Extending INSPIRE Specs

OS Experience 2014-2016

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Principal Data Architect
21/04/2014

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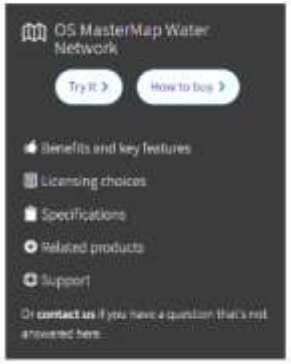
Experience to Date: 5 Products available for use

OS MasterMap Water Network



The only detailed, heighted 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

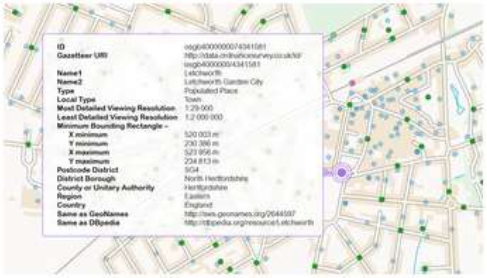
OS Open Roads (Beta)

OS Open Roads over OS Open Map – Local

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

Learn more

OS Open Names

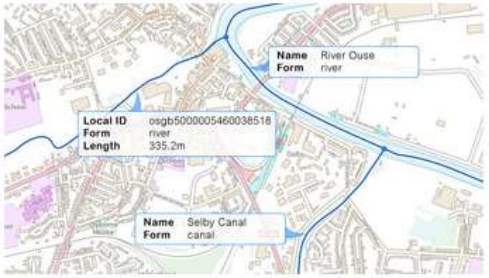


OS Open Names over OS VectorMap District

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

Learn more

OS Open Rivers (Beta)



OS Open Rivers - attribution

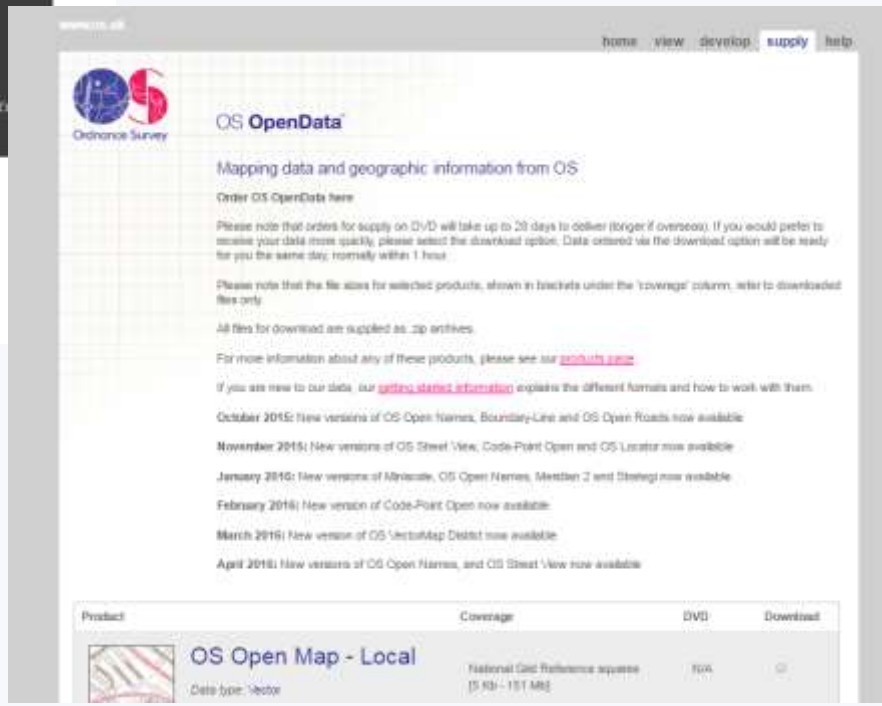
A high-level view of the water network, with generalised geometry and network connectivity.

