Standards, GML and AIXM

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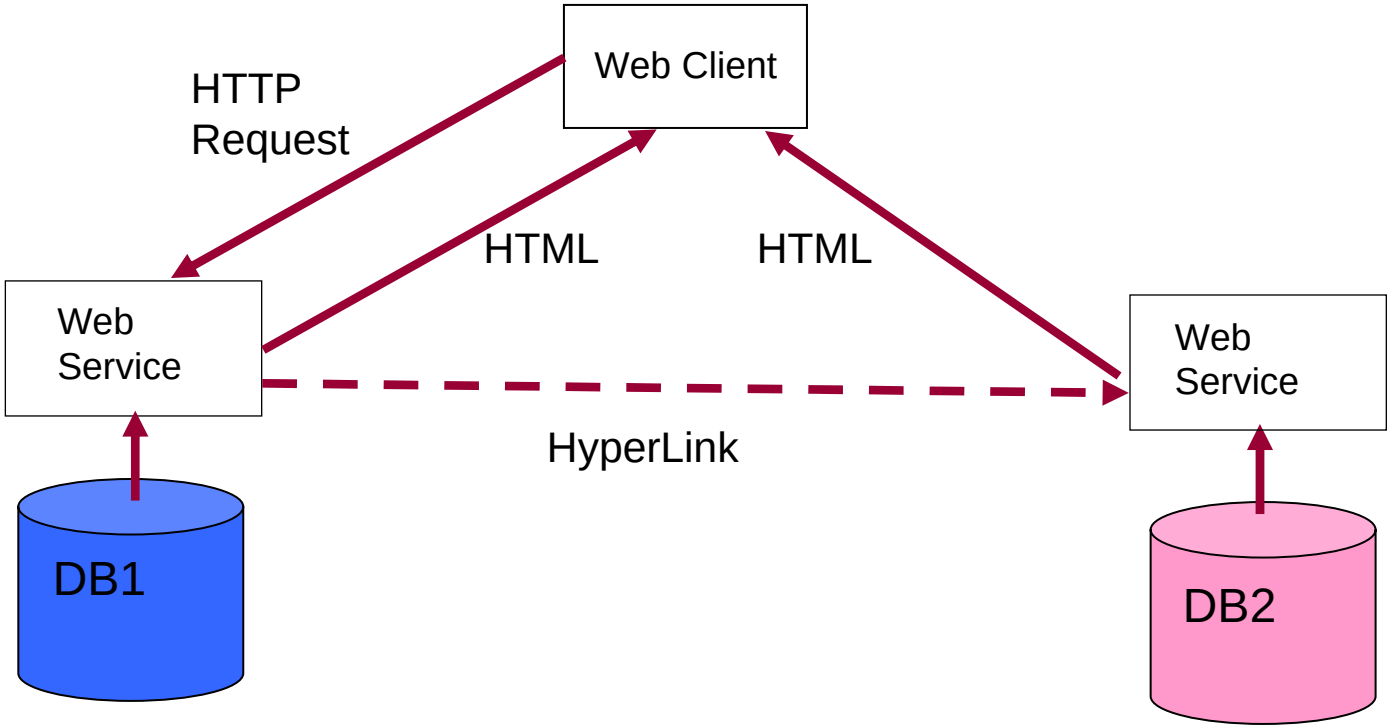
