

# OSLC Core Version 3.0. Part 1: Overview

## Committee Specification Draft 01

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#### Additional artifacts:

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

- OSLC Core Version 3.0. Part 1: Overview (this document). <http://docs.oasis-open.org/oslc-core/oslc-core/v3.0/csd01/part1-overview/oslc-core-v3.0-csd01-part1-overview.html>

- OSLC Core Version 3.0. Part 2: Discovery. <http://docs.oasis-open.org/oslc-core/oslc-core/v3.0/csd01/part2-discovery/oslc-core-v3.0-csd01-part2-discovery.html>
- OSLC Core Version 3.0. Part 3: Resource Preview. <http://docs.oasis-open.org/oslc-core/oslc-core/v3.0/csd01/part3-resource-preview/oslc-core-v3.0-csd01-part3-resource-preview.html>
- OSLC Core Version 3.0. Part 4: Delegated Dialogs. <http://docs.oasis-open.org/oslc-core/oslc-core/v3.0/csd01/part4-delegated-dialogs/oslc-core-v3.0-csd01-part4-delegated-dialogs.html>
- OSLC Core Version 3.0. Part 5: Attachments. <http://docs.oasis-open.org/oslc-core/oslc-core/v3.0/csd01/part5-attachments/oslc-core-v3.0-csd01-part5-attachments.html>
- OSLC Core Version 3.0. Part 6: Resource Shape. <http://docs.oasis-open.org/oslc-core/oslc-core/v3.0/csd01/part6-resource-shape/oslc-core-v3.0-csd01-part6-resource-shape.html>
- OSLC Core Version 3.0. Part 7: Vocabulary. <http://docs.oasis-open.org/oslc-core/oslc-core/v3.0/csd01/part7-core-vocabulary/oslc-core-v3.0-csd01-part7-core-vocabulary.html>

## Related work:

This specification is related to:

- OSLC Core Version 3.0: Link Guidance. Work in progress. Current draft: <https://tools.oasis-open.org/version-control/svn/oslc-core/trunk/supporting-docs/link-guidance.html>

## RDF Namespaces:

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

## Abstract:

Defines the overall approach to Open Services for Lifecycle Collaboration (OSLC) based specifications and capabilities that extend and compliment W3C Linked Data Platform [LDP]. OSLC Core 3.0 constitutes the approach outlined in this document and capabilities referenced in other documents.

## Status:

This document was last revised or approved by the [OASIS OSLC Lifecycle Integration Core \(OSLC Core\) 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/oslc-core#technical>.

TC members should send comments on this specification to the TC’s email list. Others should send comments to the TC’s public comment list [oslc-core-comment@lists.oasis-open.org](mailto:oslc-core-comment@lists.oasis-open.org), after subscribing to it by following the instructions at the “Send A Comment” button on the TC’s web page at <https://www.oasis-open.org/committees/oslc-core/>.

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## Citation format:

When referencing this specification the following citation format should be used:

**[OSLC-Core-3.0]**

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## 1. Introduction

*This section is non-normative.*

Information Technology (IT) enterprises are constantly addressing demands to do more with less. To meet this demand they need more efficient development processes and supporting tools. This has resulted in demand for better support of integrated system and software processes. Enterprises want solutions (such as software or hardware development tools) from different vendors, open source projects and their own proprietary components to work together. This level of integration, however, can become quite challenging and unmanageable. In order to enable integration between a heterogeneous set of tools and components from various sources, there is a need for a sufficient supporting architecture that is loosely coupled, minimal, and standardized. OSLC is based on World Wide Web and Linked Data principles, such as those defined in the W3C Linked Data Platform [LDP], to create a cohesive set of specifications that can enable products, services, and other distributed network resources to interoperate successfully [LDP].

