RDF Vocabulary Description Language 1.0: RDF Schema

W3C Recommendation 10 February 2004

This Version:
> http://www.w3.org/TR/2004/REC-rdf-schema-20040210/

Latest Version:
> http://www.w3.org/TR/rdf-schema/

Previous Version:
> http://www.w3.org/TR/2003/PR-rdf-schema-20031215/

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Acknowledgments

Please refer to the **errata** for this document, which may include some normative corrections.

See also translations.

Abstract

The Resource Description Framework (RDF) is a general-purpose language for representing information in the Web. This specification describes how to use RDF to describe RDF vocabularies. This specification defines a vocabulary for this purpose and defines other built-in RDF vocabulary initially specified in the RDF Model and Syntax Specification.

Status of this Document

This document has been reviewed by W3C Members and other interested parties, and it has been endorsed by the Director as a W3C Recommendation. W3C's role in making the Recommendation is to draw attention to the specification and to promote its widespread deployment. This enhances the functionality and

interoperability of the Web.

This is one document in a [set of six](#) ([Primer](#), [Concepts](#), [Syntax](#), [Semantics](#), [Vocabulary](#), and [Test Cases](#)) intended to jointly replace the original Resource Description Framework specifications, [RDF Model and Syntax (1999 Recommendation)](#) and [RDF Schema (2000 Candidate Recommendation)](#). It has been developed by the [RDF Core Working Group](#) as part of the [W3C Semantic Web Activity](#) ([Activity Statement](#), [Group Charter](#)) for publication on 10 February 2004.

Changes to this document since the [Proposed Recommendation Working Draft](#) are detailed in the [change log](#).

The public is invited to send comments to [www-rdf-comments@w3.org](#) ([archive](#)) and to participate in general discussion of related technology on [www-rdf-interest@w3.org](#) ([archive](#)).

A list of [implementations](#) is available.

The W3C maintains a list of [any patent disclosures related to this work](#).

This section describes the status of this document at the time of its publication. Other documents may supersede this document. A list of current W3C publications and the latest revision of this technical report can be found in the [W3C technical reports index](#) at http://www.w3.org/TR/.

Contents

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1. Introduction

The Resource Description Framework (RDF) is a general-purpose language for representing information in the Web.

This specification is one of several [[RDF-PRIMER](#)] [[RDF-SYNTAX](#)] [[RDF-CONCEPTS](#)] [[RDF-SEMANTICS](#)] [[RDF-TESTS](#)] related to RDF. The reader is referred to the [RDF schema chapter](#) in the RDF Primer [[RDF-PRIMER](#)] for an informal introduction and examples of the use of the concepts specified in this document.

This specification introduces RDF's vocabulary description language, RDF Schema. It is complemented by several companion documents which describe RDF's XML encoding [[RDF-SYNTAX](#)], mathematical foundations [[RDF-SEMANTICS](#)] and Resource Description Framework (RDF): Concepts and Abstract Syntax [[RDF-CONCEPTS](#)]. The RDF Primer [[RDF-PRIMER](#)] provides an informal introduction and examples of the use of the concepts specified in this document.

This document is intended to provide a clear specification of the RDF vocabulary description language to those who find the formal semantics specification, RDF Semantics [[RDF-SEMANTICS](#)] daunting. Thus, this document duplicates material also specified in the RDF Semantics specification . Where there is disagreement between this document and the RDF Semantics specification, the RDF Semantics specification should be taken to be correct.

RDF properties may be thought of as attributes of resources and in this sense correspond to traditional attribute-value pairs. RDF properties also represent relationships between resources.

RDF however, provides no mechanisms for describing these properties, nor does it provide any mechanisms for describing the relationships between these

properties and other resources. That is the role of the RDF vocabulary description language, RDF Schema. RDF Schema defines classes and properties that may be used to describe classes, properties and other resources.

This document does not specify a vocabulary of descriptive properties such as "author". Instead it specifies mechanisms that may be used to name and describe properties and the classes of resource they describe.

RDF's vocabulary description language, RDF Schema, is a semantic extension (as defined in [RDF-SEMANTICS]) of RDF. It provides mechanisms for describing groups of related resources and the relationships between these resources. RDF Schema vocabulary descriptions are written in RDF using the terms described in this document. These resources are used to determine characteristics of other resources, such as the domains and ranges of properties.

The RDF vocabulary description language class and property system is similar to the type systems of object-oriented programming languages such as Java. RDF differs from many such systems in that instead of defining a class in terms of the properties its instances may have, the RDF vocabulary description language describes properties in terms of the classes of resource to which they apply. This is the role of the domain and range mechanisms described in this specification. For example, we could define the `eg:author` property to have a domain of `eg:Document` and a range of `eg:Person`, whereas a classical object oriented system might typically define a class `eg:Book` with an attribute called `eg:author` of type `eg:Person`. Using the RDF approach, it is easy for others to subsequently define additional properties with a domain of `eg:Document` or a range of `eg:Person`. This can be done without the need to re-define the original description of these classes. One benefit of the RDF property-centric approach is that it allows anyone to extend the description of existing resources, one of the architectural principles of the Web [BERNERS-LEE98].

This specification does not attempt to enumerate all the possible forms of vocabulary description that are useful for representing the meaning of RDF classes and properties. Instead, the RDF vocabulary description strategy is to acknowledge that there are many techniques through which the meaning of classes and properties can be described. Richer vocabulary or 'ontology' languages such as DAML+OIL, W3C's [OWL] language, inference rule languages and other formalisms (for example temporal logics) will each contribute to our ability to capture meaningful generalizations about data in the Web. RDF vocabulary designers can create and deploy Semantic Web applications using the RDF vocabulary description language 1.0 facilities, while exploring richer vocabulary description languages that share this general approach.

The language defined in this specification consists of a collection of RDF resources that can be used to describe properties of other RDF resources (including properties) in application-specific RDF vocabularies. The core vocabulary is defined in a namespace informally called 'rdfs' here. That namespace is identified by the URI-Reference http://www.w3.org/2000/01/rdf-schema# and is associated with the prefix 'rdfs'. This specification also uses the prefix 'rdf' to refer to the RDF namespace http://www.w3.org/1999/02/22-rdf-syntax-ns#.