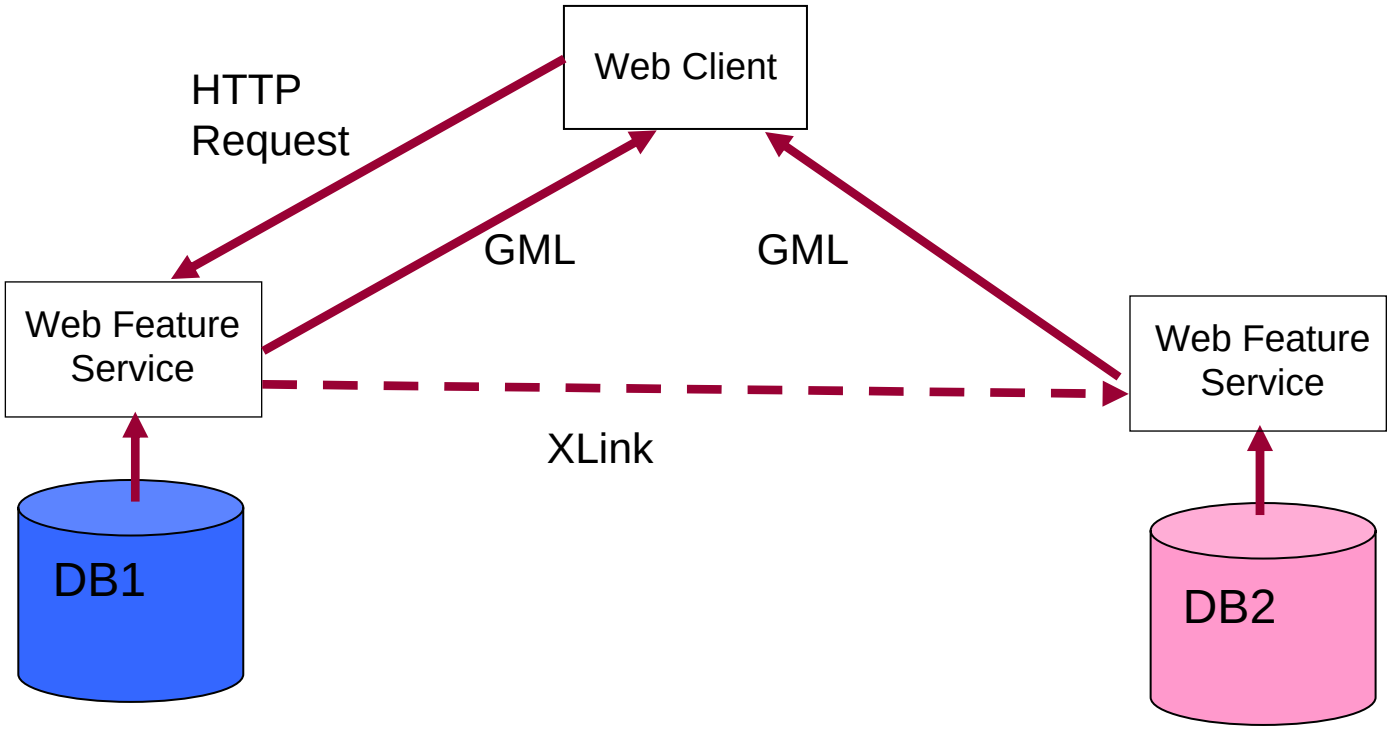
Geography Markup Language: What is it ?

