OSLC Product Lifecycle Management  
Specification

Version: Initial draft

# Introduction

This specification defines a RESTful web services interface for the Product Lifecycle Management (PLM) domain. This domain addresses the management of physical and logical designs of products and parts, and relationships with other OSLC resources such as requirements, testing resources and change requests. 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.

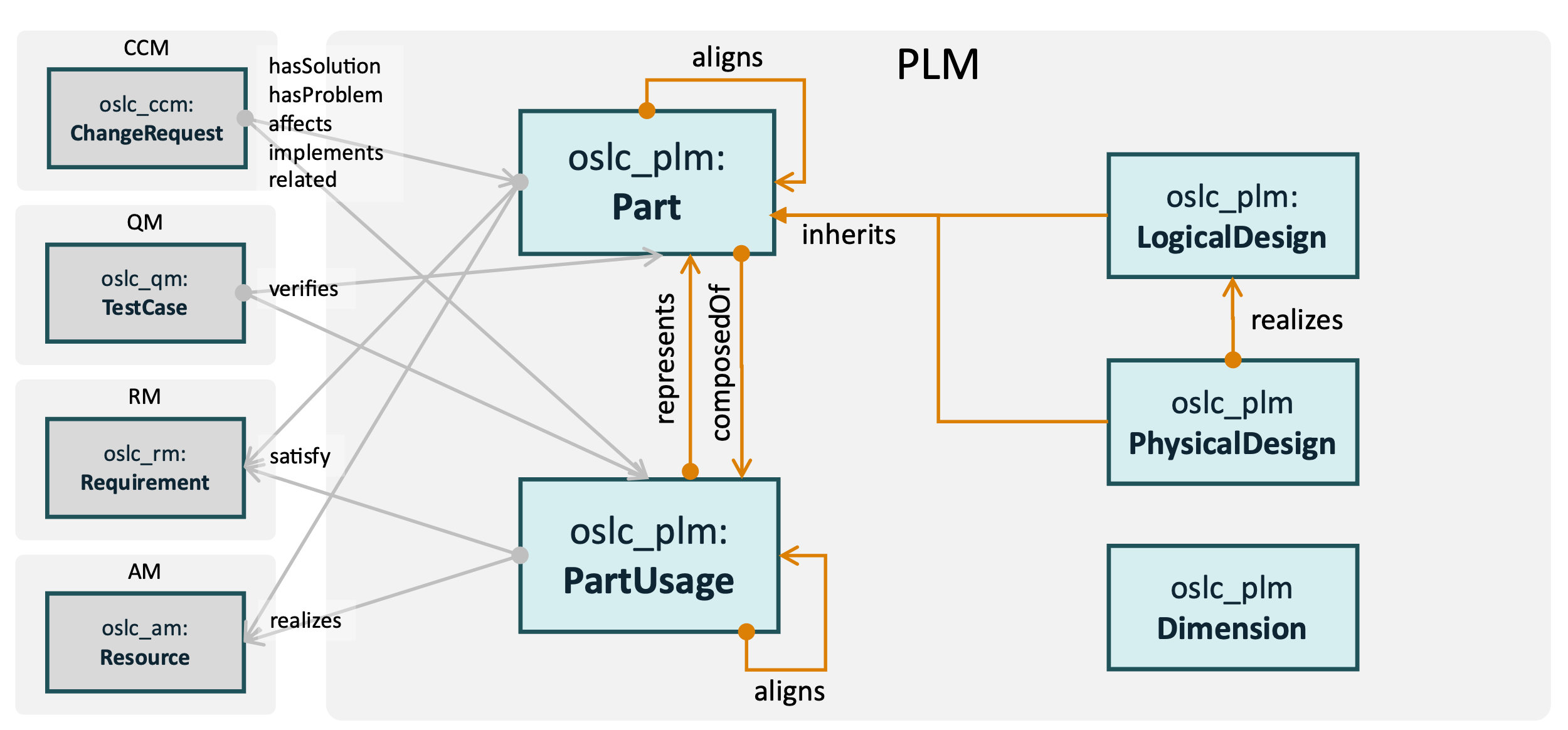
The intent of this specification is to define the capabilities needed to support integration scenarios and not to provide a comprehensive interface to Product Lifecycle Management.

