



Sistemas de Informação Geográfica

Tutorial WebSIG

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PORUGAL

Tutorial WebSIG - Relembrar informação base

■ Termos e Conceitos

<https://libguides.colorado.edu/gis/terms>

libguides.colorado.edu/gis/terms



GIS (Geographic Information Systems): Terms & Concepts

[Home](#) [Starting Out & Getting Help](#) [Terms & Concepts](#) [GIS Websites & Books](#) [Apps & Software](#) [ArcGIS Access](#) [Feedback](#)

Glossaries & More

Need to know what raster data is? Did someone say "Horizontal geodetic datum?"

Check out Esri's comprehensive [GIS Dictionary](#)! For exploring GIS research in depth, see the [GIS Bibliography](#), a massive index of GIS research.

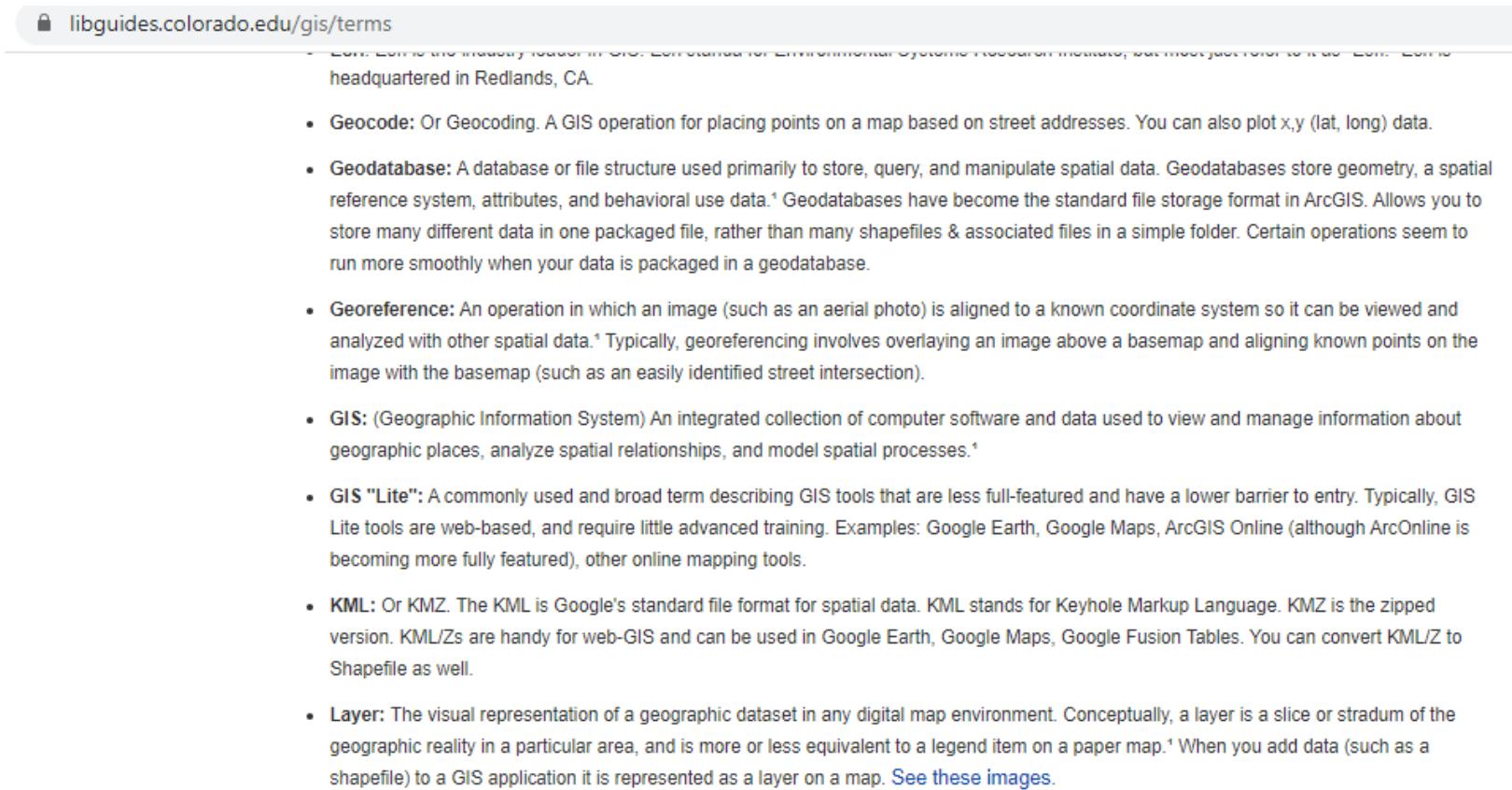
Terms and Concepts

- **ArcGIS:** ArcGIS is a suite of GIS applications designed and licensed by Esri. ArcGIS for desktop includes the applications ArcMap, ArcCatalog, ArcScene, and ArcGlobe.
- **ArcGIS Online:** Esri's online GIS tool. Great for creating web-maps and sharing them with others. Has ready-made apps that you can use to feature your web-maps. Does not have the same capabilities of ArcMap or Pro, but seems to gain functionality all the time.
- **ArcGIS Pro:** A new addition to Esri's desktop GIS offerings. Pro is kind of a step between ArcMap and ArcGIS Online. Much of the functionality of ArcMap has been carried into ArcGIS Pro.
- **ArcMap:** The primary GIS application available in the ArcGIS software suite by Esri. ArcMap is the go to software for GIS professionals, though the line between ArcMap and ArcGIS Pro is getting fuzzier.
- **Coordinate System:** A reference framework consisting of a set of points, lines, and/or surfaces, and a set of rules, used to define the positions of points in space in either two or three dimensions. Cartesian coordinate system and the geographic coordinate system used on the earth's surface are common examples of coordinate systems.¹
- **Datum:** The reference specifications of a measurement system, usually a system of coordinate positions on a surface (a horizontal datum) or heights above or below a surface (a vertical datum).¹
- **DEM:** Digital Elevation Model. The representation of continuous elevation values over a topographic surface by a regular array of z-values, referenced to a common datum. DEMs are typically used to represent terrain relief.¹
- **Esri:** Esri is the industry leader in GIS. Esri stands for Environmental Systems Research Institute, but most just refer to it as "Esri." Esri is headquartered in Redlands, CA.

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■ Termos e Conceitos

<https://libguides.colorado.edu/gis/terms>



The screenshot shows a web browser window with the URL libguides.colorado.edu/gis/terms in the address bar. The page content is a list of GIS terms:

- **Geocode:** Or Geocoding. A GIS operation for placing points on a map based on street addresses. You can also plot x,y (lat, long) data.
- **Geodatabase:** A database or file structure used primarily to store, query, and manipulate spatial data. Geodatabases store geometry, a spatial reference system, attributes, and behavioral use data.¹ Geodatabases have become the standard file storage format in ArcGIS. Allows you to store many different data in one packaged file, rather than many shapefiles & associated files in a simple folder. Certain operations seem to run more smoothly when your data is packaged in a geodatabase.
- **Georeference:** An operation in which an image (such as an aerial photo) is aligned to a known coordinate system so it can be viewed and analyzed with other spatial data.¹ Typically, georeferencing involves overlaying an image above a basemap and aligning known points on the image with the basemap (such as an easily identified street intersection).
- **GIS:** (Geographic Information System) An integrated collection of computer software and data used to view and manage information about geographic places, analyze spatial relationships, and model spatial processes.¹
- **GIS "Lite":** A commonly used and broad term describing GIS tools that are less full-featured and have a lower barrier to entry. Typically, GIS Lite tools are web-based, and require little advanced training. Examples: Google Earth, Google Maps, ArcGIS Online (although ArcOnline is becoming more fully featured), other online mapping tools.
- **KML:** Or KMZ. The KML is Google's standard file format for spatial data. KML stands for Keyhole Markup Language. KMZ is the zipped version. KML/Zs are handy for web-GIS and can be used in Google Earth, Google Maps, Google Fusion Tables. You can convert KML/Z to Shapefile as well.
- **Layer:** The visual representation of a geographic dataset in any digital map environment. Conceptually, a layer is a slice or stratum of the geographic reality in a particular area, and is more or less equivalent to a legend item on a paper map.¹ When you add data (such as a shapefile) to a GIS application it is represented as a layer on a map. [See these images](#).

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- **Map Document:** Or .mxd file. The filetype for saving your workspace in ArcMap. My friend Mark Thomas says it best: *"Sort of a bookmark file, which tells the program which layers and tables are being used for the particular map and how they are being symbolized. All the files referred to that are being used to build the layers and store the data must be accessible."*
- **Projection:** A method by which the curved surface of the earth is portrayed on a flat surface. Every map projection distorts distance, area, shape, direction, or some combination thereof.¹
- **QGIS:** A free and open-source (and fully featured) GIS platform. An alternative to ArcGIS. Also works on Macs.
- **Raster Data:** A spatial data model that defines space as an array of equally sized cells arranged in rows and columns.¹ Think of these cells as pixels.
- **Shapefile:** Or .shp. This is the most common filetype for geographic or spatial data, and is the most frequently used filetype in ArcGIS. Shapefiles come to you as points (placemarks, cities), lines (roads, rivers), or polygons (state boundaries, counties, zones). Free available shapefiles of all sorts of stuff are freely available on the web.
- **Topology:** The spatial relationships between connecting or adjacent features in a geographic data layer (for example, arcs, nodes, polygons, and points). Topological relationships are used for spatial modeling operations that do not require coordinate information.¹ Think of it as the relationships between things that are adjacent or connected to one another.
- **Topography:** The study and mapping of land surfaces, including relief (relative positions and elevations) and the position of natural and constructed features.¹ USGS Topo Maps are a prime example.
- **Vector Data:** A coordinate-based data model that represents geographic features as points, lines, and polygons.¹

¹ Wade, T., & Sommer, S. (2006). *A to Z GIS: An illustrated dictionary of geographic information systems*. Redlands, Calif: ESRI Press.

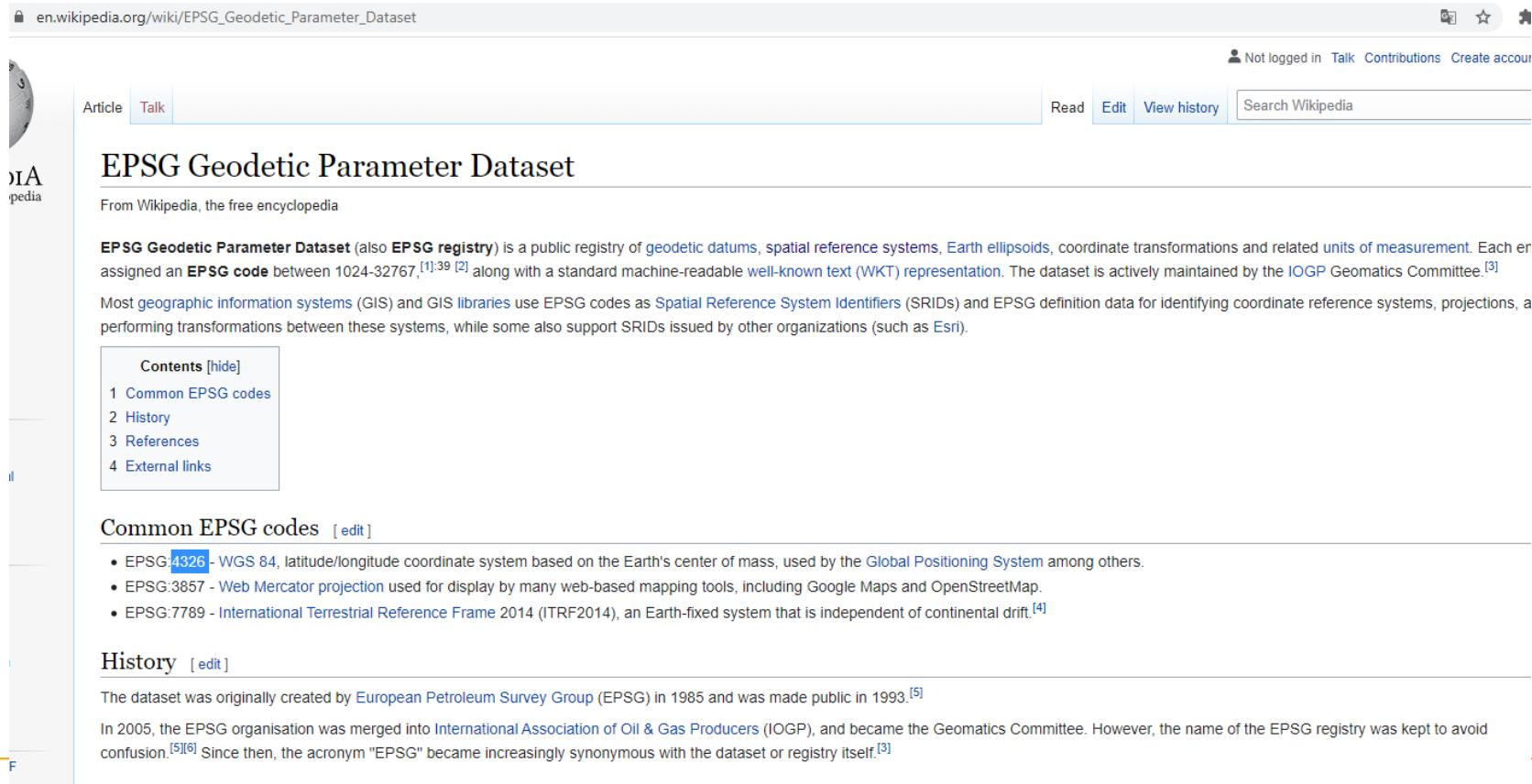
*Note: Much of this content is based on a guide I also created at my previous institution.

