



# ORE User Guide - Resource Map Implementation in JSON-LD 0.9

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Open Archives Initiative  
Object Reuse and Exchange



## ORE User Guide - Resource Map Implementation in JSON-LD

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## Abstract

Open Archives Initiative Object Reuse and Exchange (OAI-ORE) defines standards for the description and exchange of aggregations of Web resources. OAI-ORE introduces the notion of a Resource Map, an RDF Graph [[RDF Concepts](#)] which describes the Aggregation, the aggregated Resources of which it is composed, and the relationships between them (and/or the relationships between these and other resources).

Since a Resource Map is an RDF Graph, it can be serialized using any RDF syntax. This document outlines the use of one such syntax for the serialization of Resource Maps: [JSON-LD](#) [[JSON-LD](#)]. Two companion documents [ORE RDFa](#) [[ORE RDFa](#)] and [ORE RDF/XML](#) [[ORE RDF/XML](#)] outline the serialization of Resource Maps in [RDFa Syntax](#) [[RDFa Syntax](#)] and [RDF/XML syntax](#) [[RDF/XML Syntax](#)] respectively.

This document is intended for implementers who have an understanding of ORE concepts and are responsible for the development of applications which generate or process Resource Maps using JSON-LD. Readers who want a high-level understanding of the motivation for ORE, and of the solution it provides, should read the [Primer](#) [[ORE Primer](#)]; readers who want further details of the JSON-LD syntax should consult the W3C [JSON-LD specification](#) [[JSON-LD](#)].

This is one of several documents comprising the [OAI-ORE specifications and user guides](#).

This is a beta specification released for public comment. Please send feedback to the [OAI-ORE Google Group](#).

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## 1. Introduction

Open Archives Initiative Object Reuse and Exchange (OAI-ORE) defines standards for the description and exchange of aggregations of web resources. The [OAI-ORE Abstract Data Model](#) [[ORE Model](#)] introduces the notion of a Resource Map, an [RDF Graph](#) [[RDF Concepts](#)] which describes the Aggregation, the aggregated Resources of which it is composed, and the relationships between them (and/or the relationships between these and other resources). A Resource Map is an RDF Graph and can thus be serialized using any RDF syntax. This document outlines the use of the JSON-LD syntax for serialization of Resource Maps.

The [JSON-LD specification](#) [[JSON-LD](#)] describes a format for serialising RDF graphs as [JSON](#) [[RFC4627](#)]. In short, the JSON-LD format allows the use of JSON Objects (maps/dictionaries) to represent an RDF resource. The JSON-LD reserved key `@id` defines the IRI for the resource, and `@type` defines the `rdf:type` (class of the resource). Other RDF properties are defined using additional keys on the resource, and can point to either other JSON Objects, JSON Lists (multiple property relations) or to plain JSON literals. The JSON-LD `@context` can define prefixes and short-hand names, thus avoiding the need to use full IRIs for identifying properties and types. This specification includes a [ORE JSON-LD context](#) for this purpose.

JSON-LD allows for several equivalent representations of the same graph triples, and a compliant ORE JSON-LD document might therefore not follow the JSON structure exactly as listed in the examples of this document. See the [framing section](#) for measures to shape an ORE JSON-LD document into a predictable JSON structure.

### 1.1 Notational Conventions

The keywords "MUST", "MUST NOT", "REQUIRED", "SHALL", "SHALL NOT", "SHOULD", "SHOULD NOT", "RECOMMENDED", "NOT RECOMMENDED", "MAY", and "OPTIONAL" in this document are to be interpreted as described in RFC 2119 [[RFC2119](#)].

This specification uses the common term *URI* to mean both IRI [[RFC3987](#)] and URI [[RFC3986](#)]. JSON-LD [natively supports IRIs](#) without any special measures.

### 1.2 Namespaces

This specification uses the following namespaces and prefixes:

Prefix	Namespace URI	Description
ore	<a href="http://www.openarchives.org/ore/terms/">http://www.openarchives.org/ore/terms/</a>	ORE vocabulary
rdf	<a href="http://www.w3.org/1999/02/22-rdf-syntax-ns#">http://www.w3.org/1999/02/22-rdf-syntax-ns#</a>	RDF built-in vocabulary
rdfs	<a href="http://www.w3.org/2000/01/rdf-schema#">http://www.w3.org/2000/01/rdf-schema#</a>	RDFS vocabulary
owl	<a href="http://www.w3.org/2002/07/owl#">http://www.w3.org/2002/07/owl#</a>	OWL vocabulary
dcterms	<a href="http://purl.org/dc/terms/">http://purl.org/dc/terms/</a>	Dublin Core Terms
dcmitype	<a href="http://purl.org/dc/dcmitype/">http://purl.org/dc/dcmitype/</a>	Dublin Core DCMI types
fabio	<a href="http://purl.org/spar/fabio/">http://purl.org/spar/fabio/</a>	FaBiO, the FRBR-aligned Bibliographic Ontology
foaf	<a href="http://xmlns.com/foaf/0.1/">http://xmlns.com/foaf/0.1/</a>	FOAF vocabulary

prov	http://w3.org/ns/prov#	<a href="#">PROV ontology</a>
pav	http://purl.org/pav/	<a href="#">PAV ontology</a>
schema	http://schema.org/	<a href="#">schema.org</a> vocabulary

### 1.3 Conformance

The Internet Media Type (MIME type) for JSON-LD is [application/ld+json](#). Where JSON-LD is used to provide representations of ORE Resource Maps, that media type SHOULD be used. For backwards compatibility, the JSON-LD specification allows for the alternative content-type of `application/json`, in which case the [JSON-LD context Link header](#) MUST be present.