For convenience and readability, this specification uses an abbreviated form to represent URI-References. A name of the form prefix:suffix should be interpreted as a URI-Reference consisting of the URI-Reference associated with the prefix concatenated with the suffix.

2. Classes

Resources may be divided into groups called classes. The members of a class are known as *instances* of the class. Classes are themselves resources. They are often identified by RDF URI References and may be described using RDF properties. The `rdf:type` property may be used to state that a resource is an instance of a class.

RDF distinguishes between a class and the set of its instances. Associated with each class is a set, called the class extension of the class, which is the set of the instances of the class. Two classes may have the same set of instances but be different classes. For example, the tax office may define the class of people living at the same address as the editor of this document. The Post Office may define the class of people whose address has the same zip code as the address of the author. It is possible for these classes to have exactly the same instances, yet to have different properties. Only one of the classes has the property that it was

defined by the tax office, and only the other has the property that it was defined by the Post Office.

A class may be a member of its own class extension and may be an instance of itself.

The group of resources that are RDF Schema classes is itself a class called `rdfs:Class`.

If a class C is a *subclass* of a class C', then all instances of C will also be instances of C'. The `rdfs:subClassOf` property may be used to state that one class is a subclass of another. The term super-class is used as the inverse of subclass. If a class C' is a super-class of a class C, then all instances of C are also instances of C'.

The RDF Concepts and Abstract Syntax [RDF-CONCEPTS] specification defines the RDF concept of an RDF datatype. All datatypes are classes. The instances of a class that is a datatype are the members of the value space of the datatype.

2.1 rdfs:Resource

All things described by RDF are called *resources*, and are instances of the class `rdfs:Resource`. This is the class of everything. All other classes are subclasses of this class. `rdfs:Resource` is an instance of `rdfs:Class`.

2.2 rdfs:Class

This is the class of resources that are RDF classes. `rdfs:Class` is an instance of `rdfs:Class`.

2.3 rdfs:Literal

The class `rdfs:Literal` is the class of literal values such as strings and integers. Property values such as textual strings are examples of RDF literals. Literals may be plain or typed. A typed literal is an instance of a datatype class. This specification does not define the class of plain literals.

`rdfs:Literal` is an instance of `rdfs:Class`. rdfs:Literal is a subclass of rdfs:Resource.

2.4 rdfs:Datatype

`rdfs:Datatype` is the class of datatypes. All instances of `rdfs:Datatype` correspond to the RDF model of a datatype described in the RDF Concepts specification [RDF-CONCEPTS]. `rdfs:Datatype` is both an instance of and a subclass of `rdfs:Class`. Each instance of `rdfs:Datatype` is a subclass of rdfs:Literal.

2.5 rdf:XMLLiteral

The class `rdf:XMLLiteral` is the class of XML literal values. `rdf:XMLLiteral` is an instance of `rdfs:Datatype` and a subclass of `rdfs:Literal`.

2.6 rdf:Property

`rdf:Property` is the class of RDF properties. `rdf:Property` is an instance of `rdfs:Class`.

3. Properties

The RDF Concepts and Abstract Syntax specification [RDF-CONCEPTS] describes the concept of an RDF property as a relation between subject resources and object resources.

This specification defines the concept of subproperty. The `rdfs:subPropertyOf` property may be used to state that one property is a subproperty of another. If a property P is a subproperty of property P', then all pairs of resources which are related by P are also related by P'. The term super-property is often used as the inverse of subproperty. If a property P' is a super-property of a property P, then all pairs of resources which are related by P are also related by P'. This specification does not define a top property that is the super-property of all properties.

Note: The basic facilities provided by `rdfs:domain` and `rdfs:range` do not provide any direct way to indicate property restrictions that are local to a class. Although it is possible to combine use `rdfs:domain` and `rdfs:range` with sub-property hierarchies, direct support for such declarations are provided by richer Web Ontology languages such as [OWL].

3.1 rdfs:range

`rdfs:range` is an instance of `rdf:Property` that is used to state that the values of a property are instances of one or more classes.

The triple

> P rdfs:range C

states that P is an instance of the class `rdf:Property`, that C is an instance of the class `rdfs:Class` and that the resources denoted by the objects of triples whose predicate is P are instances of the class C.

Where P has more than one rdfs:range property, then the resources denoted by the objects of triples with predicate P are instances of all the classes stated by the `rdfs:range` properties.

The `rdfs:range` property can be applied to itself. The rdfs:range of `rdfs:range` is the class `rdfs:Class`. This states that any resource that is the value of an `rdfs:range` property is an instance of `rdfs:Class`.

The `rdfs:range` property is applied to properties. This can be represented in RDF using the `rdfs:domain` property. The `rdfs:domain` of `rdfs:range` is the class `rdf:Property`. This states that any resource with an `rdfs:range` property is an instance of `rdf:Property`.

3.2 rdfs:domain

`rdfs:domain` is an instance of `rdf:Property` that is used to state that any resource that has a given property is an instance of one or more classes.

A triple of the form:

> P rdfs:domain C

states that P is an instance of the class `rdf:Property`, that C is a instance of the class `rdfs:Class` and that the resources denoted by the subjects of triples whose predicate is P are instances of the class C.

Where a property P has more than one rdfs:domain property, then the resources denoted by subjects of triples with predicate P are instances of all the classes stated by the `rdfs:domain` properties.

The `rdfs:domain` property may be applied to itself. The rdfs:domain of `rdfs:domain` is the class [rdf:Property](). This states that any resource with an `rdfs:domain` property is an instance of [rdf:Property]().

The [rdfs:range]() of `rdfs:domain` is the class [rdfs:Class](). This states that any resource that is the value of an `rdfs:domain` property is an instance of [rdfs:Class]().

3.3 rdf:type

`rdf:type` is an instance of [rdf:Property]() that is used to state that a resource is an instance of a class.

A triple of the form:

> R rdf:type C

states that C is an instance of [rdfs:Class]() and R is an instance of C.

The [rdfs:domain]() of `rdf:type` is [rdfs:Resource](). The [rdfs:range]() of rdf:type is [rdfs:Class]().

3.4 rdfs:subClassOf

The property `rdfs:subClassOf` is an instance of [rdf:Property]() that is used to state that all the instances of one class are instances of another.

