ENTERPRISE ARCHITECT

User Guide Series

Geospatial Modeling

CREATED WITH ENTERPRISE ARCHITECT

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Geospatial Modeling

The popularity of the internet, the ever-present mobile phone and the prevalence of location-based services have resulted in almost everyone interacting with location-based information in some form in their daily lives. It has also become critical for governments and organizations to embrace this type of information as part of strategic decision making. Geospatial information can be modeled in Enterprise Architect and also integrated with other data to form a single and comprehensive view of information not possible in other tools.

Enterprise Architect, through the use of MDG Technologies, supports the Geography Markup Language (GML) application schemas and the modeling of ArcGIS geodatabases. The information precursors to these models - such as community conceptual models - can also be modeled, and traceability can be used to connect the models together.

Modeling Tools

Tool	Description
ArcGIS Profile	Enterprise Architect supports the design of geodatabases for the ArcGIS 10.0 suite of tools developed by Esri Inc.
Geography Markup Language	MDG Technology for GML is the implementation of the Open Geospatial Consortium's Geography Markup Language (GML) 3.3 for Enterprise Architect, which provides an XML grammar for geographical feature modeling capabilities within Enterprise Architect

Getting Started

Enterprise Architect partitions the tools extensive features into perspectives this ensures that you can focus on a specific task and work with the tools you need without the distraction of other features. To work with the ArcGIS Geodatabases or Geography Markup Language features you first need to select the following perspectives:

Database Engineering > ArcGIS

Information Exchange > Geographic GML
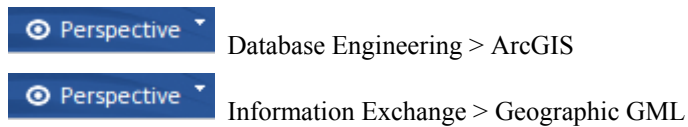
Setting the perspective ensures that the ArcGIS Geodatabases and Geography Markup Language diagrams and their tool boxes and other features of the perspective will be available by default.

ArcGIS Geodatabases

Using the ArcGIS features in Enterprise Architect you can visualize geodatabases inside this powerful system and collaboration platform. This allows you to unify teams working in traditional software centric and engineering systems with your geospatial teams defining features and domains. Teams defining the strategy business rules and requirements for a system or the components that deliver the system functionality can share models with the geospatial teams creating an integrated model that will help with integration and risk reduction.

Geography Markup Language (GML)

Using the Geography Markup Language (GML) facility you can model organization or community based application schemas. The models can be used to show the relationship between Features and these elements in turn can contain any number of Properties that qualify their characteristics. These can be based on defined Types, DataTypes, CodeLIsts or Enumerations.

ArcGIS Geodatabases

Exchange, Model and Visualize ArcGIS Geodatabases

Enterprise Architect allows you to import and export ArcGIS geodatabses allowing you to visualize Features and Domains within this powerful collaboration platform. In the recent past there has been a separation of the disciplines of system and software development and geospatial development. In this age of social architecture and digital disruption almost every project and endeavor requires some aspect of location information from simple delivery services to agricultural, mining, exploration, weather, real estate and disaster recovery systems.
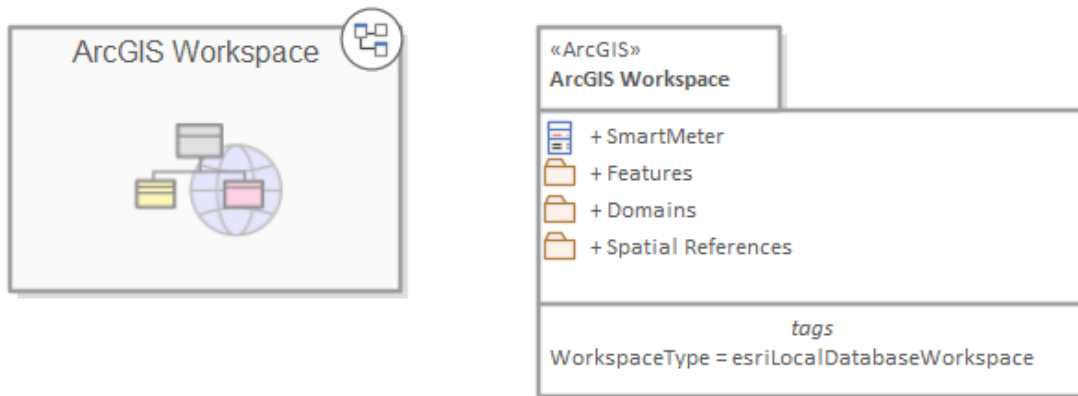
Package diagram showing a navigation cell and a Package containing Features Domains and a Geospatial Reference

The ArcGIS system, developed by Esri, supports the development and management of geodatabases. As it is for other databases, it is useful to model the design of a geodatabase using a standard notation such as UML. You can perform such modeling in Enterprise Architect, using the UML profile for ArcGIS, which is part of the built-in MDG Technology for ArcGIS. Once you have modeled an ArcGIS schema in Enterprise Architect, you can export the model to ArcGIS as an XML Workspace document. You can also visualize an existing ArcGIS geodatabase schema, by importing the ArcGIS XML Workspace document into Enterprise Architect.

