Test Documentation on Prov-O

# rdfs:comment

## rdf:type

owl:AnnotationProperty

## rdfs:comment

## rdfs:isDefinedBy

prov:

http://www.w3.org/ns/prov-o#

# rdfs:isDefinedBy

## rdf:type

owl:AnnotationProperty

# rdfs:label

## rdf:type

owl:AnnotationProperty

## rdfs:comment

## rdfs:isDefinedBy

prov:

http://www.w3.org/ns/prov-o#

# rdfs:seeAlso

## rdf:type

owl:AnnotationProperty

## rdfs:comment

# owl:Thing

## rdf:type

owl:Class

# owl:topObjectProperty

## rdf:type

owl:ObjectProperty

# owl:versionInfo

## rdf:type

owl:AnnotationProperty

# prov:

## rdf:type

owl:Ontology

## rdfs:comment

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Archives/Public/public-prov-comments/). All feedback is welcome.

## rdfs:isDefinedBy

ns1:prov

## rdfs:label

W3C PROVenance Interchange

## rdfs:seeAlso

ns2:names-of-inverse-properties

http://www.w3.org/TR/prov-overview/

## owl:imports

http://www.w3.org/ns/prov-aq#

http://www.w3.org/ns/prov-o-inverses#

http://www.w3.org/ns/prov-dc#

http://www.w3.org/ns/prov-dictionary#

http://www.w3.org/ns/prov-links#

http://www.w3.org/ns/prov-o#

## owl:versionIRI

ns1:prov-o-inverses-20130430

ns1:prov-20130430

## prov:specializationOf

ns1:prov-o-inverses

## prov:wasDerivedFrom

ns1:prov-o-20130430

http://www.w3.org/ns/prov-dictionary#

http://www.w3.org/ns/prov-links#

http://www.w3.org/ns/prov-dc#

http://www.w3.org/ns/prov-o#

http://www.w3.org/ns/prov-aq#

http://www.w3.org/ns/prov-o-inverses#

## prov:wasRevisionOf

ns1:prov-20130312

ns1:prov-o-inverses-20120312

# prov:Accept

## rdf:type

owl:Class

## rdfs:label

Accept

## rdfs:subClassOf

prov:Activity

## prov:definition

Activity that identifies the acceptance of a resource (e.g., an article in a conference)

# prov:Activity

## rdf:type

owl:Class

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o#

## rdfs:label

Activity

## owl:disjointWith

prov:Entity

## prov:category

starting-point

## prov:component

entities-activities

## prov:constraints

http://www.w3.org/TR/2013/REC-prov-constraints-20130430/#prov-dm-constraints-fig

## prov:definition

An activity is something that occurs over a period of time and acts upon or with entities; it may include consuming, processing, transforming, modifying, relocating, using, or generating entities.

## prov:dm

http://www.w3.org/TR/2013/REC-prov-dm-20130430/#term-Activity

## prov:n

http://www.w3.org/TR/2013/REC-prov-n-20130430/#expression-Activity

# prov:ActivityInfluence

## rdf:type

owl:Class

## rdfs:comment

It is not recommended that the type ActivityInfluence be asserted without also asserting one of its more specific subclasses.

ActivityInfluence provides additional descriptions of an Activity's binary influence upon any other kind of resource. Instances of ActivityInfluence use the prov:activity property to cite the influencing Activity.

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o#

## rdfs:label

ActivityInfluence

## rdfs:seeAlso

prov:activity

## rdfs:subClassOf

### rdf:type

owl:Restriction

### owl:onProperty

prov:hadActivity

### owl:maxCardinality

prov:Influence

## owl:disjointWith

prov:EntityInfluence

## prov:category

qualified

## prov:editorsDefinition

ActivitiyInfluence is the capacity of an activity to have an effect on the character, development, or behavior of another by means of generation, invalidation, communication, or other.

# prov:Agent

## rdf:type

owl:Class

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o#

## rdfs:label

Agent

## owl:disjointWith

prov:InstantaneousEvent

## prov:category

starting-point

## prov:component

agents-responsibility

## prov:definition

An agent is something that bears some form of responsibility for an activity taking place, for the existence of an entity, or for another agent's activity.

## prov:dm

http://www.w3.org/TR/2013/REC-prov-dm-20130430/#term-agent

## prov:n

http://www.w3.org/TR/2013/REC-prov-n-20130430/#expression-Agent

# prov:AgentInfluence

## rdf:type

owl:Class

## rdfs:comment

AgentInfluence provides additional descriptions of an Agent's binary influence upon any other kind of resource. Instances of AgentInfluence use the prov:agent property to cite the influencing Agent.

It is not recommended that the type AgentInfluence be asserted without also asserting one of its more specific subclasses.

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o#

## rdfs:label

AgentInfluence

## rdfs:seeAlso

prov:agent

## rdfs:subClassOf

prov:Influence

## prov:category

qualified

## prov:editorsDefinition

AgentInfluence is the capacity of an agent to have an effect on the character, development, or behavior of another by means of attribution, association, delegation, or other.

# prov:Association

## rdf:type

owl:Class

## rdfs:comment

An instance of prov:Association provides additional descriptions about the binary prov:wasAssociatedWith relation from an prov:Activity to some prov:Agent that had some responsiblity for it. For example, :baking prov:wasAssociatedWith :baker; prov:qualifiedAssociation [ a prov:Association; prov:agent :baker; :foo :bar ].

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o#

## rdfs:label

Association

## rdfs:subClassOf

prov:AgentInfluence

## prov:category

qualified

## prov:component

agents-responsibility

## prov:definition

An activity association is an assignment of responsibility to an agent for an activity, indicating that the agent had a role in the activity. It further allows for a plan to be specified, which is the plan intended by the agent to achieve some goals in the context of this activity.

## prov:dm

http://www.w3.org/TR/2013/REC-prov-dm-20130430/#term-Association

## prov:n

http://www.w3.org/TR/2013/REC-prov-n-20130430/#expression-Association

## prov:unqualifiedForm

prov:wasAssociatedWith

# prov:Attribution

## rdf:type

owl:Class

## rdfs:comment

An instance of prov:Attribution provides additional descriptions about the binary prov:wasAttributedTo relation from an prov:Entity to some prov:Agent that had some responsible for it. For example, :cake prov:wasAttributedTo :baker; prov:qualifiedAttribution [ a prov:Attribution; prov:entity :baker; :foo :bar ].

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o#

## rdfs:label

Attribution

## rdfs:subClassOf

prov:AgentInfluence

## prov:category

qualified

## prov:component

agents-responsibility

## prov:constraints

http://www.w3.org/TR/2013/REC-prov-constraints-20130430/#prov-dm-constraints-fig

## prov:definition

Attribution is the ascribing of an entity to an agent.  
  
When an entity e is attributed to agent ag, entity e was generated by some unspecified activity that in turn was associated to agent ag. Thus, this relation is useful when the activity is not known, or irrelevant.

## prov:dm

http://www.w3.org/TR/2013/REC-prov-dm-20130430/#term-attribution

## prov:n

http://www.w3.org/TR/2013/REC-prov-n-20130430/#expression-attribution

## prov:unqualifiedForm

prov:wasAttributedTo

# prov:Bundle

## rdf:type

owl:Class

## rdfs:comment

Note that there are kinds of bundles (e.g. handwritten letters, audio recordings, etc.) that are not expressed in PROV-O, but can be still be described by PROV-O.

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o#

## rdfs:label

Bundle

## rdfs:subClassOf

prov:Entity

## prov:category

expanded

## prov:definition

A bundle is a named set of provenance descriptions, and is itself an Entity, so allowing provenance of provenance to be expressed.

## prov:dm

http://www.w3.org/TR/2013/REC-prov-dm-20130430/#term-bundle-entity

## prov:n

http://www.w3.org/TR/2013/REC-prov-n-20130430/#expression-bundle-declaration

# prov:Collection

## rdf:type

owl:Class

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o#

## rdfs:label

Collection

## rdfs:subClassOf

prov:Entity

## prov:category

expanded

## prov:component

collections

## prov:definition

A collection is an entity that provides a structure to some constituents, which are themselves entities. These constituents are said to be member of the collections.

## prov:dm

http://www.w3.org/TR/2013/REC-prov-dm-20130430/#term-collection

# prov:Communication

## rdf:type

owl:Class

## rdfs:comment

An instance of prov:Communication provides additional descriptions about the binary prov:wasInformedBy relation from an informed prov:Activity to the prov:Activity that informed it. For example, :you\_jumping\_off\_bridge prov:wasInformedBy :everyone\_else\_jumping\_off\_bridge; prov:qualifiedCommunication [ a prov:Communication; prov:activity :everyone\_else\_jumping\_off\_bridge; :foo :bar ].

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o#

## rdfs:label

Communication

## rdfs:subClassOf

prov:ActivityInfluence

## prov:category

qualified

## prov:component

entities-activities

## prov:constraints

http://www.w3.org/TR/2013/REC-prov-constraints-20130430/#prov-dm-constraints-fig

## prov:definition

Communication is the exchange of an entity by two activities, one activity using the entity generated by the other.

## prov:dm

http://www.w3.org/TR/2013/REC-prov-dm-20130430/#term-Communication

## prov:n

http://www.w3.org/TR/2013/REC-prov-n-20130430/#expression-wasInformedBy

## prov:unqualifiedForm

prov:wasInformedBy

# prov:Contribute

## rdf:type

owl:Class

## rdfs:label

Contribute

## rdfs:subClassOf

prov:Activity

## prov:definition

Activity that identifies any contribution of an agent to a resource.

# prov:Contributor

## rdf:type

owl:Class

## rdfs:label

Contributor

## rdfs:subClassOf

prov:Role

## prov:definition

Role with the function of having responsibility for making contributions to a resource. The Agent assigned to this role is associated with a Modify or Create Activities

# prov:Copyright

## rdf:type

owl:Class

## rdfs:label

Copyright

## rdfs:subClassOf

prov:Activity

## prov:definition

Activity that identifies the Copyrighting activity associated to a resource.

# prov:Create

## rdf:type

owl:Class

## rdfs:label

Create

## rdfs:subClassOf

prov:Contribute

## prov:definition

Activity that identifies the creation of a resource

# prov:Creator

## rdf:type

owl:Class

## rdfs:label

Creator

## rdfs:subClassOf

prov:Contributor

## prov:definition

Role with the function of creating a resource. The Agent assigned to this role is associated with a Create Activity

# prov:Delegation

## rdf:type

owl:Class

## rdfs:comment

An instance of prov:Delegation provides additional descriptions about the binary prov:actedOnBehalfOf relation from a performing prov:Agent to some prov:Agent for whom it was performed. For example, :mixing prov:wasAssociatedWith :toddler . :toddler prov:actedOnBehalfOf :mother; prov:qualifiedDelegation [ a prov:Delegation; prov:entity :mother; :foo :bar ].

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o#

## rdfs:label

Delegation

## rdfs:subClassOf

prov:AgentInfluence

## prov:category

qualified

## prov:component

agents-responsibility

## prov:definition

Delegation is the assignment of authority and responsibility to an agent (by itself or by another agent) to carry out a specific activity as a delegate or representative, while the agent it acts on behalf of retains some responsibility for the outcome of the delegated work.  
  
For example, a student acted on behalf of his supervisor, who acted on behalf of the department chair, who acted on behalf of the university; all those agents are responsible in some way for the activity that took place but we do not say explicitly who bears responsibility and to what degree.

## prov:dm

http://www.w3.org/TR/2013/REC-prov-dm-20130430/#term-delegation

## prov:n

http://www.w3.org/TR/2013/REC-prov-n-20130430/#expression-delegation

## prov:unqualifiedForm

prov:actedOnBehalfOf

# prov:Derivation

## rdf:type

owl:Class

## rdfs:comment

The more specific forms of prov:Derivation (i.e., prov:Revision, prov:Quotation, prov:PrimarySource) should be asserted if they apply.

An instance of prov:Derivation provides additional descriptions about the binary prov:wasDerivedFrom relation from some derived prov:Entity to another prov:Entity from which it was derived. For example, :chewed\_bubble\_gum prov:wasDerivedFrom :unwrapped\_bubble\_gum; prov:qualifiedDerivation [ a prov:Derivation; prov:entity :unwrapped\_bubble\_gum; :foo :bar ].

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o#

## rdfs:label

Derivation

## rdfs:subClassOf

prov:EntityInfluence

## prov:category

qualified

## prov:component

derivations

## prov:constraints

http://www.w3.org/TR/2013/REC-prov-constraints-20130430/#prov-dm-constraints-fig

## prov:definition

A derivation is a transformation of an entity into another, an update of an entity resulting in a new one, or the construction of a new entity based on a pre-existing entity.

## prov:dm

http://www.w3.org/TR/2013/REC-prov-dm-20130430/#term-Derivation

## prov:n

http://www.w3.org/TR/2013/REC-prov-n-20130430/#Derivation-Relation

## prov:unqualifiedForm

prov:wasDerivedFrom

# prov:Dictionary

## rdf:type

owl:Class

## rdfs:comment

This concept allows for the provenance of the dictionary, but also of its constituents to be expressed. Such a notion of dictionary corresponds to a wide variety of concrete data structures, such as a maps or associative arrays.

A given dictionary forms a given structure for its members. A different structure (obtained either by insertion or removal of members) constitutes a different dictionary.

## rdfs:isDefinedBy

prov:

## rdfs:label

Dictionary

## prov:category

collections

## prov:component

collections

## prov:constraints

http://www.w3.org/TR/2013/NOTE-prov-dictionary-20130430/#dictionary-constraints

## prov:definition

A dictionary is an entity that provides a structure to some constituents, which are themselves entities. These constituents are said to be member of the dictionary.

## prov:dm

http://www.w3.org/TR/2013/NOTE-prov-dictionary-20130430/#dictionary-conceptual-definition

## prov:n

http://www.w3.org/TR/2013/NOTE-prov-dictionary-20130430/#expression-dictionary

# prov:DirectQueryService

## rdf:type

owl:Class

## rdfs:comment

Type for a generic provenance query service. Mainly for use in RDF provenance query service descriptions, to facilitate discovery in linked data environments.

## rdfs:isDefinedBy

prov:

## rdfs:label

ProvenanceService

## rdfs:subClassOf

prov:SoftwareAgent

## prov:aq

http://www.w3.org/TR/2013/NOTE-prov-aq-20130430/#provenance-query-service-discovery

## prov:category

access-and-query

# prov:EmptyCollection

## rdf:type

owl:NamedIndividual

owl:Class

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o#

## rdfs:label

EmptyCollection

## rdfs:subClassOf

prov:Collection

## prov:category

expanded

## prov:component

collections

## prov:definition

An empty collection is a collection without members.

# prov:EmptyDictionary

## rdf:type

owl:Class

## rdfs:isDefinedBy

prov:

## rdfs:label

Empty Dictionary

## rdfs:subClassOf

prov:Dictionary

prov:EmptyCollection

## prov:category

collections

## prov:component

collections

## prov:constraints

http://www.w3.org/TR/2013/NOTE-prov-dictionary-20130430/#dictionary-constraints

## prov:definition

An empty dictionary (i.e. has no members).

## prov:dm

http://www.w3.org/TR/2013/NOTE-prov-dictionary-20130430/#dictionary-conceptual-definition

## prov:n

http://www.w3.org/TR/2013/NOTE-prov-dictionary-20130430/#expression-dictionary

# prov:End

## rdf:type

owl:Class

## rdfs:comment

An instance of prov:End provides additional descriptions about the binary prov:wasEndedBy relation from some ended prov:Activity to an prov:Entity that ended it. For example, :ball\_game prov:wasEndedBy :buzzer; prov:qualifiedEnd [ a prov:End; prov:entity :buzzer; :foo :bar; prov:atTime '2012-03-09T08:05:08-05:00'^^xsd:dateTime ].

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o#

## rdfs:label

End

## rdfs:subClassOf

prov:InstantaneousEvent

prov:EntityInfluence

## prov:category

qualified

## prov:component

entities-activities

## prov:constraints

http://www.w3.org/TR/2013/REC-prov-constraints-20130430/#prov-dm-constraints-fig

## prov:definition

End is when an activity is deemed to have been ended by an entity, known as trigger. The activity no longer exists after its end. Any usage, generation, or invalidation involving an activity precedes the activity's end. An end may refer to a trigger entity that terminated the activity, or to an activity, known as ender that generated the trigger.

## prov:dm

http://www.w3.org/TR/2013/REC-prov-dm-20130430/#term-End

## prov:n

http://www.w3.org/TR/2013/REC-prov-n-20130430/#expression-End

## prov:unqualifiedForm

prov:wasEndedBy

# prov:Entity

## rdf:type

owl:Class

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o#

## rdfs:label

Entity

## owl:disjointWith

prov:InstantaneousEvent

## prov:category

starting-point

## prov:component

entities-activities

## prov:constraints

http://www.w3.org/TR/2013/REC-prov-constraints-20130430/#prov-dm-constraints-fig

## prov:definition

An entity is a physical, digital, conceptual, or other kind of thing with some fixed aspects; entities may be real or imaginary.

## prov:dm

http://www.w3.org/TR/2013/REC-prov-dm-20130430/#term-entity

## prov:n

http://www.w3.org/TR/2013/REC-prov-n-20130430/#expression-Entity

# prov:EntityInfluence

## rdf:type

owl:Class

## rdfs:comment

EntityInfluence provides additional descriptions of an Entity's binary influence upon any other kind of resource. Instances of EntityInfluence use the prov:entity property to cite the influencing Entity.

It is not recommended that the type EntityInfluence be asserted without also asserting one of its more specific subclasses.

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o#

## rdfs:label

EntityInfluence

## rdfs:seeAlso

prov:entity

## rdfs:subClassOf

prov:Influence

## prov:category

qualified

## prov:editorsDefinition

EntityInfluence is the capacity of an entity to have an effect on the character, development, or behavior of another by means of usage, start, end, derivation, or other.

# prov:Generation

## rdf:type

owl:Class

## rdfs:comment

An instance of prov:Generation provides additional descriptions about the binary prov:wasGeneratedBy relation from a generated prov:Entity to the prov:Activity that generated it. For example, :cake prov:wasGeneratedBy :baking; prov:qualifiedGeneration [ a prov:Generation; prov:activity :baking; :foo :bar ].

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o#

## rdfs:label

Generation

## rdfs:subClassOf

prov:InstantaneousEvent

prov:ActivityInfluence

## prov:category

qualified

## prov:component

entities-activities

## prov:constraints

http://www.w3.org/TR/2013/REC-prov-constraints-20130430/#prov-dm-constraints-fig

## prov:definition

Generation is the completion of production of a new entity by an activity. This entity did not exist before generation and becomes available for usage after this generation.

## prov:dm

http://www.w3.org/TR/2013/REC-prov-dm-20130430/#term-Generation

## prov:n

http://www.w3.org/TR/2013/REC-prov-n-20130430/#expression-Generation

## prov:unqualifiedForm

prov:wasGeneratedBy

# prov:Influence

## rdf:type

owl:Class

## rdfs:comment

Because prov:Influence is a broad relation, its most specific subclasses (e.g. prov:Communication, prov:Delegation, prov:End, prov:Revision, etc.) should be used when applicable.

An instance of prov:Influence provides additional descriptions about the binary prov:wasInfluencedBy relation from some influenced Activity, Entity, or Agent to the influencing Activity, Entity, or Agent. For example, :stomach\_ache prov:wasInfluencedBy :spoon; prov:qualifiedInfluence [ a prov:Influence; prov:entity :spoon; :foo :bar ] . Because prov:Influence is a broad relation, the more specific relations (Communication, Delegation, End, etc.) should be used when applicable.

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o#

## rdfs:label

Influence

## prov:category

qualified

## prov:component

derivations

## prov:definition

Influence is the capacity of an entity, activity, or agent to have an effect on the character, development, or behavior of another by means of usage, start, end, generation, invalidation, communication, derivation, attribution, association, or delegation.

## prov:dm

http://www.w3.org/TR/2013/REC-prov-dm-20130430/#term-influence

## prov:n

http://www.w3.org/TR/2013/REC-prov-n-20130430/#expression-influence

## prov:unqualifiedForm

prov:wasInfluencedBy

# prov:Insertion

## rdf:type

owl:Class

## rdfs:isDefinedBy

prov:

## rdfs:label

Insertion

## rdfs:subClassOf

### owl:cardinality

1

### owl:onProperty

prov:dictionary

### rdf:type

owl:Restriction

### rdf:type

owl:Restriction

### owl:minCardinality

1

### owl:onProperty

prov:insertedKeyEntityPair

prov:Derivation

## prov:category

collections

## prov:component

collections

## prov:constraints

http://www.w3.org/TR/2013/NOTE-prov-dictionary-20130430/#dictionary-constraints

## prov:definition

Insertion is a derivation that transforms a dictionary into another, by insertion of one or more key-entity pairs.

## prov:dm

http://www.w3.org/TR/2013/NOTE-prov-dictionary-20130430/#term-dictionary-insertion

## prov:n

http://www.w3.org/TR/2013/NOTE-prov-dictionary-20130430/#expression-dictionary-insertion

## prov:unqualifiedForm

prov:derivedByInsertionFrom

# prov:InstantaneousEvent

## rdf:type

owl:Class

## rdfs:comment

An instantaneous event, or event for short, happens in the world and marks a change in the world, in its activities and in its entities. The term 'event' is commonly used in process algebra with a similar meaning. Events represent communications or interactions; they are assumed to be atomic and instantaneous.

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o#

## rdfs:label

InstantaneousEvent

## prov:category

qualified

## prov:component

entities-activities

## prov:constraints

http://www.w3.org/TR/2013/REC-prov-constraints-20130430/#dfn-event

## prov:definition

The PROV data model is implicitly based on a notion of instantaneous events (or just events), that mark transitions in the world. Events include generation, usage, or invalidation of entities, as well as starting or ending of activities. This notion of event is not first-class in the data model, but it is useful for explaining its other concepts and its semantics.

# prov:Invalidation

## rdf:type

owl:Class

## rdfs:comment

An instance of prov:Invalidation provides additional descriptions about the binary prov:wasInvalidatedBy relation from an invalidated prov:Entity to the prov:Activity that invalidated it. For example, :uncracked\_egg prov:wasInvalidatedBy :baking; prov:qualifiedInvalidation [ a prov:Invalidation; prov:activity :baking; :foo :bar ].

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o#

## rdfs:label

Invalidation

## rdfs:subClassOf

prov:ActivityInfluence

prov:InstantaneousEvent

## prov:category

qualified

## prov:component

entities-activities

## prov:constraints

http://www.w3.org/TR/2013/REC-prov-constraints-20130430/#prov-dm-constraints-fig

## prov:definition

Invalidation is the start of the destruction, cessation, or expiry of an existing entity by an activity. The entity is no longer available for use (or further invalidation) after invalidation. Any generation or usage of an entity precedes its invalidation.

## prov:dm

http://www.w3.org/TR/2013/REC-prov-dm-20130430/#term-Invalidation

## prov:n

http://www.w3.org/TR/2013/REC-prov-n-20130430/#expression-Invalidation

## prov:unqualifiedForm

prov:wasInvalidatedBy

# prov:KeyEntityPair

## rdf:type

owl:Class

## rdfs:isDefinedBy

prov:

## rdfs:label

Key-Entity Pair

## rdfs:subClassOf

### owl:cardinality

1

### owl:onProperty

prov:pairEntity

### rdf:type

owl:Restriction

### owl:onProperty

prov:pairKey

### rdf:type

owl:Restriction

### owl:cardinality

1

## prov:category

collections

## prov:component

collections

## prov:constraints

http://www.w3.org/TR/2013/NOTE-prov-dictionary-20130430/#dictionary-constraints

## prov:definition

A key-entity pair. Part of a prov:Dictionary through prov:hadDictionaryMember. The key is any RDF Literal, the value is a prov:Entity.

## prov:dm

http://www.w3.org/TR/2013/NOTE-prov-dictionary-20130430/#term-dictionary-membership

## prov:n

http://www.w3.org/TR/2013/NOTE-prov-dictionary-20130430/#expression-dictionary-membership

# prov:Location

## rdf:type

owl:Class

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o#

## rdfs:label

Location

## rdfs:seeAlso

prov:atLocation

## prov:category

expanded

## prov:definition

A location can be an identifiable geographic place (ISO 19112), but it can also be a non-geographic place such as a directory, row, or column. As such, there are numerous ways in which location can be expressed, such as by a coordinate, address, landmark, and so forth.

## prov:dm

http://www.w3.org/TR/2013/REC-prov-dm-20130430/#term-attribute-location

## prov:n

http://www.w3.org/TR/2013/REC-prov-n-20130430/#expression-attribute

# prov:Modify

## rdf:type

owl:Class

## rdfs:label

Modify

## rdfs:subClassOf

prov:Activity

## prov:definition

Activity that identifies the modification of a resource.

# prov:Organization

## rdf:type

owl:Class

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o#

## rdfs:label

Organization

## rdfs:subClassOf

prov:Agent

## prov:category

expanded

## prov:component

agents-responsibility

## prov:definition

An organization is a social or legal institution such as a company, society, etc.

## prov:dm

http://www.w3.org/TR/2013/REC-prov-dm-20130430/#term-agent

## prov:n

http://www.w3.org/TR/2013/REC-prov-n-20130430/#expression-types

# prov:Person

## rdf:type

owl:Class

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o#

## rdfs:label

Person

## rdfs:subClassOf

prov:Agent

## prov:category

expanded

## prov:component

agents-responsibility

## prov:definition

Person agents are people.

