



## OData Vocabularies Version 4.0

### Committee Specification Draft 02

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#### Related work:

This specification is related to:

- *OData Version 4.02*. Edited by Michael Pizzo, Ralf Handl, and Heiko Theißen. A multi-part Work Product that includes:
  - *OData Version 4.02 Part 1: Protocol*. Latest stage. <https://docs.oasis-open.org/odata/odata/v4.02/odata-v4.02-part1-protocol.html>
  - *OData Version 4.02 Part 2: URL Conventions*. Latest stage. <https://docs.oasis-open.org/odata/odata/v4.02/odata-v4.02-part2-url-conventions.html>

- *ABNF components: OData ABNF Construction Rules Version 4.02 and OData ABNF Test Cases.*  
<https://docs.oasis-open.org/odata/odata/v4.02/csd01/abnf/>
- *OData Common Schema Definition Language (CSDL) JSON Representation Version 4.02.* Edited by Michael Pizzo, Ralf Handl, and Heiko Theißen. Latest stage: <https://docs.oasis-open.org/odata/odata-csdl-json/v4.02/odata-csdl-json-v4.02.html>
- *OData Common Schema Definition Language (CSDL) XML Representation Version 4.02.* Edited by Michael Pizzo, Ralf Handl, and Heiko Theißen. Latest stage: <https://docs.oasis-open.org/odata/odata-csdl-xml/v4.02/odata-csdl-xml-v4.02.html>
- *OData JSON Format Version 4.02.* Edited by Michael Pizzo, Ralf Handl, and Heiko Theißen. Latest stage: <https://docs.oasis-open.org/odata/odata-json-format/v4.02/odata-json-format-v4.02.html>
- *OData Data Aggregation Extension Version 4.0.* Edited by Ralf Handl, Hubert Heijkers, Gerald Krause, Michael Pizzo, Heiko Theißen, and Martin Zurmuehl. Latest stage: <https://docs.oasis-open.org/odata/odata-data-aggregation-ext/v4.0/odata-data-aggregation-ext-v4.0.html>
- *OData Extension for Temporal Data Version 4.0.* Edited by Ralf Handl, Hubert Heijkers, Gerald Krause, Michael Pizzo, Heiko Theißen, and Martin Zurmuehl. Latest stage: <https://docs.oasis-open.org/odata/odata-temporal-ext/v4.0/odata-temporal-ext-v4.0.html>

### Abstract:

This prose specification describes a set of OData vocabularies maintained by the OASIS OData Technical Committee. These vocabulary components are continuously evolved. The latest work-in-progress revisions are available at the odata-vocabularies OASIS TC GitHub repository: <https://github.com/oasis-tcs/odata-vocabularies>.

### Status:

This document was last revised or approved by the OASIS Open Data Protocol (OData) TC on the above date. The level of approval is also listed above. Check the “Latest stage” location noted above for possible later revisions of this document. Any other numbered Versions and other technical work produced by the Technical Committee (TC) are listed at <https://groups.oasis-open.org/communities/tc-community-home2?CommunityKey=e7cac2a9-2d18-4640-b94d-018dc7d3f0e2#technical>.

TC members should send comments on this specification to the TC’s email list. Any individual may submit comments to the TC by sending email to [Technical-Committee-Comments@oasis-open.org](mailto:Technical-Committee-Comments@oasis-open.org). Please use a Subject line like “Comment on OData Vocabularies”.

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Note that any machine-readable content ([Computer Language Definitions](#)) declared Normative for this Work Product is provided in separate plain text files. In the event of a discrepancy between any such plain text file and display content in the Work Product’s prose narrative document(s), the content in the separate plain text file prevails.

### Key words:

The key words “MUST”, “MUST NOT”, “REQUIRED”, “SHALL”, “SHALL NOT”, “SHOULD”, “SHOULD NOT”, “RECOMMENDED”, “NOT RECOMMENDED”, “MAY”, and “OPTIONAL” in this document are to be interpreted as described in BCP 14 [\[RFC2119\]](#) and [\[RFC8174\]](#) when, and only when, they appear in all capitals, as shown here.

### Citation format:

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

**[OData-Vocabularies-v4.0]**

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## 1 Introduction

OData provides the ability to decorate model elements of a schema and instances of data with descriptive elements called annotations. Annotations can be used to specify additional facts about an element, such as whether it is read-only, or to define a common concept, such as a person or a movie. Annotations consist of a term (the namespace-qualified name of the annotation being applied), a target (the element to which the term is applied), and a value. A set of related annotation terms with a common namespace comprises a Vocabulary. Shared vocabularies provide a powerful extensibility point for OData. Refer to the [\[OData-Protocol\]](#) and [\[OData-CSDL\]](#) specifications for more information on the use of vocabularies.

This prose specification describes a set of OData vocabularies maintained by the OASIS OData Technical Committee. It is one component of a Work Product that also includes the various vocabulary components. These vocabulary components are continuously evolved, the latest work-in-progress revisions are available at [\[OData-Vocabs\]](#).

Other OData vocabularies may be created, shared, and maintained outside of this work product.

## 2 Core Vocabulary

Namespace: [Org.OData.Core.V1](#)

Core terms needed to write vocabularies

### Terms

Term	Type	Description
<a href="#">ODataVersions</a>	String	A space-separated list of supported versions of the OData Protocol. Note that 4.0 is implied by 4.01 and does not need to be separately listed.
<a href="#">SchemaVersion</a>	String	Service-defined value representing the version of the schema. Services MAY use semantic versioning, but clients MUST NOT assume this is the case.
<a href="#">Revisions</a>	[ <a href="#">RevisionType</a> ]	List of revisions of a model element
<a href="#">Description</a>	String?	A brief description of a model element
<a href="#">LongDescription</a>	String?	A long description of a model element
<a href="#">Links</a>	[ <a href="#">Link</a> ]	Link to related information
<a href="#">Example</a>	<a href="#">ExampleValue</a>	Example for an instance of the annotated model element ( <a href="#">Example</a> )
<a href="#">Messages</a>	[ <a href="#">MessageType</a> ]	Instance annotation for warning and info messages
<a href="#">ValueException</a>	<a href="#">ValueExceptionType</a>	The annotated value is problematic
<a href="#">ResourceException</a>	<a href="#">ResourceExceptionType</a>	The annotated instance within a success payload is problematic
<a href="#">DataModificationException</a>	<a href="#">DataModificationExceptionType</a>	A modification operation failed on the annotated instance or collection within a success payload
<a href="#">IsLanguageDependent</a>	<a href="#">Tag</a>	Properties and terms annotated with this term are language-dependent
<a href="#">RequiresType</a>	String	Terms annotated with this term can only be applied to elements that have a type that is identical to or derived from the given type name

Term	Type	Description
<a href="#">AppliesViaContainer</a>	<a href="#">Tag</a>	The target path of an annotation with the tagged term MUST start with an entity container or the annotation MUST be embedded within an entity container, entity set or singleton Services MAY additionally annotate a container-independent model element (entity type, property, navigation property) if allowed by the <code>AppliesTo</code> property of the term and the annotation applies to all uses of that model element.
<a href="#">ResourcePath</a>	URL	Resource path for entity container child, can be relative to <code>xml:base</code> and the request URL
<a href="#">DereferenceableIDs</a>	<a href="#">Tag</a>	Entity-ids are URLs that locate the identified entity
<a href="#">ConventionalIDs</a>	<a href="#">Tag</a>	Entity-ids follow OData URL conventions
<a href="#">Permissions</a>	<a href="#">Permission</a>	Permissions for accessing a resource
<a href="#">ContentID</a>	String	A unique identifier for nested entities within a request.
<a href="#">DefaultNamespace</a>	<a href="#">Tag</a>	Functions, actions and types in this namespace can be referenced in URLs with or without namespace- or alias- qualification. Data Modelers should ensure uniqueness of schema children across all default namespaces, and should avoid naming bound functions, actions, or derived types with the same name as a structural or navigational property of the type.
<a href="#">Immutable</a>	<a href="#">Tag</a>	A value for this non-key property can be provided by the client on insert and remains unchanged on update
<a href="#">Computed</a>	<a href="#">Tag</a>	A value for this property is generated on both insert and update
<a href="#">ComputedDefaultValue</a>	<a href="#">Tag</a>	A value for this property can be provided by the client on insert and update. If no value is provided on insert, a non-static default value is generated
<a href="#">IsURL</a>	<a href="#">Tag</a>	Properties and terms annotated with this term MUST contain a valid URL
<a href="#">AcceptableMediaTypes</a>	[MediaType]	Lists the MIME types acceptable for the annotated entity type marked with <code>HasStream="true"</code> or the annotated binary, stream, or string property or term The annotation of a <code>TypeDefinition</code> propagates to the model elements having this type

Term	Type	Description
<a href="#">MediaType</a>	MediaType?	The media type of the media stream of the annotated entity type marked with HasStream="true" or the annotated binary, stream, or string property or term The annotation of a TypeDefinition propagates to the model elements having this type
<a href="#">IsMediaType</a>	<a href="#">Tag</a>	Properties and terms annotated with this term MUST contain a valid MIME type
<a href="#">ContentDisposition</a>	<a href="#">ContentDispositionType</a>	The content disposition of the media stream of the annotated entity type marked with HasStream="true" or the annotated binary, stream, or string property or term
<a href="#">OptimisticConcurrency</a>	[PropertyPath]	Data modification requires the use of ETags. A non-empty collection contains the set of properties that are used to compute the ETag. An empty collection means that the service won't tell how it computes the ETag
<a href="#">AdditionalProperties</a>	<a href="#">Tag</a>	Instances of this type may contain properties in addition to those declared in \$metadata If specified as false clients can assume that instances will not contain dynamic properties, irrespective of the value of the OpenType attribute.
<a href="#">AutoExpand</a>	<a href="#">Tag</a>	The service will automatically expand this stream property, navigation property, or the media stream of this media entity type even if not requested with \$expand
<a href="#">AutoExpandReferences</a>	<a href="#">Tag</a>	The service will automatically expand this navigation property as entity references even if not requested with <i>expand =.../ref</i>
<a href="#">MayImplement</a>	[QualifiedTypeName]	A collection of qualified type names outside of the type hierarchy that instances of this type might be addressable as by using a type-cast segment.
<a href="#">Ordered</a>	<a href="#">Tag</a>	Collection has a stable order. Ordered collections of primitive or complex types can be indexed by ordinal.
<a href="#">PositionalInsert</a>	<a href="#">Tag</a>	Items can be inserted at a given ordinal index.
<a href="#">AlternateKeys</a>	[AlternateKey]	Communicates available alternate keys
<a href="#">OptionalParameter</a>	<a href="#">OptionalParameterType</a>	Supplying a value for the action or function parameter is optional. All parameters marked as optional must come after any parameters not marked as optional. The binding parameter must not be marked as optional.



Term	Type	Description
<a href="#">OperationAvailable</a>	Boolean?	Action or function is available The annotation value will usually be an expression, e.g. using properties of the binding parameter type for instance-dependent availability, or using properties of a singleton for global availability. The static value <code>null</code> means that availability cannot be determined upfront and is instead expressed as an operation advertisement.
<a href="#">RequiresExplicitBinding</a>	<a href="#">Tag?</a>	This bound action or function is only available on model elements annotated with the <a href="#">ExplicitOperationBindings</a> term.
<a href="#">ExplicitOperationBindings</a>	<a href="#">[QualifiedBoundOperationName]</a>	The qualified names of explicitly bound operations that are supported on the target model element. These operations are in addition to any operations not annotated with <a href="#">RequiresExplicitBinding</a> that are bound to the type of the target model element.
<a href="#">SymbolicName</a>	<a href="#">SimpleIdentifier</a>	A symbolic name for a model element
<a href="#">GeometryFeature</a>	<a href="#">GeometryFeatureType?</a>	A <a href="#">Feature Object</a> represents a spatially bounded thing
<a href="#">AnyStructure</a>	<a href="#">Tag</a>	Instances of a type are annotated with this tag if they have no common structure in a given response payload The select-list of a context URL MUST be ( <code>@Core.AnyStructure</code> ) if it would otherwise be empty, but this instance annotation SHOULD be omitted from the response value.