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Spatial Reference Systems Identifiers (SIRD)

https://en.wikipedia.org/wiki/EPSG_Geodetic_Parameter_Dataset

STSRid is an integer representing the spatial reference identifier of the instance.



The screenshot shows the Wikipedia article page for "EPSG Geodetic Parameter Dataset". The page title is "EPSG Geodetic Parameter Dataset". The top navigation bar includes links for "Article", "Talk", "Read", "Edit", "View history", and "Search Wikipedia". A sidebar on the left contains a "Contents [hide]" section with links to "Common EPSG codes", "History", "References", and "External links". The main content area starts with a brief introduction about the dataset being a public registry of geodetic datums, spatial reference systems, Earth ellipsoids, coordinate transformations, and units of measurement. It mentions that each entry has an assigned EPSG code between 1024-32767, along with a WKT representation, and is maintained by the IOGP Geomatics Committee. The text also notes that most GIS systems use EPSG codes for identifying coordinate reference systems, projections, and performing transformations. Below this, there are sections for "Common EPSG codes" (listing EPSG:4326, EPSG:3857, and EPSG:7789), "History" (mentioning its creation by the European Petroleum Survey Group in 1985 and its merger with IOGP in 2005), and "References".

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■ WGS84b

<https://epsg.io/4326>

EPSG:4326

WGS 84 -- WGS84 - World Geodetic System 1984,
used in GPS

Transform

Get position on a map

Share on:



Attributes

Unit: degree (supplier to define representation)

Geodetic CRS: [WGS 84](#)

Datum: World Geodetic System 1984

Ellipsoid: WGS 84

Prime meridian: Greenwich

Data source: OGP

Information source: EPSG. See 3D CRS for original
information source.

Revision date: 2007-08-27

Scope: Horizontal component of 3D system. Used by the
GPS satellite navigation system and for NATO military
geodetic surveying.

Area of use: World.

Coordinate system: Ellipsoidal 2D CS. Axes: latitude,
longitude. Orientations: north, east. UoM: degree

Covered area powered by MapTiler 



Center coordinates

0.00000000 0.00000000

WGS84 bounds:

-180.0 -90.0

180.0 90.0

World.

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■ Tabela Spatial_Ref_SYS

https://en.wikipedia.org/wiki/Spatial_reference_system

en.wikipedia.org/wiki/Spatial_reference_system

- United States National Grid

Identifiers [edit]

A **Spatial Reference System Identifier (SRID)** is a unique value used to unambiguously identify projected, unprojected, and local spatial coordinate system definitions. These coordinate systems form the heart of all GIS applications.

Virtually all major spatial vendors have created their own SRID implementation or refer to those of an authority, such as the EPSG Geodetic Parameter Dataset.

SRIDs are the primary key for the Open Geospatial Consortium (OGC) **spatial_ref_sys** metadata table for the Simple Features for SQL Specification, Versions 1.1 and 1.2, which is defined as follows:

```
CREATE TABLE SPATIAL_REF_SYS
(
    SRID      INTEGER      NOT NULL PRIMARY KEY,
    AUTH_NAME CHARACTER VARYING(256),
    AUTH_SRID INTEGER,
    SRTEXT    CHARACTER VARYING(2048)
)
```

In spatially enabled databases (such as IBM DB2, IBM Informix, Ingres, Microsoft SQL Server, MySQL, Oracle RDBMS, Teradata, PostGIS, SQL Anywhere and Vertica), SRIDs are used to uniquely identify the coordinate systems used to define columns of spatial data or individual spatial objects in a spatial column (depending on the spatial implementation). SRIDs are typically associated with a [well-known text \(WKT\)](#) string definition of the coordinate system (SRTEXT, above). Here are two common coordinate systems with their EPSG SRID value followed by their WKT:

WGS84 — SRID 4326

```
GEOGCS["WGS_84",
  DATUM["WGS_1984",
    SPHEROID["WGS_84",6378137,298.257223563,
      AUTHORITY["EPSG","7030"]],
    AUTHORITY["EPSG","6326"]],
  PRIMEM["Greenwich",0,
    AUTHORITY["EPSG","8901"]],
  UNIT["degree",0.01745329251994328,
    AUTHORITY["EPSG","9122"]],
  AUTHORITY["EPSG","4326"]]
```

SRID values associated with spatial data can be used to constrain spatial operations — for instance, spatial operations cannot be performed between spatial objects with differing SRIDs in some systems, or trigger coordinate system transformations between spatial objects in others.

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XML Files for Geographic Information

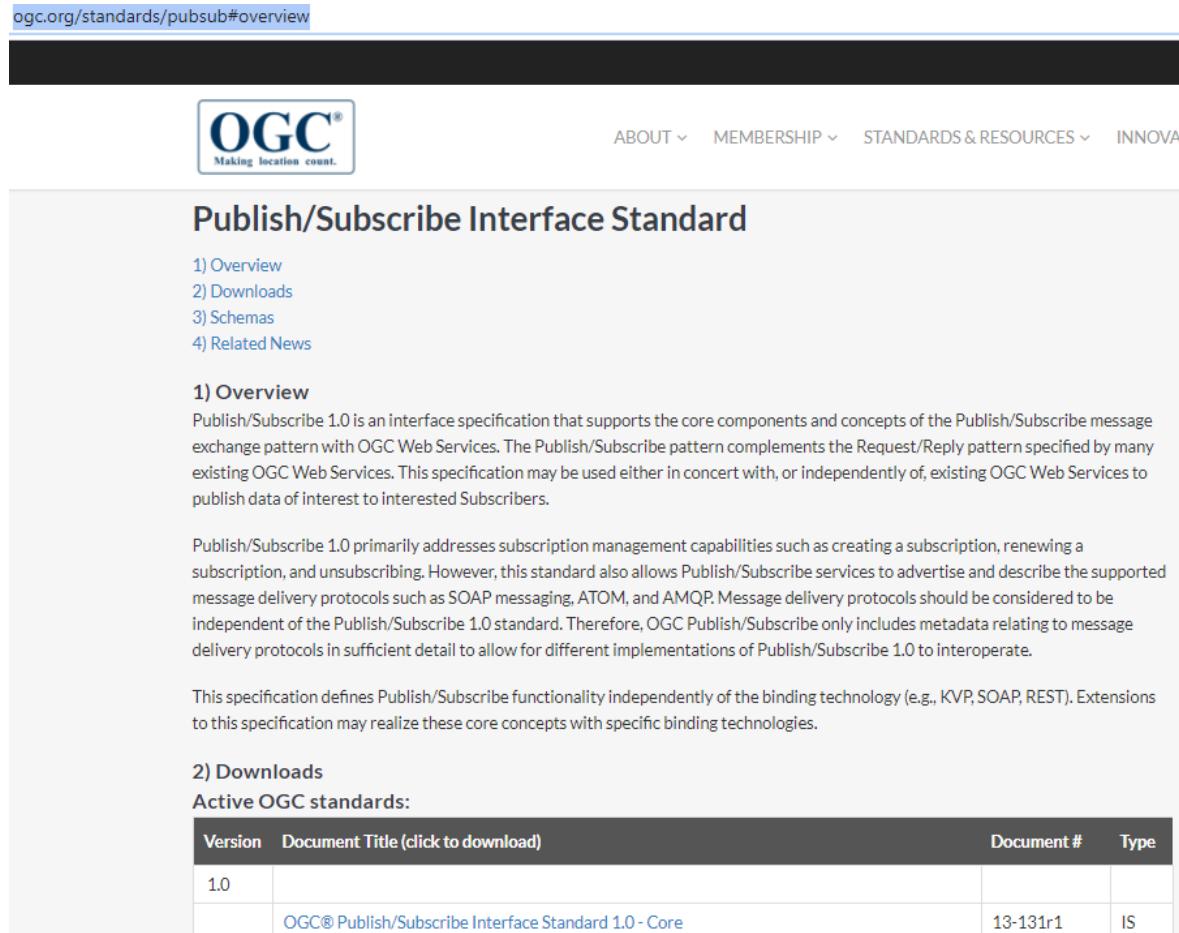


<https://www.spatialpost.com/list-common-gis-file-format/>

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■ Standards OGC para a publicação de informação geográfica na Web

<https://www.opengeospatial.org/standards/publishsubscribe#overview>



The screenshot shows the homepage of the OGC website for the Publish/Subscribe Interface Standard. The URL 'ogc.org/standards/publishsubscribe#overview' is visible in the address bar. The page features the OGC logo ('Making location count.') and navigation links for 'ABOUT', 'MEMBERSHIP', 'STANDARDS & RESOURCES', and 'INNOVATION'. The main content area is titled 'Publish/Subscribe Interface Standard' and includes sections for '1) Overview', '2) Downloads', '3) Schemas', and '4) Related News'. The '1) Overview' section provides a detailed description of the standard, mentioning its role in supporting message exchange patterns and its compatibility with existing OGC Web Services. It also discusses the supported message delivery protocols like SOAP, ATOM, and AMQP. The '2) Downloads' section lists the 'Active OGC standards' table, which shows version 1.0 of the 'OGC® Publish/Subscribe Interface Standard 1.0 - Core' document, which is a Type IS document.

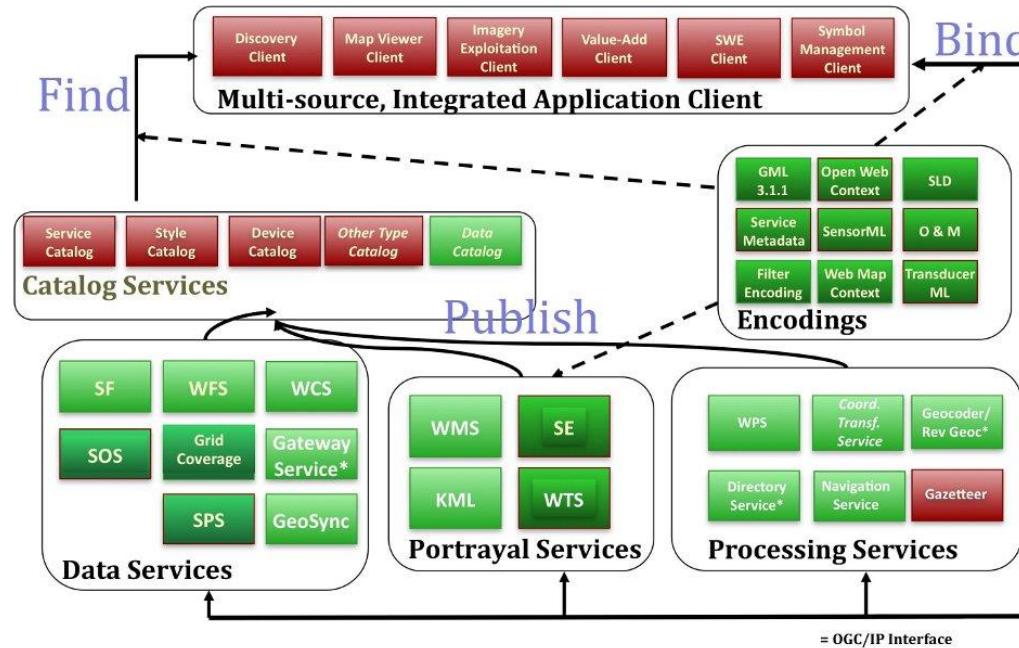
Version	Document Title (click to download)	Document #	Type
1.0	OGC® Publish/Subscribe Interface Standard 1.0 - Core	13-131r1	IS

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■ Standards OGC para a publicação de informação geográfica na Web

<https://live.osgeo.org/archive/10.5/en/standards/standards.html>

Web Services Framework Of OGC Geoprocessing Standards

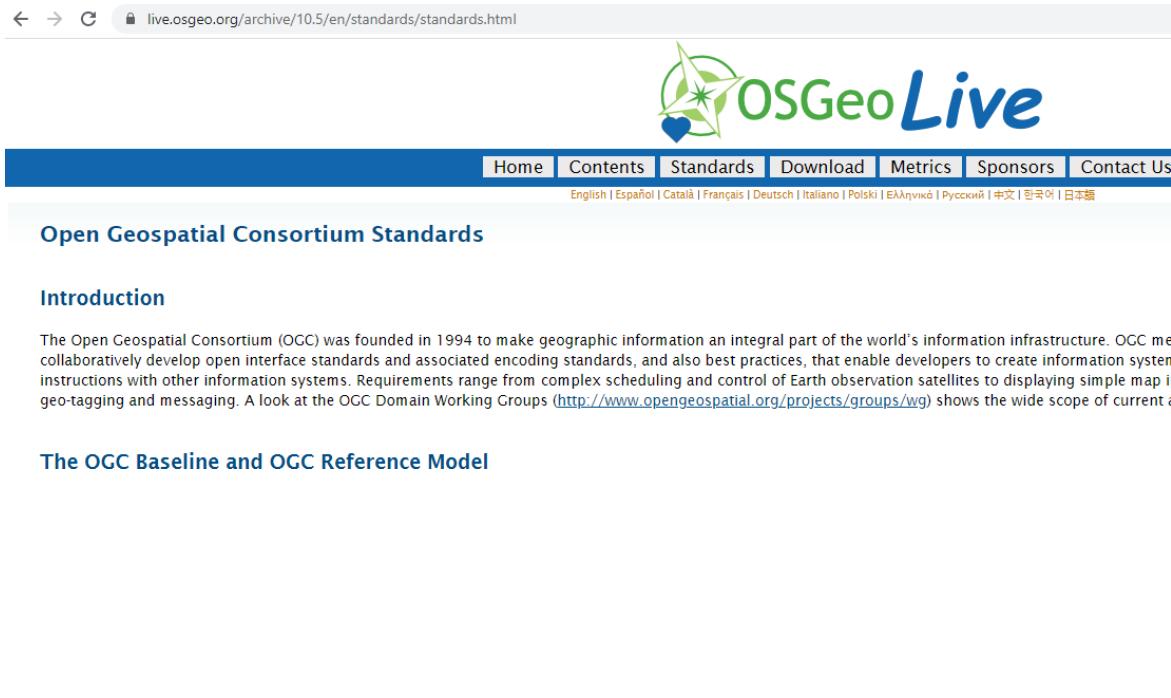


3

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■ Standards OGC para a publicação de informação geográfica na Web

<https://live.osgeo.org/archive/10.5/en/standards/standards.html>



The screenshot shows the 'Open Geospatial Consortium Standards' page. At the top, there's a navigation bar with links for Home, Contents, Standards, Download, Metrics, Sponsors, and Contact Us. Below the navigation bar, there's a language selection bar with links for English, Español, Català, Français, Deutsch, Italiano, Polski, Ελληνικά, Русский, 中文, 한국어, and 日本語. The main content area features the OSGeoLive logo and several sections: 'Introduction' (describing the OGC's mission), 'The OGC Baseline and OGC Reference Model' (linking to the OGC Baseline document), and a large list of OGC standards.