## prov:dm

http://www.w3.org/TR/2013/REC-prov-dm-20130430/#term-agent

## prov:n

http://www.w3.org/TR/2013/REC-prov-n-20130430/#expression-types

# prov:Plan

## rdf:type

owl:Class

## rdfs:comment

There exist no prescriptive requirement on the nature of plans, their representation, the actions or steps they consist of, or their intended goals. Since plans may evolve over time, it may become necessary to track their provenance, so plans themselves are entities. Representing the plan explicitly in the provenance can be useful for various tasks: for example, to validate the execution as represented in the provenance record, to manage expectation failures, or to provide explanations.

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o#

## rdfs:label

Plan

## rdfs:subClassOf

prov:Entity

## prov:category

qualified

expanded

## prov:component

agents-responsibility

## prov:definition

A plan is an entity that represents a set of actions or steps intended by one or more agents to achieve some goals.

## prov:dm

http://www.w3.org/TR/2013/REC-prov-dm-20130430/#term-Association

## prov:n

http://www.w3.org/TR/2013/REC-prov-n-20130430/#expression-Association

# prov:PrimarySource

## rdf:type

owl:Class

## rdfs:comment

An instance of prov:PrimarySource provides additional descriptions about the binary prov:hadPrimarySource relation from some secondary prov:Entity to an earlier, primary prov:Entity. For example, :blog prov:hadPrimarySource :newsArticle; prov:qualifiedPrimarySource [ a prov:PrimarySource; prov:entity :newsArticle; :foo :bar ] .

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o#

## rdfs:label

PrimarySource

## rdfs:subClassOf

prov:Derivation

## prov:category

qualified

## prov:component

derivations

## prov:definition

A primary source for a topic refers to something produced by some agent with direct experience and knowledge about the topic, at the time of the topic's study, without benefit from hindsight.  
  
Because of the directness of primary sources, they 'speak for themselves' in ways that cannot be captured through the filter of secondary sources. As such, it is important for secondary sources to reference those primary sources from which they were derived, so that their reliability can be investigated.  
  
A primary source relation is a particular case of derivation of secondary materials from their primary sources. It is recognized that the determination of primary sources can be up to interpretation, and should be done according to conventions accepted within the application's domain.

## prov:dm

http://www.w3.org/TR/2013/REC-prov-dm-20130430/#term-primary-source

## prov:n

http://www.w3.org/TR/2013/REC-prov-n-20130430/#expression-original-source

## prov:unqualifiedForm

prov:hadPrimarySource

# prov:Publish

## rdf:type

owl:Class

## rdfs:label

Publish

## rdfs:subClassOf

prov:Activity

## prov:definition

Activity that identifies the publication of a resource

# prov:Publisher

## rdf:type

owl:Class

## rdfs:label

Publisher

## rdfs:subClassOf

prov:Role

## prov:definition

Role with the function of publishing a resource. The Agent assigned to this role is associated with a Publish Activity

# prov:Quotation

## rdf:type

owl:Class

## rdfs:comment

An instance of prov:Quotation provides additional descriptions about the binary prov:wasQuotedFrom relation from some taken prov:Entity from an earlier, larger prov:Entity. For example, :here\_is\_looking\_at\_you\_kid prov:wasQuotedFrom :casablanca\_script; prov:qualifiedQuotation [ a prov:Quotation; prov:entity :casablanca\_script; :foo :bar ].

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o#

## rdfs:label

Quotation

## rdfs:subClassOf

prov:Derivation

## prov:category

qualified

## prov:component

derivations

## prov:definition

A quotation is the repeat of (some or all of) an entity, such as text or image, by someone who may or may not be its original author. Quotation is a particular case of derivation.

## prov:dm

http://www.w3.org/TR/2013/REC-prov-dm-20130430/#term-quotation

## prov:n

http://www.w3.org/TR/2013/REC-prov-n-20130430/#expression-quotation

## prov:unqualifiedForm

prov:wasQuotedFrom

# prov:Removal

## rdf:type

owl:Class

## rdfs:isDefinedBy

prov:

## rdfs:label

Removal

## rdfs:subClassOf

### rdf:type

owl:Restriction

### owl:minCardinality

1

### owl:onProperty

prov:removedKey

### rdf:type

owl:Restriction

### owl:cardinality

1

### owl:onProperty

prov:dictionary

prov:Derivation

## prov:category

collections

## prov:component

collections

## prov:constraints

http://www.w3.org/TR/2013/NOTE-prov-dictionary-20130430/#dictionary-constraints

## prov:definition

Removal is a derivation that transforms a dictionary into another, by removing one or more key-entity pairs.

## prov:dm

http://www.w3.org/TR/2013/NOTE-prov-dictionary-20130430/#term-dictionary-removal

## prov:n

http://www.w3.org/TR/2013/NOTE-prov-dictionary-20130430/#expression-dictionary-removal

## prov:unqualifiedForm

prov:derivedByRemovalFrom

# prov:Replace

## rdf:type

owl:Class

## rdfs:label

Replace

## rdfs:subClassOf

prov:Activity

## prov:definition

Activity that identifies the replacement of a resource.

# prov:Revision

## rdf:type

owl:Class

## rdfs:comment

An instance of prov:Revision provides additional descriptions about the binary prov:wasRevisionOf relation from some newer prov:Entity to an earlier prov:Entity. For example, :draft\_2 prov:wasRevisionOf :draft\_1; prov:qualifiedRevision [ a prov:Revision; prov:entity :draft\_1; :foo :bar ].

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o#

## rdfs:label

Revision

## rdfs:subClassOf

prov:Derivation

## prov:category

qualified

## prov:component

derivations

## prov:definition

A revision is a derivation for which the resulting entity is a revised version of some original. The implication here is that the resulting entity contains substantial content from the original. Revision is a particular case of derivation.

## prov:dm

http://www.w3.org/TR/2013/REC-prov-dm-20130430/#term-revision

## prov:n

http://www.w3.org/TR/2013/REC-prov-n-20130430/#expression-Revision

## prov:unqualifiedForm

prov:wasRevisionOf

# prov:RightsAssignment

## rdf:type

owl:Class

## rdfs:label

RightsAssignment

## rdfs:subClassOf

prov:Activity

## prov:definition

Activity that identifies the rights assignment of a resource.

# prov:RightsHolder

## rdf:type

owl:Class

## rdfs:label

RightsHolder

## rdfs:subClassOf

prov:Role

## prov:definition

Role with the function of owning or managing rights over a resource. The Agent assigned to this role is associated with a RightsAssignment Activity

# prov:Role

## rdf:type

owl:Class

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o#

## rdfs:label

Role

## rdfs:seeAlso

prov:hadRole

## prov:category

qualified

## prov:component

agents-responsibility

## prov:definition

A role is the function of an entity or agent with respect to an activity, in the context of a usage, generation, invalidation, association, start, and end.

## prov:dm

http://www.w3.org/TR/2013/REC-prov-dm-20130430/#term-attribute-role

## prov:n

http://www.w3.org/TR/2013/REC-prov-n-20130430/#expression-attribute

# prov:ServiceDescription

## rdf:type

owl:Class

## rdfs:comment

Type for a generic provenance query service. Mainly for use in RDF provenance query service descriptions, to facilitate discovery in linked data environments.

## rdfs:isDefinedBy

prov:

## rdfs:label

ServiceDescription

## rdfs:subClassOf

prov:SoftwareAgent

## prov:aq

http://www.w3.org/TR/2013/NOTE-prov-aq-20130430/#provenance-query-service-discovery

## prov:category

access-and-query

# prov:SoftwareAgent

## rdf:type

owl:Class

## rdfs:isDefinedBy

prov:

http://www.w3.org/ns/prov-o#

## rdfs:label

SoftwareAgent

## rdfs:subClassOf

prov:Agent

owl:Thing

## prov:category

expanded

## prov:component

agents-responsibility

## prov:definition

A software agent is running software.

## prov:dm

http://www.w3.org/TR/2012/WD-prov-dm-20120703/prov-dm.html#term-agent

http://www.w3.org/TR/2013/REC-prov-dm-20130430/#term-agent

## prov:n

http://www.w3.org/TR/2013/REC-prov-n-20130430/#expression-types

http://www.w3.org/TR/2012/WD-prov-dm-20120703/prov-n.html#expression-types

# prov:Start

## rdf:type

owl:Class

## rdfs:comment

An instance of prov:Start provides additional descriptions about the binary prov:wasStartedBy relation from some started prov:Activity to an prov:Entity that started it. For example, :foot\_race prov:wasStartedBy :bang; prov:qualifiedStart [ a prov:Start; prov:entity :bang; :foo :bar; prov:atTime '2012-03-09T08:05:08-05:00'^^xsd:dateTime ] .

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o#

## rdfs:label

Start

## rdfs:subClassOf

prov:InstantaneousEvent

prov:EntityInfluence

## prov:category

qualified

## prov:component

entities-activities

## prov:constraints

http://www.w3.org/TR/2013/REC-prov-constraints-20130430/#prov-dm-constraints-fig

## prov:definition

Start is when an activity is deemed to have been started by an entity, known as trigger. The activity did not exist before its start. Any usage, generation, or invalidation involving an activity follows the activity's start. A start may refer to a trigger entity that set off the activity, or to an activity, known as starter, that generated the trigger.

## prov:dm

http://www.w3.org/TR/2013/REC-prov-dm-20130430/#term-Start

## prov:n

http://www.w3.org/TR/2013/REC-prov-n-20130430/#expression-Start

## prov:unqualifiedForm

prov:wasStartedBy

# prov:Submit

## rdf:type

owl:Class

## rdfs:label

Submit

## rdfs:subClassOf

prov:Activity

## prov:definition

Activity that identifies the issuance (e.g., publication) of a resource.

# prov:Usage

## rdf:type

owl:Class

## rdfs:comment

An instance of prov:Usage provides additional descriptions about the binary prov:used relation from some prov:Activity to an prov:Entity that it used. For example, :keynote prov:used :podium; prov:qualifiedUsage [ a prov:Usage; prov:entity :podium; :foo :bar ].

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o#

## rdfs:label

Usage

## rdfs:subClassOf

prov:InstantaneousEvent

prov:EntityInfluence

## prov:category

qualified

## prov:component

entities-activities

## prov:constraints

http://www.w3.org/TR/2013/REC-prov-constraints-20130430/#prov-dm-constraints-fig

## prov:definition

Usage is the beginning of utilizing an entity by an activity. Before usage, the activity had not begun to utilize this entity and could not have been affected by the entity.

## prov:dm

http://www.w3.org/TR/2013/REC-prov-dm-20130430/#term-Usage

## prov:n

http://www.w3.org/TR/2013/REC-prov-n-20130430/#expression-Usage

## prov:unqualifiedForm

prov:used

# prov:actedOnBehalfOf

## rdf:type

owl:ObjectProperty

## rdfs:comment

An object property to express the accountability of an agent towards another agent. The subordinate agent acted on behalf of the responsible agent in an actual activity.

## rdfs:domain

prov:Agent

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o#

## rdfs:label

actedOnBehalfOf

## rdfs:range

prov:Agent

## rdfs:subPropertyOf

prov:wasInfluencedBy

## owl:propertyChainAxiom

### rdf:first

prov:qualifiedDelegation

### rdf:rest

f185e06ee5f874913be617042744bbedfb2

### rdf:rest

rdf:nil

### rdf:first

prov:agent

## prov:category

starting-point

## prov:component

agents-responsibility

## prov:inverse

hadDelegate

## prov:qualifiedForm

prov:qualifiedDelegation

prov:Delegation

# prov:activity

## rdf:type

owl:ObjectProperty

## rdfs:domain

prov:ActivityInfluence

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o#

## rdfs:label

activity

## rdfs:range

prov:Activity

## rdfs:subPropertyOf

prov:influencer

## prov:category

qualified

## prov:editorialNote

This property behaves in spirit like rdf:object; it references the object of a prov:wasInfluencedBy triple.

## prov:editorsDefinition

The prov:activity property references an prov:Activity which influenced a resource. This property applies to an prov:ActivityInfluence, which is given by a subproperty of prov:qualifiedInfluence from the influenced prov:Entity, prov:Activity or prov:Agent.

## prov:inverse

activityOfInfluence

# prov:activityOfInfluence

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o-inverses#

## rdfs:label

activityOfInfluence

## owl:inverseOf

prov:activity

# prov:agent

## rdf:type

owl:ObjectProperty

## rdfs:domain

prov:AgentInfluence

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o#

## rdfs:label

agent

## rdfs:range

prov:Agent

## rdfs:subPropertyOf

prov:influencer

## prov:category

qualified

## prov:editorialNote

This property behaves in spirit like rdf:object; it references the object of a prov:wasInfluencedBy triple.

## prov:editorsDefinition

The prov:agent property references an prov:Agent which influenced a resource. This property applies to an prov:AgentInfluence, which is given by a subproperty of prov:qualifiedInfluence from the influenced prov:Entity, prov:Activity or prov:Agent.

## prov:inverse

agentOfInfluence

# prov:agentOfInfluence

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o-inverses#

## rdfs:label

agentOfInfluence

## owl:inverseOf

prov:agent

# prov:alternateOf

## rdf:type

owl:ObjectProperty

## rdfs:domain

prov:Entity

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o#

http://www.w3.org/ns/prov-o-inverses#

## rdfs:label

alternateOf

## rdfs:range

prov:Entity

## rdfs:seeAlso

prov:specializationOf

## owl:inverseOf

prov:alternateOf

## prov:category

expanded

## prov:component

alternate

## prov:constraints

http://www.w3.org/TR/2013/REC-prov-constraints-20130430/#prov-dm-constraints-fig

## prov:definition

Two alternate entities present aspects of the same thing. These aspects may be the same or different, and the alternate entities may or may not overlap in time.

## prov:dm

http://www.w3.org/TR/2013/REC-prov-dm-20130430/#term-alternate

## prov:inverse

alternateOf

## prov:n

http://www.w3.org/TR/2013/REC-prov-n-20130430/#expression-alternate

# prov:aq

## rdf:type

owl:AnnotationProperty

## rdfs:isDefinedBy

prov:

http://www.w3.org/ns/prov-o#

## rdfs:subPropertyOf

rdfs:seeAlso

# prov:asInBundle

## rdf:type

owl:ObjectProperty

## rdfs:comment

prov:asInBundle is used to specify which bundle the general entity of a prov:mentionOf property is described.  
  
When :x prov:mentionOf :y and :y is described in Bundle :b, the triple :x prov:asInBundle :b is also asserted to cite the Bundle in which :y was described.

## rdfs:domain

prov:Entity

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-links#

## rdfs:label

asInBundle

## rdfs:range

prov:Bundle

## prov:inverse

contextOf

## prov:sharesDefinitionWith

prov:mentionOf

# prov:atLocation

## rdf:type

owl:ObjectProperty

## rdfs:comment

The Location of any resource.

This property has multiple RDFS domains to suit multiple OWL Profiles. See <a href="#owl-profile">PROV-O OWL Profile</a>.

## rdfs:domain

### owl:unionOf

f185e06ee5f874913be617042744bbedfb3

### rdf:rest

f185e06ee5f874913be617042744bbedfb4

### rdf:first

prov:Agent

### rdf:rest

f185e06ee5f874913be617042744bbedfb5

### rdf:first

prov:Entity

### rdf:rest

f185e06ee5f874913be617042744bbedfb6

### rdf:first

prov:InstantaneousEvent

### rdf:rest

rdf:nil

### rdf:first

prov:Activity

### rdf:type

owl:Class

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o#

## rdfs:label

atLocation

## rdfs:range

prov:Location

## prov:category

expanded

## prov:editorialNote

This property is not functional because the many values could be at a variety of granularies (In this building, in this room, in that chair).

The naming of prov:atLocation parallels prov:atTime, and is not named prov:hadLocation to avoid conflicting with the convention that prov:had\* properties are used on prov:Influence classes.

## prov:inverse

locationOf

## prov:sharesDefinitionWith

prov:Location

# prov:atTime

## rdf:type

owl:DatatypeProperty

## rdfs:comment

The time at which an InstantaneousEvent occurred, in the form of xsd:dateTime.

## rdfs:domain

prov:InstantaneousEvent

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o#

## rdfs:label

atTime

## rdfs:range

xsd:dateTime

## prov:category

qualified

## prov:component

entities-activities

## prov:sharesDefinitionWith

prov:InstantaneousEvent

## prov:unqualifiedForm

prov:endedAtTime

prov:generatedAtTime

prov:startedAtTime

prov:invalidatedAtTime

# prov:category

## rdf:type

owl:AnnotationProperty

## rdfs:comment

Classify prov-o terms into three categories, including 'starting-point', 'qualifed', and 'extended'. This classification is used by the prov-o html document to gently introduce prov-o terms to its users.

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o#

prov:

# prov:component

## rdf:type

owl:AnnotationProperty

## rdfs:comment

Classify prov-o terms into six components according to prov-dm, including 'agents-responsibility', 'alternate', 'annotations', 'collections', 'derivations', and 'entities-activities'. This classification is used so that readers of prov-o specification can find its correspondence with the prov-dm specification.

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o#

prov:

# prov:constraints

## rdf:type

owl:AnnotationProperty

## rdfs:comment

A reference to the principal section of the PROV-CONSTRAINTS document that describes this concept.

## rdfs:isDefinedBy

prov:

http://www.w3.org/ns/prov-o#

## rdfs:subPropertyOf

rdfs:seeAlso

# prov:contributed

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o-inverses#

## rdfs:label

contributed

## owl:inverseOf

prov:wasAttributedTo

# prov:definition

## rdf:type

owl:AnnotationProperty

## rdfs:comment

A definition quoted from PROV-DM or PROV-CONSTRAINTS that describes the concept expressed with this OWL term.

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o#

prov:

# prov:derivedByInsertionFrom

## rdf:type

owl:ObjectProperty

## rdfs:domain

prov:Dictionary

## rdfs:isDefinedBy

prov:

## rdfs:label

derivedByInsertionFrom

## rdfs:range

prov:Dictionary

## rdfs:subPropertyOf

prov:wasDerivedFrom

## prov:category

collections

## prov:component

collections

## prov:constraints

http://www.w3.org/TR/2013/NOTE-prov-dictionary-20130430/#dictionary-constraints

## prov:definition

The dictionary was derived from the other by insertion. prov:qualifiedInsertion shows details of the insertion, in particular the inserted key-entity pairs.

## prov:dm

http://www.w3.org/TR/2013/NOTE-prov-dictionary-20130430/#term-dictionary-insertion

## prov:n

http://www.w3.org/TR/2013/NOTE-prov-dictionary-20130430/#expression-dictionary-insertion

# prov:derivedByRemovalFrom

## rdf:type

owl:ObjectProperty

## rdfs:domain

prov:Dictionary

## rdfs:isDefinedBy

prov:

## rdfs:label

derivedByRemovalFrom

## rdfs:range

prov:Dictionary

## rdfs:subPropertyOf

prov:wasDerivedFrom

## prov:category

collections

## prov:component

collections

## prov:constraints

http://www.w3.org/TR/2013/NOTE-prov-dictionary-20130430/#dictionary-constraints

## prov:definition

The dictionary was derived from the other by removal. prov:qualifiedRemoval shows details of the removal, in particular the removed key-entity pairs.

## prov:dm

http://www.w3.org/TR/2013/NOTE-prov-dictionary-20130430/#term-dictionary-removal

## prov:n

http://www.w3.org/TR/2013/NOTE-prov-dictionary-20130430/#expression-dictionary-removal

# prov:describesService

## rdf:type

owl:ObjectProperty

## rdfs:comment

relates a generic provenance query service resource (type prov:ServiceDescription) to a specific query service description (e.g. a prov:DirectQueryService or a sd:Service).

## rdfs:isDefinedBy

prov:

## rdfs:label

describesService

## prov:aq

http://www.w3.org/TR/2013/NOTE-prov-aq-20130430/rovenance-query-service-description

## prov:category

access-and-query

## prov:inverse

serviceDescribedBy

# prov:dictionary

## rdf:type

owl:ObjectProperty

## rdfs:domain

prov:Insertion

prov:Removal

## rdfs:isDefinedBy

prov:

## rdfs:label

dictionary

## rdfs:range

prov:Dictionary

## rdfs:subPropertyOf

prov:entity

## prov:category

collections

## prov:component

collections

## prov:constraints

http://www.w3.org/TR/2013/NOTE-prov-dictionary-20130430/#dictionary-constraints

## prov:definition

The property used by a prov:Insertion and prov:Removal to cite the prov:Dictionary that was prov:derivedByInsertionFrom or prov:derivedByRemovalFrom another dictionary.

## prov:dm

http://www.w3.org/TR/2013/NOTE-prov-dictionary-20130430/#term-dictionary-removal

http://www.w3.org/TR/2013/NOTE-prov-dictionary-20130430/#term-dictionary-insertion

## prov:n

http://www.w3.org/TR/2013/NOTE-prov-dictionary-20130430/#expression-dictionary-removal

http://www.w3.org/TR/2013/NOTE-prov-dictionary-20130430/#expression-dictionary-insertion

# prov:dm

## rdf:type

owl:AnnotationProperty

## rdfs:comment

A reference to the principal section of the PROV-DM document that describes this concept.

## rdfs:isDefinedBy

prov:

http://www.w3.org/ns/prov-o#

## rdfs:subPropertyOf

rdfs:seeAlso

# prov:editorialNote

## rdf:type

owl:AnnotationProperty

## rdfs:comment

A note by the OWL development team about how this term expresses the PROV-DM concept, or how it should be used in context of semantic web or linked data.

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o#

prov:

# prov:editorsDefinition

## rdf:type

owl:AnnotationProperty

## rdfs:comment

When the prov-o term does not have a definition drawn from prov-dm, and the prov-o editor provides one.

## rdfs:isDefinedBy

prov:

http://www.w3.org/ns/prov-o#

## rdfs:subPropertyOf

prov:definition

# prov:ended

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o-inverses#

## rdfs:label

ended

## owl:inverseOf

prov:wasEndedBy

# prov:endedAtTime

## rdf:type

owl:DatatypeProperty

## rdfs:comment

The time at which an activity ended. See also prov:startedAtTime.

## rdfs:domain

prov:Activity

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o#

## rdfs:label

endedAtTime

## rdfs:range

xsd:dateTime

## prov:category

starting-point

## prov:component

entities-activities

## prov:editorialNote

It is the intent that the property chain holds: (prov:qualifiedEnd o prov:atTime) rdfs:subPropertyOf prov:endedAtTime.

## prov:qualifiedForm

prov:atTime

prov:End

# prov:entity

## rdf:type

owl:ObjectProperty

## rdfs:domain

prov:EntityInfluence

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o#

## rdfs:label

entity

## rdfs:range

prov:Entity

## rdfs:subPropertyOf

prov:influencer

## prov:category

qualified

## prov:editorialNote

This property behaves in spirit like rdf:object; it references the object of a prov:wasInfluencedBy triple.

## prov:editorsDefinition

The prov:entity property references an prov:Entity which influenced a resource. This property applies to an prov:EntityInfluence, which is given by a subproperty of prov:qualifiedInfluence from the influenced prov:Entity, prov:Activity or prov:Agent.

## prov:inverse

entityOfInfluence

# prov:entityOfInfluence

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o-inverses#

## rdfs:label

entityOfInfluence

## owl:inverseOf

prov:entity

# prov:generalizationOf

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o-inverses#

## rdfs:label

generalizationOf

## owl:inverseOf

prov:specializationOf

# prov:generated

## rdf:type

owl:ObjectProperty

## rdfs:domain

prov:Activity

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o#

http://www.w3.org/ns/prov-o-inverses#

## rdfs:label

generated

## rdfs:range

prov:Entity

## rdfs:subPropertyOf

prov:influenced

## owl:inverseOf

prov:wasGeneratedBy

## prov:category

expanded

## prov:component

entities-activities

## prov:editorialNote

prov:generated is one of few inverse property defined, to allow Activity-oriented assertions in addition to Entity-oriented assertions.

## prov:inverse

wasGeneratedBy

## prov:sharesDefinitionWith

prov:Generation

# prov:generatedAsDerivation

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o-inverses#

## rdfs:label

generatedAsDerivation

## owl:inverseOf

prov:hadGeneration

# prov:generatedAtTime

## rdf:type

owl:DatatypeProperty

## rdfs:comment

The time at which an entity was completely created and is available for use.

## rdfs:domain

prov:Entity

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o#

## rdfs:label

generatedAtTime

## rdfs:range

xsd:dateTime

## prov:category

expanded

## prov:component

entities-activities

## prov:editorialNote

It is the intent that the property chain holds: (prov:qualifiedGeneration o prov:atTime) rdfs:subPropertyOf prov:generatedAtTime.

## prov:qualifiedForm

prov:Generation

prov:atTime

# prov:hadActivity

## rdf:type

owl:ObjectProperty

## rdfs:comment

This property has multiple RDFS domains to suit multiple OWL Profiles. See <a href="#owl-profile">PROV-O OWL Profile</a>.

The \_optional\_ Activity of an Influence, which used, generated, invalidated, or was the responsibility of some Entity. This property is \_not\_ used by ActivityInfluence (use prov:activity instead).