**Domains of interest** that maintain separation of concerns and establish collaborative value streams through integration

OSLC Domains		Vocabularies	Constraints
RM	DM	CCM	QM
		Automation	

OSLC Change Management 3.0 and OSLC Configuration Management 1.0 Specifications, OASIS

**Discoverability** through Minimal, discoverable, self-describing capabilities to *enable* application integration

OSLC Core	Resource Preview	Query
Discovery	Delegated UI	Attachments

OSLC Core 3.0 Specification, OASIS

**Reducing Variability** through Self-describing, semantically rich, linked data resources leveraging HATEOAS

LDP	Containers, Accept-Post	Link Relations	Paging
Open-World Assumptions	JSON-LD	Turtle	Patch

LDP 1.0 Specification, LDPnext Working Group, W3C

**Address Complexity** through HTTP and REST as the standard mechanism for distributed, loosely coupled APIs

HTTP	POST	GET	PUT	DELETE	REST
Authentication	Resource MIME Types		Content Negotiation		

HTTP 1.1 Specification, IETF

Fig. 1 OSLC Core 3.0 Architecture

OSLC is motivated by domain-driven scenarios that inspire standardization of common capabilities across disciplines such as change management, requirements management, and quality management, as well as by cross-domain scenarios such as Application Lifecycle Management (ALM) & DevOps, Product Lifecycle Management (PLM), and Integrated Service Management (ISM). The OSLC approach focuses on software lifecycle management to ensure it meets a core set of scenarios and requirements. Nonetheless, it can be used by tools belonging to any other domains and cross-domain scenarios such as Internet of Things, back office application integration, and customer relationship management.

The OSLC Core specifications provide additional capabilities that expand on the W3C LDP capabilities, as needed, to enable key integration scenarios. These capabilities define the essential and common technical elements of OSLC domain specifications and offers guidance on common concerns for creating, updating, retrieving, and linking to lifecycle resources based on W3C [LDP]. These specifications have emerged from the best practices and other work of other OSLC Member Section (MS)-affiliated Technical Committees (TCs), sometime referred to as OSLC domain TCs. OSLC domain TCs focus on a certain domain or topic. The [OSLC Core TC](#) develops technical specifications, creates best practices documents and formulates design principles that can be leveraged by other OSLC MS-affiliated TCs to enable them to focus on domain-specific concerns.

