

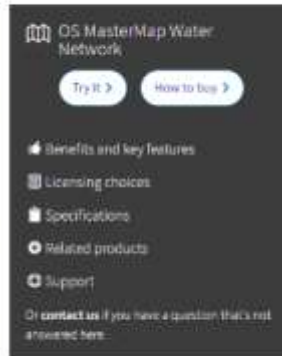
Extending INSPIRE Specs

OS Experience 2014-2016

Debbie Wilson
Principal Data Architect
21/04/2014

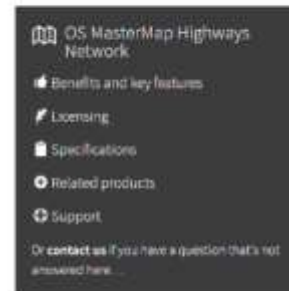
Experience to Date: 5 Products available for use

OS MasterMap Water Network



The only detailed, heightened water network of Great Britain showing the flow and precise course of rivers, streams, lakes and canals.

OS MasterMap Highways Network



The next generation of road mapping.

GML Only

OS OpenData products

<https://www.ordnancesurvey.co.uk/business-and-government/products/opendata-products-grid.html>

OS Open Roads (Beta)



OS Open Roads over OS Open Map - Local

A high-level view of Britain's road network, with generalised geometry and network connectivity.

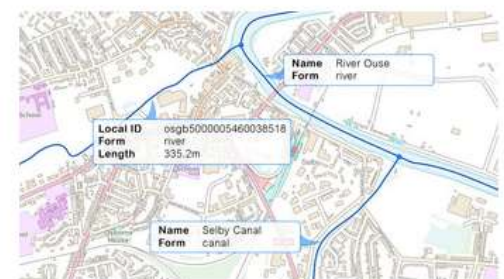
OS Open Names



OS Open Names over OS VectorMap District

Definitive place names, roads numbers and postcodes in Great Britain.

OS Open Rivers (Beta)



OS Open Rivers - attribution

A high-level view of the water network, with generalised geometry and network connectivity.



[Learn more](#)

GML/SHP/CSV

[Learn more](#)

[Learn more](#)

Experience to Date: 5 Products Access Services


XML and JSON

Twitter Facebook Google+ LinkedIn





OS Open Names API



An online geographic directory of information about identifiable places, OS Open Names API is a place, road and postcode verification tool that you can plug into your website or app completely free.

 OS Open Names API

[Sign up for the API >](#)

-  Benefits and key features
-  Technical specification
-  Related products and services
-  Support

Or [contact us](#) if you have a question that's answered here...

www.os.uk home view develop **supply** help

 **OS OpenData**

Mapping data and geographic information from OS

[Order OS OpenData here](#)

Please note that orders for supply on DVD will take up to 20 days to deliver (longer if overseas). If you would prefer to receive your data more quickly, please select the download option. Data ordered via the download option will be ready for you the same day, normally within 1 hour.

Please note that the file sizes for selected products, shown in brackets under the 'coverage' column, refer to downloaded files only.

All files for download are supplied as .zip archives.

For more information about any of these products, please see our [products page](#).

If you are new to our data, our [getting started information](#) explains the different formats and how to work with them.

October 2015: New versions of OS Open Names, Boundary-Line and OS Open Roads now available


November 2015: New versions of OS Street View, Code-Point Open and OS Locator now available

January 2016: New versions of Mosaic, OS Open Names, Mentimeter and Strategist now available

February 2016: New version of Code-Point Open now available

March 2016: New version of OS VectorMap District now available

April 2016: New versions of OS Open Names, and OS Street View now available

Product	Coverage	DVD	Download
 OS Open Map - Local Data type: Vector	National Grid Reference squares (5 Kb - 151 Mb)	FOA	

Approach for extending INSPIRE Specification

Tooling – Enterprise Architect

1. Set up a product model version control repository in subversion
2. Create a parent product root model
3. Add packages for each of the product families: OS MasterMap, OS Open Data, OS Insight (for pre-release versions)
4. Users checkout the INSPIRE Model Repository