A consumer of ORE Resource Maps encoded in JSON-LD SHOULD support all of the syntactic conventions defined by JSON-LD. This allowance for different syntactic conventions is supported by conformant [JSON-LD parsers](#) [see [JSON-LD Community](#)].

## 2. Overview of ORE in JSON-LD syntax

An ORE Resource Map expressed as a JSON-LD resource MUST be valid [JSON \[RFC4627\]](#), and MUST be valid [JSON-LD \[JSON-LD\]](#).

An ORE JSON-LD resource MUST define a JSON-LD `@context`, which SHOULD be `https://w3id.org/ore/context` (see [ORE JSON-LD context](#) below).

The `@type` SHOULD be provided for ORE resources of type `Aggregation`, `ResourceMap`, `Proxy`, and MAY be provided for resources of type `AggregatedResource` and others.

#### *ResourceMap, describes, Aggregation*

The [ResourceMap](#) SHOULD be the top-level JSON object (indicating that the JSON-LD document *is* the resource map), in which case it MUST indicate which [Aggregation](#) it [describes](#):

```
{ "@context": "https://w3id.org/ore/context",
  "@type": "ResourceMap",
  "@id": "",
  "describes": {
    "@id": "http://example.com/aggregation-1",
    "@type": "Aggregation"
  }
}
```

The `Aggregation` MUST have an `@id` to identify it; this URI SHOULD be absolute. The `ResourceMap` MAY have an identifier using `@id`, which MUST be different from the `Aggregation` URI.

#### *isDescribedBy*

The `Aggregation` MAY list [other resource maps](#) it [isDescribedBy](#), which SHOULD be given as a JSON list of URIs:

```
{ "@context": "https://w3id.org/ore/context",
  "@type": "ResourceMap",
  "describes": {
    "@id": "http://example.com/aggregation-1",
    "@type": "Aggregation",
    "isDescribedBy": [
      "http://example.com/aggregation-1.rdf",
      "http://example.com/aggregation-1.jsonld"
    ]
  }
}
```

#### *similarTo*

If an `Aggregation` can be considered [similar to](#) another resource, like a journal article identified with a DOI, then this MAY be indicated using `similarTo`:

```
{ "@context": "https://w3id.org/ore/context",
  "@type": "ResourceMap",
  "describes": {
    "@id": "http://example.com/aggregation-1",
    "@type": "Aggregation",
    "similarTo": "http://dx.doi.org/10.1002/cpe.1594"
  }
}
```

#### *aggregates*

All resources aggregated by this `Aggregation` MUST be listed using [aggregates](#), which SHOULD be given as a JSON list. The list MUST contain either URI strings or JSON Objects, which SHOULD specify their URI with `@id`:

```
{ "@context": "https://w3id.org/ore/context",
  "@type": "ResourceMap",
  "describes": {
    "@id": "http://example.com/aggregation-1",
    "@type": "Aggregation",
    "aggregates": [
      "http://example.com/document-1",
      { "@id": "http://other.example.org/data-2",
        "@type": "AggregatedResource"
      }
    ]
  }
}
```

Aggregated resources MAY specify their `@type`: `AggregatedResource`. If a more specific type of the resource is known (e.g. [dcmitype:MovingImage](#) or [fabio:MagazineNewsitem](#)), it is RECOMMENDED to specify this using `@type` and the full URI of the class. A JSON List MAY be used to indicate multiple types. Example:

```
{ "@context": "https://w3id.org/ore/context",
  "@type": "ResourceMap",
  "describes": {
    "@id": "http://example.com/aggregation-1",
    "@type": "Aggregation",
    "aggregates": [
      "http://example.com/document-1",
      { "@id": "http://other.example.org/data-2",
        "@type": ["AggregatedResource",
                  "http://purl.org/dc/dcmitype/Dataset",
                  "http://www.w3.org/ns/dcat#Dataset"]
      }
    ]
  }
}
```

```

    ]
  }
}

