

Introduction to GML (Geography Markup Language)

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Introduction to GML



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- Standards for Geographic Information
 - ▣ Open Geospatial Consortium (OGC)
 - ▣ International Organisation for Standardisation (ISO)
- Geography Markup Language (GML)
- Simple feature elements for geometry
- Spatial Reference Systems

History of Open Geospatial Consortium (OGC)

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- Clinton's executive order April 2004
- OGC was formed later in 2004
- Today (2014) around 500 companies, agencies and universities are members
- <http://www.opengeospatial.org/>

OGC creates industry standards, not formal standards

OGC produce specifications



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- Web services
 - ▣ Web Map Service (WMS)
 - ▣ Web Feature Service (WFS)
 - ▣ Web Coverage Service (WCS)
 - ▣ Catalogue Service (CSW)
 - ▣ Etc
- XML schemas (formats)
 - ▣ GML
 - ▣ KML

Most well known specifications

GML 2.1.2 Validation | Compliance and Interoperability Testing Initiative (CITE) - Windows Internet Explorer provided by Högskola

http://cite.opengeospatial.org/test_engine/gml/2.1.2

Google

Google

Sök

318 blockerade

Stavning

Slicka till

SVT Text - 343

YGG - Geodesy & Geoinforma...

Logga av - privat - Logga av ...

GML 2.1.2 Validation | Co... X

OGC Home | OGC Network | OGC User | OGC Forum

OGC Compliance and Interoperability Testing Initiative (CITE)

Open Geospatial Consortium, Inc.

CITE Navigation

- CITE Home
- About Compliance Testing
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 - Atom+GeoRSS Validation
 - GML Validation
 - GML 2.1.2 Validator**
 - Web Map Context Validation
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Home >> test_engine >> gml >> 2.1.2

GML 2.1.2 Validation

The GML 2.1.2 test engine supports the validation of GML 2.1.2 schemas and instance documents. There is currently one test suite version for Geography Markup Language validation available online via the Legacy CITE Engine. As a stand-alone tool, it is not currently associated with any type of official compliance certification.

Schema Validation

The GML application schema validator checks that the schema is valid according to the XML Schema 1.0 rules and the GML 2.1.2 rules. The schema must be available on a web server via a HTTP URL.

The following checks are performed.

- XML Schema 1.0 Validity (Users Xerces schema validator).
- All feature type definitions must extend `xmlns(gml=http://www.opengis.net/gml)AbstractFeatureType` or from a complex type that extends that type.
- A GML feature definition must not have a direct child element that derives from `xmlns(gml=http://www.opengis.net/gml)gml:AbstractFeatureType`.
- A GML feature definition must not have a direct child element that derives from `xmlns(gml=http://www.opengis.net/gml)gml:AbstractGeometryType`.

Note: The schemas must define the schemaLocation for all import and include statements that is resolvable from the source schema URL.

Instance Validation

The instance document validation validates a GML instance document against the GML 2.1.2 schemas in the test engine and the application schemas defined in the document. The test document can either be available on a web server via a HTTP url or the body can be pasted into the form.

The following checks are performed.

- The document must be a valid document and must validate against the application schema defined in the schema location (Users Xerces xml validator).
- The GML elements must validate against the internal GML 2.1.2 schemas used by the test engine.

Note: The schemas must define the schemaLocation for all application schemas that is resolvable from the test engine.

Related information

- GML 2.1.2 Specification (02-069)

Search

Search

Quick Links

TEAM Engine - CSW, WFS, & WMS compliance testing along with WMC validation, Legacy CITE Engine - WCS compliance testing, GeoRSS Validator - Validate your GeoRSS feed, GML 2.1.2 Validator - Validate your GML schema or instance documents.

Compliant Products

Visit the OGC Website for a listing of certified OGC Compliant products.

TEAM Engine Launches

Subscribe

Also validation tools, in this case for validating that a schema conforms to the XML and GML standards

ISO (www.iso.org)



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- A network of 157 national standards institutes
- Develop formal standards
- ISO-TC211 is dealing with geographic information
- GML (and some other OGC specifications) has also become an ISO standard (GML = ISO 19136)

ISO standards costs around 100 € each. OGC specs are free of charge

Geography Markup Language (GML)



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- First tests in 1999
- Version 2 (simple features)
- Version 3 – profiles made (subsets of full GML)

- GML files may be provided by Web Feature Services
- GML files have to be rendered (styling) for display (remember XSLT?)

