



# **AstroWeb Astroinformatics Project and Comparison of the WEB-GIS Protocol Standards**

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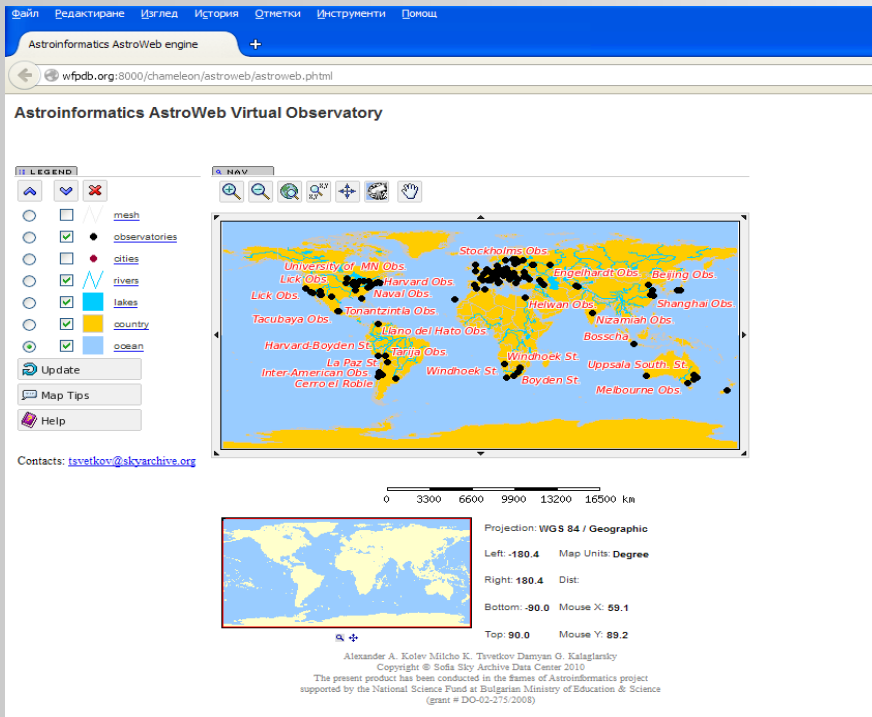
**IX BULGARIAN-SERBIAN ASTRONOMICAL CONFERENCE:  
ASTROINFORMATICS**

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# AstroWeb Virtual Observatory

The significant part of **Astrionformatics** project is a WEB-based **AstroWeb Virtual Observatory**.

In the AstroWeb realization was implemented some advanced GIS (Geographical Information System) information techniques.



Main used software tools are product of the **OGS** (Open Geospatial Consortium) and works according to international adopted GIS interoperability standards.

# OGS standards

In the interest of **AstroWeb** software project are few **OGS** standards:

## **WMS (Web Map Service)**

Provides operations in support of the creation and display of map-like raster data views of geographic information;

## **WFS (Web Feature Service)**

Allows a client to retrieve geographic data encoded in GML text data format. The specification defines interfaces for data access and manipulation operations on geographic features and the feature information behind a map image;