- [Catalogue Service for the Web \(CSW\)](#)
- [Filter Encoding \(FE\)](#)
- [Geography Markup Language \(GML\)](#)
- [KML Encoding Standard \(KML\)](#)
- [Sensor Model Language \(SensorML\)](#)
- [Style Layer Descriptor \(SLD\)](#)
- [Sensor Observation Service \(SOS\)](#)
- [Web Coverage Service \(WCS\)](#)
- [Web Feature Service \(WFS\)](#)
- [Web Map Service \(WMS\)](#)
- [Web Processing Service \(WPS\)](#)
- Sensor Planning Service (SPS)
- Web Terrain Service (WTS)
- Grid Coverage Service
- Coordinate Transformation Service
- Web Coverage Processing Service (WCPS)
- Web Map Tile Service (WMTS)
- Simple Features (SF)
- Sensor Web Enablement (SWE)
- XML for Image and Map Annotation (XIMA)
- CityGML
- GeosciML
- GML in JPEG 2000
- Observations and Measurements (O&M)
- Symbology Encoding
- Transducer Markup Language (TML)

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■ Servidores Cartográficos (servidores de mapas):

■ Open source servers:



■ Servidores de Mapas Proprietários:



ArcGIS



ORACLE®
Oracle Spatial and Mapviewer



GeoMedia®



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- Software OpenSource (standalone) para ver serviços de mapas:



<https://qgis.org/en/site/>



<http://www.gvsig.com/pt>



<https://www.openstreetmap.org/>



<https://www.bluemarblegeo.com/products/global-mapper.php>



<https://marble.kde.org/>



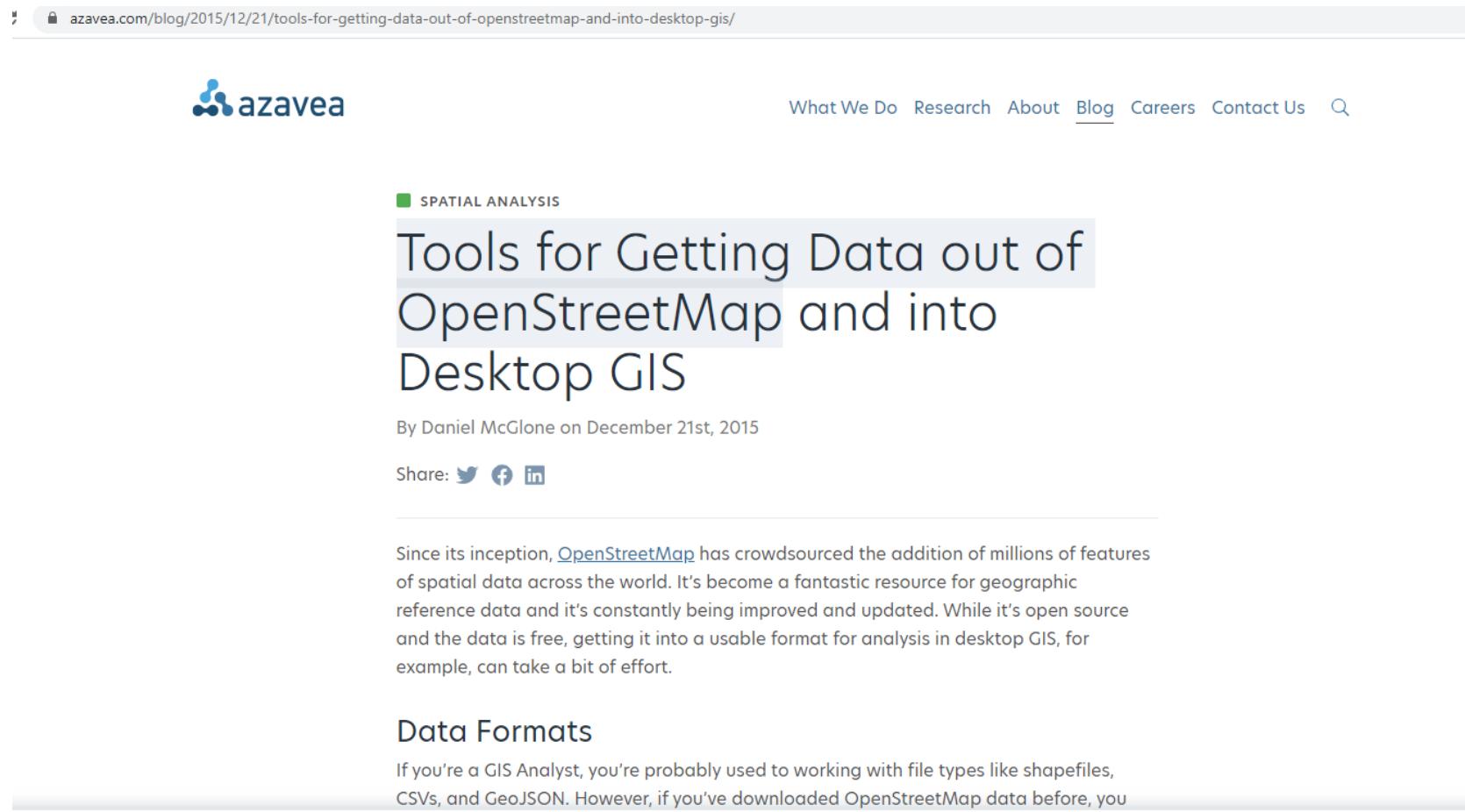
<http://udig.refractions.net/>



<http://www.openjump.org>

Tutorial WebSIG - Relembrar informação base

■ Ver mapas na WEB e exportar informação para KML, GML, ShapeFile, etc:



The screenshot shows a blog post from azavea.com. The header includes the Azavea logo and a navigation menu with links to 'What We Do', 'Research', 'About', 'Blog' (which is underlined), 'Careers', 'Contact Us', and a search icon. The main title of the post is 'Tools for Getting Data out of OpenStreetMap and into Desktop GIS', with a subtitle 'SPATIAL ANALYSIS'. Below the title, it says 'By Daniel McGlone on December 21st, 2015'. There are sharing icons for Twitter, Facebook, and LinkedIn. The post content discusses the challenges of working with OpenStreetMap data in desktop GIS environments due to its large size and complex structure. It mentions various tools and formats like shapefiles, CSVs, and GeoJSON. The footer contains a 'Data Formats' section and a note about GIS Analysts.

azavea.com/blog/2015/12/21/tools-for-getting-data-out-of-openstreetmap-and-into-desktop-gis/

 azavea

What We Do Research About Blog Careers Contact Us 

■ SPATIAL ANALYSIS

Tools for Getting Data out of OpenStreetMap and into Desktop GIS

By Daniel McGlone on December 21st, 2015

Share:   

Since its inception, [OpenStreetMap](#) has crowdsourced the addition of millions of features of spatial data across the world. It's become a fantastic resource for geographic reference data and it's constantly being improved and updated. While it's open source and the data is free, getting it into a usable format for analysis in desktop GIS, for example, can take a bit of effort.

Data Formats

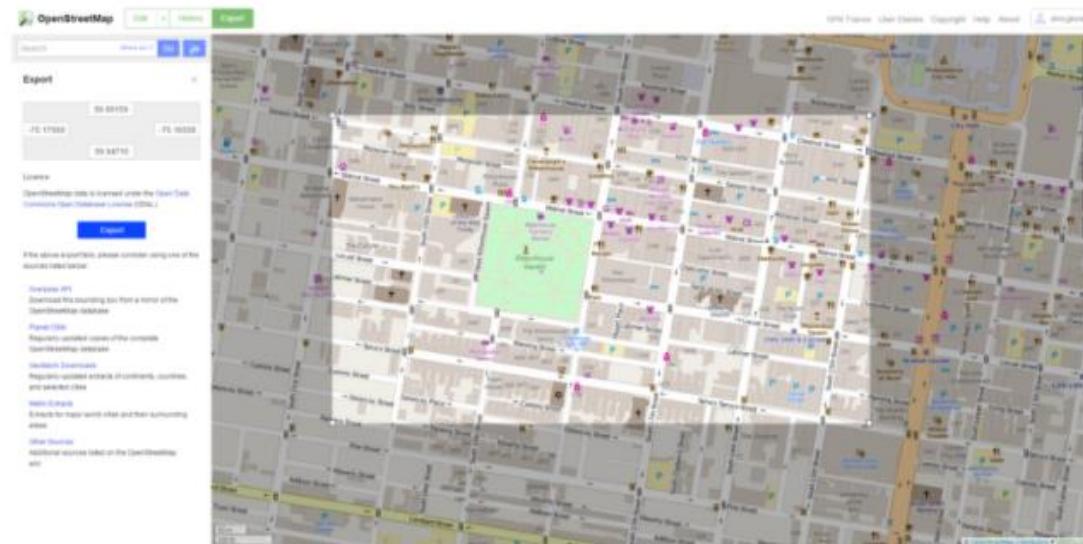
If you're a GIS Analyst, you're probably used to working with file types like shapefiles, CSVs, and GeoJSON. However, if you've downloaded OpenStreetMap data before, you

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■ Ver mapas na WEB e exportar informação para KML, GML, ShapeFile, etc:

Right in the web browser...

OpenStreetMap

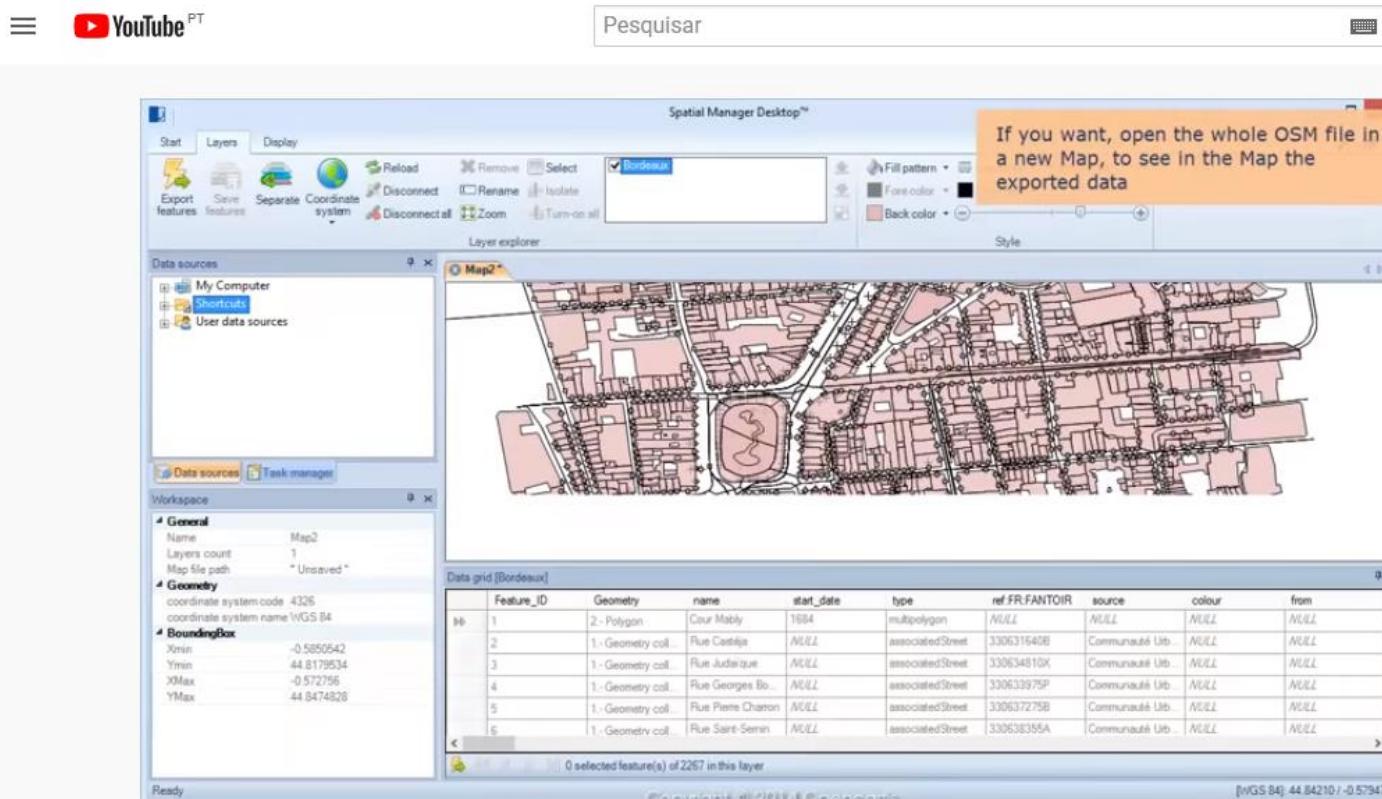


You can get OpenStreetMap directly from the web browser while viewing the data. To do so, click the Export button above the window. The export tab will open on the left side of your screen with the bounding box populated with the map coordinates you are currently zoomed to. This tool seemed to fail just about every time I tried it, with the exception of very small bounding boxes the size of only a few city blocks. However, below the Export button they provide some other ways to get the data, which I'll talk about later.