Simple features: features whose geometric properties are restricted to 'simple' geometries for which coordinates are defined in two dimensions and the delineation of a curve is subject to linear interpolation.

Version 3: represent geospatial phenomena in addition to simple 2D linear features, including features with complex, non-linear, 3D geometry, features with 2D topology, features with temporal properties, dynamic features, coverages, and observations;

- provide more explicit support for properties of features and other objects whose value is complex;
- represent spatial and temporal reference systems, units of measure and standards information;
- use reference system, units and standards information in the representation of geospatial phenomena, observations, and values;
- represent default styles for feature and coverage visualization;
- conform with standards from the ISO 19100 series.

The expansion of GML to meet these needs is reflected in base schemas for GML version 3 that are over eight times as large as the base schemas for GML version 2. However, few applications will use all of the definitions added to GML version 3. Implementers may use a selective subset of the GML version 3 schemas sufficient to support the definitions in their application schemas.

Based on XML technologies



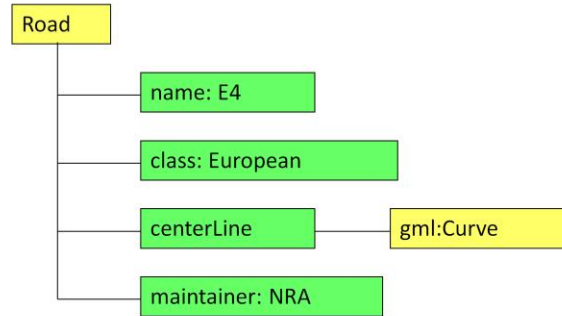
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- ❑ XML, XML Namespaces, XML Schema, XLinks
- ❑ Implements concepts from the ISO 19100 standards
- ❑ Support spatial and non-spatial properties of objects
- ❑ Open and vendor neutral

Example



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GML example



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```
<Road gml:id="o.1fg7a3">  
  <name>E4</name>  
  <class>European</class>  
  <centerLine>  
    <gmlCurve>...</gmlCurve>  
  </centerLine>  
  <maintainer>NRA</maintainer>  
</Road>
```

GML example with XLink



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```
<Road gml:id="o.1fg7a3">
  <name>E4</name>
  <class>European</class>
  <centerLine>
    <gml:Curve>...</gml:Curve>
  </centerLine>
  <maintainer xlink:href="urn:x-auth:o.1f7d6e" />
</Road>
```

If maintainer is another object

The object is either a child element of the property or referenced by an xlink:href attribute in the property element

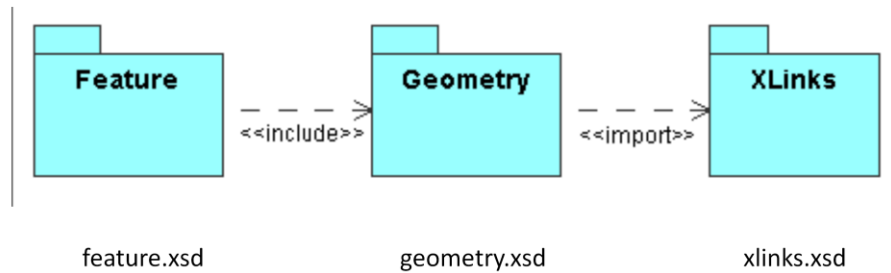
The xlink:href attribute is interpreted in the way that the value of the property is the object referenced in the link

The object can be part of the same GML document or anywhere in the internet/intranet

Feature type



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In GML, feature types are represented by an XML Schema. In general terms a “schema” defines the characteristics of a class of objects; in XML a schema also describes how data is marked up. Feature collections can build the root of an XML document carrying geospatial data. GML builds on three (3) basic XML schemas:

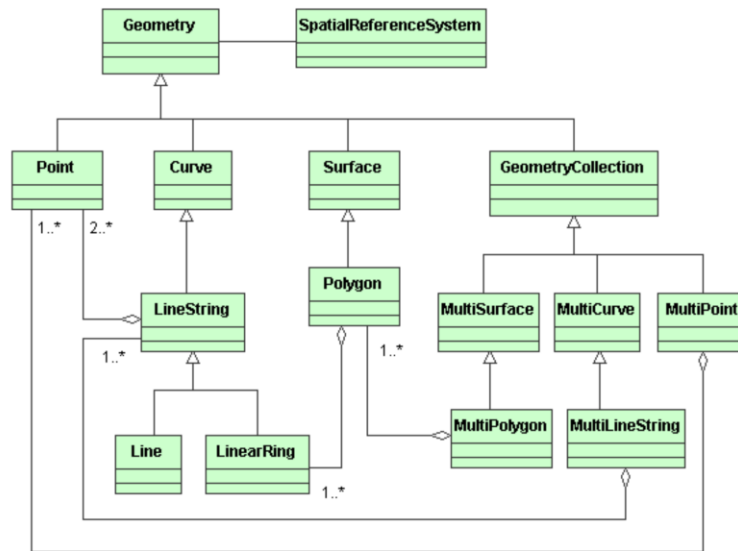
geometry.xsd, which includes the detailed geometry components. It includes type definitions for abstract geometry elements as point, line and polygons and complex type definitions for the underlying geometry types. It is based on the OGC Abstract Specification (Topic 1: Feature Geometry).

feature.xsd, which defines the general feature-property model. It includes the GML geometry constructs, which can be used in the feature type definitions

xlink.xsd, which provides the XLink attributes used to implement linking functionality.

Geometry model (Simple features)

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Version 2 – simple features

Classes have 3 fields (name, attributes and operations)

Triangle mean generalisation (Geometry, Curve, Surface)

Diamond mean aggregation

We have SpatialREfSys. We have a separate look at that one later

Point example



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GML 2

```
<gml:Point gml:id="P1" srsName="http://www.opengis.net/def/crs/EPSG/0/28992">  
  <gml:coordinates>56.1 , 0.45 </gml:coordinates>  
</gml:Point>
```

GML 3

```
<gml:Point gml:id="P1" srsName="http://www.opengis.net/def/crs/EPSG/0/28992">  
  <gml:pos srsDimension="2"> 56.1 0.45 </gml:pos>  
</gml:Point>
```

Earlier versions of GML allows the usage of <coord>. Avoid that construction.

```
<Point gid="P1" srsName="http://www.opengis.net/gml/srs/epsg.xml#4326">  
<coord><X>56.1</X><Y>0.45</Y></coord>  
</Point>
```

Line String example



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GML 2

```
<gml:LineString gml:id="L1" srsName="http://www.opengis.net/def/crs/EPSG/0/28992">  
  <gml:coordinates> 0.0 , 0.0 20.0 , 35.0 100.0 , 100.0 </gml:coordinates>  
</gml:LineString>
```

GML 3

```
<gml:LineString gml:id="L1" srsName="http://www.opengis.net/def/crs/EPSG/0/28992">  
  <gml:posList srsDimension="2 "> 0.0 0.0 20.0 35.0 100.0 100.0 </gml:posList>  
</gml:LineString>
```

```
<LineString srsName="http://www.opengis.net/gml/srs/epsg.xml#4326">  
<coord><X>0.0</X><Y>0.0</Y></coord>  
<coord><X>20.0</X><Y>35.0</Y></coord>  
<coord><X>100.0</X><Y>100.0</Y></coord>  
</LineString>
```

