

# OData and Schema.org

## Overview

[OData](#) defines a RESTful interface for working with data on the web. The newest version of OData defines a feature called "Vocabularies", which is a way to annotate data or metadata exposed by an OData Service. A common use for this feature will be to define shared vocabularies for common ontologies such as Sales (with Customers, SalesOrder, Product, etc.), Movies (with Title, Actor, Director, ....), or Calendars (with Event, Venue, ...)

RDFa 1.1 Lite defines an [alternate encoding](#) to Microdata which "...will allow publishers to focus more on what they want to say with their data, rather than on the details of its specific encoding as markup." In the same way, defining an OData Vocabulary encoding of the Schema.org schemas facilitates the understanding and even transformation of data across these different encodings.

## OData Background

OData is a RESTful web API for querying and updating data sources on the web. Sources may include enterprise data such as customers or sales orders, government data such as census, crime, or points of interest, or other types of data publication such as movie catalogs, blogs, social network interactions, events, etc. More information on OData can be found on the site [www.odata.org](http://www.odata.org).

In May of 2012, Microsoft and other key partners [announced](#) a proposal for an OData Technical Committee in OASIS in order to broaden the adoption and acceptance of OData as an Open Standard.

## Examples: Netflix

The entire Netflix movies catalog is available as an OData Service at <http://odata.netflix.com>. Applications can use this feed to query titles, actors, directors, etc. in a data-centric, RESTful manner.

### NetFlix OData Metadata

The Netflix collections available to query and enumerate can be found by going to <http://odata.netflix.com/>. This root resolves to a URL that enumerates the currently available collections for Titles, People, etc. In JSON (accept:application/json header), this would look like the following:

```
{
  "d": {
    "EntitySets": [
      "Genres", "Titles", "TitleAudioFormats", "TitleAwards", "People", "TitleScreenFormats", "Languages"
    ]
  }
}
```

The metadata describing the schema of the Netflix service can be obtained from [http://odata.netflix.com/v2/Catalog/\\$metadata](http://odata.netflix.com/v2/Catalog/$metadata). A snippet of this metadata, showing the definition of the Title EntityType representing a movie, is shown below:

```
<EntityType Name="Title" m:HasStream="true">
  <Key>
    <PropertyRef Name="Id" />
  </Key>
```

```

<Property Name="Id" Type="Edm.String" Nullable="false" MaxLength="128" />
<Property Name="Name" Type="Edm.String" MaxLength="Max"/>
<Property Name="ShortName" Type="Edm.String" MaxLength="Max"/>
<Property Name="Synopsis" Type="Edm.String" MaxLength="Max" />
<Property Name="ShortSynopsis" Type="Edm.String" MaxLength="Max" />
<Property Name="AverageRating" Type="Edm.Double" />
<Property Name="ReleaseYear" Type="Edm.Int32" />
<Property Name="Url" Type="Edm.String" MaxLength="Max" />
<Property Name="Runtime" Type="Edm.Int32" />
<Property Name="Rating" Type="Edm.String" MaxLength="Max"/>
<Property Name="DateModified" Type="Edm.DateTime" Nullable="false"/>
<Property Name="Type" Type="Edm.String" MaxLength="Max"/>
<Property Name="WebsiteUrl" Type="Edm.String" MaxLength="Max" />
<Property Name="NetflixApiId" Type="Edm.String" MaxLength="Max"/>
<Property Name="TinyUrl" Type="Edm.String" MaxLength="Max" />
  <Property Name="BluRay" Type="Netflix.Catalog.v2.DeliveryFormatAvailability"
    Nullable="false" />
<Property Name="BoxArt" Type="Netflix.Catalog.v2.BoxArt" Nullable="false" />
<Property Name="Dvd" Type="Netflix.Catalog.v2.DeliveryFormatAvailability" Nullable="false"
  />
<Property Name="Instant" Type="Netflix.Catalog.v2.InstantAvailability" Nullable="false" />
<NavigationProperty Name="Awards" Relationship="Netflix.Catalog.v2.TitleAward_Title"
  FromRole="TitleAward_Title_Target" ToRole="TitleAward_Title_Source" />
<NavigationProperty Name="Cast" Relationship="Netflix.Catalog.v2.Person_TitlesActedIn"
  FromRole="Person_TitlesActedIn_Target" ToRole="Person_TitlesActedIn_Source" />
  <NavigationProperty Name="Directors"
    Relationship="Netflix.Catalog.v2.Person_TitlesDirected"
    FromRole="Person_TitlesDirected_Target" ToRole="Person_TitlesDirected_Source" />
</EntityType>

```

## OData Vocabularies

An OData Vocabulary is a set of related annotation terms that can be applied to an OData result directly, or to the metadata describing an OData result.