Learn more

GML/SHP/CSV

Experience to Date: 5 Products Access Services

XML and JSON



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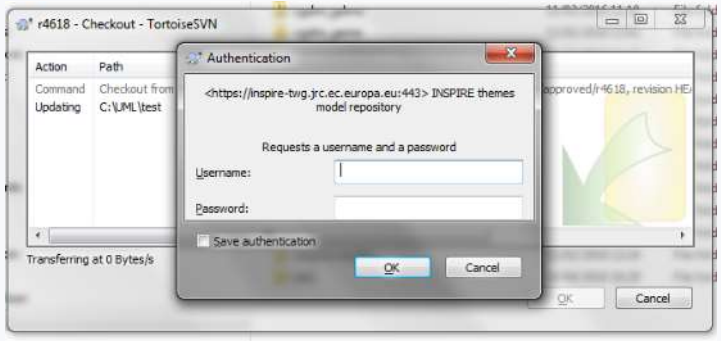
Approach for extending INSPIRE Specification

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

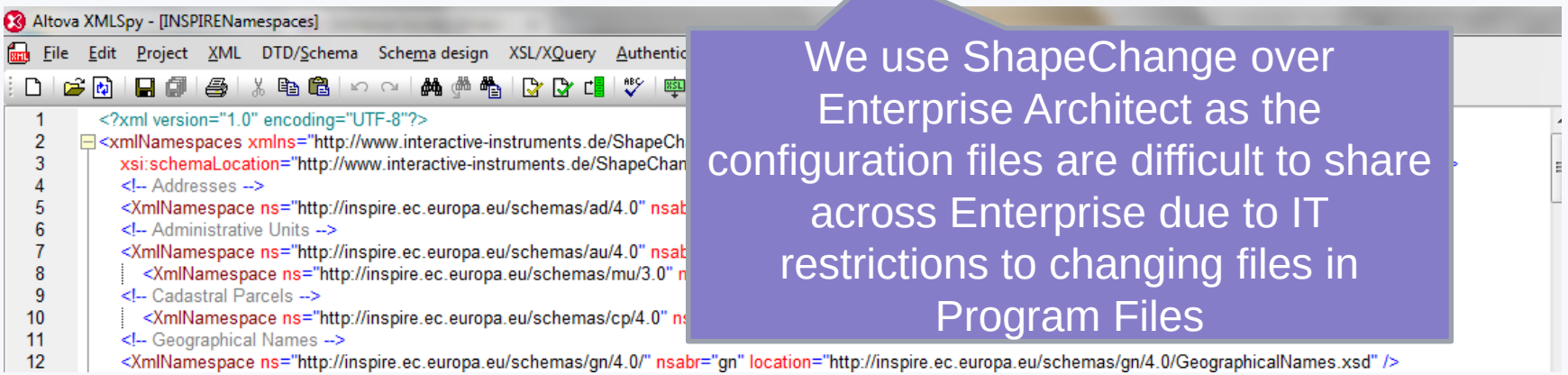


Well they used to until client delivery upgraded all SVN clients to v1.8

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 an 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