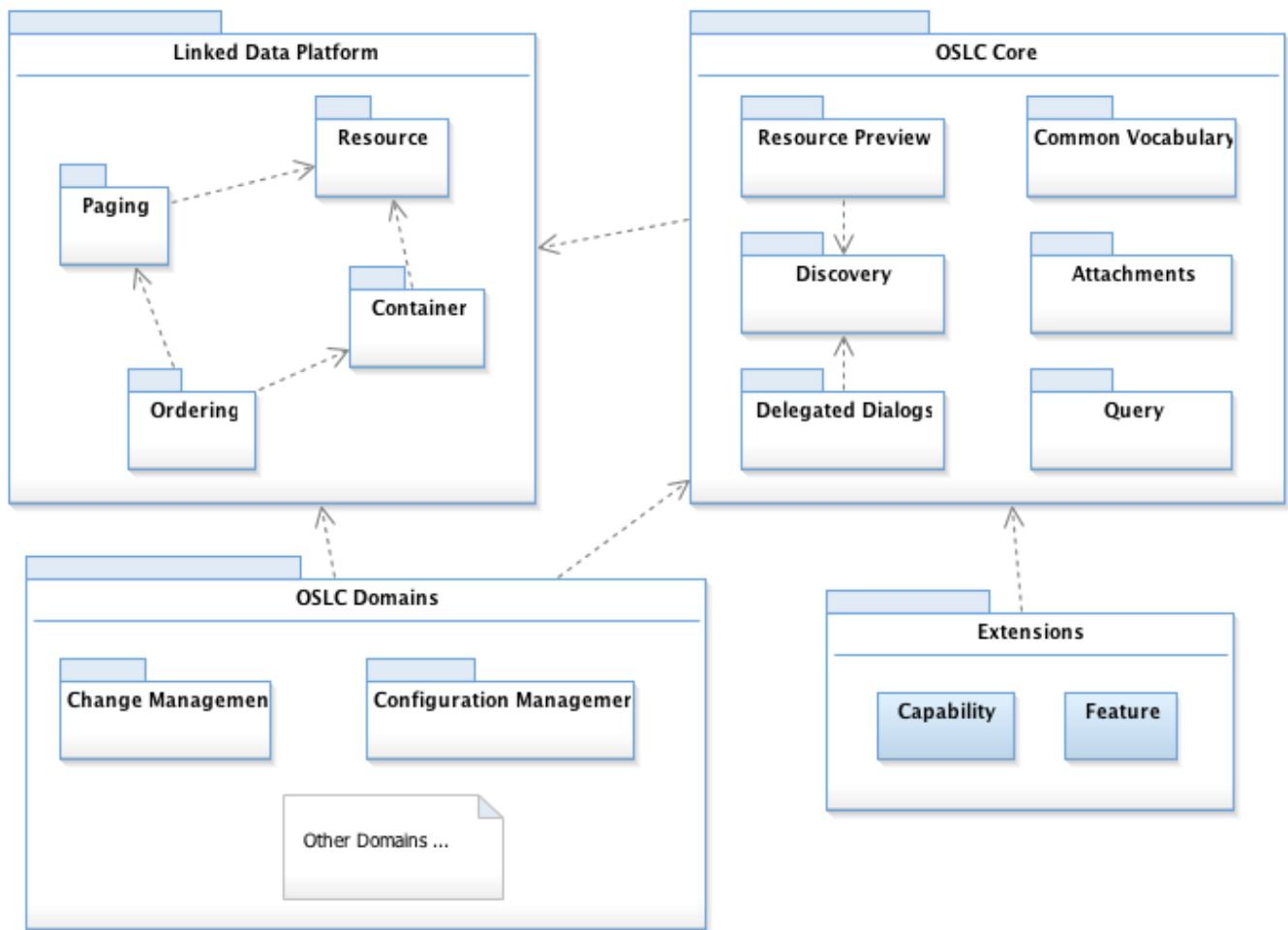


Fig. 2 OSLC Core 3.0 Overview

As seen in [Fig. 2 OSLC Core 3.0 Overview](#), there are a number of capabilities developed in different standards organizations, TCs and working groups. The arrows represent either dependencies or extensions to some specifications or capabilities. OSLC MS-affiliated TC developed specifications may depend on OSLC Core 3.0 specifications as scenarios motivate. However, a leading goal is to minimize and eliminate unnecessary dependencies to simplify adoption, which may result in no dependency on OSLC Core 3.0 specifications for some OSLC domains.

This work is an evolution from the OSLC Core 2.0 [\[OSLCCore2\]](#) efforts, taking the experience gained from that effort along with the common foundation on W3C LDP, to produce an updated set of specifications that are simpler, built on layered capabilities and easier to adopt.

## 1.1 Terminology

Terminology uses and extends the terminology and capabilities of W3C Linked Data Platform [\[LDP\]](#), W3C's Architecture of the World Wide Web [\[WEBARCH\]](#) and Hyper-text Transfer Protocol [\[HTTP11\]](#).

### OSLC Server

LDP Server that also supports capabilities defined by at least on OSLC-based specification. See Server [\[HTTP11\]](#) and LDP Server [\[LDP\]](#).

### OSLC Client

LDP Client that uses capabilities defined by some OSLC-based specifications. See Client [\[HTTP11\]](#) and LDP Client [\[LDP\]](#). A particular software component or application could be an OSLC Server supporting a set of domains, and an OSLC Client of other domains depending on its needs.

### Domain



A topic area of a specific focus area and/or collection of disciplines. Often OASIS OSLC-affiliated TCs are organized around a domain.

