ncML-G

and

ncML-G$_{ML}$ Ver. 0.3.1

AN EXTENSION OF ncML FOR ENABLING INTEROPERABILITY WITH GIS

SCHEMA DOCUMENTATION

When netCDF meets GIS Coomunity

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OBJECTIVES

The main object of the GIS extension model for ncML is to facilitate the interoperability between the Earth Sciences and the GIS Communities.

Such interoperability is essential to support interoperability: between the Earth Sciences Community and the Society.

The present extension introduces a set of optional elements which are useful to describe a netCDF dataset according to geo-spatial models introduced by international committee for standardization.

These elements are based on the following international standardization initiatives: OGC OpenGIS and ISO TC211.

The ncML-G expected result is to ease the import of netCDF dataset from GIS tools.

The ncML-G$_{ML}$ schema was conceived to explicitly formalize the introduced solution to harmonize Earth Sciences and GIS data models (i.e. ncML-G). NcML-G$_{ML}$ must consist of two parts (or views):

– a multidimesional array model for ES community realm;

– a feature/coverage model for GIS community realm;

OVERVIEW

See the separated documentation

XML SCHEMAS DOCUMENTATION

Documentation of geoCoordinateSystem schema version 0.3.1

Schema **geoCoordinateSystem.xsd** version 0.3.1

Elements	Complex types
geoCoordinateSystem	**_DatasetGeoDomainExtent**
geoRefCoordinateSystem	**_DatasetGeoDomainLocation**
spatialExtent	**_GeoCoordinateSystemType**
temporalExtent	**_GeoRefCoordinateSystemType**
verticalExtent	**_TemporalExtent**
	_VerticalExtent

schema location:	**http://www.unidata.ucar.edu/schemas/netcdf-cs.xsd**
targetNamespace:	**http://www.ucar.edu/schemas/netcdf**

Elements	Complex types
coordinateAxis	**CoordinateAxisBoundaryType**
coordinateAxisBoundary	**CoordinateAxisType**
coordinateSystem	**CoordinateSystemType**

coordinateTransform	CoordinateTransformType
	NetcdfType (r)
	VariableType (r)

schema location: **http://www.unidata.ucar.edu/schemas/netcdf.xsd**
targetNamespace: **http://www.ucar.edu/schemas/netcdf**

Elements	Complex types
attribute	**AttributeType**
dimension	**DimensionType**
netcdf	**NetcdfType**
values	**ValuesType**
variable	**VariableType**

element **geoCoordinateSystem**

diagram

namespace http://www.ucar.edu/schemas/netcdf

type **nc:_GeoCoordinateSystemType**

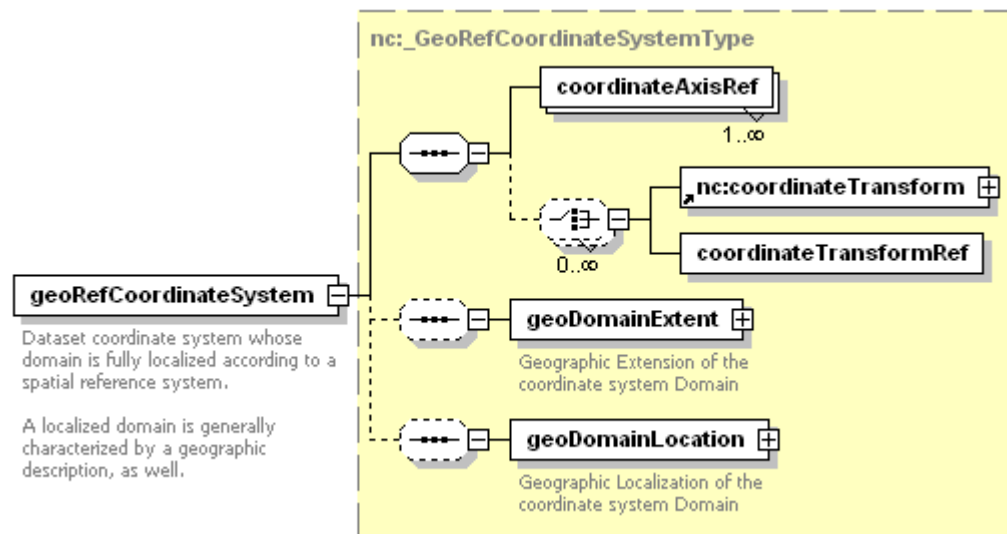children **coordinateAxisRef nc:coordinateTransform coordinateTransformRef geoDomainExtent**

attributes	Name	Type	Use	Default	Fixed	Annotation
	name	xsd:token	required			

annotation documentation Dataset coordinate system whose domain is characterized by a geographic description.
Such geographic description of the domain is generally useful for catalog service

source `<xsd:element name="geoCoordinateSystem" type="nc:_GeoCoordinateSystemType"`
`substitutionGroup="nc:coordinateSystem">`
`  <xsd:annotation>`
`    <xsd:documentation>`Dataset coordinate system whose domain is characterized by a geographic description.

Such geographic description of the domain is generally useful for catalog service`</xsd:documentation>`
`  </xsd:annotation>`
`</xsd:element>`

element **geoRefCoordinateSystem**

diagram

namespace	http://www.ucar.edu/schemas/netcdf
type	**nc:_GeoRefCoordinateSystemType**
children	**coordinateAxisRef nc:coordinateTransform coordinateTransformRef geoDomainExtent geoDomainLocation**

attributes	Name	Type	Use	Default	Fixed	Annotation
	name	xsd:token	required			

annotation	documentation	Dataset coordinate system whose domain is fully localized according to a spatial reference system. A localized domain is generally characterized by a geographic description, as well.

source
```
<xsd:element name="geoRefCoordinateSystem" type="nc:_GeoRefCoordinateSystemType"
substitutionGroup="nc:geoCoordinateSystem">
  <xsd:annotation>
    <xsd:documentation>Dataset coordinate system whose domain is fully localized according to a spatial reference
system.

A localized domain is generally characterized by a geographic description, as well.</xsd:documentation>
  </xsd:annotation>
</xsd:element>
```
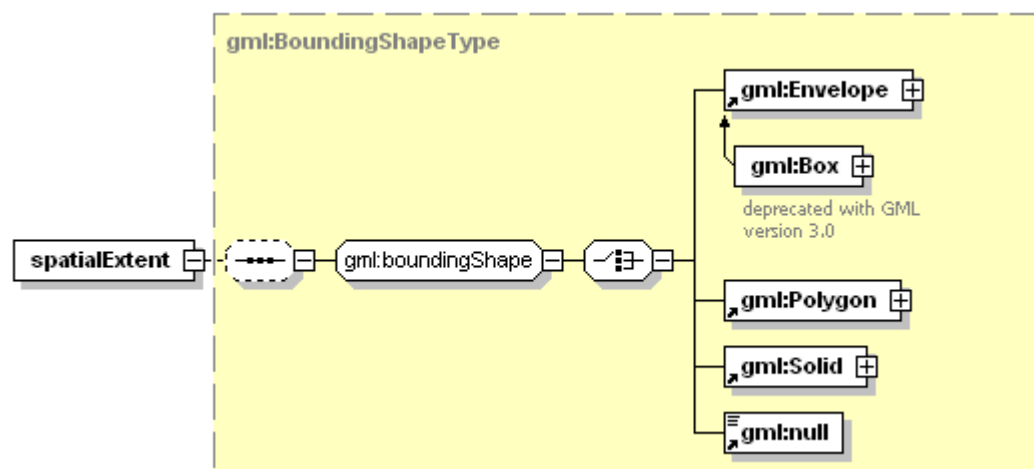
## element **spatialExtent**

diagram

namespace	http://www.ucar.edu/schemas/netcdf
type	**gml:BoundingShapeType**
children	**gml:Envelope gml:Polygon gml:Solid gml:null**

used by	complexType	**_DatasetGeoDomainExtent**				
attributes	Name	Type	Use	Default	Fixed	Annotation
	type	string			simple	
	xlink:href	anyURI	optional			
	xlink:role	anyURI	optional			
	xlink:arcrole	anyURI	optional			
	xlink:title	string	optional			
	xlink:show	string	optional			
	xlink:actuate	string	optional			
	gml:remoteSche ma	anyURI	optional			

source `<xsd:element name="spatialExtent" type="gml:BoundingShapeType"/>`

element **temporalExtent**

diagram

namespace http://www.ucar.edu/schemas/netcdf
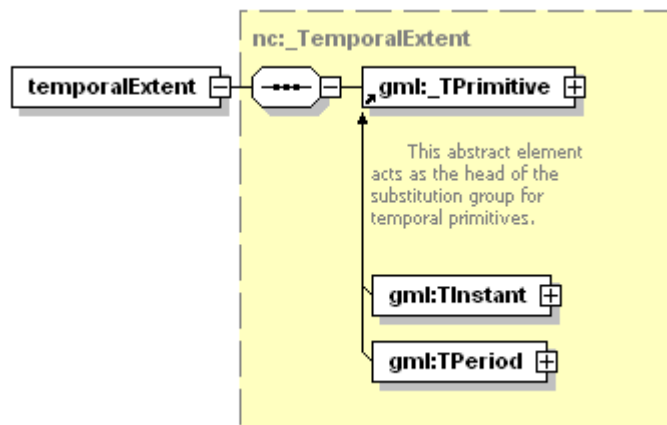
type **nc:_TemporalExtent**

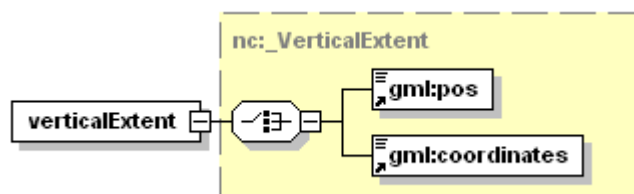children **gml:_TPrimitive**

used by	complexType	**_DatasetGeoDomainExtent**

source `<xsd:element name="temporalExtent" type="nc:_TemporalExtent"/>`

element **verticalExtent**

diagram

namespace http://www.ucar.edu/schemas/netcdf

type **nc:_VerticalExtent**

children **gml:pos gml:coordinates**

used by	complexType	**_DatasetGeoDomainExtent**				
attributes	Name	Type	Use	Default	Fixed	Annotation
	srsName	xsd:anyURI	optional			

source `<xsd:element name="verticalExtent" type="nc:_VerticalExtent"/>`

complexType **_DatasetGeoDomainExtent**

diagram

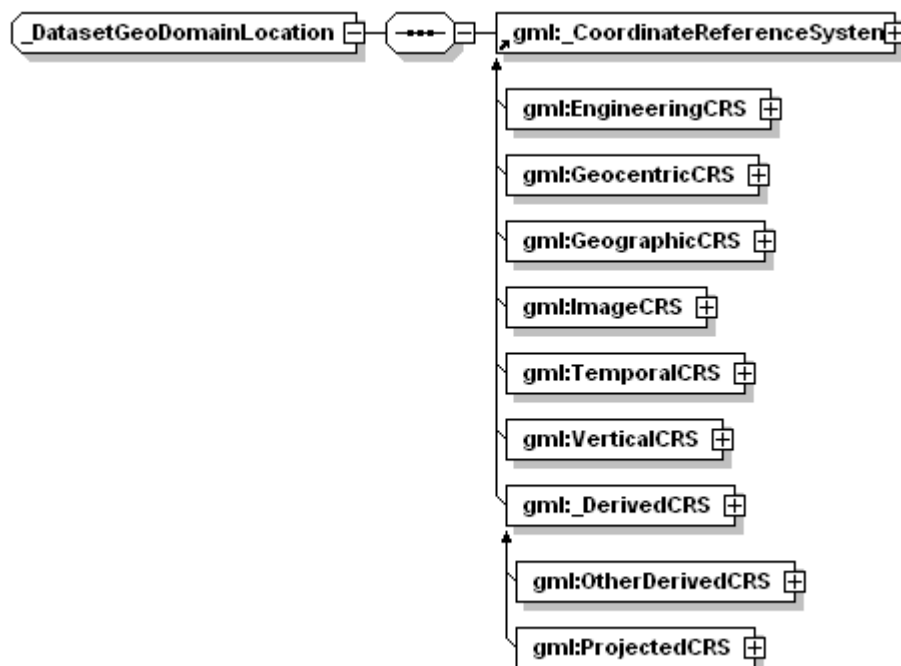|	
namespace	http://www.ucar.edu/schemas/netcdf
children	**nc:spatialExtent nc:verticalExtent nc:temporalExtent**
used by	element **_GeoCoordinateSystemType/geoDomainExtent**

attributes

Name	Type	Use	Default	Fixed	Annotation
description	xsd:string	optional			

source

```xml
<xsd:complexType name="_DatasetGeoDomainExtent" abstract="false">
  <xsd:sequence>
    <xsd:element ref="nc:spatialExtent" maxOccurs="unbounded"/>
    <xsd:element ref="nc:verticalExtent" minOccurs="0" maxOccurs="unbounded"/>
    <xsd:element ref="nc:temporalExtent" minOccurs="0" maxOccurs="unbounded"/>
  </xsd:sequence>
  <xsd:attribute name="description" type="xsd:string" use="optional"/>
</xsd:complexType>
```

complexType **_DatasetGeoDomainLocation**

diagram

namespace	http://www.ucar.edu/schemas/netcdf
children	**gml:_CoordinateReferenceSystem**
used by	element **_GeoRefCoordinateSystemType/geoDomainLocation**

source

```xml
<xsd:complexType name="_DatasetGeoDomainLocation">
  <xsd:sequence>
    <xsd:element ref="gml:_CoordinateReferenceSystem"/>
  </xsd:sequence>
```
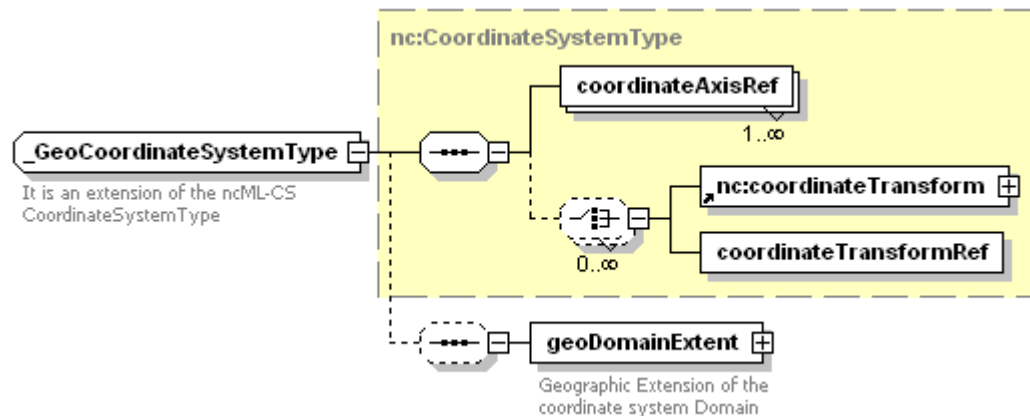
</xsd:complexType>

complexType _GeoCoordinateSystemType

diagram

_GeoCoordinateSystemType
It is an extension of the ncML-CS CoordinateSystemType

namespace	http://www.ucar.edu/schemas/netcdf
type	extension of **nc:CoordinateSystemType**
children	**coordinateAxisRef nc:coordinateTransform coordinateTransformRef geoDomainExtent**

used by		
	element	**geoCoordinateSystem**
	complexType	**_GeoRefCoordinateSystemType**