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■ Ver mapas na WEB e exportar informação para KML, GML, ShapeFile, etc:

[youtube.com/watch?v=jE_zYT3Od04&ab_channel=SpatialManager](https://www.youtube.com/watch?v=jE_zYT3Od04&ab_channel=SpatialManager)



The screenshot shows the Spatial Manager Desktop interface. The top menu bar includes 'Start', 'Layers', 'Display', 'Export features', 'Save features', 'Separate coordinate system', 'Reload', 'Remove', 'Select', 'Rename', 'Isolate', 'Disconnect all', 'Zoom', and 'Turn-on all'. A checked checkbox labeled 'Bordeaux' is in the 'Layer explorer' panel. The 'Data sources' panel shows 'My Computer' and 'User data sources'. The main workspace displays a map titled 'Map2' of Bordeaux, France, with a legend on the right. An orange callout box says: 'If you want, open the whole OSM file in a new Map, to see in the Map the exported data'. Below the map is a 'Data grid [Bordeaux]' table with the following data:

Feature_ID	Geometry	name	start_date	type	ref.FR.FANTOIR	source	color	from
1	2 - Polygon	Cour Mably	1684	multipolygon	NULL	NULL	NULL	NULL
2	1 - Geometry coll.	Rue Castaigne	NULL	associatedStreet	3306315408	Communauté Urb.	NULL	NULL
3	1 - Geometry coll.	Rue Judélique	NULL	associatedStreet	330634810X	Communauté Urb.	NULL	NULL
4	1 - Geometry coll.	Rue Georges Bo...	NULL	associatedStreet	330633975P	Communauté Urb.	NULL	NULL
5	1 - Geometry coll.	Rue Pierre Charon	NULL	associatedStreet	330637275B	Communauté Urb.	NULL	NULL
6	1 - Geometry coll.	Rue Saint-Sernin	NULL	associatedStreet	330638355A	Communauté Urb.	NULL	NULL

At the bottom, it says '0 selected feature(s) of 2267 in this layer', 'Copyright © 2014 OpenStreetMap', and coordinates '(WGS 84): 44.84210 / -0.57947'.

Below the video player, there is a caption: 'Convert OpenStreetMap data to Shapefiles (SHP) - Spatial Manager Blog'.

Below the caption, there are social media sharing options: '69.198 visualizações • 27 de abr. de 2014' (Views • April 27, 2014), '159', '6', 'COMPARTELHAR', 'SALVAR', and '...'.

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- Ver mapas na WEB e exportar informação para KML, GML, ShapeFile, etc:

<https://www.geemap.com/pt/militar-espana>

Centro de Informação Espacial do Exército

The screenshot shows a web-based map application. On the left, there is a vertical toolbar with icons for zooming in (+), zooming out (-), panning (crosshair), searching (magnifying glass), and file operations (refresh, save, etc.). The main area displays a map of the Iberian Peninsula and parts of North Africa and Europe. The map is densely labeled with place names in multiple languages. A large inset map in the center-left provides a detailed view of Spain. At the bottom of the page, there is a cookie consent banner in Spanish.

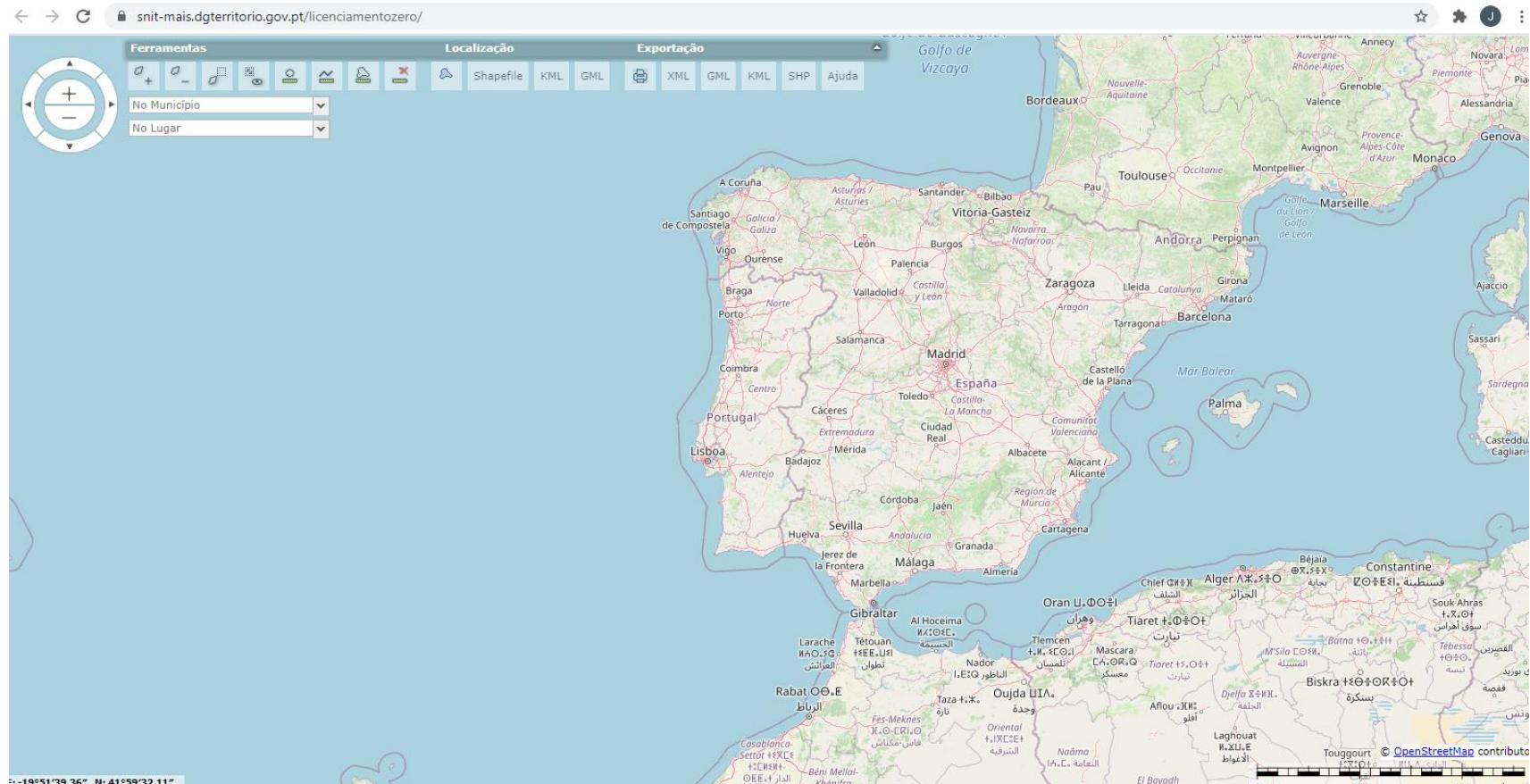
Este sitio web utiliza cookies para mejorar la funcionalidad, recopilar estadísticas anónimas de navegación e integrar contenido de otros servicios. Si continúa con la navegación entendemos que acepta su uso.

OK, acepto More info

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■ Ver mapas na WEB e exportar informação para KML, GML, ShapeFile, etc:

<https://snit-mais.dgterritorio.gov.pt/licenciamentozero/>



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■ Componentes de software – Visualizadores de Mapas na Web



<https://openlayers.org>



<https://www.mapbox.com/>



<https://developer.here.com/>



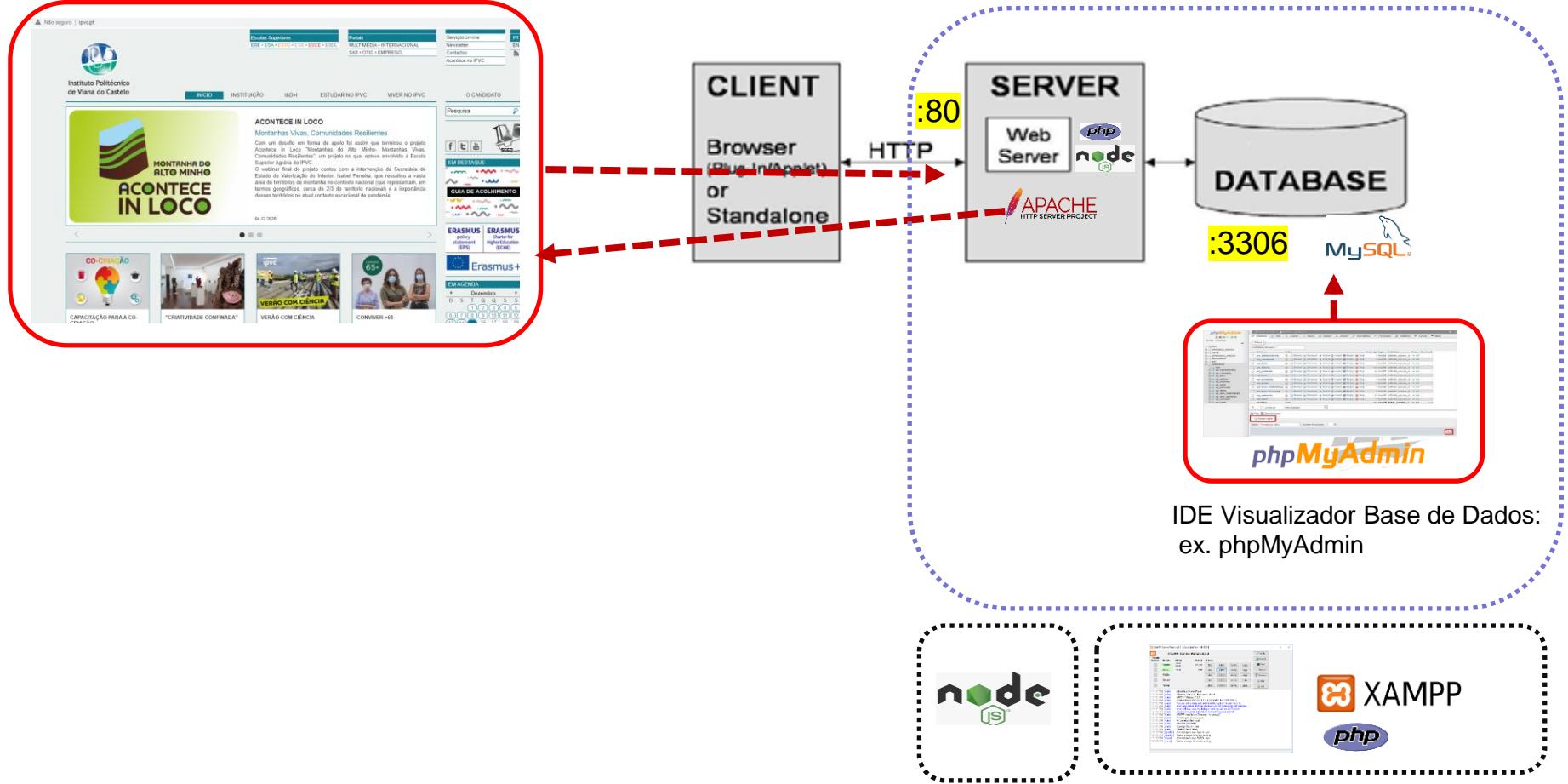
<https://developers.google.com/waze/iframe?hl=pt-br>