```

Additional descriptions of aggregated resources MAY be provided using other RDF vocabularies following the [JSON-LD syntax](#). The example below shows how to indicate the [provenance](#) of an aggregated resource using [PROV-O](#) [[PROV-O](#)] and [PAV](#) [[PAV](#)]. When using third-party vocabularies it may be desirable to add prefixes using [additional contexts](#) as a list.

```

{ "@context": [
  "https://w3id.org/ore/context",
  {
    "foaf": "http://xmlns.com/foaf/0.1/",
    "schema": "http://schema.org/",
    "prov": "http://www.w3.org/ns/prov#",
    "pav": "http://purl.org/pav/"
  }
],
"@type": "ResourceMap",
"describes": {
  "@id": "http://example.com/aggregation-1",
  "@type": "Aggregation",
  "aggregates": [
    "http://example.com/document-1",
    { "@id": "http://example.com/blog/",
      "@type": "schema:BlogPosting",
      "prov:wasDerivedFrom": {
        "@id": "http://example.com/document-1"
      }
    },
    "pav:authoredBy": {
      "@id": "http://orcid.org/0000-0001-9842-9718",
      "foaf:name": "Stian Soiland-Reyes"
    }
  ]
}
}

```

#### [isAggregatedBy](#), [isDescribedBy](#)

If a resource is also part of a *different* Aggregation, then this can be indicated with [isAggregatedBy](#):

```

{ "@context": "https://w3id.org/ore/context",
"@type": "ResourceMap",
"describes": {
  "@id": "http://example.com/aggregation-1",
  "@type": "Aggregation",
  "aggregates": [
    { "@id": "http://other.example.org/data-2",
      "isAggregatedBy": {
        "@id": "http://other.example.org/aggregation-2",
        "@type": "Aggregation"
      }
    }
  ]
}
}

```

It is NOT RECOMMENDED to detail the [aggregates](#) of the other Aggregation, but one MAY use [isDescribedBy](#) to indicate its ResourceMap representations.

In the special case of *aggregating another Aggregation*, that SHOULD be typed as an Aggregation, and there SHOULD be at least one ResourceMap representation indicated with [isDescribedBy](#):

```

{ "@context": "https://w3id.org/ore/context",
"@type": "ResourceMap",
"describes": {
  "@id": "http://example.com/aggregation-1",
  "@type": "Aggregation",
  "aggregates": [
    { "@id": "http://other.example.org/aggregation-2",
      "@type": "Aggregation",
      "isDescribedBy": [ "http://other.example.org/aggregation-2.rdf",
        "http://other.example.org/aggregation-2.jsonld" ]
    }
  ]
}
}

```

#### [proxies](#), [proxyFor](#), [proxyIn](#)

A [Proxy](#) represents an AggregatedResource as it exists in a specific Aggregation, which can be used as a [subject in other annotations](#) and aggregations. Proxies SHOULD be provided for each aggregated resource:

```

{ "@context": "https://w3id.org/ore/context",
"@type": "ResourceMap",
"describes": {
  "@id": "http://example.com/aggregation-1",
  "@type": "Aggregation",
  "aggregates": [
    { "@id": "http://example.com/document-1" }
  ],
  "proxies": [
    { "@id": "urn:uuid:d4e63599-d28d-4966-8606-dbb985a865f2",
      "@type": "Proxy",
      "proxyFor": "http://example.com/document-1" }
  ]
}
}

```

The property [proxies](#) SHOULD be a JSON List of resources, each of which SHOULD have "@type": "[Proxy](#)" and MUST identify the aggregated resource using [proxyFor](#). The resource identified by [proxyFor](#) MUST be listed under [aggregates](#).

The proxy MUST be identified with an URI using [@id](#), which MAY be a randomly generated [UUID](#) [[UUID](#)] using the urn:uuid: scheme.

Note that, unlike in other serializations of ORE resource maps, the property [proxyIn](#) SHOULD NOT be given for proxies listed under [proxies](#) (it is already given as [proxies](#) is a [reverse](#) property for [proxyIn](#)); however in the special case of *aggregating a proxy*, that MUST specify [proxyIn](#), which MUST be a different Aggregation:

```
{ "@context": "https://w3id.org/ore/context",
  "@type": "ResourceMap",
  "describes": {
    "@id": "http://example.com/aggregation-1",
    "@type": "Aggregation",
    "aggregates": [
      { "@id": "urn:uuid:09561248-bf55-4c85-930a-9a7a60e81602",
        "@type": "Proxy",
        "proxyFor": "http://example.com/document-1",
        "proxyIn": "http://other.example.org/aggregation-3"
      }
    ]
  }
}
```

Such "external" proxies MUST NOT be listed under proxies as a proxy can only be proxyFor for a single Aggregation, and an aggregation SHOULD NOT aggregate its own proxies. The proxyIn MAY be expanded to a JSON Object with @id and @type: "Aggregation" to provide isDescribedBy.

#### lineage and provenance of proxy

If an aggregated resource was discovered in a different aggregation, this [lineage](#) can be described between the corresponding proxies:

```
{ "@context": "https://w3id.org/ore/context",
  "@type": "ResourceMap",
  "describes": {
    "@id": "http://example.com/aggregation-1",
    "@type": "Aggregation",
    "aggregates": [
      { "@id": "http://example.com/document-1" },
    ],
    "proxies": [
      { "@id": "urn:uuid:d4e63599-d28d-4966-8606-dbb985a865f2",
        "@type": "Proxy",
        "proxyFor": "http://example.com/document-1"
      },
      { "@id": "urn:uuid:09561248-bf55-4c85-930a-9a7a60e81602",
        "@type": "Proxy",
        "proxyFor": "http://example.com/document-1",
        "proxyIn": "http://other.example.org/aggregation-3"
      }
    ],
    "lineage": {
      "@id": "urn:uuid:09561248-bf55-4c85-930a-9a7a60e81602",
      "@type": "Proxy",
      "proxyFor": "http://example.com/document-1",
      "proxyIn": "http://other.example.org/aggregation-3"
    }
  }
}
```

