the `application/rdf+xml` content type. No additional guidance is given.

**JSON-LD Representation** - identified by the `application/ld+json` content type. Format representation rules are specified in [JSON-LD 1.0](#).

**Atom Syndication Format XML Representation** - identified by the `application/atom+xml` content type. Format representation rules are outlined in Core [OSLC Core Resource Formats section](#).

## 2.5 Authentication

[OSLCCore3] specifies the recommended OSLC authentication mechanisms. In addition to the OSLC Core authentication requirements, OSLC QM services providers **SHOULD** support [OpenIDConnect](#). [qm-33]

## 2.6 Error Responses

[OSLCCore3] specifies the OSLC Core error responses. OSLC QM puts no additional constraints on error responses.

## 2.7 Pagination

OSLC QM servers **SHOULD** support pagination of query results and **MAY** support pagination of a single resource's properties as defined by [OSLCCore3]. [qm-34]

## 2.8 Requesting and Updating Properties

### 2.8.1 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. [qm-35]

### 2.8.2 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. [qm-36]

For compatibility with [OSLCCore2], QM servers **MAY** also support partial update by identifying those properties to be modified using the `oslc.properties` URL parameter on a HTTP PUT request. [qm-37]

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. [qm-38]

### 2.8.3 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 QM servers **SHOULD** provide support for a partial update of the multi-valued properties as defined by [OSLC Core Partial Update](#). [qm-39]

## 2.9 Labels for Relationships

*This section is non-normative.*

QM resource 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 [OSLCPreview] 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). In the case where the link requires a unique label that is not available from the target resource, only then 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 ns0: <http://open-services.net/ns/qm#> .
@prefix rdf: <http://www.w3.org/1999/02/22-rdf-syntax-ns#> .
@prefix dcterms: <http://purl.org/dc/terms/> .

<http://example.com/tests/4321>
```

## Standards Track Work Product

```
a <http://open-services.net/ns/qm#TestCase> ;  
ns0:uses <http://anotherexample.com/testscript/123> .
```

```
<http://njh.me/#link1>  
  a rdf:Statement ;  
  rdf:subject <http://example.com//4321> ;  
  rdf:predicate ns0:uses ;  
  rdf:object <http://anotherexample.com/testscript/123> ;  
  dcterms:title "Test Script 123: " .
```

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_qm": "http://open-services.net/ns/qm#"  
  },  
  "@id": "http://example.com/testscripts/4321",  
  "@type": "oslc_qm:TestScript",  
  "oslc_cm:relatedChangeRequest": {  
    "@id": "http://anotherexample.com/defects/123",  
    "dcterms:title": "Defect 123: Problems during install"  
  }  
}
```

### 3. Vocabulary Terms and Constraints

[OSLC QM Resources 2.1](#) Defines the vocabulary terms and constraints for OSLC Quality Management resources. These terms and constraints are specified according to [\[OSLC Core Vocab\]](#).

The intent is to define resources needed to support common integration scenarios and not to provide a comprehensive definition of QM resources like Test Case. The resource formats may not match exactly the native models supported by quality management service providers, but are intended to be compatible with them. The approach to supporting these scenarios is to delegate operations, as driven by service provider contributed user interfaces, as much as possible and not require a service provider to expose its complete data model and application logic.

## 4. QM Server Capabilities

### 4.1 Resource Shapes

OSLC QM servers **SHOULD** support Resource Shapes as defined in [OSLCShapes]. [qm-40]

### 4.2 Service Provider Resources

OSLC QM servers **MUST** support OSLC Discovery capabilities defined by [OSLCCore3]. [qm-41]

OSLC domain-name servers **MAY** provide a ServiceProvider Resource that can be retrieved at a implementation dependent URI. [qm-42]

OSLC QM servers **MAY** provide a ServiceProviderCatalog Resource that can be retrieved at a implementation dependent URI. [qm-43]

OSLC QM servers **MAY** provide a `oslc:serviceProvider` property for their defined resources that will be the URI to a ServiceProvider Resource. [qm-44]

OSLC QM servers **MUST** supply a value of `http://open-services.net/ns/qm#` for the property `oslc:domain` on either `oslc:Service` or `oslc:ServiceProviderCatalog` resources. [qm-45]