OData Vocabularies may define a common schema; for example, that of a Person, Calendar, or Creative Work, such as a Movie.

The metadata describing the schema of a particular OData Service may then be annotated to describe how the properties of the types used within the OData schema map to one or more vocabulary. The mapping may be a simple property mapping or may include simple expressions, for example, to map multiple properties of the OData Service to a single property in the shared vocabulary schema.

Mapping may be done through annotations within the metadata or through an external annotation application. External annotation applications allow annotations to be applied to existing OData services; for example, an external annotation may describe how an existing service's metadata can be interpreted according to a standard vocabulary.

### Examples: Annotating the Netflix Titles feed

The following examples demonstrate how an OData Vocabulary could be defined to reflect the Movie schema on schema.org, and how that vocabulary could be applied to the Netflix metadata.

#### OData Movie Vocabulary Definition

The following snippet defines an OData Vocabulary for the schema.org Movies schema. The Movie type inherits from the CreativeWork type, and adds a property "duration" as well as properties for actors,

directors, etc.

```
<!--Movie-->
<ComplexType Name="Movie" Base="CreativeWorks.CreativeWork">
  <Property Name="Actors" Type="Collection(Person.Person)" />
  <Property Name="Director" Type="Person.Person" />
  <Property Name="Duration" Type="Edm.Integer" />
  <Property Name="MusicBy" Type="Organization.MusicGroup" />
  <Property Name="Producer" Type="Person.Person" />
  <Property Name="ProductionCompany" Type="Organization.Organization" />
  <Property Name="Trailer" Type="CreativeWorks.VideoObject" />
</ComplexType>
```

## Netflix Metadata Annotated with OData Vocabulary

The following snippet shows how the Netflix Metadata may be externally annotated to describe the mapping of the Netflix metadata to a standard OData Movies vocabulary.

```
<Annotations Target="Netflix.Catalog.Title">
  <TypeAnnotation Term="CreativeWorks.Thing">
    <PropertyValue Property="Description" Path="Synopsis"/>
    <PropertyValue Property="ImageUrl" Path="BoxArt.LargeUrl" />
    <PropertyValue Property="Name" Path="Name" />
    <PropertyValue Property="Url" Path="Url" />
  </TypeAnnotation>
  <TypeAnnotation Term="CreativeWorks.CreativeWork">
    <PropertyValue Property="AlternativeHeadline" Path="ShortName" />
    <PropertyValue Property="ContentRating" Path="Rating" />
    <PropertyValue Property="CopyrightYear" Path="ReleaseYear" />
    <PropertyValue Property="Creator" Path="Director" />
    <PropertyValue Property="DateCreated" Path="ReleaseYear" />
    <PropertyValue Property="DateModified" Path="DateModified" />
    <PropertyValue Property="DatePublished" Path="ReleaseYear" />
    <PropertyValue Property="Genre" Path="Genre.Name" />
    <PropertyValue Property="Headline" Path="ShortSynopsis" />
    <PropertyValue Property="InLanguage" Path="Language.Name" />
    <PropertyValue Name="IsFamilyFriendly">
      <If>
        <Apply Function="Equals">
          <Path>Rating</Path>
          <String>G</String>
        </Apply>
        <Boolean>true</Boolean>
        <Boolean>>false</Boolean>
      </If>
    </PropertyValue>
    <PropertyValue Property="ThumbnailUrl" Path="BoxArt.SmallUrl" />
  </TypeAnnotation>
  <TypeAnnotation Term="CreativeWorks.Movie">
    <PropertyValue Property="Actors" Path="Actors" />
    <PropertyValue Property="Director" Path="Director" />
    <PropertyValue Property="Duration" Path="Runtime" />
  </TypeAnnotation>
</Annotations>

<Annotations Target="Netflix.Catalog.Person">
  <TypeAnnotation Term="CreativeWorks.Thing">
    <PropertyValue Property="Name" Path="Name" />
    <PropertyValue Property="Url">
      <Apply Function="Concat">
        <String>http://odata.netflix.com/v2/Catalog/People(</String>
```

```

        <Path>Id</Path>
        <String></String>
    </Apply>
    </PropertyValue>
</TypeAnnotation>
<TypeAnnotation Term="Person.Person">
    <PropertyValue Property="Awards" Path="Awards" />
</TypeAnnotation>
</Annotations>