Example Diagram

ArcGIS diagrams allow you to visualize the geographic features, domains and other elements that make up a geodatabase schema. In this example a Building has been sub-typed as a house, the house in turn is sub-typed based on the material type. The subtypes of the House references a Coded Value Domain also presented in the diagram with two Domain Code Values:

- Brick
- WeatherBoard

A Smart Meter is associated with the house. The House is a type of Building and the Building contains the property of Street Address
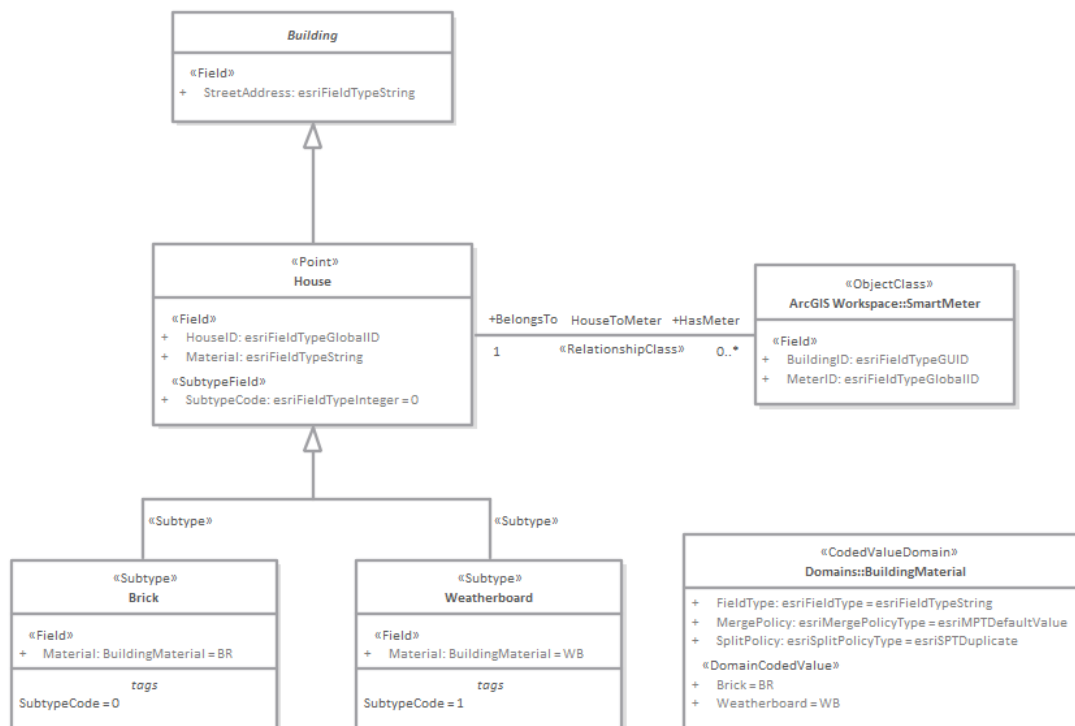
Exporting ArcGIS XML Workspaces

When you have modeled your Geodatabase Workspace XML Document (containing the ArcGIS schema), you can export it to an external directory (using the Publish Model Package facility), from which you can then import it to the Esri ArcCatalog.

Access

Click on an ArcGIS stereotyped Package (your ArcGIS Workspace Package) in the **Browser window**.

Ribbon	Specialize > Technologies > ArcGIS > Export to ArcGIS Workspace XML or Publish > Model Exchange > Publish As...
Context Menu	Right-click on Package | Specialize | ArcGIS | Export to ArcGIS Workspace XML
Keyboard Shortcuts	**Ctrl+Alt+E** : Publish

Export the Workspace

Option	Action
Root Package	Display the name of the selected ArcGIS Workspace Package.
Filename	Type in or browse for the file path into which the XML file is to be generated.
XML Type	Select 'ArcGIS' as the XML/XMI version to export the Package to.
Format XML Output	Format the output into readable XML (this takes a few more seconds at the end of the run).
Write Log File	Write a log of the export activity (recommended). The log file is saved to the directory into which the XML file is exported.
View XML	Click on this button to view the exported XML file.
Export	Click on this button to initiate the XML export.
Close	Click on this button to close this dialog.
Progress	Observe the progress of the XML export.