## [RevisionType](#)

Property	Type	Description
<a href="#">Version</a>	String?	The schema version with which this revision was first published
<a href="#">Kind</a>	<a href="#">RevisionKind</a>	The kind of revision
<a href="#">Description</a>	String	Text describing the reason for the revision

## [RevisionKind](#)

Member	Value	Description
<a href="#">Added</a>	0	Model element was added
<a href="#">Modified</a>	1	Model element was modified
<a href="#">Deprecated</a>	2	Model element was deprecated

## Link

The Link term is inspired by the `atom:link` element, see [RFC4287](#), and the Link HTTP header, see [RFC5988](#)

Property	Type	Description
<a href="#">rel</a>	String	Link relation type, see <a href="#">IANA Link Relations</a>
<a href="#">href</a>	URL	URL of related information

## ExampleValue

### Derived Types:

- [PrimitiveExampleValue](#)
- [ComplexExampleValue](#)
- [EntityExampleValue](#)
- [ExternalExampleValue](#)

Property	Type	Description
<a href="#">Description</a>	String?	Description of the example value

### PrimitiveExampleValue: ExampleValue

Property	Type	Description
<a href="#">Description</a>	String?	Description of the example value
<a href="#">Value</a>	PrimitiveType	Example value for the custom parameter

### ComplexExampleValue: ExampleValue

Property	Type	Description
<a href="#">Description</a>	String?	Description of the example value
<a href="#">Value</a>	ComplexType	Example value for the custom parameter

### EntityExampleValue: ExampleValue

Property	Type	Description
<a href="#">Description</a>	String?	Description of the example value
<a href="#">Value</a>	EntityType	Example value for the custom parameter

### ExternalExampleValue: ExampleValue

Property	Type	Description
<a href="#">Description</a>	String?	Description of the example value

Property	Type	Description
<a href="#">ExternalValue</a>	URL	Url reference to the value in its literal format

## MessageType

Property	Type	Description
<a href="#">code</a>	String	Machine-readable, language-independent message code
<a href="#">message</a>	String	Human-readable, language-dependent message text
<a href="#">severity</a>	<a href="#">MessageSeverity</a>	Severity of the message
<a href="#">target</a>	String?	A path to the target of the message detail, relative to the annotated instance
<a href="#">details</a>	[ <a href="#">MessageType</a> ]	List of detail messages

## MessageSeverity

**Type:** String

Allowed Value	Description
<a href="#">success</a>	Positive feedback - no action required
<a href="#">info</a>	Additional information - no action required
<a href="#">warning</a>	Warning - action may be required
<a href="#">error</a>	Error - action is required

## ExceptionType

**Derived Types:**

- [ValueExceptionType](#)
- [ResourceExceptionType](#)
- [DataModificationExceptionType](#)

Property	Type	Description
<a href="#">info</a>	<a href="#">MessageType?</a>	Information about the exception

## ValueExceptionType: ExceptionType

Property	Type	Description
<a href="#">info</a>	<a href="#">MessageType?</a>	Information about the exception
<a href="#">value</a>	String?	String representation of the exact value

**ResourceExceptionType: ExceptionType**

Property	Type	Description
<a href="#">info</a>	<a href="#">MessageType?</a>	Information about the exception
<a href="#">retryLink</a>	URL?	A GET request to this URL retries retrieving the problematic instance

**DataModificationExceptionType: ExceptionType**

Property	Type	Description
<a href="#">info</a>	<a href="#">MessageType?</a>	Information about the exception
<a href="#">failedOperation</a>	<a href="#">DataModificationOperationKind</a>	The kind of modification operation that failed
<a href="#">responseCode</a>	Int16?	Response code of the failed operation, e.g. 424 for a failed dependency

**DataModificationOperationKind**

Member	Value	Description
<a href="#">insert</a>	0	Insert new instance
<a href="#">update</a>	1	Update existing instance
<a href="#">upsert</a>	2	Insert new instance or update it if it already exists
<a href="#">delete</a>	3	Delete existing instance
<a href="#">invoke</a>	4	Invoke action or function
<a href="#">link</a>	5	Add link between entities
<a href="#">unlink</a>	6	Remove link between entities

**Tag**

**Type:** Boolean

This is the type to use for all tagging terms

**Permission**

Flag Member	Value	Description
<a href="#">None</a>	0	No permissions
<a href="#">Read</a>	1	Read permission
<a href="#">Write</a>	2	Write permission
<a href="#">ReadWrite</a>	3	Read and write permission
<a href="#">Invoke</a>	4	Permission to invoke actions

## [ContentDispositionType](#)

Property	Type	Description
<a href="#">Type</a>	String	The disposition type of the binary or stream value, see <a href="#">RFC 6266, Disposition Type</a>
<a href="#">Filename</a>	String?	The proposed filename for downloading the binary or stream value, see <a href="#">RFC 6266, Disposition Parameter: 'Filename'</a>

## [QualifiedTermName](#)

**Type:** String

The qualified name of a term in scope.

## [QualifiedTypeName](#)

**Type:** String

The qualified name of a type in scope.

## [QualifiedActionName](#)

**Type:** String

The qualified name of an action in scope.

## [QualifiedBoundOperationName](#)

**Type:** String

The qualified name of a bound action or function in scope.

Either

- the qualified name of an action, to indicate the single bound overload with the specified binding parameter type,
- the qualified name of a function, to indicate all bound overloads with the specified binding parameter type, or
- the qualified name of a function followed by parentheses containing a comma-separated list of parameter types, in the order of their definition, to identify a single function overload with the first (binding) parameter matching the specified parameter type.

## [AlternateKey](#)

Property	Type	Description
<a href="#">Key</a>	<a href="#">[PropertyRef]</a>	The set of properties that make up this key

## [PropertyRef](#)

Property	Type	Description
<a href="#">Name</a>	PropertyPath	A path expression resolving to a primitive property of the entity type itself or to a primitive property of a complex or navigation property (recursively) of the entity type. The names of the properties in the path are joined together by forward slashes.

Property	Type	Description
<a href="#">Alias</a>	String	A SimpleIdentifier that MUST be unique within the set of aliases, structural and navigation properties of the containing entity type that MUST be used in the key predicate of URLs

## Dictionary

A dictionary of name-value pairs. Names must be valid property names, values may be restricted to a list of types via an annotation with term `Validation.OpenPropertyTypeConstraint`.

Property	Type
Any simple identifier	Any type listed in <code>Validation.OpenPropertyTypeConstraint</code> , or any type if there is no constraint

## OptionalParameterType

Property	Type	Description
<a href="#">DefaultValue</a>	String?	Default value for an optional parameter of primitive or enumeration type, using the same rules as the <code>cast</code> function in URLs. If no explicit <code>DefaultValue</code> is specified, the service is free on how to interpret omitting the parameter from the request. For example, a service might interpret an omitted optional parameter <code>KeyDate</code> as having the current date.

## LocalDateTime

**Type:** String

A string representing a Local Date-Time value with no offset.

## SimpleIdentifier

**Type:** String

A [simple identifier](#)

## GeometryFeatureType

A [Feature Object](#) represents a spatially bounded thing

Property	Type	Description
<a href="#">geometry</a>	Geometry?	Location of the Feature
<a href="#">properties</a>	<a href="#">Dictionary?</a>	Properties of the Feature
<a href="#">id</a>	String?	Commonly used identifier for a Feature

## 3 Capabilities Vocabulary

Namespace: [Org.OData.Capabilities.V1](#)

Terms describing capabilities of a service

There are some capabilities which are strongly recommended for services to support even though they are optional. Support for \$stop and \$skip is a good example as supporting these query options helps with performance of a service and are essential. Such capabilities are assumed to be default capabilities of an OData service even in the case that a capabilities annotation doesn't exist. Capabilities annotations are mainly expected to be used to explicitly specify that a service doesn't support such capabilities. Capabilities annotations can as well be used to declaratively specify the support of such capabilities.

On the other hand, there are some capabilities that a service may choose to support or not support and in varying degrees. \$filter and \$orderby are such good examples. This vocabulary aims to define terms to specify support or no support for such capabilities.

A service is assumed to support by default the following capabilities even though an annotation doesn't exist:

- Countability (\$count)
- Client pageability (\$top, \$skip)
- Expandability (\$expand)
- Indexability by key
- Batch support (\$batch)
- Navigability of navigation properties

A service is expected to support the following capabilities. If not supported, the service is expected to call out the restrictions using annotations:

- Filterability (\$filter)
- Sortability (\$orderby)
- Queryability of top level entity sets
- Query functions

A client cannot assume that a service supports certain capabilities. A client can try, but it needs to be prepared to handle an error in case the following capabilities are not supported:

- Insertability
- Updatability
- Deletability

### Terms

Term	Type	Description
<a href="#">ConformanceLevel</a>	<a href="#">ConformanceLevelType</a>	The conformance level achieved by this service
<a href="#">SupportedFormats</a>	[MediaType]	Media types of supported formats, including format parameters
<a href="#">SupportedMetadataFormats</a>	[MediaType]	Media types of supported formats for \$metadata, including format parameters

Term	Type	Description
<a href="#">AcceptableEncodings</a>	[String]	List of acceptable compression methods for (\$batch) requests, e.g. gzip
<a href="#">AsynchronousRequestsSupported</a>	Tag	Service supports the asynchronous request preference
<a href="#">BatchContinueOnErrorSupported</a>	Tag	Service supports the continue on error preference. Supports \$batch requests. Services that apply the BatchContinueOnErrorSupported term should also specify the ContinueOnErrorSupported property from the BatchSupport term.
<a href="#">IsolationSupported</a>	<a href="#">IsolationLevel</a>	Supported odata.isolation levels
<a href="#">CrossJoinSupported</a>	Tag	Supports cross joins for the entity sets in this container
<a href="#">CallbackSupported</a>	<a href="#">CallbackType</a>	Supports callbacks for the specified protocols
<a href="#">ChangeTracking</a>	<a href="#">ChangeTrackingType</a>	Change tracking capabilities of this service or entity set
<a href="#">CountRestrictions</a>	<a href="#">CountRestrictionsType</a>	Restrictions on /\$count path suffix and \$count=true system query option
<a href="#">NavigationRestrictions</a>	<a href="#">NavigationRestrictionsType</a>	Restrictions on navigating properties according to OData URL conventions Restrictions specified on an entity set are valid whether the request is directly to the entity set or through a navigation property bound to that entity set. Services can specify a different set of restrictions specific to a path, in which case the more specific restrictions take precedence.
<a href="#">IndexableByKey</a>	Tag	Supports key values according to OData URL conventions
<a href="#">TopSupported</a>	Tag	Supports \$top
<a href="#">SkipSupported</a>	Tag	Supports \$skip
<a href="#">ComputeSupported</a>	Tag	Supports \$compute
<a href="#">SelectSupport</a>	<a href="#">SelectSupportType</a>	Support for \$select and nested query options within \$select



Term	Type	Description
<a href="#">BatchSupported</a>	<a href="#">Tag</a>	Supports \$batch requests. Services that apply the BatchSupported term should also apply the more comprehensive BatchSupport term.
<a href="#">BatchSupport</a>	<a href="#">BatchSupportType</a>	Batch Support for the service
<a href="#">FilterFunctions</a>	[String]	List of functions and operators supported in filter expressions If not specified, null, or empty, all functions and operators may be attempted.
<a href="#">FilterRestrictions</a>	<a href="#">FilterRestrictionsType</a>	Restrictions on filter expressions
<a href="#">SortRestrictions</a>	<a href="#">SortRestrictionsType</a>	Restrictions on orderby expressions
<a href="#">ExpandRestrictions</a>	<a href="#">ExpandRestrictionsType</a>	Restrictions on expand expressions
<a href="#">SearchRestrictions</a>	<a href="#">SearchRestrictionsType</a>	Restrictions on search expressions
<a href="#">KeyAsSegmentSupported</a>	<a href="#">Tag</a>	Supports <a href="#">key-as-segment convention</a> for addressing entities within a collection
<a href="#">QuerySegmentSupported</a>	<a href="#">Tag</a>	Supports <a href="#">passing query options in the request body</a>
<a href="#">InsertRestrictions</a>	<a href="#">InsertRestrictionsType</a>	Restrictions on insert operations
<a href="#">DeepInsertSupport</a>	<a href="#">DeepInsertSupportType?</a>	Deep Insert Support of the annotated resource (the whole service, an entity set, or a collection-valued resource)
<a href="#">UpdateRestrictions</a>	<a href="#">UpdateRestrictionsType</a>	Restrictions on update operations
<a href="#">DeepUpdateSupport</a>	<a href="#">DeepUpdateSupportType</a>	Deep Update Support of the annotated resource (the whole service, an entity set, or a collection-valued resource)
<a href="#">DeleteRestrictions</a>	<a href="#">DeleteRestrictionsType</a>	Restrictions on delete operations
<a href="#">CollectionPropertyRestrictions</a>	[ <a href="#">CollectionPropertyRestrictionsType</a> ]	Describes restrictions on operations applied to collection-valued structural properties
<a href="#">OperationRestrictions</a>	<a href="#">OperationRestrictionsType</a>	Restrictions for function or action operation
<a href="#">AnnotationValuesInQuerySupported</a>	<a href="#">Tag</a>	Supports annotation values within system query options