This specification is a OSLC Core 3 compliant specification, and as such most of its content are references to OSLC Core 3.

# Overview

This specification defines a vocabulary for OSLC Product Lifecycle Management resources. The intent is to define resources needed to support common integration scenarios and not to provide a comprehensive definition of product lifecycle management resources.

The following is an overview of the PLM following specification. The specification includes classes: Part, PartUsage, LogicalDesign and PhysicalDesign, and Dimension; links between these within the PLM domain and links to classes in other OSLC domains.



## Example

The following example is non normative.

@prefix oslc\_plm: <http://open-servces.net/ns/plm#>.

@prefix dc: <http://purl.org/dc/elements/1.1/>.

@prefix dcterms: <http://purl.org/dc/terms/>.

# teamcenter plm namespaces

@prefix tc\_plm\_material: <http://teamcenter.com/ns/plm/material>.

@prefix tc\_plm: <http://teamcenter.com/ns/plm/>.

<http://example.com/oslc/PhysicalComponent/12345>

a oslc\_plm:Part;

dcterms:title "Brake Housing"@en;

dcterms:description "A caliper housing that holds the brake shoes."@en;

tc\_plm:weight "1.2 kg";

tc\_plm:material tc\_plm\_material:steel;

dcterms:identifier "gs-001-15489";

oslc\_plm:boundingBox[

a oslc\_plm:Dimension;

oslc\_plm:height: "10 cm";

oslc\_plm:width: "20 cm";

oslc\_plm:length: "10 cm"];

tc\_plm:relatedTo <http://example.com/oslc/PhysicalAssembly/67890>;

oslc\_plm:composedOf <http://example.com/oslc/Usage/33>.

<http://example.com/oslc/Usage/33>

a oslc\_plm:PartUsage;

oslc\_plm:represents <http://example.com/oslc/PhysicalComponent/71350>.

<http://example.com/oslc/PhysicalComponent/71350>

a oslc\_plm:Part;

dcterms:title "Brake Shoe"@en;

dcterms:description "A brake shoe carries the brake lining inside brake drums."@en;

tc\_plm:weight "3.2 kg";

tc\_plm:material tc\_plm\_material:ceramic;

dcterms:identifier "gs-001-15489";

oslc\_plm:boundingBox[

a oslc\_plm:Dimension;

oslc\_plm:height: "5 cm";

oslc\_plm:width: "5 cm";

oslc\_plm:length: "10 cm"];

tc\_plm:relatedTo <http://example.com/oslc/BOM/brakeshoe>.

# Vocabulary

## RDF Namespace and prefixes:

[http://open-servces.net/ns/plm#](http://open-servces.net/ns/plm)

The standard prefix for PLM used herein is *oslc\_plm*.

In addition, the prefixes *oslc*, *rdf*, *dcterms* and *foaf* defined in the OSLC Core specification, the following prefixes are used in this specification:

* **oslc\_rm** : http://open-services.net/ns/rm#
* **oslc\_qm** : http://open-services.net/ns/qm#
* **oslc\_ccm** : http://open-services.net/ns/ccm#
* **oslc\_am** : http://open-services.net/ns/am#

## Classes in this namespace

### Part

<http://open-servces.net/ns/plm#Part>

Part is an RDFS class.

The PLM part resource

### PartUsage

<http://open-servces.net/ns/plm#PartUsage>

PartUsage is an RDFS class.

The PLM part usage resource.

### Logical Design

<http://open-servces.net/ns/plm#LogicalDesign>

LogicalDesign is an RDFS class.

The PLM logical design resource.

### Physical Design

<http://open-servces.net/ns/plm#PhysicalDesign>

PhysicalDesign is an RDFS class.