attributes	Name	Type	Use	Default	Fixed	Annotation
	name	xsd:token	required			

annotation	
	documentation It is an extension of the ncML-CS CoordinateSystemType

source

```xml
<xsd:complexType name="_GeoCoordinateSystemType">
 <xsd:annotation>
  <xsd:documentation>It is an extension of the ncML-CS CoordinateSystemType</xsd:documentation>
 </xsd:annotation>
 <xsd:complexContent>
  <xsd:extension base="nc:CoordinateSystemType">
   <xsd:sequence minOccurs="0">
    <xsd:element name="geoDomainExtent" type="nc:_DatasetGeoDomainExtent">
     <xsd:annotation>
      <xsd:documentation>Geographic Extension of the coordinate system Domain</xsd:documentation>
     </xsd:annotation>
    </xsd:element>
   </xsd:sequence>
  </xsd:extension>
 </xsd:complexContent>
</xsd:complexType>
```
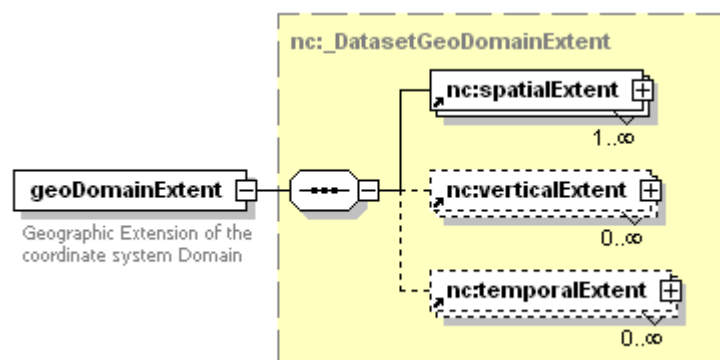
element _GeoCoordinateSystemType/geoDomainExtent

diagram

geoDomainExtent
Geographic Extension of the coordinate system Domain

namespace	http://www.ucar.edu/schemas/netcdf
type	**nc:_DatasetGeoDomainExtent**
children	**nc:spatialExtent nc:verticalExtent nc:temporalExtent**

attributes	Name	Type	Use	Default	Fixed	Annotation
	description	xsd:string	optional			

annotation		
	documentation	Geographic Extension of the coordinate system Domain

source

```
<xsd:element name="geoDomainExtent" type="nc:_DatasetGeoDomainExtent">
  <xsd:annotation>
    <xsd:documentation>Geographic Extension of the coordinate system Domain</xsd:documentation>
  </xsd:annotation>
</xsd:element>
```

complexType **_GeoRefCoordinateSystemType**

diagram

namespace   http://www.ucar.edu/schemas/netcdf

type   extension of **nc:_GeoCoordinateSystemType**

children   **coordinateAxisRef nc:coordinateTransform coordinateTransformRef geoDomainExtent geoDomainLocation**

used by   element   **geoRefCoordinateSystem**

attributes	Name	Type	Use	Default	Fixed	Annotation
	name	xsd:token	required			

annotation		
	documentation	Geo-referenced Coordinate System type

source

```
<xsd:complexType name="_GeoRefCoordinateSystemType">
  <xsd:annotation>
    <xsd:documentation>Geo-referenced Coordinate System type</xsd:documentation>
  </xsd:annotation>
  <xsd:complexContent>
    <xsd:extension base="nc:_GeoCoordinateSystemType">
      <xsd:sequence minOccurs="0">
        <xsd:element name="geoDomainLocation" type="nc:_DatasetGeoDomainLocation">
          <xsd:annotation>
            <xsd:documentation>Geographic Localization of the coordinate system Domain</xsd:documentation>
          </xsd:annotation>
        </xsd:element>
      </xsd:sequence>
    </xsd:extension>
  </xsd:complexContent>
</xsd:complexType>
```
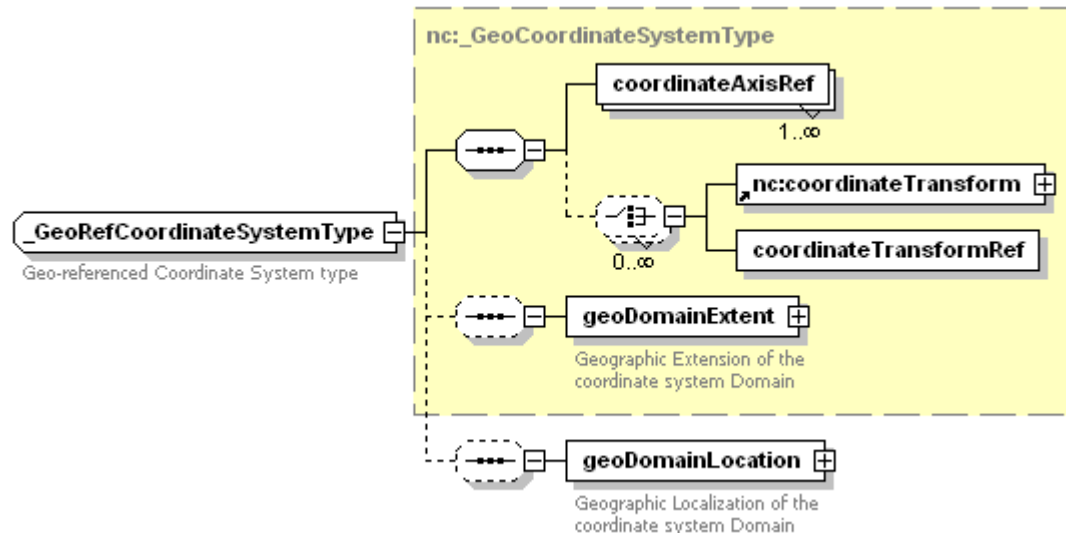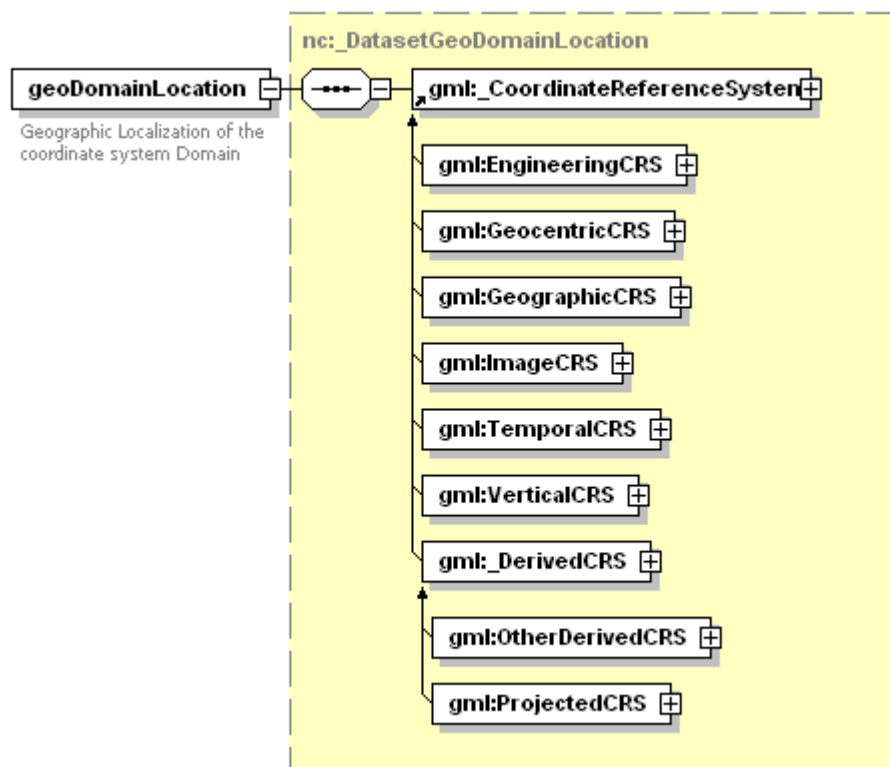
element **_GeoRefCoordinateSystemType/geoDomainLocation**

diagram

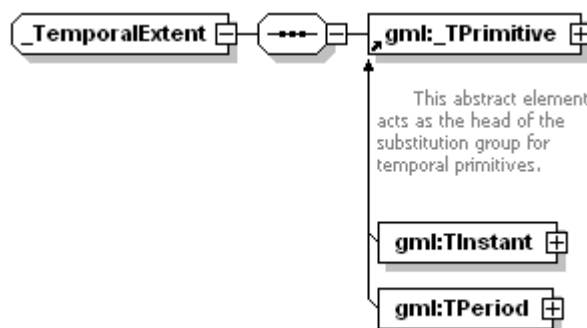|	
namespace	http://www.ucar.edu/schemas/netcdf
type	**nc:_DatasetGeoDomainLocation**
children	**gml:_CoordinateReferenceSystem**
annotation	documentation Geographic Localization of the coordinate system Domain

source

```
<xsd:element name="geoDomainLocation" type="nc:_DatasetGeoDomainLocation">
  <xsd:annotation>
    <xsd:documentation>Geographic Localization of the coordinate system Domain</xsd:documentation>
  </xsd:annotation>
</xsd:element>
```

complexType **_TemporalExtent**

diagram

namespace	http://www.ucar.edu/schemas/netcdf
children	**gml:_TPrimitive**
used by	element **temporalExtent**

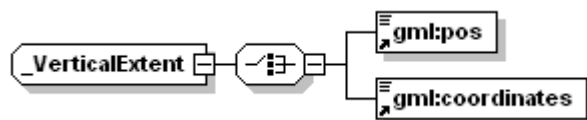source   `<xsd:complexType name="_TemporalExtent" abstract="false">`

```
<xsd:sequence>
  <xsd:element ref="gml:_TPrimitive"/>
</xsd:sequence>
</xsd:complexType>
```

complexType **_VerticalExtent**

diagram

namespace	http://www.ucar.edu/schemas/netcdf

children **gml:pos gml:coordinates**

used by element **vertical Extent**

attributes

Name	Type	Use	Default	Fixed	Annotation
srsName	xsd:anyURI	optional			

source
```
<xsd:complexType name="_VerticalExtent" abstract="false">
  <xsd:choice>
    <xsd:element ref="gml:pos"/>
    <xsd:element ref="gml:coordinates"/>
  </xsd:choice>
  <xsd:attribute name="srsName" type="xsd:anyURI" use="optional"/>
</xsd:complexType>
```
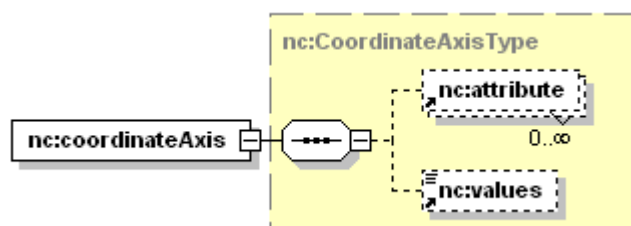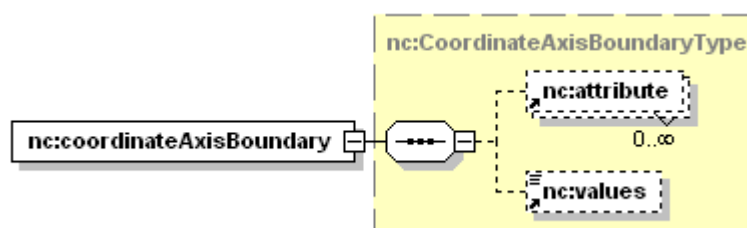
element **nc:coordinateAxis**

diagram

namespace	http://www.ucar.edu/schemas/netcdf

type **nc:CoordinateAxisType**

children **nc:attribute nc:values**

attributes

Name	Type	Use	Default	Fixed	Annotation
name	xsd:token	required			
shape	xsd:token	optional			
type	nc:DataType	required			
units	xsd:token	required			
axisType	nc:AxisType	optional			
positive	nc:PositiveValue	optional			
boundaryRef	xsd:token	optional			

source `<xsd:element name="coordinateAxis" type="nc:CoordinateAxisType" substitutionGroup="nc:variable"/>`
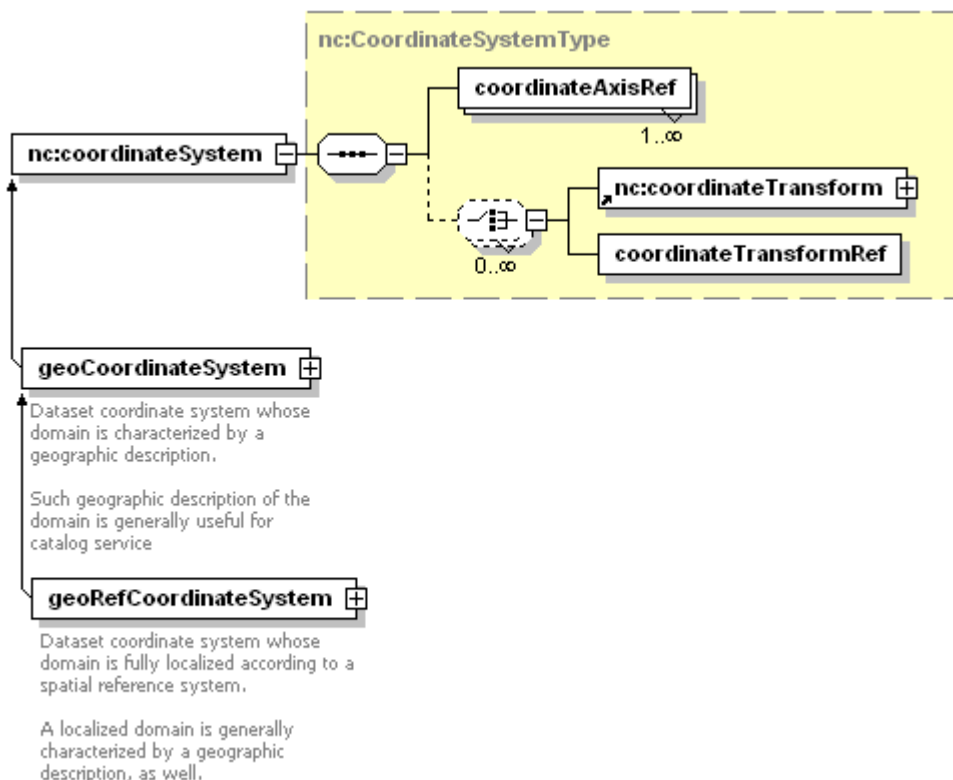
element **nc:coordinateAxisBoundary**

diagram

namespace	http://www.ucar.edu/schemas/netcdf

type	**nc:CoordinateAxisBoundaryType**				

children	**nc:attribute nc:values**				

	Name	Type	Use	Default	Fixed	Annotation
attributes	name	xsd:token	required			
	shape	xsd:token	optional			
	type	nc:DataType	required			