- A modeling language for geographic features
- A set of XML technologies for handling geographic information on the web
- A GML model determines how data is:
  - Structured
  - Requested (e.g. feature type name, gml:id)
  - Filtered (e.g. spatial extent, temporal interval)
- Used for information exchange between disparate data stores
- Flexible/extensible enough to represent any DB model

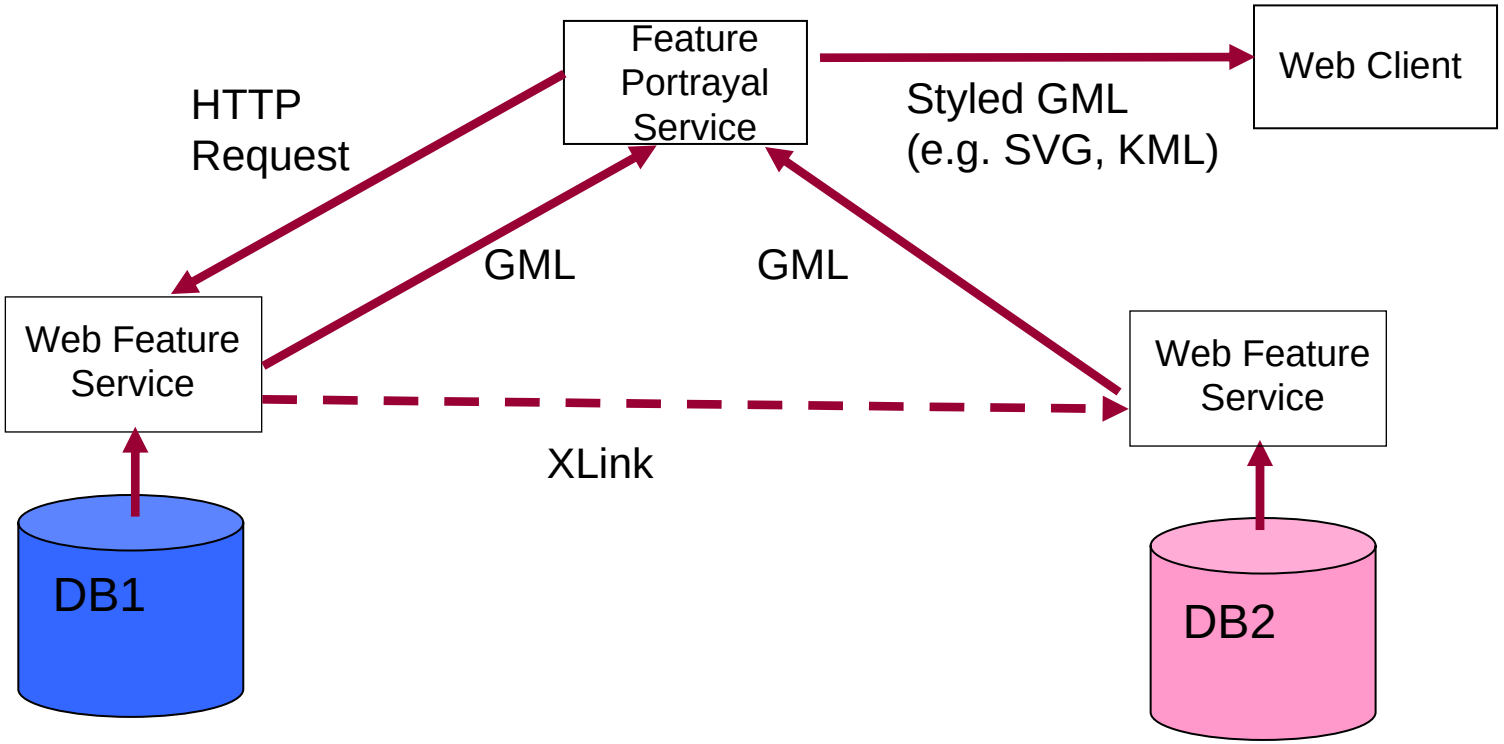
GML/HTML Analogy



GML/HTML Analogy



GML/HTML Analogy



Geography Markup Language: What is it ?

- An Open Geospatial Consortium (OGC) Adopted Standard
  - Previous Versions:
    - GML 1.0 Apr 2000, GML 2.0 Feb 2001
    - GML 2.1 Jan 2002
    - GML 3.0 Jan 2003
    - GML 3.1 Feb 2004
  - Current Version (Joint OGC/ISO TC 211 Adopted Standard):
    - GML 3.2 Sep 2007 also ISO 19136