Notes

- The MDG Technology for ArcGIS is available in the Professional, Corporate, Unified and Ultimate Editions of

Enterprise Architect

- In the Corporate, Unified and Ultimate Editions of Enterprise Architect, if security is enabled you must have 'Export XMI' permission to export to XML

- Before exporting your model to an ArcGIS schema, you must define at least one Spatial Reference element; Spatial Reference elements are referred to by other schema elements via a dynamically linked Tagged Value, named SpatialReference

- The DefaultSpatialReference tag on an ArcGIS Package is used to specify a Spatial Reference that can be applied to all Feature Datasets and Feature Classes in the workspace; therefore, you do not need to apply a Spatial Reference element to each Feature Dataset or Feature Class

- If you do not reference a Spatial Reference Class from any Feature Dataset or Feature Class in your ArcGIS model, Enterprise Architect by default will generate an XML schema with Unknown type of Spatial Reference for these elements

Importing ArcGIS XML Workspaces

If you have a Geodatabase Workspace XML Document (containing the ArcGIS schema) you can import it into your Enterprise Architect project as a UML model.

Before running the import, deselect the 'Sort Features Alphabetically' checkbox on the 'Objects' page of the **Preferences window** (Start > Desktop > Preferences > Preferences). This ensures that the fields are imported and organized in Enterprise Architect in the same order as in the source.

Access

Click on the target Package in the **Browser window**.

Ribbon	Publish > Technologies > Publish > ArcGIS > Import ArcGIS Workspace XML or Publish > Model Exchange > Import-XML > Import Package from XML : Other XML Formats > ArcGIS
Context Menu	Right-click on Package | Specialize | ArcGIS | Import ArcGIS Workspace XML
Keyboard Shortcuts	**Ctrl+Alt+I** : Other XML Formats | ArcGIS

Import a Geodatabase Workspace XML document

Option	Action
Filename	Type in or browse for the name of the ArcGIS XML file to import.
Create Diagrams	Select the checkbox to create Class diagrams under the imported Packages.
Hide System-Level ArcGIS Fields on Diagrams	Select the checkbox to hide these stereotyped attributes: • RequiredField • AttributeIndex • SpatialIndex on these stereotyped Classes: • Point • Polyline • Polygon • MultiPatch The 'RequiredField' and 'AttributeIndex' attributes are also hidden for the Table (Object Class) Class. This option is enabled only when the 'Create Diagrams' checkbox is selected.
Strip GUIDs	The 'Strip GUIDs' feature is currently mandatory for ArcGIS imports, which means that elements are created 'as new' each time an ArcGIS schema is imported.

| Write Log File | Select the checkbox to write a log of import activity (recommended). |
	The log file is saved in the directory from which the file is being imported, with the same name as the imported file plus the suffix _import.log.
View XML	Click on this button to view the XML before import.
Import	Click on this button to import the ArcGIS XML file.
Close	Click on this button to close this dialog.
Help	Click on this button to display this Help page.
Import Progress	This field indicates the progress of the import.

Notes

- The MDG Technology for ArcGIS is available in the Professional, Corporate, Unified and Ultimate Editions of Enterprise Architect

Geography Markup Language (GML)