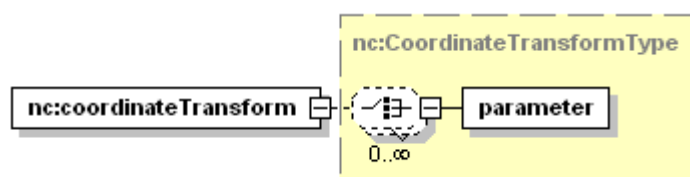|	
source	`<xsd:element name="coordinateAxisBoundary" type="nc:CoordinateAxisBoundaryType" substitutionGroup="nc:variable"/>`

element **nc:coordinateSystem**

diagram

namespace	http://www.ucar.edu/schemas/netcdf

type	**nc:CoordinateSystemType**

children	**coordinateAxisRef nc:coordinateTransform coordinateTransformRef**

	Name	Type	Use	Default	Fixed	Annotation
attributes	name	xsd:token	required			

source	`<xsd:element name="coordinateSystem" type="nc:CoordinateSystemType"/>`

element **nc:coordinateTransform**

diagram

namespace	http://www.ucar.edu/schemas/netcdf

type	**nc:CoordinateTransformType**

children	**parameter**

	complexType	**nc:CoordinateSystemType**				
used by						
attributes	Name	Type	Use	Default	Fixed	Annotation
	name	xsd:token	required			
	authority	xsd:token	required			
	transformType	nc:TransformType	optional			
source	`<xsd:element name="coordinateTransform" type="nc:CoordinateTransformType"/>`					

complexType **nc:CoordinateAxisBoundaryType**

diagram

namespace	http://www.ucar.edu/schemas/netcdf
type	extension of **nc:VariableType**
children	**nc:attribute nc:values**

	element	**nc:coordinateAxisBoundary**				
used by						
attributes	Name	Type	Use	Default	Fixed	Annotation
	name	xsd:token	required			
	shape	xsd:token	optional			
	type	nc:DataType	required			

source	`<xsd:complexType name="CoordinateAxisBoundaryType">`
	 `<xsd:complexContent>`
	 `<xsd:extension base="nc:VariableType"/>`
	 `</xsd:complexContent>`
	`</xsd:complexType>`					

complexType **nc:CoordinateAxisType**

diagram

namespace	http://www.ucar.edu/schemas/netcdf
type	extension of **nc:VariableType**
children	**nc:attribute nc:values**

	element	**nc:coordinateAxis**				
used by						
attributes	Name	Type	Use	Default	Fixed	Annotation
	name	xsd:token	required			
	shape	xsd:token	optional			
	type	nc:DataType	required			
	units	xsd:token	required			
	axisType	nc:AxisType	optional			
	positive	nc:PositiveValue	optional			
	boundaryRef	xsd:token	optional			

source	`<xsd:complexType name="CoordinateAxisType">`
	 `<xsd:complexContent>`
	 `<xsd:extension base="nc:VariableType">`
	 `<xsd:attribute name="units" type="xsd:token" use="required"/>`
	 `<xsd:attribute name="axisType" type="nc:AxisType" use="optional"/>`					

```
                    <xsd:attribute name="positive" type="nc:PositiveValue" use="optional"/>
                    <xsd:attribute name="boundaryRef" type="xsd:token" use="optional"/>
                  </xsd:extension>
                </xsd:complexContent>
              </xsd:complexType>
```
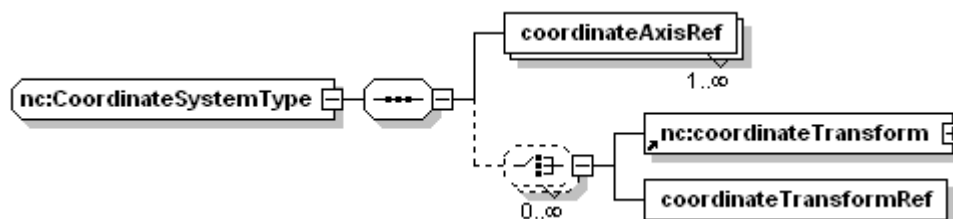
complexType **nc:CoordinateSystemType**

diagram

namespace	http://www.ucar.edu/schemas/netcdf
children	**coordinateAxisRef nc:coordinateTransform coordinateTransformRef**

used by	element	**nc:coordinateSystem**
	complexType	**_GeoCoordinateSystemType**

attributes	Name	Type	Use	Default	Fixed	Annotation
	name	xsd:token	required			

source
```
<xsd:complexType name="CoordinateSystemType">
  <xsd:sequence>
    <xsd:element name="coordinateAxisRef" maxOccurs="unbounded">
      <xsd:complexType>
        <xsd:attribute name="ref" type="xsd:string"/>
      </xsd:complexType>
    </xsd:element>
    <xsd:choice minOccurs="0" maxOccurs="unbounded">
      <xsd:element ref="nc:coordinateTransform"/>
      <xsd:element name="coordinateTransformRef">
        <xsd:complexType>
          <xsd:attribute name="ref" type="xsd:token"/>
        </xsd:complexType>
      </xsd:element>
    </xsd:choice>
    <!-- coordinate axis references  -->
    <!-- set of coordinateTransform or coordinateTransform references -->
  </xsd:sequence>
  <xsd:attribute name="name" type="xsd:token" use="required"/>
</xsd:complexType>
```

element **nc:CoordinateSystemType/coordinateAxisRef**

diagram

namespace	http://www.ucar.edu/schemas/netcdf

attributes	Name	Type	Use	Default	Fixed	Annotation
	ref	xsd:string				

source
```
<xsd:element name="coordinateAxisRef" maxOccurs="unbounded">
  <xsd:complexType>
    <xsd:attribute name="ref" type="xsd:string"/>
  </xsd:complexType>
</xsd:element>
```
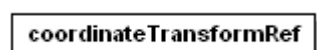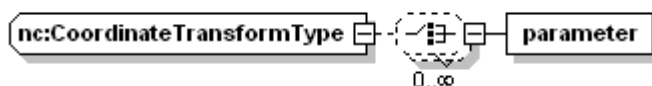
element **nc:CoordinateSystemType/coordinateTransformRef**

diagram

namespace	http://www.ucar.edu/schemas/netcdf

attributes	Name	Type	Use	Default	Fixed	Annotation
	ref	xsd:token				

```
source  <xsd:element name="coordinateTransformRef">
          <xsd:complexType>
            <xsd:attribute name="ref" type="xsd:token"/>
          </xsd:complexType>
        </xsd:element>
```

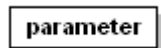## complexType nc:CoordinateTransformType

diagram

namespace http://www.ucar.edu/schemas/netcdf

children **parameter**

used by element **nc:coordinateTransform**

attributes

Name	Type	Use	Default	Fixed	Annotation
name	xsd:token	required			
authority	xsd:token	required			
transformType	nc:TransformType	optional			

```
source  <xsd:complexType name="CoordinateTransformType">
          <xsd:choice minOccurs="0" maxOccurs="unbounded">
            <xsd:element name="parameter" type="nc:AttributeType"/>
          </xsd:choice>
          <xsd:attribute name="name" type="xsd:token" use="required"/>
          <xsd:attribute name="authority" type="xsd:token" use="required"/>
          <xsd:attribute name="transformType" type="nc:TransformType" use="optional"/>
        </xsd:complexType>
```

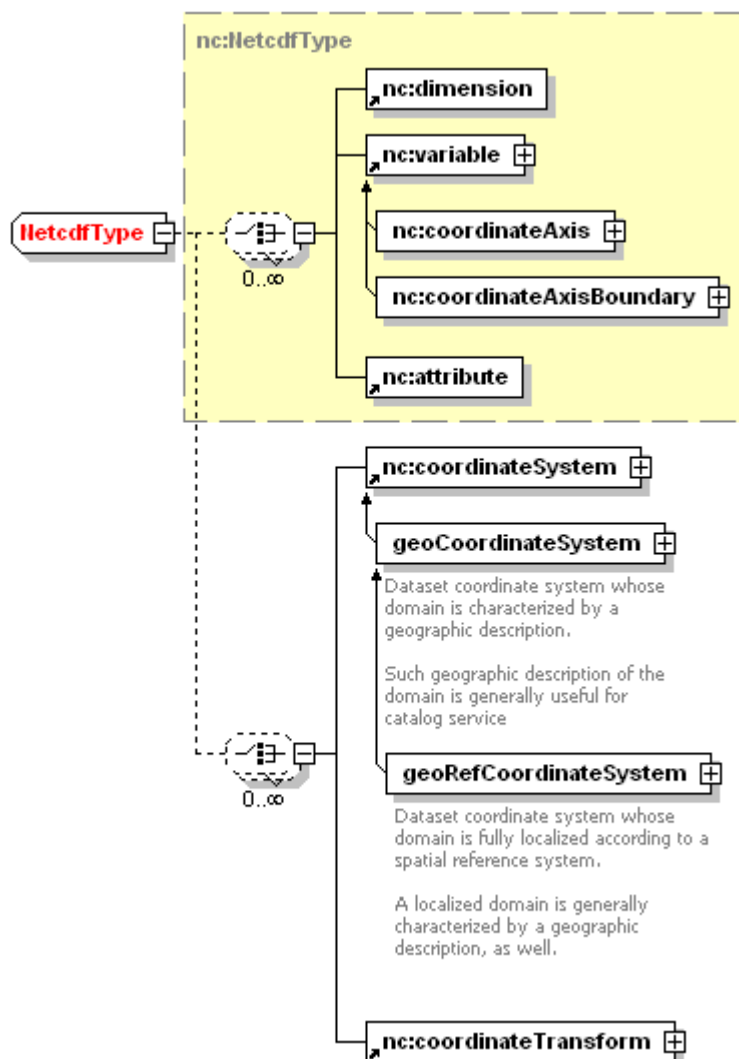## element nc:CoordinateTransformType/parameter

diagram

namespace http://www.ucar.edu/schemas/netcdf

type **nc:AttributeType**

attributes

Name	Type	Use	Default	Fixed	Annotation
name	xsd:token	required			
type	nc:DataType	required			
value	xsd:string	optional			
separator	xsd:string				

```
source  <xsd:element name="parameter" type="nc:AttributeType"/>
```

redefinition of complexType **NetcdfType**

diagram

type	extension of **nc:NetcdfType**	
children	**nc:dimension nc:variable nc:attribute nc:coordinateSystem nc:coordinateTransform**	
used by	element	**nc:netcdf**

attributes	Name	Type	Use	Default	Fixed	Annotation
	id	xsd:token	optional			
	uri	xsd:anyURI	optional			

source

```xml
<xsd:complexType name="NetcdfType">
 <xsd:complexContent>
  <xsd:extension base="nc:NetcdfType">
   <xsd:choice minOccurs="0" maxOccurs="unbounded">
    <xsd:element ref="nc:coordinateSystem"/>
    <xsd:element ref="nc:coordinateTransform"/>
   </xsd:choice>
  </xsd:extension>
 </xsd:complexContent>
</xsd:complexType>
```

geoCoordinateSystem schema source

```xml
<?xml version="1.0" encoding="UTF-8" ?>
<!--
edited with XMLSPY v5 rel. 4 U (http://www.xmlspy.com) by Stefano Nativi (UCAR Unidata)
```

```
-->
<xsd:schema targetNamespace="http://www.ucar.edu/schemas/netcdf"
    xmlns:nc="http://www.ucar.edu/schemas/netcdf"
    xmlns:fgdc="http://www.fgdc.gov/metadata/standards" xmlns:gml="http://www.opengis.net/gml"
    xmlns:xsd="http://www.w3.org/2001/XMLSchema" elementFormDefault="qualified">
<xsd:annotation>
<xsd:documentation>
 <appinfo source="urn:ncML:specification:schema-
    xsd:geoCoordinateSystem:v0.3.1">geoCoordinateSystem.xsd</appinfo>
 <documentation xml:lang="en">Metadata for unreferenced or referenced geo coordinate systems
    characterizing a ncML dataset. An extension to the ncML core metadata in order to formalise netCDF
    metadata useful for GIS interoperability NcML Group, editor S. Nativi Creation: Boulder, Aug 2003; Update:
    Florence, Dec 2004;</documentation>
    </xsd:documentation>
    </xsd:annotation>
 <xsd:import namespace="http://www.ucar.edu/schemas/netcdf"
    schemaLocation="http://www.unidata.ucar.edu/schemas/netcdf-cs.xsd" />
 <xsd:import namespace="http://www.opengis.net/gml"
    schemaLocation="C:\Nativi\Geomatics\STANDARDS\OpenGIS\GML NWIP\GML3\gml3.0\base\feature.xsd"
    />
 <xsd:import namespace="http://www.opengis.net/gml"
    schemaLocation="C:\Nativi\Geomatics\STANDARDS\OpenGIS\GML
    NWIP\GML3\gml3.0\base\temporal.xsd" />
 <xsd:import namespace="http://www.opengis.net/gml"
    schemaLocation="C:\Nativi\Geomatics\STANDARDS\OpenGIS\GML
    NWIP\GML3\gml3.0\base\coordinateReferenceSystems.xsd" />
 <!--
  ===================== Elements =======================
  -->
<xsd:element name="geoCoordinateSystem" type="nc:_GeoCoordinateSystemType"
    substitutionGroup="nc:coordinateSystem">
<xsd:annotation>
 <xsd:documentation>Dataset coordinate system whose domain is characterized by a geographic description.
    Such geographic description of the domain is generally useful for catalog service</xsd:documentation>
    </xsd:annotation>
    </xsd:element>
<xsd:element name="geoRefCoordinateSystem" type="nc:_GeoRefCoordinateSystemType"
    substitutionGroup="nc:geoCoordinateSystem">
<xsd:annotation>
 <xsd:documentation>Dataset coordinate system whose domain is fully localized according to a spatial
    reference system. A localized domain is generally characterized by a geographic description, as
    well.</xsd:documentation>
    </xsd:annotation>
    </xsd:element>
 <!--
  ====================== Complex type =======================
  -->
<xsd:complexType name="_GeoRefCoordinateSystemType">
<xsd:annotation>
 <xsd:documentation>Geo-referenced Coordinate System type</xsd:documentation>
    </xsd:annotation>
<xsd:complexContent>
<xsd:extension base="nc:_GeoCoordinateSystemType">
<xsd:sequence minOccurs="0">
<xsd:element name="geoDomainLocation" type="nc:_DatasetGeoDomainLocation">
<xsd:annotation>
 <xsd:documentation>Geographic Localization of the coordinate system Domain</xsd:documentation>
    </xsd:annotation>
    </xsd:element>
    </xsd:sequence>
    </xsd:extension>
    </xsd:complexContent>
    </xsd:complexType>
<xsd:complexType name="_GeoCoordinateSystemType">
<xsd:annotation>
 <xsd:documentation>It is an extension of the ncML-CS CoordinateSystemType</xsd:documentation>
    </xsd:annotation>
<xsd:complexContent>
<xsd:extension base="nc:CoordinateSystemType">
<xsd:sequence minOccurs="0">
```

```
<xsd:element name="geoDomainExtent" type="nc:_DatasetGeoDomainExtent">
<xsd:annotation>
 <xsd:documentation>Geographic Extension of the coordinate system Domain</xsd:documentation>
    </xsd:annotation>
    </xsd:element>
    </xsd:sequence>
    </xsd:extension>
    </xsd:complexContent>
    </xsd:complexType>
<xsd:complexType name="_DatasetGeoDomainExtent" abstract="false">
<xsd:sequence>
 <xsd:element ref="nc:spatialExtent" maxOccurs="unbounded" />
 <xsd:element ref="nc:verticalExtent" minOccurs="0" maxOccurs="unbounded" />
 <xsd:element ref="nc:temporalExtent" minOccurs="0" maxOccurs="unbounded" />
    </xsd:sequence>
 <xsd:attribute name="description" type="xsd:string" use="optional" />
    </xsd:complexType>
<xsd:complexType name="_DatasetGeoDomainLocation">
<xsd:sequence>
 <xsd:element ref="gml:_CoordinateReferenceSystem" />
    </xsd:sequence>
    </xsd:complexType>
<xsd:complexType name="_TemporalExtent" abstract="false">
<xsd:sequence>
 <xsd:element ref="gml:_TPrimitive" />
    </xsd:sequence>
    </xsd:complexType>
<xsd:complexType name="_VerticalExtent" abstract="false">
<xsd:choice>
 <xsd:element ref="gml:pos" />
 <xsd:element ref="gml:coordinates" />
    </xsd:choice>
 <xsd:attribute name="srsName" type="xsd:anyURI" use="optional" />
    </xsd:complexType>
   <!--
  ====================== GML based elements ======================
   -->
<xsd:element name="verticalExtent" type="nc:_VerticalExtent" />
<xsd:element name="temporalExtent" type="nc:_TemporalExtent" />
<xsd:element name="spatialExtent" type="gml:BoundingShapeType" />
    </xsd:schema>
```