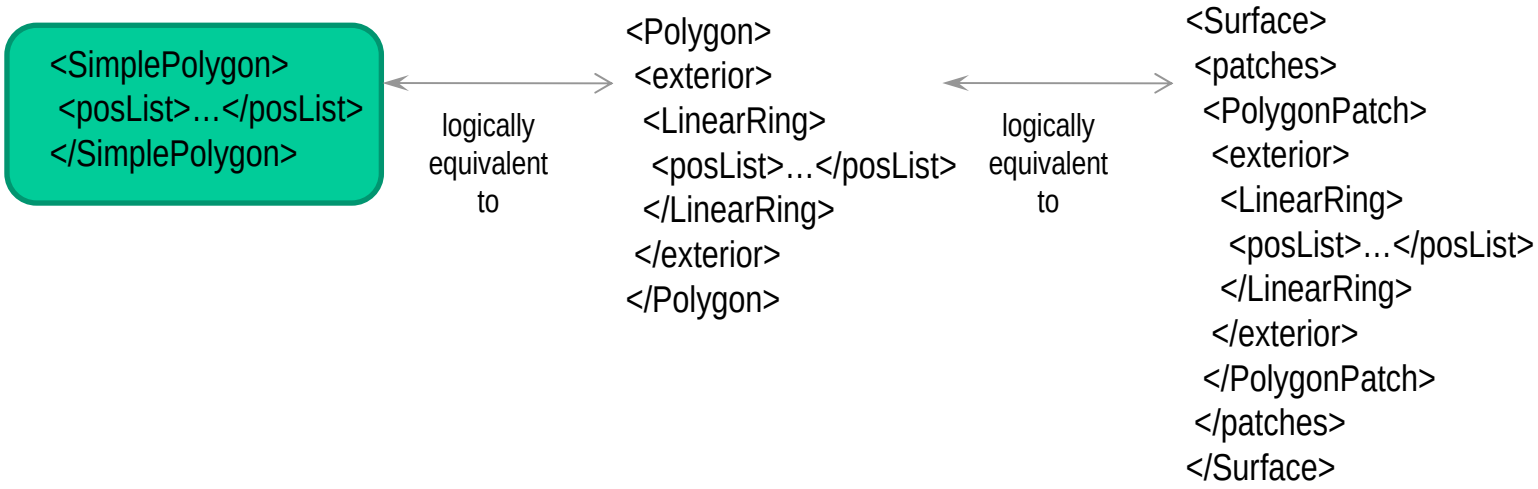
Geography Markup Language:

- Upcoming version 3.3 (expected Sep 2010):
  - GML 3.3 (Application Schema of GML 3.2) will add:
    - Extensible UML-to-XML encoding rules
      - Can support additions, e.g. xsi:nil and nilReason
    - Compact Geometry Encodings
      - For Polygon, Arc, Circle, etc
    - Linear Referencing
      - Eg mark a position *100m along* an existing Curve
    - Multilingual support
      - xml:lang attribute on name, description, etc
    - Temporal Aggregates
      - Add timePositionList (similar to posList)
    - Etc

GML 3.3 Sneak Peak:

SimplePolygon

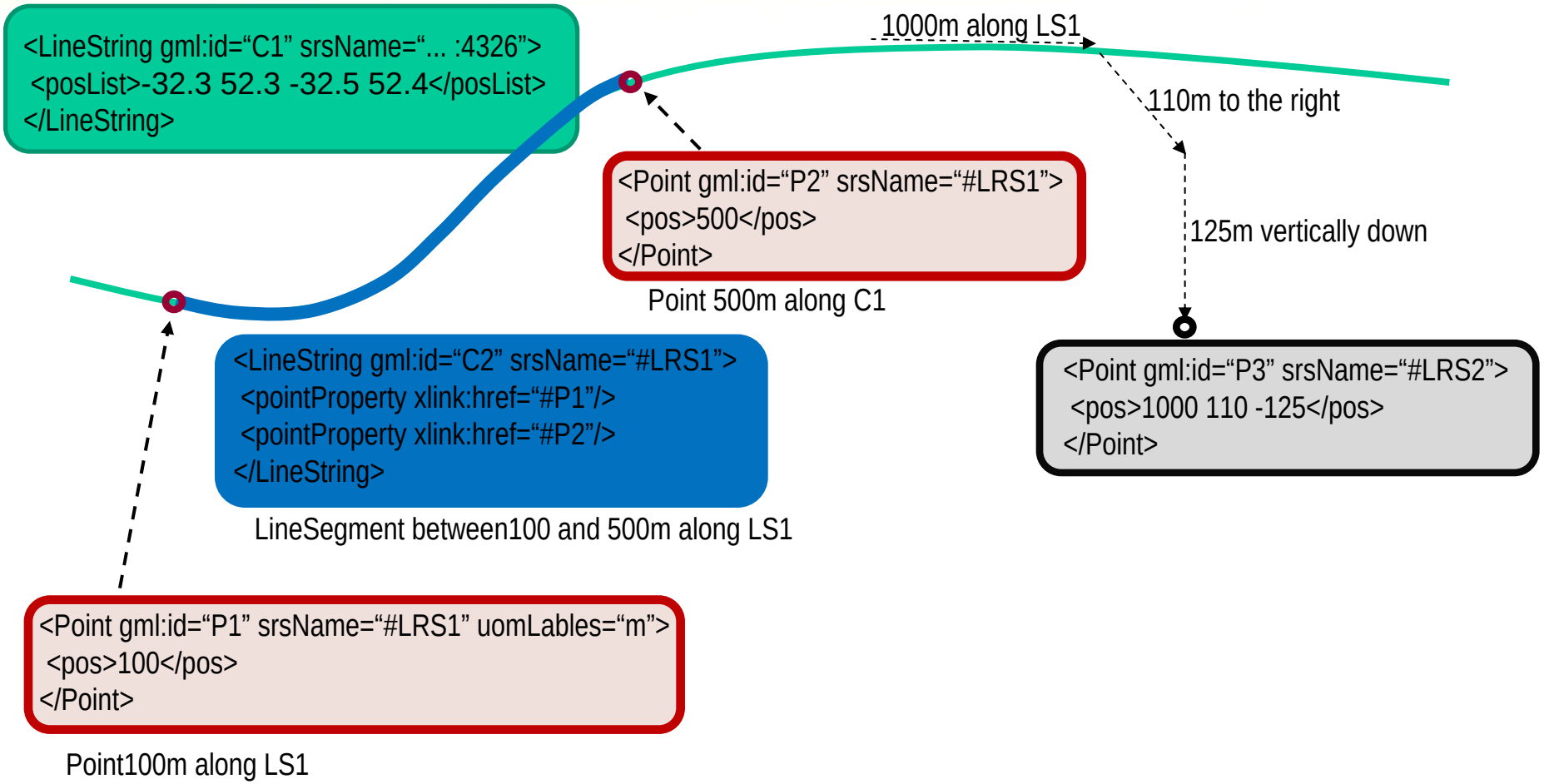
- a simply connected polygon (no interior holes)
- has a single, simply closed exterior boundary (no self-crossing)



- SimpleCircle, SimpleArc, SimpleTriangle, SimpleRectangle
  - compact encodings are similar to SimplePolygon

GML 3.3 Sneak Peak:

Linear Referencing



GML is Standards Based

GML Builds on:

- XML 1.0
- XML Schema (Parts 0, I, II)
- XML namespaces
- XPointer/XPath
- XLink

W3C

- ISO TC/211 (19103, 19107, 19108, 19109, 19111, 19112, 19117, 19123, 19115, 19139,19148)

ISO TC 211 (Geomatics)

Other Standards Build on GML:

- AIXM (Aeronautical Information)
- WXXM (Weather Information)
- WFS (Web Feature Service)
- WCS (Web Coverage Service)
- FPS (Feature Portrayal Service)
- CSW-ebRIM (Catalog/Registry Service)
- CityGML (City Planning)
- O&M (Observations and Measurement)
- CSML (Climate Science)
- DIGGS (Geo-Technical, Geo-Environmental)
- GeoSciML (Geo Science)
- TransXML (Transportation – US)
- LandGML (Engineering/Construction)
- …