<https://leafletjs.com>

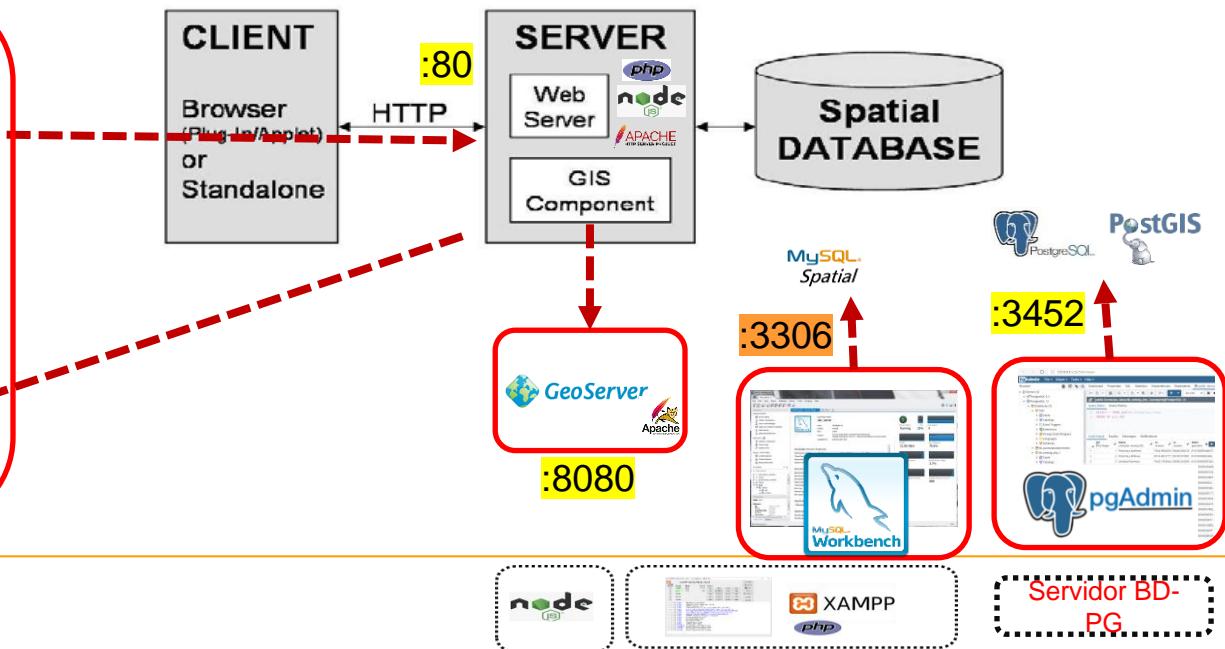
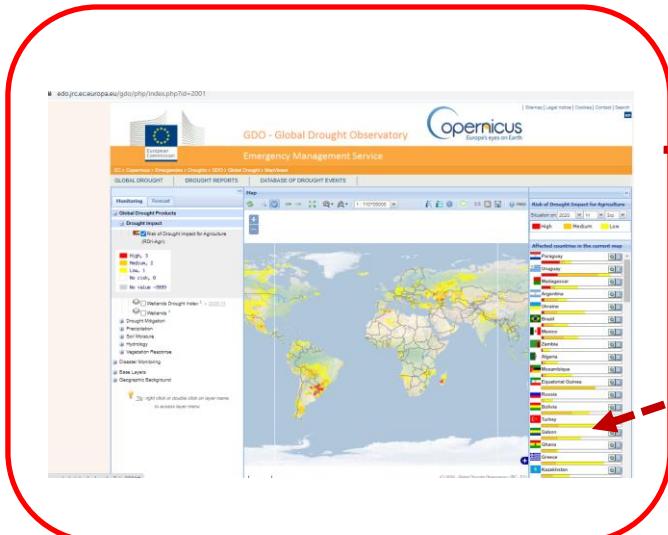
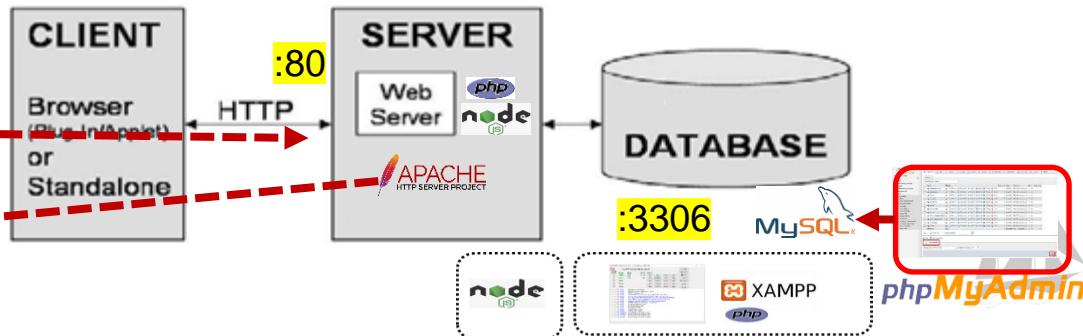
Tutorial WebSIG