A triple of the form:

> C1 rdfs:subClassOf C2

states that C1 is an instance of [rdfs:Class](), C2 is an instance of [rdfs:Class]() and C1 is a [subclass]() of C2. The `rdfs:subClassOf` property is transitive.

The [rdfs:domain]() of `rdfs:subClassOf` is [rdfs:Class](). The [rdfs:range]() of `rdfs:subClassOf` is [rdfs:Class]().

3.5 rdfs:subPropertyOf

The property `rdfs:subPropertyOf` is an instance of [rdf:Property]() that is used to state that all resources related by one property are also related by another.

A triple of the form:

> P1 rdfs:subPropertyOf P2

states that P1 is an instance of [rdf:Property](), P2 is an instance of [rdf:Property]() and P1 is a [subproperty]() of P2. The `rdfs:subPropertyOf` property is transitive.

The [rdfs:domain]() of `rdfs:subPropertyOf` is [rdf:Property](). The [rdfs:range]() of rdfs:subPropertyOf is [rdf:Property]().

3.6 rdfs:label

`rdfs:label` is an instance of [`rdf:Property`](rdf:Property) that may be used to provide a human-readable version of a resource's name.

A triple of the form:

> R rdfs:label L

states that L is a human readable label for R.

The [`rdfs:domain`](rdfs:domain) of `rdfs:label` is [`rdfs:Resource`](rdfs:Resource). The [`rdfs:range`](rdfs:range) of rdfs:label is [`rdfs:Literal`](rdfs:Literal).

Multilingual labels are supported using the language tagging facility of RDF literals.

3.7 rdfs:comment

`rdfs:comment` is an instance of [`rdf:Property`](rdf:Property) that may be used to provide a human-readable description of a resource.

A triple of the form:

> R rdfs:comment L

states that L is a human readable description of R.

The [`rdfs:domain`](rdfs:domain) of `rdfs:comment` is [`rdfs:Resource`](rdfs:Resource). The [`rdfs:range`](rdfs:range) of rdfs:comment is [`rdfs:Literal`](rdfs:Literal).

A textual comment helps clarify the meaning of RDF classes and properties. Such in-line documentation complements the use of both formal techniques (Ontology and rule languages) and informal (prose documentation, examples, test cases). A variety of documentation forms can be combined to indicate the intended meaning of the classes and properties described in an RDF vocabulary. Since RDF vocabularies are expressed as RDF graphs, vocabularies defined in other namespaces may be used to provide richer documentation.

Multilingual documentation is supported through use of the language tagging facility of RDF literals.

4. Using the Domain and Range Vocabulary (Informative)

This specification introduces an RDF vocabulary for describing the meaningful use of properties and classes in RDF data. For example, an RDF vocabulary might describe limitations on the types of values that are appropriate for some property, or on the classes to which it makes sense to ascribe such properties.

The RDF Vocabulary Description language provides a mechanism for describing this information, but does not say whether or how an application should use it. For example, while an RDF vocabulary can assert that an `author` property is used to indicate resources that are instances of the class `Person`, it does not say whether or how an application should act in processing that range information. Different applications will use this information in different ways. For example, data checking tools might use this to help discover errors in some data set, an interactive editor might suggest appropriate values, and a reasoning application might use it to infer additional information from instance data.

RDF vocabularies can describe relationships between vocabulary items from multiple independently developed vocabularies. Since URI-References are used to identify classes and properties in the Web, it is possible to create new properties that have a `domain` or `range` whose value is a class defined in another

namespace.

5. Other vocabulary

Additional classes and properties, including constructs for representing containers and RDF statements, and for deploying RDF vocabulary descriptions in the World Wide Web are defined in this section.

5.1 Container Classes and Properties

RDF containers are resources that are used to represent collections. An [introduction](#) to RDF containers with examples may be found in the RDF Primer [[RDF-PRIMER](#)]. The same resource may appear in a container more than once. Unlike containment in the physical world, a container may be contained in itself.

Three different kinds of container are defined. Whilst the formal semantics [[RDF-SEMANTICS](#)] of all three classes of container are identical, different classes may be used to indicate informally further information. An rdf:Bag is used to indicate that the container is intended to be unordered. An rdf:Seq is used to indicate that the order indicated by the numerical order of the [container member ship properties](#) of the container is intended to be significant. An rdf:Alt container is used to indicate that typical processing of the container will be to select one of the members.

Just as a hen house may have the property that it is made of wood, that does not mean that all the hens it contains are made of wood, a property of a container is not necessarily a property of all of its members.

RDF containers are defined by the following classes and properties.

5.1.1 rdfs:Container

The `rdfs:Container` class is a super-class of the RDF Container classes, i.e. `rdf:Bag`, `rdf:Seq`, `rdf:Alt`.

5.1.2 rdf:Bag

The `rdf:Bag` class is the class of RDF 'Bag' containers. It is a [subclass](#) of `rdfs:Container`. Whilst formally it is no different from an `rdf:Seq` or an `rdf:Alt`, the `rdf:Bag` class is used conventionally to indicate to a human reader that the container is intended to be unordered.

5.1.3 rdf:Seq

The `rdf:Seq` class is the class of RDF 'Sequence' containers. It is a [subclass](#) of `rdfs:Container`. Whilst formally it is no different from an `rdf:Bag` or an `rdf:Alt`, the `rdf:Seq` class is used conventionally to indicate to a human reader that the numerical ordering of the [container membership properties](#) of the container is intended to be significant.

5.1.4 rdf:Alt

The `rdf:Alt` class is the class of RDF 'Alternative' containers. It is a [subclass](#) of `rdfs:Container`. Whilst formally it is no different from an `rdf:Seq` or an `rdf:Bag`, the `rdf:Alt` class is used conventionally to indicate to a human reader that typical processing will be to select one of the members of the container. The first member of the container, i.e. the value of the `rdf:_1` property, is the default choice.

5.1.5 rdfs:ContainerMembershipProperty

The `rdfs:ContainerMembershipProperty` class has as instances the properties `rdf:_1, rdf:_2, rdf:_3 ...` that are used to state that a resource is a member of a container. `rdfs:ContainerMembershipProperty` is a [subclass](#) of [`rdf:Property`](#). Each instance of `rdfs:ContainerMembershipProperty` is an [`rdfs:subPropertyOf`](#) the [`rdfs:member`](#) property.