Other kinds of *provenance of a proxy* (e.g. who aggregated the given resource) MAY be stated using vocabularies like [PROV-O](#) and [PAV](#). The example below says that Matthew aggregated document-1 (e.g. created its proxy in this aggregation) on the 17th of May 2014 (without implying that he created document-1):

```
{ "@context": [
  "https://w3id.org/ore/context",
  {
    "foaf": "http://xmlns.com/foaf/0.1/",
    "prov": "http://www.w3.org/ns/prov#",
    "xsd": "http://www.w3.org/2001/XMLSchema#",
    "prov:generatedAtTime": { "@type": "xsd:dateTime" }
  }
],
  "@type": "ResourceMap",
  "describes": {
    "@id": "http://example.com/aggregation-1",
    "@type": "Aggregation",
    "aggregates": [
      "http://example.com/document-1"
    ],
    "proxies": [
      { "@id": "urn:uuid:d4e63599-d28d-4966-8606-dbb985a865f2",
        "@type": "Proxy",
        "proxyFor": "http://example.com/document-1",
        "prov:attributedTo": {
          "@id": "http://orcid.org/0000-0003-4913-1485",
          "foaf:name": "Matthew Gamble"
        },
        "prov:generatedAtTime": "2014-05-17T14:00:00Z"
      }
    ]
  }
}
```

### 3. ORE JSON-LD context

A [JSON-LD context](#) defines how to understand identifiers in a JSON-LD document. The [ORE context](#) thus defines how to interpret documents according to the [ORE JSON-LD syntax](#) as defined above. This allows these documents to be processed using [JSON-LD tools](#), for instance to convert to other RDF formats.

The context is available from <https://w3id.org/ore/context>, from where it SHOULD be included using the @context keyword at the top-level node of ORE JSON-LD documents:

```
{ "@context": "https://w3id.org/ore/context",
  "@type": "ResourceMap",
  "...": ""
}
```

#### 3.1 Additional contexts

In order to facilitate usage of additional RDF vocabularies, one MAY instead specify [@context](#) as a JSON List which includes the ORE context and additional contexts as either URIs or JSON objects:

```
{ "@context": [
  "https://w3id.org/ore/context",
  "http://example.com/other/context",
  {
    "prov": "http://www.w3.org/ns/prov#",
    "xsd": "http://www.w3.org/2001/XMLSchema#",
    "prov:generatedAtTime": { "@type": "xsd:dateTime" }
  }
],
  "@type": "ResourceMap",
  "...": ""
}
```

### 3.2 Content of ORE JSON-LD context

The content of the [ORE JSON-LD context](#) at time of writing is:

```
{
  "@context" : {
    "Proxy" : {
      "@id" : "http://www.openarchives.org/ore/terms/Proxy"
    },
    "proxyFor" : {
      "@id" : "http://www.openarchives.org/ore/terms/proxyFor",
      "@type" : "@id"
    },
    "lineage" : {
      "@id" : "http://www.openarchives.org/ore/terms/lineage",
      "@type" : "@id"
    },
    "describes" : {
      "@id" : "http://www.openarchives.org/ore/terms/describes",
      "@type" : "@id"
    },
    "AggregatedResource" : {
      "@id" : "http://www.openarchives.org/ore/terms/AggregatedResource"
    },
    "ResourceMap" : {
      "@id" : "http://www.openarchives.org/ore/terms/ResourceMap"
    },
    "similarTo" : {
      "@id" : "http://www.openarchives.org/ore/terms/similarTo",
      "@type" : "@id"
    },
    "Aggregation" : {
      "@id" : "http://www.openarchives.org/ore/terms/Aggregation"
    },
    "isAggregatedBy" : {
      "@id" : "http://www.openarchives.org/ore/terms/isAggregatedBy",
      "@type" : "@id"
    },
    "proxyIn" : {
      "@id" : "http://www.openarchives.org/ore/terms/proxyIn",
      "@type" : "@id"
    },
    "aggregates" : {
      "@id" : "http://www.openarchives.org/ore/terms/aggregates",
      "@type" : "@id"
    },
    "isDescribedBy" : {
      "@id" : "http://www.openarchives.org/ore/terms/isDescribedBy",
      "@type" : "@id"
    },
    "proxies" : {
      "@reverse" : "http://www.openarchives.org/ore/terms/proxyIn"
    }
  }
}
```

## 4. Complete example

The following [complete example](#) shows a *ResourceMap* describing aggregation-1 containing 4 resources (document-1, data-2, aggregation-3 and a *proxy for document-1 within aggregation-3*). data-2 is also known to be aggregated by aggregation-2.

The aggregated resource aggregation-3 is itself an aggregation with its own resource maps and proxies, but they are not detailed fully here (except for the aggregated external proxy urn:uuid:095612..).