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

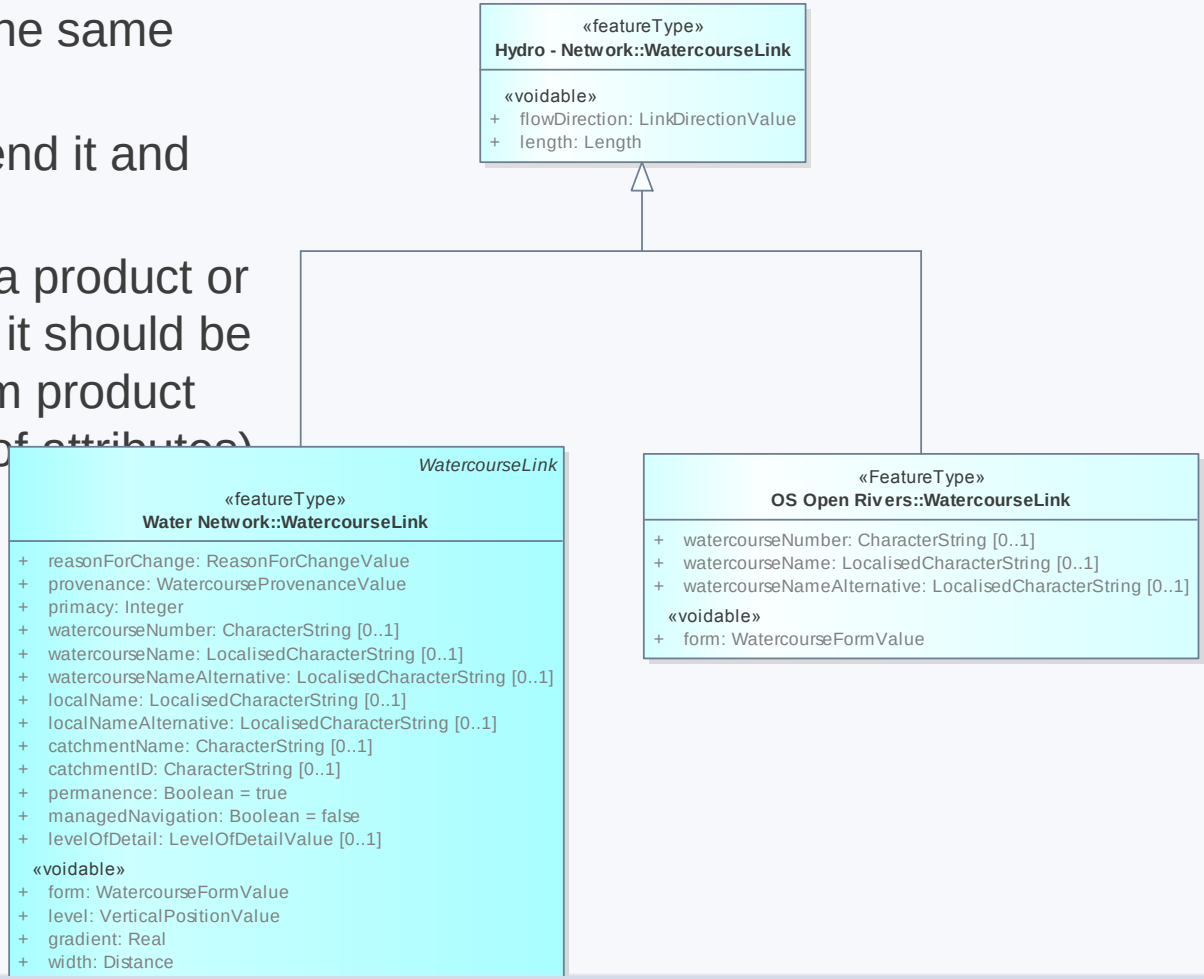
OS MasterMap Highways Network:

- 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

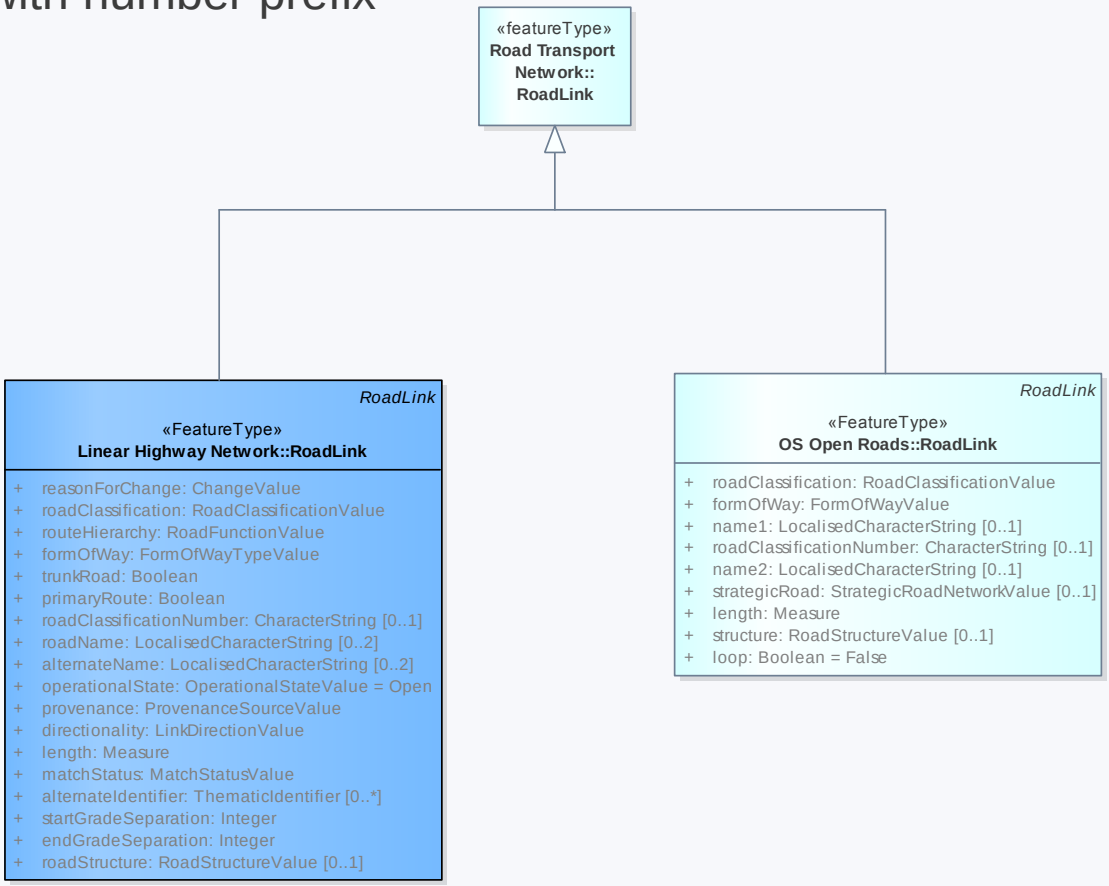
General Rules

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)