Working with these standards in OWS-7

GML and WFS

GML

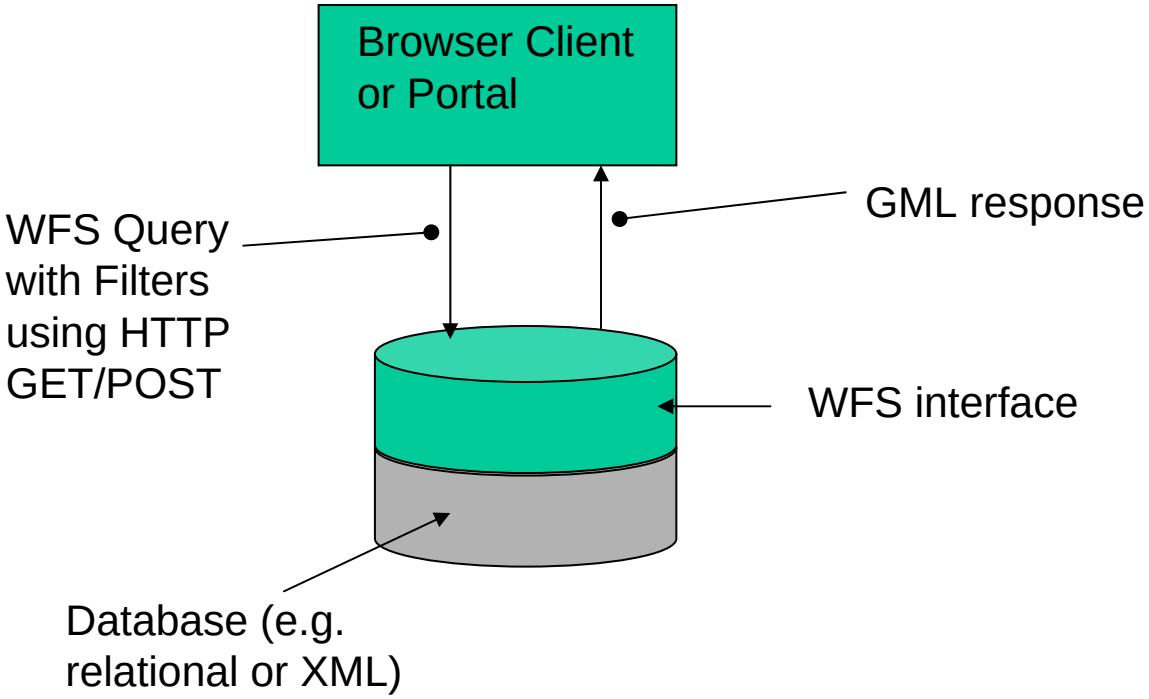
- V2.x (2001)
- V3.0, 3.1 (2003)
- V3.2 (2007)

WFS

- V1.0 (2002)
- V1.1 (2004)
- V2.0 developed jointly by OGC and ISO TC211, doc# 19142 (OGC Filter Encoding is ISO 19143)

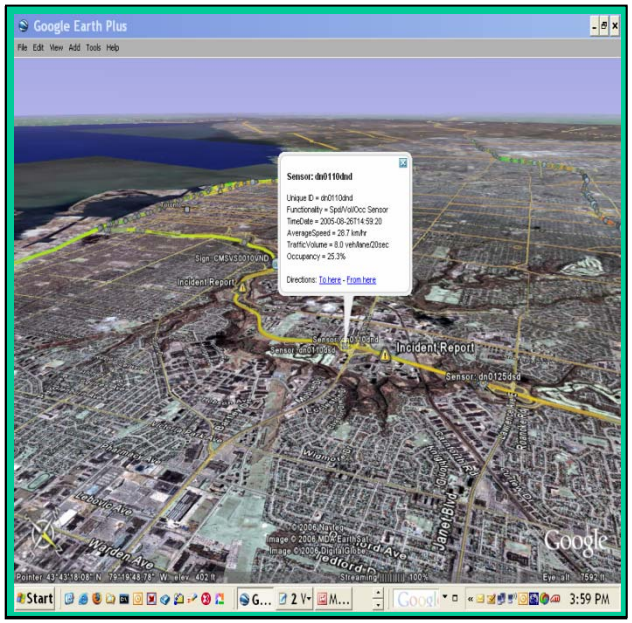
Role of WFS

- Request and serve GML data over the Internet (e.g. via spatial or temporal queries)
- Transactional data updates

