

# The Cybercartographic Atlas of Antarctica: Towards Implementation

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# Objectives of Paper

1. Provide background to and update on the Cybercartographic Atlas of Antarctica (The Atlas)
2. Present a high level essential (real-world) model for The Atlas
3. Outline a preliminary abstract model for The Atlas
4. Indicate directions for The Atlas in terms of implementation technologies

# Project History

- First proposed by Dr. Vergani of Argentina, 1999
- Formally adopted by SCAR in Sienna, 2001
- Two workshops held to date
  - Puerto Madryn, December 2001
  - Ottawa, May 2002

# Cybercartography

- Multisensory
- Multimedia
- Interactive
- Information package
- Produce by interdisciplinary teams
- Forms new partnerships
- Applied to a wide variety of subjects

# Recent Developments

- Contact with a number of potential partners including: JCADM, KGIS, AAD, Gateway Antarctica, USGS/UNH, Students on Ice, Antarctic Treaty Database (Byrd PRC)
- Awarded a 4 year research grant to support research in cybercartographic theory and methodology: **interested in human interaction / based on user centred design**
- Grant commenced 01/2003
- New lab equipment being installed with server architecture developed over next year

# Essential Model

# Essential Model

- Atlas Goals:
  - Create an innovative new product and methodology to compliment discovering, utilizing, *presenting and distributing existing information* and data about Antarctica to a wide variety of users, including scientists, decision makers and the general public
  - Facilitate increased cooperation and information exchange between Antarctic stakeholders under the terms of the Antarctic treaty
  - Through international cooperation, to develop and link National Atlases of Antarctica

# Use Case

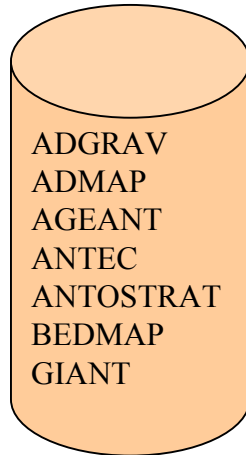
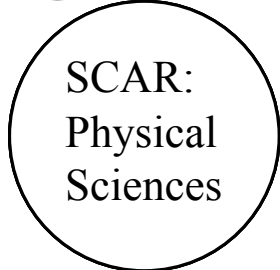
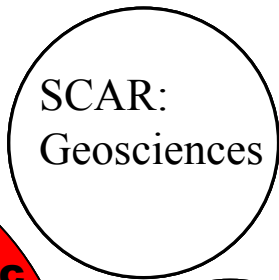
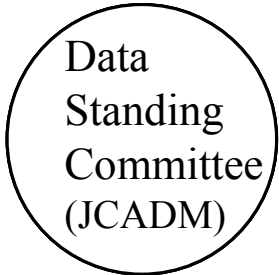
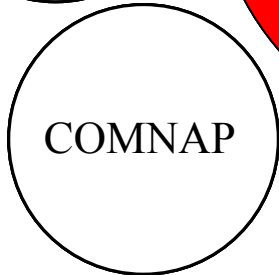
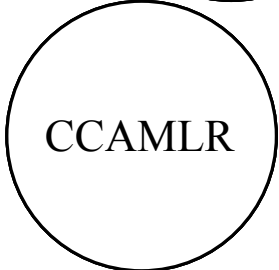
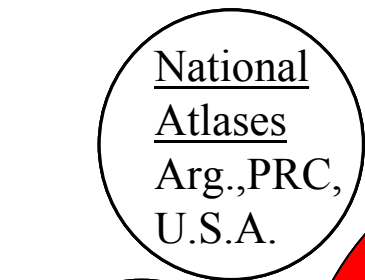
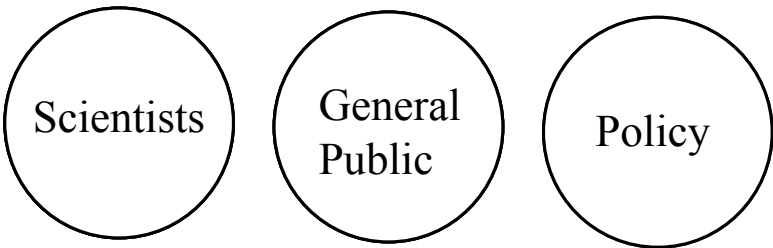
- General public
  - Learn from theme specific synthesis of data on Antarctica
- Policy makers
  - Integrate and analyse GI to support policy decisions (Cordonnery, 1999)
- Scientists
  - Integrate and analyse GI using scientific visualization to support information discovery and knowledge generation