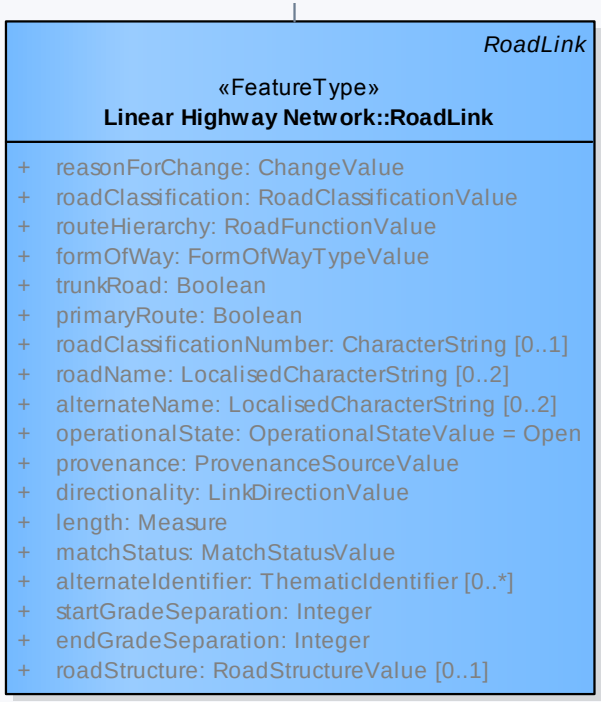
General Rules

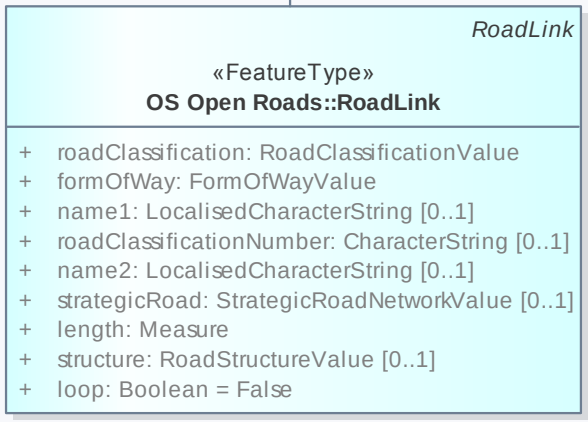
4. Exceptions may occur where multiplicity > 1 in open data and flatten attribution with number prefix



General Rules

5. Names – Do not use the INSPIRE Geographical Name data type instead define our own name attribute and use LocalisedCharacterString for simplicity
6. 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

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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!

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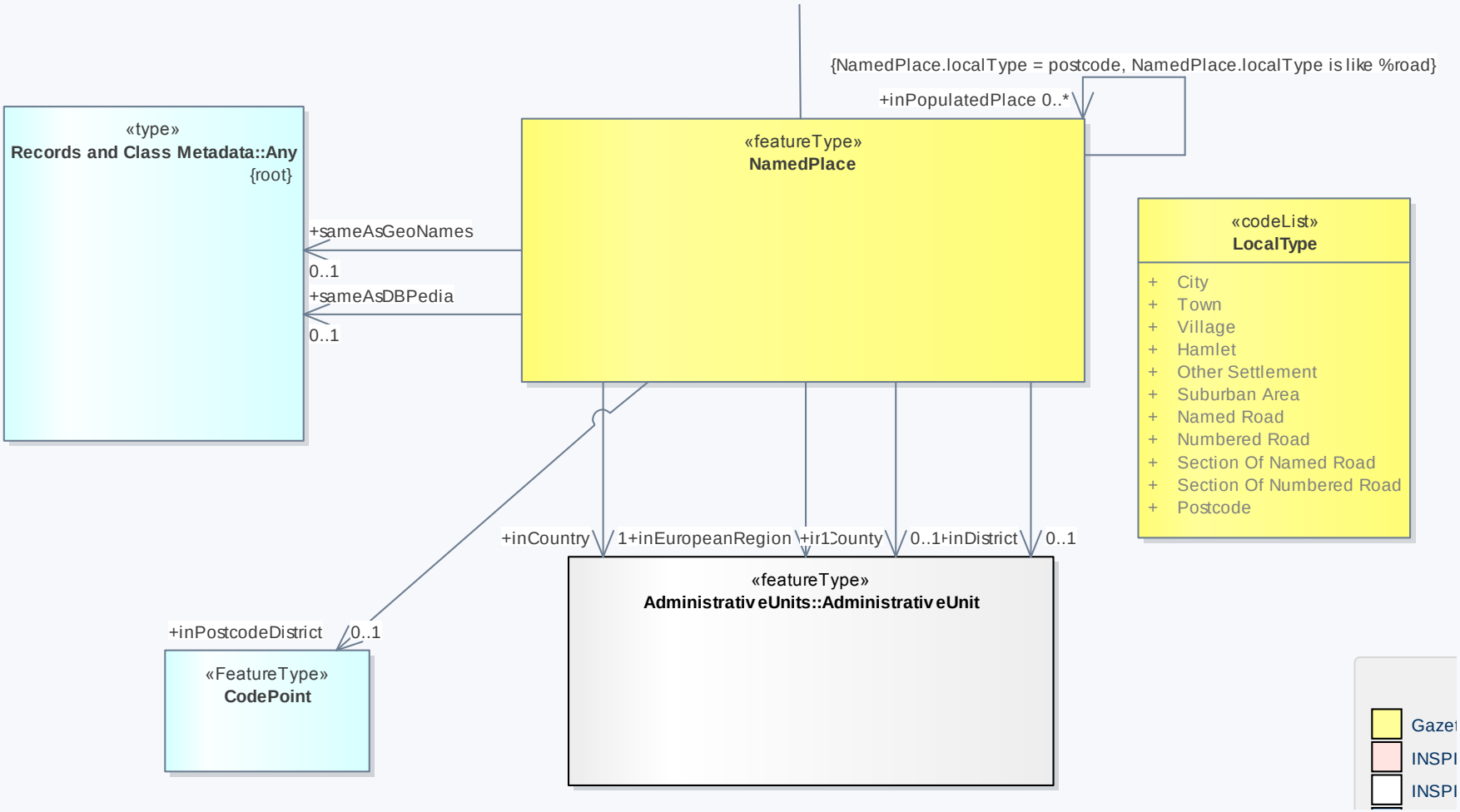
```
<water:reasonForChange
xlink:href="http://os.uk/xml/codelists/reasonforchange.xml#new"
```