Term	Type	Description
<a href="#">ModificationQueryOptions</a>	<a href="#">ModificationQueryOptionsType</a>	Support for query options with modification requests (insert, update, action invocation)
<a href="#">ReadRestrictions</a>	<a href="#">ReadRestrictionsType</a>	Restrictions for retrieving a collection of entities, retrieving a singleton instance.
<a href="#">CustomHeaders</a>	[ <a href="#">CustomParameter</a> ]	Custom headers that are supported/required for the annotated resource ( <a href="#">Example</a> )
<a href="#">CustomQueryOptions</a>	[ <a href="#">CustomParameter</a> ]	Custom query options that are supported/required for the annotated resource ( <a href="#">Example</a> ) If the entity container is annotated, the query option is supported/required by all resources in that container.
<a href="#">MediaLocationUpdateSupported</a>	<a href="#">Tag</a>	Stream property or media stream supports update of its media edit URL and/or media read URL
<a href="#">DefaultCapabilities</a>	<a href="#">DefaultCapabilitiesType</a>	<p>Default capability settings for all collection-valued resources in the container</p> <p>Annotating a specific capability term, which is included as property in <code>DefaultCapabilitiesType</code>, for a specific collection-valued resource overrides the default capability with the specified properties using PATCH semantics:</p> <ul style="list-style-type: none"> <li>• Primitive or collection-valued properties specified in the specific capability term replace the corresponding properties specified in <code>DefaultCapabilities</code></li> <li>• Complex-valued properties specified in the specific capability term override the corresponding properties specified in <code>DefaultCapabilities</code> using PATCH semantics recursively</li> <li>• Properties specified neither in the specific term nor in <code>DefaultCapabilities</code> have their default value</li> </ul>

## [ConformanceLevelType](#)

Member	Value	Description
<a href="#">Minimal</a>	0	Minimal conformance level
<a href="#">Intermediate</a>	1	Intermediate conformance level
<a href="#">Advanced</a>	2	Advanced conformance level

## [IsolationLevel](#)

Flag Member	Value	Description
<a href="#">Snapshot</a>	1	All data returned for a request, including multiple requests within a batch or results retrieved across multiple pages, will be consistent as of a single point in time

## [CallbackType](#)

A non-empty collection lists the full set of supported protocols. A empty collection means 'only HTTP is supported'

Property	Type	Description
<a href="#">CallbackProtocols</a>	[ <a href="#">CallbackProtocol</a> ]	List of supported callback protocols, e.g. <code>http</code> or <code>wss</code>

## [CallbackProtocol](#)

Property	Type	Description
<a href="#">Id</a>	String?	Protocol Identifier
<a href="#">UriTemplate</a>	String?	URL Template including parameters. Parameters are enclosed in curly braces <code>{}</code> as defined in RFC6570
<a href="#">DocumentationUrl</a>	URL?	Human readable description of the meaning of the URL Template parameters

## [ChangeTrackingBase](#)

Derived Types:

- [ChangeTrackingType](#)

Property	Type	Description
<a href="#">Supported</a>	Boolean	odata.track-changes preference is supported

## [ChangeTrackingType: ChangeTrackingBase](#)

Property	Type	Description
<a href="#">Supported</a>	Boolean	odata.track-changes preference is supported

Property	Type	Description
<a href="#">FilterableProperties</a>	[PropertyPath]	Change tracking supports filters on these properties If no properties are specified or FilterableProperties is omitted, clients cannot assume support for filtering on any properties in combination with change tracking.
<a href="#">ExpandableProperties</a>	[NavigationPropertyPath]	Change tracking supports these properties expanded If no properties are specified or ExpandableProperties is omitted, clients cannot assume support for expanding any properties in combination with change tracking.

## [CountRestrictionsBase](#)

### Derived Types:

- [CountRestrictionsType](#)

Property	Type	Description
<a href="#">Countable</a>	Boolean	Instances can be counted in requests targeting a collection

## [CountRestrictionsType: CountRestrictionsBase](#)

Property	Type	Description
<a href="#">Countable</a>	Boolean	Instances can be counted in requests targeting a collection
<a href="#">NonCountableProperties</a>	[PropertyPath]	Members of these collection properties cannot be counted
<a href="#">NonCountableNavigationProperties</a>	[NavigationPropertyPath]	Members of these navigation properties cannot be counted

## [NavigationRestrictionsType](#)

Property	Type	Description
<a href="#">Navigability</a>	<a href="#">NavigationType?</a>	Default navigability for all navigation properties of the annotation target. Individual navigation properties can override this value via <code>RestrictedProperties/Navigability</code> .
<a href="#">RestrictedProperties</a>	<a href="#">[NavigationPropertyRestriction]</a>	List of navigation properties with restrictions

## [NavigationPropertyRestriction](#)

Using a property of `NavigationPropertyRestriction` in a `NavigationRestrictions` annotation is discouraged in favor of using an annotation with the corresponding term from this vocabulary and a target path starting with a container and ending in the `NavigationProperty`, unless the favored alternative is impossible because a dynamic expression requires an instance path whose evaluation starts at the target of the `NavigationRestrictions` annotation. See [this example](#).

Property	Type	Description
<a href="#">NavigationProperty</a>	NavigationPropertyPath	Navigation properties can be navigated The target path of a <a href="#">NavigationRestrictions</a> annotation followed by this navigation property path addresses the resource to which the other properties of <a href="#">NavigationPropertyRestriction</a> apply. Instance paths that occur in dynamic expressions are evaluated starting at the boundary between both paths, which must therefore be chosen accordingly.
<a href="#">Navigability</a>	<a href="#">NavigationType?</a>	Supported navigability of this navigation property
<a href="#">FilterFunctions</a>	[String]	List of functions and operators supported in filter expressions If not specified, null, or empty, all functions and operators may be attempted.
<a href="#">FilterRestrictions</a>	<a href="#">FilterRestrictionsType?</a>	Restrictions on filter expressions
<a href="#">SearchRestrictions</a>	<a href="#">SearchRestrictionsType?</a>	Restrictions on search expressions
<a href="#">SortRestrictions</a>	<a href="#">SortRestrictionsType?</a>	Restrictions on orderby expressions
<a href="#">TopSupported</a>	Boolean	Supports \$top
<a href="#">SkipSupported</a>	Boolean	Supports \$skip
<a href="#">SelectSupport</a>	<a href="#">SelectSupportType?</a>	Support for \$select
<a href="#">IndexableByKey</a>	Boolean	Supports key values according to OData URL conventions
<a href="#">InsertRestrictions</a>	<a href="#">InsertRestrictionsType?</a>	Restrictions on insert operations
<a href="#">DeepInsertSupport</a>	<a href="#">DeepInsertSupportType?</a>	Deep Insert Support of the annotated resource (the whole service, an entity set, or a collection-valued resource)
<a href="#">UpdateRestrictions</a>	<a href="#">UpdateRestrictionsType?</a>	Restrictions on update operations
<a href="#">DeepUpdateSupport</a>	<a href="#">DeepUpdateSupportType?</a>	Deep Update Support of the annotated resource (the whole service, an entity set, or a collection-valued resource)
<a href="#">DeleteRestrictions</a>	<a href="#">DeleteRestrictionsType?</a>	Restrictions on delete operations
<a href="#">OptimisticConcurrencyControl</a>	Boolean	Data modification (including insert) along this navigation property requires the use of ETags
<a href="#">ReadRestrictions</a>	<a href="#">ReadRestrictionsType?</a>	Restrictions for retrieving entities

## NavigationType

Member	Value	Description
<a href="#">Recursive</a>	0	Navigation properties can be recursively navigated
<a href="#">Single</a>	1	Navigation properties can be navigated to a single level
<a href="#">None</a>	2	Navigation properties are not navigable

## SelectSupportType

Property	Type	Description
<a href="#">Supported</a>	Boolean	Supports \$select
<a href="#">InstanceAnnotationsSupported</a>	Boolean	Supports instance annotations in \$select list
<a href="#">Expandable</a>	Boolean	\$expand within \$select is supported
<a href="#">Filterable</a>	Boolean	\$filter within \$select is supported
<a href="#">Searchable</a>	Boolean	\$search within \$select is supported
<a href="#">TopSupported</a>	Boolean	\$top within \$select is supported
<a href="#">SkipSupported</a>	Boolean	\$skip within \$select is supported
<a href="#">ComputeSupported</a>	Boolean	\$compute within \$select is supported
<a href="#">Countable</a>	Boolean	\$count within \$select is supported
<a href="#">Sortable</a>	Boolean	\$orderby within \$select is supported

## BatchSupportType

Property	Type	Description
<a href="#">Supported</a>	Boolean	Service supports requests to \$batch
<a href="#">ContinueOnErrorSupported</a>	Boolean	Service supports the continue on error preference
<a href="#">ReferencesInRequestBodiesSupported</a>	Boolean	Service supports Content-ID referencing in request bodies
<a href="#">ReferencesAcrossChangeSetsSupported</a>	Boolean	Service supports Content-ID referencing across change sets
<a href="#">EtagReferencesSupported</a>	Boolean	Service supports referencing Etags from previous requests
<a href="#">RequestDependencyConditionsSupported</a>	Boolean	Service supports the if member in JSON batch requests

Property	Type	Description
<a href="#">SupportedFormats</a>	[MediaType]	Media types of supported formats for \$batch  Allowed values: <a href="#">multipart/mixed</a> <a href="#">Multipart Batch Format</a> <a href="#">application/json</a> <a href="#">JSON Batch Format</a>

**Applicable Annotation Terms:**

- [Description](#)
- [LongDescription](#)

**[FilterRestrictionsBase](#)****Derived Types:**

- [FilterRestrictionsType](#)

Property	Type	Description
<a href="#">Filterable</a>	Boolean	\$filter is supported
<a href="#">RequiresFilter</a>	Boolean	\$filter is required
<a href="#">MaxLevels</a>	Int32	The maximum number of levels (including recursion) that can be traversed in a filter expression. A value of -1 indicates there is no restriction.

**Applicable Annotation Terms:**

- [Description](#)

**[FilterRestrictionsType: FilterRestrictionsBase](#)**

Property	Type	Description
<a href="#">Filterable</a>	Boolean	\$filter is supported
<a href="#">RequiresFilter</a>	Boolean	\$filter is required
<a href="#">MaxLevels</a>	Int32	The maximum number of levels (including recursion) that can be traversed in a filter expression. A value of -1 indicates there is no restriction.
<a href="#">RequiredProperties</a>	[PropertyPath]	These properties must be specified in the \$filter clause (properties of derived types are not allowed here)
<a href="#">NonFilterableProperties</a>	[PropertyPath]	These structural properties cannot be used in filter expressions

Property	Type	Description
<a href="#">FilterExpressionRestrictions</a>	<a href="#">[FilterExpressionRestrictionType]</a>	These properties only allow a subset of filter expressions. A valid filter expression for a single property can be enclosed in parentheses and combined by <code>and</code> with valid expressions for other properties.