## rdfs:domain

prov:Influence

### owl:unionOf

f185e06ee5f874913be617042744bbedfb7

### rdf:first

prov:Delegation

### rdf:rest

f185e06ee5f874913be617042744bbedfb8

### rdf:rest

f185e06ee5f874913be617042744bbedfb9

### rdf:rest

f185e06ee5f874913be617042744bbedfb10

### rdf:first

prov:Start

### rdf:rest

rdf:nil

### rdf:first

prov:End

### rdf:first

prov:Derivation

### rdf:type

owl:Class

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o#

## rdfs:label

hadActivity

## rdfs:range

prov:Activity

## prov:category

qualified

## prov:component

derivations

## prov:editorialNote

The multiple rdfs:domain assertions are intended. One is simpler and works for OWL-RL, the union is more specific but is not recognized by OWL-RL.

## prov:inverse

wasActivityOfInfluence

## prov:sharesDefinitionWith

prov:Activity

# prov:hadDelegate

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o-inverses#

## rdfs:label

hadDelegate

## owl:inverseOf

prov:actedOnBehalfOf

# prov:hadDerivation

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o-inverses#

## rdfs:label

hadDerivation

## owl:inverseOf

prov:wasDerivedFrom

# prov:hadDictionaryMember

## rdf:type

owl:ObjectProperty

## rdfs:domain

prov:Dictionary

## rdfs:isDefinedBy

prov:

## rdfs:label

hadDictionaryMember

## rdfs:range

prov:KeyEntityPair

## prov:category

collections

## prov:component

collections

## prov:constraints

http://www.w3.org/TR/2013/NOTE-prov-dictionary-20130430/#dictionary-constraints

## prov:definition

Describes the key-entity pair that was member of a prov:Dictionary. A dictionary can have multiple members.

## prov:dm

http://www.w3.org/TR/2013/NOTE-prov-dictionary-20130430/#term-dictionary-membership

## prov:n

http://www.w3.org/TR/2013/NOTE-prov-dictionary-20130430/#expression-dictionary-membership

# prov:hadGeneration

## rdf:type

owl:ObjectProperty

## rdfs:comment

The \_optional\_ Generation involved in an Entity's Derivation.

## rdfs:domain

prov:Derivation

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o#

## rdfs:label

hadGeneration

## rdfs:range

prov:Generation

## prov:category

qualified

## prov:component

derivations

## prov:inverse

generatedAsDerivation

## prov:sharesDefinitionWith

prov:Generation

# prov:hadInfluence

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o-inverses#

## rdfs:label

hadInfluence

## owl:inverseOf

prov:influencer

# prov:hadMember

## rdf:type

owl:ObjectProperty

## rdfs:domain

prov:Collection

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o#

## rdfs:label

hadMember

## rdfs:range

prov:Entity

## rdfs:subPropertyOf

prov:wasInfluencedBy

## prov:category

expanded

## prov:component

expanded

## prov:inverse

wasMemberOf

## prov:sharesDefinitionWith

prov:Collection

# prov:hadPlan

## rdf:type

owl:ObjectProperty

## rdfs:comment

The \_optional\_ Plan adopted by an Agent in Association with some Activity. Plan specifications are out of the scope of this specification.

## rdfs:domain

prov:Association

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o#

## rdfs:label

hadPlan

## rdfs:range

prov:Plan

## prov:category

qualified

## prov:component

agents-responsibility

## prov:inverse

wasPlanOf

## prov:sharesDefinitionWith

prov:Plan

# prov:hadPrimarySource

## rdf:type

owl:ObjectProperty

## rdfs:domain

prov:Entity

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o#

## rdfs:label

hadPrimarySource

## rdfs:range

prov:Entity

## rdfs:subPropertyOf

prov:wasDerivedFrom

## owl:propertyChainAxiom

### rdf:rest

f185e06ee5f874913be617042744bbedfb12

### rdf:rest

rdf:nil

### rdf:first

prov:entity

### rdf:first

prov:qualifiedPrimarySource

## prov:category

expanded

## prov:component

derivations

## prov:inverse

wasPrimarySourceOf

## prov:qualifiedForm

prov:PrimarySource

prov:qualifiedPrimarySource

# prov:hadRevision

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o-inverses#

## rdfs:label

hadRevision

## owl:inverseOf

prov:wasRevisionOf

# prov:hadRole

## rdf:type

owl:ObjectProperty

## rdfs:comment

The \_optional\_ Role that an Entity assumed in the context of an Activity. For example, :baking prov:used :spoon; prov:qualified [ a prov:Usage; prov:entity :spoon; prov:hadRole roles:mixing\_implement ].

This property has multiple RDFS domains to suit multiple OWL Profiles. See <a href="#owl-profile">PROV-O OWL Profile</a>.

## rdfs:domain

### rdf:type

owl:Class

### owl:unionOf

f185e06ee5f874913be617042744bbedfb13

### rdf:rest

f185e06ee5f874913be617042744bbedfb14

### rdf:first

prov:InstantaneousEvent

### rdf:rest

rdf:nil

### rdf:first

prov:Association

prov:Influence

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o#

## rdfs:label

hadRole

## rdfs:range

prov:Role

## prov:category

qualified

## prov:component

agents-responsibility

## prov:editorsDefinition

prov:hadRole references the Role (i.e. the function of an entity with respect to an activity), in the context of an instantaneous usage, generation, association, start, and end.

## prov:inverse

wasRoleIn

## prov:sharesDefinitionWith

prov:Role

# prov:hadUsage

## rdf:type

owl:ObjectProperty

## rdfs:comment

The \_optional\_ Usage involved in an Entity's Derivation.

## rdfs:domain

prov:Derivation

## rdfs:isDefinedBy

prov:

http://www.w3.org/ns/prov-o#

## rdfs:label

hadUsage

## rdfs:range

prov:Usage

## prov:category

qualified

## prov:component

derivations

## prov:inverse

wasUsedInDerivation

## prov:sharesDefinitionWith

prov:Usage

# prov:has\_anchor

## rdf:type

owl:ObjectProperty

## rdfs:comment

Indicates anchor URI for a potentially dynamic resource instance.

## rdfs:isDefinedBy

prov:

## rdfs:label

has\_anchor

## prov:aq

http://www.w3.org/TR/2013/NOTE-prov-aq-20130430/#resource-represented-as-html

## prov:category

access-and-query

## prov:inverse

anchorOf

# prov:has\_provenance

## rdf:type

owl:ObjectProperty

## rdfs:comment

Indicates a provenance-URI for a resource; the resource identified by this property presents a provenance record about its subject or anchor resource.

## rdfs:isDefinedBy

prov:

## rdfs:label

has\_provenance

## prov:aq

http://www.w3.org/TR/2013/NOTE-prov-aq-20130430/#resource-represented-as-html

## prov:category

access-and-query

## prov:inverse

provenanceOf

# prov:has\_query\_service

## rdf:type

owl:ObjectProperty

## rdfs:comment

Indicates a provenance query service that can access provenance related to its subject or anchor resource.

## rdfs:isDefinedBy

prov:

## rdfs:label

hasProvenanceService

## prov:aq

http://www.w3.org/TR/2013/NOTE-prov-aq-20130430/

## prov:category

access-and-query

## prov:inverse

provenanceQueryServiceOf

# prov:influenced

## rdf:type

owl:ObjectProperty

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o#

http://www.w3.org/ns/prov-o-inverses#

## rdfs:label

influenced

## owl:inverseOf

prov:wasInfluencedBy

## prov:category

expanded

## prov:component

agents-responsibility

## prov:inverse

wasInfluencedBy

## prov:sharesDefinitionWith

prov:Influence

# prov:influencer

## rdf:type

owl:ObjectProperty

## rdfs:comment

Subproperties of prov:influencer are used to cite the object of an unqualified PROV-O triple whose predicate is a subproperty of prov:wasInfluencedBy (e.g. prov:used, prov:wasGeneratedBy). prov:influencer is used much like rdf:object is used.

## rdfs:domain

prov:Influence

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o#

## rdfs:label

influencer

## rdfs:range

owl:Thing

## prov:category

qualified

## prov:dm

http://www.w3.org/TR/2013/REC-prov-dm-20130430/#term-influence

## prov:editorialNote

This property and its subproperties are used in the same way as the rdf:object property, i.e. to reference the object of an unqualified prov:wasInfluencedBy or prov:influenced triple.

## prov:editorsDefinition

This property is used as part of the qualified influence pattern. Subclasses of prov:Influence use these subproperties to reference the resource (Entity, Agent, or Activity) whose influence is being qualified.

## prov:inverse

hadInfluence

# prov:informed

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o-inverses#

## rdfs:label

informed

## owl:inverseOf

prov:wasInformedBy

# prov:insertedKeyEntityPair

## rdf:type

owl:ObjectProperty

## rdfs:domain

prov:Insertion

## rdfs:isDefinedBy

prov:

## rdfs:label

insertedKeyEntityPair

## rdfs:range

prov:KeyEntityPair

## prov:category

collections

## prov:component

collections

## prov:constraints

http://www.w3.org/TR/2013/NOTE-prov-dictionary-20130430/#dictionary-constraints

## prov:definition

An object property to refer to the prov:KeyEntityPair inserted into a prov:Dictionary.

## prov:dm

http://www.w3.org/TR/2013/NOTE-prov-dictionary-20130430/#term-dictionary-insertion

## prov:n

http://www.w3.org/TR/2013/NOTE-prov-dictionary-20130430/#expression-dictionary-insertion

# prov:invalidated

## rdf:type

owl:ObjectProperty

## rdfs:domain

prov:Activity

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o#

http://www.w3.org/ns/prov-o-inverses#

## rdfs:label

invalidated

## rdfs:range

prov:Entity

## rdfs:subPropertyOf

prov:influenced

## owl:inverseOf

prov:wasInvalidatedBy

## prov:category

expanded

## prov:component

entities-activities

## prov:editorialNote

prov:invalidated is one of few inverse property defined, to allow Activity-oriented assertions in addition to Entity-oriented assertions.

## prov:inverse

wasInvalidatedBy

## prov:sharesDefinitionWith

prov:Invalidation

# prov:invalidatedAtTime

## rdf:type

owl:DatatypeProperty

## rdfs:comment

The time at which an entity was invalidated (i.e., no longer usable).

## rdfs:domain

prov:Entity

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o#

## rdfs:label

invalidatedAtTime

## rdfs:range

xsd:dateTime

## prov:category

expanded

## prov:component

entities-activities

## prov:editorialNote

It is the intent that the property chain holds: (prov:qualifiedInvalidation o prov:atTime) rdfs:subPropertyOf prov:invalidatedAtTime.

## prov:qualifiedForm

prov:atTime

prov:Invalidation

# prov:inverse

## rdf:type

owl:AnnotationProperty

## rdfs:comment

PROV-O does not define all property inverses. The directionalities defined in PROV-O should be given preference over those not defined. However, if users wish to name the inverse of a PROV-O property, the local name given by prov:inverse should be used.

## rdfs:isDefinedBy

prov:

http://www.w3.org/ns/prov-o#

## rdfs:seeAlso

ns2:names-of-inverse-properties

# prov:locationOf

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o-inverses#

## rdfs:label

locationOf

## owl:inverseOf

prov:atLocation

# prov:mentionOf

## rdf:type

owl:ObjectProperty

## rdfs:comment

prov:mentionOf is used to specialize an entity as described in another bundle. It is to be used in conjuction with prov:asInBundle.  
  
prov:asInBundle is used to cite the Bundle in which the generalization was mentioned.

## rdfs:domain

prov:Entity

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-links#

## rdfs:label

mentionOf

## rdfs:range

prov:Entity

## rdfs:subPropertyOf

prov:specializationOf

## prov:inverse

hadMention

# prov:n

## rdf:type

owl:AnnotationProperty

## rdfs:comment

A reference to the principal section of the PROV-DM document that describes this concept.

A reference to the principal section of the PROV-M document that describes this concept.

## rdfs:isDefinedBy

prov:

http://www.w3.org/ns/prov-o#

## rdfs:subPropertyOf

rdfs:seeAlso

# prov:order

## rdf:type

owl:AnnotationProperty

## rdfs:comment

The position that this OWL term should be listed within documentation. The scope of the documentation (e.g., among all terms, among terms within a prov:category, among properties applying to a particular class, etc.) is unspecified.

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o#

# prov:pairEntity

## rdf:type

owl:ObjectProperty

owl:FunctionalProperty

## rdfs:domain

prov:KeyEntityPair

## rdfs:isDefinedBy

prov:

## rdfs:label

pairKey

## rdfs:range

prov:Entity

## prov:category

collections

## prov:component

collections

## prov:constraints

http://www.w3.org/TR/2013/NOTE-prov-dictionary-20130430/#dictionary-constraints

## prov:definition

The value of a KeyEntityPair.

## prov:dm

http://www.w3.org/TR/2013/NOTE-prov-dictionary-20130430/#term-dictionary-membership

## prov:n

http://www.w3.org/TR/2013/NOTE-prov-dictionary-20130430/#expression-dictionary-membership

# prov:pairKey

## rdf:type

owl:DatatypeProperty

owl:FunctionalProperty

## rdfs:domain

prov:KeyEntityPair

## rdfs:isDefinedBy

prov:

## rdfs:label

pairKey

## rdfs:range

rdfs:Literal

## prov:category

collections

## prov:component

collections

## prov:constraints

http://www.w3.org/TR/2013/NOTE-prov-dictionary-20130430/#dictionary-constraints

## prov:definition

The key of a KeyEntityPair, which is an element of a prov:Dictionary.

## prov:dm

http://www.w3.org/TR/2013/NOTE-prov-dictionary-20130430/#term-dictionary-membership

## prov:n

http://www.w3.org/TR/2013/NOTE-prov-dictionary-20130430/#expression-dictionary-membership

# prov:pingback

## rdf:type

owl:ObjectProperty

## rdfs:comment

Relates a resource to a provenance pingback service that may receive additional provenance links about the resource.

## rdfs:isDefinedBy

prov:

## rdfs:label

provenance pingback

## prov:aq

http://www.w3.org/TR/2013/NOTE-prov-aq-20130430/#provenance-pingback

## prov:category

access-and-query

# prov:provenanceUriTemplate

## rdf:type

owl:DatatypeProperty

## rdfs:comment

Relates a provenance service to a URI template string for constructing provenance-URIs.

## rdfs:isDefinedBy

prov:

## rdfs:label

provenanceUriTemplate

## prov:aq

http://www.w3.org/TR/2013/NOTE-prov-aq-20130430/

## prov:category

access-and-query

# prov:qualifiedAssociation

## rdf:type

owl:ObjectProperty

## rdfs:comment

If this Activity prov:wasAssociatedWith Agent :ag, then it can qualify the Association using prov:qualifiedAssociation [ a prov:Association; prov:agent :ag; :foo :bar ].

## rdfs:domain

prov:Activity

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o#

## rdfs:label

qualifiedAssociation

## rdfs:range

prov:Association

## rdfs:subPropertyOf

prov:qualifiedInfluence

## prov:category

qualified

## prov:component

agents-responsibility

## prov:inverse

qualifiedAssociationOf

## prov:sharesDefinitionWith

prov:Association

## prov:unqualifiedForm

prov:wasAssociatedWith

# prov:qualifiedAssociationOf

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o-inverses#

## rdfs:label

qualifiedAssociationOf

## owl:inverseOf

prov:qualifiedAssociation

# prov:qualifiedAttribution

## rdf:type

owl:ObjectProperty

## rdfs:comment

If this Entity prov:wasAttributedTo Agent :ag, then it can qualify how it was influenced using prov:qualifiedAttribution [ a prov:Attribution; prov:agent :ag; :foo :bar ].

## rdfs:domain

prov:Entity

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o#

## rdfs:label

qualifiedAttribution

## rdfs:range

prov:Attribution

## rdfs:subPropertyOf

prov:qualifiedInfluence

## prov:category

qualified

## prov:component

agents-responsibility

## prov:inverse

qualifiedAttributionOf

## prov:sharesDefinitionWith

prov:Attribution

## prov:unqualifiedForm

prov:wasAttributedTo

# prov:qualifiedAttributionOf

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o-inverses#

## rdfs:label

qualifiedAttributionOf

## owl:inverseOf

prov:qualifiedAttribution

# prov:qualifiedCommunication

## rdf:type

owl:ObjectProperty

## rdfs:comment

If this Activity prov:wasInformedBy Activity :a, then it can qualify how it was influenced using prov:qualifiedCommunication [ a prov:Communication; prov:activity :a; :foo :bar ].

## rdfs:domain

prov:Activity

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o#

## rdfs:label

qualifiedCommunication

## rdfs:range

prov:Communication

## rdfs:subPropertyOf

prov:qualifiedInfluence

## prov:category

qualified

## prov:component

entities-activities

## prov:inverse

qualifiedCommunicationOf

## prov:qualifiedForm

prov:Communication

## prov:sharesDefinitionWith

prov:Communication

# prov:qualifiedCommunicationOf

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o-inverses#

## rdfs:label

qualifiedCommunicationOf

## owl:inverseOf

prov:qualifiedCommunication

# prov:qualifiedDelegation

## rdf:type

owl:ObjectProperty

## rdfs:comment

If this Agent prov:actedOnBehalfOf Agent :ag, then it can qualify how with prov:qualifiedResponsibility [ a prov:Responsibility; prov:agent :ag; :foo :bar ].

## rdfs:domain

prov:Agent

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o#

## rdfs:label

qualifiedDelegation

## rdfs:range

prov:Delegation

## rdfs:subPropertyOf

prov:qualifiedInfluence

## prov:category

qualified

## prov:component

agents-responsibility

## prov:inverse

qualifiedDelegationOf

## prov:sharesDefinitionWith

prov:Delegation

## prov:unqualifiedForm

prov:actedOnBehalfOf

# prov:qualifiedDelegationOf

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o-inverses#

## rdfs:label

qualifiedDelegationOf

## owl:inverseOf

prov:qualifiedDelegation

# prov:qualifiedDerivation

## rdf:type

owl:ObjectProperty

## rdfs:comment

If this Entity prov:wasDerivedFrom Entity :e, then it can qualify how it was derived using prov:qualifiedDerivation [ a prov:Derivation; prov:entity :e; :foo :bar ].

## rdfs:domain

prov:Entity

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o#

## rdfs:label

qualifiedDerivation

## rdfs:range

prov:Derivation

## rdfs:subPropertyOf

prov:qualifiedInfluence

## prov:category

qualified

## prov:component

derivations

## prov:inverse

qualifiedDerivationOf

## prov:sharesDefinitionWith

prov:Derivation

## prov:unqualifiedForm

prov:wasDerivedFrom

# prov:qualifiedDerivationOf

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o-inverses#

## rdfs:label

qualifiedDerivationOf

## owl:inverseOf

prov:qualifiedDerivation

# prov:qualifiedEnd

## rdf:type

owl:ObjectProperty

## rdfs:comment

If this Activity prov:wasEndedBy Entity :e1, then it can qualify how it was ended using prov:qualifiedEnd [ a prov:End; prov:entity :e1; :foo :bar ].

## rdfs:domain

prov:Activity

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o#

## rdfs:label

qualifiedEnd

## rdfs:range

prov:End

## rdfs:subPropertyOf

prov:qualifiedInfluence

## prov:category

qualified

## prov:component

entities-activities

## prov:inverse

qualifiedEndOf

## prov:sharesDefinitionWith

prov:End

## prov:unqualifiedForm

prov:wasEndedBy

# prov:qualifiedEndOf

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o-inverses#

## rdfs:label

qualifiedEndOf

## owl:inverseOf

prov:qualifiedEnd

# prov:qualifiedForm

## rdf:type

owl:AnnotationProperty

## rdfs:comment

This annotation property links a subproperty of prov:wasInfluencedBy with the subclass of prov:Influence and the qualifying property that are used to qualify it.   
  
Example annotation:  
  
 prov:wasGeneratedBy prov:qualifiedForm prov:qualifiedGeneration, prov:Generation .  
  
Then this unqualified assertion:  
  
 :entity1 prov:wasGeneratedBy :activity1 .  
  
can be qualified by adding:  
  
 :entity1 prov:qualifiedGeneration :entity1Gen .  
 :entity1Gen   
 a prov:Generation, prov:Influence;  
 prov:activity :activity1;  
 :customValue 1337 .  
  
Note how the value of the unqualified influence (prov:wasGeneratedBy :activity1) is mirrored as the value of the prov:activity (or prov:entity, or prov:agent) property on the influence class.

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o#

prov:

## rdfs:subPropertyOf

rdfs:seeAlso

# prov:qualifiedGeneration

## rdf:type

owl:ObjectProperty

## rdfs:comment

If this Activity prov:generated Entity :e, then it can qualify how it performed the Generation using prov:qualifiedGeneration [ a prov:Generation; prov:entity :e; :foo :bar ].

## rdfs:domain

prov:Entity

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o#

## rdfs:label

qualifiedGeneration

## rdfs:range

prov:Generation

## rdfs:subPropertyOf

prov:qualifiedInfluence

## prov:category

qualified

## prov:component

entities-activities

## prov:inverse

qualifiedGenerationOf

## prov:sharesDefinitionWith

prov:Generation

## prov:unqualifiedForm

prov:wasGeneratedBy

# prov:qualifiedGenerationOf

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o-inverses#

## rdfs:label

qualifiedGenerationOf

## owl:inverseOf

prov:qualifiedGeneration

# prov:qualifiedInfluence

## rdf:type

owl:ObjectProperty

## rdfs:comment

Because prov:qualifiedInfluence is a broad relation, the more specific relations (qualifiedCommunication, qualifiedDelegation, qualifiedEnd, etc.) should be used when applicable.

## rdfs:domain

### owl:unionOf

f185e06ee5f874913be617042744bbedfb15

### rdf:rest

f185e06ee5f874913be617042744bbedfb16

### rdf:first

prov:Agent

### rdf:rest

f185e06ee5f874913be617042744bbedfb17

### rdf:first

prov:Entity

### rdf:rest

rdf:nil

### rdf:first

prov:Activity

### rdf:type

owl:Class

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o#

## rdfs:label

qualifiedInfluence

## rdfs:range

prov:Influence

## prov:category

qualified

## prov:component

derivations

## prov:inverse

qualifiedInfluenceOf

## prov:sharesDefinitionWith

prov:Influence

## prov:unqualifiedForm

prov:wasInfluencedBy

# prov:qualifiedInfluenceOf

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o-inverses#

## rdfs:label

qualifiedInfluenceOf

## owl:inverseOf

prov:qualifiedInfluence

# prov:qualifiedInsertion

## rdf:type

owl:ObjectProperty

## rdfs:domain

prov:Dictionary

## rdfs:isDefinedBy

prov:

## rdfs:label

qualifiedInsertion

## rdfs:range

prov:Insertion

## rdfs:subPropertyOf

prov:qualifiedDerivation

## prov:category

collections

## prov:component

collections

## prov:constraints

http://www.w3.org/TR/2013/NOTE-prov-dictionary-20130430/#dictionary-constraints

## prov:definition

The dictionary was derived from the other by insertion. prov:qualifiedInsertion shows details of the insertion, in particular the inserted key-entity pairs.

## prov:dm

http://www.w3.org/TR/2013/NOTE-prov-dictionary-20130430/#term-dictionary-insertion

## prov:n

http://www.w3.org/TR/2013/NOTE-prov-dictionary-20130430/#expression-dictionary-insertion

# prov:qualifiedInvalidation

## rdf:type

owl:ObjectProperty

## rdfs:comment

If this Entity prov:wasInvalidatedBy Activity :a, then it can qualify how it was invalidated using prov:qualifiedInvalidation [ a prov:Invalidation; prov:activity :a; :foo :bar ].

## rdfs:domain

prov:Entity

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o#

## rdfs:label

qualifiedInvalidation

## rdfs:range

prov:Invalidation

## rdfs:subPropertyOf

prov:qualifiedInfluence

## prov:category

qualified

## prov:component

entities-activities

## prov:inverse

qualifiedInvalidationOf

## prov:sharesDefinitionWith

prov:Invalidation

## prov:unqualifiedForm

prov:wasInvalidatedBy

# prov:qualifiedInvalidationOf

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o-inverses#

## rdfs:label

qualifiedInvalidationOf

## owl:inverseOf

prov:qualifiedInvalidation

# prov:qualifiedPrimarySource

## rdf:type

owl:ObjectProperty

## rdfs:comment

If this Entity prov:hadPrimarySource Entity :e, then it can qualify how using prov:qualifiedPrimarySource [ a prov:PrimarySource; prov:entity :e; :foo :bar ].

## rdfs:domain

prov:Entity

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o#

## rdfs:label

qualifiedPrimarySource

## rdfs:range

prov:PrimarySource

## rdfs:subPropertyOf

prov:qualifiedInfluence

## prov:category

qualified

## prov:component

derivations

## prov:inverse

qualifiedSourceOf

## prov:sharesDefinitionWith

prov:PrimarySource

## prov:unqualifiedForm

prov:hadPrimarySource

# prov:qualifiedQuotation

## rdf:type

owl:ObjectProperty

## rdfs:comment

If this Entity prov:wasQuotedFrom Entity :e, then it can qualify how using prov:qualifiedQuotation [ a prov:Quotation; prov:entity :e; :foo :bar ].

## rdfs:domain

prov:Entity

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o#

## rdfs:label

qualifiedQuotation

## rdfs:range

prov:Quotation

## rdfs:subPropertyOf

prov:qualifiedInfluence

## prov:category

qualified

## prov:component

derivations

## prov:inverse

qualifiedQuotationOf

## prov:sharesDefinitionWith

prov:Quotation

## prov:unqualifiedForm

prov:wasQuotedFrom

# prov:qualifiedQuotationOf

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o-inverses#

## rdfs:label

qualifiedQuotationOf

## owl:inverseOf

prov:qualifiedQuotation

# prov:qualifiedRemoval

## rdf:type

owl:ObjectProperty

## rdfs:domain

prov:Dictionary

## rdfs:isDefinedBy

prov:

## rdfs:label

qualifiedRemoval

## rdfs:range

prov:Removal

## rdfs:subPropertyOf

prov:qualifiedDerivation

## prov:category

collections

## prov:component

collections

## prov:constraints

http://www.w3.org/TR/2013/NOTE-prov-dictionary-20130430/#dictionary-constraints

## prov:definition

The dictionary was derived from the other by removal. prov:qualifiedRemoval shows details of the removal, in particular the removed keys.

