

A free, efficient and distributed web-based Geographic Information System Architecture for French Polynesia islands mapping.

PATRICK CAPOLSINI - « TERRE-OCÉAN LABORATORY », UNIVERSITY OF FRENCH POLYNESIA,
TAHITI, FRENCH POLYNESIA

Corresponding : patrick.capolsini@upf.pf, tel: (689) 80 38 78, Fax: (689) 80 38 04

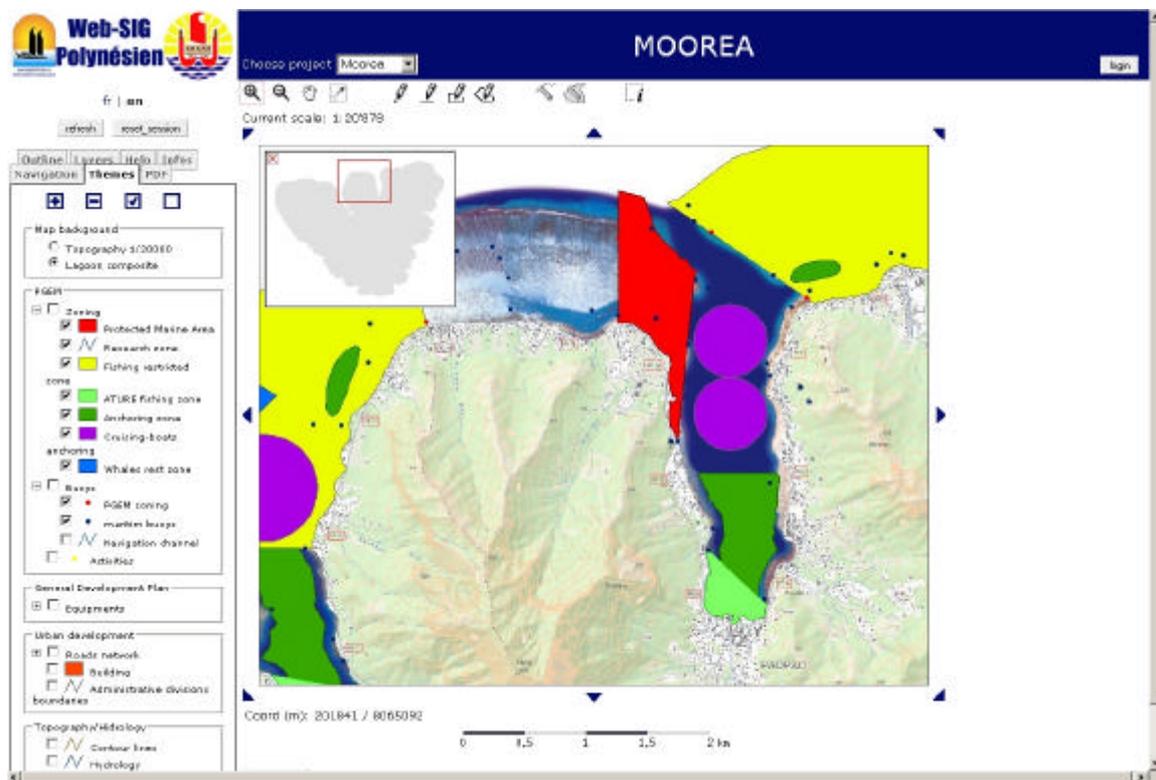
Abstract

During the last decade, the amount and complexity of geographic data has increased exponentially. Geographic Information Systems (GIS) software was developed and this technology is now fully operational. While these GIS were growing up, also grew the Internet and the needs for consultation and exchange of geographic data by using an interface as simple as a web browser. By the same time and to ensure inter-operable and distributed GIS systems over the Internet, the Open Geospatial Consortium (OGC) committee, has published recommendations concerning Geographic Data-bases and data exchange protocols such as the Web Map Service (WMS), Web Features Service (WFS) or Web Coverage Service (WCS) protocols as well as an implementation of XML called GML for Geographic Markup Language.

The present paper presents the distributed and normalized (ISO/OGC recommendations) software architecture we have settled to achieve a web-based access to geographic data concerning French Polynesia islands. The heart of our Web-based GIS platform is the free, well-known and efficient “University of Minnesota MapServer” engine (<http://mapserver.gis.umn.edu>) for the delivery of maps using common gateway interface (cgi) requests. UMN MapServer implements the OGC/ISO WMS and WFS protocols in order to ensure the international inter-operability of the platform. The Web interface has been developed using the toolkit called CartoWeb 3 developed by CampToCamp SA. CartoWeb 3 is a comprehensive and ready-to-parameter Web-GIS as well as a convenient framework for building advanced and customized applications. It is based on the UMN MapServer engine and is released under the [GNU General Public License \(GPL\)](#). Written using innovative language PHP5, CartoWeb is highly modular and customizable thanks to its object-oriented architecture. It runs evenly on Windows or Unix-like platforms and may be set up as a SOAP Web Service enabling to have front-end server on one machine and data and map generation on another.

A study-case over a well-defined geographical area: Moorea island with a particular focus on the Moorea island PGEM (Maritime Space Management Plan) has been completely achieved and is now operational at the following URL: <http://webgis.upf.pf/>. It provides lots of functionalities such as: zoom in; zoom out; pan; overview key map; X/Y localization; choice of predefined scales; layers selection, hierarchy and re-ordering; layers interactive

transparency definition; measurement tools (distances and surfaces); outlining tools including symbols, lines, rectangles and polygons; data queries; PDF files customized generation; pre-defined views storage and loading; ... The Web interface is fully bilingual (French and English) and other languages may be easily added. A login/logout mechanism is available allowing a very precise management of the rights for each user: views definition or layers selection for example. Our Web-GIS platform uses native ESRI ArcGIS® shape-files so that GIS specialists can go on working with their preferred tools and no file-conversion is required. Data may also be stored and retrieved within any geographic database system and our Web-GIS platform shows its real power when associated to the GPL-licensed PostgreSQL database and its geographic extension PostGIS. The interaction with other WMS servers over the Internet has been implemented and tested since we provide the access to some layers hosted on a University of Berkeley ESRI ArcIMS® server. Last but not least, our platform may be accessed as a WMS/WFS server by any WMS/WFS compliant software. The following screen snapshot gives a first look at the final interface.



Key words: Geographic Information System, Internet, WMS and WFS protocols, web-based GIS, geographic databases