### 4.3 Creation Factories

OSLC QM servers **MUST** support [OSLCCore3] Creation Factories and list them in the Service Provider Resource as defined by OSLC Core. OSLC QM servers **SHOULD** support Resource Shapes for Creation Factories as defined in [OSLCShapes]. [qm-46]

### 4.4 Query Capabilities

OSLC QM servers **SHOULD** support the Query Capabilities as defined by [OSLCCore3]. OSLC QM servers **SHOULD** support Resource Shapes for Query Capability as defined in [OSLCShapes]. [qm-47]

The Query Capability, if supported, **MUST** support these parameters: [qm-48]

- `oslc.where` [qm-49]
- `oslc.select` [qm-50]
- `oslc.properties` [qm-51]
- `oslc.prefix` [qm-52]

If shape information is NOT present with the Query Capability, servers **SHOULD** use these default properties to contain the result: [qm-53]

- For RDF/XML and XML, use `rdf:Description` and `rdfs:member` as defined in [OSLC Core RDF/XML Examples](#).
- For JSON, the query results are contained within `oslc:results` array. See [OSLC Core Representation Guidance for JSON](#)

### 4.5 Delegated UIs

OSLC QM servers **MUST** support the selection and creation of resources by delegated web-based user interface delegated dialogs Delegated as defined by [OSLCCore3]. [qm-54]

OSLC QM servers **MAY** support the pre-filling of creation dialogs based on the definition [OSLCCore3]. [qm-55]

## 5. Conformance

Implementations of this specification need to satisfy the following conformance clauses.

Clause Number	Requirement
<a href="#">qm-1</a>	This specification is based on [OSLCCore3]. OSLC QM servers <b>MUST</b> be compliant with both the core specification, <b>MUST</b> follow all the mandatory requirements in the normative sections of this specification, and <b>SHOULD</b> follow all the guidelines and recommendations in both these specifications.
<a href="#">qm-2</a>	An OSLC QM server <b>MUST</b> implement the domain vocabulary defined in <a href="#">OSLC Quality Management Version 2.1. Part 2: Vocabulary</a>
<a href="#">qm-3</a>	OSLC services <b>MAY</b> ignore unknown content and OSLC clients <b>MUST</b> preserve unknown content
<a href="#">qm-4</a>	OSLC service <b>MUST</b> support resource operations via standard HTTP operations
<a href="#">qm-5</a>	OSLC services <b>MAY</b> provide paging for resources but only when specifically requested by client
<a href="#">qm-6</a>	OSLC services <b>MUST</b> support request for a subset of a resource's properties via the oslc.properties URL parameter retrieval via HTTP GET
<a href="#">qm-7</a>	OSLC services <b>MAY</b> support partial update of resources using patch semantics and <b>MAY</b> support via HTTP PUT
<a href="#">qm-8</a>	OSLC servers <b>MUST</b> support OSLC Core 3.0 Discovery, <b>MAY</b> provide a ServiceProviderCatalog and <b>SHOULD</b> provide a ServiceProvider resource for Core v2 compatibility.
<a href="#">qm-9</a>	OSLC servers <b>MUST</b> provide LDPC creation factories to enable resource creation of Quality Management resources via HTTP POST
<a href="#">qm-10</a>	OSLC servers <b>MUST</b> provide query capabilities to enable clients to query for resources
<a href="#">qm-11</a>	OSLC query capabilities <b>MUST</b> support the OSLC Core Query Syntax and <b>MAY</b> use other query syntax
<a href="#">qm-12</a>	OSLC Services <b>MUST</b> offer delegated UI dialogs (creation and selections) specified via OSLC Core 3.0 Delegated Dialogs and <b>SHOULD</b> include discovery through a ServiceProvider resource for OSLC v2 compatibility
<a href="#">qm-13</a>	OSLC Services <b>SHOULD</b> offer UI previews for resources that may be referenced by other resources specified via OSLC Core 3.0 Preview and <b>SHOULD</b> include discovery through a server resource for OSLC v2 compatibility
<a href="#">qm-14</a>	OSLC Services <b>MAY</b> support Basic Auth and should do so only over HTTPS
<a href="#">qm-15</a>	OSLC Services <b>SHOULD</b> support OAuth and can indicate the required OAuth URLs via the ServiceProviderCatalog or ServiceProvider resources
<a href="#">qm-16</a>	OSLC Services <b>SHOULD</b> provide error responses using OSLC Core 3.0 defined error formats
<a href="#">qm-17</a>	OSLC services <b>MUST</b> provide a Turtle representation for HTTP GET requests and <b>SHOULD</b> support Turtle representations on POST and PUT requests.
<a href="#">qm-18</a>	OSLC services <b>SHOULD</b> provide an RDF/XML representation for HTTP GET requests and <b>SHOULD</b> support RDF/XML representations on POST and PUT requests
<a href="#">qm-19</a>	OSLC services <b>SHOULD</b> provide a XML representation for HTTP GET, POST and PUT requests that conform to the Core 2.0 Guidelines for XML.
<a href="#">qm-20</a>	OSLC services <b>MUST</b> provide JSON-LD representations for HTTP GET, POST and PUT requests that conform to the Core Guidelines for JSON-LD
<a href="#">qm-21</a>	OSLC services <b>SHOULD</b> provide HTML representations for HTTP GET requests
<a href="#">qm-22</a>	OSLC QM servers <b>MAY</b> use <code>application/x-oslc-qm-*</code> media types in responses for compatibility with [OSLCQM1]
<a href="#">qm-23</a>	QM servers <b>MUST</b> provide Turtle and JSON-LD, and <b>SHOULD</b> provide RDF/XML and XML representations. The XML and JSON representations <b>SHOULD</b> follow the guidelines outlined in the <a href="#">OSLC Core Representations Guidance</a> to maintain compatibility with [OSLCCore2].