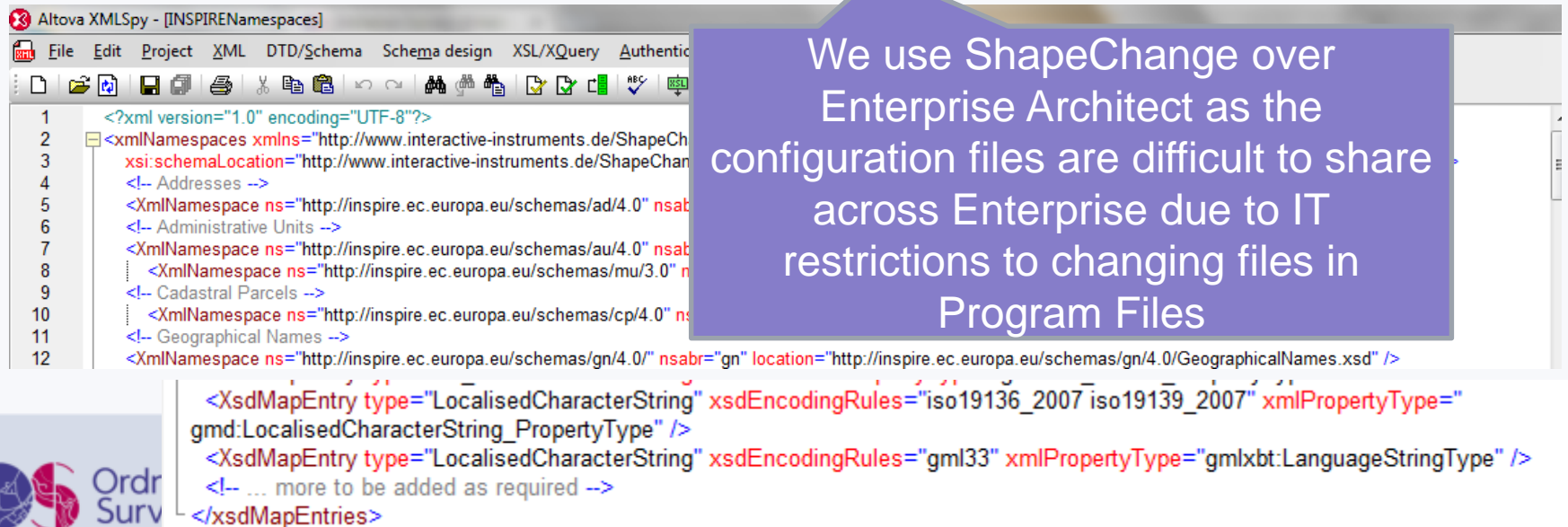


Well they used to until client delivery upgraded all SVN clients to v1.8

5. Have had to take a copy to include in the product model repository to avoid help queries and created a standard Product.eap project which Technical Product Managers use as a starter project.

Approach for extending INSPIRE Specification

6. Users initially create their product package within the relevant product family in OS Insight package
7. They then export it and add it to product model subversion repository its now available to be edited.
8. Create your model according to basic OS rules
9. Then use ShapeChange using local configuration files which were updated to INSPIRE v4.0 mappings as not available as standard config and overrides ISO 19115 Map Entries LocalisedCharacterString to use gml 3.3 type



The screenshot shows the Altova XMLSpy interface with the file [INSPIRENamespaces]. The XML content is as follows:

```
<?xml version="1.0" encoding="UTF-8"?>
<xmlNamespaces xmlns="http://www.interactive-instruments.de/ShapeChange"
  xsi:schemaLocation="http://www.interactive-instruments.de/ShapeChange"
  <!-- Addresses -->
  <XmlNamespace ns="http://inspire.ec.europa.eu/schemas/ad/4.0" nsabbr="ad"
  <!-- Administrative Units -->
  <XmlNamespace ns="http://inspire.ec.europa.eu/schemas/au/4.0" nsabbr="au"
  <XmlNamespace ns="http://inspire.ec.europa.eu/schemas/mu/3.0" nsabbr="mu"
  <!-- Cadastral Parcels -->
  <XmlNamespace ns="http://inspire.ec.europa.eu/schemas/cp/4.0" nsabbr="cp"
  <!-- Geographical Names -->
  <XmlNamespace ns="http://inspire.ec.europa.eu/schemas/gn/4.0" nsabbr="gn" location="http://inspire.ec.europa.eu/schemas/gn/4.0/GeographicalNames.xsd" />
```

A callout box contains the text: "We use ShapeChange over Enterprise Architect as the configuration files are difficult to share across Enterprise due to IT restrictions to changing files in Program Files".