Finally our aggregation has its own set of identified proxies, one for each aggregated resource. Here, the lineage of data-2's aggregation is shown to be originating from aggregation-2.

### 4.1 Example JSON-LD

```
{ "@context": "https://w3id.org/ore/context",
  "@id": "",
  "@type": "ResourceMap",
  "describes": {
    "@id": "http://example.com/aggregation-1",
    "@type": "Aggregation",
    "isDescribedBy": [
      "http://example.com/aggregation-1.rdf",
      "http://example.com/aggregation-1.jsonld"
    ],
    "aggregates": [
      "http://example.com/document-1",
      { "@id": "http://other.example.org/data-2",
        "isAggregatedBy": {
          "@id": "http://other.example.org/aggregation-2",
          "@type": "Aggregation",
          "isDescribedBy": "http://other.example.org/aggregation-2.rdf"
        }
      },
      { "@id": "http://other.example.org/aggregation-3",
        "@type": "Aggregation",
        "isDescribedBy": [ "http://other.example.org/aggregation-3.rdf",
                          "http://other.example.org/aggregation-3.jsonld" ]
      },
      { "@id": "urn:uuid:09561248-bf55-4c85-930a-9a7a60e81602",
        "@type": "Proxy",
        "proxyFor": "http://example.com/document-1",
        "proxyIn": "http://other.example.org/aggregation-3"
      }
    ],
    "proxies": [
      { "@id": "urn:uuid:d4e63599-d28d-4966-8606-dbb985a865f2",
        "@type": "Proxy",
        "proxyFor": "http://example.com/document-1"
      },
      { "@id": "urn:uuid:05bd5e0c-94c7-4856-a53f-7f6cf0756751",
        "@type": "Proxy",
        "proxyFor": "http://other.example.org/data-2",
        "lineage": {
          "@id": "urn:uuid:360ea070-efee-11e3-ac10-0800200c9a66",
          "@type": "Proxy",
          "proxyFor": "http://other.example.org/data-2",
          "proxyIn": "http://other.example.org/aggregation-2"
        }
      },
      { "@id": "urn:uuid:c0f5f1ad-5269-4cfc-b9f5-e9621c499f53",
        "@type": "Proxy",
        "proxyFor": "http://example.com/document-1",
        "proxyIn": "http://other.example.org/aggregation-3"
      }
    ]
  }
}
```

```

    "@type": "Proxy",
    "proxyFor": "http://other.example.org/aggregation-3"
  },
  {
    "@id": "urn:uuid:318745e0-5ea4-4a68-8a0a-ab27ab96985a",
    "@type": "Proxy",
    "proxyFor": "urn:uuid:09561248-bf55-4c85-930a-9a7a60e81602"
  }
],
"similarTo": "http://dx.doi.org/10.1002/cpe.1594"
}
}