The PLM physical design resource.

### Dimension

<http://open-servces.net/ns/plm#Dimension>

Dimension is an RDFS class.

The PLM dimension resource.

## Properties in this namespace

### alignsPart

<http://open-servces.net/ns/plm#alignsPart>

alignsPart is an RDF property.

A Part is aligned with another Part. It is likely that the target resource will be oslc\_plm:Part.

### alignsPartUsage

<http://open-servces.net/ns/plm#alignsPartUsage>

alignsPartUsage is an RDF property.

A PartUsage is aligned with another PartUsage. It is likely that the target resource will be oslc\_plm:PartUsage.

### composedOfPartUsage

<http://open-servces.net/ns/plm#composedOfPartUsage>

composedOfPartUsage is an RDF property.

A Part is composed of PartUsages. It is likely that the target resource will be oslc\_plm:PartUsage.

### representsPart

<http://open-servces.net/ns/plm#representsPart>

representsPart is an RDF property.

A PartUsage represents a Part. It is likely that the target resource will be oslc\_plm:Part.

### realizesLogicalDesign

<http://open-servces.net/ns/plm#realizesLogicalDesign>

realizesLogicalDesign is an RDF property.

A PhysicalDesign realizes a LogicalDesign. It is likely that the target resource will be oslc\_plm:logicalDesign.

### boundingBox

<http://open-servces.net/ns/plm#boundingBox>

boundBox is an RDF property.

An oslc\_plm:boundingBox represents the rough dimension of an oslc\_plm:Part. It is likely that the target resource will be a oslc\_plm:Dimension.

### weight

<http://open-servces.net/ns/plm#weight>

weight is an RDF property.

An oslc\_plm:weight represents the weight of an oslc\_plm:Part.

### satisifiesRequirement

<http://open-servces.net/ns/plm#satisifiesRequirement>

satisifiesRequirement is an RDF property.

An oslc\_plm:Part or oslc\_plm:PartUsage satifises a requirement. It is likely that that target resource will be oslm\_rm:Requirement.

### realizesElement

<http://open-servces.net/ns/plm#realizesElement>

realizesElementis an RDF property.

An oslc\_plm:Part or oslc\_plm:PartUsage realizes an architectural element. It is likely that that target resource will be oslm\_am:Resource.

## Properties in other Domains

In order support the PLM use cases the following properties are required for classes in other domains.

### affectsPart

<http://open-servces.net/ns/cm#affectsPart>

affectsPart is an RDF Property

A Change Request affects a Part. It is likely that the target resource will be oslc\_plm:Part.

### hasProblemPart

<http://open-servces.net/ns/cm#hasProblemPart>

hasProblemPart is an RDF Property

A Change Request has a problem Part. It is likely that the target resource will be oslc\_plm:Part.

### hasSolutionPart

<http://open-servces.net/ns/cm#hasSolutionPart>

hasSolutionPart is an RDF Property

A Change Request has a solution Part. It is likely that the target resource will be oslc\_plm:Part.

### relatedPart

<http://open-servces.net/ns/cm#relatedPart>

relatedPart is an RDF Property

A Change Request affects a Part. It is likely that the target resource will be oslc\_plm:Part.

### implementsPart

<http://open-servces.net/ns/cm#implementsPart>

implementsPart is an RDF Property

A Change Request implements a Part. It is likely that the target resource will be oslc\_plm:Part.

### verifiesPart

<http://open-servces.net/ns/qm#verifiesPart>

verifiesPartis an RDF Property

A Test Case verifies a Part. It is likely that the target resource will be oslc\_plm:Part.

### affectsPartUsage

<http://open-servces.net/ns/cm#affectsPartUsage>

affectsPartUsage is an RDF Property

A Change Request affects a PartUsage. It is likely that the target resource will be oslc\_plm:PartUsage.

### hasProblemPartUsage

<http://open-servces.net/ns/cm#hasProblemPartUsage>

hasProblemPartUsage is an RDF Property

A Change Request has a problem PartUsage. It is likely that the target resource will be oslc\_plm:PartUsage.