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="osgb4000000074554300">
```

design-policy.pdf

Lessons Learned – Linkages to other features vs attributes



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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

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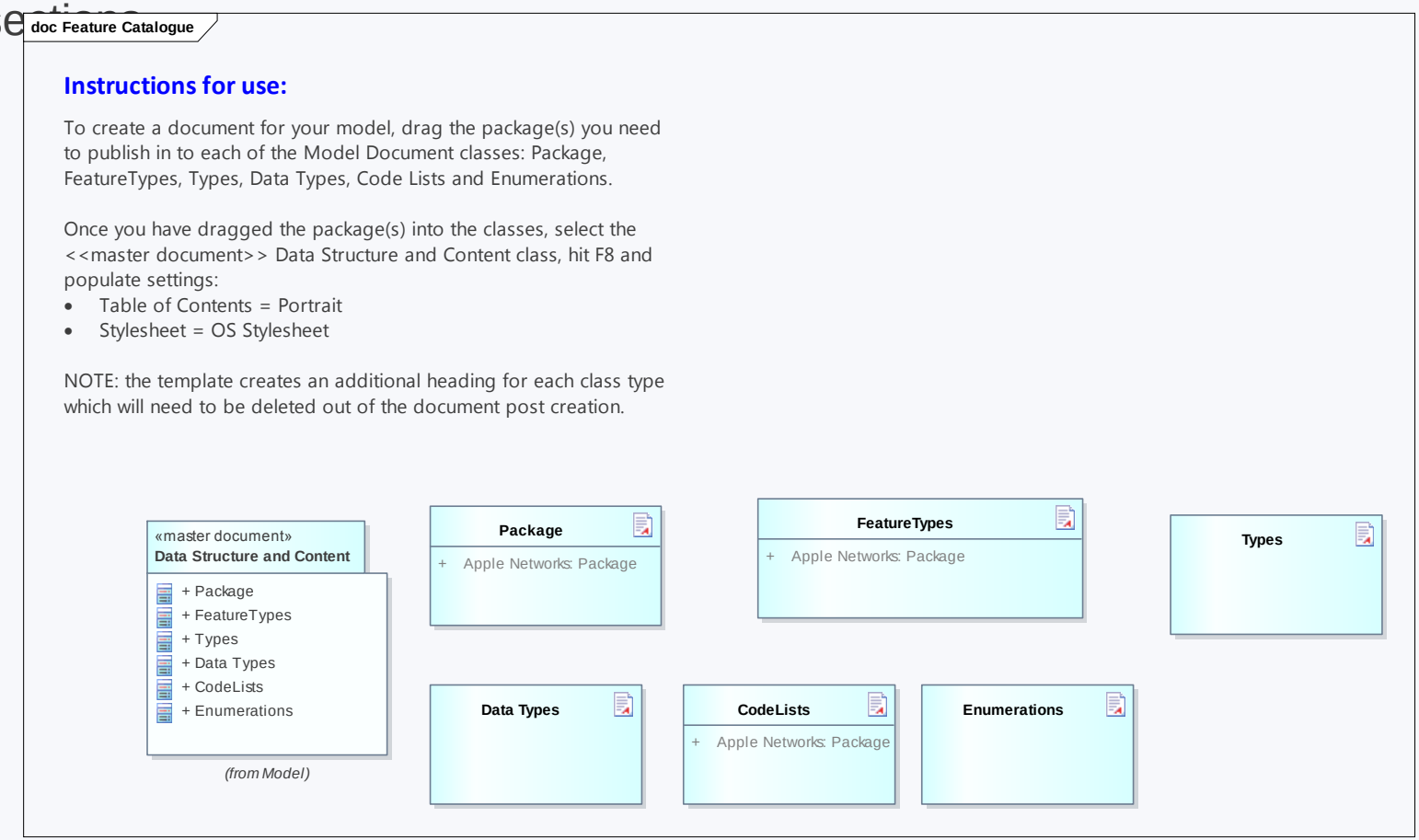
Technical Specification Documentation