Given a container C, a triple of the form:

    C rdf:_nnn O

where nnn is the decimal representation of an integer greater than 0 with no leading zeros, states that O is a member of the container C.

Container membership properties may be applied to resources other than containers.

5.1.6 rdfs:member

`rdfs:member` is an instance of [`rdf:Property`](#) that is a super-property of all the container membership properties i.e. each container membership property has an [`rdfs:subPropertyOf`](#) relationship to the property `rdfs:member`.

The [`rdfs:domain`](#) of `rdfs:member` is [`rdfs:Resource`](#). The [`rdfs:range`](#) of `rdfs:member` is [`rdfs:Resource`](#).

5.2 RDF Collections

RDF containers are open in the sense that the core RDF specifications define no mechanism to state that there are no more members. The RDF Collection vocabulary of classes and properties can describe a closed collection, i.e. one that can have no more members. The reader is referred to the [collections](#) section of the RDF primer for an informal introduction to collections with examples.

A collection is represented as a list of items, a representation that will be familiar to those with experience of Lisp and similar programming languages. There is a [shorthand notation](#) in the RDF/XML syntax specification [[RDF-SYNTAX](#)] for representing collections.

Note: RDFS does not require that there be only one first element of a list-like structure, or even that a list-like structure have a first element.

5.2.1 rdf:List

`rdf:List` is an instance of [`rdfs:Class`](#) that can be used to build descriptions of lists and other list-like structures.

5.2.2 rdf:first

`rdf:first` is an instance of [`rdf:Property`](#) that can be used to build descriptions of lists and other list-like structures.

A triple of the form:

    L rdf:first O

states that there is a first-element relationship between L and O.

The `rdfs:domain` of `rdf:first` is `rdf:List`. The `rdfs:range` of `rdf:first` is `rdfs:Resource`.

5.2.3 rdf:rest

`rdf:rest` is an instance of `rdf:Property` that can be used to build descriptions of lists and other list-like structures.

A triple of the form:

> L rdf:rest O

states that there is a rest-of-list relationship between L and O.

The `rdfs:domain` of `rdf:rest` is `rdf:List`. The `rdfs:range` of `rdf:rest` is `rdf:List`.

5.2.4 rdf:nil

The resource `rdf:nil` is an instance of `rdf:List` that can be used to represent an empty list or other list-like structure.

A triple of the form:

> L rdf:rest rdf:nil

states that L is an instance of `rdf:List` that has one item; that item can be indicated using the `rdf:first` property.

5.3 Reification Vocabulary

The original RDF Model and Syntax Specification [RDFMS] defined a vocabulary for describing RDF statements without stating them. [RDFMS] did not provide a formal semantics for this vocabulary, and the informal definition that was provided was somewhat inconsistent. The current RDF specification does not assign a normative formal semantics to this vocabulary. However, an intended meaning of this vocabulary (which generally clarifies the intent of the [RDFMS] definition) is described here. An informal introduction to the reification vocabulary, with examples, may be found in the RDF Primer [RDF-PRIMER].

5.3.1 rdf:Statement

`rdf:Statement` is an instance of `rdfs:Class.` It is intended to represent the class of RDF statements. An RDF statement is the statement made by a token of an RDF triple. The subject of an RDF statement is the instance of `rdfs:Resource` identified by the subject of the triple. The predicate of an RDF statement is the instance of `rdf:Property` identified by the predicate of the triple. The object of an RDF statement is the instance of `rdfs:Resource` identified by the object of the triple. `rdf:Statement` is in the domain of the properties `rdf:predicate`, `rdf:subject` and `rdf:object`. Different individual `rdf:Statement` instances may have the same values for their `rdf:predicate`, `rdf:subject` and `rdf:object` properties.

5.3.2 rdf:subject

`rdf:subject` is an instance of `rdf:Property` that is used to state the subject of a statement.

A triple of the form:

> S rdf:subject R

states that S is an instance of `rdf:Statement` and that the subject of S is R.

The `rdfs:domain` of `rdf:subject` is `rdf:Statement`. The `rdfs:range` of `rdf:subject` is `rdfs:Resource`.

5.3.3 rdf:predicate

rdf:predicate is an instance of `rdf:Property` that is used to state the predicate of a statement.

A triple of the form:

> S rdf:predicate P

states that S is an instance of `rdf:Statement`, that P is an instance of `rdf:Property` and that the predicate of S is P.

The `rdfs:domain` of `rdf:predicate` is `rdf:Statement` and the `rdfs:range` is `rdfs:Resource`.

5.3.4 rdf:object

rdf:object is an instance of `rdf:Property` that is used to state the object of a statement.

A triple of the form:

> S rdf:object O

states that S is an instance of `rdf:Statement` and that the object of S is O.

The `rdfs:domain` of `rdf:object` is `rdf:Statement`. The `rdfs:range` of `rdf:object` is `rdfs:Resource`.

5.4 Utility Properties

The following utility classes and properties are defined in the RDF core namespaces.

5.4.1 rdfs:seeAlso

`rdfs:seeAlso` is an instance of `rdf:Property` that is used to indicate a resource that might provide additional information about the subject resource.

A triple of the form:

> S rdfs:seeAlso O

states that the resource O may provide additional information about S. It may be possible to retrieve representations of O from the Web, but this is not required. When such representations may be retrieved, no constraints are placed on the format of those representations.

The `rdfs:domain` of `rdfs:seeAlso` is `rdfs:Resource`. The `rdfs:range` of `rdfs:seeAlso` is `rdfs:Resource`.

5.4.2 rdfs:isDefinedBy

`rdfs:isDefinedBy` is an instance of `rdf:Property` that is used to indicate a resource defining the subject resource. This property may be used to indicate an RDF vocabulary in which a resource is described.

A triple of the form:

> S rdfs:isDefinedBy O

states that the resource O defines S. It may be possible to retrieve representations of O from the Web, but this is not required. When such representations may be retrieved, no constraints are placed on the format of those representations. `rdfs:isDefinedBy` is a subproperty of `rdfs:seeAlso`.

The `rdfs:domain` of `rdfs:isDefinedBy` is `rdfs:Resource`. The `rdfs:range` of `rdfs:isDefinedBy` is `rdfs:Resource`.