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Clause Number	Requirement
<a href="#">qm-24</a>	QM clients requesting RDF/XML <b>SHOULD</b> be prepared for any valid RDF/XML document. QM clients requesting XML <b>SHOULD</b> be prepared for representations that follow the guidelines outlined in the <a href="#">OSLC Core Representations Guidance</a> .
<a href="#">qm-25</a>	QM servers <b>SHOULD</b> support an [X]HTML representation and a user interface (UI) preview as defined by <a href="#">UI Preview Guidance</a>
<a href="#">qm-26</a>	QM servers <b>MUST</b> accept Turtle and JSON-LD representations and <b>SHOULD</b> accept RDF/XML and XML representations. QM servers accepting RDF/XML <b>SHOULD</b> be prepared for any valid RDF/XML document. For XML, QM servers <b>SHOULD</b> be prepared for representations that follow the guidelines outlined in the <a href="#">OSLC Core Representations Guidance</a> .
<a href="#">qm-27</a>	QM servers <b>MUST</b> provide Turtle and JSON-LD, <b>SHOULD</b> provide RDF/XML, XML, and <b>MAY</b> provide Atom Syndication Format XML representations.
<a href="#">qm-28</a>	<code>text/turtle</code> QM servers <b>MUST</b> respond with Turtle representation.
<a href="#">qm-29</a>	<code>application/ld+json</code> QM servers <b>MUST</b> respond with JSON-LD representation.
<a href="#">qm-30</a>	<code>application/rdf+xml</code> QM servers <b>SHOULD</b> respond with RDF/XML representation without restrictions.
<a href="#">qm-31</a>	<code>application/xml</code> QM servers <b>SHOULD</b> respond with OSLC-defined abbreviated XML representation as defined in the <a href="#">OSLC Core Representations Guidance</a>
<a href="#">qm-32</a>	<code>application/atom+xml</code> QM servers <b>MAY</b> support Atom Syndication Format XML representation as defined in the <a href="#">OSLC Core Representations Guidance</a> to maintain integrations with the legacy applications.
<a href="#">qm-33</a>	[OSLCCore3] specifies the recommended OSLC authentication mechanisms. In addition to the OSLC Core authentication requirements, OSLC QM services providers <b>SHOULD</b> support [OpenIDConnect].
<a href="#">qm-34</a>	OSLC QM servers <b>SHOULD</b> support pagination of query results and <b>MAY</b> support pagination of a single resource's properties as defined by [OSLCCore3].
<a href="#">qm-35</a>	A client <b>MAY</b> request a subset of a resource's properties as well as properties from a referenced resource. In order to support this behavior a server <b>MUST</b> support the <code>oslc.properties</code> and <code>oslc.prefix</code> URL parameter on a HTTP GET request on individual resource request or a collection of resources by query. If the <code>oslc.properties</code> parameter is omitted on the request, then all resource properties <b>MUST</b> be provided in the response.
<a href="#">qm-36</a>	A client <b>MAY</b> request that a subset of a resource's properties be updated by using the [LDPPatch] <code>PATCH</code> method.
<a href="#">qm-37</a>	For compatibility with [OSLCCore2], QM servers <b>MAY</b> also support partial update by identifying those properties to be modified using the <code>oslc.properties</code> URL parameter on a HTTP PUT request.
<a href="#">qm-38</a>	If the parameter <code>oslc.properties</code> contains a valid resource property on the request that is not provided in the content, the server <b>MUST</b> set the resource's property to a null or empty value. If the parameter <code>oslc.properties</code> contains an invalid resource property, then a 409 Conflict <b>MUST</b> be returned.
<a href="#">qm-39</a>	For multi-valued properties that contain a large number of values, it may be difficult and inefficient to add or remove property values. OSLC QM servers <b>SHOULD</b> provide support for a partial update of the multi-valued properties as defined by <a href="#">OSLC Core Partial Update</a> .
<a href="#">qm-40</a>	OSLC QM servers <b>SHOULD</b> support Resource Shapes as defined in [OSLCShapes].
<a href="#">qm-41</a>	OSLC QM servers <b>MUST</b> support OSLC Discovery capabilities defined by [OSLCCore3].
<a href="#">qm-42</a>	OSLC domain-name servers <b>MAY</b> provide a ServiceProvider Resource that can be retrieved at a implementation dependent URI.
<a href="#">qm-43</a>	OSLC QM servers <b>MAY</b> provide a ServiceProviderCatalog Resource that can be retrieved at a implementation dependent URI.
<a href="#">qm-44</a>	OSLC QM servers <b>MAY</b> provide a <code>oslc:serviceProvider</code> property for their defined resources that will be the URI to a ServiceProvider Resource.
<a href="#">qm-45</a>	OSLC QM servers <b>MUST</b> supply a value of <code>http://open-services.net/ns/qm#</code> for the property <code>oslc:domain</code> on either <code>oslc:Service</code> or <code>oslc:ServiceProviderCatalog</code> resources.