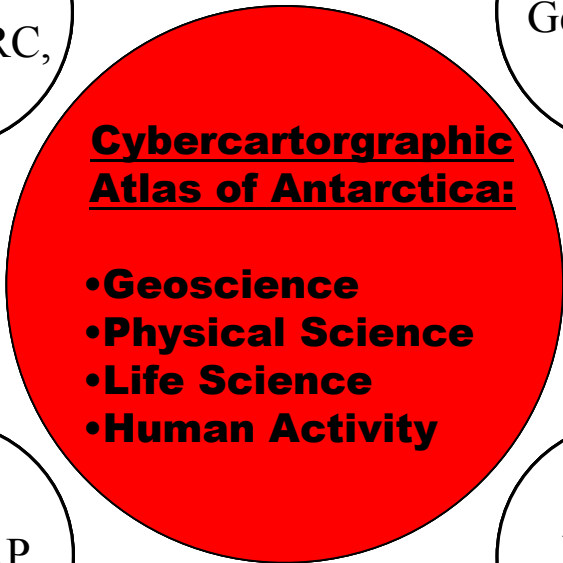
# Proposed Themes

- Ice – characteristics, processes and effects
- Historical Exploration of the Antarctic
- Declining Seal Population
- Geodesy
- Antarctica and Global Climate Change
- others ....