Model Geographic Features and Generate Application Schemas

You can create expressive and collaborative models of the important features in your domain and use these to generate GML compliant application schemas which can be consumed by other applications. Many of the disruptive forces and technologies that have changed the way we interact with each other and the world we inhabit, involve geographic locations and features. We drive along roads and stop at lookouts to view coastal features or cityscapes, we travel abroad to view monuments and buildings such as churches and museums, we rely on wind farms for energy and we take off and land at airports to name a few. You can model any geographic features of interest using Enterprise Architect's implementation of the Geography Markup Language which is fundamental for geographic information systems as well as its use as an open interchange format for geographic transactions on the Internet.
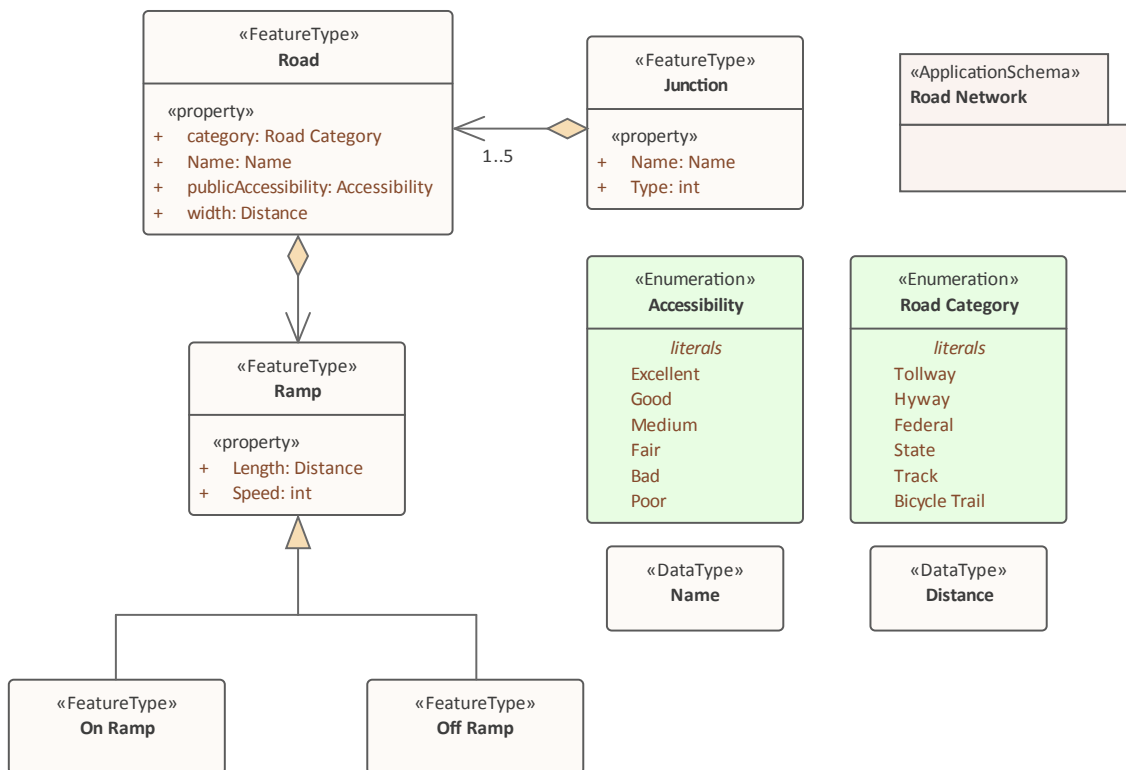
GML Model of roads showing two Feature with properties that access two Data Types and Enumerations

MDG Technology for GML is the implementation of the Open Geospatial Consortium's Geography Markup Language (GML) 3.3 for Enterprise Architect, which provides an XML grammar for geographical feature modeling capabilities within Enterprise Architect at or later than Release 10.

Through the MDG Technology for GML, you can:

- Apply a UML Profile for the Geography Markup Language (GML) 3.3

- Make use of customized diagram types and toolbox pages, for convenient access to elements and relationships to model geographical features effectively

- Generate GML Application Schema files

Example Diagram

Using the Geography Markup Language (GML) facility you can model organization or community based application schemas. The models can be used to show the relationship between Features Types that contain any number of Properties that qualify their characteristics. These can be based on defined Types, Data Types, Code Lists or Enumerations. You can collaborate with other geospatial colleagues or with people working in traditional systems implementations in disciplines that manage artifacts including: Strategies, Goals, Requirements, Data Models, Software Models, Deployment Descriptions and more.
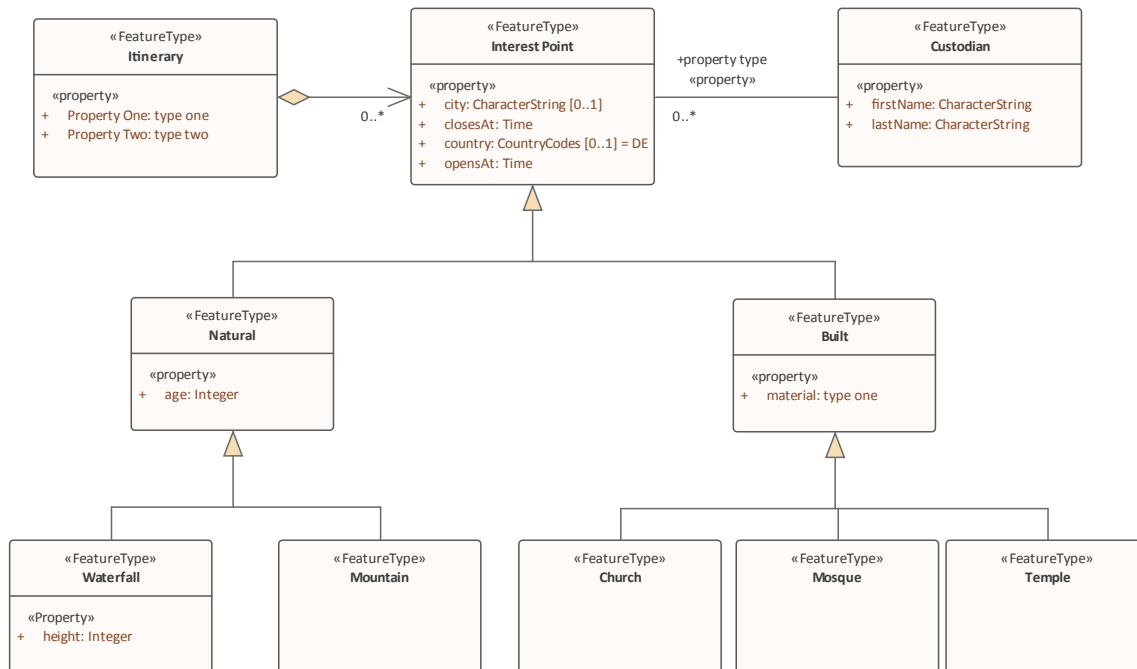
Modeling with GML