Documentation of coverageGeoCoordSystem schema version 0.3.1

Schema coverageGeoCoordSystem.xsd

schema location: **C:\Nativi\PAPERI\GIM\schemas\coverageGeoCoordSystem.xsd**
targetNamespace: **http://www.ucar.edu/schemas/netcdf**

Elements	Complex types
coverageGeoCoordSystem	**_CoverageGeoCoordSystem**
coverageGeoRefCoordSystem	**_CoverageGeoRefCoordSystem**
grid	**_GridCoverageType**
gridCoverage	**_RectifiedGridCoverageType**
netcdfCoverages	
rangeInfo	
rectifiedGrid	
rectifiedGridCoverage	
variableRef	

schema location: **C:\Nativi\PAPERI\GIM\schemas\GeoCoordinateSystem.xsd**
targetNamespace: **http://www.ucar.edu/schemas/netcdf**

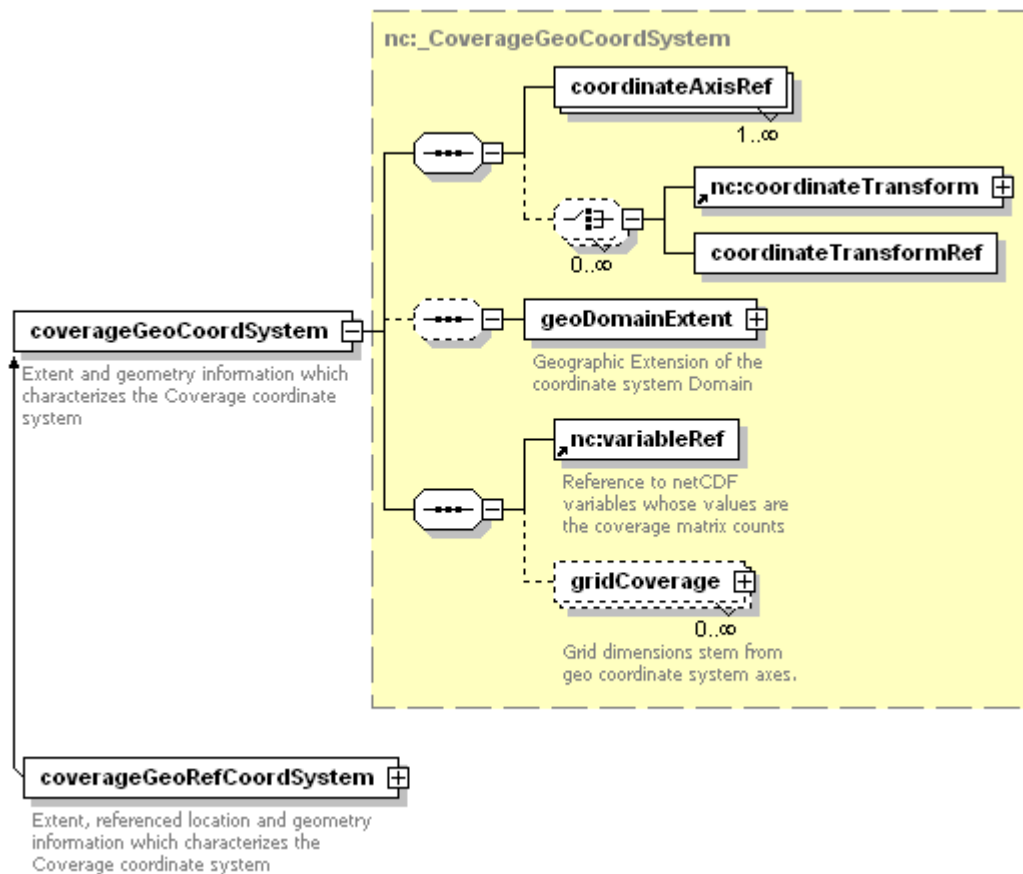Elements
geoCoordinateSystem
geoRefCoordinateSystem
spatialExtent
temporalExtent
verticalExtent

Complex types
_DatasetGeoDomainExtent
_DatasetGeoDomainLocation
_GeoCoordinateSystemType
_GeoRefCoordinateSystemType
_TemporalExtent
_VerticalExtent

element **coverageGeoCoordSystem**

diagram

namespace	http://www.ucar.edu/schemas/netcdf
type	**nc:_CoverageGeoCoordSystem**
children	**coordinateAxisRef nc:coordinateTransform coordinateTransformRef geoDomainExtent nc:variableRef gridCoverage**
used by	element **netcdfCoverages**

attributes

Name	Type	Use	Default	Fixed	Annotation
name	xsd:token	required			

annotation documentation Extent and geometry information which characterizes the Coverage coordinate system

element **coverageGeoRefCoordSystem**

diagram

namespace http://www.ucar.edu/schemas/netcdf
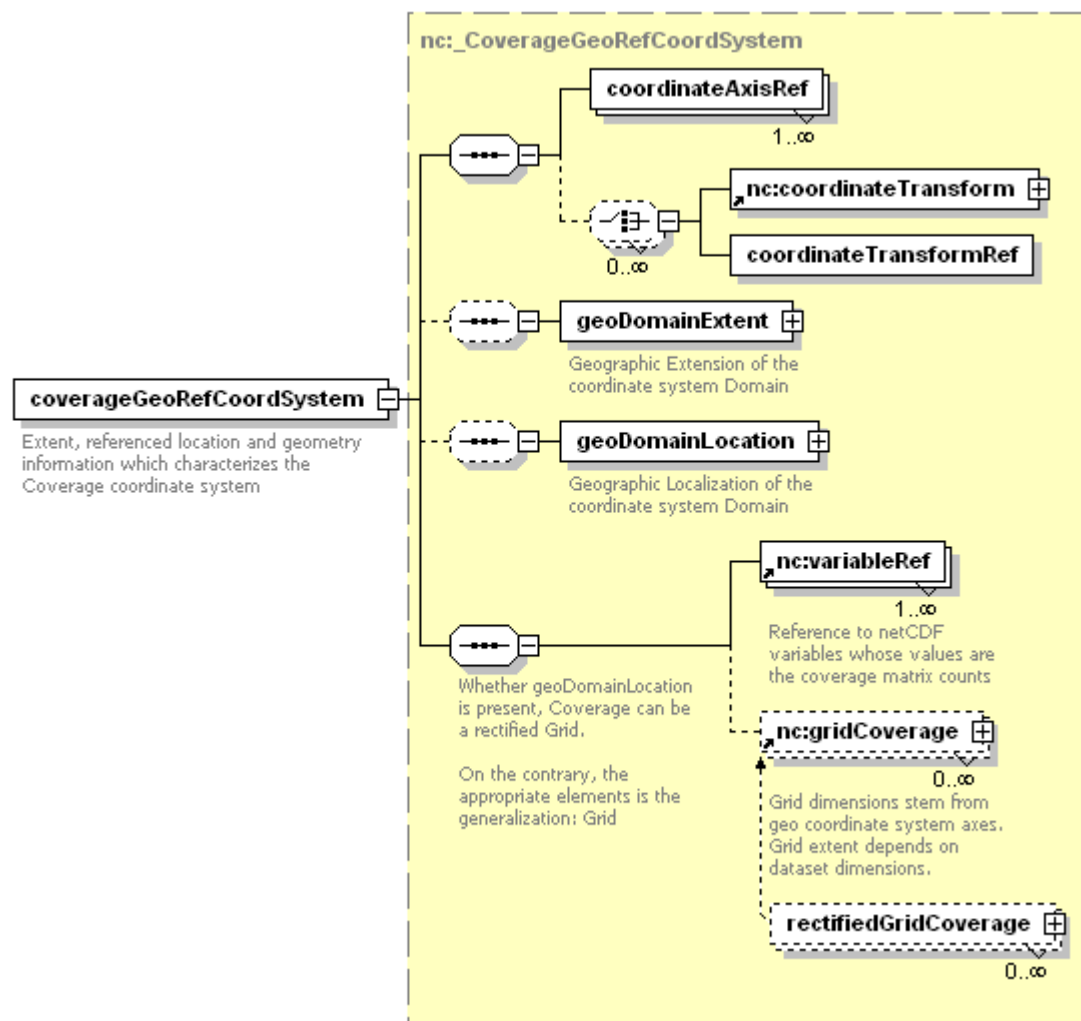
type **nc:_CoverageGeoRefCoordSystem**
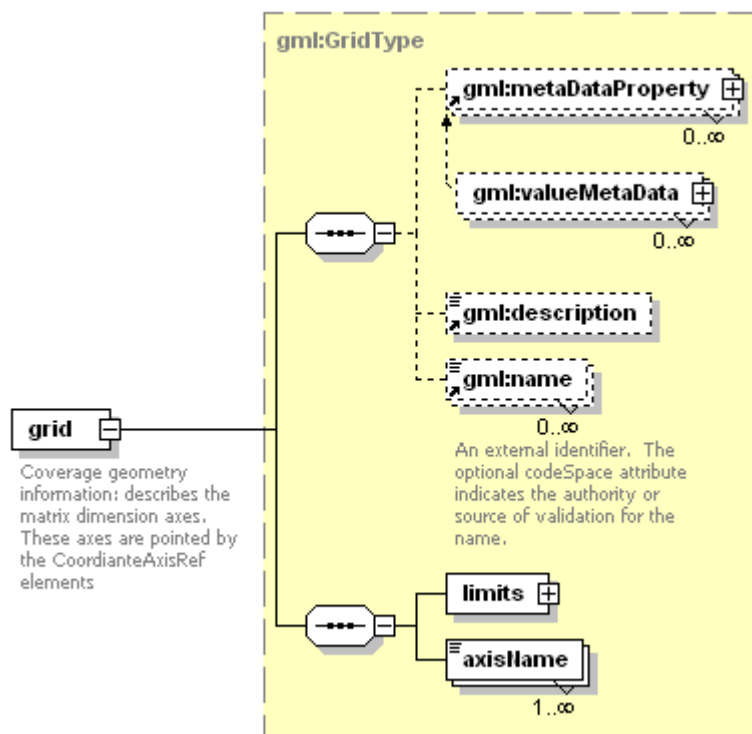
children **coordinateAxisRef nc:coordinateTransform coordinateTransformRef geoDomainExtent geoDomainLocation nc:variableRef nc:gridCoverage**

attributes	Name	Type	Use	Default	Fixed	Annotation
	name	xsd:token	required			

annotation   documentation   Extent, referenced location and geometry information which characterizes the Coverage coordinate system

element **grid**

diagram

namespace	http://www.ucar.edu/schemas/netcdf
type	**gml:GridType**
children	**gml:metaDataProperty gml:description gml:name limits axisName**
used by	complexType **_GridCoverageType**

attributes

Name	Type	Use	Default	Fixed	Annotation	
gml:id	ID	optional				
gid	string	optional			docume ntation	For backward compatibility with GML2. This identifer is superceded by gml:id inherited from AbstractGMLType.
srsName	anyURI	optional				
dimension	positiveInteger	required				

annotation	documentation	Coverage geometry information: describes the matrix dimension axes. These axes are pointed by the CoordianteAxisRef elements

element **gridCoverage**

diagram

namespace   http://www.ucar.edu/schemas/netcdf
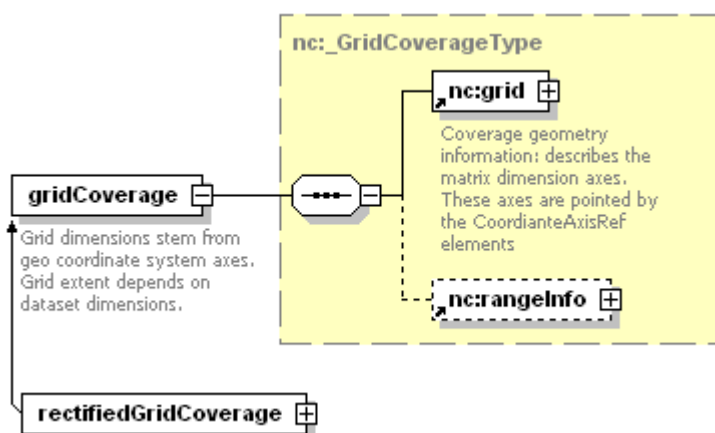
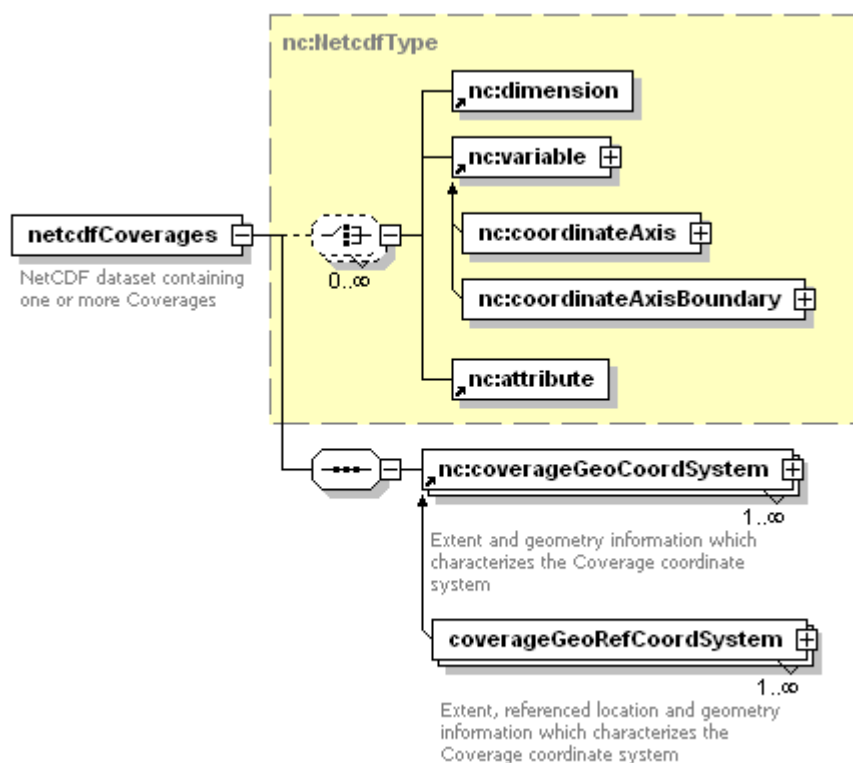type   **nc:_GridCoverageType**

children   **nc:grid nc:rangeInfo**

used by   complexType   **_CoverageGeoRefCoordSystem**

annotation   documentation   Grid dimensions stem from geo coordinate system axes. Grid extent depends on dataset dimensions.