Users



User / Providers



Providers



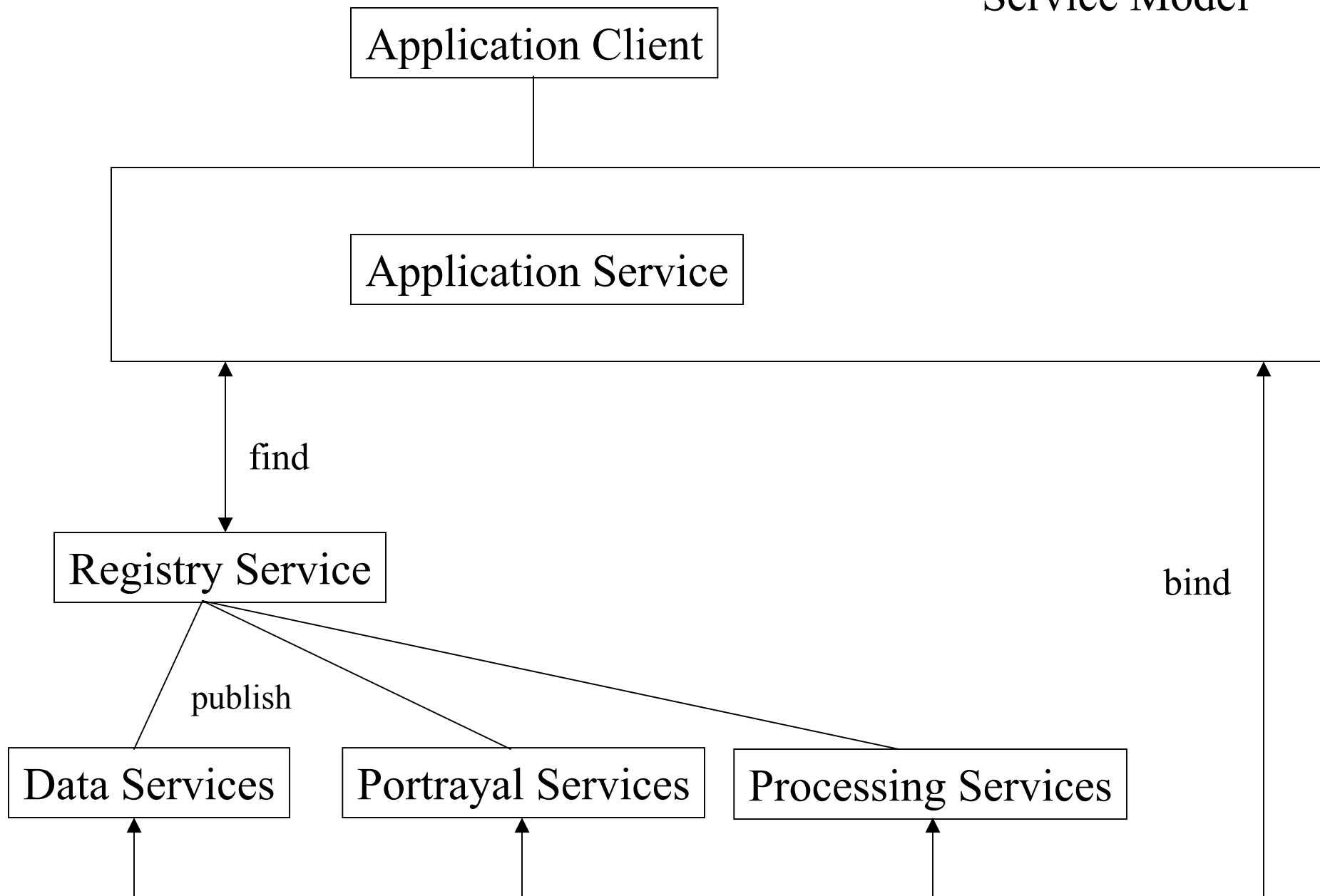
# Preliminary Abstract Model

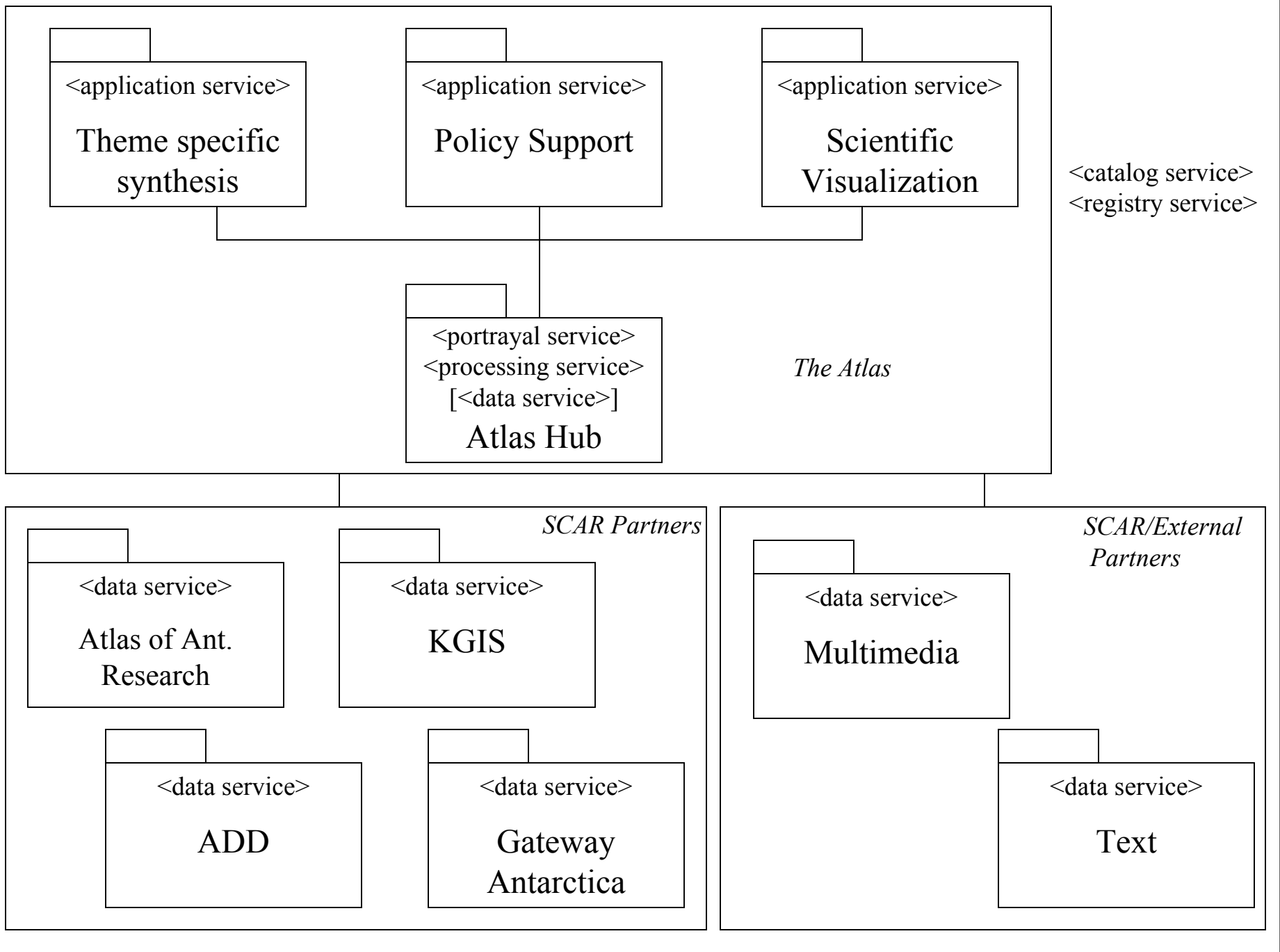
# Service Model

- Web services approach
- Links between services using standard encodings
- Reference ISO,OGC,CGDI (Brotsma & Ryan, 2002)
- Service Categories:
  - Application services
  - Portrayal Services
  - Processing Services
  - Data Services
  - Registry Services



# Service Model





# Potential Application Services

- Map\Terrain\Image viewer (including tactile)
- Cartographic vis. data discovery services
- Geocoded text viewer
- Picture display
- Sonic\haptic\[olfactory] display
- Video\animation playback
- All of the above aggregated from other services and combined by application service for delivery to user agent