### OSLC Core Specifications

Specifications that cover specific capabilities that are often needed across various domains. They are created, authored and endorsed by the OASIS OSLC Core TC. Can be abbreviated to Core Specifications.

### OSLC Domain Specifications

Specifications that cover a domain need, including existing open-services.net specifications and new specifications created and authored by OASIS OSLC-affiliated TCs. Can be abbreviated to Domain Specifications

### Resource Shape

The set of properties (triples) that constrain a resource for specific operations (i.e. creation, update or query), and for each property, their value types, allowed values and cardinality.

## Some industry terms that are often referred to (not exhaustive):

### [Product Lifecycle Management \(PLM\)](#)

The process of managing the entire lifecycle of a product from its conception, through design and manufacture, to service and disposal.

### [Systems Engineering](#)

An interdisciplinary field of engineering that focuses on how to design and manage complex engineering systems over their life cycles.

### [Application Lifecycle Management \(ALM\)](#)

The marriage of business management to software engineering made possible by tools that facilitate and integrate requirements management, architecture, coding, testing, tracking, quality and release management.

### [DevOps](#)

A software development method that stresses communication, collaboration and integration between software developers and Information Technology(IT) professionals in support of continuous delivery.

### [IT Service Management \(ITSM\)](#)

The implementation and management of quality information technology services. IT service management is performed by IT service providers through people, process and information technology.

## 1.1.1 Deprecated terms

Previous revisions of OSLC-based specifications [[OSLCCore2](#)], used terminology that may no longer be relevant, accurate or needed any more. Some of those deprecated terms are:

Provider (*deprecated*)

See Server [[HTTP11](#)].

Consumer (*deprecated*)

See Client [[HTTP11](#)].

## 1.2 References

### 1.2.1 Normative references

## [HTTP11]

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

## [LDP]

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

## [OSLCCore2]

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

## [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>

## [rfc6749]

D. Hardt, Ed.. [\*The OAuth 2.0 Authorization Framework\*](#). October 2012. Proposed Standard. URL: <https://tools.ietf.org/html/rfc6749>

## 1.2.2 Informative references

### [HTML5]

Ian Hickson; Robin Berjon; Steve Faulkner; Travis Leithead; Erika Doyle Navara; Edward O'Connor; Silvia Pfeiffer. [\*HTML5\*](#). 28 October 2014. W3C Recommendation. URL: <http://www.w3.org/TR/html5/>

### [LDBestPractices]

[\*Linked Data Best Practices\*](#). URL: <https://jazz.net/wiki/bin/view/LinkedData/BestPractices>

### [RDF-SPARQL-QUERY]

Eric Prud'hommeaux; Andy Seaborne. [\*SPARQL Query Language for RDF\*](#). 15 January 2008. W3C Recommendation. URL: <http://www.w3.org/TR/rdf-sparql-query/>

### [SHACL]

Holger Knublauch; Arthur Ryman. [\*Shapes Constraint Language \(SHACL\)\*](#). Draft. URL: <https://w3c.github.io/data-shapes/shacl/>

### [Turtle]

Eric Prud'hommeaux; Gavin Carothers. [\*RDF 1.1 Turtle\*](#). 25 February 2014. W3C Recommendation. URL: <http://www.w3.org/TR/turtle/>

### [WEBARCH]

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

### [rdf11-concepts]

Richard Cyganiak; David Wood; Markus Lanthaler. [\*RDF 1.1 Concepts and Abstract Syntax\*](#). 25 February 2014. W3C Recommendation. URL: <http://www.w3.org/TR/rdf11-concepts/>

## 1.3 RDF Namespaces

OSLC Core defines the namespace URI of <http://open-services.net/ns/core#> with a namespace prefix of **oslc**.