5.4.3 rdf:value

`rdf:value` is an instance of `rdf:Property` that may be used in describing structured values.

rdf:value has no meaning on its own. It is provided as a piece of vocabulary that may be used in idioms such as illustrated in example 16 of the RDF primer [RDF-PRIMER]. Despite the lack of formal specification of the meaning of this property, there is value in defining it to encourage the use of a common idiom in examples of this kind.

The `rdfs:domain` of `rdf:value` is `rdfs:Resource`. The `rdfs:range` of `rdf:value` is `rdfs:Resource`.

6. RDF Schema summary (Informative)

This table presents an overview of the vocabulary of RDF, drawing together vocabulary originally defined in the RDF Model and Syntax specification with classes and properties that originate with RDF Schema.

6.1 RDF classes

Class name	comment
rdfs:Resource	The class resource, everything.
rdfs:Literal	The class of literal values, e.g. textual strings and integers.
rdf:XMLLiteral	The class of XML literals values.
rdfs:Class	The class of classes.
rdf:Property	The class of RDF properties.

rdfs:Datatype	The class of RDF datatypes.
rdf:Statement	The class of RDF statements.
rdf:Bag	The class of unordered containers.
rdf:Seq	The class of ordered containers.
rdf:Alt	The class of containers of alternatives.
rdfs:Container	The class of RDF containers.
rdfs:ContainerMembershipProperty	The class of container membership properties, rdf:_1, rdf:_2, ..., all of which are sub-properties of 'member'.
rdf:List	The class of RDF Lists.

6.2 RDF properties

Property name	comment	domain	range
rdf:type	The subject is an instance of a class.	rdfs:Resource	rdfs:Class
rdfs:subClassOf	The subject is a subclass of a class.	rdfs:Class	rdfs:Class
rdfs:subPropertyOf	The subject is a subproperty of a property.	rdf:Property	rdf:Property
rdfs:domain	A domain of the subject property.	rdf:Property	rdfs:Class
rdfs:range	A range of the subject property.	rdf:Property	rdfs:Class
rdfs:label	A human-readable name for the subject.	rdfs:Resource	rdfs:Literal
rdfs:comment	A description of the subject resource.	rdfs:Resource	rdfs:Literal
rdfs:member	A member of the subject resource.	rdfs:Resource	rdfs:Resource
rdf:first	The first item in the subject RDF list.	rdf:List	rdfs:Resource
rdf:rest	The rest of the subject RDF list after the first item.	rdf:List	rdf:List
rdfs:seeAlso	Further information about the subject resource.	rdfs:Resource	rdfs:Resource
rdfs:isDefinedBy	The definition of the subject resource.	rdfs:Resource	rdfs:Resource
rdf:value	Idiomatic property used for structured values (see the RDF Primer for [an example](#) of its usage).	rdfs:Resource	rdfs:Resource
rdf:subject	The subject of the subject RDF statement.	rdf:Statement	rdfs:Resource
rdf:predicate	The predicate of the subject RDF statement.	rdf:Statement	rdfs:Resource
rdf:object	The object of the subject RDF statement.	rdf:Statement	rdfs:Resource

In addition to these classes and properties, RDF also uses properties called `rdf:_1`, `rdf:_2`, `rdf:_3`... etc., each of which is both a sub-property of `rdfs:member` and an instance of the class `rdfs:ContainerMembershipProperty`. There is also an instance of `rdf:List` called `rdf:nil` that is an empty `rdf:List`.

7.References

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http://www.w3.org/TR/1998/REC-xml-19980210.html#elemdecls

8. Acknowledgments

The RDF Schema design was originally produced by the RDF Schema Working Group (1997-2000). The current specification is largely an editorial clarification of that design, and has benefited greatly from the hard work of the RDF Core Working Group members, and from implementation feedback from many members of the RDF Interest Group.

David Singer of IBM was the chair of the original RDF Schema group throughout most of the development of this specification; we thank David for his efforts and thank IBM for supporting him and us in this endeavor. Particular thanks are also due to Andrew Layman for his editorial work on early versions of this specification.

The original RDF Schema Working Group membership included:

Nick Arnett (Verity), Dan Brickley (ILRT / University of Bristol), Walter Chang (Adobe), Sailesh Chutani (Oracle), Ron Daniel (DATAFUSION), Charles Frankston (Microsoft), Joe Lapp (webMethods Inc.), Patrick Gannon (CommerceNet), RV Guha (Epinions, previously of Netscape Communications), Tom Hill (Apple Computer), Renato Iannella (DSTC), Sandeep Jain (Oracle), Kevin Jones, (InterMind), Emiko Kezuka (Digital Vision Laboratories), Ora Lassila (Nokia Research Center), Andrew Layman (Microsoft), John McCarthy (Lawrence Berkeley National Laboratory), Michael Mealling (Network Solutions), Norbert Mikula (DataChannel), Eric Miller (OCLC), Frank Olken (Lawrence Berkeley National Laboratory), Sri Raghavan (Digital/Compaq), Lisa Rein (webMethods Inc.), Tsuyoshi Sakata (Digital Vision Laboratories), Leon Shklar (Pencom Web Works), David Singer (IBM), Wei (William) Song (SISU), Neel Sundaresan (IBM), Ralph Swick (W3C), Naohiko Uramoto (IBM), Charles Wicksteed (Reuters Ltd.), Misha Wolf (Reuters Ltd.)

Changes

The following is an outline of the main changes made to this specification, latest first, since the Last Call Working Draft of 23 January 2003. See the Last Call issue tracking document for details of the specific issues raised regarding this specification.