```

4.2 Example triples

If processed with the [ORE JSON-LD context](#) and [using a JSON-LD library to generate RDF](#), the following [triples](#) are expressed:

```

<> <http://www.w3.org/1999/02/22-rdf-syntax-ns#type> <http://www.openarchives.org/ore/terms/ResourceMap> .
<> <http://www.openarchives.org/ore/terms/describes> <http://example.com/aggregation-1> .

<http://example.com/aggregation-1> <http://www.w3.org/1999/02/22-rdf-syntax-ns#type> <http://www.openarchives.org/ore/terms/Aggregation> .
<http://example.com/aggregation-1> <http://www.openarchives.org/ore/terms/isDescribedBy> <http://example.com/aggregation-1.jsonld> .
<http://example.com/aggregation-1> <http://www.openarchives.org/ore/terms/isDescribedBy> <http://example.com/aggregation-1.rdf> .
<http://example.com/aggregation-1> <http://www.openarchives.org/ore/terms/similarTo> "http://dx.doi.org/10.1002/cpe.1594" .

<http://example.com/aggregation-1> <http://www.openarchives.org/ore/terms/aggregates> <http://example.com/document-1> .
<http://example.com/aggregation-1> <http://www.openarchives.org/ore/terms/aggregates> <http://other.example.org/aggregation-3> .
<http://example.com/aggregation-1> <http://www.openarchives.org/ore/terms/aggregates> <http://other.example.org/data-2> .
<http://example.com/aggregation-1> <http://www.openarchives.org/ore/terms/aggregates> <urn:uuid:09561248-bf55-4c85-930a-9a7a60e81602> .

<http://other.example.org/data-2> <http://www.openarchives.org/ore/terms/isAggregatedBy> <http://other.example.org/aggregation-2> .

<http://other.example.org/aggregation-2> <http://www.openarchives.org/ore/terms/isDescribedBy> <http://other.example.org/aggregation-2.rdf> .
<http://other.example.org/aggregation-2> <http://www.w3.org/1999/02/22-rdf-syntax-ns#type> <http://www.openarchives.org/ore/terms/Aggregation> .

<http://other.example.org/aggregation-3> <http://www.openarchives.org/ore/terms/isDescribedBy> <http://other.example.org/aggregation-3.jsonld> .
<http://other.example.org/aggregation-3> <http://www.openarchives.org/ore/terms/isDescribedBy> <http://other.example.org/aggregation-3.rdf> .
<http://other.example.org/aggregation-3> <http://www.w3.org/1999/02/22-rdf-syntax-ns#type> <http://www.openarchives.org/ore/terms/Aggregation> .

<urn:uuid:d4e63599-d28d-4966-8606-dbb985a865f2> <http://www.w3.org/1999/02/22-rdf-syntax-ns#type> <http://www.openarchives.org/ore/terms/Proxy> .
<urn:uuid:d4e63599-d28d-4966-8606-dbb985a865f2> <http://www.openarchives.org/ore/terms/proxyFor> <http://example.com/document-1> .
<urn:uuid:d4e63599-d28d-4966-8606-dbb985a865f2> <http://www.openarchives.org/ore/terms/proxyIn> <http://example.com/aggregation-1> .

<urn:uuid:05bd5e0c-94c7-4856-a53f-7f6cf0756751> <http://www.w3.org/1999/02/22-rdf-syntax-ns#type> <http://www.openarchives.org/ore/terms/Proxy> .
<urn:uuid:05bd5e0c-94c7-4856-a53f-7f6cf0756751> <http://www.openarchives.org/ore/terms/proxyFor> <http://other.example.org/data-2> .
<urn:uuid:05bd5e0c-94c7-4856-a53f-7f6cf0756751> <http://www.openarchives.org/ore/terms/proxyIn> <http://example.com/aggregation-1> .
<urn:uuid:05bd5e0c-94c7-4856-a53f-7f6cf0756751> <http://www.openarchives.org/ore/terms/lineage> <urn:uuid:360ea070-efee-11e3-ac10-0800200c9a66> .

<urn:uuid:c0f5f1ad-5269-4cfc-b9f5-e9621c499f53> <http://www.w3.org/1999/02/22-rdf-syntax-ns#type> <http://www.openarchives.org/ore/terms/Proxy> .
<urn:uuid:c0f5f1ad-5269-4cfc-b9f5-e9621c499f53> <http://www.openarchives.org/ore/terms/proxyFor> <http://other.example.org/aggregation-3> .
<urn:uuid:c0f5f1ad-5269-4cfc-b9f5-e9621c499f53> <http://www.openarchives.org/ore/terms/proxyIn> <http://example.com/aggregation-1> .

<urn:uuid:318745e0-5ea4-4a68-8a0a-ab27ab96985a> <http://www.w3.org/1999/02/22-rdf-syntax-ns#type> <http://www.openarchives.org/ore/terms/Proxy> .
<urn:uuid:318745e0-5ea4-4a68-8a0a-ab27ab96985a> <http://www.openarchives.org/ore/terms/proxyFor> <urn:uuid:09561248-bf55-4c85-930a-9a7a60e81602> .
<urn:uuid:318745e0-5ea4-4a68-8a0a-ab27ab96985a> <http://www.openarchives.org/ore/terms/proxyIn> <http://example.com/aggregation-1> .

<urn:uuid:360ea070-efee-11e3-ac10-0800200c9a66> <http://www.w3.org/1999/02/22-rdf-syntax-ns#type> <http://www.openarchives.org/ore/terms/Proxy> .
<urn:uuid:360ea070-efee-11e3-ac10-0800200c9a66> <http://www.openarchives.org/ore/terms/proxyFor> <http://other.example.org/data-2> .
<urn:uuid:360ea070-efee-11e3-ac10-0800200c9a66> <http://www.openarchives.org/ore/terms/proxyIn> <http://other.example.org/aggregation-2> .

<urn:uuid:09561248-bf55-4c85-930a-9a7a60e81602> <http://www.w3.org/1999/02/22-rdf-syntax-ns#type> <http://www.openarchives.org/ore/terms/Proxy> .
<urn:uuid:09561248-bf55-4c85-930a-9a7a60e81602> <http://www.openarchives.org/ore/terms/proxyFor> <http://example.com/document-1> .
<urn:uuid:09561248-bf55-4c85-930a-9a7a60e81602> <http://www.openarchives.org/ore/terms/proxyIn> <http://other.example.org/aggregation-3> .

```

5. ORE JSON-LD frame

JSON-LD, as all RDF serialization, allow many degrees of freedom for representing the same RDF graph. Thus, an ORE Resource Map could appear in other JSON structures than the one defined in this document. This could particularly be the case if converting an ORE Resource Map to JSON-LD using regular RDF libraries.

By facilitating [JSON-LD Framing \[JSON-LD Framing\]](#) with the [ORE JSON-LD Frame](#), followed by [JSON-LD Compaction](#), a predictable JSON structure is returned that can be used by consumers without requiring any further JSON-LD or RDF knowledge.

**Note:** At time of writing, [JSON-LD Framing](#) a *draft specification* which is still subject to change. This section is therefore to be considered as *experimental*. The ORE JSON-LD Frame at <https://w3id.org/ore/frame> might subsequently be updated independently of this document in order to be compliant with later updates of the JSON-LD Framing specification.

