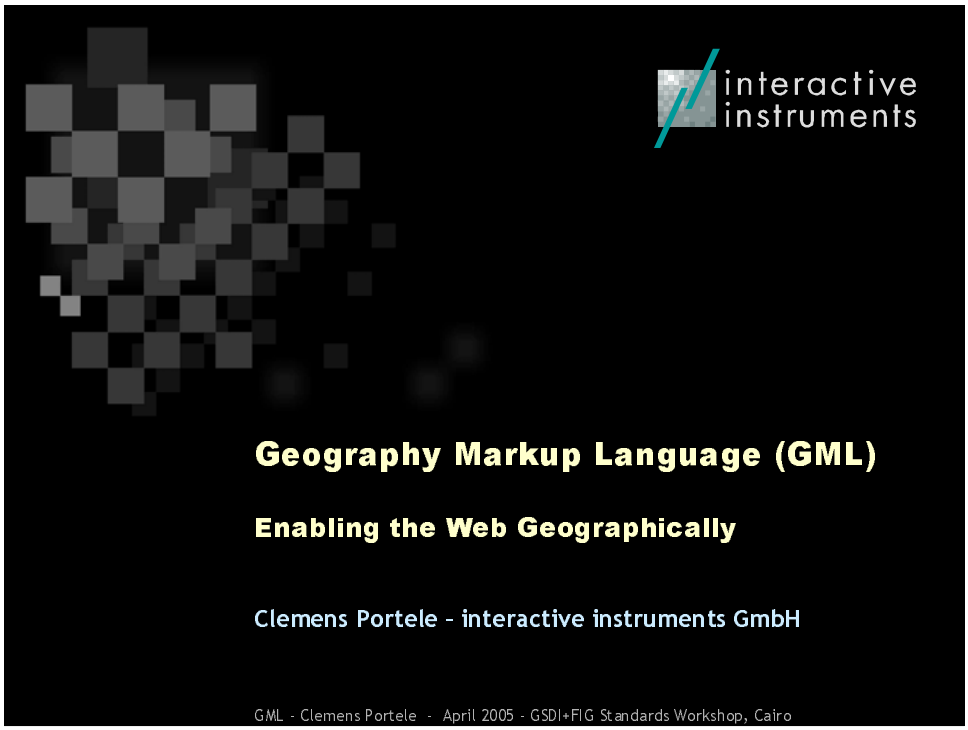


What is GML?

Scope of GML:

- A modeling language for geographic information
- An encoding for geographic information
- Designed for the web and web-based services

GML is

- an open standard
- enabling a vendor-neutral exchange of spatial data
- ready for service oriented architectures

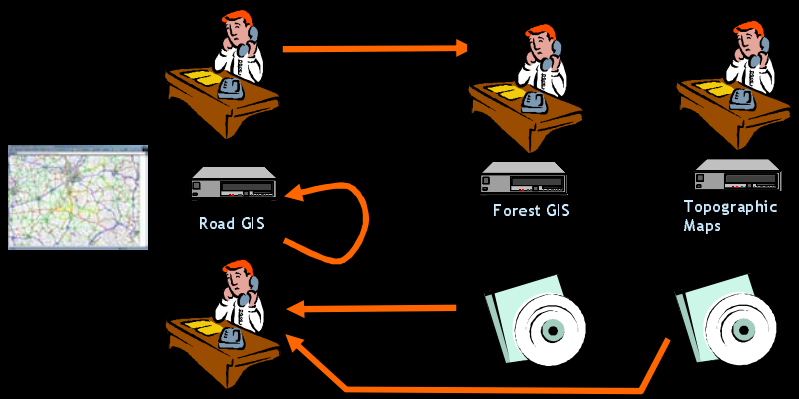
Simple scenario – Example

During the storm disaster in the German state Baden-Wuerttemberg in 1999 (storm „Lothar“) approximately 2 million solid cubic meter wood were felled by the storm. Primarily old trees were affected. After such an event the parts of the road network are to be identified, which are to be examined urgently whether they must be cleared.