Below the XML snippet, the following XSD MapEntry definitions are shown:

```
<XsdMapEntry type="LocalisedCharacterString" xsdEncodingRules="iso19136_2007 iso19139_2007" xmlPropertyType="
gmd:LocalisedCharacterString_PropertyType" />
<XsdMapEntry type="LocalisedCharacterString" xsdEncodingRules="gml33" xmlPropertyType="gmlx:bt:LanguageStringType" />
<!-- ... more to be added as required -->
</xsdMapEntries>
```

In the bottom left corner, there is a logo for "Ordnung Survey" featuring a stylized globe and the text "Ordnung Survey".

Who has been involved in developing the INSPIRE Extensions

OS Team:

Products & Innovation: Product Managers, Technical Product Managers, Data Architects, Data Engineers (10 people)

Geospatial Engineering: Software Developers, Test Analysts, Solution Architects (15-30 people)

Stakeholders:

Water Network: Scottish Environmental Protection Agency (SEPA), Environment Agency (EA)

Highway Network: Department for Transport (co-sponsor), Highways England, Transport Scotland, Local Highways Authorities, GeoPlace, Joint Advisory Group (UK), HAUG

How long did it take to develop

OS MasterMap Water Network : took 2 years to develop and implement was our first

OS Open Names: took ~ 18 mths to develop and implement

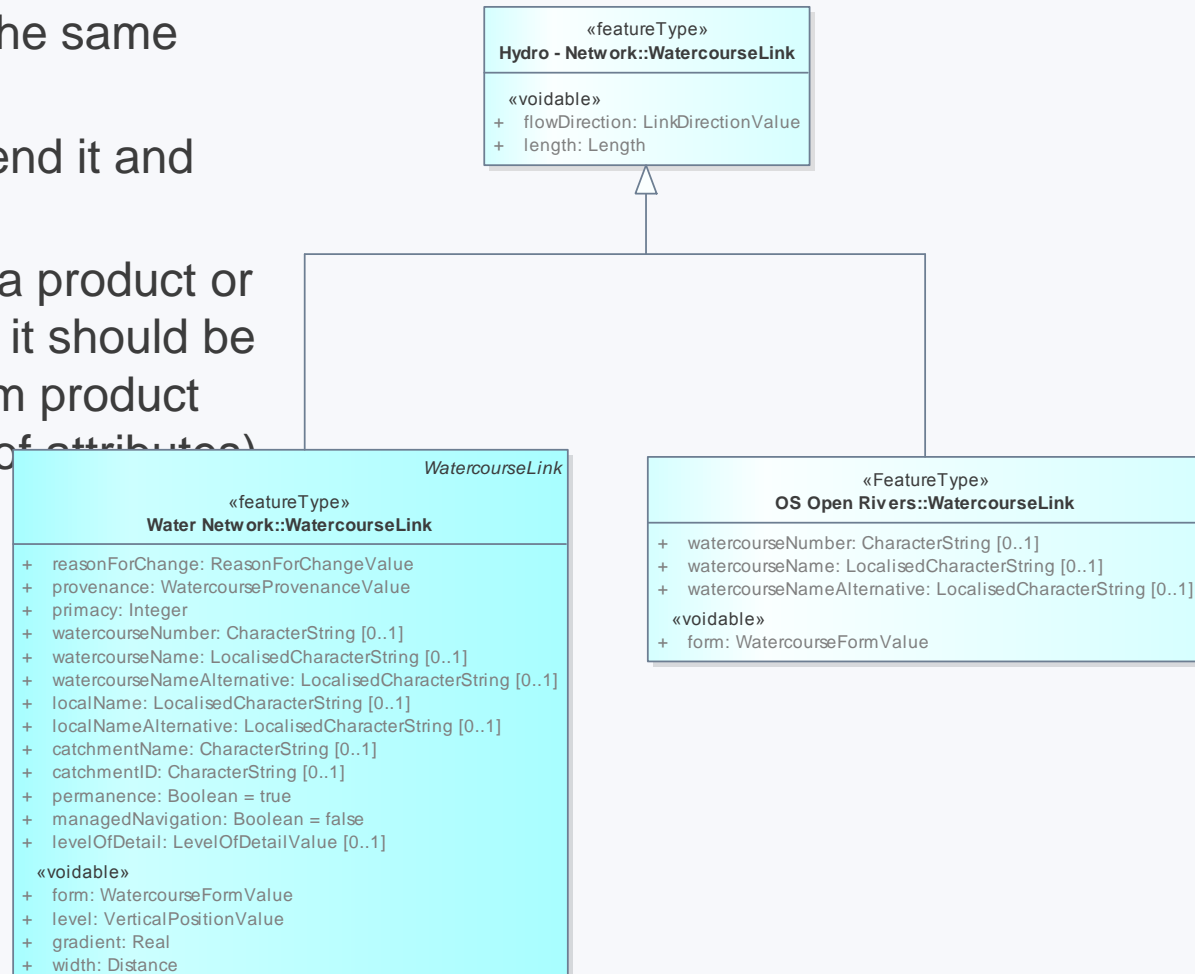
OS MasterMap Highways Network:

- 6 months to create v1rc1 and 2 months to generate initial national sample dataset in product development (April 2015).
- 12 months to establish operational system and continued stakeholder engagement to finalise v1 and produce Epoch 1 of national dataset (April 2016)
- 6 mths to develop v1.1 to include new features and implement in operational system (Oct 2016) – surface type, width....
- 6 months to develop v 1.2 to include more new features

OS Open Roads & OS Open Rivers: 3 months to create initial model then ~ 9 months to implement

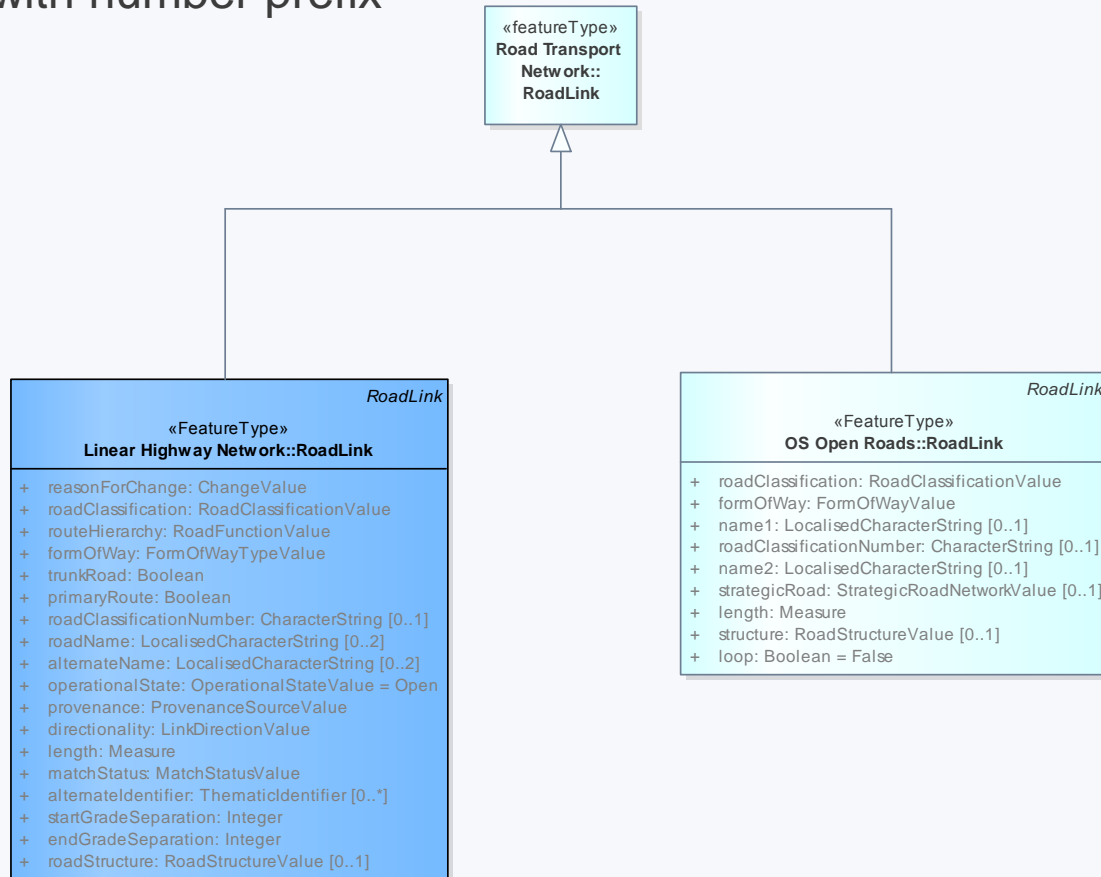
General Rules

1. If the FeatureType is the same as INSPIRE, then assign it the same name
2. If it is a subtype then extend it and assign it relevant name
3. If designing an Open Data product or small scale product, then it should be consistent with a Premium product specification (i.e. subset of attributes)