OSLC Core uses the following prefixes:

Prefix	Namespace
dcterms	<a href="http://purl.org/dc/terms/">http://purl.org/dc/terms/</a>
foaf	<a href="http://xmlns.com/foaf/0.1/">http://xmlns.com/foaf/0.1/</a>
ldp	<a href="http://www.w3.org/ns/ldp#">http://www.w3.org/ns/ldp#</a>
owl	<a href="http://www.w3.org/2002/07/owl#">http://www.w3.org/2002/07/owl#</a>
prov	<a href="http://www.w3.org/ns/prov#">http://www.w3.org/ns/prov#</a>
rdf	<a href="http://www.w3.org/1999/02/22-rdf-syntax-ns#">http://www.w3.org/1999/02/22-rdf-syntax-ns#</a>
rdfs	<a href="http://www.w3.org/2000/01/rdf-schema#">http://www.w3.org/2000/01/rdf-schema#</a>
vann	<a href="http://purl.org/vocab/vann/">http://purl.org/vocab/vann/</a>
vs	<a href="http://www.w3.org/2003/06/sw-vocab-status/ns#">http://www.w3.org/2003/06/sw-vocab-status/ns#</a>
xsd	<a href="http://www.w3.org/2001/XMLSchema#">http://www.w3.org/2001/XMLSchema#</a>

## 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. Goals/Motivation

*This section is non-normative.*

The primary goal of OSLC is to enable integration of federated, shared information across tools that support different, but related domains. OSLC was initially focused on development of Information Technology (IT) solutions involving processes, activities, work products and supporting tools for Application Lifecycle Management (ALM). However, OSLC capabilities could be applicable to other domains. The specific goals for OSLC Core 3.0 are to build on the existing OSLC Core 2.0 specifications to further facilitate the development and integration of domains and supporting tools that address additional integration needs. Specifically:

- Integration is based on an open standard, and not controlled by any single vendor
- OSLC 3.0 is based on the new W3C Linked Data Platform standard which provides a solid foundation for reading and writing linked data resources
- The specifications are simpler, more consistent and will potentially be more attractive to, and easier to consume by new integrations
- There are some new capabilities including Attachments, inverse link labels, traceability and impact types
- Domain vocabularies can be improved for data consistency and removing data gaps
- All Resource Shapes are provided in machine readable [Turtle] files

The following guiding principles were used to govern the evolution of OSLC and guide the development of the OSLC Core 3.0 specifications.

### **Scenario-driven**

Every capability should be linked back to key integration scenarios that motivate its need. These are important not only for knowing that the correct specification content is being developed but also to assist with implementers understanding the intended usage and in developing relevant test cases.

### **Incremental**

Specifications should be developed in an incremental fashion that not only validates the technical approaches but also delivers integration value sooner.

### ***Loose-coupling***

Specifications should support a model where clients have little to no knowledge about server implementation-specific behaviors in order to support key integration scenarios. As a result, clients should be unaffected by any server application software or data model implementation changes. Similarly, client software should be able to be independently changed without changes to server software.

### ***Minimalistic***

Specification authors should strive to find not only the simplest solution that would work for a given scenario but allows for easy adoption. Authors should avoid solutions that offer additional capabilities which may inhibit adoption of necessary capabilities.

### ***Capability Based***

A capability is the ability to perform actions to achieve outcomes described by scenarios through the use of specific technologies. Capabilities should be incrementally defined as independent focused specifications and independently discoverable at runtime. Even though there may be some generally agreed upon best practices for capability publication and discovery, each capability should define how it is published and discovered. The Core OSLC capabilities are defined in this specification.

### ***Vocabularies***

Various OSLC MS-affiliated TCs, or any specification development body that is authoring specifications for specific domains of knowledge, should minimally define vocabularies and the semantics behind the various terms. Some consideration should be given for global reuse when terms are used for cross domain queries and within other domain resource shape definitions. Domain specifications are the definition of an OSLC capability, and how those vocabulary terms are used in LDP interactions by both the clients and servers of that capability. The specification should include defining resource shapes that describe resources based on a set of vocabulary terms, which introduces any domain specific constraints on the vocabulary's usage.