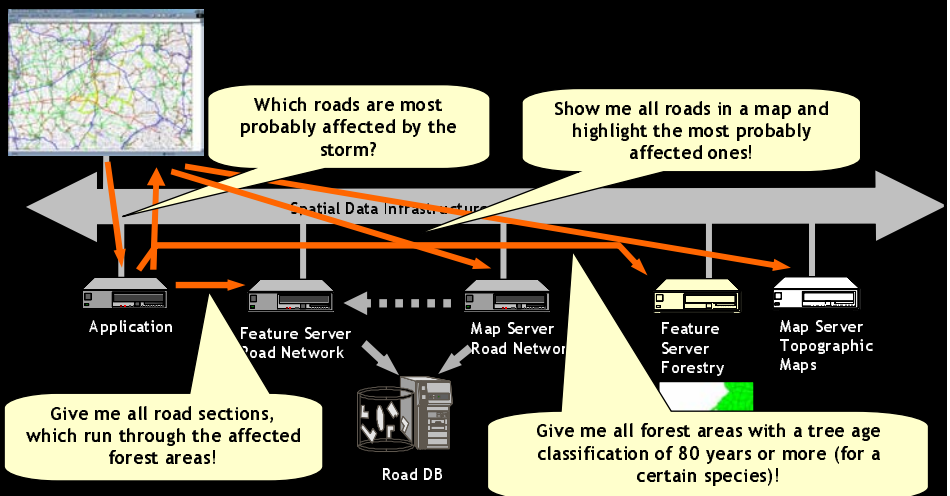
„Show me all roads crossing forest areas, whose age classification is higher than 80 years.“

Simple scenario – Example

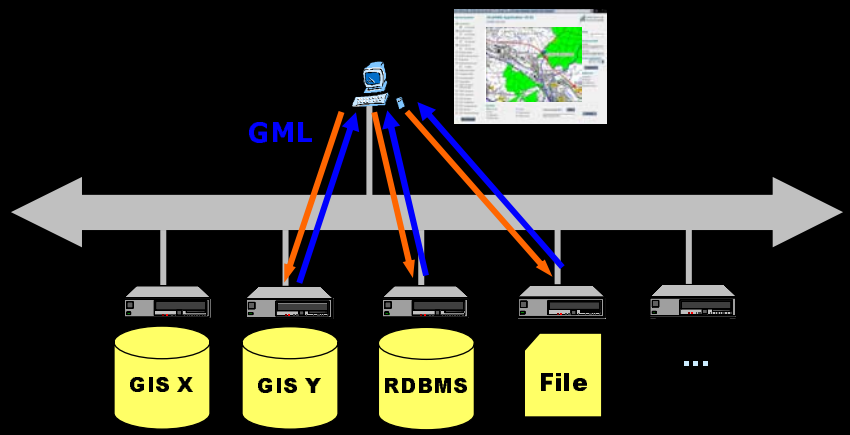
Traditional GIS usage:



Simple scenario – Example



GML enables a vendor-neutral exchange of spatial data

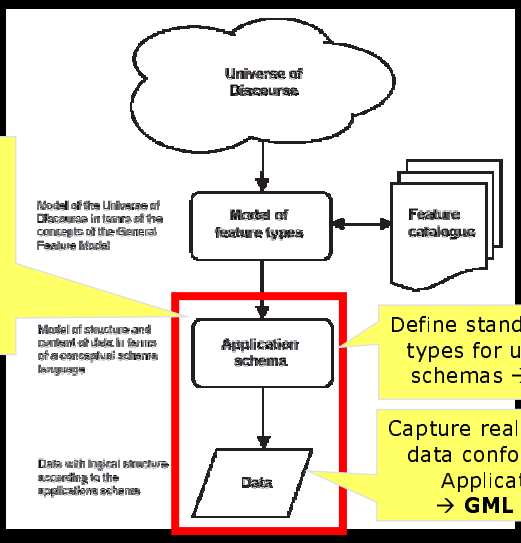


What is GML? – Characteristics

GML

- is based on XML technologies (W3C)
  - XML, XML Namespaces, XML Schema, Xlinks
- implements concepts of the ISO 19100 series
- supports spatial and non-spatial properties of objects
- is open and vendor-neutral
- is extensible
- supports the definition of profiles (proper subsets) of the full GML capabilities