element **netcdfCoverages**

diagram

namespace   http://www.ucar.edu/schemas/netcdf

type   extension of **nc:NetcdfType**

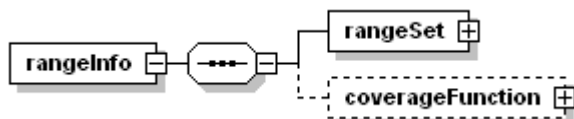children   **nc:dimension nc:variable nc:attribute nc:coverageGeoCoordSystem**

attributes

Name	Type	Use	Default	Fixed	Annotation
id	xsd:token	optional			

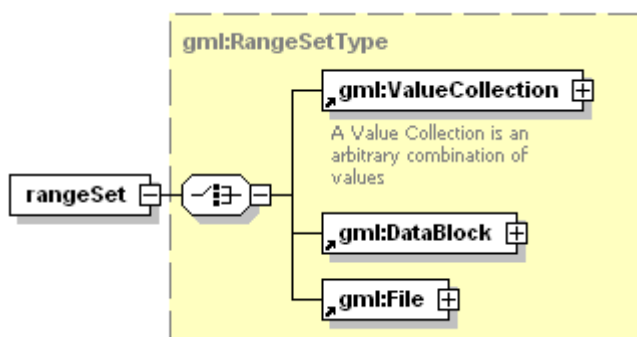| | uri | xsd:anyURI | optional |
| annotation | documentation | NetCDF dataset containing one or more Coverages | |

element **rangeInfo**

diagram

namespace http://www.ucar.edu/schemas/netcdf

children **rangeSet coverageFunction**

used by complexTypes **_GridCoverageType _RectifiedGridCoverageType**

element **rangeInfo/rangeSet**

diagram

gml:RangeSetType

gml:ValueCollection

A Value Collection is an arbitrary combination of values
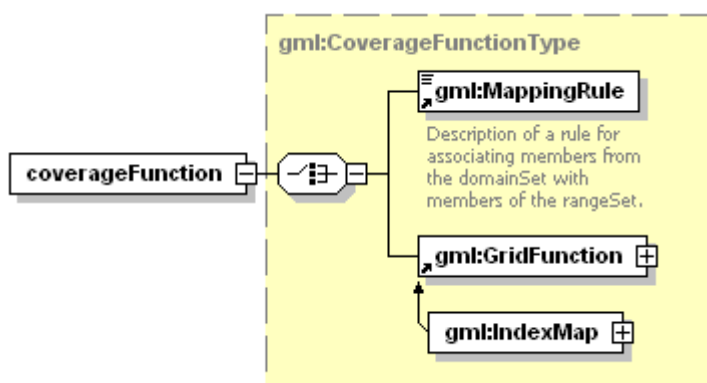
gml:DataBlock

gml:File

namespace http://www.ucar.edu/schemas/netcdf

type **gml:RangeSetType**

children **gml:ValueCollection gml:DataBlock gml:File**

element **rangeInfo/coverageFunction**

diagram

gml:CoverageFunctionType

gml:MappingRule

Description of a rule for associating members from the domainSet with members of the rangeSet.

gml:GridFunction

gml:IndexMap

namespace http://www.ucar.edu/schemas/netcdf
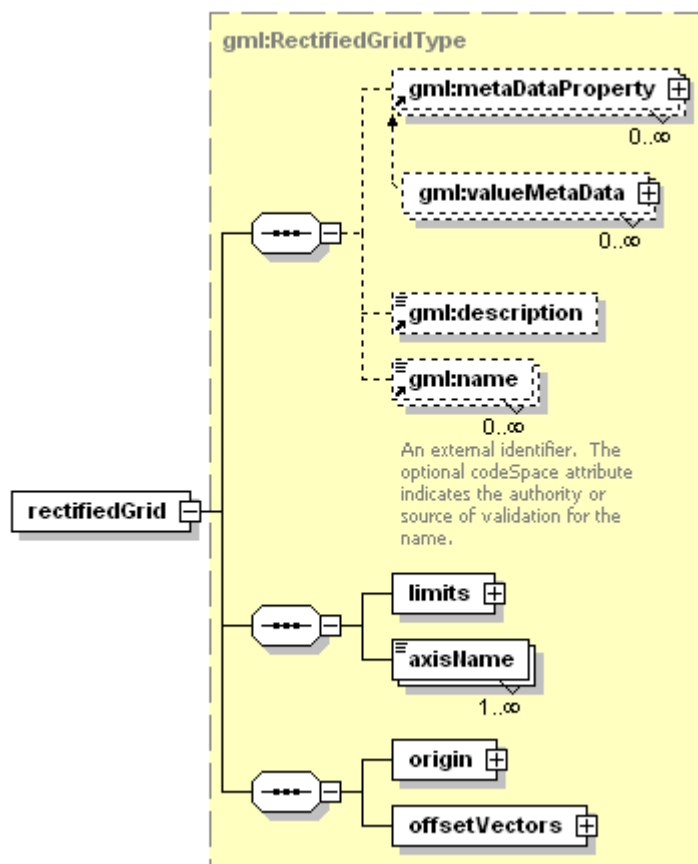
type **gml:CoverageFunctionType**

children **gml:MappingRule gml:GridFunction**

element **rectifiedGrid**

diagram

| namespace	http://www.ucar.edu/schemas/netcdf
type	**gml:RectifiedGridType**
children	**gml:metaDataProperty gml:description gml:name limits axisName origin offsetVectors**
used by	complexType **_RectifiedGridCoverageType**

attributes

Name	Type	Use	Default	Fixed	Annotation	
gml:id	ID	optional				
gid	string	optional			docume ntation	For backward compatibility with GML2. This identifer is superceded by gml:id inherited from AbstractGMLType.
srsName	anyURI	optional				
dimension	positiveInteger	required				

element **rectifiedGridCoverage**

diagram
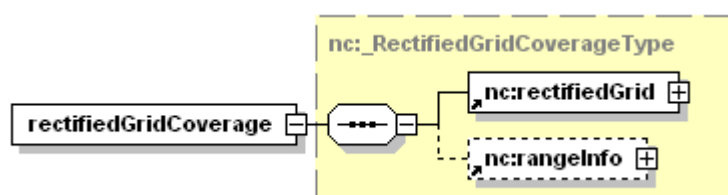
namespace	http://www.ucar.edu/schemas/netcdf
type	**nc:_RectifiedGridCoverageType**
children	**nc:rectifiedGrid nc:rangeInfo**

element **variableRef**

diagram

namespace   http://www.ucar.edu/schemas/netcdf

used by	complexTypes	**_CoverageGeoCoordSystem _CoverageGeoRefCoordSystem**				
attributes	Name	Type	Use	Default	Fixed	Annotation
	ref	xsd:string				
annotation	documentation	Reference to netCDF variables whose values are the coverage matrix counts				

complexType **_CoverageGeoCoordSystem**

diagram

namespace   http://www.ucar.edu/schemas/netcdf

type   extension of **nc:_GeoCoordinateSystemType**

children   **coordinateAxisRef nc:coordinateTransform coordinateTransformRef geoDomainExtent nc:variableRef gridCoverage**

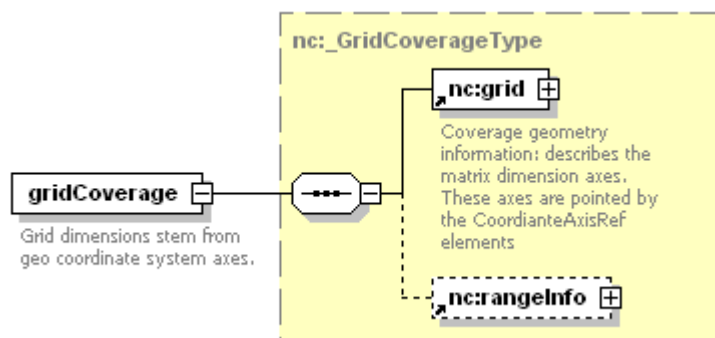| used by	element	**coverageGeoCoordSystem**				
attributes	Name	Type	Use	Default	Fixed	Annotation
	name	xsd:token	required			
annotation	documentation	Coordinate System of a Coverage dataset. Dataset coordinate system whose domain is characterized by a geographic description. Such geographic description of the domain is generally useful for catalog service. Coverage dataset is characterized by Grid implicit geometry.				

element **_CoverageGeoCoordSystem/gridCoverage**

diagram

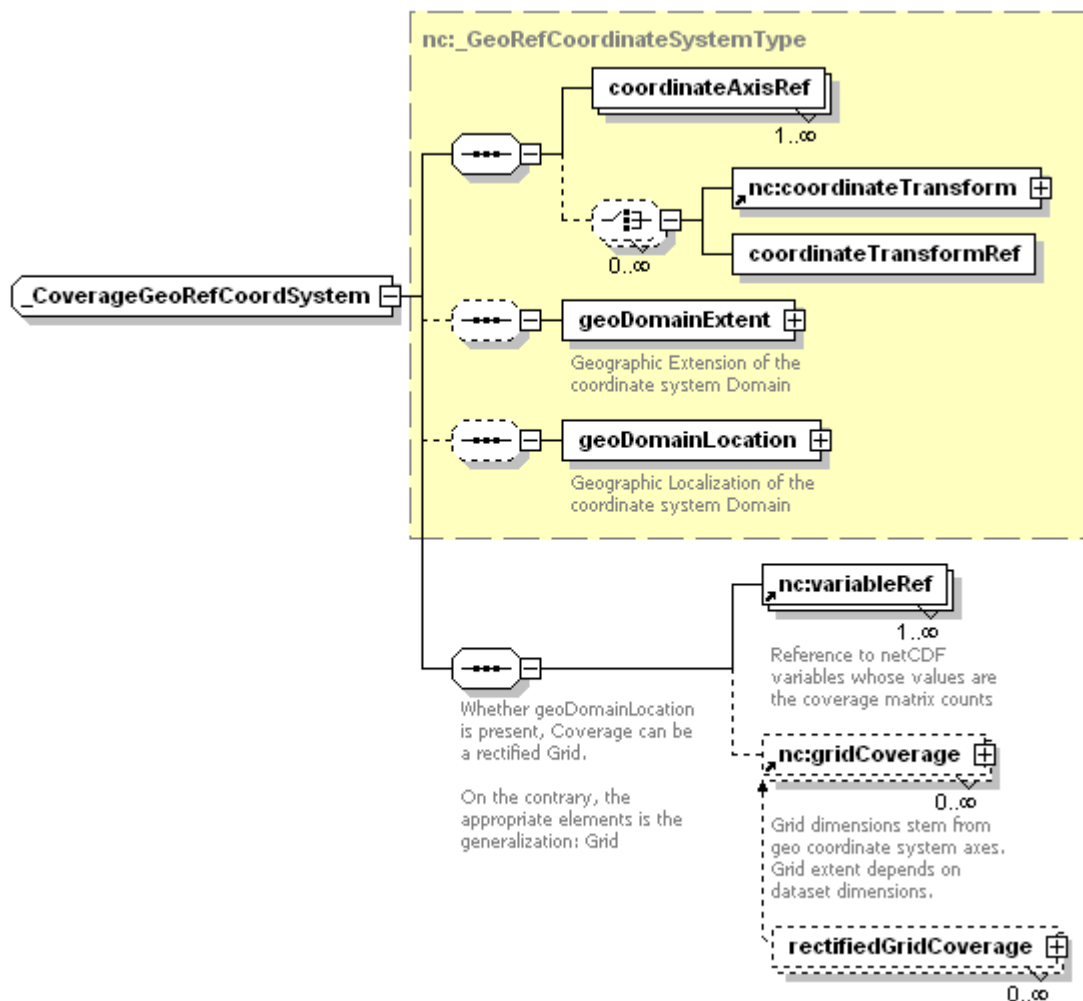namespace   http://www.ucar.edu/schemas/netcdf

type   **nc:_GridCoverageType**

children   **nc:grid nc:rangeInfo**

annotation   documentation   Grid dimensions stem from geo coordinate system axes.

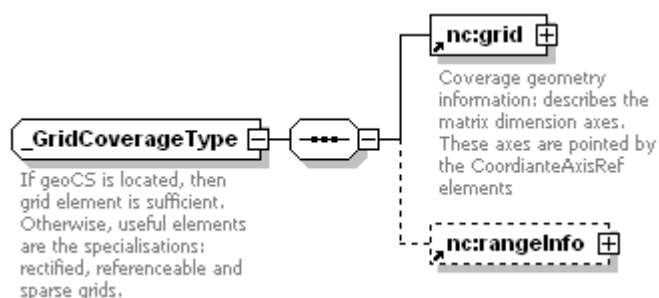## complexType **_CoverageGeoRefCoordSystem**

diagram

namespace   http://www.ucar.edu/schemas/netcdf

type	extension of **nc:_GeoRefCoordinateSystemType**					
children	**coordinateAxisRef nc:coordinateTransform coordinateTransformRef geoDomainExtent geoDomainLocation nc:variableRef nc:gridCoverage**					
used by	element	**coverageGeoRefCoordSystem**				
attributes	Name	Type	Use	Default	Fixed	Annotation
	name	xsd:token	required			

complexType **_GridCoverageType**

diagram

|	
namespace	http://www.ucar.edu/schemas/netcdf
children	**nc:grid nc:rangeInfo**
used by	elements **gridCoverage _CoverageGeoCoordSystem/gridCoverage**
annotation	documentation If geoCS is located, then grid element is sufficient. Otherwise, useful elements are the specialisations: rectified, referenceable and sparse grids.