**Applicable Annotation Terms:**

- [Description](#)

**[FilterExpressionRestrictionType](#)**

Property	Type	Description
<a href="#">Property</a>	PropertyPath?	Path to the restricted property
<a href="#">AllowedExpressions</a>	<a href="#">FilterExpressionType?</a>	Allowed subset of expressions

**[FilterExpressionType](#)****Type:** String

Allowed Value	Description
<a href="#">SingleValue</a>	Property can be used in a single <code>eq</code> clause
<a href="#">MultiValue</a>	Property can be used in multiple <code>eq</code> and <code>in</code> clauses, combined by <code>or</code> (which is logically equivalent to a single <code>in</code> clause)
<a href="#">SingleRange</a>	Property can be used in at most one <code>ge</code> and/or one <code>le</code> clause, separated by <code>and</code>
<a href="#">MultiRange</a>	Property can be compared to a union of one or more closed, half-open, or open intervals The filter expression for this property consists of one or more interval expressions combined by <code>or</code> . A single interval expression is either a single comparison of the property and a literal value with <code>eq</code> , <code>le</code> , <code>lt</code> , <code>ge</code> , or <code>gt</code> , or pair of boundaries combined by <code>and</code> and enclosed in parentheses. The lower boundary is either <code>ge</code> or <code>gt</code> , the upper boundary either <code>le</code> or <code>lt</code> .
<a href="#">SearchExpression</a>	String property can be used as first operand in <code>startswith</code> , <code>endswith</code> , and <code>contains</code> clauses
<a href="#">MultiRangeOrSearchExpression</a>	Property can be compared to a union of zero or more closed, half-open, or open intervals plus zero or more simple string patterns The filter expression for this property consists of one or more interval expressions or string comparison functions combined by <code>or</code> . See <code>MultiRange</code> for a definition of an interval expression. See <code>SearchExpression</code> for the allowed string comparison functions.

**[SortRestrictionsBase](#)****Derived Types:**



- [SortRestrictionsType](#)

Property	Type	Description
<a href="#">Sortable</a>	Boolean	\$orderby is supported

#### Applicable Annotation Terms:

- [Description](#)

#### [SortRestrictionsType](#): [SortRestrictionsBase](#)

Property	Type	Description
<a href="#">Sortable</a>	Boolean	\$orderby is supported
<a href="#">AscendingOnlyProperties</a>	[PropertyPath]	These properties can only be used for sorting in Ascending order
<a href="#">DescendingOnlyProperties</a>	[PropertyPath]	These properties can only be used for sorting in Descending order
<a href="#">NonSortableProperties</a>	[PropertyPath]	These structural properties cannot be used in orderby expressions

#### Applicable Annotation Terms:

- [Description](#)

#### [ExpandRestrictionsBase](#)

#### Derived Types:

- [ExpandRestrictionsType](#)

Property	Type	Description
<a href="#">Expandable</a>	Boolean	\$expand is supported
<a href="#">StreamsExpandable</a>	Boolean	\$expand is supported for stream properties and media streams
<a href="#">MaxLevels</a>	Int32	The maximum number of levels that can be expanded in a expand expression. A value of -1 indicates there is no restriction.

#### Applicable Annotation Terms:

- [Description](#)

#### [ExpandRestrictionsType](#): [ExpandRestrictionsBase](#)

Property	Type	Description
<a href="#">Expandable</a>	Boolean	\$expand is supported
<a href="#">StreamsExpandable</a>	Boolean	\$expand is supported for stream properties and media streams

Property	Type	Description
<a href="#">MaxLevels</a>	Int32	The maximum number of levels that can be expanded in a expand expression. A value of -1 indicates there is no restriction.
<a href="#">NonExpandableProperties</a>	[NavigationPropertyPath]	These properties cannot be used in expand expressions
<a href="#">NonExpandableStreamProperties</a>	[PropertyPath]	These stream properties cannot be used in expand expressions

**Applicable Annotation Terms:**

- [Description](#)

**[SearchRestrictionsType](#)**

Property	Type	Description
<a href="#">Searchable</a>	Boolean	\$search is supported
<a href="#">UnsupportedExpressions</a>	<a href="#">SearchExpressions</a>	Expressions not supported in \$search

**Applicable Annotation Terms:**

- [Description](#)

**[SearchExpressions](#)**

Flag Member	Value	Description
<a href="#">none</a>	0	Single search term
<a href="#">AND</a>	1	Multiple search terms, optionally separated by AND
<a href="#">OR</a>	2	Multiple search terms separated by OR
<a href="#">NOT</a>	4	Search terms preceded by NOT
<a href="#">phrase</a>	8	Search phrases enclosed in double quotes
<a href="#">group</a>	16	Precedence grouping of search expressions with parentheses

**[InsertRestrictionsBase](#)****Derived Types:**

- [InsertRestrictionsType](#)

Property	Type	Description
<a href="#">Insertable</a>	Boolean	Entities can be inserted

Property	Type	Description
<a href="#">MaxLevels</a>	Int32	The maximum number of navigation properties that can be traversed when addressing the collection to insert into. A value of -1 indicates there is no restriction.
<a href="#">TypecastSegmentSupported</a>	Boolean	Entities of a specific derived type can be created by specifying a type-cast segment
<a href="#">QueryOptions</a>	<a href="#">ModificationQueryOptionsType?</a>	Support for query options with insert requests
<a href="#">CustomHeaders</a>	[ <a href="#">CustomParameter</a> ]	Supported or required custom headers
<a href="#">CustomQueryOptions</a>	[ <a href="#">CustomParameter</a> ]	Supported or required custom query options
<a href="#">Description</a>	String?	A brief description of the request
<a href="#">LongDescription</a>	String?	A long description of the request
<a href="#">ErrorResponses</a>	[ <a href="#">HttpResponse</a> ]	Possible error responses returned by the request.

### **InsertRestrictionsType: InsertRestrictionsBase**

Property	Type	Description
<a href="#">Insertable</a>	Boolean	Entities can be inserted
<a href="#">MaxLevels</a>	Int32	The maximum number of navigation properties that can be traversed when addressing the collection to insert into. A value of -1 indicates there is no restriction.
<a href="#">TypecastSegmentSupported</a>	Boolean	Entities of a specific derived type can be created by specifying a type-cast segment
<a href="#">QueryOptions</a>	<a href="#">ModificationQueryOptionsType?</a>	Support for query options with insert requests
<a href="#">CustomHeaders</a>	[ <a href="#">CustomParameter</a> ]	Supported or required custom headers
<a href="#">CustomQueryOptions</a>	[ <a href="#">CustomParameter</a> ]	Supported or required custom query options
<a href="#">Description</a>	String?	A brief description of the request
<a href="#">LongDescription</a>	String?	A long description of the request
<a href="#">ErrorResponses</a>	[ <a href="#">HttpResponse</a> ]	Possible error responses returned by the request.
<a href="#">NonInsertableProperties</a>	[ <a href="#">PropertyPath</a> ]	These structural properties cannot be specified on insert

Property	Type	Description
<a href="#">NonInsertableNavigationProperties</a>	[NavigationPropertyPath]	These navigation properties do not allow deep inserts
<a href="#">RequiredProperties</a>	[PropertyPath]	These structural properties must be specified on insert
<a href="#">Permissions</a>	[ <a href="#">PermissionType?</a> ]	Required permissions. One of the specified sets of scopes is required to perform the insert.

## [PermissionType](#)

Property	Type	Description
<a href="#">SchemeName</a>	<a href="#">SchemeName</a>	Authorization flow scheme name
<a href="#">Scopes</a>	[ <a href="#">ScopeType</a> ]	List of scopes that can provide access to the resource

## [ScopeType](#)

Property	Type	Description
<a href="#">Scope</a>	String	Name of the scope.
<a href="#">RestrictedProperties</a>	String?	Comma-separated string value of all properties that will be included or excluded when using the scope. Possible string value identifiers when specifying properties are *, <i>PropertyName</i> , - <i>PropertyName</i> . * denotes all properties are accessible. - <i>PropertyName</i> excludes that specific property. <i>PropertyName</i> explicitly provides access to the specific property. The absence of <code>RestrictedProperties</code> denotes all properties are accessible using that scope.

## [DeepInsertSupportType](#)

Property	Type	Description
<a href="#">Supported</a>	Boolean	Annotation target supports deep inserts
<a href="#">ContentIDSupported</a>	Boolean	Annotation target supports accepting and returning nested entities annotated with the <code>Core.ContentID</code> instance annotation.

## [UpdateRestrictionsBase](#)

### Derived Types:

- [UpdateRestrictionsType](#)

Property	Type	Description
<a href="#">Updatable</a>	Boolean	Entities can be updated

Property	Type	Description
<a href="#">Upsertable</a>	Boolean	Entities can be upserted
<a href="#">DeltaUpdateSupported</a>	Boolean	Entities can be inserted, updated, and deleted via a PATCH request with a delta payload
<a href="#">UpdateMethod</a>	<a href="#">HttpMethod?</a>	Supported HTTP Methods (PUT or PATCH) for updating an entity. If null, PATCH SHOULD be supported and PUT MAY be supported.
<a href="#">FilterSegmentSupported</a>	Boolean	Members of collections can be updated via a PATCH request with a <code>/\$filter(...)/\$each</code> segment
<a href="#">TypecastSegmentSupported</a>	Boolean	Members of collections can be updated via a PATCH request with a type-cast segment and a <code>/\$each</code> segment
<a href="#">MaxLevels</a>	Int32	The maximum number of navigation properties that can be traversed when addressing the collection or entity to update. A value of -1 indicates there is no restriction.
<a href="#">Permissions</a>	<a href="#">[PermissionType?]</a>	Required permissions. One of the specified sets of scopes is required to perform the update.
<a href="#">QueryOptions</a>	<a href="#">ModificationQueryOptionsType?</a>	Support for query options with update requests
<a href="#">CustomHeaders</a>	<a href="#">[CustomParameter]</a>	Supported or required custom headers
<a href="#">CustomQueryOptions</a>	<a href="#">[CustomParameter]</a>	Supported or required custom query options
<a href="#">Description</a>	String?	A brief description of the request
<a href="#">LongDescription</a>	String?	A long description of the request
<a href="#">ErrorResponses</a>	<a href="#">[HttpResponse]</a>	Possible error responses returned by the request.

### [UpdateRestrictionsType: UpdateRestrictionsBase](#)

Property	Type	Description
<a href="#">Updatable</a>	Boolean	Entities can be updated
<a href="#">Upsertable</a>	Boolean	Entities can be upserted
<a href="#">DeltaUpdateSupported</a>	Boolean	Entities can be inserted, updated, and deleted via a PATCH request with a delta payload
<a href="#">UpdateMethod</a>	<a href="#">HttpMethod?</a>	Supported HTTP Methods (PUT or PATCH) for updating an entity. If null, PATCH SHOULD be supported and PUT MAY be supported.

Property	Type	Description
<a href="#"><i>FilterSegmentSupported</i></a>	Boolean	Members of collections can be updated via a PATCH request with a <code>/\$filter(...)/\$each</code> segment
<a href="#"><i>TypecastSegmentSupported</i></a>	Boolean	Members of collections can be updated via a PATCH request with a type-cast segment and a <code>/\$each</code> segment
<a href="#"><i>MaxLevels</i></a>	Int32	The maximum number of navigation properties that can be traversed when addressing the collection or entity to update. A value of -1 indicates there is no restriction.
<a href="#"><i>Permissions</i></a>	[ <a href="#">PermissionType?</a> ]	Required permissions. One of the specified sets of scopes is required to perform the update.
<a href="#"><i>QueryOptions</i></a>	<a href="#">ModificationQueryOptionsType?</a>	Support for query options with update requests
<a href="#"><i>CustomHeaders</i></a>	[ <a href="#">CustomParameter</a> ]	Supported or required custom headers
<a href="#"><i>CustomQueryOptions</i></a>	[ <a href="#">CustomParameter</a> ]	Supported or required custom query options
<a href="#"><i>Description</i></a>	String?	A brief description of the request
<a href="#"><i>LongDescription</i></a>	String?	A long description of the request
<a href="#"><i>ErrorResponses</i></a>	[ <a href="#">HttpResponse</a> ]	Possible error responses returned by the request.
<a href="#"><i>NonUpdatableProperties</i></a>	[PropertyPath]	These structural properties cannot be specified on update
<a href="#"><i>NonUpdatableNavigationProperties</i></a>	[NavigationPropertyPath]	These navigation properties do not allow rebinding
<a href="#"><i>RequiredProperties</i></a>	[PropertyPath]	These structural properties must be specified on update

## HttpMethod

Flag Member	Value	Description
<a href="#">GET</a>	1	The HTTP GET Method
<a href="#">PATCH</a>	2	The HTTP PATCH Method
<a href="#">PUT</a>	4	The HTTP PUT Method
<a href="#">POST</a>	8	The HTTP POST Method

Flag Member	Value	Description
<a href="#">DELETE</a>	16	The HTTP DELETE Method
<a href="#">OPTIONS</a>	32	The HTTP OPTIONS Method
<a href="#">HEAD</a>	64	The HTTP HEAD Method

## [DeepUpdateSupportType](#)

Property	Type	Description
<a href="#">Supported</a>	Boolean	Annotation target supports deep updates
<a href="#">ContentIDSupported</a>	Boolean	Annotation target supports accepting and returning nested entities annotated with the <code>Core.ContentID</code> instance annotation.