## **GML (Geography Markup Language)**

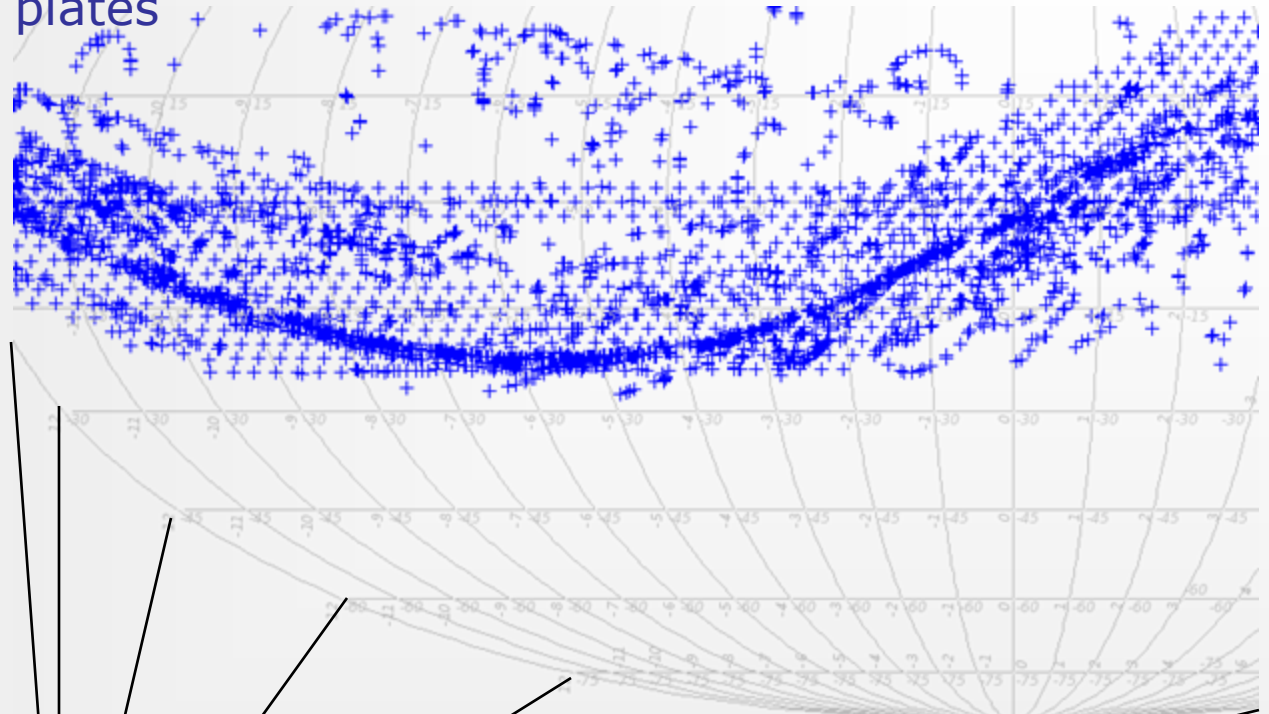
Is an XML encoding for the transport and storage of geographic information, including both the geometry and properties (textual and numeric attribute data) of geographic features;

## **SLD (Styled Layer Descriptor)**

Is an XML encoding that allow user-defined symbolization of geographic feature data. It allows system to determine which features or layers are rendered with which colors or symbols.