# Portrayal Services

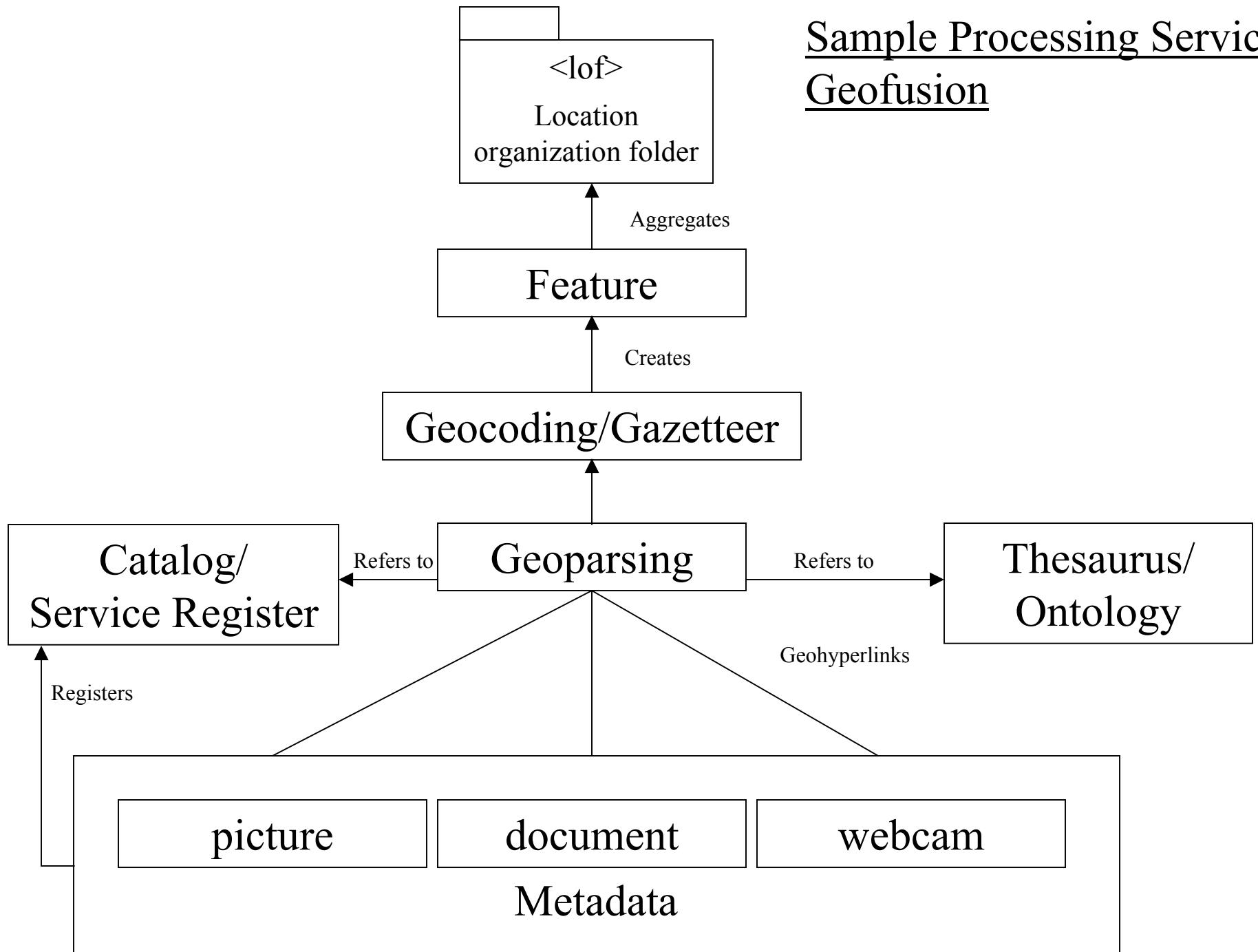
- Map portrayal service
- Coverage portrayal service
- Terrain portrayal service
- Mobile presentation services



# Processing Services

- Geofusion
- Semantic Translation
- Geocoding/Gazetteer
- Coordinate transformation
- Image classification
- Advanced modelling