GML Schema, Application Schemas and Documents



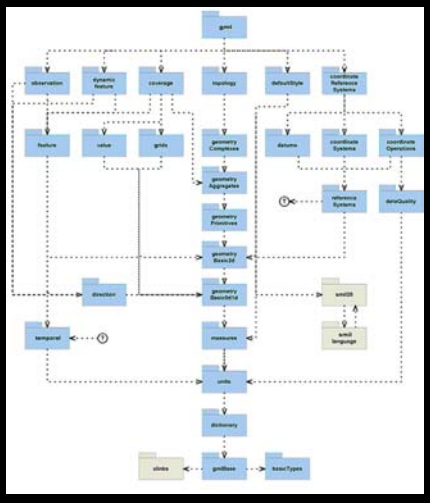
Use a schema language to model geographic information in a **GML Application Schema** and define rules for such schemas

Define standard elements and types for use in application schemas → **GML Schema**

Capture real-world objects as data conforming to a GML Application Schema → **GML Documents**

GML Schema

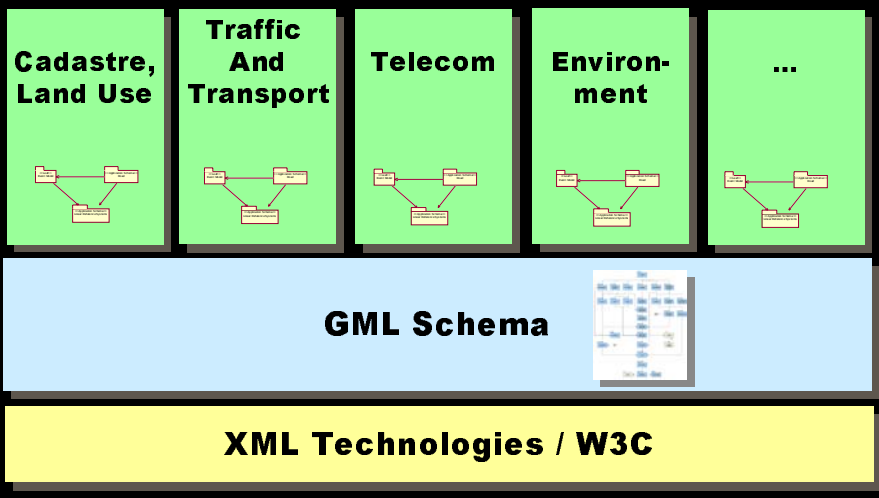
- The GML Schema is horizontal and not focused on a specific application domain
- But the schema provides common constructs and concepts which may be used by all the different application domains



GML Schema

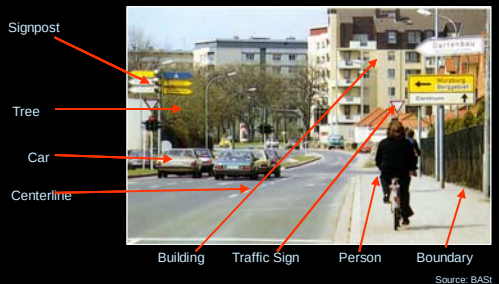
- Base schemas, general syntax, feature model, metadata mechanisms
- Basic geometry (0d, 1d, 2d)
- Additional geometric primitives (0d, 1d, 2d, 3d)
- Geometric composites
- Geometric aggregates
- Coordinate reference systems
- Topology
- Temporal information and dynamic features
- Definitions and dictionaries
- Units, measures and values
- Directions
- Observations
- Coverages
- Default styling

GML Application Schemas



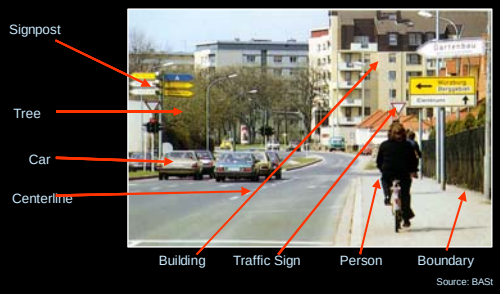
GML – Key concepts

- The core concept of GML is the feature. A feature is the abstraction of the phenomenon in the real world.
- Every feature has a feature type. A feature type in GML is a named classification of a fact of the real world.