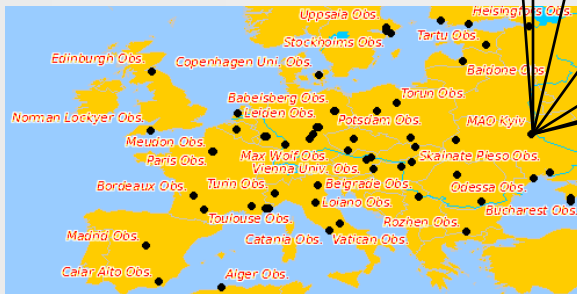
# Virtual Observatory WEB-GIS

Astronomical Catalogues and Archived digitalized plates



**SkyMAP**

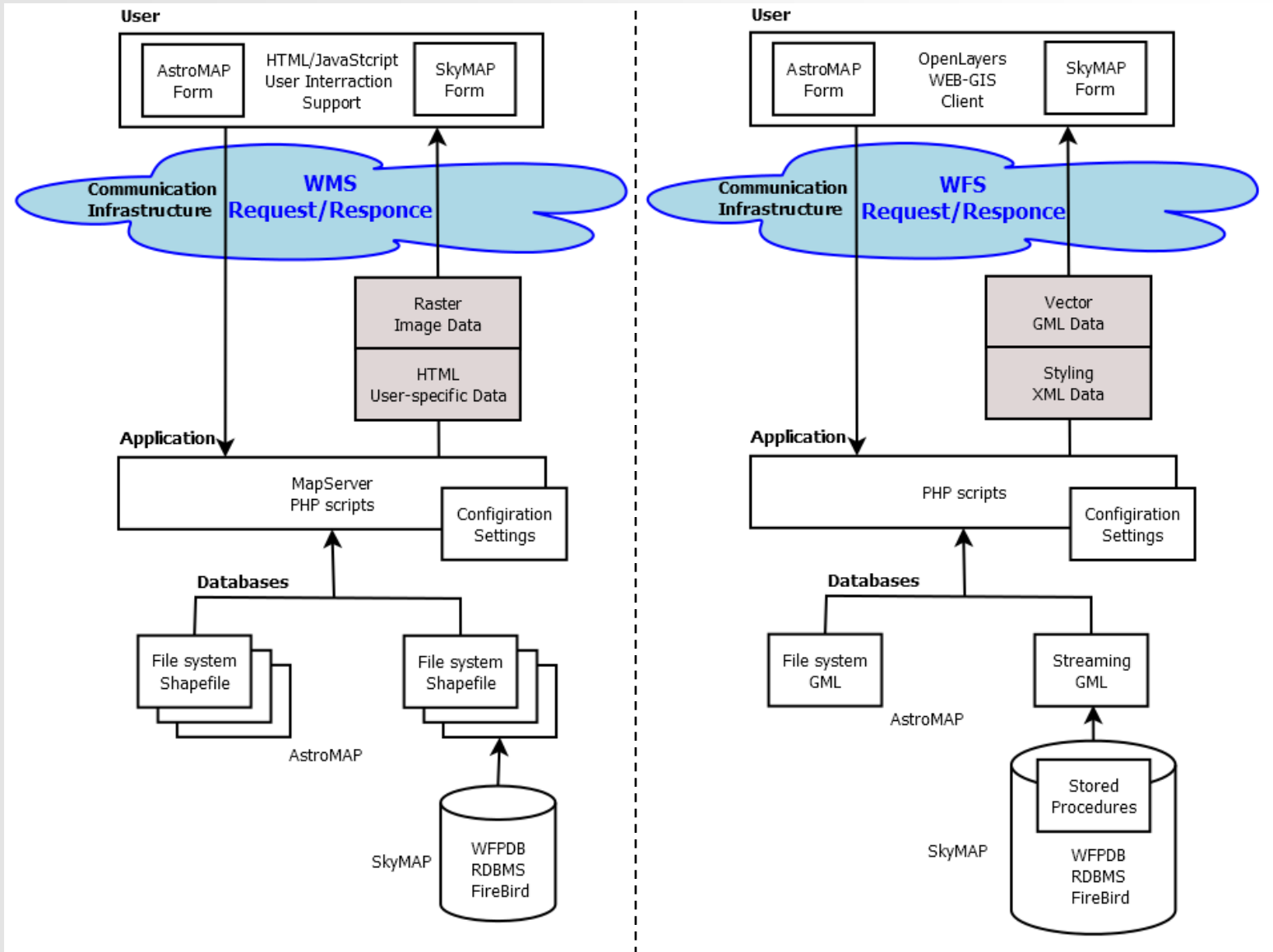
World Map of the  
Astronomical  
Observatories



**AstroMAP**

Two main forms are based on the one of most commonly used WMS protocol.