OSLC domain vocabularies should follow the recommended best practices for managing RDF vocabularies described at [[LDBestPractices](#)].

## **3. Architecture**

*This section is non-normative.*

In support of the previously stated goals and motivation, it is desired to have a consistent and recommended architecture. The architecture needs to support scenarios requiring a protocol to access, create, update and delete resources. [[LDP](#)] is the foundation for this protocol. Resources need to relate, or link, to one another utilizing a consistent, standard and web-scale data model. Resource Description Framework (RDF) [[rdf11-concepts](#)] is the foundation for this. The ability to work with these data models over HTTP protocols, is based on [[LDP](#)].

Some scenarios require the need to integrate user interface components: either within a desktop or mobile web-browser, mobile device application, or rich desktop applications. For these scenarios the technology is rapidly evolving and changing. Priority should be based on existing standards such as HTML5, with use of `iframe` and `postMessage()`. [[HTML5](#)]

OSLC Core specification documents elaborate on the conformance requirements leveraging these various technologies and approaches.

As the primary goals have been outlined around lifecycle integration, some scenarios may require exploration of new (or different) approaches and technologies. As with all specification development efforts, the OSLC Core TC will advise, develop and approve such efforts through the established processes for cross-TC and organization coordination.

## 4. OSLC Core 3.0 Capabilities

*This section is non-normative.*

The following sections and referenced documents define the capabilities for OSLC Core 3.0. These documents comprise the multi-part specification for OSLC Core 3.0. They represent common capabilities that servers **MAY** provide and that may be discovered and used by clients. Although OSLC Core could be useful on its own, it is intended to specify capabilities that are common across many domains. Servers will generally specify conformance with specific domain specifications, and those domain specifications will describe what parts of OSLC Core are required for conformance. This allows servers to implement the capabilities they need in a standard way without the burden of implementing capabilities that are not required. The purpose of the OSLC Core Discovery capability is to allow clients to determine what capabilities are provided by a server. Any provided capability must meet all the conformance criteria for that capability as defined in the OSLC Core 3.0 specifications.

This implies that any capability that is discoverable is essentially optional, and once discovered, the capability is provided as defined in the applicable OSLC specifications. Servers should support OSLC Discovery, but Discovery itself is also an optional capability as servers could provide other means of informing specific clients of supported OSLC capabilities that could be utilized directly. For example, a server might provide only preview dialogs on specific resources and nothing else.

### 4.1 Resource Constraints

Constraints on OSLC Core and Domain resources **SHOULD** be described using [OSLC Resource Shape 3.0](#) which is included as part of the OSLC Core multi-part specifications. Servers **MAY** use other constraint languages such as [\[SHACL\]](#) to define resource constraints. The shape of an RDF resource is a description of the set of triples it is expected to contain and the integrity constraints those triples are required to satisfy. Applications of shapes include validating RDF data, documenting RDF APIs, and providing metadata to tools that handle RDF data such as form and query builders.

### 4.2 Authentication

Authentication determines how a user of a client identifies themselves to a server to ensure the user has sufficient privileges to access resources from that server, and provides a mechanism for servers to control access to resources.

4.2.1 OSLC 3.0 servers **MAY** protect resources with HTTP Basic Authentication. OSLC Services that use HTTP Basic Authentication **SHOULD** do so only via SSL.

4.2.2 OSLC 3.0 servers **SHOULD** protect resources with [\[rfc6749\]](#) Authentication utilizing [\[OpenIDConnect\]](#).

### 4.3 Resource Discovery

Resource [Discovery](#) defines a common approach for HTTP/LDP-based servers to be able to publish their RESTful API capabilities and how clients can discover and use them.

### 4.4 Resource Representations

*This section is non-normative.*

OSLC resource representations come in many forms and are subject to standard HTTP and mechanisms for content negotiation.