The [ORE JSON-LD frame](#) is available at <https://w3id.org/ore/frame>, which at time of writing is:

```

{
  "@context": "https://w3id.org/ore/context",
  "describes": {
    "@type": "Aggregation",
    "isDescribedBy": { "@embed": false } ,
    "aggregates": { "@embed": true } ,
    "proxies": { "@embed": true }
  }
}

```

5.1 Example framing

For example, say we have a ["unstructured" JSON-LD ORE manifest](#) after serializing a Resource Map as triples in JSON-LD:

```

{
  "@graph": [
    {
      "@id": "http://example.com/aggregation-1",
      "@type": "http://www.openarchives.org/ore/terms/Aggregation",
      "http://www.openarchives.org/ore/terms/aggregates": [
        {
          "@id": "http://example.com/document-1"
        },
        {
          "@id": "http://other.example.org/data-2"
        },
        {
          "@id": "http://other.example.org/aggregation-3"
        },
        {
          "@id": "urn:uuid:09561248-bf55-4c85-930a-9a7a60e81602"
        }
      ],
      "http://www.openarchives.org/ore/terms/isDescribedBy": [
        {

```



```

    "@id": "http://example.com/aggregation-1.rdf"
  },
  {
    "@id": "http://example.com/aggregation-1.jsonld"
  }
],
"http://www.openarchives.org/ore/terms/similarTo": {
  "@id": "http://dx.doi.org/10.1002/cpe.1594"
},
{
  "@id": "index.html",
  "@type": "http://www.openarchives.org/ore/terms/ResourceMap",
  "http://www.openarchives.org/ore/terms/describes": {
    "@id": "http://example.com/aggregation-1"
  }
},
{
  "@id": "http://other.example.org/aggregation-2",
  "@type": "http://www.openarchives.org/ore/terms/Aggregation",
  "http://www.openarchives.org/ore/terms/isDescribedBy": {
    "@id": "http://other.example.org/aggregation-2.rdf"
  }
},
{
  "@id": "http://other.example.org/aggregation-3",
  "@type": "http://www.openarchives.org/ore/terms/Aggregation",
  "http://www.openarchives.org/ore/terms/isDescribedBy": [
    {
      "@id": "http://other.example.org/aggregation-3.rdf"
    },
    {
      "@id": "http://other.example.org/aggregation-3.jsonld"
    }
  ]
},
{
  "@id": "http://other.example.org/data-2",
  "http://www.openarchives.org/ore/terms/isAggregatedBy": {
    "@id": "http://other.example.org/aggregation-2"
  }
},
{
  "@id": "urn:uuid:05bd5e0c-94c7-4856-a53f-7f6cf0756751",
  "@type": "http://www.openarchives.org/ore/terms/Proxy",
  "http://www.openarchives.org/ore/terms/lineage": {
    "@id": "urn:uuid:360ea070-efee-11e3-ac10-0800200c9a66"
  },
  "http://www.openarchives.org/ore/terms/proxyFor": {
    "@id": "http://other.example.org/data-2"
  },
  "http://www.openarchives.org/ore/terms/proxyIn": {
    "@id": "http://example.com/aggregation-1"
  }
},
{
  "@id": "urn:uuid:09561248-bf55-4c85-930a-9a7a60e81602",
  "@type": "http://www.openarchives.org/ore/terms/Proxy",
  "http://www.openarchives.org/ore/terms/proxyFor": {
    "@id": "http://example.com/document-1"
  },
  "http://www.openarchives.org/ore/terms/proxyIn": {
    "@id": "http://other.example.org/aggregation-3"
  }
},
{
  "@id": "urn:uuid:318745e0-5ea4-4a68-8a0a-ab27ab96985a",
  "@type": "http://www.openarchives.org/ore/terms/Proxy",
  "http://www.openarchives.org/ore/terms/proxyFor": {
    "@id": "urn:uuid:09561248-bf55-4c85-930a-9a7a60e81602"
  },
  "http://www.openarchives.org/ore/terms/proxyIn": {
    "@id": "http://example.com/aggregation-1"
  }
},
{
  "@id": "urn:uuid:360ea070-efee-11e3-ac10-0800200c9a66",
  "@type": "http://www.openarchives.org/ore/terms/Proxy",
  "http://www.openarchives.org/ore/terms/proxyFor": {
    "@id": "http://other.example.org/data-2"
  },
  "http://www.openarchives.org/ore/terms/proxyIn": {
    "@id": "http://other.example.org/aggregation-2"
  }
},
{
  "@id": "urn:uuid:c0f5f1ad-5269-4cfc-b9f5-e9621c499f53",
  "@type": "http://www.openarchives.org/ore/terms/Proxy",
  "http://www.openarchives.org/ore/terms/proxyFor": {
    "@id": "http://other.example.org/aggregation-3"
  },
  "http://www.openarchives.org/ore/terms/proxyIn": {
    "@id": "http://example.com/aggregation-1"
  }
},
{
  "@id": "urn:uuid:d4e63599-d28d-4966-8606-dbb985a865f2",
  "@type": "http://www.openarchives.org/ore/terms/Proxy",
  "http://www.openarchives.org/ore/terms/proxyFor": {
    "@id": "http://example.com/document-1"
  },
  "http://www.openarchives.org/ore/terms/proxyIn": {
    "@id": "http://example.com/aggregation-1"
  }
}
]
}