# WEB-GIS dataflow



Current realization

Future possibility realization

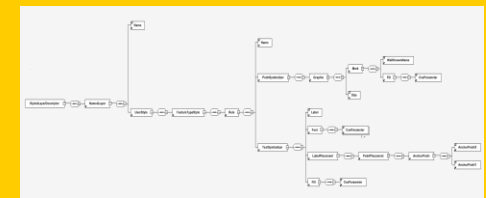
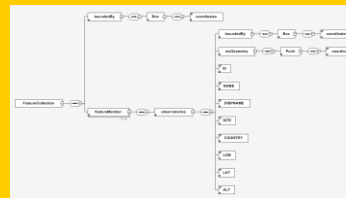
# Web Feature Service, Geographic Markup Language and Styled Layer Descriptor in AstroWeb Virtual Observatory

```
<?xml version='1.0' encoding='ISO-8859-1' ?>
<wfs:FeatureCollection
  xmlns:ms="http://mapserver.gis.umn.edu/mapserver"
  xmlns:wfs="http://www.opengis.net/wfs"
  xmlns:gml="http://www.opengis.net/gml"
  xmlns:ogc="http://www.opengis.net/ogc"
  xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xsi:schemaLocation="http://www.w3.org/2001/XMLSchema-instance
    http://schemas.opengis.net/wfs/1.0.0/WFS
    http://mapserver.gis.umn.edu/mapserver http://localhost/cgi-bin/map

  <gml:boundedBy>
    <gml:Box srsName="EPSG:4326">
      <gml:coordinates>-115.136665,-31.273333 149.070007,60.416668</gml:coordinates>
    </gml:Box>
  </gml:boundedBy>
  <gml:featureMember>
    <ms:observatories fid="observatories.3">
      <gml:boundedBy>
        <gml:Box srsName="EPSG:4326">
          <gml:coordinates>11.528334,45.861668 11.528334,45.861668</gml:coordinates>
        </gml:Box>
      </gml:boundedBy>
      <ms:msGeometry>
        <gml:Point srsName="EPSG:4326">
          <gml:coordinates>11.528334,45.861668</gml:coordinates>
        </gml:Point>
      </ms:msGeometry>
      <ms:ID>3</ms:ID>
      <ms:NAME>Asiago obs.</ms:NAME>
      <ms:DISPNAME</ms:DISPNAME>
      <ms:SITE>Asiago</ms:SITE>
      <ms:COUNTRY>Italy</ms:COUNTRY>
      <ms:LONG>11.52833366394</ms:LONG>
      <ms:LAT>45.861667633057</ms:LAT>
      <ms:ALT>1045</ms:ALT>
    </ms:observatories>
  </gml:featureMember>

```

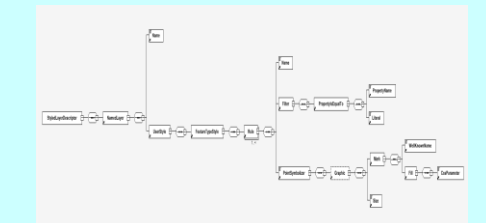
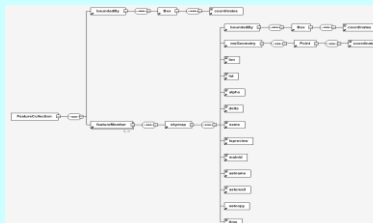
## AstroMAP



Features data-GML

Styling data-SLD

## SkyMAP



Features data-GML

Styling data-SLD

Sample of a XML coded geographic feature data





# Conclusion

Open Geospatial Consortium offers few WEB-GIS standards, very suitable in Astroinformatic`s AstroWEB Virtual Observatory software.

The current working realization stays on a well-known WMS standard.

Another, more complicated to application WFS standard, estimates more reliability and shorter response times, may be preferred by end users.

The project is a good starting point to in-depth produce a scientific research of this two protocols effectiveness

# Resources

1. Open Geospatial Consortium (OGC) and Web Services (WMS, WFS), [http://www.e-cartouche.ch/content\\_reg/cartouche/webservice/en/html/index.html](http://www.e-cartouche.ch/content_reg/cartouche/webservice/en/html/index.html) , accessed may 2014 ;
2. OGC® Standards and Supporting Documents, <http://www.opengeospatial.org/standards>, accessed may 2014.



**Thank You for the Attention!**