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Clause Number	Requirement
<a href="#">qm-46</a>	OSLC QM servers <b>MUST</b> support [ <a href="#">OSLCCore3</a> ] Creation Factories and list them in the Service Provider Resource as defined by OSLC Core. OSLC QM servers <b>SHOULD</b> support Resource Shapes for Creation Factories as defined in [ <a href="#">OSLCShapes</a> ].
<a href="#">qm-47</a>	OSLC QM servers <b>SHOULD</b> support the Query Capabilities as defined by [ <a href="#">OSLCCore3</a> ]. OSLC QM servers <b>SHOULD</b> support Resource Shapes for Query Capability as defined in [ <a href="#">OSLCShapes</a> ].
<a href="#">qm-48</a>	The Query Capability, if supported, <b>MUST</b> support these parameters:
<a href="#">qm-49</a>	<b>oslc.where</b>
<a href="#">qm-50</a>	<b>oslc.select</b>
<a href="#">qm-51</a>	<b>oslc.properties</b>
<a href="#">qm-52</a>	<b>oslc.prefix</b>
<a href="#">qm-53</a>	If shape information is NOT present with the Query Capability, servers <b>SHOULD</b> use these default properties to contain the result:
<a href="#">qm-54</a>	OSLC QM servers <b>MUST</b> support the selection and creation of resources by delegated web-based user interface delegated dialogs Delegated as defined by [ <a href="#">OSLCCore3</a> ].
<a href="#">qm-55</a>	OSLC QM servers <b>MAY</b> support the pre-filling of creation dialogs based on the definition [ <a href="#">OSLCCore3</a> ].

## Appendix A. Version Compatibility with 2.0 Specifications

The following differences were noted when migrating the open-services.net version 2.0 Quality Management specification to the version 2.1 OASIS template based upon Change Management

Item	V2 status	V3 status	Remark
01	Service Provider Compliance requirements are listed	These requirements appear to be hosted under the heading of Discovery	No action
03	Query <b>MUST</b> scope limited to osc.where and osc.select	Query <b>MUST</b> scope extended osc.properties and osc.prefix	No action
04	V1 compatibility included	V1 compatibility not included	No action

## Appendix B. Acknowledgements

*This section is non-normative.*

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