## prov:dm

http://www.w3.org/TR/2013/NOTE-prov-dictionary-20130430/#term-dictionary-removal

## prov:n

http://www.w3.org/TR/2013/NOTE-prov-dictionary-20130430/#expression-dictionary-removal

# prov:qualifiedRevision

## rdf:type

owl:ObjectProperty

## rdfs:comment

If this Entity prov:wasRevisionOf Entity :e, then it can qualify how it was revised using prov:qualifiedRevision [ a prov:Revision; prov:entity :e; :foo :bar ].

## rdfs:domain

prov:Entity

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o#

## rdfs:label

qualifiedRevision

## rdfs:range

prov:Revision

## rdfs:subPropertyOf

prov:qualifiedInfluence

## prov:category

qualified

## prov:component

derivations

## prov:inverse

revisedEntity

## prov:sharesDefinitionWith

prov:Revision

## prov:unqualifiedForm

prov:wasRevisionOf

# prov:qualifiedSourceOf

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o-inverses#

## rdfs:label

qualifiedSourceOf

## owl:inverseOf

prov:qualifiedPrimarySource

# prov:qualifiedStart

## rdf:type

owl:ObjectProperty

## rdfs:comment

If this Activity prov:wasStartedBy Entity :e1, then it can qualify how it was started using prov:qualifiedStart [ a prov:Start; prov:entity :e1; :foo :bar ].

## rdfs:domain

prov:Activity

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o#

## rdfs:label

qualifiedStart

## rdfs:range

prov:Start

## rdfs:subPropertyOf

prov:qualifiedInfluence

## prov:category

qualified

## prov:component

entities-activities

## prov:inverse

qualifiedStartOf

## prov:sharesDefinitionWith

prov:Start

## prov:unqualifiedForm

prov:wasStartedBy

# prov:qualifiedStartOf

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o-inverses#

## rdfs:label

qualifiedStartOf

## owl:inverseOf

prov:qualifiedStart

# prov:qualifiedUsage

## rdf:type

owl:ObjectProperty

## rdfs:comment

If this Activity prov:used Entity :e, then it can qualify how it used it using prov:qualifiedUsage [ a prov:Usage; prov:entity :e; :foo :bar ].

## rdfs:domain

prov:Activity

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o#

## rdfs:label

qualifiedUsage

## rdfs:range

prov:Usage

## rdfs:subPropertyOf

prov:qualifiedInfluence

## prov:category

qualified

## prov:component

entities-activities

## prov:inverse

qualifiedUsingActivity

## prov:sharesDefinitionWith

prov:Usage

## prov:unqualifiedForm

prov:used

# prov:qualifiedUsingActivity

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o-inverses#

## rdfs:label

qualifiedUsingActivity

## owl:inverseOf

prov:qualifiedUsage

# prov:quotedAs

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o-inverses#

## rdfs:label

quotedAs

## owl:inverseOf

prov:wasQuotedFrom

# prov:removedKey

## rdf:type

owl:DatatypeProperty

## rdfs:domain

prov:Removal

## rdfs:isDefinedBy

prov:

## rdfs:label

removedKey

## rdfs:range

rdfs:Literal

## prov:category

collections

## prov:component

collections

## prov:constraints

http://www.w3.org/TR/2013/NOTE-prov-dictionary-20130430/#dictionary-constraints

## prov:definition

The key removed in a Removal.

## prov:dm

http://www.w3.org/TR/2013/NOTE-prov-dictionary-20130430/#term-dictionary-removal

## prov:n

http://www.w3.org/TR/2013/NOTE-prov-dictionary-20130430/#expression-dictionary-removal

# prov:revisedEntity

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o-inverses#

## rdfs:label

revisedEntity

## owl:inverseOf

prov:qualifiedRevision

# prov:sharesDefinitionWith

## rdf:type

owl:AnnotationProperty

## rdfs:isDefinedBy

prov:

http://www.w3.org/ns/prov-o#

## rdfs:subPropertyOf

rdfs:seeAlso

# prov:specializationOf

## rdf:type

owl:AnnotationProperty

owl:ObjectProperty

## rdfs:domain

prov:Entity

## rdfs:isDefinedBy

prov:

http://www.w3.org/ns/prov-o#

## rdfs:label

specializationOf

## rdfs:range

prov:Entity

## rdfs:seeAlso

prov:alternateOf

## rdfs:subPropertyOf

prov:alternateOf

owl:topObjectProperty

## prov:category

expanded

## prov:component

alternate

## prov:constraints

http://www.w3.org/TR/2012/WD-prov-dm-20120703/prov-constraints.html#prov-dm-constraints-fig

http://www.w3.org/TR/2013/REC-prov-constraints-20130430/#prov-dm-constraints-fig

## prov:definition

An entity that is a specialization of another shares all aspects of the latter, and additionally presents more specific aspects of the same thing as the latter. In particular, the lifetime of the entity being specialized contains that of any specialization. Examples of aspects include a time period, an abstraction, and a context associated with the entity.

## prov:dm

http://www.w3.org/TR/2013/REC-prov-dm-20130430/#term-specialization

http://www.w3.org/TR/2012/WD-prov-dm-20120703/prov-dm.html#term-specialization

## prov:inverse

generalizationOf

## prov:n

http://www.w3.org/TR/2012/WD-prov-dm-20120703/prov-n.html#expression-specialization

http://www.w3.org/TR/2013/REC-prov-n-20130430/#expression-specialization

# prov:started

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o-inverses#

## rdfs:label

started

## owl:inverseOf

prov:wasStartedBy

# prov:startedAtTime

## rdf:type

owl:DatatypeProperty

## rdfs:comment

The time at which an activity started. See also prov:endedAtTime.

## rdfs:domain

prov:Activity

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o#

## rdfs:label

startedAtTime

## rdfs:range

xsd:dateTime

## prov:category

starting-point

## prov:component

entities-activities

## prov:editorialNote

It is the intent that the property chain holds: (prov:qualifiedStart o prov:atTime) rdfs:subPropertyOf prov:startedAtTime.

## prov:qualifiedForm

prov:Start

prov:atTime

# prov:todo

## rdf:type

owl:AnnotationProperty

# prov:unqualifiedForm

## rdf:type

owl:AnnotationProperty

## rdfs:comment

Classes and properties used to qualify relationships are annotated with prov:unqualifiedForm to indicate the property used to assert an unqualified provenance relation.

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o#

prov:

## rdfs:subPropertyOf

rdfs:seeAlso

# prov:used

## rdf:type

owl:ObjectProperty

## rdfs:comment

A prov:Entity that was used by this prov:Activity. For example, :baking prov:used :spoon, :egg, :oven .

## rdfs:domain

prov:Activity

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o#

## rdfs:label

used

## rdfs:range

prov:Entity

## rdfs:subPropertyOf

prov:wasInfluencedBy

## owl:propertyChainAxiom

### rdf:rest

f185e06ee5f874913be617042744bbedfb19

### rdf:rest

rdf:nil

### rdf:first

prov:entity

### rdf:first

prov:qualifiedUsage

## prov:category

starting-point

## prov:component

entities-activities

## prov:inverse

wasUsedBy

## prov:qualifiedForm

prov:qualifiedUsage

prov:Usage

# prov:value

## rdf:type

owl:DatatypeProperty

## rdfs:domain

prov:Entity

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o#

## rdfs:label

value

## prov:category

expanded

## prov:component

entities-activities

## prov:definition

Provides a value that is a direct representation of an entity.

## prov:dm

http://www.w3.org/TR/2013/REC-prov-dm-20130430/#term-attribute-value

## prov:editorialNote

The editor's definition comes from http://www.w3.org/TR/rdf-primer/#rdfvalue

This property serves the same purpose as rdf:value, but has been reintroduced to avoid some of the definitional ambiguity in the RDF specification (specifically, 'may be used in describing structured values').

# prov:wasActivityOfInfluence

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o-inverses#

## rdfs:label

wasActivityOfInfluence

## owl:inverseOf

prov:hadActivity

# prov:wasAssociateFor

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o-inverses#

## rdfs:label

wasAssociateFor

## owl:inverseOf

prov:wasAssociatedWith

# prov:wasAssociatedWith

## rdf:type

owl:ObjectProperty

## rdfs:comment

An prov:Agent that had some (unspecified) responsibility for the occurrence of this prov:Activity.

## rdfs:domain

prov:Activity

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o#

## rdfs:label

wasAssociatedWith

## rdfs:range

prov:Agent

## rdfs:subPropertyOf

prov:wasInfluencedBy

## owl:propertyChainAxiom

### rdf:first

prov:qualifiedAssociation

### rdf:rest

f185e06ee5f874913be617042744bbedfb21

### rdf:rest

rdf:nil

### rdf:first

prov:agent

## prov:category

starting-point

## prov:component

agents-responsibility

## prov:inverse

wasAssociateFor

## prov:qualifiedForm

prov:qualifiedAssociation

prov:Association

# prov:wasAttributedTo

## rdf:type

owl:ObjectProperty

## rdfs:comment

Attribution is the ascribing of an entity to an agent.

## rdfs:domain

prov:Entity

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o#

## rdfs:label

wasAttributedTo

## rdfs:range

prov:Agent

## rdfs:subPropertyOf

prov:wasInfluencedBy

## owl:propertyChainAxiom

### rdf:first

prov:qualifiedAttribution

### rdf:rest

f185e06ee5f874913be617042744bbedfb23

### rdf:rest

rdf:nil

### rdf:first

prov:agent

## prov:category

starting-point

## prov:component

agents-responsibility

## prov:definition

Attribution is the ascribing of an entity to an agent.

## prov:inverse

contributed

## prov:qualifiedForm

prov:qualifiedAttribution

prov:Attribution

# prov:wasDerivedFrom

## rdf:type

owl:ObjectProperty

## rdfs:comment

The more specific subproperties of prov:wasDerivedFrom (i.e., prov:wasQuotedFrom, prov:wasRevisionOf, prov:hadPrimarySource) should be used when applicable.

## rdfs:domain

prov:Entity

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o#

## rdfs:label

wasDerivedFrom

## rdfs:range

prov:Entity

## rdfs:subPropertyOf

prov:wasInfluencedBy

## owl:propertyChainAxiom

### rdf:first

prov:qualifiedDerivation

### rdf:rest

f185e06ee5f874913be617042744bbedfb25

### rdf:rest

rdf:nil

### rdf:first

prov:entity

## prov:category

starting-point

## prov:component

derivations

## prov:definition

A derivation is a transformation of an entity into another, an update of an entity resulting in a new one, or the construction of a new entity based on a pre-existing entity.

## prov:inverse

hadDerivation

## prov:qualifiedForm

prov:Derivation

prov:qualifiedDerivation

# prov:wasEndedBy

## rdf:type

owl:ObjectProperty

## rdfs:comment

End is when an activity is deemed to have ended. An end may refer to an entity, known as trigger, that terminated the activity.

## rdfs:domain

prov:Activity

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o#

## rdfs:label

wasEndedBy

## rdfs:range

prov:Entity

## rdfs:subPropertyOf

prov:wasInfluencedBy

## owl:propertyChainAxiom

### rdf:first

prov:qualifiedEnd

### rdf:rest

f185e06ee5f874913be617042744bbedfb27

### rdf:rest

rdf:nil

### rdf:first

prov:entity

## prov:category

expanded

## prov:component

entities-activities

## prov:inverse

ended

## prov:qualifiedForm

prov:qualifiedEnd

prov:End

# prov:wasGeneratedBy

## rdf:type

owl:ObjectProperty

## rdfs:domain

prov:Entity

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o#

http://www.w3.org/ns/prov-o-inverses#

## rdfs:label

wasGeneratedBy

## rdfs:range

prov:Activity

## rdfs:subPropertyOf

prov:wasInfluencedBy

## owl:inverseOf

prov:generated

## owl:propertyChainAxiom

### rdf:rest

f185e06ee5f874913be617042744bbedfb29

### rdf:rest

rdf:nil

### rdf:first

prov:activity

### rdf:first

prov:qualifiedGeneration

## prov:category

starting-point

## prov:component

entities-activities

## prov:inverse

generated

## prov:qualifiedForm

prov:qualifiedGeneration

prov:Generation

# prov:wasInfluencedBy

## rdf:type

owl:ObjectProperty

## rdfs:comment

Because prov:wasInfluencedBy is a broad relation, its more specific subproperties (e.g. prov:wasInformedBy, prov:actedOnBehalfOf, prov:wasEndedBy, etc.) should be used when applicable.

This property has multiple RDFS domains to suit multiple OWL Profiles. See <a href="#owl-profile">PROV-O OWL Profile</a>.

## rdfs:domain

### rdf:type

owl:Class

### owl:unionOf

f185e06ee5f874913be617042744bbedfb30

### rdf:rest

f185e06ee5f874913be617042744bbedfb31

### rdf:first

prov:Agent

### rdf:rest

f185e06ee5f874913be617042744bbedfb32

### rdf:rest

rdf:nil

### rdf:first

prov:Entity

### rdf:first

prov:Activity

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o#

http://www.w3.org/ns/prov-o-inverses#

## rdfs:label

wasInfluencedBy

## rdfs:range

### rdf:type

owl:Class

### owl:unionOf

f185e06ee5f874913be617042744bbedfb33

### rdf:rest

f185e06ee5f874913be617042744bbedfb34

### rdf:rest

f185e06ee5f874913be617042744bbedfb35

### rdf:first

prov:Entity

### rdf:rest

rdf:nil

### rdf:first

prov:Agent

### rdf:first

prov:Activity

## owl:inverseOf

prov:influenced

## prov:category

qualified

## prov:component

agents-responsibility

## prov:editorialNote

The sub-properties of prov:wasInfluencedBy can be elaborated in more detail using the Qualification Pattern. For example, the binary relation :baking prov:used :spoon can be qualified by asserting :baking prov:qualifiedUsage [ a prov:Usage; prov:entity :spoon; prov:atLocation :kitchen ] .  
  
Subproperties of prov:wasInfluencedBy may also be asserted directly without being qualified.  
  
prov:wasInfluencedBy should not be used without also using one of its subproperties.

## prov:inverse

influenced

## prov:qualifiedForm

prov:qualifiedInfluence

prov:Influence

## prov:sharesDefinitionWith

prov:Influence

# prov:wasInformedBy

## rdf:type

owl:ObjectProperty

## rdfs:comment

An activity a2 is dependent on or informed by another activity a1, by way of some unspecified entity that is generated by a1 and used by a2.

## rdfs:domain

prov:Activity

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o#

## rdfs:label

wasInformedBy

## rdfs:range

prov:Activity

## rdfs:subPropertyOf

prov:wasInfluencedBy

## owl:propertyChainAxiom

### rdf:rest

f185e06ee5f874913be617042744bbedfb37

### rdf:rest

rdf:nil

### rdf:first

prov:activity

### rdf:first

prov:qualifiedCommunication

## prov:category

starting-point

## prov:component

entities-activities

## prov:inverse

informed

## prov:qualifiedForm

prov:qualifiedCommunication

prov:Communication

# prov:wasInvalidatedBy

## rdf:type

owl:ObjectProperty

## rdfs:domain

prov:Entity

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o-inverses#

http://www.w3.org/ns/prov-o#

## rdfs:label

wasInvalidatedBy

## rdfs:range

prov:Activity

## rdfs:subPropertyOf

prov:wasInfluencedBy

## owl:inverseOf

prov:invalidated

## owl:propertyChainAxiom

### rdf:first

prov:qualifiedInvalidation

### rdf:rest

f185e06ee5f874913be617042744bbedfb39

### rdf:rest

rdf:nil

### rdf:first

prov:activity

## prov:category

expanded

## prov:component

entities-activities

## prov:inverse

invalidated

## prov:qualifiedForm

prov:qualifiedInvalidation

prov:Invalidation

# prov:wasMemberOf

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o-inverses#

## rdfs:label

wasMemberOf

## owl:inverseOf

prov:hadMember

# prov:wasPlanOf

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o-inverses#

## rdfs:label

wasPlanOf

## owl:inverseOf

prov:hadPlan

# prov:wasPrimarySourceOf

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o-inverses#

## rdfs:label

wasPrimarySourceOf

## owl:inverseOf

prov:hadPrimarySource

# prov:wasQuotedFrom

## rdf:type

owl:ObjectProperty

## rdfs:comment

An entity is derived from an original entity by copying, or 'quoting', some or all of it.

## rdfs:domain

prov:Entity

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o#

## rdfs:label

wasQuotedFrom

## rdfs:range

prov:Entity

## rdfs:subPropertyOf

prov:wasDerivedFrom

## owl:propertyChainAxiom

### rdf:first

prov:qualifiedQuotation

### rdf:rest

f185e06ee5f874913be617042744bbedfb41

### rdf:rest

rdf:nil

### rdf:first

prov:entity

## prov:category

expanded

## prov:component

derivations

## prov:inverse

quotedAs

## prov:qualifiedForm

prov:qualifiedQuotation

prov:Quotation

# prov:wasRevisionOf

## rdf:type

owl:AnnotationProperty

owl:ObjectProperty

## rdfs:comment

A revision is a derivation that revises an entity into a revised version.

## rdfs:domain

prov:Entity

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o#

## rdfs:label

wasRevisionOf

## rdfs:range

prov:Entity

## rdfs:subPropertyOf

prov:wasDerivedFrom

## owl:propertyChainAxiom

### rdf:rest

f185e06ee5f874913be617042744bbedfb43

### rdf:rest

rdf:nil

### rdf:first

prov:entity

### rdf:first

prov:qualifiedRevision

## prov:category

expanded

## prov:component

derivations

## prov:inverse

hadRevision

## prov:qualifiedForm

prov:qualifiedRevision

prov:Revision

# prov:wasRoleIn

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o-inverses#

## rdfs:label

wasRoleIn

## owl:inverseOf

prov:hadRole

# prov:wasStartedBy

## rdf:type

owl:ObjectProperty

## rdfs:comment

Start is when an activity is deemed to have started. A start may refer to an entity, known as trigger, that initiated the activity.

## rdfs:domain

prov:Activity

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o#

## rdfs:label

wasStartedBy

## rdfs:range

prov:Entity

## rdfs:subPropertyOf

prov:wasInfluencedBy

## owl:propertyChainAxiom

### rdf:first

prov:qualifiedStart

### rdf:rest

f185e06ee5f874913be617042744bbedfb45

### rdf:rest

rdf:nil

### rdf:first

prov:entity

## prov:category

expanded

## prov:component

entities-activities

## prov:inverse

started

## prov:qualifiedForm

prov:qualifiedStart

prov:Start

# prov:wasUsedBy

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o-inverses#

## rdfs:label

wasUsedBy

## owl:inverseOf

prov:used

# prov:wasUsedInDerivation

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o-inverses#

## rdfs:label

wasUsedInDerivation

## owl:inverseOf

prov:hadUsage

# http://www.w3.org/ns/prov-aq#

## rdf:type

owl:Ontology

## rdfs:comment

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## rdfs:label

PROV Access and Query Ontology

## rdfs:seeAlso

http://www.w3.org/TR/prov-aq/

prov:

## owl:versionIRI

http://www.w3.org/TR/2013/NOTE-prov-aq-20130430/

# http://www.w3.org/ns/prov-dc#

## rdf:type

owl:Ontology

## rdfs:comment

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## rdfs:label

Dublin Core extensions of the W3C PROVenance Interchange Ontology (PROV-O)

## owl:imports

http://www.w3.org/ns/prov-o#

# http://www.w3.org/ns/prov-dictionary#

## rdf:type

owl:Ontology

## rdfs:comment

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## rdfs:label

W3C PROVenance Interchange Ontology (PROV-O) Dictionary Extension

## rdfs:seeAlso

ns1:prov

http://www.w3.org/TR/prov-dictionary/

# http://www.w3.org/ns/prov-links#

## rdf:type

owl:Ontology

## rdfs:comment

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). All feedback is welcome.

## rdfs:label

W3C PROV Linking Across Provenance Bundles Ontology (PROV-LINKS)

## rdfs:seeAlso

ns1:prov

http://www.w3.org/TR/prov-links/

## owl:imports

http://www.w3.org/ns/prov-o#

## owl:versionIRI

ns1:prov-links-20130430

## owl:versionInfo

Working Group Note version 2013-04-30

## prov:specializationOf

ns1:prov-links

# http://www.w3.org/ns/prov-o#

## rdf:type

owl:Ontology

## rdfs:comment

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If you wish to make comments regarding this document, please send them to public-prov-comments@w3.org (subscribe public-prov-comments-request@w3.org, archives http://lists.w3.org/Archives/Public/public-prov-comments/). All feedback is welcome.

## rdfs:label

W3C PROVenance Interchange Ontology (PROV-O)

## rdfs:seeAlso

http://www.w3.org/TR/prov-o/

ns1:prov

## owl:versionIRI

ns1:prov-o-20130430

## owl:versionInfo

Recommendation version 2013-04-30

## prov:specializationOf

ns1:prov-o

## prov:wasRevisionOf

ns1:prov-o-20120312

# rdfs:comment

## rdf:type

owl:AnnotationProperty

## rdfs:comment

# rdfs:isDefinedBy

## rdf:type

owl:AnnotationProperty

# rdfs:label

## rdf:type

owl:AnnotationProperty

## rdfs:comment

# rdfs:seeAlso

## rdf:type

owl:AnnotationProperty

## rdfs:comment

# owl:Thing

## rdf:type

owl:Class

# owl:topObjectProperty

## rdf:type

owl:ObjectProperty

# owl:versionInfo

## rdf:type

owl:AnnotationProperty

# prov:

## rdf:type

owl:Ontology

# prov:DirectQueryService

## rdf:type

owl:Class

## rdfs:comment

Type for a generic provenance query service. Mainly for use in RDF provenance query service descriptions, to facilitate discovery in linked data environments.

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-aq#

## rdfs:label

ProvenanceService

## rdfs:subClassOf

prov:SoftwareAgent

## prov:aq

http://www.w3.org/TR/2013/NOTE-prov-aq-20130430/#provenance-query-service-discovery

## prov:category

access-and-query

# prov:ServiceDescription

## rdf:type

owl:Class

## rdfs:comment

Type for a generic provenance query service. Mainly for use in RDF provenance query service descriptions, to facilitate discovery in linked data environments.

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-aq#

## rdfs:label

ServiceDescription

## rdfs:subClassOf

prov:SoftwareAgent

## prov:aq

http://www.w3.org/TR/2013/NOTE-prov-aq-20130430/#provenance-query-service-discovery

## prov:category

access-and-query

# prov:SoftwareAgent

## rdf:type

owl:Class

## rdfs:isDefinedBy

prov:

## rdfs:label

SoftwareAgent

## rdfs:subClassOf

owl:Thing

## prov:category

expanded

## prov:component

agents-responsibility

## prov:definition

A software agent is running software.

## prov:dm

http://www.w3.org/TR/2012/WD-prov-dm-20120703/prov-dm.html#term-agent

## prov:n

http://www.w3.org/TR/2012/WD-prov-dm-20120703/prov-n.html#expression-types

# prov:aq

## rdf:type

owl:AnnotationProperty

## rdfs:isDefinedBy

prov:

## rdfs:subPropertyOf

rdfs:seeAlso

# prov:category

## rdf:type

owl:AnnotationProperty

## rdfs:comment

Classify prov-o terms into three categories, including 'starting-point', 'qualifed', and 'extended'. This classification is used by the prov-o html document to gently introduce prov-o terms to its users.

## rdfs:isDefinedBy

prov:

# prov:component

## rdf:type

owl:AnnotationProperty

## rdfs:comment

Classify prov-o terms into six components according to prov-dm, including 'agents-responsibility', 'alternate', 'annotations', 'collections', 'derivations', and 'entities-activities'. This classification is used so that readers of prov-o specification can find its correspondence with the prov-dm specification.

## rdfs:isDefinedBy

prov:

# prov:constraints

## rdf:type

owl:AnnotationProperty

## rdfs:comment

A reference to the principal section of the PROV-CONSTRAINTS document that describes this concept.

## rdfs:isDefinedBy

prov:

## rdfs:subPropertyOf

rdfs:seeAlso

# prov:definition

## rdf:type

owl:AnnotationProperty

## rdfs:comment

A definition quoted from PROV-DM or PROV-CONSTRAINTS that describes the concept expressed with this OWL term.

## rdfs:isDefinedBy

prov:

# prov:describesService

## rdf:type

owl:ObjectProperty

## rdfs:comment

relates a generic provenance query service resource (type prov:ServiceDescription) to a specific query service description (e.g. a prov:DirectQueryService or a sd:Service).

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-aq#

## rdfs:label

describesService

## prov:aq

http://www.w3.org/TR/2013/NOTE-prov-aq-20130430/rovenance-query-service-description

## prov:category

access-and-query

## prov:inverse

serviceDescribedBy

# prov:dm

## rdf:type

owl:AnnotationProperty

## rdfs:comment

A reference to the principal section of the PROV-DM document that describes this concept.