OSLC domain specifications specify the representations needed for the specific scenarios that they are addressing, and should recognize that different representations are appropriate for different purposes. For example, browser oriented scenarios might be best addressed by JSON or Atom format representations.

OSLC domain specifications are also expected to follow common practices and conventions that are in concert with existing industry standards and which offer consistency across domains. All of the OSLC specifications are built upon the standard RDF data model, allowing OSLC to align with the Linked-Data Platform [LDP]. In addition, all OSLC specifications have adopted the convention to illustrate most examples using Turtle and/or JSON-LD representations and will typically require these representations to enable consistency across OSLC implementations.

4.4.1 OSLC Services **MUST** provide and accept text/turtle and application/ld+json representations for each OSLC resource.

4.4.2 OSLC Services **SHOULD** provide and accept RDF/XML representations for each OSLC resource.

4.4.3 OSLC Services **MAY** provide and accept existing standard or emerging standard formats such as XML, HTML, and the Atom Syndication Format.

## 4.5 Common Vocabulary

[Common Vocabulary Terms](#) defines a number of commonly used RDF vocabulary terms and resources (shapes), that have broad applicability across various domains.

## 4.6 Resource Operations

Resource Operations specify how clients create, read, update and delete resources managed by servers.

4.6.1 OSLC Services use HTTP for create, retrieve, update and delete operations on resources. OSLC Services **MUST** comply with the HTTP specification [HTTP11].

4.6.2 Because the update process may involve first getting a resource, modifying it and then later putting it back to the server, there is the possibility of a conflict, e.g. some other client may have updated the resource since the GET. To mitigate this problem, OSLC Services **SHOULD** use the HTTP **If-Match** header on a PUT request:

- If the HTTP **If-Match** header is missing OSLC Services **SHOULD** return HTTP Bad Request (400) status code to indicate that the header is required.
- If the HTTP **If-Match** header is present OSLC Services **MUST** behave as described in the HTTP specification, returning an HTTP Precondition Failed (412) error to indicate that the header does not match.
- If the HTTP **If-Match** header is present and it matches, but there is some other problem or conflict with the update then OSLC Services **MAY** return an HTTP Conflict (409) to indicate that problem.

4.6.3 OSLC Services **MAY** support a technique called [Selective Property Values](#) as defined in [OSLCCore2] to enable clients to retrieve only selected property values. This capability is included to preserve compatibility with [OSLCCore2].

## 4.7 Resource Preview

[Resource Preview](#) specifies a technique to get a minimal HTML representation of a resource identified by a URL. Applications often use this representation to display a link with an appropriate icon, a label, or

display a small or large preview when a user makes some gesture over a link.

## 4.8 Delegated Dialogs

[Delegated Dialogs](#) allow one application to embed a creation or selection UI into another using HTML `iframe` elements and JavaScript code. The embedded dialog notifies the parent page of events using HTML5 `postMessage`.

## 4.9 Query

*This section is non-normative.*

OSLC servers will often manage large amounts of potentially complex link-data entities. Practical use of this information will require some query capability that minimally supports selection of matching elements, filtering of desired properties and ordering. Ideally OSLC Core would rely on existing standard query services such as [\[RDF-SPARQL-QUERY\]](#) that may be integrated with [\[LDP\]](#). The [Linked Data Query Language Community Group](#) is currently working on a Query Language for [\[LDP\]](#). However, the reality is that many OSLC servers are adapters built on existing data management capabilities that are not built on an RDF foundation and do not provide SPARQL endpoints for query. In order to address the need for standard query capability to enable integration, [\[OSLCCore2\]](#) introduced a [Query Capability](#) and a [Query Syntax](#) that were intended to be simple enough that they could be implemented on a wide range of existing server architectures. In practice this has proven to be more difficult than anticipated. But the need is still there. OSLC Core 3.0 is built on [\[LDP\]](#) and future OSLC domain servers may provide more consistent access to SPARQL endpoints. Eventually that may lead to the deprecation of OSLC Core 2.0 Query Capability. In the meantime, OSLC Core 2.0 Query Capability is still available for OSLC domain specifications that need it.