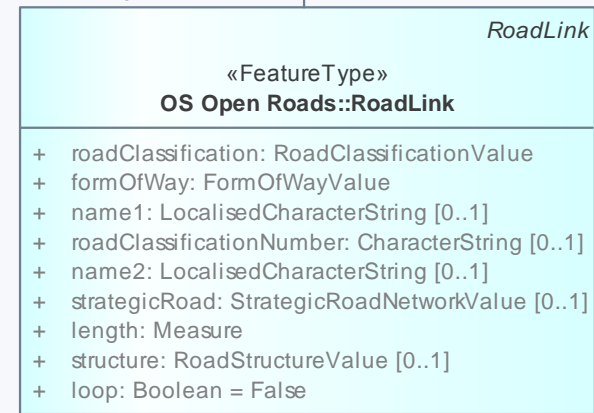
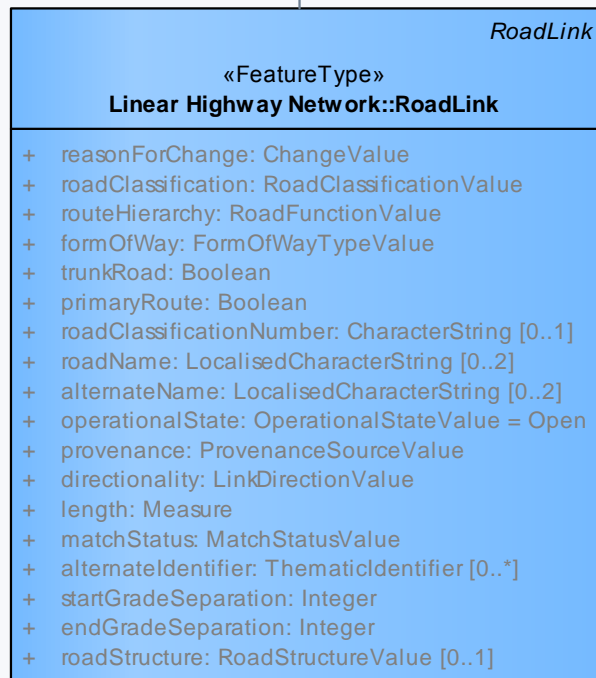
General Rules

4. Exceptions may occur where multiplicity > 1 in open data and flatten attribution with number prefix



General Rules

- Names – Do not use the INSPIRE Geographical Name data type instead define our own name attribute and use LocalisedCharacterString for simplicity
- Have also flattened attribution down onto feature type where possible



General Rules

NOTE: Open Rivers and Open Roads has stuck to encoding codelists in the xsd to keep it simple and readable by tools like QGIS directly

3.7 Dictionaries and Code lists (8.4.4.13, 8.4.4.14)

Until recently, OS products have used enumerations, where the controlled list of values is specified in the schema.

- a) GML SF allows elements with string content from a code list, where an instance looks like:

```
<os:functionTheme  
codeSpace="http://os.uk/xml/codelists/sitethemes.xml">Education</os:  
functionTheme>
```

We adopted this approach in the Sites layer, so that additional themes could be added without amending the XSD.

- b) GML SF also allows 'elements that reference other resources' (8.4.4.13).

```
<water:reasonForChange  
xlink:href="http://os.uk/xml/codelists/reasonforchange.xml#new"  
xlink:title="new"/>
```

GML 3.3 deprecates the code list pattern and states that all references to external dictionaries shall use the reference pattern. INSPIRE is moving to this position.

Note: often the fragment identifier and the title will be the same, but they may differ. The href fragment has to conform to URL fragment syntax (e.g. it cannot contain a space), the title is intended to be human readable. So for example, when we move Sites Layer over to this approach, there will be

```
<function  
xlink:href=http://os.uk/xml/codelists/sitefunctions.xml#specialNeedsEducation"  
title="Special Needs Education"/>
```

Exposing the fragment identifier will always provide something meaningful, but sometimes it will not be as readable as the title.

<https://www.ordnancesurvey.co.uk/docs/policies/gml-design-policy.pdf>

General Rules

NOTE: OS Open Names was developed against v 3.0 schemas so have combo of gml 3.2. and gml 3.3 encodings!