## rdfs:isDefinedBy

prov:

## rdfs:subPropertyOf

rdfs:seeAlso

# prov:editorialNote

## rdf:type

owl:AnnotationProperty

## rdfs:comment

A note by the OWL development team about how this term expresses the PROV-DM concept, or how it should be used in context of semantic web or linked data.

## rdfs:isDefinedBy

prov:

# prov:editorsDefinition

## rdf:type

owl:AnnotationProperty

## rdfs:comment

When the prov-o term does not have a definition drawn from prov-dm, and the prov-o editor provides one.

## rdfs:isDefinedBy

prov:

## rdfs:subPropertyOf

prov:definition

# prov:hadUsage

## rdf:type

owl:ObjectProperty

## rdfs:comment

The \_optional\_ Usage involved in an Entity's Derivation.

## rdfs:isDefinedBy

prov:

## rdfs:label

hadUsage

## prov:category

qualified

## prov:component

derivations

## prov:inverse

wasUsedInDerivation

## prov:sharesDefinitionWith

prov:Usage

# prov:has\_anchor

## rdf:type

owl:ObjectProperty

## rdfs:comment

Indicates anchor URI for a potentially dynamic resource instance.

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-aq#

## rdfs:label

has\_anchor

## prov:aq

http://www.w3.org/TR/2013/NOTE-prov-aq-20130430/#resource-represented-as-html

## prov:category

access-and-query

## prov:inverse

anchorOf

# prov:has\_provenance

## rdf:type

owl:ObjectProperty

## rdfs:comment

Indicates a provenance-URI for a resource; the resource identified by this property presents a provenance record about its subject or anchor resource.

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-aq#

## rdfs:label

has\_provenance

## prov:aq

http://www.w3.org/TR/2013/NOTE-prov-aq-20130430/#resource-represented-as-html

## prov:category

access-and-query

## prov:inverse

provenanceOf

# prov:has\_query\_service

## rdf:type

owl:ObjectProperty

## rdfs:comment

Indicates a provenance query service that can access provenance related to its subject or anchor resource.

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-aq#

## rdfs:label

hasProvenanceService

## prov:aq

http://www.w3.org/TR/2013/NOTE-prov-aq-20130430/

## prov:category

access-and-query

## prov:inverse

provenanceQueryServiceOf

# prov:inverse

## rdf:type

owl:AnnotationProperty

## rdfs:comment

PROV-O does not define all property inverses. The directionalities defined in PROV-O should be given preference over those not defined. However, if users wish to name the inverse of a PROV-O property, the local name given by prov:inverse should be used.

## rdfs:isDefinedBy

prov:

## rdfs:seeAlso

ns2:names-of-inverse-properties

# prov:n

## rdf:type

owl:AnnotationProperty

## rdfs:comment

A reference to the principal section of the PROV-M document that describes this concept.

## rdfs:isDefinedBy

prov:

## rdfs:subPropertyOf

rdfs:seeAlso

# prov:pingback

## rdf:type

owl:ObjectProperty

## rdfs:comment

Relates a resource to a provenance pingback service that may receive additional provenance links about the resource.

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-aq#

## rdfs:label

provenance pingback

## prov:aq

http://www.w3.org/TR/2013/NOTE-prov-aq-20130430/#provenance-pingback

## prov:category

access-and-query

# prov:provenanceUriTemplate

## rdf:type

owl:DatatypeProperty

## rdfs:comment

Relates a provenance service to a URI template string for constructing provenance-URIs.

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-aq#

## rdfs:label

provenanceUriTemplate

## prov:aq

http://www.w3.org/TR/2013/NOTE-prov-aq-20130430/

## prov:category

access-and-query

# prov:qualifiedForm

## rdf:type

owl:AnnotationProperty

## rdfs:comment

This annotation property links a subproperty of prov:wasInfluencedBy with the subclass of prov:Influence and the qualifying property that are used to qualify it.   
  
Example annotation:  
  
 prov:wasGeneratedBy prov:qualifiedForm prov:qualifiedGeneration, prov:Generation .  
  
Then this unqualified assertion:  
  
 :entity1 prov:wasGeneratedBy :activity1 .  
  
can be qualified by adding:  
  
 :entity1 prov:qualifiedGeneration :entity1Gen .  
 :entity1Gen   
 a prov:Generation, prov:Influence;  
 prov:activity :activity1;  
 :customValue 1337 .  
  
Note how the value of the unqualified influence (prov:wasGeneratedBy :activity1) is mirrored as the value of the prov:activity (or prov:entity, or prov:agent) property on the influence class.

## rdfs:isDefinedBy

prov:

## rdfs:subPropertyOf

rdfs:seeAlso

# prov:sharesDefinitionWith

## rdf:type

owl:AnnotationProperty

## rdfs:isDefinedBy

prov:

## rdfs:subPropertyOf

rdfs:seeAlso

# prov:specializationOf

## rdf:type

owl:ObjectProperty

## rdfs:isDefinedBy

prov:

## rdfs:label

specializationOf

## rdfs:seeAlso

prov:alternateOf

## rdfs:subPropertyOf

owl:topObjectProperty

## prov:category

expanded

## prov:component

alternate

## prov:constraints

http://www.w3.org/TR/2012/WD-prov-dm-20120703/prov-constraints.html#prov-dm-constraints-fig

## prov:definition

An entity that is a specialization of another shares all aspects of the latter, and additionally presents more specific aspects of the same thing as the latter. In particular, the lifetime of the entity being specialized contains that of any specialization. Examples of aspects include a time period, an abstraction, and a context associated with the entity.

## prov:dm

http://www.w3.org/TR/2012/WD-prov-dm-20120703/prov-dm.html#term-specialization

## prov:inverse

generalizationOf

## prov:n

http://www.w3.org/TR/2012/WD-prov-dm-20120703/prov-n.html#expression-specialization

# prov:todo

## rdf:type

owl:AnnotationProperty

# prov:unqualifiedForm

## rdf:type

owl:AnnotationProperty

## rdfs:comment

Classes and properties used to qualify relationships are annotated with prov:unqualifiedForm to indicate the property used to assert an unqualified provenance relation.

## rdfs:isDefinedBy

prov:

## rdfs:subPropertyOf

rdfs:seeAlso

# http://www.w3.org/ns/prov-aq#

## rdf:type

owl:Ontology

## rdfs:comment

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## rdfs:label

PROV Access and Query Ontology

## rdfs:seeAlso

prov:

http://www.w3.org/TR/prov-aq/

## owl:versionIRI

http://www.w3.org/TR/2013/NOTE-prov-aq-20130430/

# prov:Accept

## rdf:type

owl:Class

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-dc#

## rdfs:label

Accept

## rdfs:subClassOf

prov:Activity

## prov:definition

Activity that identifies the acceptance of a resource (e.g., an article in a conference)

# prov:Contribute

## rdf:type

owl:Class

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-dc#

## rdfs:label

Contribute

## rdfs:subClassOf

prov:Activity

## prov:definition

Activity that identifies any contribution of an agent to a resource.

# prov:Contributor

## rdf:type

owl:Class

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-dc#

## rdfs:label

Contributor

## rdfs:subClassOf

prov:Role

## prov:definition

Role with the function of having responsibility for making contributions to a resource. The Agent assigned to this role is associated with a Modify or Create Activities

# prov:Copyright

## rdf:type

owl:Class

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-dc#

## rdfs:label

Copyright

## rdfs:subClassOf

prov:Activity

## prov:definition

Activity that identifies the Copyrighting activity associated to a resource.

# prov:Create

## rdf:type

owl:Class

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-dc#

## rdfs:label

Create

## rdfs:subClassOf

prov:Contribute

## prov:definition

Activity that identifies the creation of a resource

# prov:Creator

## rdf:type

owl:Class

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-dc#

## rdfs:label

Creator

## rdfs:subClassOf

prov:Contributor

## prov:definition

Role with the function of creating a resource. The Agent assigned to this role is associated with a Create Activity

# prov:Modify

## rdf:type

owl:Class

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-dc#

## rdfs:label

Modify

## rdfs:subClassOf

prov:Activity

## prov:definition

Activity that identifies the modification of a resource.

# prov:Publish

## rdf:type

owl:Class

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-dc#

## rdfs:label

Publish

## rdfs:subClassOf

prov:Activity

## prov:definition

Activity that identifies the publication of a resource

# prov:Publisher

## rdf:type

owl:Class

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-dc#

## rdfs:label

Publisher

## rdfs:subClassOf

prov:Role

## prov:definition

Role with the function of publishing a resource. The Agent assigned to this role is associated with a Publish Activity

# prov:Replace

## rdf:type

owl:Class

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-dc#

## rdfs:label

Replace

## rdfs:subClassOf

prov:Activity

## prov:definition

Activity that identifies the replacement of a resource.

# prov:RightsAssignment

## rdf:type

owl:Class

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-dc#

## rdfs:label

RightsAssignment

## rdfs:subClassOf

prov:Activity

## prov:definition

Activity that identifies the rights assignment of a resource.

# prov:RightsHolder

## rdf:type

owl:Class

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-dc#

## rdfs:label

RightsHolder

## rdfs:subClassOf

prov:Role

## prov:definition

Role with the function of owning or managing rights over a resource. The Agent assigned to this role is associated with a RightsAssignment Activity

# prov:Submit

## rdf:type

owl:Class

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-dc#

## rdfs:label

Submit

## rdfs:subClassOf

prov:Activity

## prov:definition

Activity that identifies the issuance (e.g., publication) of a resource.

# http://www.w3.org/ns/prov-dc#

## frbr:abridgement

http://www.w3.org/ns/prov-dc-refinements#

## frbr:complement

http://www.w3.org/ns/prov-dc-directmappings#

## rdf:type

owl:Ontology

## rdfs:comment

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## rdfs:label

Dublin Core extensions of the W3C PROVenance Interchange Ontology (PROV-O)

## rdfs:seeAlso

ns1:prov

http://www.w3.org/TR/2013/NOTE-prov-dc-20130430/

## owl:imports

http://www.w3.org/ns/prov-o#

## owl:versionIRI

ns1:prov-dc-20130430

## owl:versionInfo

2013-04-30

## prov:alternateOf

http://www.w3.org/ns/prov-dc-refinements#

## prov:wasDerivedFrom

http://www.w3.org/ns/prov-dc-refinements#

# prov:

## rdf:type

owl:Ontology

# prov:Dictionary

## rdf:type

owl:Class

## rdfs:comment

This concept allows for the provenance of the dictionary, but also of its constituents to be expressed. Such a notion of dictionary corresponds to a wide variety of concrete data structures, such as a maps or associative arrays.

A given dictionary forms a given structure for its members. A different structure (obtained either by insertion or removal of members) constitutes a different dictionary.

## rdfs:isDefinedBy

prov:

## rdfs:label

Dictionary

## prov:category

collections

## prov:component

collections

## prov:constraints

http://www.w3.org/TR/2013/NOTE-prov-dictionary-20130430/#dictionary-constraints

## prov:definition

A dictionary is an entity that provides a structure to some constituents, which are themselves entities. These constituents are said to be member of the dictionary.

## prov:dm

http://www.w3.org/TR/2013/NOTE-prov-dictionary-20130430/#dictionary-conceptual-definition

## prov:n

http://www.w3.org/TR/2013/NOTE-prov-dictionary-20130430/#expression-dictionary

# prov:EmptyDictionary

## rdf:type

owl:Class

## rdfs:isDefinedBy

prov:

## rdfs:label

Empty Dictionary

## rdfs:subClassOf

prov:Dictionary

prov:EmptyCollection

## prov:category

collections

## prov:component

collections

## prov:constraints

http://www.w3.org/TR/2013/NOTE-prov-dictionary-20130430/#dictionary-constraints

## prov:definition

An empty dictionary (i.e. has no members).

## prov:dm

http://www.w3.org/TR/2013/NOTE-prov-dictionary-20130430/#dictionary-conceptual-definition

## prov:n

http://www.w3.org/TR/2013/NOTE-prov-dictionary-20130430/#expression-dictionary

# prov:Insertion

## rdf:type

owl:Class

## rdfs:isDefinedBy

prov:

## rdfs:label

Insertion

## rdfs:subClassOf

### owl:onProperty

prov:insertedKeyEntityPair

### rdf:type

owl:Restriction

### owl:minCardinality

1

prov:Derivation

### owl:cardinality

1

### owl:onProperty

prov:dictionary

### rdf:type

owl:Restriction

## prov:category

collections

## prov:component

collections

## prov:constraints

http://www.w3.org/TR/2013/NOTE-prov-dictionary-20130430/#dictionary-constraints

## prov:definition

Insertion is a derivation that transforms a dictionary into another, by insertion of one or more key-entity pairs.

## prov:dm

http://www.w3.org/TR/2013/NOTE-prov-dictionary-20130430/#term-dictionary-insertion

## prov:n

http://www.w3.org/TR/2013/NOTE-prov-dictionary-20130430/#expression-dictionary-insertion

## prov:unqualifiedForm

prov:derivedByInsertionFrom

# prov:KeyEntityPair

## rdf:type

owl:Class

## rdfs:isDefinedBy

prov:

## rdfs:label

Key-Entity Pair

## rdfs:subClassOf

### owl:onProperty

prov:pairKey

### rdf:type

owl:Restriction

### owl:cardinality

1

### owl:cardinality

1

### owl:onProperty

prov:pairEntity

### rdf:type

owl:Restriction

## prov:category

collections

## prov:component

collections

## prov:constraints

http://www.w3.org/TR/2013/NOTE-prov-dictionary-20130430/#dictionary-constraints

## prov:definition

A key-entity pair. Part of a prov:Dictionary through prov:hadDictionaryMember. The key is any RDF Literal, the value is a prov:Entity.

## prov:dm

http://www.w3.org/TR/2013/NOTE-prov-dictionary-20130430/#term-dictionary-membership

## prov:n

http://www.w3.org/TR/2013/NOTE-prov-dictionary-20130430/#expression-dictionary-membership

# prov:Removal

## rdf:type

owl:Class

## rdfs:isDefinedBy

prov:

## rdfs:label

Removal

## rdfs:subClassOf

prov:Derivation

### owl:minCardinality

1

### owl:onProperty

prov:removedKey

### rdf:type

owl:Restriction

### rdf:type

owl:Restriction

### owl:cardinality

1

### owl:onProperty

prov:dictionary

## prov:category

collections

## prov:component

collections

## prov:constraints

http://www.w3.org/TR/2013/NOTE-prov-dictionary-20130430/#dictionary-constraints

## prov:definition

Removal is a derivation that transforms a dictionary into another, by removing one or more key-entity pairs.

## prov:dm

http://www.w3.org/TR/2013/NOTE-prov-dictionary-20130430/#term-dictionary-removal

## prov:n

http://www.w3.org/TR/2013/NOTE-prov-dictionary-20130430/#expression-dictionary-removal

## prov:unqualifiedForm

prov:derivedByRemovalFrom

# prov:derivedByInsertionFrom

## rdf:type

owl:ObjectProperty

## rdfs:domain

prov:Dictionary

## rdfs:isDefinedBy

prov:

## rdfs:label

derivedByInsertionFrom

## rdfs:range

prov:Dictionary

## rdfs:subPropertyOf

prov:wasDerivedFrom

## prov:category

collections

## prov:component

collections

## prov:constraints

http://www.w3.org/TR/2013/NOTE-prov-dictionary-20130430/#dictionary-constraints

## prov:definition

The dictionary was derived from the other by insertion. prov:qualifiedInsertion shows details of the insertion, in particular the inserted key-entity pairs.

## prov:dm

http://www.w3.org/TR/2013/NOTE-prov-dictionary-20130430/#term-dictionary-insertion

## prov:n

http://www.w3.org/TR/2013/NOTE-prov-dictionary-20130430/#expression-dictionary-insertion

# prov:derivedByRemovalFrom

## rdf:type

owl:ObjectProperty

## rdfs:domain

prov:Dictionary

## rdfs:isDefinedBy

prov:

## rdfs:label

derivedByRemovalFrom

## rdfs:range

prov:Dictionary

## rdfs:subPropertyOf

prov:wasDerivedFrom

## prov:category

collections

## prov:component

collections

## prov:constraints

http://www.w3.org/TR/2013/NOTE-prov-dictionary-20130430/#dictionary-constraints

## prov:definition

The dictionary was derived from the other by removal. prov:qualifiedRemoval shows details of the removal, in particular the removed key-entity pairs.

## prov:dm

http://www.w3.org/TR/2013/NOTE-prov-dictionary-20130430/#term-dictionary-removal

## prov:n

http://www.w3.org/TR/2013/NOTE-prov-dictionary-20130430/#expression-dictionary-removal

# prov:dictionary

## rdf:type

owl:ObjectProperty

## rdfs:domain

prov:Insertion

prov:Removal

## rdfs:isDefinedBy

prov:

## rdfs:label

dictionary

## rdfs:range

prov:Dictionary

## rdfs:subPropertyOf

prov:entity

## prov:category

collections

## prov:component

collections

## prov:constraints

http://www.w3.org/TR/2013/NOTE-prov-dictionary-20130430/#dictionary-constraints

## prov:definition

The property used by a prov:Insertion and prov:Removal to cite the prov:Dictionary that was prov:derivedByInsertionFrom or prov:derivedByRemovalFrom another dictionary.

## prov:dm

http://www.w3.org/TR/2013/NOTE-prov-dictionary-20130430/#term-dictionary-removal

http://www.w3.org/TR/2013/NOTE-prov-dictionary-20130430/#term-dictionary-insertion

## prov:n

http://www.w3.org/TR/2013/NOTE-prov-dictionary-20130430/#expression-dictionary-removal

http://www.w3.org/TR/2013/NOTE-prov-dictionary-20130430/#expression-dictionary-insertion

# prov:hadDictionaryMember

## rdf:type

owl:ObjectProperty

## rdfs:domain

prov:Dictionary

## rdfs:isDefinedBy

prov:

## rdfs:label

hadDictionaryMember

## rdfs:range

prov:KeyEntityPair

## prov:category

collections

## prov:component

collections

## prov:constraints

http://www.w3.org/TR/2013/NOTE-prov-dictionary-20130430/#dictionary-constraints

## prov:definition

Describes the key-entity pair that was member of a prov:Dictionary. A dictionary can have multiple members.

## prov:dm

http://www.w3.org/TR/2013/NOTE-prov-dictionary-20130430/#term-dictionary-membership

## prov:n

http://www.w3.org/TR/2013/NOTE-prov-dictionary-20130430/#expression-dictionary-membership

# prov:insertedKeyEntityPair

## rdf:type

owl:ObjectProperty

## rdfs:domain

prov:Insertion

## rdfs:isDefinedBy

prov:

## rdfs:label

insertedKeyEntityPair

## rdfs:range

prov:KeyEntityPair

## prov:category

collections

## prov:component

collections

## prov:constraints

http://www.w3.org/TR/2013/NOTE-prov-dictionary-20130430/#dictionary-constraints

## prov:definition

An object property to refer to the prov:KeyEntityPair inserted into a prov:Dictionary.

## prov:dm

http://www.w3.org/TR/2013/NOTE-prov-dictionary-20130430/#term-dictionary-insertion

## prov:n

http://www.w3.org/TR/2013/NOTE-prov-dictionary-20130430/#expression-dictionary-insertion

# prov:pairEntity

## rdf:type

owl:ObjectProperty

owl:FunctionalProperty

## rdfs:domain

prov:KeyEntityPair

## rdfs:isDefinedBy

prov:

## rdfs:label

pairKey

## rdfs:range

prov:Entity

## prov:category

collections

## prov:component

collections

## prov:constraints

http://www.w3.org/TR/2013/NOTE-prov-dictionary-20130430/#dictionary-constraints

## prov:definition

The value of a KeyEntityPair.

## prov:dm

http://www.w3.org/TR/2013/NOTE-prov-dictionary-20130430/#term-dictionary-membership

## prov:n

http://www.w3.org/TR/2013/NOTE-prov-dictionary-20130430/#expression-dictionary-membership

# prov:pairKey

## rdf:type

owl:FunctionalProperty

owl:DatatypeProperty

## rdfs:domain

prov:KeyEntityPair

## rdfs:isDefinedBy

prov:

## rdfs:label

pairKey

## rdfs:range

rdfs:Literal

## prov:category

collections

## prov:component

collections

## prov:constraints

http://www.w3.org/TR/2013/NOTE-prov-dictionary-20130430/#dictionary-constraints

## prov:definition

The key of a KeyEntityPair, which is an element of a prov:Dictionary.

## prov:dm

http://www.w3.org/TR/2013/NOTE-prov-dictionary-20130430/#term-dictionary-membership

## prov:n

http://www.w3.org/TR/2013/NOTE-prov-dictionary-20130430/#expression-dictionary-membership

# prov:qualifiedInsertion

## rdf:type

owl:ObjectProperty

## rdfs:domain

prov:Dictionary

## rdfs:isDefinedBy

prov:

## rdfs:label

qualifiedInsertion

## rdfs:range

prov:Insertion

## rdfs:subPropertyOf

prov:qualifiedDerivation

## prov:category

collections

## prov:component

collections

## prov:constraints

http://www.w3.org/TR/2013/NOTE-prov-dictionary-20130430/#dictionary-constraints

## prov:definition

The dictionary was derived from the other by insertion. prov:qualifiedInsertion shows details of the insertion, in particular the inserted key-entity pairs.

## prov:dm

http://www.w3.org/TR/2013/NOTE-prov-dictionary-20130430/#term-dictionary-insertion

## prov:n

http://www.w3.org/TR/2013/NOTE-prov-dictionary-20130430/#expression-dictionary-insertion

# prov:qualifiedRemoval

## rdf:type

owl:ObjectProperty

## rdfs:domain

prov:Dictionary

## rdfs:isDefinedBy

prov:

## rdfs:label

qualifiedRemoval

## rdfs:range

prov:Removal

## rdfs:subPropertyOf

prov:qualifiedDerivation

## prov:category

collections

## prov:component

collections

## prov:constraints

http://www.w3.org/TR/2013/NOTE-prov-dictionary-20130430/#dictionary-constraints

## prov:definition

The dictionary was derived from the other by removal. prov:qualifiedRemoval shows details of the removal, in particular the removed keys.

## prov:dm

http://www.w3.org/TR/2013/NOTE-prov-dictionary-20130430/#term-dictionary-removal

## prov:n

http://www.w3.org/TR/2013/NOTE-prov-dictionary-20130430/#expression-dictionary-removal

# prov:removedKey

## rdf:type

owl:DatatypeProperty

## rdfs:domain

prov:Removal

## rdfs:isDefinedBy

prov:

## rdfs:label

removedKey

## rdfs:range

rdfs:Literal

## prov:category

collections

## prov:component

collections

## prov:constraints

http://www.w3.org/TR/2013/NOTE-prov-dictionary-20130430/#dictionary-constraints

## prov:definition

The key removed in a Removal.

## prov:dm

http://www.w3.org/TR/2013/NOTE-prov-dictionary-20130430/#term-dictionary-removal

## prov:n

http://www.w3.org/TR/2013/NOTE-prov-dictionary-20130430/#expression-dictionary-removal

# http://www.w3.org/ns/prov-dictionary#

## rdf:type

owl:Ontology

## rdfs:comment

This document is published by the Provenance Working Group (http://www.w3.org/2011/prov/wiki/Main\_Page).   
  
If you wish to make comments regarding this document, please send them to public-prov-comments@w3.org (subscribe public-prov-comments-request@w3.org, archives http://lists.w3.org/Archives/Public/public-prov-comments/). All feedback is welcome.

## rdfs:label

W3C PROVenance Interchange Ontology (PROV-O) Dictionary Extension

## rdfs:seeAlso

ns1:prov

http://www.w3.org/TR/prov-dictionary/

# rdfs:comment

## rdf:type

owl:AnnotationProperty

# rdfs:isDefinedBy

## rdf:type

owl:AnnotationProperty

# rdfs:label

## rdf:type

owl:AnnotationProperty

# rdfs:seeAlso

## rdf:type

owl:AnnotationProperty

# owl:Thing

## rdf:type

owl:Class

# owl:versionInfo

## rdf:type

owl:AnnotationProperty

# prov:asInBundle

## rdf:type

owl:ObjectProperty

## rdfs:comment

prov:asInBundle is used to specify which bundle the general entity of a prov:mentionOf property is described.  
  
When :x prov:mentionOf :y and :y is described in Bundle :b, the triple :x prov:asInBundle :b is also asserted to cite the Bundle in which :y was described.

## rdfs:domain

prov:Entity

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-links#

## rdfs:label

asInBundle

## rdfs:range

prov:Bundle

## prov:inverse

contextOf

## prov:sharesDefinitionWith

prov:mentionOf

# prov:mentionOf

## rdf:type

owl:ObjectProperty

## rdfs:comment

prov:mentionOf is used to specialize an entity as described in another bundle. It is to be used in conjuction with prov:asInBundle.  
  
prov:asInBundle is used to cite the Bundle in which the generalization was mentioned.

## rdfs:domain

prov:Entity

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-links#

## rdfs:label

mentionOf

## rdfs:range

prov:Entity

## rdfs:subPropertyOf

prov:specializationOf

## prov:inverse

hadMention

# http://www.w3.org/ns/prov-links#

## rdf:type

owl:Ontology

## rdfs:comment

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). All feedback is welcome.