### hasSolutionPartUsage

<http://open-servces.net/ns/cm#hasSolutionPartUsage>

hasSolutionPartUsage is an RDF Property

A Change Request has a solution PartUsage. It is likely that the target resource will be oslc\_plm:PartUsage.

### implementsPartUsage

<http://open-servces.net/ns/cm#implementsPartUsage>

implementsPartUsage is an RDF Property

A Change Request implements a PartUsage. It is likely that the target resource will be oslc\_plm:PartUsage.

### relatedPartUsage

<http://open-servces.net/ns/cm#relatedPartUsage>

relatedPartUsage is an RDF Property

A Change Request affects a Part. It is likely that the target resource will be oslc\_plm:PartUsage.

### verifiesPartUsage

<http://open-servces.net/ns/qm#verifiesPartUsage>

verifiesPartUsage is an RDF Property

A Test Case verifies a PartUsage. It is likely that the target resource will be oslc\_plm:PartUsage.

# Resource Constraints

This section specifies the constraints for the PLM resources. The resource properties are not limited to the ones defined in this specification PLM Servers may provide additional properties. It is recommended that any additional properties exist in their own unique namespace and not use the namespaces defined in these specifications.

RDF vocabularies define the terms and resources for a domain of interest, product life-cycle management in the case of OSLC PLM. These vocabularies are often specified in an open manner, without providing information such as property domain and range assertions, cardinalities, etc. This helps keep the vocabulary applicable for a wide range of uses and furthering integration with other vocabularies.

However, it is often desirable to closed down a vocabulary with specific constraints to facilitate using the vocabulary for a specific purpose. This document specifies the constraints for using the OSLC PLM vocabulary in OSLC. Different sets of constraints may be applied to a vocabulary in order to tailor its use, without overly constraining the vocabulary for other usages.

## Standard Constraints

The following properties are common to plm:Part and plm:PartUsage and all their derived classes.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Prefixed Name | Occurs | Value Type | Representation | Range | Description |
| dcterms: contributor | Zero-or-many | Any resource | Either | oslc:Any | Contributor or contributors to the resource. It is likely that the target resource will be a foaf:Person but that is not necessarily the case. |
| dcterms: created | Zero-or-one | Date- Time | N/A | Unspecified | Timestamp of resource creation. |
| dcterms: creator | Zero-or-many | Any  resource | Either | oslc:Any | Creator or creators of the resource. It is likely that the target resource will be a foaf:Person but that is not necessarily the case. |
| dcterms: description | Zero-or-one | XMLLiteral | N/A | Unspecified | Descriptive text about resource represented as rich text in XHTML content. |
| dcterms: identifier | Exactly-one | string | N/A | Unspecified | A unique identifier for a resource. Typically read-only and assigned by the service provider when a resource is created. Not typically intended for end-user display. |
| dcterms: modified | Zero-or-one | Date- Time | N/A | Unspecified | Timestamp of latest resource modification. |
| dcterms: source | Zero-or-one | Resource | Reference | oslc:Any | The resource URI a client can perform a get on to obtain the original non-OSLC PLM formatted resource that was used to create this resource. The source resource is usually a proprietary format e.g. JSON. |
| dcterms:title | Exactly-one | XMLLiteral | N/A | Unspecified | Title of the resource represented as rich text in XHTML content. |
| dcterms:type | Zero-or-many | string | N/A | Unspecified | A short string representation for the type, for example ‘Drill’ |
| oslc: instanceShape | Zero-or-one | Resource | Reference | oslc:ResourceShape | The URI of a Resource Shape that describes the possible properties, occurrence, value types, allowed values and labels. This shape information is useful in displaying the subject resource as well as guiding clients in performing modifications. Instance shapes may be specific to the authenticated user associated with the request that retrieved the resource, the current state of the resource and other factors and thus should not be cached. |
| oslc: serviceProvider | Zero-or-many | Resource | Reference | oslc:ServiceProvider | A link to the resource's OSLC Service Provider. There may be cases when the subject resource is available from a service provider that implements multiple domain specifications, which could result in multiple values for this property. |
| oslc: shortTitle | Zero-or-one | XMLLiteral | N/A | Unspecified | Short name identifying a resource, often used as an abbreviated identifier for presentation to end-users. should include only content that is valid inside an XHTML <span> element |
| rdf:type | Zero-or-many | Resource | Reference | rdfs:Class | The resource Type URIs |