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



Technical Specification Documentation

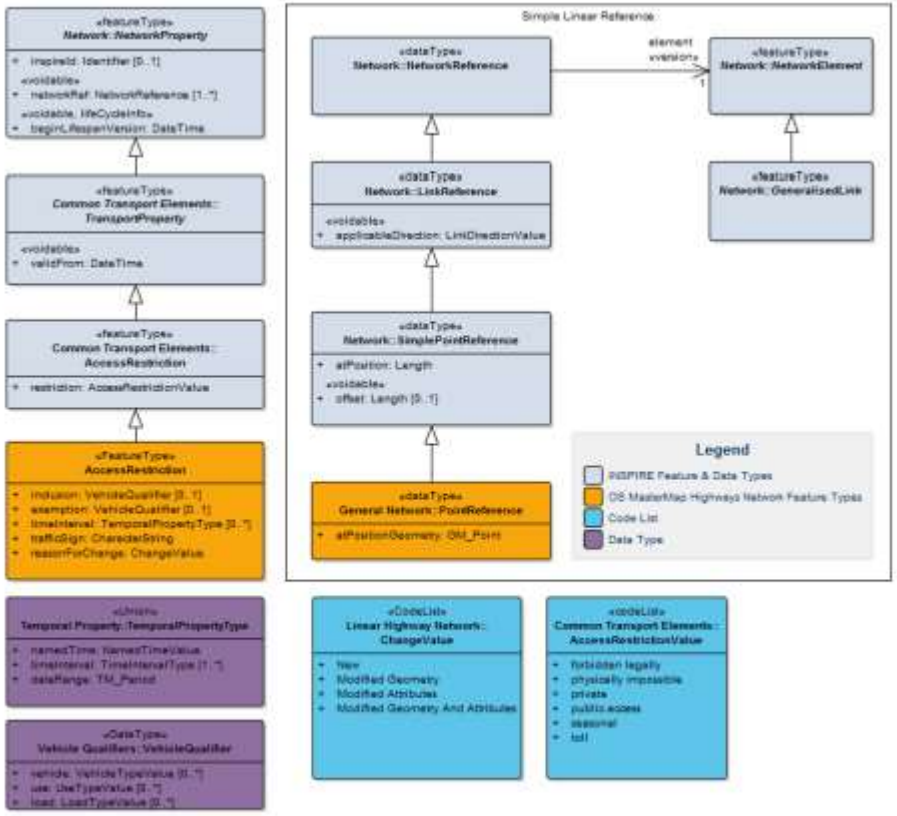


Figure 7 Context diagram for AccessRestriction.

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]

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]

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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