Polygon example



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```
<gml:Polygon gml:id="P1"
  srsName="http://www.opengis.net/def/crs/EPSG/0/28992">
  <gml:outerBoundaryIs>
    <gml:LinearRing>
      <gml:coordinates>0.0,0.0 100.0,0.0 100.0,100.0 0.0,100.0 0.0,0.0
    </gml:coordinates>
    </gml:LinearRing>
  </gml:outerBoundaryIs>
  <gml:innerBoundaryIs>
    <gml:LinearRing>
      <gml:coordinates>10.0,10.0 10.0,40.0 40.0,40.0 40.0,10.0 10.0,10.0
    </gml:coordinates>
    </gml:LinearRing>
  </gml:innerBoundaryIs>
</gml:Polygon>
```


What is meant by
srsName="http://www.opengis.net/def/crs/EPSG/0/28992"?



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- Specifications of Spatial Reference Systems have been collected by the European Petroleum Survey Group (EPSG)
- Their database is now maintained by the International Association of Oil and Gas Producers (IOGP), www.iogp.org
- Codes are accessible at <http://www.epsg-registry.org/>

The Dutch reference system has number 28992
We will look at this later.

Some coordinate systems



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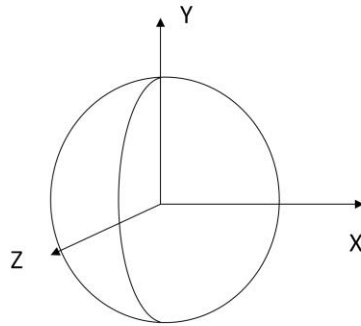
Table 4 — Naming constraints for coordinate system axes

CS	CRS	Permitted coordinate system axis names
Cartesian	Geocentric	Geocentric X, Geocentric Y, Geocentric Z
Spherical	Geocentric	Spherical Latitude, Spherical Longitude, Geocentric Radius
Ellipsoidal	Geographic	Geodetic latitude, Geodetic longitude, Ellipsoidal height (if 3D)
Vertical	Vertical	Gravity-related height
Vertical	Vertical	Depth
Cartesian	Projected	Easting, Northing
Cartesian	Projected	Westing, Southing

Geocentric coordinates



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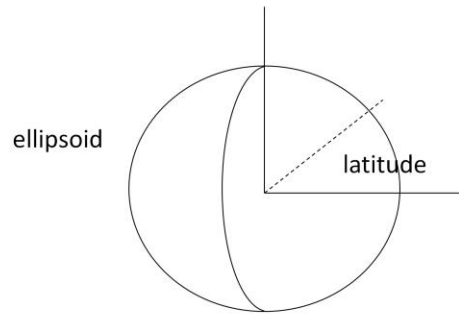


In this case, cartesian coordinates with the origin at the center of the earth
Can also be latitude, longitude and radius (spherical)

Geographical coordinates



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Water should be horizontal.

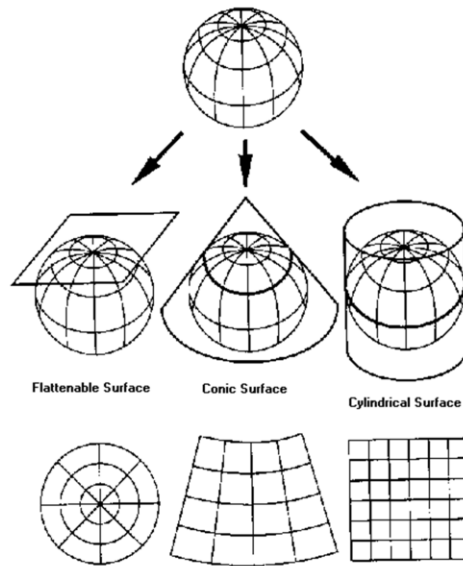
Due to the rotation of the earth and irregularities in mass distribution of the interior of the earth, the water surface is irregular

The irregular water surface is approximated by an ellipsoid. Different ones in different countries.

The ellipsoid being used is one important part of the specification of a spatial reference system



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Map projections

From a curved surface to a plane

Cartesian coordinates in X,Y

What is EPSG code 28992?



← → ↻

Appar ftv Fransk TV Väder Antibes - 14 d...

query by filter

retrieve by code

Code:

Retrieve


Reset

?

EPSG Geodetic Parameter Registry

Version: 8.6

Welcome guest! | [login or register](#) | [help](#)

International Association of Oil & Gas Producers

Note: Codes are only unique within a type, therefore multiple codes may be retrieved.

Welcome to the EPSG Geodetic Parameter Dataset

The EPSG Geodetic Parameter Dataset is a structured dataset of Coordinate Reference Systems and Coordinate Transformations, accessible through this online registry (www.epsg-registry.org) or, as a downloadable zip files, through IOGP's EPSG home page at www.epsg.org. The geographic coverage of the data is worldwide, but it is stressed that the dataset does not and cannot record all possible geodetic parameters in use around the world. The EPSG Geodetic Parameter Dataset is maintained by the Geodesy Subcommittee of IOGP's Geomatics Committee.

The EPSG Geodetic Parameter Dataset, offered through IOGP's web pages, may be used free of charge, but its use is subject to the acceptance of the [Terms of Use](#).

Registry users may query and view the data and generate printable reports. The Registry supports anonymous (guest) access, but also permits the user to register for additional services, such as the export of the entire dataset as GML 3.2 dictionaries.

Additionally the Registry provides a web service interface, permitting geospatial software to query and retrieve geodetic parameters. Information on how to access the service is available in [Guidance Note 7-3: EPSG Registry Developers Guide](#).

If you are interested in receiving news about the EPSG Dataset, please register on IOGP's EPSG home page at www.epsg.org or contact EPSGAdministrator@iogp.org

Links

- [IOGP's EPSG home page](#)
- [IOGP's Geomatics area](#)
- [IOGP's home page](#)

- [What is new to the current version](#)
- [EPSG Dataset supporting documentation](#)
- [Submit Feedback or Change Request](#)

[Back to IOGP's Geomatics area](#)

Developed by: [Galdos Systems Inc.](#)

Version: 7.4.1.1

www.petrosysguru.com

Our result



query by filter

retrieve by code

Code: 28992

Retrieve


Reset

?

EPSP Geodetic Parameter Registry

Version: 8.6

Welcome guest! | [login or register](#) | [help](#)


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Note: Codes are only unique within a type, therefore multiple codes may be retrieved.

ProjectedCRS [Amersfoort / RD New]

metadata

Code: EPSG::28992

Name: Amersfoort / RD New

Aliases

Area of Use [Netherlands - onshore]

Base Geodetic CRS [Amersfoort]

Conversion [RD New]

Code: EPSG::19914

Name: RD New

Operation is Reversible: yes

Area of Use [Netherlands - onshore]

Parameter Values

Parameter Name	Parameter Value or Parameter File	Unit of Measure	Sign Reversible
Latitude of natural origin	52° 9' 22.178" N	sexagesimal DMS	No
Longitude of natural origin	5° 23' 15.5" E	sexagesimal DMS	No
Scale factor at natural origin	0.9999079	unity	No
False easting	155000	metre	No
False northing	463000	metre	No

Method [Oblique Stereographic]

metadata

Amersfoort / RD New[VALID]

Remarks: Replaces 28991 (Amersfoort / RD Old).

Scope: Large and medium scale topographic mapping and engineering survey.

Data Source: OGP

Revision Date: 2005-05-27

Change ID: [EPSG::2000.370](#)

Change ID: [EPSG::2005.180](#)

GML

WKT

Note 28992

Amersfoort Geographic CRS

RD New projection

WKT for EPSG 28992