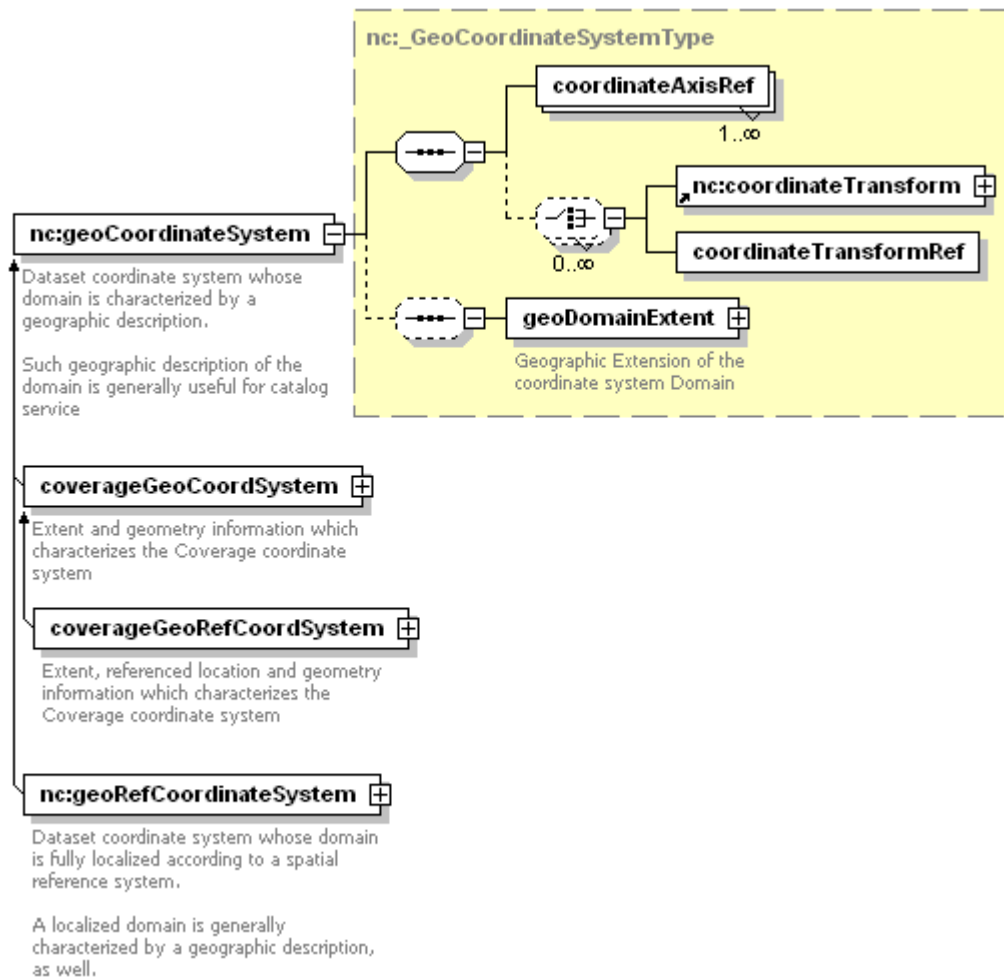## complexType **_RectifiedGridCoverageType**

diagram
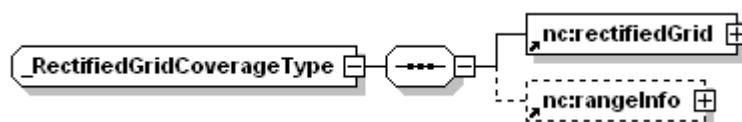
namespace	http://www.ucar.edu/schemas/netcdf
children	**nc:rectifiedGrid nc:rangeInfo**
used by	element **rectifiedGridCoverage**

element **nc:geoCoordinateSystem**

diagram

| namespace	http://www.ucar.edu/schemas/netcdf
type	**nc:_GeoCoordinateSystemType**
children	**coordinateAxisRef nc:coordinateTransform coordinateTransformRef geoDomainExtent**

attributes	Name	Type	Use	Default	Fixed	Annotation
	name	xsd:token	required			
annotation	documentation	Dataset coordinate system whose domain is characterized by a geographic description. Such geographic description of the domain is generally useful for catalog service				

element **gml:_ImplicitGeometry**

diagram
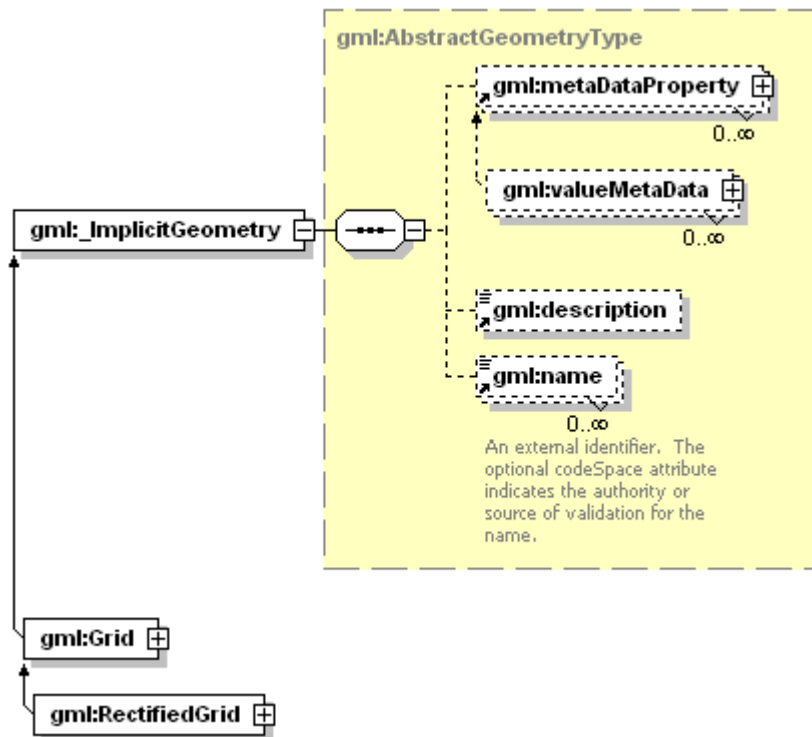
namespace	http://www.opengis.net/gml
type	**gml:AbstractGeometryType**
children	**gml:metaDataProperty gml:description gml:name**

attributes

Name	Type	Use	Default	Fixed	Annotation	
gml:id	ID	optional				
gid	string	optional			docume ntation	For backward compatibility with GML2. This identifer is superceded by gml:id inherited from AbstractGMLType.
srsName	anyURI	optional				

element **gml:Grid**

diagram

namespace	http://www.opengis.net/gml
type	**gml:GridType**
children	**gml:metaDataProperty gml:description gml:name limits axisName**
used by	complexType **gml:GridDomainType**

attributes

Name	Type	Use	Default	Fixed	Annotation	
gml:id	ID	optional				
gid	string	optional			docume ntation	For backward compatibility with GML2. This identifer is superceded by gml:id inherited from AbstractGMLType.
srsName	anyURI	optional				
dimension	positiveInteger	required				

element **gml:RectifiedGrid**

diagram

namespace   http://www.opengis.net/gml

type   **gml:RectifiedGridType**

children   **gml:metaDataProperty gml:description gml:name limits axisName origin offsetVectors**

used by   complexType   **gml:RectifiedGridDomainType**

attributes

Name	Type	Use	Default	Fixed	Annotation	
gml:id	ID	optional				
gid	string	optional			docume ntation	For backward compatibility with GML2. This identifer is superceded by gml:id inherited from AbstractGMLType.
srsName	anyURI	optional				
dimension	positiveInteger	required				

complexType **gml:GridEnvelopeType**

diagram
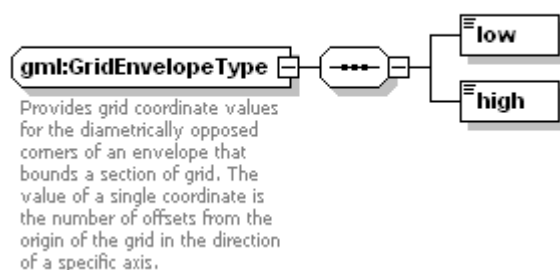
namespace	http://www.opengis.net/gml	
children	**low high**	
used by	element	**gml:GridLimitsType/GridEnvelope**
annotation	documentation	Provides grid coordinate values for the diametrically opposed corners of an envelope that bounds a section of grid. The value of a single coordinate is the number of offsets from the origin of the grid in the direction of a specific axis.

element **gml:GridEnvelopeType/low**

diagram

namespace	http://www.opengis.net/gml
type	**gml:integerList**

element **gml:GridEnvelopeType/high**

diagram

namespace	http://www.opengis.net/gml
type	**gml:integerList**

complexType **gml:GridLimitsType**

diagram

namespace	http://www.opengis.net/gml	
children	**GridEnvelope**	
used by	element	**gml:GridType/limits**

element **gml:GridLimitsType/GridEnvelope**

diagram
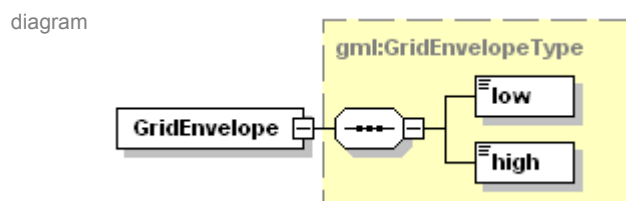
namespace	http://www.opengis.net/gml
type	**gml:GridEnvelopeType**
children	**low high**

complexType **gml:GridType**

diagram

namespace   http://www.opengis.net/gml
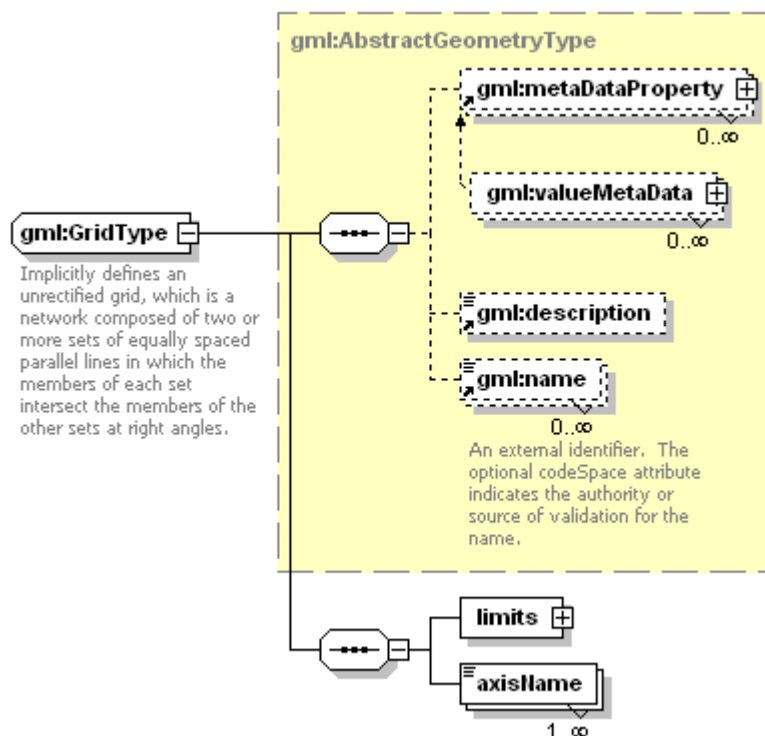
type   extension of **gml:AbstractGeometryType**

children   **gml:metaDataProperty gml:description gml:name limits axisName**

used by	elements	**gml:Grid grid**				
	complexType	**gml:RectifiedGridType**				
attributes	Name	Type	Use	Default	Fixed	Annotation
	gml:id	ID	optional			
	gid	string	optional			docume ntation For backward compatibility with GML2. This identifer is superceded by gml:id inherited from AbstractGMLType.
	srsName	anyURI	optional			
	dimension	positiveInteger	required			
annotation	documentation	Implicitly defines an unrectified grid, which is a network composed of two or more sets of equally spaced parallel lines in which the members of each set intersect the members of the other sets at right angles.				

element **gml:GridType/limits**

diagram

namespace   http://www.opengis.net/gml
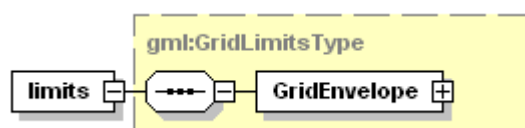
type   **gml:GridLimitsType**

children   **GridEnvelope**

element **gml:GridType/axisName**

diagram

namespace   http://www.opengis.net/gml
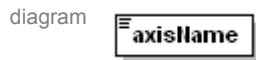
type   **xsd:string**

complexType **gml:RectifiedGridType**

diagram

namespace   http://www.opengis.net/gml
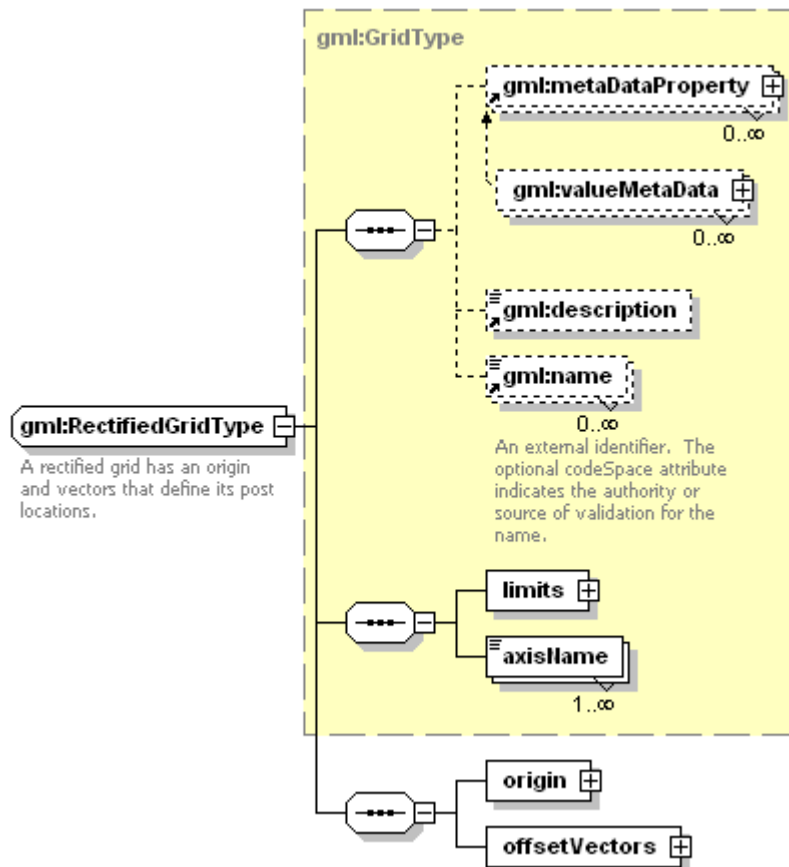
type   extension of **gml:GridType**

children   **gml:metaDataProperty gml:description gml:name limits axisName origin offsetVectors**

used by   elements   **gml:RectifiedGrid rectifiedGrid**

attributes

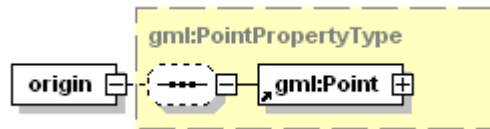| Name	Type	Use	Default	Fixed	Annotation	
gml:id	ID	optional				
gid	string	optional			docume ntation	For backward compatibility with GML2. This identifer is superceded by gml:id inherited from AbstractGMLType.
srsName	anyURI	optional				
dimension	positiveInteger	required				

annotation   documentation   A rectified grid has an origin and vectors that define its post locations.