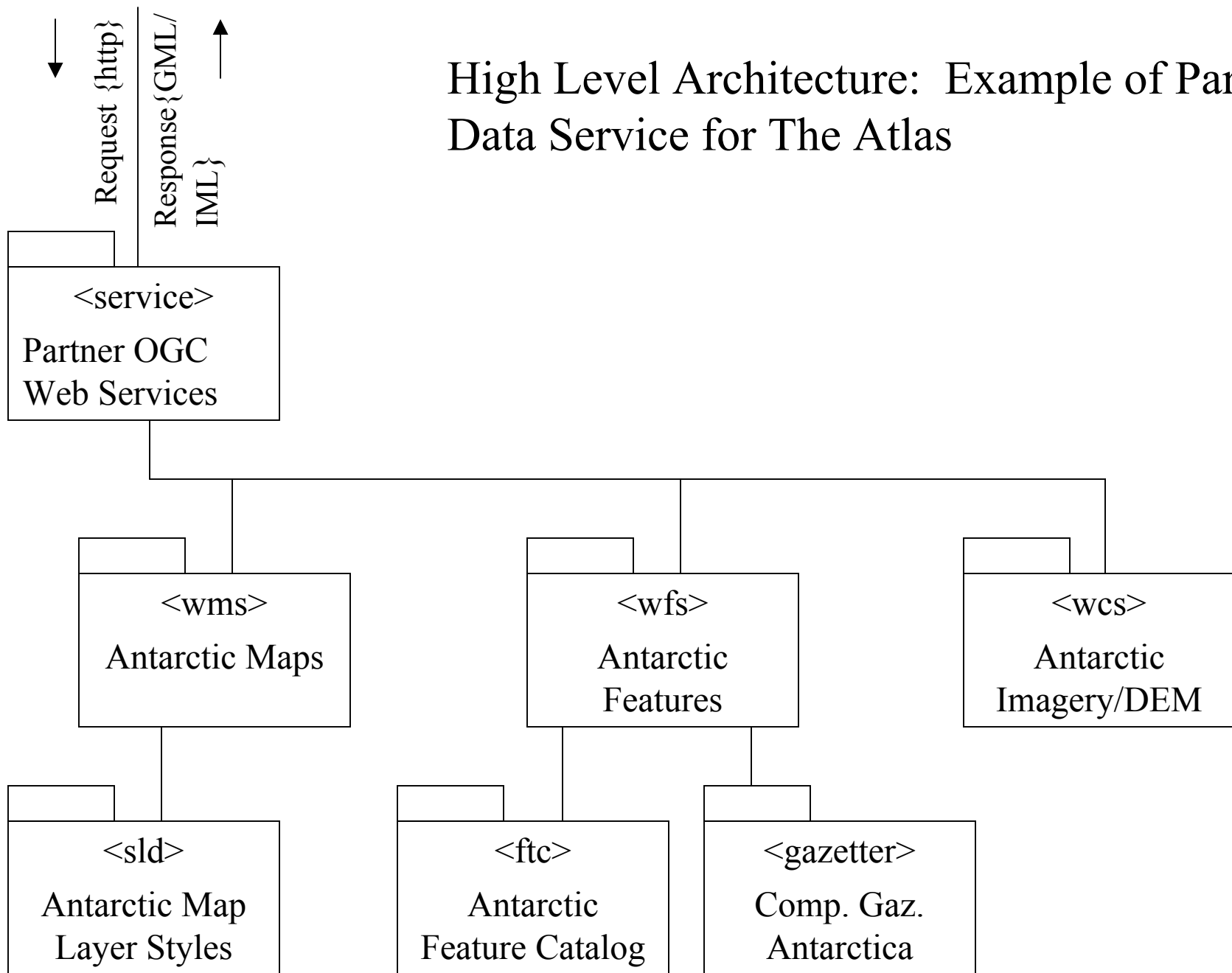
# Sample Processing Service: Geofusion



# Data Services

- Primary: WFS, WCS
- Future: Sensor Collection Service using SensorML
- Syntax – Standardized Feature model and encoding (i.e. ISO feature model and GML)
- Schematic – Object Oriented through encoding (user defined – hidden from The Atlas)
- Semantics to be addressed by processing services i.e. applications developed using formal ontologies