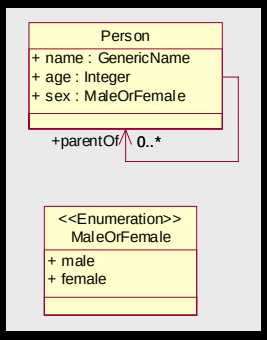
GML – Key concepts

- A geographic feature is a feature that is associated with a location relative to the Earth.
- As a result, the real world can be represented - in terms of an application domain - by a collection of features.
- Spatial properties are those properties that have a geometric object as their value (e.g. a point).



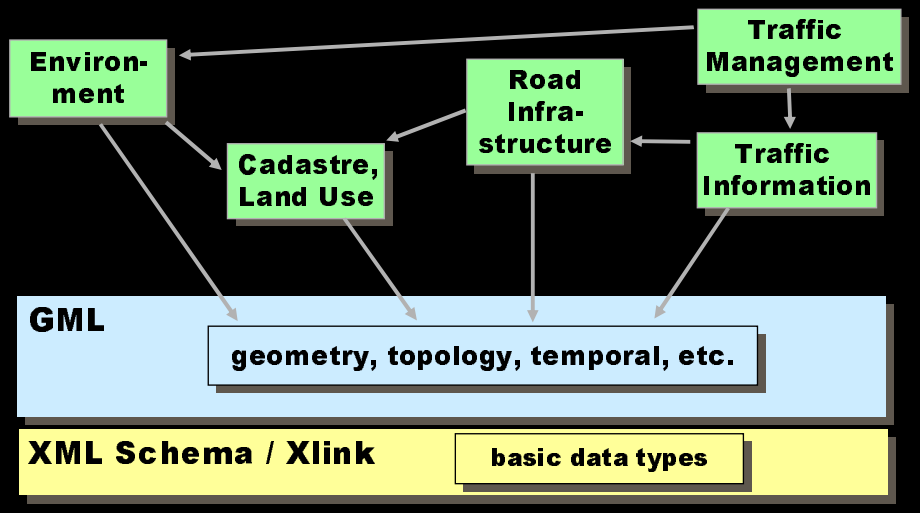
GML – Key concepts

- Features with a similar characteristic are grouped to feature types, those features will share a similar set of properties. This structure is specified in a GML Application Schema.



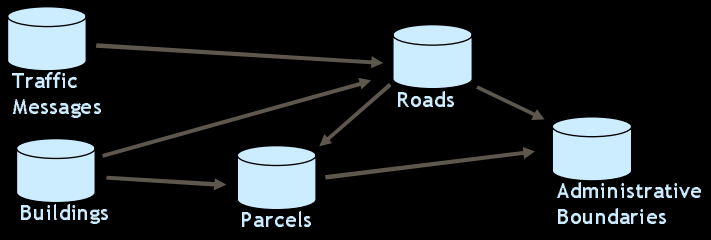

```
<Person gml:id = "p1">
    <gml:name>Bob</gml:name>
    <age>51</age>
    <sex>male</sex>
    <parentOf xlink:href="#p45"/>
</Person>
```