- Amended Appendix A to note that the RDF/XML description of RDF and RDFS terms is not directly published at the RDFS namespace, but split between the 'rdf:' and 'rdfs:' namespace documents. Also removed the pre-REC warning that the WG might choose to change the namespace URI prior to Recommendation.
- Amended rdfs:range specification for rdf:predicate for consistency with the Semantics document (previously rdf:Property; now, rdfs:Resource)
- Removed reference to RDF mimetypes doc, as the IETF draft has expired and is 404 missing on their site.
- Reification vocabulary redescribed (details).
- Reworded rdfs:comment for rdfs:member, changing "container" to "resource"
- Reworded lead-in to Appendix A per 0170.html.
- OWL references now go to OWL specs rather than WebOnt homepage. Fixed minor typos per 0373.html)
- Reworded rdf:nil to tone down the imperative style.
- Added note to Properties section warning about over-use of sub-property, and referencing OWL, an editorial suggestion from Bijan Parsia. (details).
- Regarding pfps-12, discussion led to rdf:first/rest/List/nil rewritten per Peter Patel-Schneider's suggestion.
- Change to description of subProperty and subClass, to match changes to RDF Semantics. See discussion for details.
- Edits closing 'what is rdf schema' issue by clarifying that RDFS is a semantic extension of RDF, as defined in the RDF Semantics document. This closes rdfcore last call issue pfps-24.

Appendix A: RDF Schema as RDF/XML

An RDFS description of the [RDF vocabulary](#) and [RDFS vocabulary](#) is given here in RDF/XML syntax. It includes statements describing RDF resources originally introduced by the 1999 RDF Model and Syntax specification, as well as definitions for resources introduced in the RDF Core Schema vocabulary.