## [DeleteRestrictionsBase](#)

### Derived Types:

- [DeleteRestrictionsType](#)

Property	Type	Description
<a href="#">Deletable</a>	Boolean	Entities can be deleted
<a href="#">MaxLevels</a>	Int32	The maximum number of navigation properties that can be traversed when addressing the collection to delete from or the entity to delete. A value of -1 indicates there is no restriction.
<a href="#">FilterSegmentSupported</a>	Boolean	Members of collections can be deleted via a DELETE request with a <code>/\$filter(...)/\$each</code> segment
<a href="#">TypecastSegmentSupported</a>	Boolean	Members of collections can be deleted via a DELETE request with a type-cast segment and a <code>/\$each</code> segment
<a href="#">Permissions</a>	[ <a href="#">PermissionType?</a> ]	Required permissions. One of the specified sets of scopes is required to perform the delete.
<a href="#">CustomHeaders</a>	[ <a href="#">CustomParameter</a> ]	Supported or required custom headers
<a href="#">CustomQueryOptions</a>	[ <a href="#">CustomParameter</a> ]	Supported or required custom query options
<a href="#">Description</a>	String?	A brief description of the request
<a href="#">LongDescription</a>	String?	A long description of the request
<a href="#">ErrorResponses</a>	[ <a href="#">HttpResponse</a> ]	Possible error responses returned by the request.

## [DeleteRestrictionsType](#): [DeleteRestrictionsBase](#)

Property	Type	Description
<a href="#">Deletable</a>	Boolean	Entities can be deleted

Property	Type	Description
<a href="#">MaxLevels</a>	Int32	The maximum number of navigation properties that can be traversed when addressing the collection to delete from or the entity to delete. A value of -1 indicates there is no restriction.
<a href="#">FilterSegmentSupported</a>	Boolean	Members of collections can be deleted via a DELETE request with a <code>/\$filter(...)/\$each</code> segment
<a href="#">TypecastSegmentSupported</a>	Boolean	Members of collections can be deleted via a DELETE request with a type-cast segment and a <code>/\$each</code> segment
<a href="#">Permissions</a>	[ <a href="#">PermissionType?</a> ]	Required permissions. One of the specified sets of scopes is required to perform the delete.
<a href="#">CustomHeaders</a>	[ <a href="#">CustomParameter</a> ]	Supported or required custom headers
<a href="#">CustomQueryOptions</a>	[ <a href="#">CustomParameter</a> ]	Supported or required custom query options
<a href="#">Description</a>	String?	A brief description of the request
<a href="#">LongDescription</a>	String?	A long description of the request
<a href="#">ErrorResponses</a>	[ <a href="#">HttpResponse</a> ]	Possible error responses returned by the request.
<a href="#">NonDeletableNavigationProperties</a>	[ <a href="#">NavigationPropertyPath</a> ]	These navigation properties do not allow DeleteLink requests

## [CollectionPropertyRestrictionsType](#)

Property	Type	Description
<a href="#">CollectionProperty</a>	PropertyPath?	Restricted Collection-valued property
<a href="#">FilterFunctions</a>	[String]	List of functions and operators supported in filter expressions If not specified, null, or empty, all functions and operators may be attempted.
<a href="#">FilterRestrictions</a>	<a href="#">FilterRestrictionsType?</a>	Restrictions on filter expressions
<a href="#">SearchRestrictions</a>	<a href="#">SearchRestrictionsType?</a>	Restrictions on search expressions
<a href="#">SortRestrictions</a>	<a href="#">SortRestrictionsType?</a>	Restrictions on orderby expressions
<a href="#">TopSupported</a>	Boolean	Supports \$top
<a href="#">SkipSupported</a>	Boolean	Supports \$skip
<a href="#">SelectSupport</a>	<a href="#">SelectSupportType?</a>	Support for \$select
<a href="#">Insertable</a>	Boolean	Members can be inserted into this collection If additionally annotated with <a href="#">Core.PositionalInsert</a> , members can be inserted at a specific position



Property	Type	Description
<a href="#">Updatable</a>	Boolean	Members of this ordered collection can be updated by ordinal
<a href="#">Deletable</a>	Boolean	Members of this ordered collection can be deleted by ordinal

### [OperationRestrictionsType](#)

Property	Type	Description
<a href="#">FilterSegmentSupported</a>	Boolean	Bound action or function can be invoked on a collection-valued binding parameter path with a <code>/\$filter(...)</code> segment
<a href="#">Permissions</a>	[ <a href="#">PermissionType?</a> ]	Required permissions. One of the specified sets of scopes is required to invoke an action or function
<a href="#">CustomHeaders</a>	[ <a href="#">CustomParameter</a> ]	Supported or required custom headers
<a href="#">CustomQueryOptions</a>	[ <a href="#">CustomParameter</a> ]	Supported or required custom query options
<a href="#">ErrorResponses</a>	[ <a href="#">HttpResponse</a> ]	Possible error responses returned by the request.

### [ModificationQueryOptionsType](#)

Property	Type	Description
<a href="#">ExpandSupported</a>	Boolean	Supports \$expand with modification requests
<a href="#">SelectSupported</a>	Boolean	Supports \$select with modification requests
<a href="#">ComputeSupported</a>	Boolean	Supports \$compute with modification requests
<a href="#">FilterSupported</a>	Boolean	Supports \$filter with modification requests
<a href="#">SearchSupported</a>	Boolean	Supports \$search with modification requests
<a href="#">SortSupported</a>	Boolean	Supports \$orderby with modification requests

### [ReadRestrictionsBase](#)

#### Derived Types:

- [ReadByKeyRestrictionsType](#)
- [ReadRestrictionsType](#)

Property	Type	Description
<a href="#">Readable</a>	Boolean	Entities can be retrieved
<a href="#">Permissions</a>	[ <a href="#">PermissionType?</a> ]	Required permissions. One of the specified sets of scopes is required to read.
<a href="#">CustomHeaders</a>	[ <a href="#">CustomParameter</a> ]	Supported or required custom headers
<a href="#">CustomQueryOptions</a>	[ <a href="#">CustomParameter</a> ]	Supported or required custom query options

Property	Type	Description
<a href="#">Description</a>	String?	A brief description of the request
<a href="#">LongDescription</a>	String?	A long description of the request
<a href="#">ErrorResponses</a>	[ <a href="#">HttpResponse</a> ]	Possible error responses returned by the request.

### [ReadByKeyRestrictionsType: ReadRestrictionsBase](#)

Restrictions for retrieving an entity by key

Property	Type	Description
<a href="#">Readable</a>	Boolean	Entities can be retrieved
<a href="#">Permissions</a>	[ <a href="#">PermissionType?</a> ]	Required permissions. One of the specified sets of scopes is required to read.
<a href="#">CustomHeaders</a>	[ <a href="#">CustomParameter</a> ]	Supported or required custom headers
<a href="#">CustomQueryOptions</a>	[ <a href="#">CustomParameter</a> ]	Supported or required custom query options
<a href="#">Description</a>	String?	A brief description of the request
<a href="#">LongDescription</a>	String?	A long description of the request
<a href="#">ErrorResponses</a>	[ <a href="#">HttpResponse</a> ]	Possible error responses returned by the request.

### [ReadRestrictionsType: ReadRestrictionsBase](#)

Property	Type	Description
<a href="#">Readable</a>	Boolean	Entities can be retrieved
<a href="#">Permissions</a>	[ <a href="#">PermissionType?</a> ]	Required permissions. One of the specified sets of scopes is required to read.
<a href="#">CustomHeaders</a>	[ <a href="#">CustomParameter</a> ]	Supported or required custom headers
<a href="#">CustomQueryOptions</a>	[ <a href="#">CustomParameter</a> ]	Supported or required custom query options
<a href="#">Description</a>	String?	A brief description of the request
<a href="#">LongDescription</a>	String?	A long description of the request
<a href="#">ErrorResponses</a>	[ <a href="#">HttpResponse</a> ]	Possible error responses returned by the request.
<a href="#">TypecastSegmentSupported</a>	Boolean	Entities of a specific derived type can be read by specifying a type-cast segment
<a href="#">ReadByKeyRestrictions</a>	<a href="#">ReadByKeyRestrictionsType?</a>	Restrictions for retrieving an entity by key Only valid when applied to a collection. If a property of <a href="#">ReadByKeyRestrictions</a> is not specified, the corresponding property value of <a href="#">ReadRestrictions</a> applies.

## CustomParameter

A custom parameter is either a header or a query option

The type of a custom parameter is always a string. Restrictions on the parameter values can be expressed by annotating the record expression describing the parameter with terms from the Validation vocabulary, e.g. Validation.Pattern or Validation.AllowedValues.

Property	Type	Description
<a href="#">Name</a>	String	Name of the custom parameter
<a href="#">Description</a>	String?	Description of the custom parameter
<a href="#">DocumentationURL</a>	URL?	URL of related documentation
<a href="#">Required</a>	Boolean	true: parameter is required, false or not specified: parameter is optional
<a href="#">ExampleValues</a>	[ <a href="#">PrimitiveExampleValue</a> ]	Example values for the custom parameter

## DefaultCapabilitiesType

Property	Type	Description
<a href="#">ChangeTracking</a>	<a href="#">ChangeTrackingBase?</a>	Change tracking capabilities
<a href="#">CountRestrictions</a>	<a href="#">CountRestrictionsBase?</a>	Restrictions on /\$count path suffix and \$count=true system query option
<a href="#">IndexableByKey</a>	<a href="#">Tag?</a>	Supports key values according to OData URL conventions
<a href="#">TopSupported</a>	<a href="#">Tag?</a>	Supports \$top
<a href="#">SkipSupported</a>	<a href="#">Tag?</a>	Supports \$skip
<a href="#">ComputeSupported</a>	<a href="#">Tag?</a>	Supports \$compute
<a href="#">SelectSupport</a>	<a href="#">SelectSupportType?</a>	Support for \$select and nested query options within \$select
<a href="#">FilterRestrictions</a>	<a href="#">FilterRestrictionsBase?</a>	Restrictions on filter expressions
<a href="#">SortRestrictions</a>	<a href="#">SortRestrictionsBase?</a>	Restrictions on orderby expressions
<a href="#">ExpandRestrictions</a>	<a href="#">ExpandRestrictionsBase?</a>	Restrictions on expand expressions
<a href="#">SearchRestrictions</a>	<a href="#">SearchRestrictionsType?</a>	Restrictions on search expressions
<a href="#">InsertRestrictions</a>	<a href="#">InsertRestrictionsBase?</a>	Restrictions on insert operations
<a href="#">UpdateRestrictions</a>	<a href="#">UpdateRestrictionsBase?</a>	Restrictions on update operations
<a href="#">DeleteRestrictions</a>	<a href="#">DeleteRestrictionsBase?</a>	Restrictions on delete operations
<a href="#">OperationRestrictions</a>	<a href="#">OperationRestrictionsType?</a>	Restrictions for function or action operations

Property	Type	Description
<a href="#">ReadRestrictions</a>	<a href="#">ReadRestrictionsType?</a>	Restrictions for retrieving a collection of entities, retrieving a singleton instance

## [HttpResponse](#)

Property	Type	Description
<a href="#">StatusCode</a>	String	HTTP response status code, for example 400, 403, 501
<a href="#">Description</a>	String	Human-readable description of the response

## 4 Measures Vocabulary

Namespace: [Org.OData.Measures.V1](#)

Terms describing monetary amounts and measured quantities

### Terms

Term	Type	Description
<a href="#">ISOCurrency</a>	String	The currency for this monetary amount as an ISO 4217 currency code
<a href="#">Scale</a>	Byte	The number of significant decimal places in the scale part (less than or equal to the number declared in the Scale facet)
<a href="#">Unit</a>	String	The unit of measure for this measured quantity, e.g. cm for centimeters or % for percentages
<a href="#">UNECEUnit</a>	String	The unit of measure for this measured quantity, according to the <a href="#">UN/CEFACT Recommendation 20</a>
<a href="#">DurationGranularity</a>	<a href="#">DurationGranularityType</a>	The minimum granularity of duration values. Absence of this annotation means a granularity of seconds with sub-seconds according to the Precision facet.