## rdfs:label

W3C PROV Linking Across Provenance Bundles Ontology (PROV-LINKS)

## rdfs:seeAlso

http://www.w3.org/TR/prov-links/

ns1:prov

## owl:imports

http://www.w3.org/ns/prov-o#

## owl:versionIRI

ns1:prov-links-20130430

## owl:versionInfo

Working Group Note version 2013-04-30

## prov:specializationOf

ns1:prov-links

# rdfs:comment

## rdf:type

owl:AnnotationProperty

## rdfs:comment

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o#

# rdfs:isDefinedBy

## rdf:type

owl:AnnotationProperty

# rdfs:label

## rdf:type

owl:AnnotationProperty

## rdfs:comment

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o#

# rdfs:seeAlso

## rdf:type

owl:AnnotationProperty

## rdfs:comment

# owl:Thing

## rdf:type

owl:Class

# owl:versionInfo

## rdf:type

owl:AnnotationProperty

# prov:

## rdf:type

owl:Ontology

# prov:Activity

## rdf:type

owl:Class

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o#

## rdfs:label

Activity

## owl:disjointWith

prov:Entity

## prov:category

starting-point

## prov:component

entities-activities

## prov:constraints

http://www.w3.org/TR/2013/REC-prov-constraints-20130430/#prov-dm-constraints-fig

## prov:definition

An activity is something that occurs over a period of time and acts upon or with entities; it may include consuming, processing, transforming, modifying, relocating, using, or generating entities.

## prov:dm

http://www.w3.org/TR/2013/REC-prov-dm-20130430/#term-Activity

## prov:n

http://www.w3.org/TR/2013/REC-prov-n-20130430/#expression-Activity

# prov:ActivityInfluence

## rdf:type

owl:Class

## rdfs:comment

It is not recommended that the type ActivityInfluence be asserted without also asserting one of its more specific subclasses.

ActivityInfluence provides additional descriptions of an Activity's binary influence upon any other kind of resource. Instances of ActivityInfluence use the prov:activity property to cite the influencing Activity.

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o#

## rdfs:label

ActivityInfluence

## rdfs:seeAlso

prov:activity

## rdfs:subClassOf

### rdf:type

owl:Restriction

### owl:onProperty

prov:hadActivity

### owl:maxCardinality

prov:Influence

## owl:disjointWith

prov:EntityInfluence

## prov:category

qualified

## prov:editorsDefinition

ActivitiyInfluence is the capacity of an activity to have an effect on the character, development, or behavior of another by means of generation, invalidation, communication, or other.

# prov:Agent

## rdf:type

owl:Class

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o#

## rdfs:label

Agent

## owl:disjointWith

prov:InstantaneousEvent

## prov:category

starting-point

## prov:component

agents-responsibility

## prov:definition

An agent is something that bears some form of responsibility for an activity taking place, for the existence of an entity, or for another agent's activity.

## prov:dm

http://www.w3.org/TR/2013/REC-prov-dm-20130430/#term-agent

## prov:n

http://www.w3.org/TR/2013/REC-prov-n-20130430/#expression-Agent

# prov:AgentInfluence

## rdf:type

owl:Class

## rdfs:comment

AgentInfluence provides additional descriptions of an Agent's binary influence upon any other kind of resource. Instances of AgentInfluence use the prov:agent property to cite the influencing Agent.

It is not recommended that the type AgentInfluence be asserted without also asserting one of its more specific subclasses.

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o#

## rdfs:label

AgentInfluence

## rdfs:seeAlso

prov:agent

## rdfs:subClassOf

prov:Influence

## prov:category

qualified

## prov:editorsDefinition

AgentInfluence is the capacity of an agent to have an effect on the character, development, or behavior of another by means of attribution, association, delegation, or other.

# prov:Association

## rdf:type

owl:Class

## rdfs:comment

An instance of prov:Association provides additional descriptions about the binary prov:wasAssociatedWith relation from an prov:Activity to some prov:Agent that had some responsiblity for it. For example, :baking prov:wasAssociatedWith :baker; prov:qualifiedAssociation [ a prov:Association; prov:agent :baker; :foo :bar ].

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o#

## rdfs:label

Association

## rdfs:subClassOf

prov:AgentInfluence

## prov:category

qualified

## prov:component

agents-responsibility

## prov:definition

An activity association is an assignment of responsibility to an agent for an activity, indicating that the agent had a role in the activity. It further allows for a plan to be specified, which is the plan intended by the agent to achieve some goals in the context of this activity.

## prov:dm

http://www.w3.org/TR/2013/REC-prov-dm-20130430/#term-Association

## prov:n

http://www.w3.org/TR/2013/REC-prov-n-20130430/#expression-Association

## prov:unqualifiedForm

prov:wasAssociatedWith

# prov:Attribution

## rdf:type

owl:Class

## rdfs:comment

An instance of prov:Attribution provides additional descriptions about the binary prov:wasAttributedTo relation from an prov:Entity to some prov:Agent that had some responsible for it. For example, :cake prov:wasAttributedTo :baker; prov:qualifiedAttribution [ a prov:Attribution; prov:entity :baker; :foo :bar ].

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o#

## rdfs:label

Attribution

## rdfs:subClassOf

prov:AgentInfluence

## prov:category

qualified

## prov:component

agents-responsibility

## prov:constraints

http://www.w3.org/TR/2013/REC-prov-constraints-20130430/#prov-dm-constraints-fig

## prov:definition

Attribution is the ascribing of an entity to an agent.  
  
When an entity e is attributed to agent ag, entity e was generated by some unspecified activity that in turn was associated to agent ag. Thus, this relation is useful when the activity is not known, or irrelevant.

## prov:dm

http://www.w3.org/TR/2013/REC-prov-dm-20130430/#term-attribution

## prov:n

http://www.w3.org/TR/2013/REC-prov-n-20130430/#expression-attribution

## prov:unqualifiedForm

prov:wasAttributedTo

# prov:Bundle

## rdf:type

owl:Class

## rdfs:comment

Note that there are kinds of bundles (e.g. handwritten letters, audio recordings, etc.) that are not expressed in PROV-O, but can be still be described by PROV-O.

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o#

## rdfs:label

Bundle

## rdfs:subClassOf

prov:Entity

## prov:category

expanded

## prov:definition

A bundle is a named set of provenance descriptions, and is itself an Entity, so allowing provenance of provenance to be expressed.

## prov:dm

http://www.w3.org/TR/2013/REC-prov-dm-20130430/#term-bundle-entity

## prov:n

http://www.w3.org/TR/2013/REC-prov-n-20130430/#expression-bundle-declaration

# prov:Collection

## rdf:type

owl:Class

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o#

## rdfs:label

Collection

## rdfs:subClassOf

prov:Entity

## prov:category

expanded

## prov:component

collections

## prov:definition

A collection is an entity that provides a structure to some constituents, which are themselves entities. These constituents are said to be member of the collections.

## prov:dm

http://www.w3.org/TR/2013/REC-prov-dm-20130430/#term-collection

# prov:Communication

## rdf:type

owl:Class

## rdfs:comment

An instance of prov:Communication provides additional descriptions about the binary prov:wasInformedBy relation from an informed prov:Activity to the prov:Activity that informed it. For example, :you\_jumping\_off\_bridge prov:wasInformedBy :everyone\_else\_jumping\_off\_bridge; prov:qualifiedCommunication [ a prov:Communication; prov:activity :everyone\_else\_jumping\_off\_bridge; :foo :bar ].

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o#

## rdfs:label

Communication

## rdfs:subClassOf

prov:ActivityInfluence

## prov:category

qualified

## prov:component

entities-activities

## prov:constraints

http://www.w3.org/TR/2013/REC-prov-constraints-20130430/#prov-dm-constraints-fig

## prov:definition

Communication is the exchange of an entity by two activities, one activity using the entity generated by the other.

## prov:dm

http://www.w3.org/TR/2013/REC-prov-dm-20130430/#term-Communication

## prov:n

http://www.w3.org/TR/2013/REC-prov-n-20130430/#expression-wasInformedBy

## prov:unqualifiedForm

prov:wasInformedBy

# prov:Delegation

## rdf:type

owl:Class

## rdfs:comment

An instance of prov:Delegation provides additional descriptions about the binary prov:actedOnBehalfOf relation from a performing prov:Agent to some prov:Agent for whom it was performed. For example, :mixing prov:wasAssociatedWith :toddler . :toddler prov:actedOnBehalfOf :mother; prov:qualifiedDelegation [ a prov:Delegation; prov:entity :mother; :foo :bar ].

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o#

## rdfs:label

Delegation

## rdfs:subClassOf

prov:AgentInfluence

## prov:category

qualified

## prov:component

agents-responsibility

## prov:definition

Delegation is the assignment of authority and responsibility to an agent (by itself or by another agent) to carry out a specific activity as a delegate or representative, while the agent it acts on behalf of retains some responsibility for the outcome of the delegated work.  
  
For example, a student acted on behalf of his supervisor, who acted on behalf of the department chair, who acted on behalf of the university; all those agents are responsible in some way for the activity that took place but we do not say explicitly who bears responsibility and to what degree.

## prov:dm

http://www.w3.org/TR/2013/REC-prov-dm-20130430/#term-delegation

## prov:n

http://www.w3.org/TR/2013/REC-prov-n-20130430/#expression-delegation

## prov:unqualifiedForm

prov:actedOnBehalfOf

# prov:Derivation

## rdf:type

owl:Class

## rdfs:comment

The more specific forms of prov:Derivation (i.e., prov:Revision, prov:Quotation, prov:PrimarySource) should be asserted if they apply.

An instance of prov:Derivation provides additional descriptions about the binary prov:wasDerivedFrom relation from some derived prov:Entity to another prov:Entity from which it was derived. For example, :chewed\_bubble\_gum prov:wasDerivedFrom :unwrapped\_bubble\_gum; prov:qualifiedDerivation [ a prov:Derivation; prov:entity :unwrapped\_bubble\_gum; :foo :bar ].

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o#

## rdfs:label

Derivation

## rdfs:subClassOf

prov:EntityInfluence

## prov:category

qualified

## prov:component

derivations

## prov:constraints

http://www.w3.org/TR/2013/REC-prov-constraints-20130430/#prov-dm-constraints-fig

## prov:definition

A derivation is a transformation of an entity into another, an update of an entity resulting in a new one, or the construction of a new entity based on a pre-existing entity.

## prov:dm

http://www.w3.org/TR/2013/REC-prov-dm-20130430/#term-Derivation

## prov:n

http://www.w3.org/TR/2013/REC-prov-n-20130430/#Derivation-Relation

## prov:unqualifiedForm

prov:wasDerivedFrom

# prov:EmptyCollection

## rdf:type

owl:NamedIndividual

owl:Class

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o#

## rdfs:label

EmptyCollection

## rdfs:subClassOf

prov:Collection

## prov:category

expanded

## prov:component

collections

## prov:definition

An empty collection is a collection without members.

# prov:End

## rdf:type

owl:Class

## rdfs:comment

An instance of prov:End provides additional descriptions about the binary prov:wasEndedBy relation from some ended prov:Activity to an prov:Entity that ended it. For example, :ball\_game prov:wasEndedBy :buzzer; prov:qualifiedEnd [ a prov:End; prov:entity :buzzer; :foo :bar; prov:atTime '2012-03-09T08:05:08-05:00'^^xsd:dateTime ].

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o#

## rdfs:label

End

## rdfs:subClassOf

prov:InstantaneousEvent

prov:EntityInfluence

## prov:category

qualified

## prov:component

entities-activities

## prov:constraints

http://www.w3.org/TR/2013/REC-prov-constraints-20130430/#prov-dm-constraints-fig

## prov:definition

End is when an activity is deemed to have been ended by an entity, known as trigger. The activity no longer exists after its end. Any usage, generation, or invalidation involving an activity precedes the activity's end. An end may refer to a trigger entity that terminated the activity, or to an activity, known as ender that generated the trigger.

## prov:dm

http://www.w3.org/TR/2013/REC-prov-dm-20130430/#term-End

## prov:n

http://www.w3.org/TR/2013/REC-prov-n-20130430/#expression-End

## prov:unqualifiedForm

prov:wasEndedBy

# prov:Entity

## rdf:type

owl:Class

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o#

## rdfs:label

Entity

## owl:disjointWith

prov:InstantaneousEvent

## prov:category

starting-point

## prov:component

entities-activities

## prov:constraints

http://www.w3.org/TR/2013/REC-prov-constraints-20130430/#prov-dm-constraints-fig

## prov:definition

An entity is a physical, digital, conceptual, or other kind of thing with some fixed aspects; entities may be real or imaginary.

## prov:dm

http://www.w3.org/TR/2013/REC-prov-dm-20130430/#term-entity

## prov:n

http://www.w3.org/TR/2013/REC-prov-n-20130430/#expression-Entity

# prov:EntityInfluence

## rdf:type

owl:Class

## rdfs:comment

EntityInfluence provides additional descriptions of an Entity's binary influence upon any other kind of resource. Instances of EntityInfluence use the prov:entity property to cite the influencing Entity.

It is not recommended that the type EntityInfluence be asserted without also asserting one of its more specific subclasses.

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o#

## rdfs:label

EntityInfluence

## rdfs:seeAlso

prov:entity

## rdfs:subClassOf

prov:Influence

## prov:category

qualified

## prov:editorsDefinition

EntityInfluence is the capacity of an entity to have an effect on the character, development, or behavior of another by means of usage, start, end, derivation, or other.

# prov:Generation

## rdf:type

owl:Class

## rdfs:comment

An instance of prov:Generation provides additional descriptions about the binary prov:wasGeneratedBy relation from a generated prov:Entity to the prov:Activity that generated it. For example, :cake prov:wasGeneratedBy :baking; prov:qualifiedGeneration [ a prov:Generation; prov:activity :baking; :foo :bar ].

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o#

## rdfs:label

Generation

## rdfs:subClassOf

prov:InstantaneousEvent

prov:ActivityInfluence

## prov:category

qualified

## prov:component

entities-activities

## prov:constraints

http://www.w3.org/TR/2013/REC-prov-constraints-20130430/#prov-dm-constraints-fig

## prov:definition

Generation is the completion of production of a new entity by an activity. This entity did not exist before generation and becomes available for usage after this generation.

## prov:dm

http://www.w3.org/TR/2013/REC-prov-dm-20130430/#term-Generation

## prov:n

http://www.w3.org/TR/2013/REC-prov-n-20130430/#expression-Generation

## prov:unqualifiedForm

prov:wasGeneratedBy

# prov:Influence

## rdf:type

owl:Class

## rdfs:comment

Because prov:Influence is a broad relation, its most specific subclasses (e.g. prov:Communication, prov:Delegation, prov:End, prov:Revision, etc.) should be used when applicable.

An instance of prov:Influence provides additional descriptions about the binary prov:wasInfluencedBy relation from some influenced Activity, Entity, or Agent to the influencing Activity, Entity, or Agent. For example, :stomach\_ache prov:wasInfluencedBy :spoon; prov:qualifiedInfluence [ a prov:Influence; prov:entity :spoon; :foo :bar ] . Because prov:Influence is a broad relation, the more specific relations (Communication, Delegation, End, etc.) should be used when applicable.

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o#

## rdfs:label

Influence

## prov:category

qualified

## prov:component

derivations

## prov:definition

Influence is the capacity of an entity, activity, or agent to have an effect on the character, development, or behavior of another by means of usage, start, end, generation, invalidation, communication, derivation, attribution, association, or delegation.

## prov:dm

http://www.w3.org/TR/2013/REC-prov-dm-20130430/#term-influence

## prov:n

http://www.w3.org/TR/2013/REC-prov-n-20130430/#expression-influence

## prov:unqualifiedForm

prov:wasInfluencedBy

# prov:InstantaneousEvent

## rdf:type

owl:Class

## rdfs:comment

An instantaneous event, or event for short, happens in the world and marks a change in the world, in its activities and in its entities. The term 'event' is commonly used in process algebra with a similar meaning. Events represent communications or interactions; they are assumed to be atomic and instantaneous.

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o#

## rdfs:label

InstantaneousEvent

## prov:category

qualified

## prov:component

entities-activities

## prov:constraints

http://www.w3.org/TR/2013/REC-prov-constraints-20130430/#dfn-event

## prov:definition

The PROV data model is implicitly based on a notion of instantaneous events (or just events), that mark transitions in the world. Events include generation, usage, or invalidation of entities, as well as starting or ending of activities. This notion of event is not first-class in the data model, but it is useful for explaining its other concepts and its semantics.

# prov:Invalidation

## rdf:type

owl:Class

## rdfs:comment

An instance of prov:Invalidation provides additional descriptions about the binary prov:wasInvalidatedBy relation from an invalidated prov:Entity to the prov:Activity that invalidated it. For example, :uncracked\_egg prov:wasInvalidatedBy :baking; prov:qualifiedInvalidation [ a prov:Invalidation; prov:activity :baking; :foo :bar ].

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o#

## rdfs:label

Invalidation

## rdfs:subClassOf

prov:ActivityInfluence

prov:InstantaneousEvent

## prov:category

qualified

## prov:component

entities-activities

## prov:constraints

http://www.w3.org/TR/2013/REC-prov-constraints-20130430/#prov-dm-constraints-fig

## prov:definition

Invalidation is the start of the destruction, cessation, or expiry of an existing entity by an activity. The entity is no longer available for use (or further invalidation) after invalidation. Any generation or usage of an entity precedes its invalidation.

## prov:dm

http://www.w3.org/TR/2013/REC-prov-dm-20130430/#term-Invalidation

## prov:n

http://www.w3.org/TR/2013/REC-prov-n-20130430/#expression-Invalidation

## prov:unqualifiedForm

prov:wasInvalidatedBy

# prov:Location

## rdf:type

owl:Class

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o#

## rdfs:label

Location

## rdfs:seeAlso

prov:atLocation

## prov:category

expanded

## prov:definition

A location can be an identifiable geographic place (ISO 19112), but it can also be a non-geographic place such as a directory, row, or column. As such, there are numerous ways in which location can be expressed, such as by a coordinate, address, landmark, and so forth.

## prov:dm

http://www.w3.org/TR/2013/REC-prov-dm-20130430/#term-attribute-location

## prov:n

http://www.w3.org/TR/2013/REC-prov-n-20130430/#expression-attribute

# prov:Organization

## rdf:type

owl:Class

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o#

## rdfs:label

Organization

## rdfs:subClassOf

prov:Agent

## prov:category

expanded

## prov:component

agents-responsibility

## prov:definition

An organization is a social or legal institution such as a company, society, etc.

## prov:dm

http://www.w3.org/TR/2013/REC-prov-dm-20130430/#term-agent

## prov:n

http://www.w3.org/TR/2013/REC-prov-n-20130430/#expression-types

# prov:Person

## rdf:type

owl:Class

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o#

## rdfs:label

Person

## rdfs:subClassOf

prov:Agent

## prov:category

expanded

## prov:component

agents-responsibility

## prov:definition

Person agents are people.

## prov:dm

http://www.w3.org/TR/2013/REC-prov-dm-20130430/#term-agent

## prov:n

http://www.w3.org/TR/2013/REC-prov-n-20130430/#expression-types

# prov:Plan

## rdf:type

owl:Class

## rdfs:comment

There exist no prescriptive requirement on the nature of plans, their representation, the actions or steps they consist of, or their intended goals. Since plans may evolve over time, it may become necessary to track their provenance, so plans themselves are entities. Representing the plan explicitly in the provenance can be useful for various tasks: for example, to validate the execution as represented in the provenance record, to manage expectation failures, or to provide explanations.

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o#

## rdfs:label

Plan

## rdfs:subClassOf

prov:Entity

## prov:category

qualified

expanded

## prov:component

agents-responsibility

## prov:definition

A plan is an entity that represents a set of actions or steps intended by one or more agents to achieve some goals.

## prov:dm

http://www.w3.org/TR/2013/REC-prov-dm-20130430/#term-Association

## prov:n

http://www.w3.org/TR/2013/REC-prov-n-20130430/#expression-Association

# prov:PrimarySource

## rdf:type

owl:Class

## rdfs:comment

An instance of prov:PrimarySource provides additional descriptions about the binary prov:hadPrimarySource relation from some secondary prov:Entity to an earlier, primary prov:Entity. For example, :blog prov:hadPrimarySource :newsArticle; prov:qualifiedPrimarySource [ a prov:PrimarySource; prov:entity :newsArticle; :foo :bar ] .

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o#

## rdfs:label

PrimarySource

## rdfs:subClassOf

prov:Derivation

## prov:category

qualified

## prov:component

derivations

## prov:definition

A primary source for a topic refers to something produced by some agent with direct experience and knowledge about the topic, at the time of the topic's study, without benefit from hindsight.  
  
Because of the directness of primary sources, they 'speak for themselves' in ways that cannot be captured through the filter of secondary sources. As such, it is important for secondary sources to reference those primary sources from which they were derived, so that their reliability can be investigated.  
  
A primary source relation is a particular case of derivation of secondary materials from their primary sources. It is recognized that the determination of primary sources can be up to interpretation, and should be done according to conventions accepted within the application's domain.

## prov:dm

http://www.w3.org/TR/2013/REC-prov-dm-20130430/#term-primary-source

## prov:n

http://www.w3.org/TR/2013/REC-prov-n-20130430/#expression-original-source

## prov:unqualifiedForm

prov:hadPrimarySource

# prov:Quotation

## rdf:type

owl:Class

## rdfs:comment

An instance of prov:Quotation provides additional descriptions about the binary prov:wasQuotedFrom relation from some taken prov:Entity from an earlier, larger prov:Entity. For example, :here\_is\_looking\_at\_you\_kid prov:wasQuotedFrom :casablanca\_script; prov:qualifiedQuotation [ a prov:Quotation; prov:entity :casablanca\_script; :foo :bar ].

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o#

## rdfs:label

Quotation

## rdfs:subClassOf

prov:Derivation

## prov:category

qualified

## prov:component

derivations

## prov:definition

A quotation is the repeat of (some or all of) an entity, such as text or image, by someone who may or may not be its original author. Quotation is a particular case of derivation.

## prov:dm

http://www.w3.org/TR/2013/REC-prov-dm-20130430/#term-quotation

## prov:n

http://www.w3.org/TR/2013/REC-prov-n-20130430/#expression-quotation

## prov:unqualifiedForm

prov:wasQuotedFrom

# prov:Revision

## rdf:type

owl:Class

## rdfs:comment

An instance of prov:Revision provides additional descriptions about the binary prov:wasRevisionOf relation from some newer prov:Entity to an earlier prov:Entity. For example, :draft\_2 prov:wasRevisionOf :draft\_1; prov:qualifiedRevision [ a prov:Revision; prov:entity :draft\_1; :foo :bar ].

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o#

## rdfs:label

Revision

## rdfs:subClassOf

prov:Derivation

## prov:category

qualified

## prov:component

derivations

## prov:definition

A revision is a derivation for which the resulting entity is a revised version of some original. The implication here is that the resulting entity contains substantial content from the original. Revision is a particular case of derivation.

## prov:dm

http://www.w3.org/TR/2013/REC-prov-dm-20130430/#term-revision

## prov:n

http://www.w3.org/TR/2013/REC-prov-n-20130430/#expression-Revision

## prov:unqualifiedForm

prov:wasRevisionOf

# prov:Role

## rdf:type

owl:Class

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o#

## rdfs:label

Role

## rdfs:seeAlso

prov:hadRole

## prov:category

qualified

## prov:component

agents-responsibility

## prov:definition

A role is the function of an entity or agent with respect to an activity, in the context of a usage, generation, invalidation, association, start, and end.

## prov:dm

http://www.w3.org/TR/2013/REC-prov-dm-20130430/#term-attribute-role

## prov:n

http://www.w3.org/TR/2013/REC-prov-n-20130430/#expression-attribute

# prov:SoftwareAgent

## rdf:type

owl:Class

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o#

## rdfs:label

SoftwareAgent

## rdfs:subClassOf

prov:Agent

## prov:category

expanded

## prov:component

agents-responsibility

## prov:definition

A software agent is running software.

## prov:dm

http://www.w3.org/TR/2013/REC-prov-dm-20130430/#term-agent

## prov:n

http://www.w3.org/TR/2013/REC-prov-n-20130430/#expression-types

# prov:Start

## rdf:type

owl:Class

## rdfs:comment

An instance of prov:Start provides additional descriptions about the binary prov:wasStartedBy relation from some started prov:Activity to an prov:Entity that started it. For example, :foot\_race prov:wasStartedBy :bang; prov:qualifiedStart [ a prov:Start; prov:entity :bang; :foo :bar; prov:atTime '2012-03-09T08:05:08-05:00'^^xsd:dateTime ] .

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o#

## rdfs:label

Start

## rdfs:subClassOf

prov:InstantaneousEvent

prov:EntityInfluence

## prov:category

qualified

## prov:component

entities-activities

## prov:constraints

http://www.w3.org/TR/2013/REC-prov-constraints-20130430/#prov-dm-constraints-fig

## prov:definition

Start is when an activity is deemed to have been started by an entity, known as trigger. The activity did not exist before its start. Any usage, generation, or invalidation involving an activity follows the activity's start. A start may refer to a trigger entity that set off the activity, or to an activity, known as starter, that generated the trigger.

## prov:dm

http://www.w3.org/TR/2013/REC-prov-dm-20130430/#term-Start

## prov:n

http://www.w3.org/TR/2013/REC-prov-n-20130430/#expression-Start

## prov:unqualifiedForm

prov:wasStartedBy

# prov:Usage

## rdf:type

owl:Class

## rdfs:comment

An instance of prov:Usage provides additional descriptions about the binary prov:used relation from some prov:Activity to an prov:Entity that it used. For example, :keynote prov:used :podium; prov:qualifiedUsage [ a prov:Usage; prov:entity :podium; :foo :bar ].