■ Objetivo Geral: Arquitetura típica de uma plataforma WEB



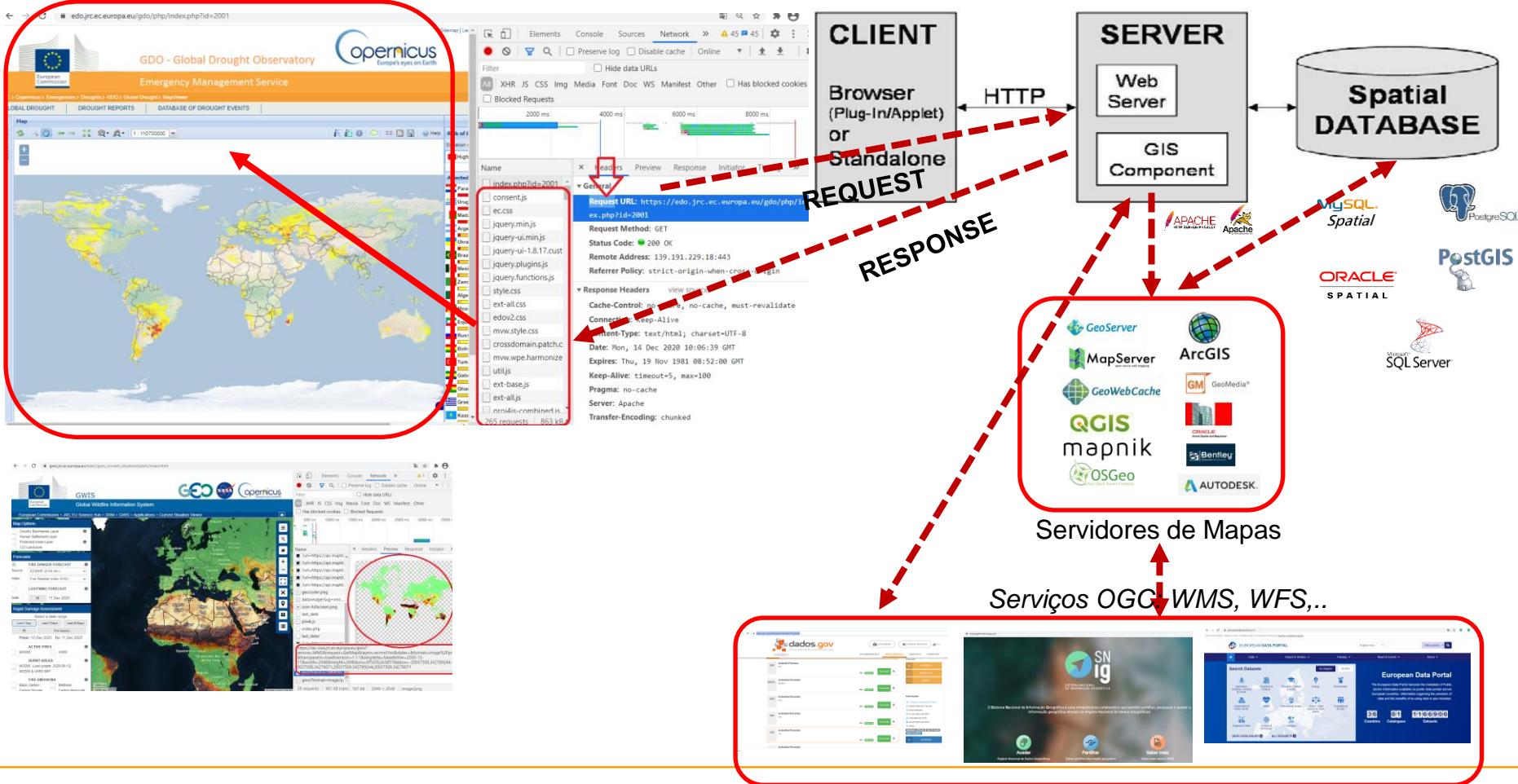
Tutorial WebSIG

■ Objetivo Geral: Preparar uma estrutura de servidores de suporte a um WebSIG



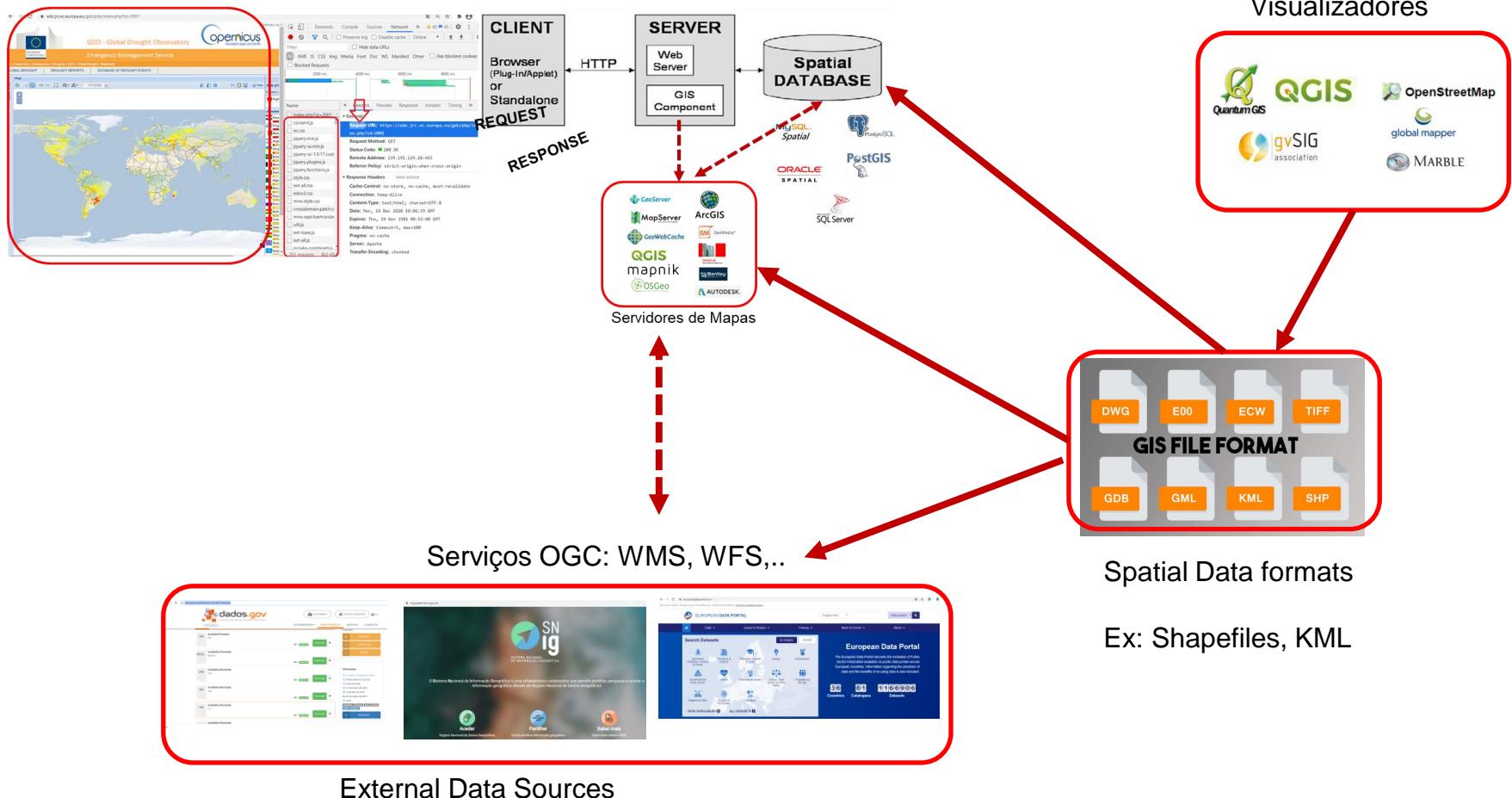
Tutorial WebSIG

■ Objetivo Geral: Estrutura de servidores de suporte a um WebSIG



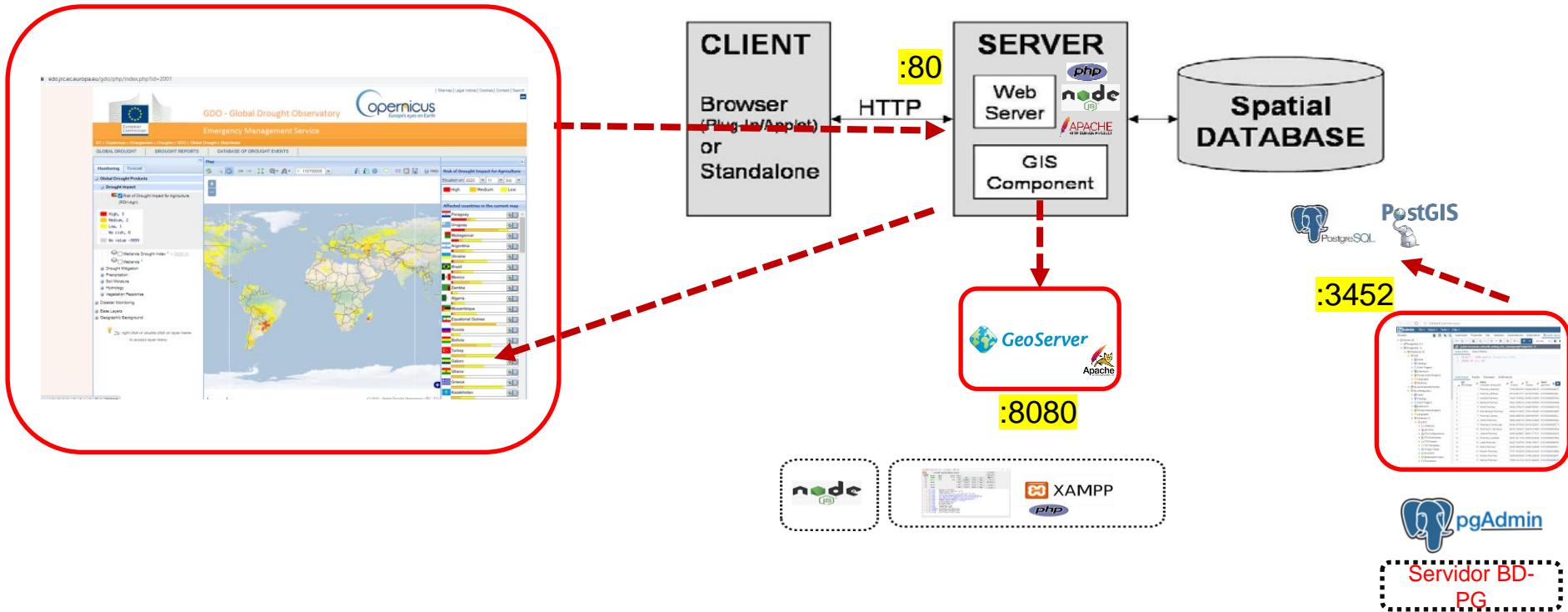
Tutorial WebSIG

■ Objetivo Geral: Estrutura de servidores de suporte a um WebSIG



Tutorial WebSIG

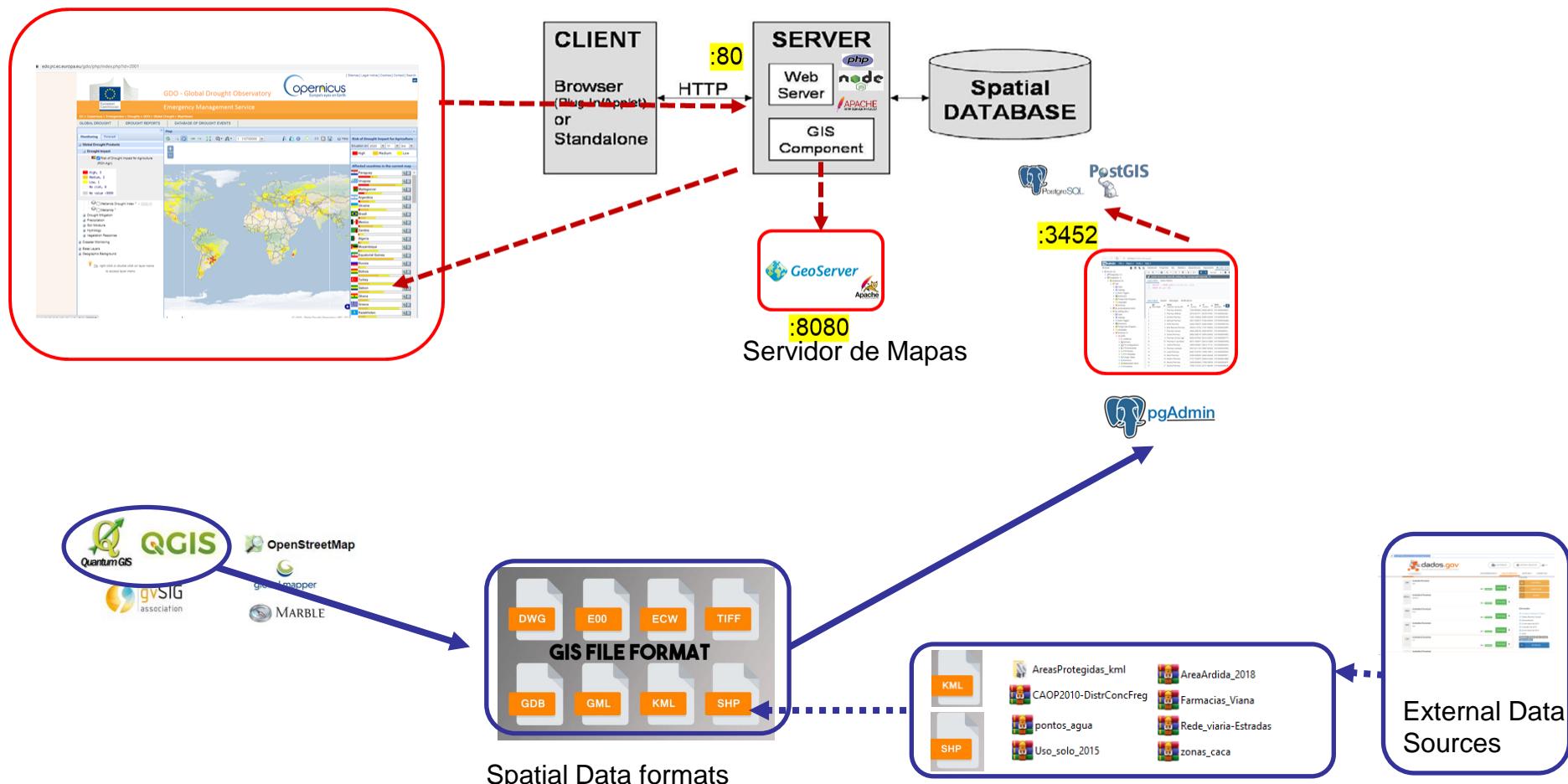
■ Objetivo Geral: Preparar a Estrutura de servidores de suporte a um WebSIG



NOTA: Neste cenário em vez da Base de Dados MySQL será utilizada a base de dados PostGrSQL

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■ Objetivo Geral: Preparar a Estrutura de servidores de suporte a um WebSIG



Tutorial WebSIG

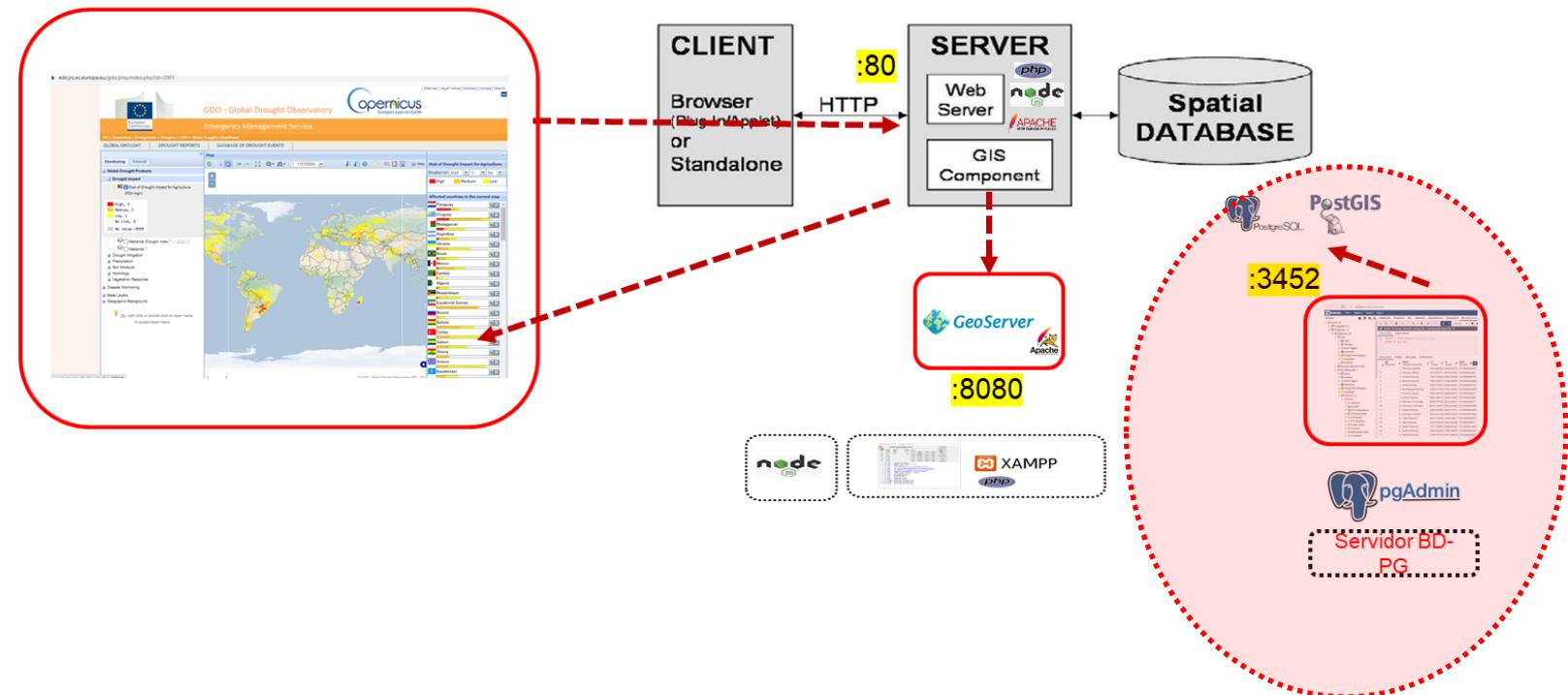
■ Objetivo Geral: Preparar a Estrutura de servidores de suporte a um WebSIG

- 1º Instalar a plataforma de base de dados geográfica PostgreSQL;
- 2º Importar as shapefiles para a base de dados e visualizar a informação geográfica;
- 3º Visualizar a informação das shapefiles no visualizador Quantum GIS (OPCIONAL);
- 4º Instalar o servidor de mapas Geoserver;
- 5º Interligar o Geoserver com os dados geográficos da base de dados e criar os serviços WFS, WMS;
- 6º Utilizar um visualizador web (leaflet, mapbox, openlayers) para visualizar a informação geográfica, via Geoserver ou diretamente na base de dados geográfica;

Tutorial WebSIG

■ Objetivo Geral: Preparar a Estrutura de servidores de suporte a um WebSIG

1º Instalar a plataforma de base de dados geográfica PostgreSQL;



Tutorial WebSIG

■ Objetivo Geral: Preparar a Estrutura de servidores de suporte a um WebSIG

1º Instalar a plataforma de base de dados geográfica PostgreSQL;

Execute o Tutorial seguinte:



Conteúdo

Tema	1
Bibliografia Recomendada	1
1. Passos de instalação do Servidor de Bases de Dados com a componente Geográfica	2
2. Verificar e visualizar se a base de dados suporta informação geográfica	13

Tema

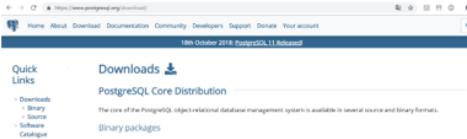
Contextualização, enquadramento e utilização de exemplos práticos associados à instalação de servidores de base de dados espacial de suporte a plataformas WEBSIG.



Bibliografia Recomendada

Para apoio a este tutorial os alunos devem consultar os apontamentos teóricos e práticos da disciplina bem como links associados a:

- Instalação do Servidor de Bases de Dados Espaciais - PostgreSQL + PostGIS:
<https://www.postgresql.org/download/>





1. Passos de instalação do Servidor de Bases de Dados com a componente Geográfica

PostgreSQL – Windows: <https://www.openscg.com/bigsql/postgresql/installers/>



Tutorial WebSIG

■ Objetivo Geral: Preparar a Estrutura de servidores de suporte a um WebSIG

1º Instalar a plataforma de base de dados geográfica PostgreSQL;

Execute o Tutorial seguinte:

 pgAdmin 4

The screenshot shows the pgAdmin 4 interface. On the left, the 'Browser' pane lists the database structure: Servers (1), Databases (3), Catalogs (2), Event Triggers, Extensions, Foreign Data Wrappers, Languages, Schemas (1), and Tables (1). Under 'Tables (1)', there is a 'tabela1' table with columns: ID, Name, and Geometry. A context menu is open over the 'Geometry' column, showing options like 'Create', 'Column...', 'Index', 'Refresh...', 'Rules', 'Query Tool...', 'Trigger Functions', 'Types', and 'Views'. The 'Database sessions' and 'Database activity' panes are also visible.

 Tutorial
Instalação de Servidores de suporte à WebSIG – Instalação da Base de Dados PostgreSQL (com a componente geográfica)

The screenshot shows a 'Tutorial' window titled 'Instalação de Servidores de suporte à WebSIG – Instalação da Base de Dados PostgreSQL (com a componente geográfica)'. It contains several screenshots of pgAdmin 4. One screenshot shows a SQL query being run: 'CREATE TABLE geometria AS SELECT * FROM geometries;'. Another screenshot shows the results of the query, displaying a single row with geometry data. A third screenshot shows the 'Geometry Viewer' tab where a blue polygon is displayed. A note at the bottom says: 'Neste momento a base de dados está preparada para receber dados geográficos.'