3.7 Dictionaries and Code lists (8.4.4.13, 8.4.4.14)

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```
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functionTheme>
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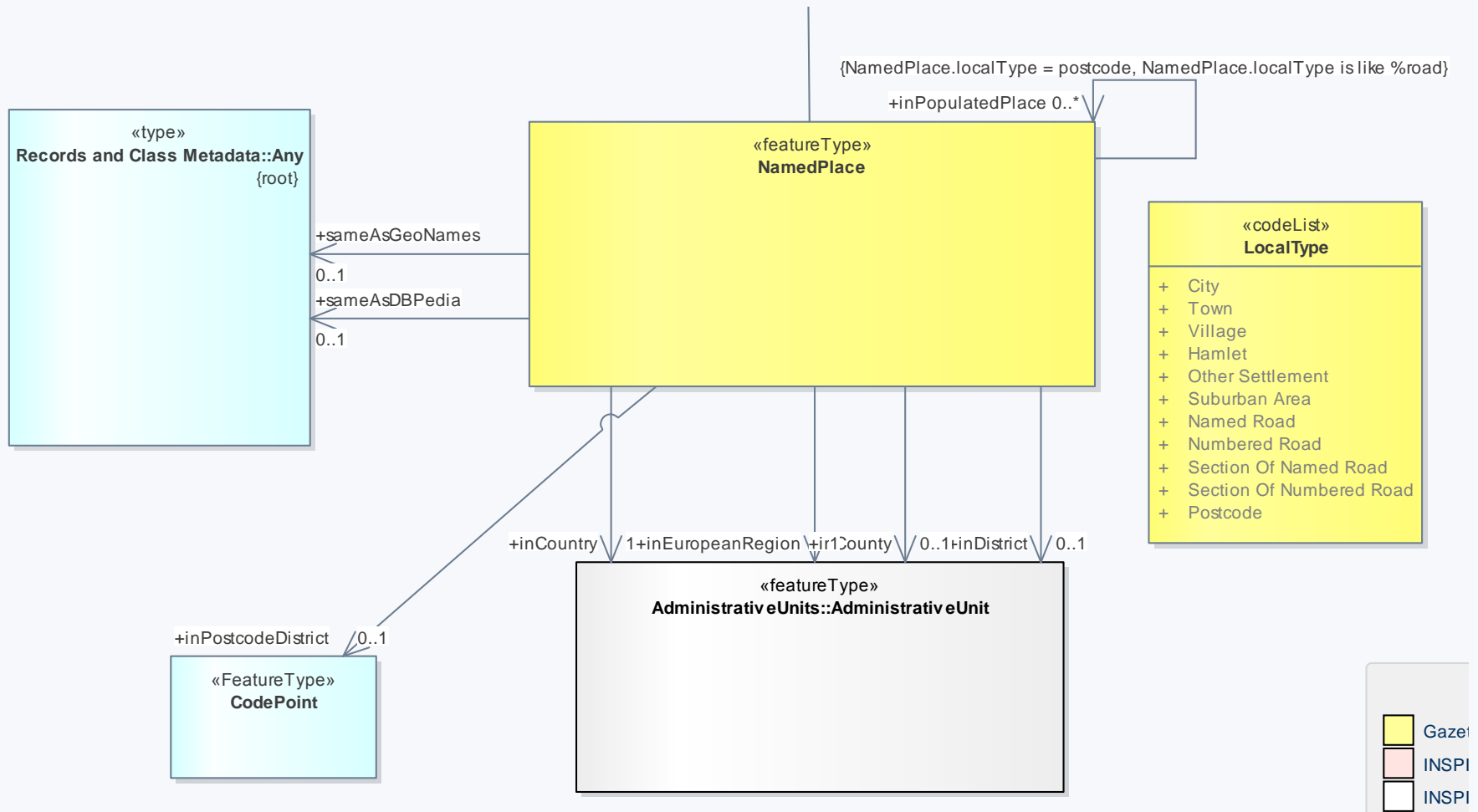
```
<water:reasonForChange  
xlink:href="http://os.uk/xml/codelists/reasonforchange.xml#new"
```