```
PROJCRS["Amersfoort / RD New",  
  BASEGEODCRS["Amersfoort",  
    DATUM["Amersfoort",  
      ELLIPSOID["Bessel 1841",6377397.155,299.1528128,LENGTHUNIT["metre",1.0]]],  
    CONVERSION["RD New",  
      METHOD["Oblique Stereographic",ID["EPSG",9809]],  
      PARAMETER["Latitude of natural origin",52.156160555556,ANGLEUNIT["degree",0.01745329252]],  
      PARAMETER["Longitude of natural origin",5.387638888889,ANGLEUNIT["degree",0.01745329252]],  
      PARAMETER["Scale factor at natural origin",0.9999079,SCALEUNIT["unity",1.0]],  
      PARAMETER["False easting",155000,LENGTHUNIT["metre",1.0]],  
      PARAMETER["False northing",463000,LENGTHUNIT["metre",1.0]]],  
    CS[cartesian,2],  
    AXIS["easting (X)",east,ORDER[1]],  
    AXIS["northing (Y)",north,ORDER[2]],  
    LENGTHUNIT["metre",1.0],  
    ID["EPSG",28992]]
```

The Amersfoort CRS is based on the Bessel ellipsoid
RD new projection is an Oblique Stereographic

That's all

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- ☐ Read the literature
- ☐ Make the assignment

Introduction to XML and UML

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Source:

EuroSDR Educational Services - EduServ, ([EuroSDR](#)).



Novogit