This material is also available as [a separate RDF/XML document](#). It does not necessarily match the content published at the [RDF namespace URI](#) or the [RDFS namespace URI](#), which may evolve over time.

```
<rdf:RDF
  xmlns:rdf="http://www.w3.org/1999/02/22-rdf-syntax-ns#"
  xmlns:rdfs="http://www.w3.org/2000/01/rdf-schema#"
  xmlns:owl="http://www.w3.org/2002/07/owl#">

<owl:Ontology rdf:about="http://www.w3.org/2000/01/rdf-schema#"/>

<rdfs:Class rdf:about="http://www.w3.org/2000/01/rdf-schema#Resource">
  <rdfs:isDefinedBy rdf:resource="http://www.w3.org/2000/01/rdf-schema#"/>
  <rdfs:label>Resource</rdfs:label>
  <rdfs:comment>The class resource, everything.</rdfs:comment>
</rdfs:Class>

<rdf:Property rdf:about="http://www.w3.org/1999/02/22-rdf-syntax-ns#type">
  <rdfs:isDefinedBy rdf:resource="http://www.w3.org/1999/02/22-rdf-syntax-ns#"/>
  <rdfs:label>type</rdfs:label>
  <rdfs:comment>The subject is an instance of a class.</rdfs:comment>
  <rdfs:range rdf:resource="http://www.w3.org/2000/01/rdf-schema#Class"/>
  <rdfs:domain rdf:resource="http://www.w3.org/2000/01/rdf-schema#Resource"/>
</rdf:Property>

<rdfs:Class rdf:about="http://www.w3.org/2000/01/rdf-schema#Class">
  <rdfs:isDefinedBy rdf:resource="http://www.w3.org/2000/01/rdf-schema#"/>
  <rdfs:label>Class</rdfs:label>
  <rdfs:comment>The class of classes.</rdfs:comment>
  <rdfs:subClassOf rdf:resource="http://www.w3.org/2000/01/rdf-schema#Resource"/>
</rdfs:Class>

<rdf:Property rdf:about="http://www.w3.org/2000/01/rdf-schema#subClassOf">
  <rdfs:isDefinedBy rdf:resource="http://www.w3.org/2000/01/rdf-schema#"/>
  <rdfs:label>subClassOf</rdfs:label>
  <rdfs:comment>The subject is a subclass of a class.</rdfs:comment>
  <rdfs:range rdf:resource="http://www.w3.org/2000/01/rdf-schema#Class"/>
  <rdfs:domain rdf:resource="http://www.w3.org/2000/01/rdf-schema#Class"/>
</rdf:Property>

<rdf:Property rdf:about="http://www.w3.org/2000/01/rdf-schema#subPropertyOf">
  <rdfs:isDefinedBy rdf:resource="http://www.w3.org/2000/01/rdf-schema#"/>
  <rdfs:label>subPropertyOf</rdfs:label>
  <rdfs:comment>The subject is a subproperty of a property.</rdfs:comment>
  <rdfs:range rdf:resource="http://www.w3.org/1999/02/22-rdf-syntax-ns#Property"/>
  <rdfs:domain rdf:resource="http://www.w3.org/1999/02/22-rdf-syntax-ns#Property"/>
</rdf:Property>

<rdfs:Class rdf:about="http://www.w3.org/1999/02/22-rdf-syntax-ns#Property">
  <rdfs:isDefinedBy rdf:resource="http://www.w3.org/1999/02/22-rdf-syntax-ns#"/>
  <rdfs:label>Property</rdfs:label>
```

```xml
    <rdfs:comment>The class of RDF properties.</rdfs:comment>
    <rdfs:subClassOf rdf:resource="http://www.w3.org/2000/01/rdf-schema#Resource"/>
  </rdfs:Class>

  <rdf:Property rdf:about="http://www.w3.org/2000/01/rdf-schema#comment">
    <rdfs:isDefinedBy rdf:resource="http://www.w3.org/2000/01/rdf-schema#"/>
    <rdfs:label>comment</rdfs:label>
    <rdfs:comment>A description of the subject resource.</rdfs:comment>
    <rdfs:domain rdf:resource="http://www.w3.org/2000/01/rdf-schema#Resource"/>
    <rdfs:range rdf:resource="http://www.w3.org/2000/01/rdf-schema#Literal"/>
  </rdf:Property>

  <rdf:Property rdf:about="http://www.w3.org/2000/01/rdf-schema#label">
    <rdfs:isDefinedBy rdf:resource="http://www.w3.org/2000/01/rdf-schema#"/>
    <rdfs:label>label</rdfs:label>
    <rdfs:comment>A human-readable name for the subject.</rdfs:comment>
    <rdfs:domain rdf:resource="http://www.w3.org/2000/01/rdf-schema#Resource"/>
    <rdfs:range rdf:resource="http://www.w3.org/2000/01/rdf-schema#Literal"/>
  </rdf:Property>

  <rdf:Property rdf:about="http://www.w3.org/2000/01/rdf-schema#domain">
    <rdfs:isDefinedBy rdf:resource="http://www.w3.org/2000/01/rdf-schema#"/>
    <rdfs:label>domain</rdfs:label>
    <rdfs:comment>A domain of the subject property.</rdfs:comment>
   <rdfs:range rdf:resource="http://www.w3.org/2000/01/rdf-schema#Class"/>
    <rdfs:domain rdf:resource="http://www.w3.org/1999/02/22-rdf-syntax-ns#Property"/>
  </rdf:Property>

  <rdf:Property rdf:about="http://www.w3.org/2000/01/rdf-schema#range">
    <rdfs:isDefinedBy rdf:resource="http://www.w3.org/2000/01/rdf-schema#"/>
    <rdfs:label>range</rdfs:label>
    <rdfs:comment>A range of the subject property.</rdfs:comment>
    <rdfs:range rdf:resource="http://www.w3.org/2000/01/rdf-schema#Class"/>
    <rdfs:domain rdf:resource="http://www.w3.org/1999/02/22-rdf-syntax-ns#Property"/>
  </rdf:Property>

  <rdf:Property rdf:about="http://www.w3.org/2000/01/rdf-schema#seeAlso">
    <rdfs:isDefinedBy rdf:resource="http://www.w3.org/2000/01/rdf-schema#"/>
    <rdfs:label>seeAlso</rdfs:label>
    <rdfs:comment>Further information about the subject resource.</rdfs:comment>
    <rdfs:range rdf:resource="http://www.w3.org/2000/01/rdf-schema#Resource"/>
    <rdfs:domain   rdf:resource="http://www.w3.org/2000/01/rdf-schema#Resource"/>
  </rdf:Property>

  <rdf:Property rdf:about="http://www.w3.org/2000/01/rdf-schema#isDefinedBy">
    <rdfs:isDefinedBy rdf:resource="http://www.w3.org/2000/01/rdf-schema#"/>
    <rdfs:subPropertyOf rdf:resource="http://www.w3.org/2000/01/rdf-schema#seeAlso"/>
    <rdfs:label>isDefinedBy</rdfs:label>
    <rdfs:comment>The defininition of the subject resource.</rdfs:comment>
    <rdfs:range rdf:resource="http://www.w3.org/2000/01/rdf-schema#Resource"/>
    <rdfs:domain rdf:resource="http://www.w3.org/2000/01/rdf-schema#Resource"/>
  </rdf:Property>

  <rdfs:Class rdf:about="http://www.w3.org/2000/01/rdf-schema#Literal">
    <rdfs:isDefinedBy rdf:resource="http://www.w3.org/2000/01/rdf-schema#"/>
```

```
      <rdfs:label>Literal</rdfs:label>
      <rdfs:comment>The class of literal values, eg. textual strings and integers.</rdfs:comment>
      <rdfs:subClassOf rdf:resource="http://www.w3.org/2000/01/rdf-schema#Resource"/>
   </rdfs:Class>

   <rdfs:Class rdf:about="http://www.w3.org/1999/02/22-rdf-syntax-ns#Statement">
      <rdfs:isDefinedBy rdf:resource="http://www.w3.org/1999/02/22-rdf-syntax-ns#"/>
      <rdfs:label>Statement</rdfs:label>
      <rdfs:subClassOf rdf:resource="http://www.w3.org/2000/01/rdf-schema#Resource"/>
      <rdfs:comment>The class of RDF statements.</rdfs:comment>
   </rdfs:Class>

   <rdf:Property rdf:about="http://www.w3.org/1999/02/22-rdf-syntax-ns#subject">
      <rdfs:isDefinedBy rdf:resource="http://www.w3.org/1999/02/22-rdf-syntax-ns#"/>
      <rdfs:label>subject</rdfs:label>
      <rdfs:comment>The subject of the subject RDF statement.</rdfs:comment>
      <rdfs:domain rdf:resource="http://www.w3.org/1999/02/22-rdf-syntax-ns#Statement"/>