You can create GML models using the powerful diagramming and modeling facilities in Enterprise Architect. FIrst you need to select the GML or Information Exchange Perspective. **Perspectives** are a powerful focusing tool facility that ensure you remain focused and can concentrate on GML modeling.
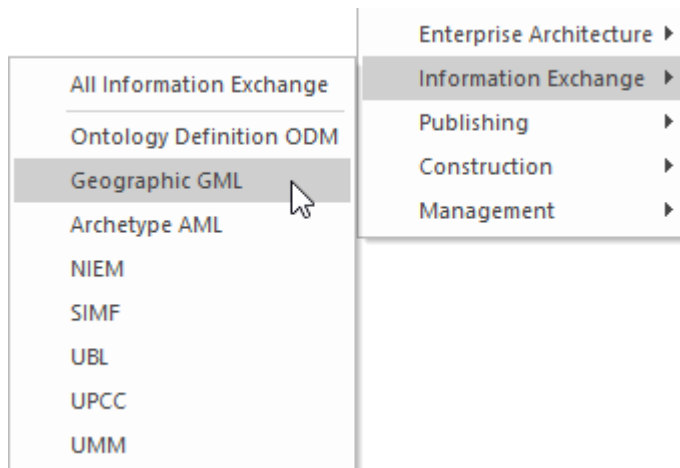
Perspective menu - GML perspective selection

This activates the MDG Technology for GML which contains the UML Profile for GML allowing you to create models with elements and connectors that describe your organization or community domains.

Access

Ribbon	Specialize > Technologies > GML
Context Menu	Right-click on Package | Specialize | GML

Features

Feature	Detail
Profile Support	You can develop GML constructs quickly and simply, through use of the built-in MDG Technology for GML facilities provided in the form of: • A GML diagram type, accessed through the 'New Diagram' dialog • GML pages in the **Diagram Toolbox** that map GML concepts to appropriately stereotyped UML elements • GML element and relationship entries in the 'Toolbox Shortcut Menu' and 'Quick Linker'
GML Toolbox Page	The GML Toolbox pages contain elements and connectors to model geographical features effectively.
UML Classes from ISO	(Optional) You can download the UML Classes implemented in ISO/TC 211 as an

	XMI file, then import the XMI file into Enterprise Architect as a Package containing diagrams and standard UML Classes, which you can reuse in your model.
	• Not all UML Classes implemented in ISO/TC 211 have a corresponding mapping in GML; the Classes that have a mapping (as specified in the GML 3.2.1 specification) are specified in the configurable file GMLClassMapping.xml in the 'Sparx Systems > EA > Config > GML' folder
	• The Namespace information for these Classes is specified in the configurable file GMLNamespaces.xml in the 'Sparx Systems > EA > Config > GML folder'
GML Application Schema Generation	Any model you create using the built-in MDG Technology for GML can be exported as a GML Application Schema.
	Using the configurable file GMLStereotypes.xml in the 'Sparx Systems > EA > Config > GML' folder, you can specify aliases for the standard GML stereotypes. The GML Application Schema Generator will also consider these aliases during Schema generation.

Notes

- The MDG Technology for GML is available in the Professional, Corporate, Unified and Ultimate Editions of Enterprise Architect

More Information

Geospatial modeling can be explored in more detail by accessing the following two topics:

ArcGIS Geodatabases
Geography Markup Language