4.9.1 OSLC Servers **MAY** support a [Query Capability](#) as defined in [\[OSLCCore2\]](#) to enable clients to perform selection and projection operations in order to retrieve a selected subset of resources and property values from an LDPC. This capability is included to preserve compatibility with [\[OSLCCore2\]](#).

## 4.10 Resource Paging

Resource Paging specifies a capability for servers to make the state of large resources available as a list of smaller subset resources (pages) whose representation is easier to produce by the server and consume by clients. Resource paging is particularly useful in handling results from the query capability or the contents of an LDP container.

4.10.1 OSLC Services **SHOULD** support [Linked Data Platform Paging 1.0](#) to enable clients to retrieve large LDP resources (LDPRs) a page at a time.

4.10.2 OSLC Services **MAY** support a [Resource Paging Capability](#) as defined in [\[OSLCCore2\]](#) to enable clients to retrieve large resources a page at a time. This capability is included to preserve compatibility with [\[OSLCCore2\]](#).

## 4.11 Attachments

[Attachments](#) describes a minimal way to manage attachments related to web resources using LDP-Containers and Non-RDF Source [\[LDP\]](#).

## 4.12 Error Responses

Error responses returned by servers in response to requests are defined in [Common Vocabulary Terms, Errors](#).



## 5. Version Compatibility

*This section is non-normative.*

OSLC is intended to provide a foundation for (lifecycle) application interoperability. A significant number of OSLC domains, and client and server implementations already exist and are in common use. Interoperability issues between applications on incompatible OSLC versions could result in negative impact to end users. One of the goals of the OSLC initiative is to mitigate or eliminate the need for lock-step version upgrades, where clients or servers target one version of a specification and break when new versions are introduced -- requiring all services to be upgraded simultaneously.

OSLC Core and domain specifications will each be versioned independently, and may specify version numbers. Existing OSLC 2.0 clients and servers use the OSLC-Core-Version header described in [OSLC Core 2.0 Specification Versioning](#) to indicate what OSLC version they expect or support. But exposing version numbers in OSLC implementations could lead to interoperability issues. Ultimately each domain will decide its compatibility needs. OSLC Core 3.0 does not introduce any changes that would break existing OSLC 2.0 clients. Because of this, there is no need for OSLC Core 3.0 to require servers or clients to utilize an OSLC-Core-Version header with a value of 3.0.

If an OSLC 2.0 client accesses an OSLC 3.0 server, the 3.0 server will always respond to the client in a manner that is compatible with 2.0. The response may include additional headers and entity request or response body information defined by OSLC Core 3.0, but this information will be simply ignored by the 2.0 clients. There will be no missing or invalid information since OSLC Core 3.0 is designed to be compatible with OSLC Core 2.0.

For OSLC clients that access 2.0 servers:

- OSLC 1.0 clients - get 1.0 responses by default from 2.0 servers and don't interoperate with 3.0 servers.
- OSLC 2.0 clients - interact with 2.0 servers that may or may not implement 1.0 by using the OSLC-Core-Version header.
- OSLC 3.0 Clients - if they are accessing 2.0 servers that might return 1.0 responses without the header, then they would have to provide the header as specified in [OSLC Core 2.0 Specification Versioning](#),

OSLC Core 3.0 does not address compatibility with versions of OSLC prior to [OSLCCore2]. Servers wishing to support compatibility with versions prior to 2.0 should follow [OSLC Core 2.0 Specification Versioning](#).

## Appendix A. Acknowledgements

*This section is non-normative.*

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

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## Appendix B. Change History

*This section is non-normative.*

Revision	Date	Editor	Changes Made
1	07/06/2016	Jim Amsden	CSD was approved and published.