### DurationGranularityType

Type: String

Allowed Value	Description
<a href="#">days</a>	Duration in days, e.g. P1D
<a href="#">hours</a>	Duration in days and hours, e.g. P1DT23H
<a href="#">minutes</a>	Duration in days, hours, and minutes, e.g. P1DT23H59M

## 5 Validation Vocabulary

Namespace: [Org.OData.Validation.V1](#)

Terms describing validation rules

### Terms

Term	Type	Description
<a href="#">Pattern</a>	String	The pattern that a string property, parameter, or term must match. This SHOULD be a valid regular expression, according to the ECMA 262 regular expression dialect.
<a href="#">Minimum</a>	PrimitiveType	Minimum value that a property, parameter, or term can have. Can be annotated with: <ul style="list-style-type: none"> <li>• <a href="#">Exclusive</a></li> </ul>
<a href="#">Maximum</a>	PrimitiveType	Maximum value that a property, parameter, or term can have. Can be annotated with: <ul style="list-style-type: none"> <li>• <a href="#">Exclusive</a></li> </ul>
<a href="#">Exclusive</a>	<a href="#">Tag</a>	Tags a Minimum or Maximum as exclusive, i.e. an open interval boundary.
<a href="#">AllowedValues</a>	<a href="#">[AllowedValue]</a>	A collection of valid values for the annotated property, parameter, or type definition
<a href="#">MultipleOf</a>	Decimal	The value of the annotated property, parameter, or term must be an integer multiple of this positive value. For temporal types, the value is measured in seconds.
<a href="#">Constraint</a>	<a href="#">ConstraintType</a>	Condition that the annotation target has to fulfill
<a href="#">ItemsOf</a>	<a href="#">[ItemsOfType]</a>	A list of constraints describing that entities related via one navigation property MUST also be related via another, collection-valued navigation property. The same path value MUST NOT occur more than once. Example: entity type <code>Customer</code> has navigation properties <code>AllOrders</code> , <code>OpenOrders</code> , and <code>ClosedOrders</code> . The term allows to express that items of <code>OpenOrders</code> and <code>ClosedOrders</code> are also items of the <code>AllOrders</code> navigation property, even though they are defined in an <code>Orders</code> entity set.
<a href="#">OpenPropertyTypeConstraint</a>	<a href="#">[SingleOrCollectionType]</a>	Dynamic properties added to the annotated open structured type are restricted to the listed types.

Term	Type	Description
<a href="#">DerivedTypeConstraint</a>	<a href="#">[SingleOrCollectionType]</a>	<p>Values are restricted to types that are both identical to or derived from the declared type and a type listed in this collection.</p> <p>This allows restricting values to certain sub-trees of an inheritance hierarchy, including hierarchies starting at the <a href="#">Built-In Abstract Types</a>. Types listed in this collection are ignored if they are not derived from the declared type of the annotated model element or would not be allowed as declared type of the annotated model element.</p> <p>When applied to a collection-valued element, this annotation specifies the types allowed for members of the collection without mentioning the <code>Collection()</code> wrapper. The <code>SingleOrCollectionType</code> may only include the <code>Collection()</code> wrapper if the annotation is applied to an element with declared type <code>Edm.Untyped</code>.</p>
<a href="#">AllowedTerms</a>	<a href="#">[QualifiedTermName]</a>	<p>Annotate a term of type <code>Edm.AnnotationPath</code>, or a property of type <code>Edm.AnnotationPath</code> that is used within a structured term, to restrict the terms that can be targeted by the path.</p> <p>The annotation path expression is intended to end in a path segment with one of the listed terms. For forward compatibility, clients should be prepared for the annotation to reference terms besides those listed.</p>
<a href="#">ApplicableTerms</a>	<a href="#">[QualifiedTermName]</a>	Names of specific terms that are applicable and may be applied in the current context. This annotation does not restrict the use of other terms.
<a href="#">MaxItems</a>	Int64	The annotated collection must have at most the specified number of items.
<a href="#">MinItems</a>	Int64	The annotated collection must have at least the specified number of items.

## [AllowedValue](#)

Property	Type	Description
<a href="#">Value</a>	PrimitiveType?	An allowed value for the property, parameter, or type definition

### Applicable Annotation Terms:

- [SymbolicName](#)

## [ConstraintType](#)

Property	Type	Description
<a href="#">FailureMessage</a>	String?	Human-readable message that can be shown to end users if the constraint is not fulfilled

Property	Type	Description
<a href="#">Condition</a>	Boolean	Value MUST be a dynamic expression that evaluates to true if and only if the constraint is fulfilled

### [ItemsOfType](#)

Entities related via the single- or collection-valued navigation property identified by `path` are also related via the collection-valued navigation property identified by `target`.

Property	Type	Description
<a href="#">path</a>	NavigationPropertyPath	A path to a single- or collection-valued navigation property
<a href="#">target</a>	NavigationPropertyPath	A path to a collection-valued navigation property

### [SingleOrCollectionType](#)

**Type:** String

The qualified name of a type in scope, optionally wrapped in `Collection()` to denote a collection of instances of the type



## 6 Aggregation Vocabulary

Namespace: [Org.OData.Aggregation.V1](#)

Terms to describe which data in a given entity model can be aggregated, and how.

Related to the specification document [OData-Data-Agg-v4.0](#).

### Terms

Term	Type	Description
<a href="#">ApplySupported</a>	<a href="#">ApplySupportedType</a>	This entity set or collection supports the \$apply system query option
<a href="#">ApplySupportedDefaults</a>	<a href="#">ApplySupportedBase</a>	<p>Default support of the \$apply system query option for all collection-valued resources in the container</p> <p>Annotating term <a href="#">ApplySupported</a> for a specific collection-valued resource overrides the default support with the specified properties using PATCH semantics:</p> <ul style="list-style-type: none"> <li>• Primitive or collection-valued properties specified in <a href="#">ApplySupported</a> replace the corresponding properties specified in <a href="#">ApplySupportedDefaults</a></li> <li>• Complex-valued properties specified in <a href="#">ApplySupported</a> override the corresponding properties specified in <a href="#">ApplySupportedDefaults</a> using PATCH semantics recursively</li> <li>• Properties specified neither in <a href="#">ApplySupported</a> nor in <a href="#">ApplySupportedDefaults</a> have their default value</li> </ul>
<a href="#">Groupable</a> (Deprecated)	<a href="#">Tag</a>	Deprecated in favor of <a href="#">ApplySupported/GroupableProperties</a>
<a href="#">Aggregatable</a> (Deprecated)	<a href="#">Tag</a>	Deprecated in favor of <a href="#">ApplySupported/AggregatableProperties</a>
<a href="#">CustomAggregate</a>	String	<p>Dynamic property that can be used in the aggregate transformation</p> <p>This term MUST be applied with a Qualifier, the Qualifier value is the name of the dynamic property. The value of the annotation MUST be the qualified name of a primitive type. The aggregated value will be of that type.</p>

Term	Type	Description
<a href="#">ContextDefiningProperties</a>	[PropertyPath]	The annotated property or custom aggregate is only well-defined in the context of these properties The context-defining properties need either be part of the result entities, or be restricted to a single value by a pre-filter operation. Examples are postal codes within a country, or monetary amounts whose context is the unit of currency.
<a href="#">LeveledHierarchy</a>	[PropertyPath]	Defines a leveled hierarchy (OData-Data-Agg-v4.0, section 5.5.1)
<a href="#">RecursiveHierarchy</a>	<a href="#">RecursiveHierarchyType</a>	Defines a recursive hierarchy (OData-Data-Agg-v4.0, section 5.5.2)
<a href="#">UpPath</a>	[String]	The string values of the node identifiers in a path from the annotated node to a start node in a traversal of a recursive hierarchy This instance annotation occurs in the result set after a <code>traverse</code> transformation (OData-Data-Agg-v4.0, section 6.2.2.2). A use case for this is traversal with multiple parents, when this annotation takes as value one parent node identifier followed by one grandparent node identifier and so on.
<a href="#">AvailableOnAggregates</a>	<a href="#">AvailableOnAggregatesType</a>	This function is available on aggregated entities if the <code>RequiredProperties</code> are still defined

## Functions

### [isnode](#)

Is the entity a node of the hierarchy specified by the [parameter pair](#) (`HierarchyNodes`, `HierarchyQualifier`)? (See OData-Data-Agg-v4.0, section 5.5.2.1)

If a node identifier passed to the function is null, the function returns null.

Parameter	Type	Description
<a href="#">HierarchyNodes</a>	[EntityType]	A collection, given through a <code>\$root</code> expression
<a href="#">HierarchyQualifier</a>	<a href="#">HierarchyQualifier</a>	
<a href="#">Node</a>	PrimitiveType?	Node identifier of the putative node
<a href="#">→</a>	Boolean?	

### [isroot](#)

Is the entity a root node of the hierarchy specified by the [parameter pair](#) (`HierarchyNodes`, `HierarchyQualifier`)?

If a node identifier passed to the function is null, the function returns null.

Parameter	Type	Description
<a href="#">HierarchyNodes</a>	[EntityType]	A collection, given through a \$root expression
<a href="#">HierarchyQualifier</a>	<a href="#">HierarchyQualifier</a>	
<a href="#">Node</a>	PrimitiveType?	Node identifier of the putative root
<a href="#">→</a>	Boolean?	

### [isdescendant](#)

Is the entity a descendant node of the ancestor node in the hierarchy specified by the [parameter pair](#) ([HierarchyNodes](#), [HierarchyQualifier](#)) with at most the specified distance? (See OData-Data-Agg-v4.0, section 5.5.2.1)

If a node identifier passed to the function is null, the function returns null.

Parameter	Type	Description
<a href="#">HierarchyNodes</a>	[EntityType]	A collection, given through a \$root expression
<a href="#">HierarchyQualifier</a>	<a href="#">HierarchyQualifier</a>	
<a href="#">Node</a>	PrimitiveType?	Node identifier of the putative descendant
<a href="#">Ancestor</a>	PrimitiveType?	Node identifier of the ancestor node
<a href="#">MaxDistance</a>	Int16	<i>Optional parameter</i>
<a href="#">IncludeSelf</a>	Boolean	<i>Optional parameter: Whether to include the node itself in the result</i>
<a href="#">→</a>	Boolean?	

### [isancestor](#)

Is the entity an ancestor node of the descendant node in the hierarchy specified by the [parameter pair](#) ([HierarchyNodes](#), [HierarchyQualifier](#)) with at most the specified distance? (See OData-Data-Agg-v4.0, section 5.5.2.1)

If a node identifier passed to the function is null, the function returns null.

Parameter	Type	Description
<a href="#">HierarchyNodes</a>	[EntityType]	A collection, given through a \$root expression
<a href="#">HierarchyQualifier</a>	<a href="#">HierarchyQualifier</a>	
<a href="#">Node</a>	PrimitiveType?	Node identifier of the putative ancestor
<a href="#">Descendant</a>	PrimitiveType?	Node identifier of the descendant node
<a href="#">MaxDistance</a>	Int16	<i>Optional parameter</i>
<a href="#">IncludeSelf</a>	Boolean	<i>Optional parameter: Whether to include the node itself in the result</i>

Parameter	Type	Description
<a href="#">→</a>	Boolean?	

### [issibling](#)

Is the entity a sibling node of the other node in the hierarchy specified by the [parameter pair](#) ([HierarchyNodes](#), [HierarchyQualifier](#))? (See OData-Data-Agg-v4.0, section 5.5.2.1)

A node is not a sibling of itself. If a node identifier passed to the function is null, the function returns null.

Parameter	Type	Description
<a href="#">HierarchyNodes</a>	[EntityType]	A collection, given through a <code>\$root</code> expression
<a href="#">HierarchyQualifier</a>	<a href="#">HierarchyQualifier</a>	
<a href="#">Node</a>	PrimitiveType?	Node identifier of the putative sibling
<a href="#">Other</a>	PrimitiveType?	Node identifier of the other node
<a href="#">→</a>	Boolean?	

### [isleaf](#)

Is the entity a leaf node in the hierarchy specified by the [parameter pair](#) ([HierarchyNodes](#), [HierarchyQualifier](#))? (See OData-Data-Agg-v4.0, section 5.5.2.1)

If a node identifier passed to the function is null, the function returns null.