 Tutorial
Instalação de Servidores de suporte à WebSIG – Instalação da Base de Dados PostgreSQL (com a componente geográfica)

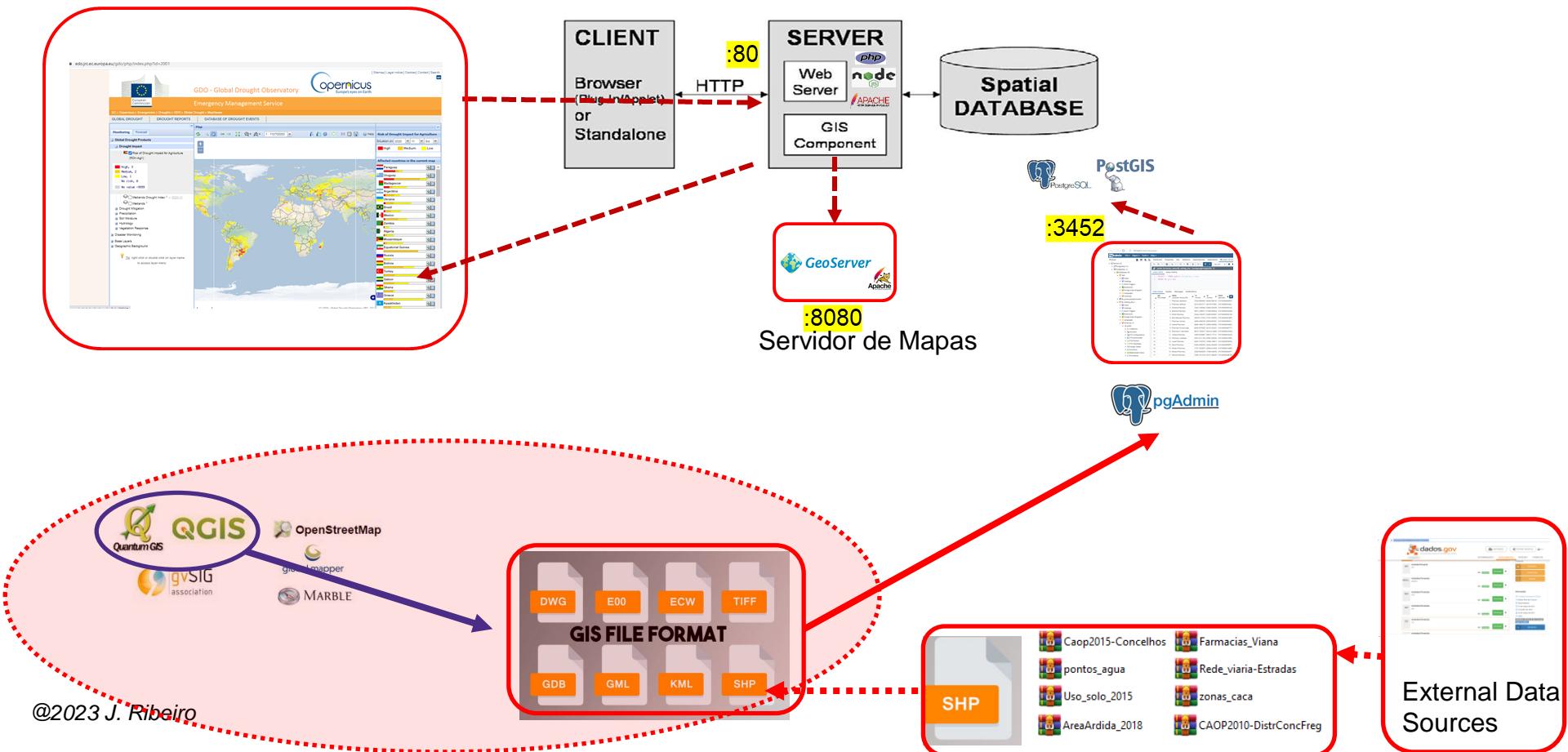
The screenshot shows a 'Tutorial' window titled 'Instalação de Servidores de suporte à WebSIG – Instalação da Base de Dados PostgreSQL (com a componente geográfica)'. It contains two screenshots of pgAdmin 4. The first screenshot shows a SQL query: 'SELECT name, ST_Area(geometry) FROM geometria;'. The second screenshot shows the results of the query, displaying a table with data for each geometry. A note at the bottom says: 'Se por exemplo importar informação geográfica em shapefile (ou outro formato) para uma tabela da base de dados (ex. a CAOP – Carta Administrativa Oficial de Portugal – "CAOP2015-DistrConcFreg.zip") poderá visualizar todos os concelhos:' followed by a screenshot of pgAdmin 4 showing a map of Portugal with numerous small blue shapes representing administrative units.

Tutorial WebSIG

■ Objetivo Geral: Preparar a Estrutura de servidores de suporte a um WebSIG

1º Instalar a plataforma de base de dados geográfica PostgreSQL;

2º Importar as shapefiles para a base de dados e visualizar a informação geográfica;



Tutorial WebSIG

■ Objetivo Geral: Preparar a Estrutura de servidores de suporte a um WebSIG

1º Instalar a plataforma de base de dados geográfica PostgreSQL;

2º Importar as shapefiles para a base de dados e visualizar a informação geográfica;

Execute o Tutorial seguinte:



Conteúdo

Tema	...
Bibliografia Recomendada	1
1. Criar a Base de Dados Geográfica e importar as Shapefiles	4
2. Importar Ficheiros KML	9
3. Visualizar a informação (em Mapas) através do PGAdmin	12

Tema

Download de Shapefiles e importação para a base de dados geográfica PosGreSQL;

Bibliografia Recomendada

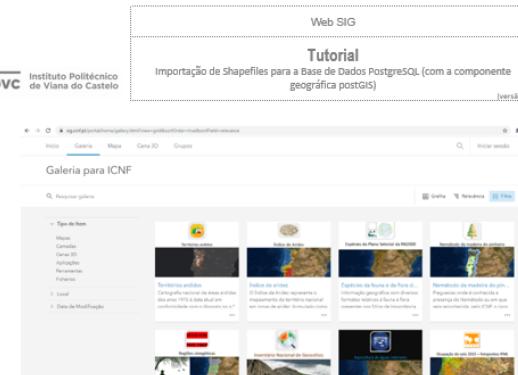
Para apoio a este tutorial os alunos devem consultar os apontamentos teóricos e práticos da disciplina bem como links associados a:

- Importação de ShapeFiles: https://postgis.net/workshops/postgis-intro/loading_data.html

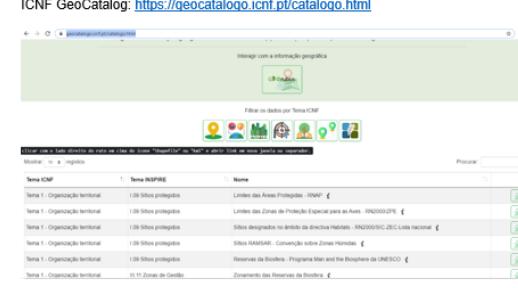
As shapefiles e ficheiros KML, disponíveis são as seguintes:

CAOP2015-DistrConFreg	Farmacias,Viana

As mesmas foram obtidas de várias fontes públicas, como por exemplo:



ICNF GeoCatalog: <https://geocatalogo.icnf.pt/catalogo.html>



Dados Geocat: <https://dados.gov.pt/dataset/terre-inspre>

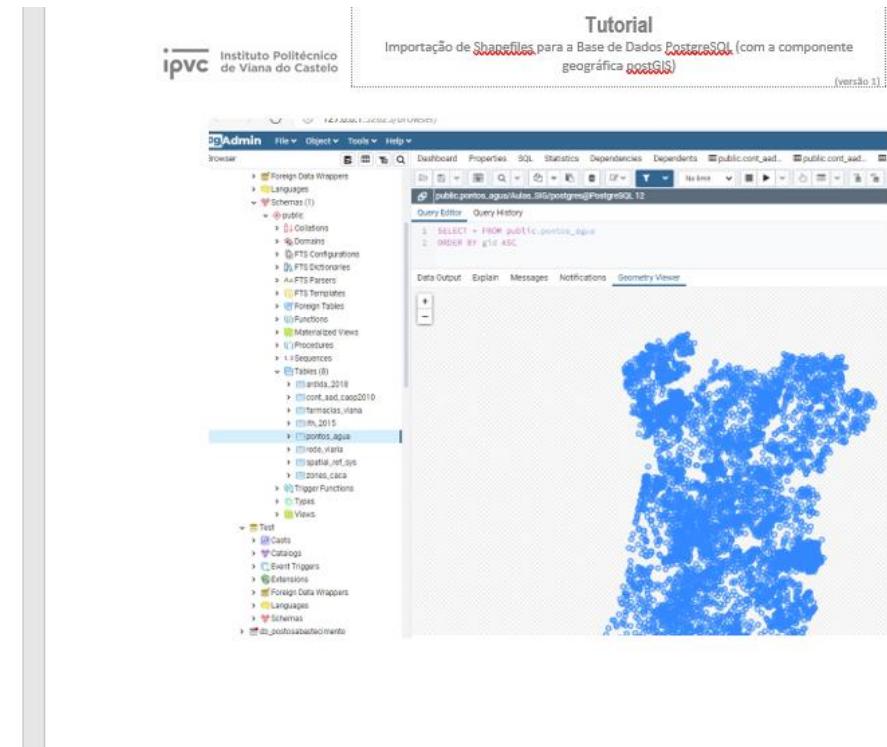
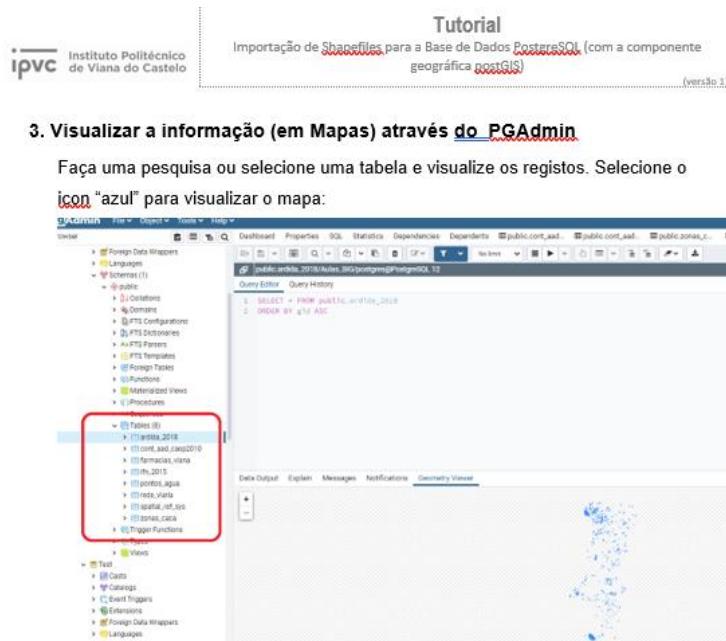
Tutorial WebSIG

■ **Objetivo Geral:** Preparar a Estrutura de servidores de suporte a um WebSIG

1º Instalar a plataforma de base de dados geográfica PostgreSQL;

2º Importar as shapefiles para a base de dados e visualizar a informação geográfica;

Execute o Tutorial seguinte:



Tutorial WebSIG

■ Objetivo Geral: Preparar a Estrutura de servidores de suporte a um WebSIG

- 1º Instalar a plataforma de base de dados geográfica PostgreSQL;
- 2º Importar as shapefiles para a base de dados e visualizar a informação geográfica;
- 3º Visualizar a informação das shapefiles no visualizador Quantum GIS;

Execute o Tutorial seguinte:

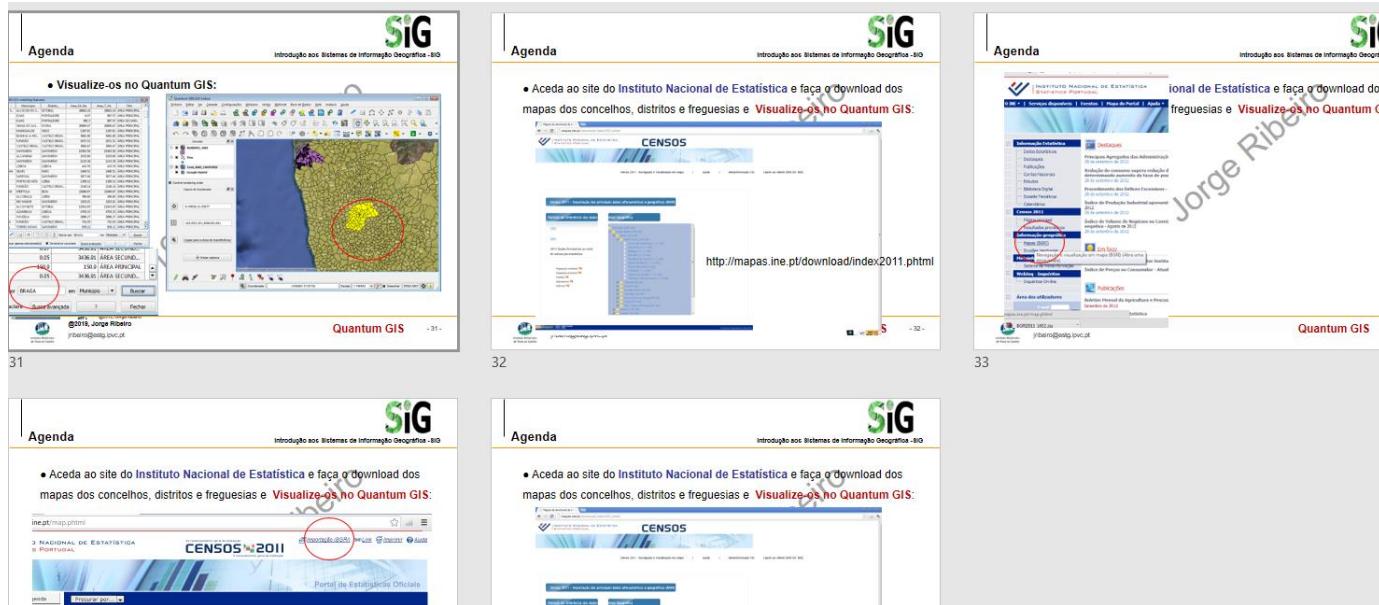
The figure consists of six screenshots arranged in two columns of three. Each screenshot shows a computer screen with a presentation slide titled 'Introdução aos Sistemas de Informação Geográfica - SIG' and 'Quantum GIS'. The slides contain text, logos, and small images related to Quantum GIS. The first three screenshots are labeled 1, 2, and 3 at the bottom left. The last three are labeled 4, 5, and 6 at the bottom left. A watermark 'Ribeiro' is diagonally across the images.