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o#

## rdfs:label

Usage

## rdfs:subClassOf

prov:InstantaneousEvent

prov:EntityInfluence

## prov:category

qualified

## prov:component

entities-activities

## prov:constraints

http://www.w3.org/TR/2013/REC-prov-constraints-20130430/#prov-dm-constraints-fig

## prov:definition

Usage is the beginning of utilizing an entity by an activity. Before usage, the activity had not begun to utilize this entity and could not have been affected by the entity.

## prov:dm

http://www.w3.org/TR/2013/REC-prov-dm-20130430/#term-Usage

## prov:n

http://www.w3.org/TR/2013/REC-prov-n-20130430/#expression-Usage

## prov:unqualifiedForm

prov:used

# prov:actedOnBehalfOf

## rdf:type

owl:ObjectProperty

## rdfs:comment

An object property to express the accountability of an agent towards another agent. The subordinate agent acted on behalf of the responsible agent in an actual activity.

## rdfs:domain

prov:Agent

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o#

## rdfs:label

actedOnBehalfOf

## rdfs:range

prov:Agent

## rdfs:subPropertyOf

prov:wasInfluencedBy

## owl:propertyChainAxiom

### rdf:first

prov:qualifiedDelegation

### rdf:rest

f16b05ffee4664f56b077b46f4523ee8ab2

### rdf:first

prov:agent

### rdf:rest

rdf:nil

## prov:category

starting-point

## prov:component

agents-responsibility

## prov:inverse

hadDelegate

## prov:qualifiedForm

prov:qualifiedDelegation

prov:Delegation

# prov:activity

## rdf:type

owl:ObjectProperty

## rdfs:domain

prov:ActivityInfluence

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o#

## rdfs:label

activity

## rdfs:range

prov:Activity

## rdfs:subPropertyOf

prov:influencer

## prov:category

qualified

## prov:editorialNote

This property behaves in spirit like rdf:object; it references the object of a prov:wasInfluencedBy triple.

## prov:editorsDefinition

The prov:activity property references an prov:Activity which influenced a resource. This property applies to an prov:ActivityInfluence, which is given by a subproperty of prov:qualifiedInfluence from the influenced prov:Entity, prov:Activity or prov:Agent.

## prov:inverse

activityOfInfluence

# prov:agent

## rdf:type

owl:ObjectProperty

## rdfs:domain

prov:AgentInfluence

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o#

## rdfs:label

agent

## rdfs:range

prov:Agent

## rdfs:subPropertyOf

prov:influencer

## prov:category

qualified

## prov:editorialNote

This property behaves in spirit like rdf:object; it references the object of a prov:wasInfluencedBy triple.

## prov:editorsDefinition

The prov:agent property references an prov:Agent which influenced a resource. This property applies to an prov:AgentInfluence, which is given by a subproperty of prov:qualifiedInfluence from the influenced prov:Entity, prov:Activity or prov:Agent.

## prov:inverse

agentOfInfluence

# prov:alternateOf

## rdf:type

owl:ObjectProperty

## rdfs:domain

prov:Entity

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o#

## rdfs:label

alternateOf

## rdfs:range

prov:Entity

## rdfs:seeAlso

prov:specializationOf

## prov:category

expanded

## prov:component

alternate

## prov:constraints

http://www.w3.org/TR/2013/REC-prov-constraints-20130430/#prov-dm-constraints-fig

## prov:definition

Two alternate entities present aspects of the same thing. These aspects may be the same or different, and the alternate entities may or may not overlap in time.

## prov:dm

http://www.w3.org/TR/2013/REC-prov-dm-20130430/#term-alternate

## prov:inverse

alternateOf

## prov:n

http://www.w3.org/TR/2013/REC-prov-n-20130430/#expression-alternate

# prov:aq

## rdf:type

owl:AnnotationProperty

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o#

## rdfs:subPropertyOf

rdfs:seeAlso

# prov:atLocation

## rdf:type

owl:ObjectProperty

## rdfs:comment

The Location of any resource.

This property has multiple RDFS domains to suit multiple OWL Profiles. See <a href="#owl-profile">PROV-O OWL Profile</a>.

## rdfs:domain

### owl:unionOf

f16b05ffee4664f56b077b46f4523ee8ab3

### rdf:rest

f16b05ffee4664f56b077b46f4523ee8ab4

### rdf:rest

f16b05ffee4664f56b077b46f4523ee8ab5

### rdf:first

prov:Entity

### rdf:rest

f16b05ffee4664f56b077b46f4523ee8ab6

### rdf:first

prov:InstantaneousEvent

### rdf:rest

rdf:nil

### rdf:first

prov:Agent

### rdf:first

prov:Activity

### rdf:type

owl:Class

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o#

## rdfs:label

atLocation

## rdfs:range

prov:Location

## prov:category

expanded

## prov:editorialNote

This property is not functional because the many values could be at a variety of granularies (In this building, in this room, in that chair).

The naming of prov:atLocation parallels prov:atTime, and is not named prov:hadLocation to avoid conflicting with the convention that prov:had\* properties are used on prov:Influence classes.

## prov:inverse

locationOf

## prov:sharesDefinitionWith

prov:Location

# prov:atTime

## rdf:type

owl:DatatypeProperty

## rdfs:comment

The time at which an InstantaneousEvent occurred, in the form of xsd:dateTime.

## rdfs:domain

prov:InstantaneousEvent

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o#

## rdfs:label

atTime

## rdfs:range

xsd:dateTime

## prov:category

qualified

## prov:component

entities-activities

## prov:sharesDefinitionWith

prov:InstantaneousEvent

## prov:unqualifiedForm

prov:endedAtTime

prov:generatedAtTime

prov:startedAtTime

prov:invalidatedAtTime

# prov:category

## rdf:type

owl:AnnotationProperty

## rdfs:comment

Classify prov-o terms into three categories, including 'starting-point', 'qualifed', and 'extended'. This classification is used by the prov-o html document to gently introduce prov-o terms to its users.

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o#

# prov:component

## rdf:type

owl:AnnotationProperty

## rdfs:comment

Classify prov-o terms into six components according to prov-dm, including 'agents-responsibility', 'alternate', 'annotations', 'collections', 'derivations', and 'entities-activities'. This classification is used so that readers of prov-o specification can find its correspondence with the prov-dm specification.

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o#

# prov:constraints

## rdf:type

owl:AnnotationProperty

## rdfs:comment

A reference to the principal section of the PROV-CONSTRAINTS document that describes this concept.

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o#

## rdfs:subPropertyOf

rdfs:seeAlso

# prov:definition

## rdf:type

owl:AnnotationProperty

## rdfs:comment

A definition quoted from PROV-DM or PROV-CONSTRAINTS that describes the concept expressed with this OWL term.

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o#

# prov:dm

## rdf:type

owl:AnnotationProperty

## rdfs:comment

A reference to the principal section of the PROV-DM document that describes this concept.

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o#

## rdfs:subPropertyOf

rdfs:seeAlso

# prov:editorialNote

## rdf:type

owl:AnnotationProperty

## rdfs:comment

A note by the OWL development team about how this term expresses the PROV-DM concept, or how it should be used in context of semantic web or linked data.

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o#

# prov:editorsDefinition

## rdf:type

owl:AnnotationProperty

## rdfs:comment

When the prov-o term does not have a definition drawn from prov-dm, and the prov-o editor provides one.

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o#

## rdfs:subPropertyOf

prov:definition

# prov:endedAtTime

## rdf:type

owl:DatatypeProperty

## rdfs:comment

The time at which an activity ended. See also prov:startedAtTime.

## rdfs:domain

prov:Activity

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o#

## rdfs:label

endedAtTime

## rdfs:range

xsd:dateTime

## prov:category

starting-point

## prov:component

entities-activities

## prov:editorialNote

It is the intent that the property chain holds: (prov:qualifiedEnd o prov:atTime) rdfs:subPropertyOf prov:endedAtTime.

## prov:qualifiedForm

prov:atTime

prov:End

# prov:entity

## rdf:type

owl:ObjectProperty

## rdfs:domain

prov:EntityInfluence

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o#

## rdfs:label

entity

## rdfs:range

prov:Entity

## rdfs:subPropertyOf

prov:influencer

## prov:category

qualified

## prov:editorialNote

This property behaves in spirit like rdf:object; it references the object of a prov:wasInfluencedBy triple.

## prov:editorsDefinition

The prov:entity property references an prov:Entity which influenced a resource. This property applies to an prov:EntityInfluence, which is given by a subproperty of prov:qualifiedInfluence from the influenced prov:Entity, prov:Activity or prov:Agent.

## prov:inverse

entityOfInfluence

# prov:generated

## rdf:type

owl:ObjectProperty

## rdfs:domain

prov:Activity

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o#

## rdfs:label

generated

## rdfs:range

prov:Entity

## rdfs:subPropertyOf

prov:influenced

## owl:inverseOf

prov:wasGeneratedBy

## prov:category

expanded

## prov:component

entities-activities

## prov:editorialNote

prov:generated is one of few inverse property defined, to allow Activity-oriented assertions in addition to Entity-oriented assertions.

## prov:inverse

wasGeneratedBy

## prov:sharesDefinitionWith

prov:Generation

# prov:generatedAtTime

## rdf:type

owl:DatatypeProperty

## rdfs:comment

The time at which an entity was completely created and is available for use.

## rdfs:domain

prov:Entity

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o#

## rdfs:label

generatedAtTime

## rdfs:range

xsd:dateTime

## prov:category

expanded

## prov:component

entities-activities

## prov:editorialNote

It is the intent that the property chain holds: (prov:qualifiedGeneration o prov:atTime) rdfs:subPropertyOf prov:generatedAtTime.

## prov:qualifiedForm

prov:Generation

prov:atTime

# prov:hadActivity

## rdf:type

owl:ObjectProperty

## rdfs:comment

This property has multiple RDFS domains to suit multiple OWL Profiles. See <a href="#owl-profile">PROV-O OWL Profile</a>.

The \_optional\_ Activity of an Influence, which used, generated, invalidated, or was the responsibility of some Entity. This property is \_not\_ used by ActivityInfluence (use prov:activity instead).

## rdfs:domain

### rdf:type

owl:Class

### owl:unionOf

f16b05ffee4664f56b077b46f4523ee8ab7

### rdf:rest

f16b05ffee4664f56b077b46f4523ee8ab8

### rdf:rest

f16b05ffee4664f56b077b46f4523ee8ab9

### rdf:first

prov:End

### rdf:rest

f16b05ffee4664f56b077b46f4523ee8ab10

### rdf:rest

rdf:nil

### rdf:first

prov:Start

### rdf:first

prov:Derivation

### rdf:first

prov:Delegation

prov:Influence

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o#

## rdfs:label

hadActivity

## rdfs:range

prov:Activity

## prov:category

qualified

## prov:component

derivations

## prov:editorialNote

The multiple rdfs:domain assertions are intended. One is simpler and works for OWL-RL, the union is more specific but is not recognized by OWL-RL.

## prov:inverse

wasActivityOfInfluence

## prov:sharesDefinitionWith

prov:Activity

# prov:hadGeneration

## rdf:type

owl:ObjectProperty

## rdfs:comment

The \_optional\_ Generation involved in an Entity's Derivation.

## rdfs:domain

prov:Derivation

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o#

## rdfs:label

hadGeneration

## rdfs:range

prov:Generation

## prov:category

qualified

## prov:component

derivations

## prov:inverse

generatedAsDerivation

## prov:sharesDefinitionWith

prov:Generation

# prov:hadMember

## rdf:type

owl:ObjectProperty

## rdfs:domain

prov:Collection

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o#

## rdfs:label

hadMember

## rdfs:range

prov:Entity

## rdfs:subPropertyOf

prov:wasInfluencedBy

## prov:category

expanded

## prov:component

expanded

## prov:inverse

wasMemberOf

## prov:sharesDefinitionWith

prov:Collection

# prov:hadPlan

## rdf:type

owl:ObjectProperty

## rdfs:comment

The \_optional\_ Plan adopted by an Agent in Association with some Activity. Plan specifications are out of the scope of this specification.

## rdfs:domain

prov:Association

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o#

## rdfs:label

hadPlan

## rdfs:range

prov:Plan

## prov:category

qualified

## prov:component

agents-responsibility

## prov:inverse

wasPlanOf

## prov:sharesDefinitionWith

prov:Plan

# prov:hadPrimarySource

## rdf:type

owl:ObjectProperty

## rdfs:domain

prov:Entity

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o#

## rdfs:label

hadPrimarySource

## rdfs:range

prov:Entity

## rdfs:subPropertyOf

prov:wasDerivedFrom

## owl:propertyChainAxiom

### rdf:first

prov:qualifiedPrimarySource

### rdf:rest

f16b05ffee4664f56b077b46f4523ee8ab12

### rdf:rest

rdf:nil

### rdf:first

prov:entity

## prov:category

expanded

## prov:component

derivations

## prov:inverse

wasPrimarySourceOf

## prov:qualifiedForm

prov:PrimarySource

prov:qualifiedPrimarySource

# prov:hadRole

## rdf:type

owl:ObjectProperty

## rdfs:comment

The \_optional\_ Role that an Entity assumed in the context of an Activity. For example, :baking prov:used :spoon; prov:qualified [ a prov:Usage; prov:entity :spoon; prov:hadRole roles:mixing\_implement ].

This property has multiple RDFS domains to suit multiple OWL Profiles. See <a href="#owl-profile">PROV-O OWL Profile</a>.

## rdfs:domain

### owl:unionOf

f16b05ffee4664f56b077b46f4523ee8ab13

### rdf:first

prov:Association

### rdf:rest

f16b05ffee4664f56b077b46f4523ee8ab14

### rdf:first

prov:InstantaneousEvent

### rdf:rest

rdf:nil

### rdf:type

owl:Class

prov:Influence

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o#

## rdfs:label

hadRole

## rdfs:range

prov:Role

## prov:category

qualified

## prov:component

agents-responsibility

## prov:editorsDefinition

prov:hadRole references the Role (i.e. the function of an entity with respect to an activity), in the context of an instantaneous usage, generation, association, start, and end.

## prov:inverse

wasRoleIn

## prov:sharesDefinitionWith

prov:Role

# prov:hadUsage

## rdf:type

owl:ObjectProperty

## rdfs:comment

The \_optional\_ Usage involved in an Entity's Derivation.

## rdfs:domain

prov:Derivation

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o#

## rdfs:label

hadUsage

## rdfs:range

prov:Usage

## prov:category

qualified

## prov:component

derivations

## prov:inverse

wasUsedInDerivation

## prov:sharesDefinitionWith

prov:Usage

# prov:influenced

## rdf:type

owl:ObjectProperty

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o#

## rdfs:label

influenced

## owl:inverseOf

prov:wasInfluencedBy

## prov:category

expanded

## prov:component

agents-responsibility

## prov:inverse

wasInfluencedBy

## prov:sharesDefinitionWith

prov:Influence

# prov:influencer

## rdf:type

owl:ObjectProperty

## rdfs:comment

Subproperties of prov:influencer are used to cite the object of an unqualified PROV-O triple whose predicate is a subproperty of prov:wasInfluencedBy (e.g. prov:used, prov:wasGeneratedBy). prov:influencer is used much like rdf:object is used.

## rdfs:domain

prov:Influence

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o#

## rdfs:label

influencer

## rdfs:range

owl:Thing

## prov:category

qualified

## prov:dm

http://www.w3.org/TR/2013/REC-prov-dm-20130430/#term-influence

## prov:editorialNote

This property and its subproperties are used in the same way as the rdf:object property, i.e. to reference the object of an unqualified prov:wasInfluencedBy or prov:influenced triple.

## prov:editorsDefinition

This property is used as part of the qualified influence pattern. Subclasses of prov:Influence use these subproperties to reference the resource (Entity, Agent, or Activity) whose influence is being qualified.

## prov:inverse

hadInfluence

# prov:invalidated

## rdf:type

owl:ObjectProperty

## rdfs:domain

prov:Activity

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o#

## rdfs:label

invalidated

## rdfs:range

prov:Entity

## rdfs:subPropertyOf

prov:influenced

## owl:inverseOf

prov:wasInvalidatedBy

## prov:category

expanded

## prov:component

entities-activities

## prov:editorialNote

prov:invalidated is one of few inverse property defined, to allow Activity-oriented assertions in addition to Entity-oriented assertions.

## prov:inverse

wasInvalidatedBy

## prov:sharesDefinitionWith

prov:Invalidation

# prov:invalidatedAtTime

## rdf:type

owl:DatatypeProperty

## rdfs:comment

The time at which an entity was invalidated (i.e., no longer usable).

## rdfs:domain

prov:Entity

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o#

## rdfs:label

invalidatedAtTime

## rdfs:range

xsd:dateTime

## prov:category

expanded

## prov:component

entities-activities

## prov:editorialNote

It is the intent that the property chain holds: (prov:qualifiedInvalidation o prov:atTime) rdfs:subPropertyOf prov:invalidatedAtTime.

## prov:qualifiedForm

prov:atTime

prov:Invalidation

# prov:inverse

## rdf:type

owl:AnnotationProperty

## rdfs:comment

PROV-O does not define all property inverses. The directionalities defined in PROV-O should be given preference over those not defined. However, if users wish to name the inverse of a PROV-O property, the local name given by prov:inverse should be used.

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o#

## rdfs:seeAlso

ns2:names-of-inverse-properties

# prov:n

## rdf:type

owl:AnnotationProperty

## rdfs:comment

A reference to the principal section of the PROV-DM document that describes this concept.

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o#

## rdfs:subPropertyOf

rdfs:seeAlso

# prov:order

## rdf:type

owl:AnnotationProperty

## rdfs:comment

The position that this OWL term should be listed within documentation. The scope of the documentation (e.g., among all terms, among terms within a prov:category, among properties applying to a particular class, etc.) is unspecified.

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o#

# prov:qualifiedAssociation

## rdf:type

owl:ObjectProperty

## rdfs:comment

If this Activity prov:wasAssociatedWith Agent :ag, then it can qualify the Association using prov:qualifiedAssociation [ a prov:Association; prov:agent :ag; :foo :bar ].

## rdfs:domain

prov:Activity

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o#

## rdfs:label

qualifiedAssociation

## rdfs:range

prov:Association

## rdfs:subPropertyOf

prov:qualifiedInfluence

## prov:category

qualified

## prov:component

agents-responsibility

## prov:inverse

qualifiedAssociationOf

## prov:sharesDefinitionWith

prov:Association

## prov:unqualifiedForm

prov:wasAssociatedWith

# prov:qualifiedAttribution

## rdf:type

owl:ObjectProperty

## rdfs:comment

If this Entity prov:wasAttributedTo Agent :ag, then it can qualify how it was influenced using prov:qualifiedAttribution [ a prov:Attribution; prov:agent :ag; :foo :bar ].

## rdfs:domain

prov:Entity

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o#

## rdfs:label

qualifiedAttribution

## rdfs:range

prov:Attribution

## rdfs:subPropertyOf

prov:qualifiedInfluence

## prov:category

qualified

## prov:component

agents-responsibility

## prov:inverse

qualifiedAttributionOf

## prov:sharesDefinitionWith

prov:Attribution

## prov:unqualifiedForm

prov:wasAttributedTo

# prov:qualifiedCommunication

## rdf:type

owl:ObjectProperty

## rdfs:comment

If this Activity prov:wasInformedBy Activity :a, then it can qualify how it was influenced using prov:qualifiedCommunication [ a prov:Communication; prov:activity :a; :foo :bar ].

## rdfs:domain

prov:Activity

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o#

## rdfs:label

qualifiedCommunication

## rdfs:range

prov:Communication

## rdfs:subPropertyOf

prov:qualifiedInfluence

## prov:category

qualified

## prov:component

entities-activities

## prov:inverse

qualifiedCommunicationOf

## prov:qualifiedForm

prov:Communication

## prov:sharesDefinitionWith

prov:Communication

# prov:qualifiedDelegation

## rdf:type

owl:ObjectProperty

## rdfs:comment

If this Agent prov:actedOnBehalfOf Agent :ag, then it can qualify how with prov:qualifiedResponsibility [ a prov:Responsibility; prov:agent :ag; :foo :bar ].

## rdfs:domain

prov:Agent

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o#

## rdfs:label

qualifiedDelegation

## rdfs:range

prov:Delegation

## rdfs:subPropertyOf

prov:qualifiedInfluence

## prov:category

qualified

## prov:component

agents-responsibility

## prov:inverse

qualifiedDelegationOf

## prov:sharesDefinitionWith

prov:Delegation

## prov:unqualifiedForm

prov:actedOnBehalfOf

# prov:qualifiedDerivation

## rdf:type

owl:ObjectProperty

## rdfs:comment

If this Entity prov:wasDerivedFrom Entity :e, then it can qualify how it was derived using prov:qualifiedDerivation [ a prov:Derivation; prov:entity :e; :foo :bar ].

## rdfs:domain

prov:Entity

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o#

## rdfs:label

qualifiedDerivation

## rdfs:range

prov:Derivation

## rdfs:subPropertyOf

prov:qualifiedInfluence

## prov:category

qualified

## prov:component

derivations

## prov:inverse

qualifiedDerivationOf

## prov:sharesDefinitionWith

prov:Derivation

## prov:unqualifiedForm

prov:wasDerivedFrom

# prov:qualifiedEnd

## rdf:type

owl:ObjectProperty

## rdfs:comment

If this Activity prov:wasEndedBy Entity :e1, then it can qualify how it was ended using prov:qualifiedEnd [ a prov:End; prov:entity :e1; :foo :bar ].

## rdfs:domain

prov:Activity

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o#

## rdfs:label

qualifiedEnd

## rdfs:range

prov:End

## rdfs:subPropertyOf

prov:qualifiedInfluence

## prov:category

qualified

## prov:component

entities-activities

## prov:inverse

qualifiedEndOf

## prov:sharesDefinitionWith

prov:End

## prov:unqualifiedForm

prov:wasEndedBy

# prov:qualifiedForm

## rdf:type

owl:AnnotationProperty

## rdfs:comment

This annotation property links a subproperty of prov:wasInfluencedBy with the subclass of prov:Influence and the qualifying property that are used to qualify it.   
  
Example annotation:  
  
 prov:wasGeneratedBy prov:qualifiedForm prov:qualifiedGeneration, prov:Generation .  
  
Then this unqualified assertion:  
  
 :entity1 prov:wasGeneratedBy :activity1 .  
  
can be qualified by adding:  
  
 :entity1 prov:qualifiedGeneration :entity1Gen .  
 :entity1Gen   
 a prov:Generation, prov:Influence;  
 prov:activity :activity1;  
 :customValue 1337 .  
  
Note how the value of the unqualified influence (prov:wasGeneratedBy :activity1) is mirrored as the value of the prov:activity (or prov:entity, or prov:agent) property on the influence class.

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o#

## rdfs:subPropertyOf

rdfs:seeAlso

# prov:qualifiedGeneration

## rdf:type

owl:ObjectProperty

## rdfs:comment

If this Activity prov:generated Entity :e, then it can qualify how it performed the Generation using prov:qualifiedGeneration [ a prov:Generation; prov:entity :e; :foo :bar ].

## rdfs:domain

prov:Entity

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o#

## rdfs:label

qualifiedGeneration

## rdfs:range

prov:Generation

## rdfs:subPropertyOf

prov:qualifiedInfluence

## prov:category

qualified

## prov:component

entities-activities

## prov:inverse

qualifiedGenerationOf

## prov:sharesDefinitionWith

prov:Generation

## prov:unqualifiedForm

prov:wasGeneratedBy

# prov:qualifiedInfluence

## rdf:type

owl:ObjectProperty

## rdfs:comment

Because prov:qualifiedInfluence is a broad relation, the more specific relations (qualifiedCommunication, qualifiedDelegation, qualifiedEnd, etc.) should be used when applicable.

## rdfs:domain

### owl:unionOf

f16b05ffee4664f56b077b46f4523ee8ab15

### rdf:rest

f16b05ffee4664f56b077b46f4523ee8ab16

### rdf:rest

f16b05ffee4664f56b077b46f4523ee8ab17

### rdf:first

prov:Entity

### rdf:rest

rdf:nil

### rdf:first

prov:Agent

### rdf:first

prov:Activity

### rdf:type

owl:Class

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o#

## rdfs:label

qualifiedInfluence

## rdfs:range

prov:Influence

## prov:category

qualified

## prov:component

derivations

## prov:inverse

qualifiedInfluenceOf

## prov:sharesDefinitionWith

prov:Influence

## prov:unqualifiedForm

prov:wasInfluencedBy

# prov:qualifiedInvalidation

## rdf:type

owl:ObjectProperty

## rdfs:comment

If this Entity prov:wasInvalidatedBy Activity :a, then it can qualify how it was invalidated using prov:qualifiedInvalidation [ a prov:Invalidation; prov:activity :a; :foo :bar ].

## rdfs:domain

prov:Entity

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o#

## rdfs:label

qualifiedInvalidation

## rdfs:range

prov:Invalidation

## rdfs:subPropertyOf

prov:qualifiedInfluence

## prov:category

qualified

## prov:component

entities-activities

## prov:inverse

qualifiedInvalidationOf

## prov:sharesDefinitionWith

prov:Invalidation

## prov:unqualifiedForm

prov:wasInvalidatedBy

# prov:qualifiedPrimarySource

## rdf:type

owl:ObjectProperty

## rdfs:comment

If this Entity prov:hadPrimarySource Entity :e, then it can qualify how using prov:qualifiedPrimarySource [ a prov:PrimarySource; prov:entity :e; :foo :bar ].