Parameter	Type	Description
<a href="#">HierarchyNodes</a>	[EntityType]	A collection, given through a <code>\$root</code> expression
<a href="#">HierarchyQualifier</a>	<a href="#">HierarchyQualifier</a>	
<a href="#">Node</a>	PrimitiveType?	Node identifier of the putative leaf
<a href="#">→</a>	Boolean?	

### [rollupnode](#)

During `rolluprecursive` for a hierarchy node, this function returns the node

This function may only occur in the second parameter of a `groupby` transformation whose first parameter contains `rolluprecursive(...)`. It is evaluated as part of the transformation  $R(x)$  in the “`rolluprecursive` algorithm” (OData-Data-Agg-v4.0, section 6.3). Its behavior is undefined outside of this algorithm.

```
Sales?$apply=groupby((rolluprecursive(...)), filter(SalesOrganization eq
Aggregation.rollupnode())/aggregate(...))
```

constructs a rollup that contains aggregates per hierarchy node while excluding descendants from the aggregation.

Parameter	Type	Description
<a href="#">Position</a>	Int16	<i>Optional parameter:</i> Position N among the <code>rolluprecursive</code> operators in the first argument of <code>groupby</code> Every instance in the output set of a <code>groupby</code> transformation with M <code>rolluprecursive</code> operators has M relationships to M nodes in M recursive hierarchies. This function returns the node x with path r to the root in relationship number N. If several such <code>groupby</code> transformations are nested, this function refers to the innermost one.
<a href="#">→</a>	EntityType	

## ApplySupportedBase

Services that do not fully implement a certain aggregation-related functionality may document this by annotating the [ApplySupported](#) or [ApplySupportedDefaults](#) annotation with a description.

### Derived Types:

- [ApplySupportedType](#)

Property	Type	Description
<a href="#">Transformations</a>	[ <a href="#">Transformation</a> ]	Transformations that can be used in <code>\$apply</code>
<a href="#">CustomAggregationMethods</a>	[String]	Qualified names of custom aggregation methods that can be used in <code>aggregate(...with...)</code>
<a href="#">Rollup</a>	<a href="#">RollupType</a>	The service supports rollup hierarchies in a <code>groupby</code> transformation
<a href="#">From</a>	Boolean	The service supports the <code>from</code> keyword in an <code>aggregate</code> transformation

## ApplySupportedType: ApplySupportedBase

Property	Type	Description
<a href="#">Transformations</a>	[ <a href="#">Transformation</a> ]	Transformations that can be used in <code>\$apply</code>
<a href="#">CustomAggregationMethods</a>	[String]	Qualified names of custom aggregation methods that can be used in <code>aggregate(...with...)</code>
<a href="#">Rollup</a>	<a href="#">RollupType</a>	The service supports rollup hierarchies in a <code>groupby</code> transformation
<a href="#">From</a>	Boolean	The service supports the <code>from</code> keyword in an <code>aggregate</code> transformation
<a href="#">PropertyRestrictions</a> ( <i>Deprecated</i> )	Boolean	Deprecated since <a href="#">Groupable</a> and <a href="#">Aggregatable</a> are deprecated
<a href="#">GroupableProperties</a>	[AnyPropertyPath]	A non-empty collection indicates that only the listed properties of the annotated target are supported by the <code>groupby</code> transformation

Property	Type	Description
<a href="#">AggregatableProperties</a>	<a href="#">[AggregatablePropertyType]</a>	A non-empty collection indicates that only the listed properties of the annotated target can be used in the <code>aggregate</code> transformation, optionally restricted to the specified aggregation methods

## AggregatablePropertyType

Property	Type	Description
<a href="#">Property</a>	PropertyPath	Aggregatable property
<a href="#">SupportedAggregationMethods</a>	<a href="#">[AggregationMethod]</a>	Standard and custom aggregation methods that can be applied to the property. If omitted, all aggregation methods can be applied
<a href="#">RecommendedAggregationMethod</a>	<a href="#">AggregationMethod?</a>	Recommended method for aggregating values of the property

## Transformation

**Type:** String

A transformation that can be used in `$apply`

Allowed Value	Description
<a href="#">aggregate</a>	OData-Data-Agg-v4.0, section 3.2.1
<a href="#">groupby</a>	OData-Data-Agg-v4.0, section 3.2.3
<a href="#">concat</a>	OData-Data-Agg-v4.0, section 3.2.2
<a href="#">identity</a>	OData-Data-Agg-v4.0, section 3.4.1
<a href="#">filter</a>	OData-Data-Agg-v4.0, section 3.3.2
<a href="#">search</a>	OData-Data-Agg-v4.0, section 3.3.4
<a href="#">nest</a>	OData-Data-Agg-v4.0, section 3.5.2
<a href="#">addnested</a>	OData-Data-Agg-v4.0, section 3.4.3
<a href="#">join</a>	OData-Data-Agg-v4.0, section 3.5.1
<a href="#">outerjoin</a>	OData-Data-Agg-v4.0, section 3.5.1
<a href="#">compute</a>	OData-Data-Agg-v4.0, section 3.4.2
<a href="#">bottomcount</a>	OData-Data-Agg-v4.0, section 3.3.1.1
<a href="#">bottomsum</a>	OData-Data-Agg-v4.0, section 3.3.1.3
<a href="#">bottompercent</a>	OData-Data-Agg-v4.0, section 3.3.1.2

Allowed Value	Description
<a href="#">topcount</a>	OData-Data-Agg-v4.0, section 3.3.1.1
<a href="#">topsum</a>	OData-Data-Agg-v4.0, section 3.3.1.3
<a href="#">toppercent</a>	OData-Data-Agg-v4.0, section 3.3.1.2
<a href="#">orderby</a>	OData-Data-Agg-v4.0, section 3.3.3
<a href="#">top</a>	OData-Data-Agg-v4.0, section 3.3.6
<a href="#">skip</a>	OData-Data-Agg-v4.0, section 3.3.5
<a href="#">ancestors</a>	OData-Data-Agg-v4.0, section 6.2.1
<a href="#">descendants</a>	OData-Data-Agg-v4.0, section 6.2.1
<a href="#">traverse</a>	OData-Data-Agg-v4.0, section 6.2.2

## AggregationMethod

**Type:** String

Standard or custom aggregation method

Custom aggregation methods **MUST** use a namespace-qualified name, that is contain at least one dot.

Allowed Value	Description
<a href="#">sum</a>	Can be applied to numeric values to return the sum of the non-null values, or null if there are no non-null values or the input set is empty
<a href="#">min</a>	Can be applied to values with a totally ordered domain to return the smallest of the non-null values, or null if there are no non-null values or the input set is empty
<a href="#">max</a>	Can be applied to values with a totally ordered domain to return the largest of the non-null values, or null if there are no non-null values or the input set is empty
<a href="#">average</a>	Can be applied to numeric values to return the sum of the non-null values divided by the count of the non-null values, or null if there are no non-null values or the input set is empty
<a href="#">countdistinct</a>	Counts the distinct values, omitting any null values For navigation properties, it counts the distinct entities in the union of all entities related to entities in the input set. For collection-valued primitive properties, it counts the distinct items in the union of all collection values in the input set.

## RollupType

The number of `rollup` or `rolluprecursive` operators allowed in a `groupby` transformation

Member	Value	Description
<a href="#">None</a>	0	No support for <code>rollup</code> or <code>rolluprecursive</code>

Member	Value	Description
<a href="#">SingleHierarchy</a>	1	Only one rollup or rolluprecursive operator per groupby
<a href="#">MultipleHierarchies</a>	2	Full support for rollup and rolluprecursive

## [RecursiveHierarchyType](#)

Property	Type	Description
<a href="#">NodeProperty</a>	PropertyPath	Primitive property holding the node identifier
<a href="#">ParentNavigationProperty</a>	NavigationPropertyPath	Property for navigating to the parent node(s). Its type MUST be the entity type annotated with this term, and it MUST be collection-valued or nullable single-valued.

## [HierarchyQualifier](#)

**Type:** String

Qualifier of a [RecursiveHierarchy](#) annotation

Every recursive hierarchy function defined in this vocabulary has

- a parameter `HierarchyQualifier` of this type and
- a parameter `HierarchyNodes` that is a collection of entities of a common type without multiple occurrences of the same entity.

`HierarchyQualifier` is the qualifier of a `RecursiveHierarchy` annotation on the entity type of the collection given by the `HierarchyNodes` parameter. This specifies a recursive hierarchy that is evaluated by the function.

## [AvailableOnAggregatesType](#)

Property	Type	Description
<a href="#">RequiredProperties</a>	[PropertyPath]	Properties required to apply this function

## [NavigationPropertyAggregationCapabilities: NavigationPropertyRestriction \(Deprecated\)](#)

[Capabilities.NavigationRestrictions](#) that make use of the additional properties in this subtype are deprecated in favor of [ApplySupported](#) and [CustomAggregate](#)

## [CustomAggregateType \(Deprecated\)](#)

Deprecated since [NavigationPropertyAggregationCapabilities](#) is also deprecated



## 7 Authorization Vocabulary

Namespace: [Org.OData.Authorization.V1](#)

The Authorization Vocabulary provides terms for describing authorization requirements of the service

### Terms

Term	Type	Description
<a href="#">SecuritySchemes</a>	[ <a href="#">SecurityScheme</a> ]	At least one of the specified security schemes are required to make a request against the service
<a href="#">Authorizations</a>	[ <a href="#">Authorization</a> ]	Lists the methods supported by the service to authorize access

### SecurityScheme

Property	Type	Description
<a href="#">Authorization</a>	<a href="#">SchemeName</a>	The name of a required authorization scheme
<a href="#">RequiredScopes</a>	[String]	The names of scopes required from this authorization scheme

### Authorization

Base type for all Authorization types

#### Derived Types:

- [OpenIDConnect](#)
- [Http](#)
- [OAuthAuthorization](#)
  - [OAuth2ClientCredentials](#)
  - [OAuth2Implicit](#)
  - [OAuth2Password](#)
  - [OAuth2AuthCode](#)
- [ApiKey](#)

Property	Type	Description
<a href="#">Name</a>	String	Name that can be used to reference the authorization scheme
<a href="#">Description</a>	String?	Description of the authorization scheme

### OpenIDConnect: Authorization

Property	Type	Description
<a href="#">Name</a>	String	Name that can be used to reference the authorization scheme
<a href="#">Description</a>	String?	Description of the authorization scheme

Property	Type	Description
<a href="#">IssuerUrl</a>	URL	Issuer location for the OpenID Provider. Configuration information can be obtained by appending /.well-known/openid-configuration to this Url.

### [Http: Authorization](#)

Property	Type	Description
<a href="#">Name</a>	String	Name that can be used to reference the authorization scheme
<a href="#">Description</a>	String?	Description of the authorization scheme
<a href="#">Scheme</a>	String	HTTP Authorization scheme to be used in the Authorization header, as per RFC7235
<a href="#">BearerFormat</a>	String?	Format of the bearer token

### [OAuthAuthorization: Authorization](#)

#### Derived Types:

- [OAuth2ClientCredentials](#)
- [OAuth2Implicit](#)
- [OAuth2Password](#)
- [OAuth2AuthCode](#)

Property	Type	Description
<a href="#">Name</a>	String	Name that can be used to reference the authorization scheme
<a href="#">Description</a>	String?	Description of the authorization scheme
<a href="#">Scopes</a>	[ <a href="#">AuthorizationScope</a> ]	Available scopes
<a href="#">RefreshUrl</a>	URL?	Refresh Url

### [OAuth2ClientCredentials: OAuthAuthorization](#)

Property	Type	Description
<a href="#">Name</a>	String	Name that can be used to reference the authorization scheme
<a href="#">Description</a>	String?	Description of the authorization scheme
<a href="#">Scopes</a>	[ <a href="#">AuthorizationScope</a> ]	Available scopes
<a href="#">RefreshUrl</a>	URL?	Refresh Url
<a href="#">TokenUrl</a>	URL	Token Url

### [OAuth2Implicit: OAuthAuthorization](#)

Security note: OAuth2 implicit grant is considered to be not secure and should not be used by clients, see [OAuth 2.0 Security Best Current Practice](#).