```

If we expand this JSON-LD document using <https://w3id.org/ore/context>, then frame it using <https://w3id.org/ore/frame> we get the [framed JSON](#):

```

{
  "@context": "https://w3id.org/ore/context",
  "@graph": [
    {
      "@id": "index.html",
      "@type": "ResourceMap",

```



```

"describes": {
  "@id": "http://example.com/aggregation-1",
  "@type": "Aggregation",
  "aggregates": [
    "http://example.com/document-1",
    {
      "@id": "http://other.example.org/data-2",
      "isAggregatedBy": {
        "@id": "http://other.example.org/aggregation-2",
        "@type": "Aggregation",
        "isDescribedBy": [
          "http://other.example.org/aggregation-2.rdf"
        ]
      }
    },
    {
      "@id": "http://other.example.org/aggregation-3",
      "@type": "Aggregation",
      "isDescribedBy": [
        "http://other.example.org/aggregation-3.rdf",
        "http://other.example.org/aggregation-3.jsonld"
      ]
    }
  ],
  "@id": "urn:uuid:09561248-bf55-4c85-930a-9a7a60e81602",
  "@type": "Proxy",
  "proxyFor": "http://example.com/document-1",
  "proxyIn": "http://other.example.org/aggregation-3"
},
"isDescribedBy": [
  "http://example.com/aggregation-1.rdf",
  "http://example.com/aggregation-1.jsonld"
],
"similarTo": "http://dx.doi.org/10.1002/cpe.1594"
}
}
}
]
}

```

Note that JSON-LD Framing always gives a `@graph` JSON List in case there are several Resource Maps that match the pattern. The properties `aggregates` and `isDescribedBy` if present, will after processing always be a JSON list, even if there is only a single resource.

## 5.2 Framing proxies

Note: `@reverse` properties like `proxies` is not at the time of writing commonly supported by JSON-LD Framing processors, and therefore have to be extracted separately using this [frame for proxies](#):

```

{ "@context": "https://w3id.org/ore/context",
  "@type": "Proxy",
  "proxyFor": {
    "@embed": false
  },
  "proxyIn": {
    "@embed": false
  },
  "lineage": {
    "@embed": false,
    "@omitDefault": true
  }
}

```

When the above frame is processed against the earlier example it will return a [list of all the proxies](#) (including those in other aggregations):

```

{ "@context": "https://w3id.org/ore/context",
  "@graph": [
    {
      "@id": "urn:uuid:05bd5e0c-94c7-4856-a53f-7f6cf0756751",
      "@type": "Proxy",
      "lineage": "urn:uuid:360ea070-efee-11e3-ac10-0800200c9a66",
      "proxyFor": "http://other.example.org/data-2",
      "proxyIn": "http://example.com/aggregation-1"
    },
    {
      "@id": "urn:uuid:09561248-bf55-4c85-930a-9a7a60e81602",
      "@type": "Proxy",
      "proxyFor": "http://example.com/document-1",
      "proxyIn": "http://other.example.org/aggregation-3"
    },
    {
      "@id": "urn:uuid:318745e0-5ea4-4a68-8a0a-ab27ab96985a",
      "@type": "Proxy",
      "proxyFor": "urn:uuid:09561248-bf55-4c85-930a-9a7a60e81602",
      "proxyIn": "http://example.com/aggregation-1"
    },
    {
      "@id": "urn:uuid:360ea070-efee-11e3-ac10-0800200c9a66",
      "@type": "Proxy",
      "proxyFor": "http://other.example.org/data-2",
      "proxyIn": "http://other.example.org/aggregation-2"
    },
    {
      "@id": "urn:uuid:c0f5f1ad-5269-4cfc-b9f5-e9621c499f53",
      "@type": "Proxy",
      "proxyFor": "http://other.example.org/aggregation-3",
      "proxyIn": "http://example.com/aggregation-1"
    },
    {
      "@id": "urn:uuid:d4e63599-d28d-4966-8606-dbb985a865f2",
      "@type": "Proxy",
      "proxyFor": "http://example.com/document-1",
      "proxyIn": "http://example.com/aggregation-1"
    }
  ]
}

```

## 6. References

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**[JSON-LD Community]**

[JSON for Linking Data \(website\)](#), A website run by the *JSON for Linking Data W3C Community Group* (<http://www.w3.org/community/json-ld/>).

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**B. Change Log**

Date	Editor	Description
2014-08-14	simeon	Integrate with other OAI-ORE specs, v0.9
2014-08-06	stain	Warning about frame spec, scrollbar on long examples
2014-08-03	ocorcho	Simplified JSON-LD Frame
2014-07-30	stain	Clarified previously draft sections (incl. proxies)
2014-06-11	stain	Fixing syntax issues
2014-06-05	stain	First draft

See also the current [editors' draft](#). For detailed changelog, see the [Github commits](#).



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