element **gml:RectifiedGridType/origin**

diagram

namespace http://www.opengis.net/gml
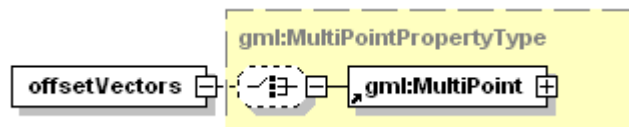
type **gml:PointPropertyType**

children **gml:Point**

attributes

Name	Type	Use	Default	Fixed	Annotation
type	string			simple	
xlink:href	anyURI	optional			
xlink:role	anyURI	optional			
xlink:arcrole	anyURI	optional			
xlink:title	string	optional			
xlink:show	string	optional			
xlink:actuate	string	optional			
gml:remoteSche ma	anyURI	optional			

element **gml:RectifiedGridType/offsetVectors**

diagram

namespace http://www.opengis.net/gml

type **gml:MultiPointPropertyType**

children **gml:MultiPoint**

attributes

Name	Type	Use	Default	Fixed	Annotation
type	string			simple	
xlink:href	anyURI	optional			
xlink:role	anyURI	optional			
xlink:arcrole	anyURI	optional			
xlink:title	string	optional			
xlink:show	string	optional			
xlink:actuate	string	optional			
gml:remoteSche ma	anyURI	optional			

element **gml:_Coverage**

diagram

namespace http://www.opengis.net/gml
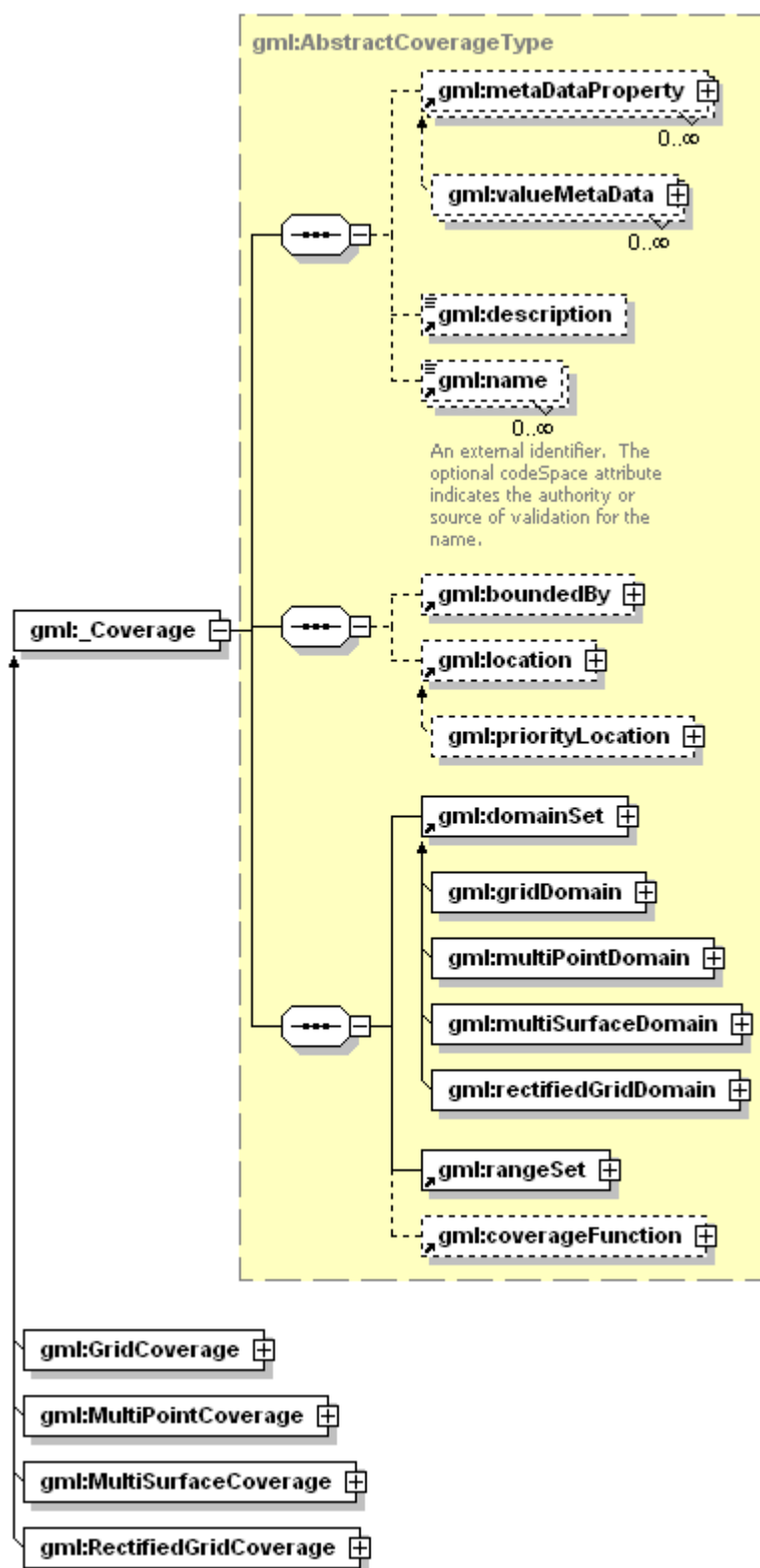
type **gml:AbstractCoverageType**

children **gml:metaDataProperty gml:description gml:name gml:boundedBy gml:location gml:domainSet gml:rangeSet gml:coverageFunction**
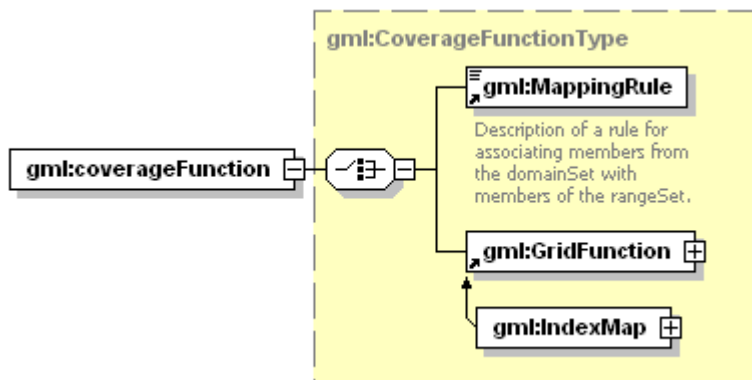
The ncML specs group

attributes	Name	Type	Use	Default	Fixed	Annotation	
	gml:id	ID	optional				
	fid	string				appInfo	deprecated
						docume ntation	deprecated in GML version 3.0
	dimension	positiveInteger	optional				

element **gml:coverageFunction**

diagram

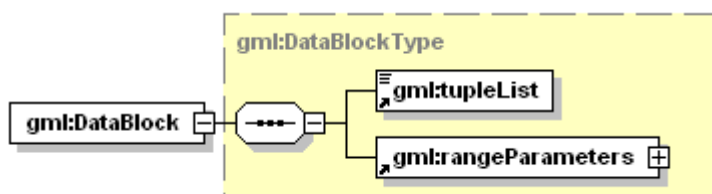|	
namespace	http://www.opengis.net/gml
type	**gml:CoverageFunctionType**
children	**gml:MappingRule gml:GridFunction**
used by	complexTypes **gml:AbstractCoverageType gml:GridCoverageType gml:MultiPointCoverageType gml:MultiSurfaceCoverageType gml:RectifiedGridCoverageType**

element **gml:DataBlock**

diagram

namespace	http://www.opengis.net/gml
type	**gml:DataBlockType**
children	**gml:tupleList gml:rangeParameters**
used by	complexType **gml:RangeSetType**

element **gml:domainSet**

namespace	http://www.opengis.net/gml
type	**gml:DomainSetType**
children	**gml:_Geometry gml:_TObject gml:_Feature**
used by	complexType **gml:AbstractCoverageType**

attributes	Name	Type	Use	Default	Fixed	Annotation
	type	string			simple	
	xlink:href	anyURI	optional			
	xlink:role	anyURI	optional			
	xlink:arcrole	anyURI	optional			
	xlink:title	string	optional			
	xlink:show	string	optional			
	xlink:actuate	string	optional			
	gml:remoteSchema	anyURI	optional			

element **gml:File**

diagram
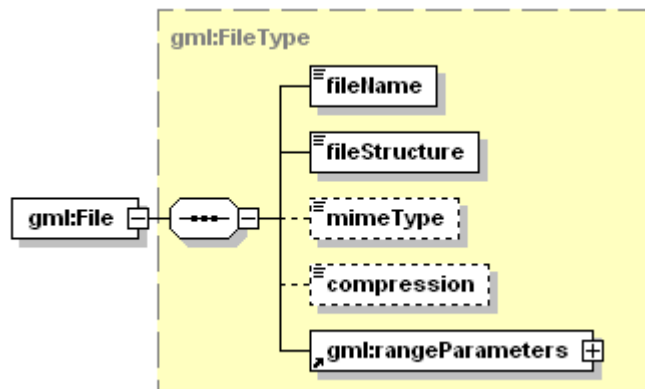
namespace	http://www.opengis.net/gml
type	**gml:FileType**
children	**fileName fileStructure mimeType compression gml:rangeParameters**
used by	complexType **gml:RangeSetType**

element **gml:GridCoverage**

diagram
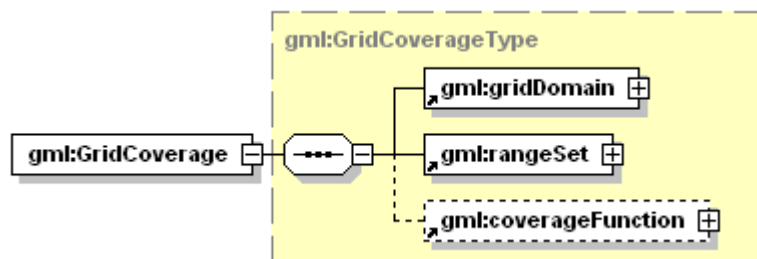

namespace	http://www.opengis.net/gml
type	**gml:GridCoverageType**
children	**gml:gridDomain gml:rangeSet gml:coverageFunction**

attributes

Name	Type	Use	Default	Fixed	Annotation	
gml:id	ID	optional				
fid	string				appInfo	deprecated
					docume ntation	deprecated in GML version 3.0
dimension	positiveInteger	required				

element **gml:gridDomain**

diagram

namespace	http://www.opengis.net/gml
type	**gml:GridDomainType**
children	**gml:Grid**

used by	complexType	**gml:GridCoverageType**				
attributes	Name	Type	Use	Default	Fixed	Annotation
	type	string			simple	
	xlink:href	anyURI	optional			
	xlink:role	anyURI	optional			
	xlink:arcrole	anyURI	optional			
	xlink:title	string	optional			
	xlink:show	string	optional			
	xlink:actuate	string	optional			
	gml:remoteSchema	anyURI	optional			

element **gml:GridFunction**

diagram
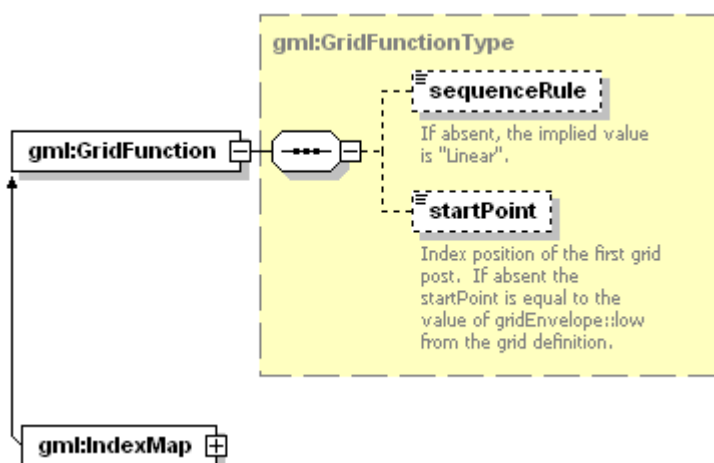
namespace	http://www.opengis.net/gml
type	**gml:GridFunctionType**
children	**sequenceRule startPoint**
used by	complexType **gml:CoverageFunctionType**

element **gml:IndexMap**

diagram

namespace	http://www.opengis.net/gml
type	**gml:IndexMapType**
children	**sequenceRule startPoint lookUpTable**

element **gml:MappingRule**

diagram

Description of a rule for associating members from the domainSet with members of the rangeSet.

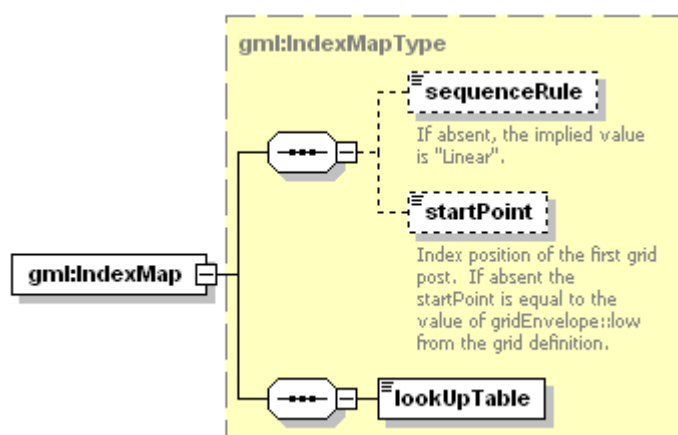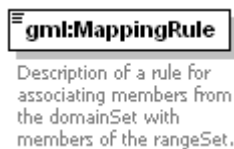| namespace	http://www.opengis.net/gml

type **gml:StringOrRefType**

used by   complexType **gml:CoverageFunctionType**

attributes

Name	Type	Use	Default	Fixed	Annotation
gml:id	ID	optional			
type	string			simple	
xlink:href	anyURI	optional			
xlink:role	anyURI	optional			
xlink:arcrole	anyURI	optional			
xlink:title	string	optional			
xlink:show	string	optional			
xlink:actuate	string	optional			
gml:remoteSchema	anyURI	optional			

annotation   documentation   Description of a rule for associating members from the domainSet with members of the rangeSet.

element **gml:MultiPointCoverage**

diagram

namespace	http://www.opengis.net/gml
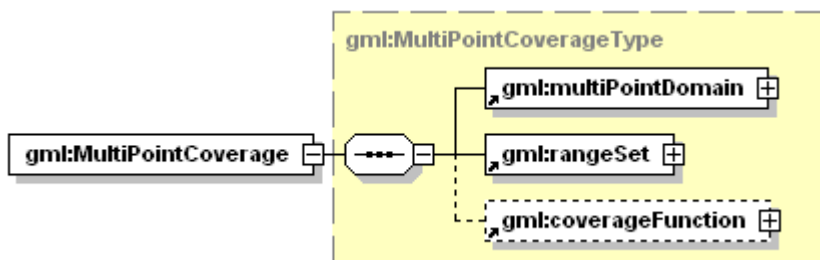
type **gml:MultiPointCoverageType**

children **gml:multiPointDomain gml:rangeSet gml:coverageFunction**

attributes

Name	Type	Use	Default	Fixed	Annotation	
gml:id	ID	optional				
fid	string				appInfo	deprecated
					documentation	deprecated in GML version 3.0
dimension	positiveInteger	required				

element **gml:multiPointDomain**

diagram

namespace	http://www.opengis.net/gml
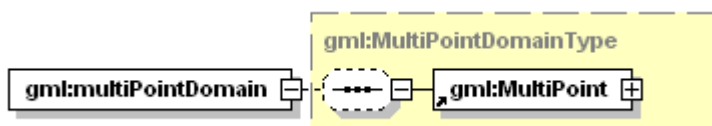
type **gml:MultiPointDomainType**

children **gml:MultiPoint**

used by   complexType **gml:MultiPointCoverageType**

attributes	Name	Type	Use	Default	Fixed	Annotation
	type	string			simple	
	xlink:href	anyURI	optional			
	xlink:role	anyURI	optional			
	xlink:arcrole	anyURI	optional			
	xlink:title	string	optional			
	xlink:show	string	optional			
	xlink:actuate	string	optional			
	gml:remoteSchema	anyURI	optional			

element **gml:MultiSurfaceCoverage**

diagram
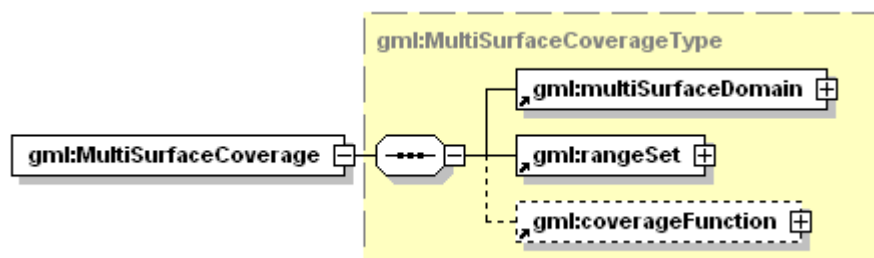
namespace	http://www.opengis.net/gml
type	**gml:MultiSurfaceCoverageType**
children	**gml:multiSurfaceDomain gml:rangeSet gml:coverageFunction**