Property	Type	Description
<a href="#">Name</a>	String	Name that can be used to reference the authorization scheme
<a href="#">Description</a>	String?	Description of the authorization scheme
<a href="#">Scopes</a>	[ <a href="#">AuthorizationScope</a> ]	Available scopes
<a href="#">RefreshUrl</a>	URL?	Refresh Url
<a href="#">AuthorizationUrl</a>	URL	Authorization URL

### **[OAuth2Password](#): [OAuthAuthorization](#)**

Property	Type	Description
<a href="#">Name</a>	String	Name that can be used to reference the authorization scheme
<a href="#">Description</a>	String?	Description of the authorization scheme
<a href="#">Scopes</a>	[ <a href="#">AuthorizationScope</a> ]	Available scopes
<a href="#">RefreshUrl</a>	URL?	Refresh Url
<a href="#">TokenUrl</a>	URL	Token Url

### **[OAuth2AuthCode](#): [OAuthAuthorization](#)**

Property	Type	Description
<a href="#">Name</a>	String	Name that can be used to reference the authorization scheme
<a href="#">Description</a>	String?	Description of the authorization scheme
<a href="#">Scopes</a>	[ <a href="#">AuthorizationScope</a> ]	Available scopes
<a href="#">RefreshUrl</a>	URL?	Refresh Url
<a href="#">AuthorizationUrl</a>	URL	Authorization URL
<a href="#">TokenUrl</a>	URL	Token Url

### **[AuthorizationScope](#)**

Property	Type	Description
<a href="#">Scope</a>	String	Scope name
<a href="#">Grant</a>	String?	Identity that has access to the scope or can grant access to the scope.
<a href="#">Description</a>	String	Description of the scope

## ApiKey: Authorization

Property	Type	Description
<a href="#">Name</a>	String	Name that can be used to reference the authorization scheme
<a href="#">Description</a>	String?	Description of the authorization scheme
<a href="#">KeyName</a>	String	The name of the header or query parameter
<a href="#">Location</a>	<a href="#">KeyLocation</a>	Whether the API Key is passed in the header or as a query option

## KeyLocation

Member	Value	Description
<a href="#">Header</a>	0	API Key is passed in the header
<a href="#">QueryOption</a>	1	API Key is passed as a query option
<a href="#">Cookie</a>	2	API Key is passed as a cookie

## SchemeName

**Type:** String

The name of the authorization scheme.

## 8 JSON Vocabulary

Namespace: [Org.OData.JSON.V1](#)

Terms for JSON properties

### Terms

Term	Type	Description
<a href="#">Schema</a>	<a href="#">JSON</a>	The JSON Schema for JSON values of the annotated media entity type, property, parameter, return type, term, or type definition The schema can be a schema reference, i.e. <code>{"\$ref": "url/of/schemafile#/path/to/schema/within/schemafile"}</code>

### JSON

**Type:** Stream

Textual data of media type `application/json`

## 9 Repeatability Vocabulary

Namespace: [Org.OData.Repeatability.V1](#)

Terms describing repeatable requests

### Terms

Term	Type	Description
<a href="#">Supported</a>	<a href="#">Tag</a>	Repeatable requests are supported for the annotated service, entity set, or action Annotations on entity set or action import level override an annotation on entity container level, and an annotation on action level override an annotation on action import level.
<a href="#">DeleteWithClientIDSupported</a>	<a href="#">Tag</a>	Deletion of remembered requests by client ID is supported Clients that specify a <code>RepeatabilityClientID</code> header can delete all remembered requests for that client ID by sending a <code>DELETE \$RepeatabilityRequestsWithClientID/{Repeatability-Client-ID}</code> request to the service root.
<a href="#">DeleteWithRequestIDSupported</a>	<a href="#">Tag</a>	Deletion of remembered requests by request ID is supported Clients can delete a single remembered request by sending a <code>DELETE \$RepeatabilityRequestWithRequestID/{Repeatability-Request-ID}</code> request to the service root.

## 10 Temporal Vocabulary

Namespace: [Org.OData.Temporal.V1](#)

Terms for describing time-dependent data

### Terms

Term	Type	Description
<a href="#">ApplicationTimeSupport</a>	<a href="#">ApplicationTimeSupportType</a>	This collection supports temporal requests

### Actions

#### Update

Updates existing time slices with values from delta time slices whose object keys match and whose periods overlap

The update behavior for a given object key is known from the [SQL statement](#) UPDATE ... FOR PORTION OF BUSINESS\_TIME ... WHERE ....

deltaTimeslices with non-matching object keys and non-overlapping sub-periods of deltaTimeslices are disregarded.

Parameter	Type	Description
<a href="#">timeslices</a>	[EntityType]	<b>Binding parameter:</b> Time slices to modify
<a href="#">deltaTimeslices</a>	[TimesliceWithPeriod]	New time slices whose property values are used to update the <code>timeslices</code> collection The delta time slices need not contain all properties, but at least the boundary values of the period to change. An absent object key property matches any key property value. New time slices are processed in the order of the collection, which especially matters if some of the specified change periods overlap.
→	[TimesliceWithPeriod]	Modified time slices

#### Upsert

Like [Update](#), but additionally inserts those (sub-periods of) deltaTimeslices that Update disregards

Parameter	Type	Description
<a href="#">timeslices</a>	[EntityType]	<b>Binding parameter:</b> Time slices to modify
<a href="#">deltaTimeslices</a>	[TimesliceWithPeriod]	New time slices to be merged into the <code>timeslices</code> collection The delta time slices must contain all properties that are needed for insertion. New time slices are processed in the order of the collection, which especially matters if some of the specified change periods overlap.
→	[TimesliceWithPeriod]	Modified time slices

## Delete

Deletes (sub-periods of) existing time slices whose object keys match and whose periods overlap `deltaTimeslices`

The deletion behavior for a given object key is known from the [SQL statement](#) `DELETE . . . FOR PORTION OF BUSINESS_TIME . . . WHERE . . .`. The sub-period of an existing time slice that lies outside a given instance of `deltaTimeslices` is kept, effectively shortening the time slice.

Parameter	Type	Description
<a href="#">timeslices</a>	[EntityType]	<b>Binding parameter:</b> Time slices to modify
<a href="#">deltaTimeslices</a>	[TimesliceWithPeriod]	Time slices to be deleted from the <code>timeslices</code> collection The delta time slices contain only the boundary values of the period to delete and (parts of) the object key. An absent object key property matches any key property value.
<a href="#">→</a>	[TimesliceWithPeriod]	Deleted (sub-periods of) time slices

## ApplicationTimeSupportType

Property	Type	Description
<a href="#">UnitOfTime</a>	<a href="#">UnitOfTime</a>	Unit of time and other properties of a time period
<a href="#">Timeline</a>	<a href="#">Timeline</a>	Describes how the history and future of the data are represented
<a href="#">SupportedActions</a>	[QualifiedActionName]	List of supported temporal actions

### [UnitOfTime](#)

Unit of time and other properties of a time period

#### Derived Types:

- [UnitOfTimeDateTimeOffset](#)
- [UnitOfTimeDate](#)

### [UnitOfTimeDateTimeOffset](#): [UnitOfTime](#)

Period start and end are of type `Edm.DateTimeOffset`

Property	Type	Description
<a href="#">Precision</a>	Byte	Precision of <code>Edm.DateTimeOffset</code> values for period start and end

### [UnitOfTimeDate](#): [UnitOfTime](#)

Period start and end are of type `Edm.Date`

The period is a contiguous set of days and does not consider the time of the day.



Property	Type	Description
<a href="#">ClosedClosedPeriods</a>	Boolean	If <code>true</code> , the period end is the last day in the period; if <code>false</code> , the period end is the first day after the period

## [Timeline](#)

Describes how the history and future of the data are represented

### Derived Types:

- [TimelineSnapshot](#)
- [TimelineVisible](#)

### [TimelineSnapshot: Timeline](#)

Each OData entity maps each point in application time to an instance of the entity type

To address an entity in a resource path or path to related resources, a point in application time must be specified as described in [OData-Temporal, section 4.2.1]. The addressed entity is then a snapshot of the data at the given point in time. When an action defined in this vocabulary is applied to a collection of this entity type, the entity key plays the role of object key.

### [TimelineVisible: Timeline](#)

Each OData entity represents data during a period of application time

The temporal collection MUST NOT contain two entities with the same object key as defined by their `ObjectKey` properties and with overlapping application-time periods as defined by their `PeriodStart` and `PeriodEnd` properties. The temporal collection always contains all entities (with consecutive time periods) for a given object key.

Property	Type	Description
<a href="#">PeriodStart</a>	PropertyPath	Property containing lower boundary of a period
<a href="#">PeriodEnd</a>	PropertyPath	Property containing upper boundary of a period If an upper boundary property does not specify a default value, a default value of <code>max</code> is assumed.
<a href="#">ObjectKey</a>	[PropertyPath]	The set of primitive properties that identify a temporal object A temporal object is a set of facts whose changes over application time are tracked by the service. The entities in the annotated collection belong to potentially multiple temporal objects, and each temporal object is uniquely identified by the values of the specified object key properties. Object key properties follow the same rules as entity key properties. If no object key is specified, only a single temporal object belongs to the annotated collection.

## [TimesliceWithPeriod](#)

Delta time slices with validity period

The properties `PeriodStart` and `PeriodEnd` MUST NOT be present if the entity type of the `Timeslice` already contains period start and end, that is, if the collection on which the action is invoked has visible timeline. If present, they MUST have the same type, either `Edm.Date` or `Edm.DateTimeOffset`, and they are interpreted according to the [ApplicationTimeSupport/UnitOfTime](#) of the collection. In particular, `ApplicationTimeSupport/UnitOfTime/ClosedClosedPeriods` governs whether a `PeriodEnd` of type `Edm.Date` is the

last day in the period or the first day after the period. If `PeriodStart` is present and `PeriodEnd` is absent, a default value of `max` is assumed for `PeriodEnd`.

Property	Type	Description
<a href="#">PeriodStart</a>	PrimitiveType?	Lower boundary of the time slice
<a href="#">PeriodEnd</a>	PrimitiveType?	Upper boundary of the time slice
<a href="#">Timeslice</a>	EntityType	A time slice with the same entity type as the binding parameter of the action When it appears in the return type of an action in this vocabulary, the time slice has the same entity set as the binding parameter value.

## [Appendix A. References](#)

This appendix contains the normative and informative references that are used in this document.

While any hyperlinks included in this appendix were valid at the time of publication, OASIS cannot guarantee their long-term validity.

### [A.1 Normative References](#)

The following documents are referenced in such a way that some or all of their content constitutes requirements of this document.

#### **[OData-Protocol]**

*OData Version 4.02. Part 1: Protocol.*

See link in "[Related work](#)" section on cover page.

#### **[OData-CSDL]**

*OData Common Schema Definition Language (CSDL) JSON Representation Version 4.02.*

See link in "[Related work](#)" section on cover page.

*OData Common Schema Definition Language (CSDL) XML Representation Version 4.02.*

See link in "[Related work](#)" section on cover page.

#### **[RFC2119]**

Bradner, S., "Key words for use in RFCs to Indicate Requirement Levels", BCP 14, RFC 2119, DOI 10.17487/RFC2119, March 1997. <https://www.rfc-editor.org/info/rfc2119>.

#### **[RFC8174]**

Leiba, B., "Ambiguity of Uppercase vs Lowercase in RFC 2119 Key Words", BCP 14, RFC 8174, DOI 10.17487/RFC8174, May 2017. <https://www.rfc-editor.org/info/rfc8174>.

### [A.2 Non-Normative References](#)

#### **[OData-Vocabs]**

*odata-vocabularies OASIS TC GitHub repository.* <https://github.com/oasis-tcs/odata-vocabularies>.

## Appendix B. Acknowledgments

### B.1 Special Thanks

The contributions of the OASIS OData Technical Committee members, enumerated in [\[OData-Protocol\]](#), are gratefully acknowledged.

### B.2 Participants

#### **OData TC Members:**

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## Appendix C. Revision History

Revision	Date	Editor	Changes Made
Committee Specification Draft 01	2016-12-08	Michael Pizzo Ralf Handl Ram Jeyaraman	Documentation automatically extracted from XML source files
Committee Specification Draft 02	2024-06-19	Michael Pizzo Ralf Handl Heiko Theißen	Documentation automatically extracted from XML source files

## Appendix D. Notices

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