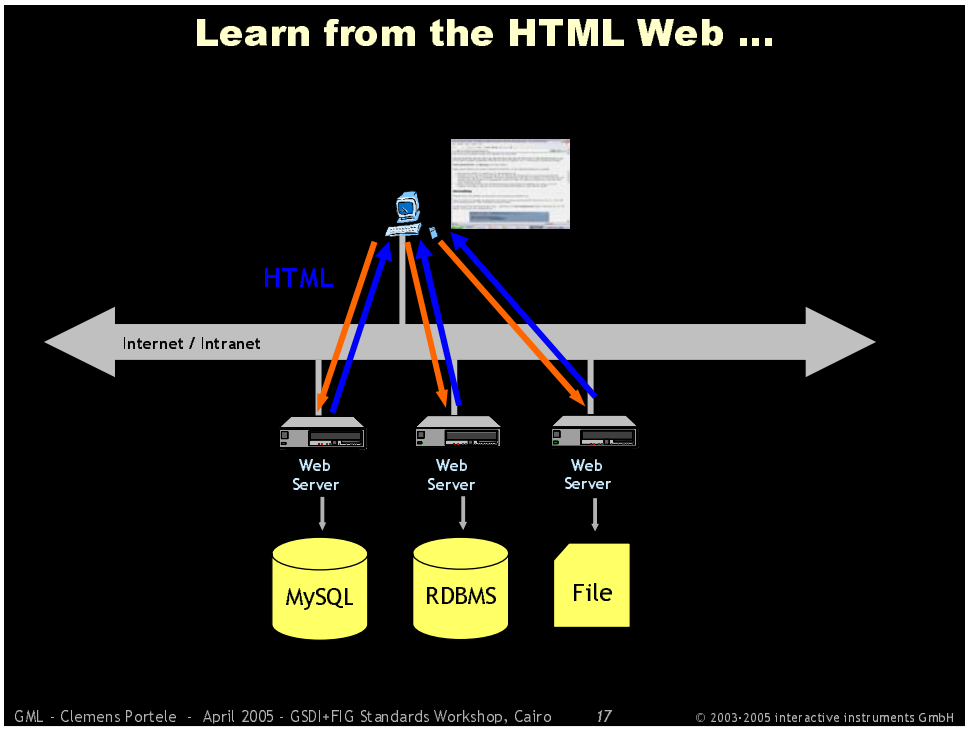
Linking GML Application Schemas



Enabling the geospatial web

- Information Communities publish their Application Schemas (preferably in some sort of registry) so that it can be found, accessed and understood by others
- This enables that also the features can have properties whose values are maintained by other authorities
  → a web of geospatial features is created




Learn from the HTML Web ...
HTML
Internet / Intranet
Web Server
Web Server
Web Server
MySQL
RDBMS
File
GML - Clemens Portele - April 2005 - GSDI+FIG Standards Workshop, Cairo 17
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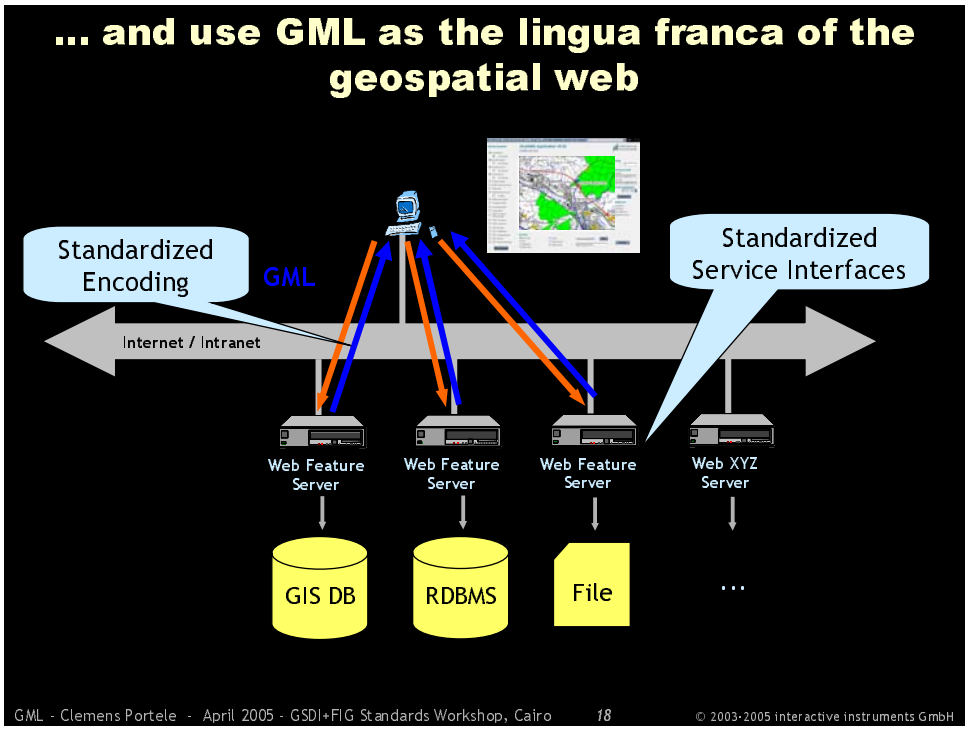
... and use GML as the lingua franca of the geospatial web
Standardized Encoding
GML
Standardized Service Interfaces
Internet / Intranet
Web Feature Server
Web Feature Server
Web Feature Server
Web XYZ Server
GIS DB
RDBMS
File
...
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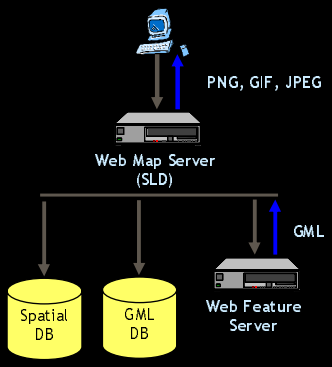
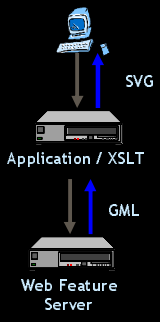
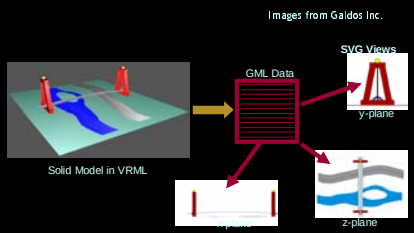
Mapping GML Data