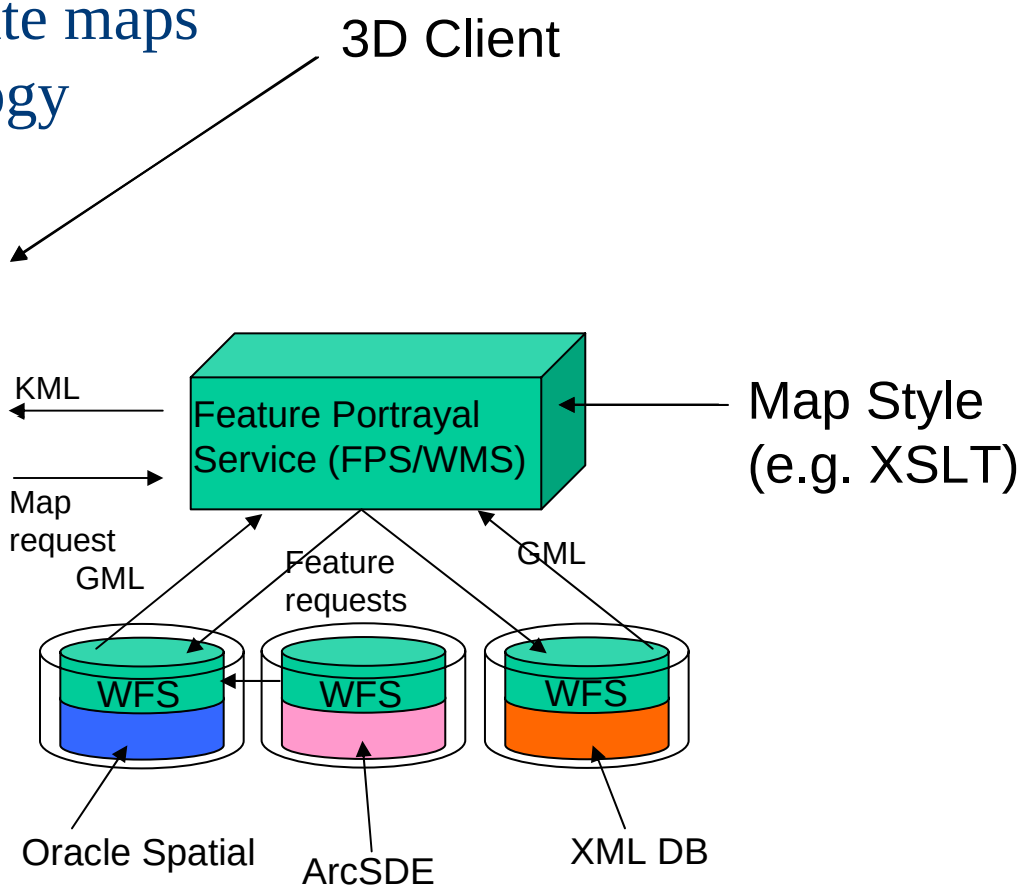


Role of Feature Portrayal Service (OGC WMS)