attributes	Name	Type	Use	Default	Fixed	Annotation
	gml:id	ID	optional			
	fid	string				appInfo: deprecated; documentation: deprecated in GML version 3.0
	dimension	positiveInteger	required			

element **gml:multiSurfaceDomain**

diagram

namespace	http://www.opengis.net/gml
type	**gml:MultiSurfaceDomainType**
children	**gml:MultiSurface**
used by	complexType **gml:MultiSurfaceCoverageType**

attributes	Name	Type	Use	Default	Fixed	Annotation
	type	string			simple	
	xlink:href	anyURI	optional			
	xlink:role	anyURI	optional			
	xlink:arcrole	anyURI	optional			
	xlink:title	string	optional			
	xlink:show	string	optional			
	xlink:actuate	string	optional			
	gml:remoteSchema	anyURI	optional			

element **gml:rangeParameters**

diagram

namespace   http://www.opengis.net/gml
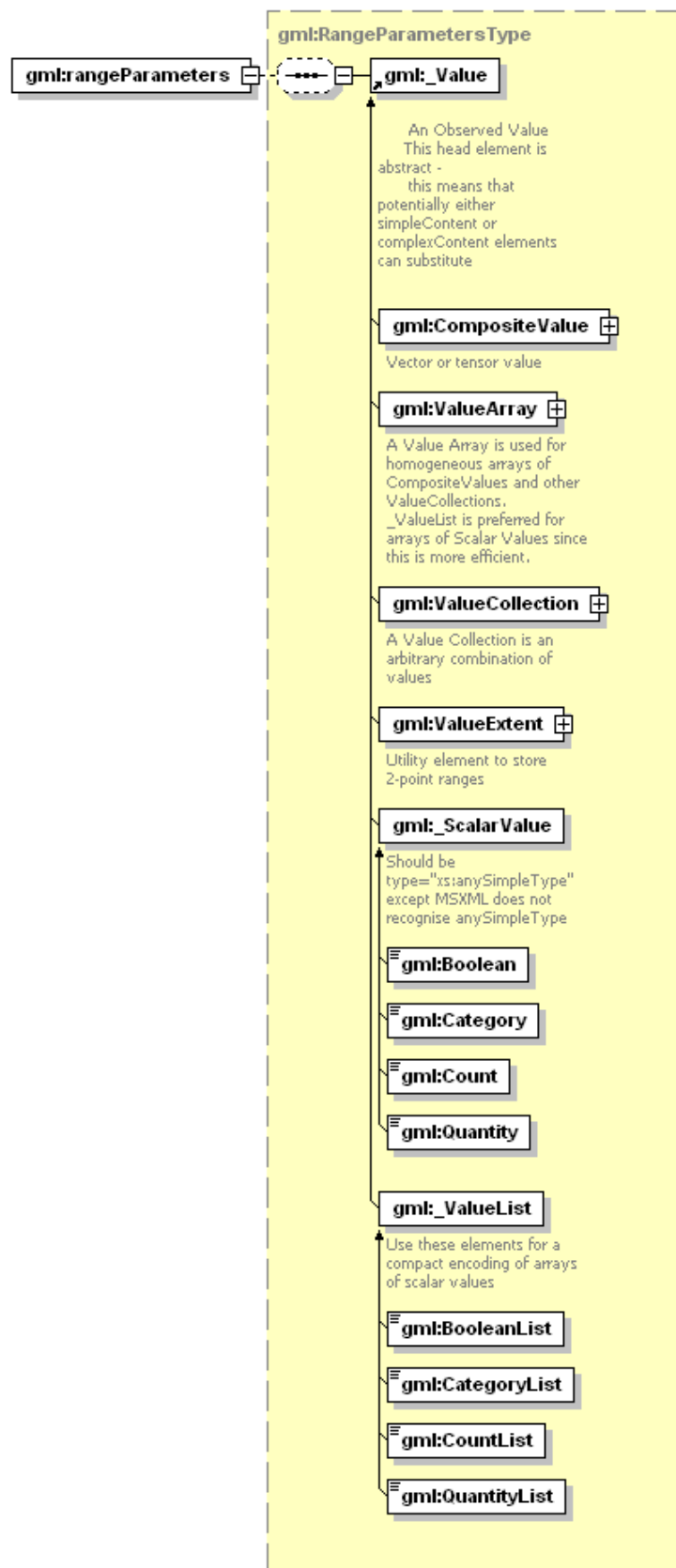
type   **gml:RangeParametersType**

	children	gml:_Value					
	used by	complexTypes	**gml:DataBlockType gml:FileType**				
	attributes	Name	Type	Use	Default	Fixed	Annotation
		type	string			simple	
		xlink:href	anyURI	optional			
		xlink:role	anyURI	optional			
		xlink:arcrole	anyURI	optional			
		xlink:title	string	optional			
		xlink:show	string	optional			
		xlink:actuate	string	optional			
		gml:remoteSchema	anyURI	optional			

element **gml:rangeSet**

diagram

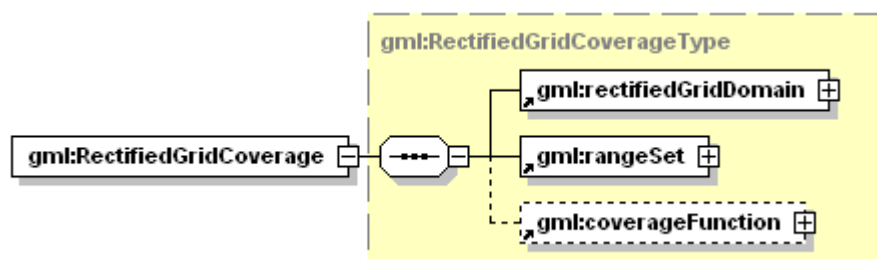namespace http://www.opengis.net/gml
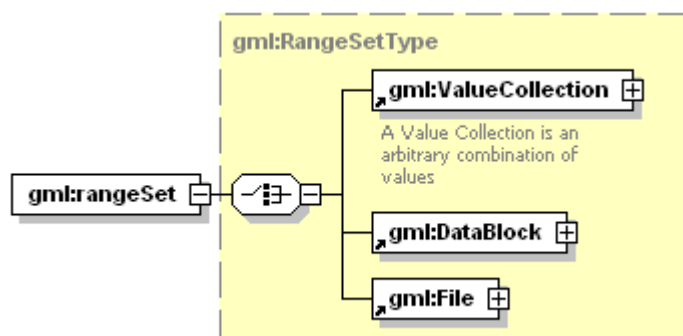
type **gml:RangeSetType**

children **gml:ValueCollection gml:DataBlock gml:File**

used by complexTypes **gml:AbstractCoverageType gml:GridCoverageType gml:MultiPointCoverageType gml:MultiSurfaceCoverageType gml:RectifiedGridCoverageType**

element **gml:RectifiedGridCoverage**

diagram

namespace http://www.opengis.net/gml

type **gml:RectifiedGridCoverageType**

children **gml:rectifiedGridDomain gml:rangeSet gml:coverageFunction**

	attributes	Name	Type	Use	Default	Fixed	Annotation	
		gml:id	ID	optional				
		fid	string				appInfo documentation	deprecated deprecated in GML version 3.0
		dimension	positiveInteger	required				

element **gml:rectifiedGridDomain**

diagram

|	
namespace	http://www.opengis.net/gml
type	**gml:RectifiedGridDomainType**
children	**gml:RectifiedGrid**
used by	complexType **gml:RectifiedGridCoverageType**

attributes

Name	Type	Use	Default	Fixed	Annotation
type	string			simple	
xlink:href	anyURI	optional			
xlink:role	anyURI	optional			
xlink:arcrole	anyURI	optional			
xlink:title	string	optional			
xlink:show	string	optional			
xlink:actuate	string	optional			
gml:remoteSchema	anyURI	optional			

element **gml:tupleList**

diagram
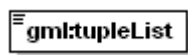
namespace	http://www.opengis.net/gml
type	**gml:CoordinatesType**
used by	complexType **gml:DataBlockType**

attributes

Name	Type	Use	Default	Fixed	Annotation
decimal	string		.		
cs	string		,		
ts	string		 		

coverageGeoCoordSystem schema source

```
<?xml version="1.0" encoding="UTF-8" ?>
- <!--
  edited with XMLSPY v5 rel. 4 U (http://www.xmlspy.com) by Stefano Nativi (UCAR Unidata)
  -->
<xsd:schema targetNamespace="http://www.ucar.edu/schemas/netcdf"
    xmlns:xsd="http://www.w3.org/2001/XMLSchema" xmlns:gml="http://www.opengis.net/gml"
    xmlns:fgdc="http://www.fgdc.gov/metadata/standards"
    xmlns:nc="http://www.ucar.edu/schemas/netcdf" elementFormDefault="qualified">
<xsd:annotation>
<xsd:documentation>
 <appinfo source="urn:ncML:specification:schema-
    xsd:CoverageGeoCoordSystem:v0.3.1">coverageGeoCoordSystem.xsd</appinfo>
 <documentation xml:lang="en">Metadata for coverage associated to a referenced or unreferenced geo
    coordinate system. An extension to the ncML core metadata in order to formalise netCDF metadata useful
    for GIS interoperability NcML Group, editor S. Nativi Creation: Boulder, Aug 2003; Update: Florence, Dec
    2004; Update: Florence, Jan 2005;</documentation>
    </xsd:documentation>
    </xsd:annotation>
 <xsd:import namespace="http://www.ucar.edu/schemas/netcdf"
    schemaLocation="C:\Nativi\PAPERI\GIM\schemas\GeoCoordinateSystem.xsd" />
```

```xml
<xsd:import namespace="http://www.opengis.net/gml"
    schemaLocation="C:\Nativi\Geomatics\STANDARDS\OpenGIS\GML NWIP\GML3\gml3.0\base\grids.xsd"
    />
<xsd:import namespace="http://www.opengis.net/gml"
    schemaLocation="C:\Nativi\Geomatics\STANDARDS\OpenGIS\GML
    NWIP\GML3\gml3.0\base\coverage.xsd" />
  <!--
  ==================== Complex Types defined ====================
  -->
<xsd:complexType name="_CoverageGeoCoordSystem">
<xsd:annotation>
  <xsd:documentation>Coordinate System of a Coverage dataset. Dataset coordinate system whose domain is
    characterized by a geographic description. Such geographic description of the domain is generally useful
    for catalog service. Coverage dataset is characterized by Grid implicit geometry.</xsd:documentation>
    </xsd:annotation>
<xsd:complexContent>
<xsd:extension base="nc:_GeoCoordinateSystemType">
<xsd:sequence>
  <xsd:element ref="nc:variableRef" />
<xsd:element name="gridCoverage" type="nc:_GridCoverageType" minOccurs="0" maxOccurs="unbounded">
<xsd:annotation>
  <xsd:documentation>Grid dimensions stem from geo coordinate system axes.</xsd:documentation>
    </xsd:annotation>
    </xsd:element>
    </xsd:sequence>
    </xsd:extension>
    </xsd:complexContent>
    </xsd:complexType>
<xsd:complexType name="_GridCoverageType">
<xsd:annotation>
  <xsd:documentation>If geoCS is located, then grid element is sufficient. Otherwise, useful elements are the
    specialisations: rectified, referenceable and sparse grids.</xsd:documentation>
    </xsd:annotation>
<xsd:sequence>
  <xsd:element ref="nc:grid" />
  <xsd:element ref="nc:rangeInfo" minOccurs="0" />
    </xsd:sequence>
    </xsd:complexType>
<xsd:complexType name="_CoverageGeoRefCoordSystem">
<xsd:complexContent>
<xsd:extension base="nc:_GeoRefCoordinateSystemType">
<xsd:sequence>
<xsd:annotation>
  <xsd:documentation>Whether geoDomainLocation is present, Coverage can be a rectified Grid. On the contrary,
    the appropriate elements is the generalization: Grid</xsd:documentation>
    </xsd:annotation>
  <xsd:element ref="nc:variableRef" maxOccurs="unbounded" />
  <xsd:element ref="nc:gridCoverage" minOccurs="0" maxOccurs="unbounded" />
    </xsd:sequence>
    </xsd:extension>
    </xsd:complexContent>
    </xsd:complexType>
<xsd:complexType name="_RectifiedGridCoverageType">
<xsd:sequence>
  <xsd:element ref="nc:rectifiedGrid" />
  <xsd:element ref="nc:rangeInfo" minOccurs="0" />
    </xsd:sequence>
    </xsd:complexType>
  <!--
  ==================== Global Element defined
  -->
<xsd:element name="netcdfCoverages" substitutionGroup="nc:netcdf">
<xsd:annotation>
  <xsd:documentation>NetCDF dataset containing one or more Coverages</xsd:documentation>
    </xsd:annotation>
<xsd:complexType>
<xsd:complexContent>
<xsd:extension base="nc:NetcdfType">
<xsd:sequence>
```

```xml
<xsd:element ref="nc:coverageGeoCoordSystem" maxOccurs="unbounded" />
    </xsd:sequence>
    </xsd:extension>
    </xsd:complexContent>
    </xsd:complexType>
    </xsd:element>
<xsd:element name="coverageGeoCoordSystem" type="nc:_CoverageGeoCoordSystem"
    substitutionGroup="nc:geoCoordinateSystem">
<xsd:annotation>
 <xsd:documentation>Extent and geometry information which characterizes the Coverage coordinate
    system</xsd:documentation>
    </xsd:annotation>
    </xsd:element>
<xsd:element name="coverageGeoRefCoordSystem" type="nc:_CoverageGeoRefCoordSystem"
    substitutionGroup="nc:coverageGeoCoordSystem">
<xsd:annotation>
 <xsd:documentation>Extent, referenced location and geometry information which characterizes the Coverage
    coordinate system</xsd:documentation>
    </xsd:annotation>
    </xsd:element>
 <xsd:element name="rectifiedGridCoverage" type="nc:_RectifiedGridCoverageType"
    substitutionGroup="nc:gridCoverage" />
<xsd:element name="gridCoverage" type="nc:_GridCoverageType">
<xsd:annotation>
 <xsd:documentation>Grid dimensions stem from geo coordinate system axes. Grid extent depends on dataset
    dimensions.</xsd:documentation>
    </xsd:annotation>
    </xsd:element>
<xsd:element name="rangeInfo">
<xsd:complexType>
<xsd:sequence>
 <xsd:element name="rangeSet" type="gml:RangeSetType" />
 <xsd:element name="coverageFunction" type="gml:CoverageFunctionType" minOccurs="0" />
    </xsd:sequence>
    </xsd:complexType>
    </xsd:element>
<xsd:element name="variableRef">
<xsd:annotation>
 <xsd:documentation>Reference to netCDF variables whose values are the coverage matrix
    counts</xsd:documentation>
    </xsd:annotation>
<xsd:complexType>
 <xsd:attribute name="ref" type="xsd:string" />
    </xsd:complexType>
    </xsd:element>
    <!--
   ==================== GML based elements =============
    -->
<xsd:element name="grid" type="gml:GridType">
<xsd:annotation>
 <xsd:documentation>Coverage geometry information: describes the matrix dimension axes. These axes are
    pointed by the CoordianteAxisRef elements</xsd:documentation>
    </xsd:annotation>
    </xsd:element>
 <xsd:element name="rectifiedGrid" type="gml:RectifiedGridType" />
    </xsd:schema>
```

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