OS MasterMap
Highways Network
v1.0 released in
March 2016 based on
v4.0 schemas so uses
gml 3.3

```
</gmd:MD_Resolution>  
</gn:mostDetailedViewingResolution>  
<gn:name>  
  <gn:GeographicalName>  
    <gn:language xsi:nil="true" nilReason="inapplicable"/>  
    <gn:nativeness codeSpace="http://inspire.ec.europa.eu/codelist/NativenessValue">endonym</gn:nativeness>  
    <gn:nameStatus codeSpace="http://inspire.ec.europa.eu/codelist/NameStatusValue">official</gn:nameStatus>  
    <gn:sourceOfName>OS Open Names</gn:sourceOfName>  
    <gn:pronunciation nilReason="missing" xsi:nil="true"/>  
    <gn:spelling>  
      <gn:SpellingOfName>  
        <gn:text>ZE2 9YL</gn:text>  
        <gn:script>Latn</gn:script>  
      </gn:SpellingOfName>  
    </gn:spelling>  
  </gn:GeographicalName>  
</gn:name>  
<gn:type codeSpace="http://inspire.ec.europa.eu/codelist/NamedPlaceTypeValue">other</gn:type>  
<names:inCounty xlink:title="Shetland Islands" xlink:role="http://data.ordnancesurvey.co.uk/ontology/admingeo/UnitaryAuthority" xlink:href="http://data.ordnancesurvey.co.uk/id/7000000000030514"/>  
<names:inEuropeanRegion xlink:title="Scotland" xlink:href="http://data.ordnancesurvey.co.uk/id/7000000000041429"/>  
<names:inCountry xlink:title="Scotland" xlink:href="http://data.ordnancesurvey.co.uk/id/country/scotland"/>  
</names:NamedPlace>  
</gml:featureMember>  
<gml:featureMember>  
  <names:NamedPlace gml:id="scsh40000000074554300">
```

design-policy.pdf

Lessons Learned – Linkages to other features vs attributes



Lessons Learned – Linkages to other features vs attributes

Users don't really like these in GML and they are difficult to manage as URIs if you haven't yet set up resolvable URIs. Would have been easier to treat as attributes. Most people download the CSV encoding of OS Open Names.

Need to use the xlink:title as well as xlink:href to make life simpler when loading data into database no need for regex transformers on href. Though we needed to request Safe to support xlink:title in FME 2016. Still not supported in QGIS.

```
</gmd:MD_Resolution>
</gn:mostDetailedViewingResolution>
<gn:name>
  <gn:GeographicalName>
    <gn:language xsi:nil="true" nilReason="inapplicable"/>
    <gn:nativeness codeSpace="http://inspire.ec.europa.eu/codelist/NativenessValue">endonym</gn:nativeness>
    <gn:nameStatus codeSpace="http://inspire.ec.europa.eu/codelist/NameStatusValue">official</gn:nameStatus>
    <gn:sourceOfName>OS Open Names</gn:sourceOfName>
    <gn:pronunciation nilReason="missing" xsi:nil="true"/>
    <gn:spelling>
      <gn:SpellingOfName>
        <gn:text>ZE2 9YL</gn:text>
        <gn:script>Latn</gn:script>
      </gn:SpellingOfName>
    </gn:spelling>
  </gn:GeographicalName>
</gn:name>
<gn:type codeSpace="http://inspire.ec.europa.eu/codelist/NamedPlaceTypeValue">other</gn:type>
<names:inCounty xlink:title="Shetland Islands" xlink:role="http://data.ordnancesurvey.co.uk/ontology/admingeo/UnitaryAuthority" xlink:href="http://data.ordnancesurvey.co.uk/id/7000000000030514"/>
<names:inEuropeanRegion xlink:title="Scotland" xlink:href="http://data.ordnancesurvey.co.uk/id/7000000000041429"/>
<names:inCountry xlink:title="Scotland" xlink:href="http://data.ordnancesurvey.co.uk/id/country/scotland"/>
</names:NamedPlace>
</gml:featureMember>
<gml:featureMember>
  <names:NamedPlace gml:id="osgb4000000074554300">
```

These are references to
BoundaryLine Linked Data API

Technical Specification Documentation

- Developed Documentation Templates in Enterprise Architect to allow Technical Product Managers to automatically generate the data structure

Section doc Feature Catalogue

Instructions for use:

To create a document for your model, drag the package(s) you need to publish in to each of the Model Document classes: Package, FeatureTypes, Types, Data Types, Code Lists and Enumerations.

Once you have dragged the package(s) into the classes, select the <<master document>> Data Structure and Content class, hit F8 and populate settings:

- Table of Contents = Portrait
- Stylesheet = OS Stylesheet

NOTE: the template creates an additional heading for each class type which will need to be deleted out of the document post creation.