```

## NetFlix Feed Annotated with OData Vocabulary

The following snippet shows the result of a simple query against the Netflix service, returned in a lightweight OData JSON format, annotated with an OData Vocabulary.

```

{
  "odata.metadata": "http://odata.netflix.com/v2/Catalog$metadata#Netflix.Catalog.V2.Title",
  "value" : [
    {
      "Id": "BVXrJ",
      "Name": "Pirates of the Caribbean: At World's End",
      "ShortName": "Pirates of the Caribbean: At World's End",
      "Synopsis": "In the third installment of the swashbuckler series,..",
      "ShortSynopsis": "Capt. Barbossa has come back to life and is headed...",
      "AverageRating": 3.8,
      "ReleaseYear": 2007,
      "Url":
        "http://www.netflix.com/Movie/Pirates_of_the_Caribbean_At_World_s_End/70058021",
      "Runtime": 10140,
      "Rating": "PG-13",
      "DateModified": "\/Date(1326164229000)\/",
      "Type": "Movie",
      "WebsiteUrl": null,
      "NetflixApiId": "http://api.netflix.com/catalog/titles/movies/70058021",
      "TinyUrl": "http://movi.es/BVXrJ",
      "BluRay":
        {
          "Available": true,
          "AvailableFrom": "\/Date(1196726400000)\/",
          "AvailableTo": null,
          "Rating": "PG-13",
          "Runtime": 10140
        },
      "BoxArt":
        {
          "SmallUrl": "http://cdn-1.nflximg.com/en_us/boxshots/small/70058021.jpg",
          "MediumUrl": "http://cdn-1.nflximg.com/en_us/boxshots/88/70058021.jpg",
          "LargeUrl": "http://cdn-1.nflximg.com/en_us/boxshots/large/70058021.jpg",
          "HighDefinitionUrl": null
        },
      "Dvd":
        {
          "Available": true,
          "AvailableFrom": "\/Date(1196726400000)\/",
          "AvailableTo": null,
          "Rating": "PG-13",
          "Runtime": 10140
        },
      "Instant":
        {
          "Available": false,

```

```

    "AvailableFrom": null,
    "AvailableTo": null,
    "HighDefinitionAvailable": false,
    "Rating": null,
    "Runtime": null
  },
  "Cast":
  {
    "results": [
      { "Id": 23954, "Name": "Johnny Depp", "Org.Schema.Person.JobTitle": "Actor"},
      { "Id": 68352, "Name": "Bill Nighy", " Org.Schema.Person.JobTitle": "Actor" },
      { "Id": 86302, "Name": "Stellan Skarsg\u00e5rd", "
Org.Schema.Person.JobTitle": "Actor" },
      { "Id": 20001683, "Name": "Geoffrey Rush",
        "Org.Schema.Person.JobTitle": "Actor" },
      { "Id": 20005249, "Name": "Tom Hollander",
        "Org.Schema.Person.JobTitle": "Actor" },
      { "Id": 20016245, "Name": "Jack Davenport",
        "Org.Schema.Person.JobTitle": "Actor" },
      { "Id": 20017660, "Name": "Jonathan Pryce",
        "Org.Schema.Person.JobTitle": "Actor" },
      { "Id": 20017850, "Name": "Lee Arenberg",
        "Org.Schema.Person.JobTitle": "Actor" },
      { "Id": 20029550, "Name": "Kevin McNally",
        "Org.Schema.Person.JobTitle": "Actor" },
      { "Id": 20029921, "Name": "Keira Knightley",
        "Org.Schema.Person.JobTitle": "Actor" },
      { "Id": 20039048, "Name": "Orlando Bloom",
        " Org.Schema.Person.JobTitle": "Actor" },
      { "Id": 20043987, "Name": "Naomie Harris",
        "Org.Schema.Person.JobTitle": "Actor" },
      { "Id": 20049558, "Name": "Mackenzie Crook",
        "Org.Schema.Person.JobTitle": "Actor" },
      { "Id": 30011045, "Name": "Yun-Fat Chow",
        "Org.Schema.Person.JobTitle": "Actor" },
      { "Id": 30046362, "Name": "Martin Klebba",
        "Org.Schema.Person.JobTitle": "Actor" },
      { "Id": 30133721, "Name": "David Bailie",
        "Org.Schema.Person.JobTitle": "Actor" }
    ]
  },
  "Directors":
  {
    "results": [
      { "Id": 195896, "Name": "Gore Verbinski",
        "Org.Schema.Person.JobTitle": "Director" }
    ]
  }
}

```

Application of the OData Movie Vocabulary as defined in the annotations file (which may be referenced from or included in the metadata returned with the feed) allows the feed to be read as CreativeWorks.Movie with related cast and directors.