      <rdfs:range rdf:resource="http://www.w3.org/2000/01/rdf-schema#Resource"/>
   </rdf:Property>

   <rdf:Property rdf:about="http://www.w3.org/1999/02/22-rdf-syntax-ns#predicate">
      <rdfs:isDefinedBy rdf:resource="http://www.w3.org/1999/02/22-rdf-syntax-ns#"/>
      <rdfs:label>predicate</rdfs:label>
      <rdfs:comment>The predicate of the subject RDF statement.</rdfs:comment>
      <rdfs:domain rdf:resource="http://www.w3.org/1999/02/22-rdf-syntax-ns#Statement"/>
      <rdfs:range rdf:resource="http://www.w3.org/2000/01/rdf-schema#Resource"/>
   </rdf:Property>

   <rdf:Property rdf:about="http://www.w3.org/1999/02/22-rdf-syntax-ns#object">
      <rdfs:isDefinedBy rdf:resource="http://www.w3.org/1999/02/22-rdf-syntax-ns#"/>
      <rdfs:label>object</rdfs:label>
      <rdfs:comment>The object of the subject RDF statement.</rdfs:comment>
      <rdfs:domain rdf:resource="http://www.w3.org/1999/02/22-rdf-syntax-ns#Statement"/>
      <rdfs:range rdf:resource="http://www.w3.org/2000/01/rdf-schema#Resource"/>
   </rdf:Property>

   <rdfs:Class rdf:about="http://www.w3.org/2000/01/rdf-schema#Container">
      <rdfs:isDefinedBy rdf:resource="http://www.w3.org/2000/01/rdf-schema#"/>
      <rdfs:label>Container</rdfs:label>
      <rdfs:subClassOf rdf:resource="http://www.w3.org/2000/01/rdf-schema#Resource"/>
      <rdfs:comment>The class of RDF containers.</rdfs:comment>
   </rdfs:Class>

   <rdfs:Class rdf:about="http://www.w3.org/1999/02/22-rdf-syntax-ns#Bag">
      <rdfs:isDefinedBy rdf:resource="http://www.w3.org/1999/02/22-rdf-syntax-ns#"/>
      <rdfs:label>Bag</rdfs:label>
      <rdfs:comment>The class of unordered containers.</rdfs:comment>
      <rdfs:subClassOf rdf:resource="http://www.w3.org/2000/01/rdf-schema#Container"/>
   </rdfs:Class>

   <rdfs:Class rdf:about="http://www.w3.org/1999/02/22-rdf-syntax-ns#Seq">
      <rdfs:isDefinedBy rdf:resource="http://www.w3.org/1999/02/22-rdf-syntax-ns#"/>
      <rdfs:label>Seq</rdfs:label>
      <rdfs:comment>The class of ordered containers.</rdfs:comment>
      <rdfs:subClassOf rdf:resource="http://www.w3.org/2000/01/rdf-schema#Container"/>
```

```xml
    </rdfs:Class>

    <rdfs:Class rdf:about="http://www.w3.org/1999/02/22-rdf-syntax-ns#Alt">
      <rdfs:isDefinedBy rdf:resource="http://www.w3.org/1999/02/22-rdf-syntax-ns#"/>
      <rdfs:label>Alt</rdfs:label>
      <rdfs:comment>The class of containers of alternatives.</rdfs:comment>
      <rdfs:subClassOf rdf:resource="http://www.w3.org/2000/01/rdf-schema#Container"/>
    </rdfs:Class>

    <rdfs:Class rdf:about="http://www.w3.org/2000/01/rdf-schema#ContainerMembershipProperty">
      <rdfs:isDefinedBy rdf:resource="http://www.w3.org/2000/01/rdf-schema#"/>
      <rdfs:label>ContainerMembershipProperty</rdfs:label>
      <rdfs:comment>The class of container membership properties, rdf:_1, rdf:_2, ...,
                    all of which are sub-properties of 'member'.</rdfs:comment>
      <rdfs:subClassOf rdf:resource="http://www.w3.org/1999/02/22-rdf-syntax-ns#Property"/>
    </rdfs:Class>

    <rdf:Property rdf:about="http://www.w3.org/2000/01/rdf-schema#member">
      <rdfs:isDefinedBy rdf:resource="http://www.w3.org/2000/01/rdf-schema#"/>
      <rdfs:label>member</rdfs:label>
      <rdfs:comment>A member of the subject resource.</rdfs:comment>
      <rdfs:domain rdf:resource="http://www.w3.org/2000/01/rdf-schema#Resource"/>
      <rdfs:range rdf:resource="http://www.w3.org/2000/01/rdf-schema#Resource"/>
    </rdf:Property>

    <rdf:Property rdf:about="http://www.w3.org/1999/02/22-rdf-syntax-ns#value">
      <rdfs:isDefinedBy rdf:resource="http://www.w3.org/1999/02/22-rdf-syntax-ns#"/>
      <rdfs:label>value</rdfs:label>
      <rdfs:comment>Idiomatic property used for structured values.</rdfs:comment>
      <rdfs:domain rdf:resource="http://www.w3.org/2000/01/rdf-schema#Resource"/>
      <rdfs:range rdf:resource="http://www.w3.org/2000/01/rdf-schema#Resource"/>
    </rdf:Property>

    <!-- the following are new additions, Nov 2002 -->

    <rdfs:Class rdf:about="http://www.w3.org/1999/02/22-rdf-syntax-ns#List">
      <rdfs:isDefinedBy rdf:resource="http://www.w3.org/1999/02/22-rdf-syntax-ns#"/>
      <rdfs:label>List</rdfs:label>
      <rdfs:comment>The class of RDF Lists.</rdfs:comment>
      <rdfs:subClassOf rdf:resource="http://www.w3.org/2000/01/rdf-schema#Resource"/></rdfs:Class>

    <rdf:List rdf:about="http://www.w3.org/1999/02/22-rdf-syntax-ns#nil">
      <rdfs:isDefinedBy rdf:resource="http://www.w3.org/1999/02/22-rdf-syntax-ns#"/>
      <rdfs:label>nil</rdfs:label>
      <rdfs:comment>The empty list, with no items in it. If the rest of a list is nil then the list has no more items in it.</rdfs:comment>
    </rdf:List>

    <rdf:Property rdf:about="http://www.w3.org/1999/02/22-rdf-syntax-ns#first">
      <rdfs:isDefinedBy rdf:resource="http://www.w3.org/1999/02/22-rdf-syntax-ns#"/>
      <rdfs:label>first</rdfs:label>
      <rdfs:comment>The first item in the subject RDF list.</rdfs:comment>
      <rdfs:domain rdf:resource="http://www.w3.org/1999/02/22-rdf-syntax-ns#List"/>
      <rdfs:range rdf:resource="http://www.w3.org/2000/01/rdf-schema#Resource"/>
    </rdf:Property>
```

```xml
    <rdf:Property rdf:about="http://www.w3.org/1999/02/22-rdf-syntax-ns#rest">
      <rdfs:isDefinedBy rdf:resource="http://www.w3.org/1999/02/22-rdf-syntax-ns#"/>
      <rdfs:label>rest</rdfs:label>
      <rdfs:comment>The rest of the subject RDF list after the first item.</rdfs:comment>
      <rdfs:domain rdf:resource="http://www.w3.org/1999/02/22-rdf-syntax-ns#List"/>
      <rdfs:range rdf:resource="http://www.w3.org/1999/02/22-rdf-syntax-ns#List"/>
    </rdf:Property>

    <rdfs:Class rdf:about="http://www.w3.org/2000/01/rdf-schema#Datatype">
      <rdfs:isDefinedBy rdf:resource="http://www.w3.org/2000/01/rdf-schema#"/>
      <rdfs:label>Datatype</rdfs:label>
      <rdfs:comment>The class of RDF datatypes.</rdfs:comment>
      <rdfs:subClassOf rdf:resource="http://www.w3.org/2000/01/rdf-schema#Class"/>
    </rdfs:Class>

    <rdfs:Datatype rdf:about="http://www.w3.org/1999/02/22-rdf-syntax-ns#XMLLiteral">
      <rdfs:subClassOf rdf:resource="http://www.w3.org/2000/01/rdf-schema#Literal"/>
      <rdfs:isDefinedBy rdf:resource="http://www.w3.org/1999/02/22-rdf-syntax-ns#"/>
      <rdfs:label>XMLLiteral</rdfs:label>
      <rdfs:comment>The class of XML literal values.</rdfs:comment>
    </rdfs:Datatype>

    <rdf:Description rdf:about="http://www.w3.org/2000/01/rdf-schema#">
      <rdfs:seeAlso rdf:resource="http://www.w3.org/2000/01/rdf-schema-more"/>
    </rdf:Description>

  </rdf:RDF>
```