(from Model)

Technical Specification Documentation

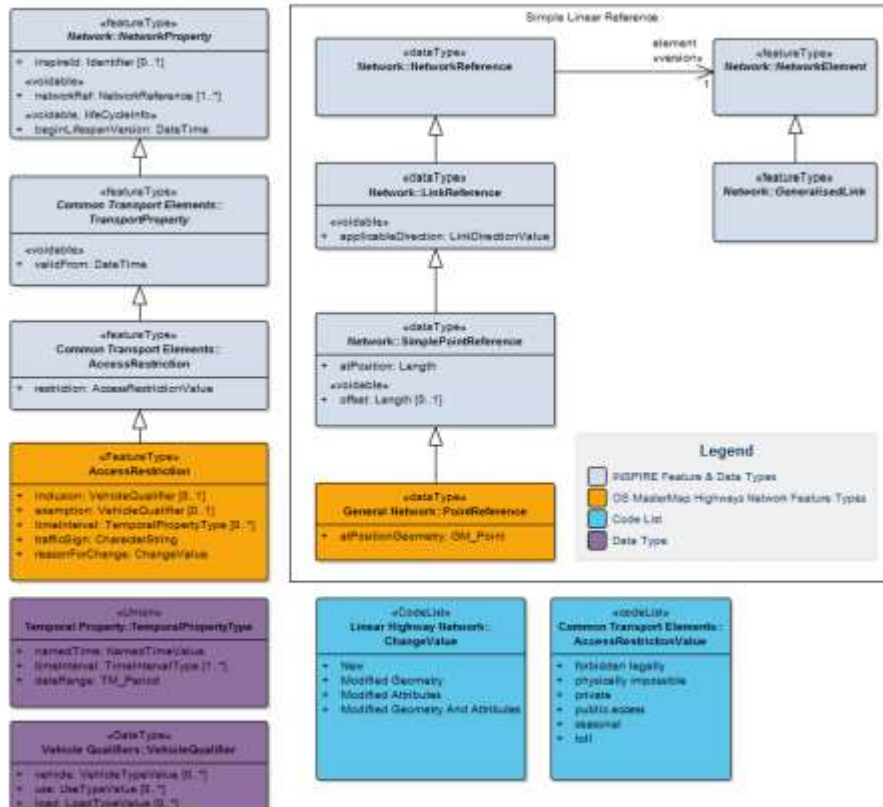


Figure 7 Context diagram for AccessRestriction.

Attribution

«FeatureType» AccessRestriction		
Definition: A restriction based on vehicular access to a highway.		
Attribute: id		
Definition: Unique identifier, for AccessRestriction this is a TOID		
Type: CharacterString	Size: 20	Multiplicity: {1}
Attribute: identifier		
Definition: Uniform Resource Identifier		
Type: CharacterString	Size: 37	Multiplicity: {1}

OS MasterMap® Highways Network
Version 1 Routing and Asset Management Information v1.01 - 04/2016
© Crown copyright Page 21 of 51

Attribute: beginLifespanVersion «voidable»			INSPIRE
Definition: Date and time at which this version of the spatial object was inserted or changed in the spatial data set.			
Type: DateTime			Multiplicity: {1}
Attribute: networkRef «voidable»			INSPIRE
Definition: Spatial reference of the network-related property.			
Type: NetworkReference			Multiplicity: {1..*}
Attribute: validFrom «voidable»			INSPIRE
Definition: The time when the transport property started to exist in the real world.			
Type: DateTime			Multiplicity: {1}
Attribute: restriction			INSPIRE
Definition: Nature of the access restriction.			
Type: AccessRestrictionValue	Size: 21	Multiplicity: {1}	
Attribute: inclusion			
Definition: Types of vehicle or use that the restriction applies to.			
Type: VehicleQualifier		Multiplicity: {0..1}	
Attribute: exemption			
Definition: Types of vehicle or use that are exempt from the restriction.			
Type: VehicleQualifier		Multiplicity: {0..1}	

Resources

OS GML Design Policy: <https://www.ordnancesurvey.co.uk/docs/policies/gml-design-policy.pdf>

OS MasterMap Highways Network: <https://www.ordnancesurvey.co.uk/business-and-government/help-and-support/products/os-mastermap-highways-network.html>

OS MasterMap Water Network: <https://www.ordnancesurvey.co.uk/business-and-government/help-and-support/products/os-mastermap-water-network.html>

<https://www.ordnancesurvey.co.uk/docs/sample-data/os-mastermap-water-network-sample-data.gz#sample-data-download>

OS Open Names: <https://www.ordnancesurvey.co.uk/business-and-government/products/os-open-names.html>

OS Open Rivers: <https://www.ordnancesurvey.co.uk/business-and-government/products/os-open-rivers.html>

OS Open Roads: <https://www.ordnancesurvey.co.uk/business-and-government/products/os-open-roads.html>

OS Open Data Download:

<https://www.ordnancesurvey.co.uk/opendatadownload/products.html>

OS Names API: <https://apidocs.os.uk/docs/os-names-overview>