# High Level Architecture: Example of Partner Data Service for The Atlas

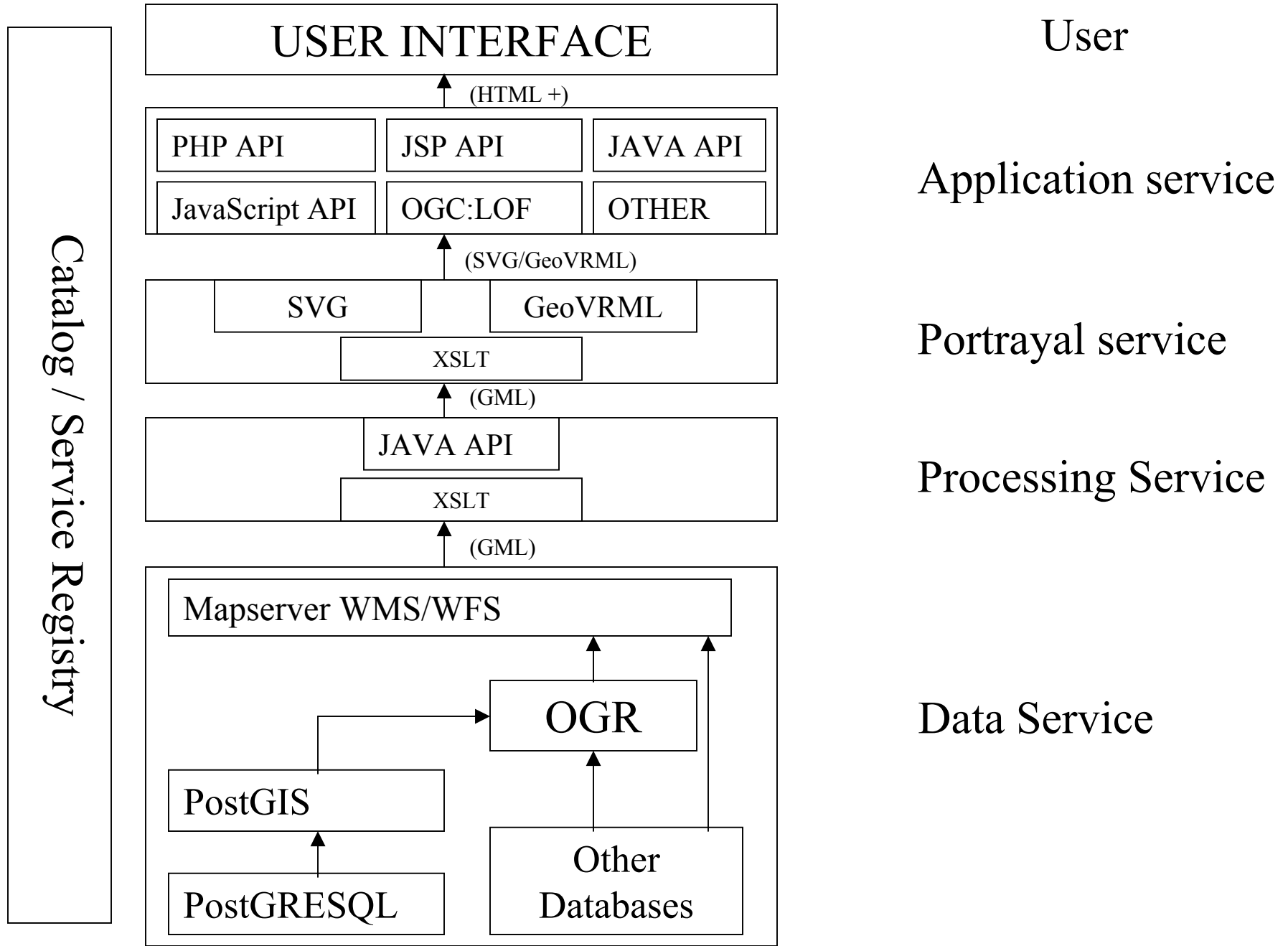


# Registry Services

- Catalog service for dataset metadata
- Service registry for service metadata

# Implementation

# Mapserver Implementation: Public Domain Approach



# Key Technologies

- Standards compliant Web services (i.e. ArcImgs, Mapserver, Web Map Composer etc.)
- Standard portrayal formats : SVG, GeoVRML
- Encoding: GML (feature) / TBD (Coverage)
- Catalog/Service registry critical -> metadata



# Conclusion

- Partner requirements/‘wish list’
  - Standard compliant Web service
  - Metadata
  - [Data semantics]
  - User participation
- Upcoming work
  - Project information Web site: May/June 2003
  - Start user testing: June, 2003
  - Prototype database construction – August 2003