## rdfs:domain

prov:Entity

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o#

## rdfs:label

qualifiedPrimarySource

## rdfs:range

prov:PrimarySource

## rdfs:subPropertyOf

prov:qualifiedInfluence

## prov:category

qualified

## prov:component

derivations

## prov:inverse

qualifiedSourceOf

## prov:sharesDefinitionWith

prov:PrimarySource

## prov:unqualifiedForm

prov:hadPrimarySource

# prov:qualifiedQuotation

## rdf:type

owl:ObjectProperty

## rdfs:comment

If this Entity prov:wasQuotedFrom Entity :e, then it can qualify how using prov:qualifiedQuotation [ a prov:Quotation; prov:entity :e; :foo :bar ].

## rdfs:domain

prov:Entity

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o#

## rdfs:label

qualifiedQuotation

## rdfs:range

prov:Quotation

## rdfs:subPropertyOf

prov:qualifiedInfluence

## prov:category

qualified

## prov:component

derivations

## prov:inverse

qualifiedQuotationOf

## prov:sharesDefinitionWith

prov:Quotation

## prov:unqualifiedForm

prov:wasQuotedFrom

# prov:qualifiedRevision

## rdf:type

owl:ObjectProperty

## rdfs:comment

If this Entity prov:wasRevisionOf Entity :e, then it can qualify how it was revised using prov:qualifiedRevision [ a prov:Revision; prov:entity :e; :foo :bar ].

## rdfs:domain

prov:Entity

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o#

## rdfs:label

qualifiedRevision

## rdfs:range

prov:Revision

## rdfs:subPropertyOf

prov:qualifiedInfluence

## prov:category

qualified

## prov:component

derivations

## prov:inverse

revisedEntity

## prov:sharesDefinitionWith

prov:Revision

## prov:unqualifiedForm

prov:wasRevisionOf

# prov:qualifiedStart

## rdf:type

owl:ObjectProperty

## rdfs:comment

If this Activity prov:wasStartedBy Entity :e1, then it can qualify how it was started using prov:qualifiedStart [ a prov:Start; prov:entity :e1; :foo :bar ].

## rdfs:domain

prov:Activity

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o#

## rdfs:label

qualifiedStart

## rdfs:range

prov:Start

## rdfs:subPropertyOf

prov:qualifiedInfluence

## prov:category

qualified

## prov:component

entities-activities

## prov:inverse

qualifiedStartOf

## prov:sharesDefinitionWith

prov:Start

## prov:unqualifiedForm

prov:wasStartedBy

# prov:qualifiedUsage

## rdf:type

owl:ObjectProperty

## rdfs:comment

If this Activity prov:used Entity :e, then it can qualify how it used it using prov:qualifiedUsage [ a prov:Usage; prov:entity :e; :foo :bar ].

## rdfs:domain

prov:Activity

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o#

## rdfs:label

qualifiedUsage

## rdfs:range

prov:Usage

## rdfs:subPropertyOf

prov:qualifiedInfluence

## prov:category

qualified

## prov:component

entities-activities

## prov:inverse

qualifiedUsingActivity

## prov:sharesDefinitionWith

prov:Usage

## prov:unqualifiedForm

prov:used

# prov:sharesDefinitionWith

## rdf:type

owl:AnnotationProperty

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o#

## rdfs:subPropertyOf

rdfs:seeAlso

# prov:specializationOf

## rdf:type

owl:AnnotationProperty

owl:ObjectProperty

## rdfs:domain

prov:Entity

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o#

## rdfs:label

specializationOf

## rdfs:range

prov:Entity

## rdfs:seeAlso

prov:alternateOf

## rdfs:subPropertyOf

prov:alternateOf

## prov:category

expanded

## prov:component

alternate

## prov:constraints

http://www.w3.org/TR/2013/REC-prov-constraints-20130430/#prov-dm-constraints-fig

## prov:definition

An entity that is a specialization of another shares all aspects of the latter, and additionally presents more specific aspects of the same thing as the latter. In particular, the lifetime of the entity being specialized contains that of any specialization. Examples of aspects include a time period, an abstraction, and a context associated with the entity.

## prov:dm

http://www.w3.org/TR/2013/REC-prov-dm-20130430/#term-specialization

## prov:inverse

generalizationOf

## prov:n

http://www.w3.org/TR/2013/REC-prov-n-20130430/#expression-specialization

# prov:startedAtTime

## rdf:type

owl:DatatypeProperty

## rdfs:comment

The time at which an activity started. See also prov:endedAtTime.

## rdfs:domain

prov:Activity

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o#

## rdfs:label

startedAtTime

## rdfs:range

xsd:dateTime

## prov:category

starting-point

## prov:component

entities-activities

## prov:editorialNote

It is the intent that the property chain holds: (prov:qualifiedStart o prov:atTime) rdfs:subPropertyOf prov:startedAtTime.

## prov:qualifiedForm

prov:Start

prov:atTime

# prov:todo

## rdf:type

owl:AnnotationProperty

# prov:unqualifiedForm

## rdf:type

owl:AnnotationProperty

## rdfs:comment

Classes and properties used to qualify relationships are annotated with prov:unqualifiedForm to indicate the property used to assert an unqualified provenance relation.

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o#

## rdfs:subPropertyOf

rdfs:seeAlso

# prov:used

## rdf:type

owl:ObjectProperty

## rdfs:comment

A prov:Entity that was used by this prov:Activity. For example, :baking prov:used :spoon, :egg, :oven .

## rdfs:domain

prov:Activity

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o#

## rdfs:label

used

## rdfs:range

prov:Entity

## rdfs:subPropertyOf

prov:wasInfluencedBy

## owl:propertyChainAxiom

### rdf:first

prov:qualifiedUsage

### rdf:rest

f16b05ffee4664f56b077b46f4523ee8ab19

### rdf:rest

rdf:nil

### rdf:first

prov:entity

## prov:category

starting-point

## prov:component

entities-activities

## prov:inverse

wasUsedBy

## prov:qualifiedForm

prov:qualifiedUsage

prov:Usage

# prov:value

## rdf:type

owl:DatatypeProperty

## rdfs:domain

prov:Entity

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o#

## rdfs:label

value

## prov:category

expanded

## prov:component

entities-activities

## prov:definition

Provides a value that is a direct representation of an entity.

## prov:dm

http://www.w3.org/TR/2013/REC-prov-dm-20130430/#term-attribute-value

## prov:editorialNote

The editor's definition comes from http://www.w3.org/TR/rdf-primer/#rdfvalue

This property serves the same purpose as rdf:value, but has been reintroduced to avoid some of the definitional ambiguity in the RDF specification (specifically, 'may be used in describing structured values').

# prov:wasAssociatedWith

## rdf:type

owl:ObjectProperty

## rdfs:comment

An prov:Agent that had some (unspecified) responsibility for the occurrence of this prov:Activity.

## rdfs:domain

prov:Activity

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o#

## rdfs:label

wasAssociatedWith

## rdfs:range

prov:Agent

## rdfs:subPropertyOf

prov:wasInfluencedBy

## owl:propertyChainAxiom

### rdf:first

prov:qualifiedAssociation

### rdf:rest

f16b05ffee4664f56b077b46f4523ee8ab21

### rdf:rest

rdf:nil

### rdf:first

prov:agent

## prov:category

starting-point

## prov:component

agents-responsibility

## prov:inverse

wasAssociateFor

## prov:qualifiedForm

prov:Association

prov:qualifiedAssociation

# prov:wasAttributedTo

## rdf:type

owl:ObjectProperty

## rdfs:comment

Attribution is the ascribing of an entity to an agent.

## rdfs:domain

prov:Entity

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o#

## rdfs:label

wasAttributedTo

## rdfs:range

prov:Agent

## rdfs:subPropertyOf

prov:wasInfluencedBy

## owl:propertyChainAxiom

### rdf:rest

f16b05ffee4664f56b077b46f4523ee8ab23

### rdf:rest

rdf:nil

### rdf:first

prov:agent

### rdf:first

prov:qualifiedAttribution

## prov:category

starting-point

## prov:component

agents-responsibility

## prov:definition

Attribution is the ascribing of an entity to an agent.

## prov:inverse

contributed

## prov:qualifiedForm

prov:qualifiedAttribution

prov:Attribution

# prov:wasDerivedFrom

## rdf:type

owl:ObjectProperty

## rdfs:comment

The more specific subproperties of prov:wasDerivedFrom (i.e., prov:wasQuotedFrom, prov:wasRevisionOf, prov:hadPrimarySource) should be used when applicable.

## rdfs:domain

prov:Entity

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o#

## rdfs:label

wasDerivedFrom

## rdfs:range

prov:Entity

## rdfs:subPropertyOf

prov:wasInfluencedBy

## owl:propertyChainAxiom

### rdf:rest

f16b05ffee4664f56b077b46f4523ee8ab25

### rdf:first

prov:entity

### rdf:rest

rdf:nil

### rdf:first

prov:qualifiedDerivation

## prov:category

starting-point

## prov:component

derivations

## prov:definition

A derivation is a transformation of an entity into another, an update of an entity resulting in a new one, or the construction of a new entity based on a pre-existing entity.

## prov:inverse

hadDerivation

## prov:qualifiedForm

prov:Derivation

prov:qualifiedDerivation

# prov:wasEndedBy

## rdf:type

owl:ObjectProperty

## rdfs:comment

End is when an activity is deemed to have ended. An end may refer to an entity, known as trigger, that terminated the activity.

## rdfs:domain

prov:Activity

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o#

## rdfs:label

wasEndedBy

## rdfs:range

prov:Entity

## rdfs:subPropertyOf

prov:wasInfluencedBy

## owl:propertyChainAxiom

### rdf:rest

f16b05ffee4664f56b077b46f4523ee8ab27

### rdf:first

prov:entity

### rdf:rest

rdf:nil

### rdf:first

prov:qualifiedEnd

## prov:category

expanded

## prov:component

entities-activities

## prov:inverse

ended

## prov:qualifiedForm

prov:qualifiedEnd

prov:End

# prov:wasGeneratedBy

## rdf:type

owl:ObjectProperty

## rdfs:domain

prov:Entity

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o#

## rdfs:label

wasGeneratedBy

## rdfs:range

prov:Activity

## rdfs:subPropertyOf

prov:wasInfluencedBy

## owl:propertyChainAxiom

### rdf:rest

f16b05ffee4664f56b077b46f4523ee8ab29

### rdf:rest

rdf:nil

### rdf:first

prov:activity

### rdf:first

prov:qualifiedGeneration

## prov:category

starting-point

## prov:component

entities-activities

## prov:inverse

generated

## prov:qualifiedForm

prov:qualifiedGeneration

prov:Generation

# prov:wasInfluencedBy

## rdf:type

owl:ObjectProperty

## rdfs:comment

Because prov:wasInfluencedBy is a broad relation, its more specific subproperties (e.g. prov:wasInformedBy, prov:actedOnBehalfOf, prov:wasEndedBy, etc.) should be used when applicable.

This property has multiple RDFS domains to suit multiple OWL Profiles. See <a href="#owl-profile">PROV-O OWL Profile</a>.

## rdfs:domain

### owl:unionOf

f16b05ffee4664f56b077b46f4523ee8ab30

### rdf:rest

f16b05ffee4664f56b077b46f4523ee8ab31

### rdf:first

prov:Agent

### rdf:rest

f16b05ffee4664f56b077b46f4523ee8ab32

### rdf:first

prov:Entity

### rdf:rest

rdf:nil

### rdf:first

prov:Activity

### rdf:type

owl:Class

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o#

## rdfs:label

wasInfluencedBy

## rdfs:range

### rdf:type

owl:Class

### owl:unionOf

f16b05ffee4664f56b077b46f4523ee8ab33

### rdf:first

prov:Activity

### rdf:rest

f16b05ffee4664f56b077b46f4523ee8ab34

### rdf:rest

f16b05ffee4664f56b077b46f4523ee8ab35

### rdf:first

prov:Entity

### rdf:rest

rdf:nil

### rdf:first

prov:Agent

## prov:category

qualified

## prov:component

agents-responsibility

## prov:editorialNote

The sub-properties of prov:wasInfluencedBy can be elaborated in more detail using the Qualification Pattern. For example, the binary relation :baking prov:used :spoon can be qualified by asserting :baking prov:qualifiedUsage [ a prov:Usage; prov:entity :spoon; prov:atLocation :kitchen ] .  
  
Subproperties of prov:wasInfluencedBy may also be asserted directly without being qualified.  
  
prov:wasInfluencedBy should not be used without also using one of its subproperties.

## prov:inverse

influenced

## prov:qualifiedForm

prov:qualifiedInfluence

prov:Influence

## prov:sharesDefinitionWith

prov:Influence

# prov:wasInformedBy

## rdf:type

owl:ObjectProperty

## rdfs:comment

An activity a2 is dependent on or informed by another activity a1, by way of some unspecified entity that is generated by a1 and used by a2.

## rdfs:domain

prov:Activity

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o#

## rdfs:label

wasInformedBy

## rdfs:range

prov:Activity

## rdfs:subPropertyOf

prov:wasInfluencedBy

## owl:propertyChainAxiom

### rdf:rest

f16b05ffee4664f56b077b46f4523ee8ab37

### rdf:rest

rdf:nil

### rdf:first

prov:activity

### rdf:first

prov:qualifiedCommunication

## prov:category

starting-point

## prov:component

entities-activities

## prov:inverse

informed

## prov:qualifiedForm

prov:qualifiedCommunication

prov:Communication

# prov:wasInvalidatedBy

## rdf:type

owl:ObjectProperty

## rdfs:domain

prov:Entity

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o#

## rdfs:label

wasInvalidatedBy

## rdfs:range

prov:Activity

## rdfs:subPropertyOf

prov:wasInfluencedBy

## owl:propertyChainAxiom

### rdf:rest

f16b05ffee4664f56b077b46f4523ee8ab39

### rdf:first

prov:activity

### rdf:rest

rdf:nil

### rdf:first

prov:qualifiedInvalidation

## prov:category

expanded

## prov:component

entities-activities

## prov:inverse

invalidated

## prov:qualifiedForm

prov:qualifiedInvalidation

prov:Invalidation

# prov:wasQuotedFrom

## rdf:type

owl:ObjectProperty

## rdfs:comment

An entity is derived from an original entity by copying, or 'quoting', some or all of it.

## rdfs:domain

prov:Entity

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o#

## rdfs:label

wasQuotedFrom

## rdfs:range

prov:Entity

## rdfs:subPropertyOf

prov:wasDerivedFrom

## owl:propertyChainAxiom

### rdf:first

prov:qualifiedQuotation

### rdf:rest

f16b05ffee4664f56b077b46f4523ee8ab41

### rdf:rest

rdf:nil

### rdf:first

prov:entity

## prov:category

expanded

## prov:component

derivations

## prov:inverse

quotedAs

## prov:qualifiedForm

prov:qualifiedQuotation

prov:Quotation

# prov:wasRevisionOf

## rdf:type

owl:AnnotationProperty

owl:ObjectProperty

## rdfs:comment

A revision is a derivation that revises an entity into a revised version.

## rdfs:domain

prov:Entity

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o#

## rdfs:label

wasRevisionOf

## rdfs:range

prov:Entity

## rdfs:subPropertyOf

prov:wasDerivedFrom

## owl:propertyChainAxiom

### rdf:rest

f16b05ffee4664f56b077b46f4523ee8ab43

### rdf:first

prov:entity

### rdf:rest

rdf:nil

### rdf:first

prov:qualifiedRevision

## prov:category

expanded

## prov:component

derivations

## prov:inverse

hadRevision

## prov:qualifiedForm

prov:qualifiedRevision

prov:Revision

# prov:wasStartedBy

## rdf:type

owl:ObjectProperty

## rdfs:comment

Start is when an activity is deemed to have started. A start may refer to an entity, known as trigger, that initiated the activity.

## rdfs:domain

prov:Activity

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o#

## rdfs:label

wasStartedBy

## rdfs:range

prov:Entity

## rdfs:subPropertyOf

prov:wasInfluencedBy

## owl:propertyChainAxiom

### rdf:rest

f16b05ffee4664f56b077b46f4523ee8ab45

### rdf:rest

rdf:nil

### rdf:first

prov:entity

### rdf:first

prov:qualifiedStart

## prov:category

expanded

## prov:component

entities-activities

## prov:inverse

started

## prov:qualifiedForm

prov:qualifiedStart

prov:Start

# http://www.w3.org/ns/prov-o#

## rdf:type

owl:Ontology

## rdfs:comment

This document is published by the Provenance Working Group (http://www.w3.org/2011/prov/wiki/Main\_Page).   
  
If you wish to make comments regarding this document, please send them to public-prov-comments@w3.org (subscribe public-prov-comments-request@w3.org, archives http://lists.w3.org/Archives/Public/public-prov-comments/). All feedback is welcome.

## rdfs:label

W3C PROVenance Interchange Ontology (PROV-O)

## rdfs:seeAlso

http://www.w3.org/TR/prov-o/

ns1:prov

## owl:versionIRI

ns1:prov-o-20130430

## owl:versionInfo

Recommendation version 2013-04-30

## prov:specializationOf

ns1:prov-o

## prov:wasRevisionOf

ns1:prov-o-20130312

# prov:actedOnBehalfOf

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o#

# prov:activity

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o#

# prov:activityOfInfluence

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o-inverses#

## rdfs:label

activityOfInfluence

## owl:inverseOf

prov:activity

# prov:agent

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o#

# prov:agentOfInfluence

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o-inverses#

## rdfs:label

agentOfInfluence

## owl:inverseOf

prov:agent

# prov:alternateOf

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o-inverses#

http://www.w3.org/ns/prov-o#

## rdfs:label

alternateOf

## owl:inverseOf

prov:alternateOf

# prov:atLocation

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o#

# prov:contributed

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o-inverses#

## rdfs:label

contributed

## owl:inverseOf

prov:wasAttributedTo

# prov:ended

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o-inverses#

## rdfs:label

ended

## owl:inverseOf

prov:wasEndedBy

# prov:entity

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o#

# prov:entityOfInfluence

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o-inverses#

## rdfs:label

entityOfInfluence

## owl:inverseOf

prov:entity

# prov:generalizationOf

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o-inverses#

## rdfs:label

generalizationOf

## owl:inverseOf

prov:specializationOf

# prov:generated

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o-inverses#

http://www.w3.org/ns/prov-o#

## rdfs:label

generated

## owl:inverseOf

prov:wasGeneratedBy

# prov:generatedAsDerivation

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o-inverses#

## rdfs:label

generatedAsDerivation

## owl:inverseOf

prov:hadGeneration

# prov:hadActivity

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o#

# prov:hadDelegate

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o-inverses#

## rdfs:label

hadDelegate

## owl:inverseOf

prov:actedOnBehalfOf

# prov:hadDerivation

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o-inverses#

## rdfs:label

hadDerivation

## owl:inverseOf

prov:wasDerivedFrom

# prov:hadGeneration

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o#

# prov:hadInfluence

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o-inverses#

## rdfs:label

hadInfluence

## owl:inverseOf

prov:influencer

# prov:hadMember

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o#

# prov:hadPlan

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o#

# prov:hadPrimarySource

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o#

# prov:hadRevision

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o-inverses#

## rdfs:label

hadRevision

## owl:inverseOf

prov:wasRevisionOf

# prov:hadRole

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o#

# prov:hadUsage

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o#

# prov:influenced

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o-inverses#

http://www.w3.org/ns/prov-o#

## rdfs:label

influenced

## owl:inverseOf

prov:wasInfluencedBy

# prov:influencer

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o#

# prov:informed

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o-inverses#

## rdfs:label

informed

## owl:inverseOf

prov:wasInformedBy

# prov:invalidated

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o-inverses#

http://www.w3.org/ns/prov-o#

## rdfs:label

invalidated

## owl:inverseOf

prov:wasInvalidatedBy

# prov:locationOf

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o-inverses#

## rdfs:label

locationOf

## owl:inverseOf

prov:atLocation

# prov:qualifiedAssociation

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o#

# prov:qualifiedAssociationOf

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o-inverses#

## rdfs:label

qualifiedAssociationOf

## owl:inverseOf

prov:qualifiedAssociation

# prov:qualifiedAttribution

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o#

# prov:qualifiedAttributionOf

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o-inverses#

## rdfs:label

qualifiedAttributionOf

## owl:inverseOf

prov:qualifiedAttribution

# prov:qualifiedCommunication

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o#

# prov:qualifiedCommunicationOf

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o-inverses#

## rdfs:label

qualifiedCommunicationOf

## owl:inverseOf

prov:qualifiedCommunication

# prov:qualifiedDelegation

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o#

# prov:qualifiedDelegationOf

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o-inverses#

## rdfs:label

qualifiedDelegationOf

## owl:inverseOf

prov:qualifiedDelegation

# prov:qualifiedDerivation

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o#

# prov:qualifiedDerivationOf

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o-inverses#

## rdfs:label

qualifiedDerivationOf

## owl:inverseOf

prov:qualifiedDerivation

# prov:qualifiedEnd

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o#

# prov:qualifiedEndOf

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o-inverses#

## rdfs:label

qualifiedEndOf

## owl:inverseOf

prov:qualifiedEnd

# prov:qualifiedGeneration

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o#

# prov:qualifiedGenerationOf

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o-inverses#

## rdfs:label

qualifiedGenerationOf

## owl:inverseOf

prov:qualifiedGeneration

# prov:qualifiedInfluence

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o#

# prov:qualifiedInfluenceOf

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o-inverses#

## rdfs:label

qualifiedInfluenceOf

## owl:inverseOf

prov:qualifiedInfluence

# prov:qualifiedInvalidation

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o#

# prov:qualifiedInvalidationOf

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o-inverses#

## rdfs:label

qualifiedInvalidationOf

## owl:inverseOf

prov:qualifiedInvalidation

# prov:qualifiedPrimarySource

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o#

# prov:qualifiedQuotation

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o#

# prov:qualifiedQuotationOf

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o-inverses#

## rdfs:label

qualifiedQuotationOf

## owl:inverseOf

prov:qualifiedQuotation

# prov:qualifiedRevision

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o#

# prov:qualifiedSourceOf

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o-inverses#

## rdfs:label

qualifiedSourceOf

## owl:inverseOf

prov:qualifiedPrimarySource

# prov:qualifiedStart

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o#

# prov:qualifiedStartOf

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o-inverses#

## rdfs:label

qualifiedStartOf

## owl:inverseOf

prov:qualifiedStart

# prov:qualifiedUsage

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o#

# prov:qualifiedUsingActivity

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o-inverses#

## rdfs:label

qualifiedUsingActivity

## owl:inverseOf

prov:qualifiedUsage

# prov:quotedAs

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o-inverses#

## rdfs:label

quotedAs

## owl:inverseOf

prov:wasQuotedFrom

# prov:revisedEntity

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o-inverses#

## rdfs:label

revisedEntity

## owl:inverseOf

prov:qualifiedRevision

# prov:specializationOf

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o#

# prov:started

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o-inverses#

## rdfs:label

started

## owl:inverseOf

prov:wasStartedBy

# prov:used

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o#

# prov:wasActivityOfInfluence

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o-inverses#

## rdfs:label

wasActivityOfInfluence

## owl:inverseOf

prov:hadActivity

# prov:wasAssociateFor

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o-inverses#

## rdfs:label

wasAssociateFor

## owl:inverseOf

prov:wasAssociatedWith

# prov:wasAssociatedWith

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o#

# prov:wasAttributedTo

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o#

# prov:wasDerivedFrom

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o#

# prov:wasEndedBy

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o#

# prov:wasGeneratedBy

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o-inverses#

http://www.w3.org/ns/prov-o#

## rdfs:label

wasGeneratedBy

## owl:inverseOf

prov:generated

# prov:wasInfluencedBy

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o-inverses#

http://www.w3.org/ns/prov-o#

## rdfs:label

wasInfluencedBy

## owl:inverseOf

prov:influenced

# prov:wasInformedBy

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o#

# prov:wasInvalidatedBy

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o#

http://www.w3.org/ns/prov-o-inverses#

## rdfs:label

wasInvalidatedBy

## owl:inverseOf

prov:invalidated

# prov:wasMemberOf

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o-inverses#

## rdfs:label

wasMemberOf

## owl:inverseOf

prov:hadMember

# prov:wasPlanOf

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o-inverses#

## rdfs:label

wasPlanOf

## owl:inverseOf

prov:hadPlan

# prov:wasPrimarySourceOf

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o-inverses#

## rdfs:label

wasPrimarySourceOf

## owl:inverseOf

prov:hadPrimarySource

# prov:wasQuotedFrom

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o#

# prov:wasRevisionOf

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o#

# prov:wasRoleIn

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o-inverses#

## rdfs:label

wasRoleIn

## owl:inverseOf

prov:hadRole

# prov:wasStartedBy

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o#

# prov:wasUsedBy

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o-inverses#

## rdfs:label

wasUsedBy

## owl:inverseOf

prov:used

# prov:wasUsedInDerivation

## rdfs:isDefinedBy

http://www.w3.org/ns/prov-o-inverses#

## rdfs:label

wasUsedInDerivation

## owl:inverseOf

prov:hadUsage

# http://www.w3.org/ns/prov-o-inverses#

## rdf:type

owl:Ontology

## rdfs:seeAlso

ns2:inverse-names

## owl:imports

http://www.w3.org/ns/prov-o#

## owl:versionIRI

ns1:prov-o-inverses-20130430

## prov:alternateOf

ns2:inverse-names-table

## prov:specializationOf

ns1:prov-o-inverses

## prov:wasDerivedFrom

ns1:prov-o-20130430

## prov:wasRevisionOf

ns1:prov-o-inverses-20130312