The following properties are should not be expected to be modifiable by a PUT, or POST.

* dcterms:identifier
* dcterms:creator
* dcterms:modified
* decterms:created
* oslc:serviceProvider
* oslc:instanceShape

## Part

* **Describes:** http://open-servces.net/ns/plm#Part
* **Summary: Part**
* **Description:**

In addition to the properties above in Standard Constraints, Part has the following properties:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Prefixed Name | Occurs | Value Type | Representation | Range | Description |
| oslc\_plm: alignsPart | Zero-or-many | Resource | Reference | oslc\_plm: Part |  |
| oslc\_plm: composedOfPartUsage | Zero-or-many | Resource | Reference | oslc\_plm: PartUsage |  |
| oslc\_plm: bondingBox | Zero-or-one | Resource | Either | oslc\_plm: Dimension |  |
| oslc\_plm: weight | Zero-or- one | unspecified | N/A | Unspecified | Weight of the Part. Value should be provided compliant with UCUM standards. https://ucum.org/ |
| oslc\_plm: satisifiesRequirement | Zero-or many | Resource | Reference | oslc\_rm: Requirement |  |
| oslc\_plm: realizesElement | Zero-or many | Resource | Reference | oslc\_am: Resource |  |
|  |  |  |  |  |  |

## PartUsage

* **Describes:** http://open-servces.net/ns/plm#PartUsage
* **Summary:** PartUsage
* **Description:**

In addition to the properties above in Standard Constraints, PartUsage has the following properties:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Prefixed Name | Occurs | Value Type | Representation | Range | Description |
| oslc\_plm: alignsPartUsage | Zero-or-many | Resource | Reference | oslc\_plm: PartUsage |  |
| oslc\_plm: representsPart | Zero-or-one | Resource | Reference | oslc\_plm: Part |  |
| oslc\_plm: satisifiesRequirement | Zero-or many | Resource | Reference | oslc\_rm: Requirement |  |
| oslc\_plm: realizesElement | Zero-or many | Resource | Reference | oslc\_am: Resource |  |
|  |  |  |  |  |  |

## LogicalDesign

* **Describes:** http://open-servces.net/ns/plm#Part
* **Summary:** LogicalDesign
* **Description:**

LogcalDesign inherits all properties from Part.

## PhysicalDesign

* **Describes:** http://open-servces.net/ns/plm#Part
* **Summary:** PhysicalDesign
* **Description:**

In addition to the properties from Part, PhysicalDesign includes the following properties

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Prefixed Name | Occurs | Value Type | Representation | Range | Description |
| oslc\_plm: realizesLogicalDesign | Zero-or-many | Resource | Reference | oslc\_plm:Part |  |
|  |  |  |  |  |  |

## Dimension

* **Describes:** http://open-servces.net/ns/plm#Dimension
* **Summary:** Dimension
* **Description:** Physical dimension. Properties values should be provided compliant with UCUM standards. https://ucum.org/

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Prefixed Name | Occurs | Value Type | Representation | Range | Description |
| oslc\_plm:length | Exactly-one | unspecified | N/A | Unspecified | Dimension length |
| oslc\_plm:width | Exactly-one | unspecified | N/A | Unspecified | Dimension width |
| oslc\_plm:height | Exactly-one | unspecified | N/A | Unspecified | Dimension height |

# References

<https://www.w3.org/TR/rdf12-turtle/>

<https://ucum.org/>