GML is focused on content!





VRML, SVG and Web Mapping Examples



GML Development

Open Geospatial Consortium

- GML 1.0 Recommendation
  - May 2000
- GML 2.0 Adopted Specification
  - February 2001
- *WFS 1.0 Adopted Specification*
  - *September 2002*
- GML 3.0 Adopted Specification
  - January 2003

ISO/TC 211

- ISO 19136 New Work Item
  - May 2002
- ISO WD 19136 = GML 3.0

ISO CD 19136 = GML 3.1
February/March 2004

Joint Working Team:
OGC GML Revision Working Group & ISO Project Team

GML 3.2 Draft, April 15, 2005
(ISO DIS 19136?)

ISO/TC 211
Editing Committee

- GML Profiles under discussion
  - Simple Features
  - Point
  - GML for JPEG2000

GML and ISO 19100

- ISO 6709:1983, Standard representation of latitude, longitude and altitude for geographic point locations
- ISO 19101 - Reference model
- ISO/TS 19103 - Conceptual schema language
- ISO 19104 - Terminology
- ISO 19105 - Conformance and testing
- ISO 19106 - Profiles
- ISO 19107 - Spatial schema
- ISO 19108 - Temporal schema
- ISO 19109 - Rules for application schema
- ISO 19110 - Feature cataloguing methodology
- ISO 19111 - Spatial referencing by coordinates
- ISO 19112 - Spatial referencing by geographic identifiers
- ISO 19113 - Quality principles
- ISO 19114 - Quality evaluation procedures
- ISO 19115 - Metadata
- ISO 19116 - Positioning services
- ISO 19117 - Portrayal
- ISO 19118 - Encoding
- ISO 19119 - Services
- ISO/TR 19120 - Functional standards + new rev
- ISO/TR 19121 - Imagery and gridded data
- ISO/TR 19122 - Qualifications and certification of personnel
- ISO 19123 - Schema for coverage geometry and functions
- ISO/RS 19124 - Imagery and gridded data components
- ISO 19125 - Simple feature access – Part 1-3
- ISO 19126 - Profile - FACC Data Dictionary
- ISO 19127 - Geodetic codes and parameters
- ISO 19128 - Web Map Server Interface
- ISO 19129 - Imagery, gridded and coverage data framework
- ISO 19130 - Sensor and data model for imagery and gridded data
- ISO 19131 - Data product specification
- ISO 19132 - Location based services possible standards
- ISO 19133 - Location based services tracking and navigation
- ISO 19134 - Multimodal location based services for routing and navigation
- ISO 19135 - Procedures for registration of geographic information items
- ISO 19136 - Geography Markup Language (GML)
- ISO 19137 - Generally used profiles of the spatial schema and of similar important other schemas
- ...

Conclusion

- GML is an adopted OpenGIS® Specification and plays a key role in the OGC Architecture
- GML enabled products are available
- A joint work item with ISO/TC 211 (→ ISO 19136)
- Provides a rich set of predefined types for Application Schemas - implementing many of the core ISO 19100 concepts
- Has an underlying model that makes processing GML documents easier and supports distributed datasets
- Separates presentation and content
- Works well in a Web Service environment
- Consensus-based profiles are being developed

→ a building block of the Geospatial Web

Thank you for your attention !

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