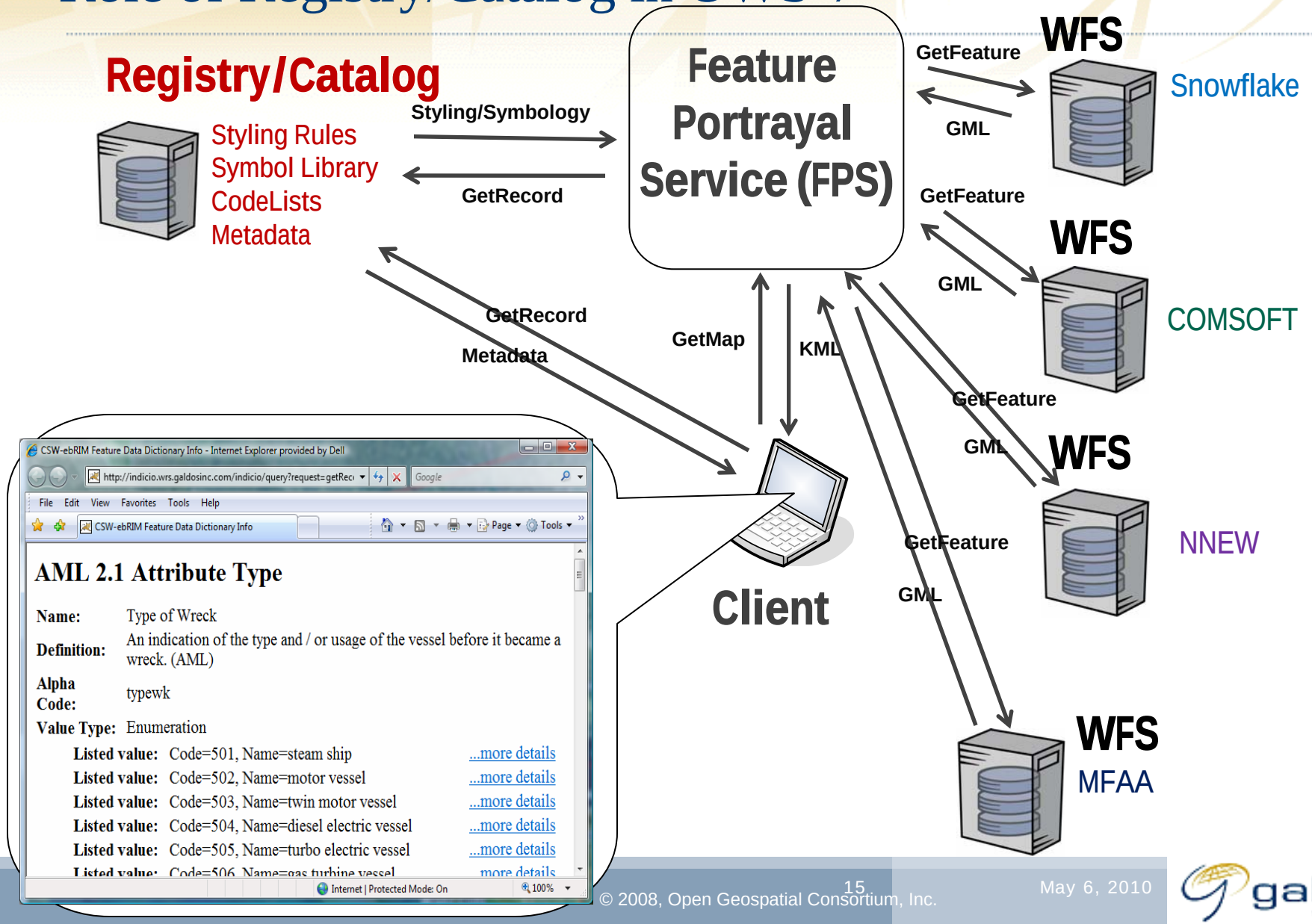
- Obtain GML data from WFS
- Apply styling rules to create maps using appropriate symbology



Viewer Client



Role of Registry/Catalog in OWS-7



Metadata

- Metadata is meaningful only if we define what we mean by data
- GML uses strong typing to distinguish metadata from data

Runway (Feature type)
Defining Characteristics (data) • name • identifier • location • hours of operation
Data Context (metadata) • how precise is the data • who is responsible for the data • creation date

Metadata (about a feature)

- **General & lifecycle metadata** describes the resource as a whole, including current status and change history
- **Technical metadata** for specific information communities (services, data sets, images, styling rules, etc.)
- **Subject-based metadata** (i.e. classifications)
- **Relationships** that assert links or associations between resources (or parts of resources)
- **Annotations** that convey third-party comments or observations (e.g. data quality)

Metadata Standards

- ISO 19115/19139 (datasets)
- ISO 19119 (services)
- Dublin core ISO 15836:2003(E) (cross domain discovery metadata)
- CSDGM/FGDC (Content Standard for Digital Geospatial Metadata)
  - Represented as North American Profile of 19115

Why Base AIXM on Standards?

- Leverage a wide world of existing tools
- Follow established best practices
- Better odds for wide adoption
- Lower the total cost of ownership

AIXM Schema Development