- 1
- 2
- 3
- 4
- 5
- 6

Tutorial WebSIG

■ Objetivo Geral: Preparar a Estrutura de servidores de suporte a um WebSIG

- 1º Instalar a plataforma de base de dados geográfica PostgreSQL;
- 2º Importar as shapefiles para a base de dados e visualizar a informação geográfica;
- 3º Visualizar a informação das shapefiles no visualizador Quantum GIS;



The screenshots illustrate the workflow for visualizing census data:

- Screenshot 31:** Shows the Quantum GIS interface with a map of Portugal and a legend. A red circle highlights the 'Visualize' button in the toolbar.
- Screenshot 32:** Shows a web browser displaying the INE website for the 2011 Census. A red circle highlights the 'Download' link for maps.
- Screenshot 33:** Shows the INE website again, with a red circle highlighting the 'Mapas' (Maps) link under the 'CENSOS 2011' section.
- Screenshot 34:** Shows the Quantum GIS interface with a map of Portugal and a legend. A red circle highlights the 'Visualize' button in the toolbar.
- Screenshot 35:** Shows the Quantum GIS interface with a map of Portugal and a legend. A red circle highlights the 'Visualize' button in the toolbar.

Tutorial WebSIG

■ Objetivo Geral: Preparar a Estrutura de servidores de suporte a um WebSIG

- 1º Instalar a plataforma de base de dados geográfica PostgreSQL;
- 2º Importar as shapefiles para a base de dados e visualizar a informação geográfica;
- 3º Visualizar a informação das shapefiles no visualizador Quantum GIS;

Ler dados do QGIS para PostGreSQL:

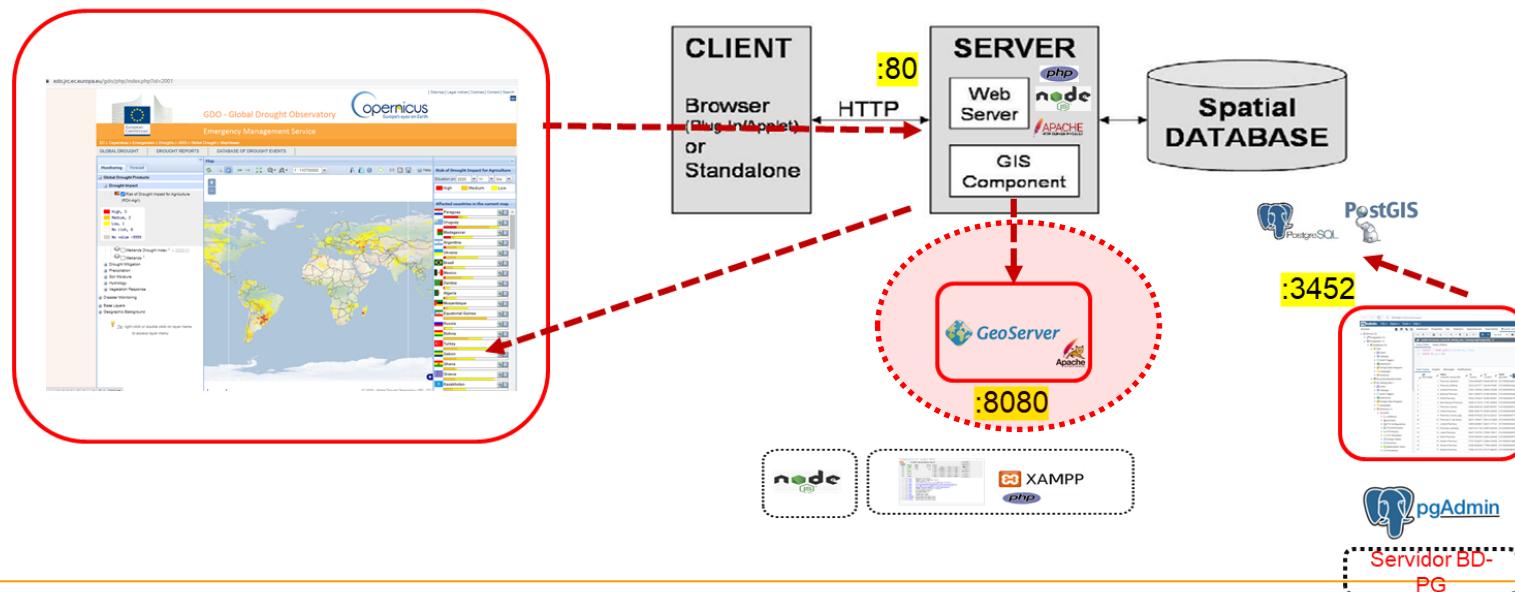
<https://astuntech.atlassian.net/wiki/spaces/ISHAREHELP/pages/137390054/Load+data+into+PostgreSQL+from+QGIS>

The screenshot shows a web browser displaying a page from the ASTUN TECHNOLOGY website. The URL in the address bar is <https://astuntech.atlassian.net/wiki/spaces/ISHAREHELP/pages/137390054/Load+data+into+PostgreSQL+from+QGIS>. The page is titled "Load data into PostgreSQL from QGIS". It features a sidebar with a list of articles related to QGIS and PostgreSQL integration. The main content area contains a brief introduction, author information (Andrew Bailey), and a "Step-by-step guide" with two numbered steps. Step 1 shows a screenshot of the QGIS interface with a map and the DB Manager dialog. Step 2 provides instructions for creating a new connection if it's not listed.

Tutorial WebSIG

■ Objetivo Geral: Preparar a Estrutura de servidores de suporte a um WebSIG

- 1º Instalar a plataforma de base de dados geográfica PostgreSQL;
- 2º Importar as shapefiles para a base de dados e visualizar a informação geográfica;
- 3º Visualizar a informação das shapefiles no visualizador Quantum GIS;
- 4º Instalar o servidor de mapas Geoserver;**



Tutorial WebSIG

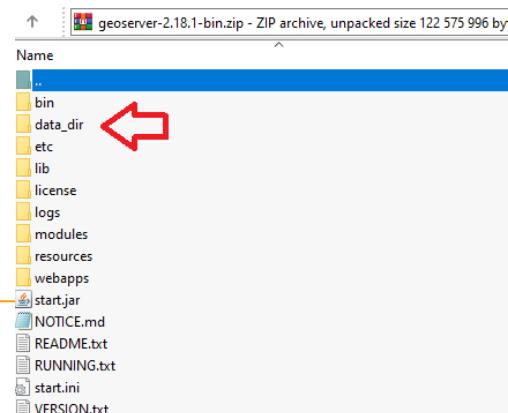
■ Objetivo Geral: Preparar a Estrutura de servidores de suporte a um WebSIG

4º Instalar o servidor de mapas Geoserver;



A instalação do Geoserver pode ser feita através:

1. Do Pacote de instalação → Irá instalar o serviço no computador (acessível através de painel controlo→ serviços)
 2. Do download do source code (zipado em tar, ou zip) e instalar o war num servidor TOMCAT já existente.
- **NOTA:** Na diretoria de instalação do Geoserver existe uma diretoria “data_dir” com toda a informação dos workspaces, layers, etc. Por este facto, poder-se-à depois da instalação, substituir esta pasta por outra de um outro geoserver.



Tutorial WebSIG

■ Objetivo Geral: **Preparar a Estrutura de servidores de suporte a um WebSIG**



4º Instalar o servidor de mapas Geoserver;

A instalação do Geoserver pode ser feita através:



The screenshot shows the GeoServer 2.18.1 download page. At the top, it says "GeoServer 2.18.1" and "Released on November 23th, 2020". Below this, there are sections for "Packages", "Documentation", "Source Code", and "Extensions". A red arrow points to the "Platform Independent Binary" link under the "Packages" section. Another red arrow points to the "zip | tar.gz" link under the "Source Code" section.

GeoServer 2.18.1
Released on November 23th, 2020

Packages

Platform Independent Binary
Operating system independent runnable binary.

Web Archive
Web Archive (war) for servlet containers.

Documentation

User Guide HTML
Export of GeoServer user guide.

Javadoc
API documentation.

Source Code

zip | tar.gz
Source code packages for tag 2.18.1.

GitHub
Browse source code on GitHub.

Extensions

Extensions
Open Source Extensions download

Tutorial WebSIG

■ Objetivo Geral: Preparar a Estrutura de servidores de suporte a um WebSIG

4º Instalar o servidor de mapas Geoserver;

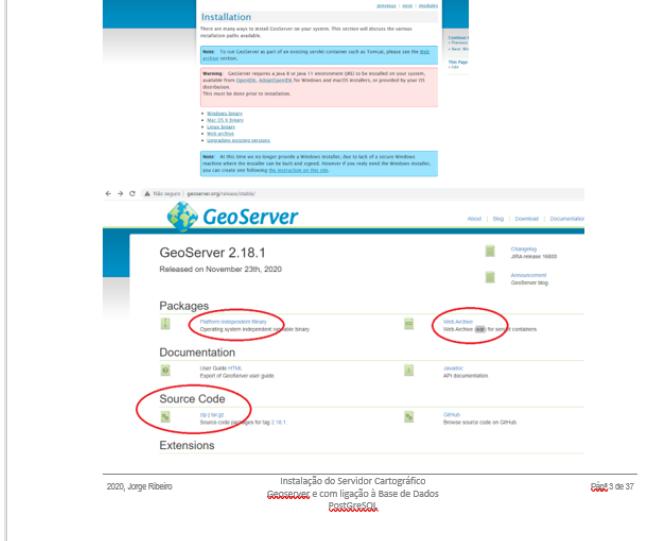
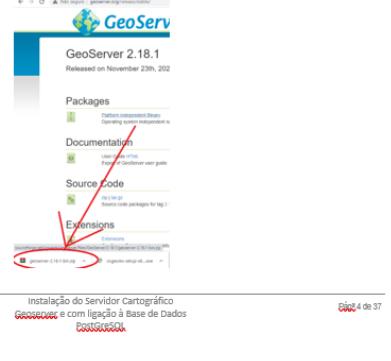
Execute o Tutorial seguinte:



A nível do pacote instalador para windows este é esta disponível para a versão 2.17:



1.1- Instalando o geoserver através dos binnaries
Se descarregar os binnaries: [geoserver-2.18.1-bin.zip](#)

Tutorial WebSIG

■ Objetivo Geral: Preparar a Estrutura de servidores de suporte a um WebSIG

- 1º Instalar a plataforma de base de dados geográfica PostgreSQL;
- 2º Importar as shapefiles para a base de dados e visualizar a informação geográfica;
- 3º Visualizar a informação das shapefiles no visualizador Quantum GIS;
- 4º Instalar o servidor de mapas Geoserver;
- 5º Interligar o Geoserver com os dados geográficos da base de dados e criar os serviços WFS, WMS;**

Execute o Tutorial seguinte:

Web SIG
Tutorial
Instalação do Servidor cartográfico Geoserver

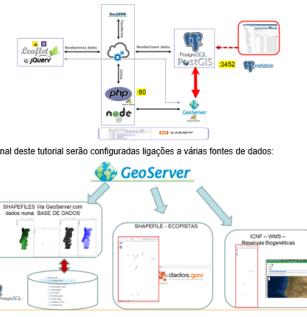
Conteúdo

Tema	1
Bibliografia Recomendada	2
1. Instalação do Geoserver	2
1.1- Instalando o geoserver através dos binários	4
1.2- Instalando o geoserver através do ficheiro WAR e instalar no servidor Tomcat já existente (ex. no XAMPP)	6
1.3- Instalando o geoserver através dos pacote executável do windows	14
2- Configuração dos Serviços no Geoserver com ligação à base de dados PostgreSQL	19
3- configuração dos Serviços Geoserver ligados a uma diretória de shapefiles	31
4- Configuração dos Serviços no Geoserver com ligação via WFS e WMS a serviços externos	34

Tema
Instalação do servidor cartográfico Geoserver e ligação à base de dados PostgreSQL e a serviços externos WFS e WMS:



Web SIG
Tutorial
Instalação do Servidor cartográfico Geoserver



No final deste tutorial serão configuradas ligações a várias fontes de dados:

Bibliografia Recomendada

Para apoio a este tutorial os alunos devem consultar os apontamentos teóricos e práticos da disciplina bem como links associados a:

- Fórum: <https://geoserver.org/>
- Tutorial de instalação: <https://docs.geoserver.org/stable/en/user/installation/index.html>
- Tutoriais de exploração: <https://docs.geoserver.org/stable/en/user/index.html>

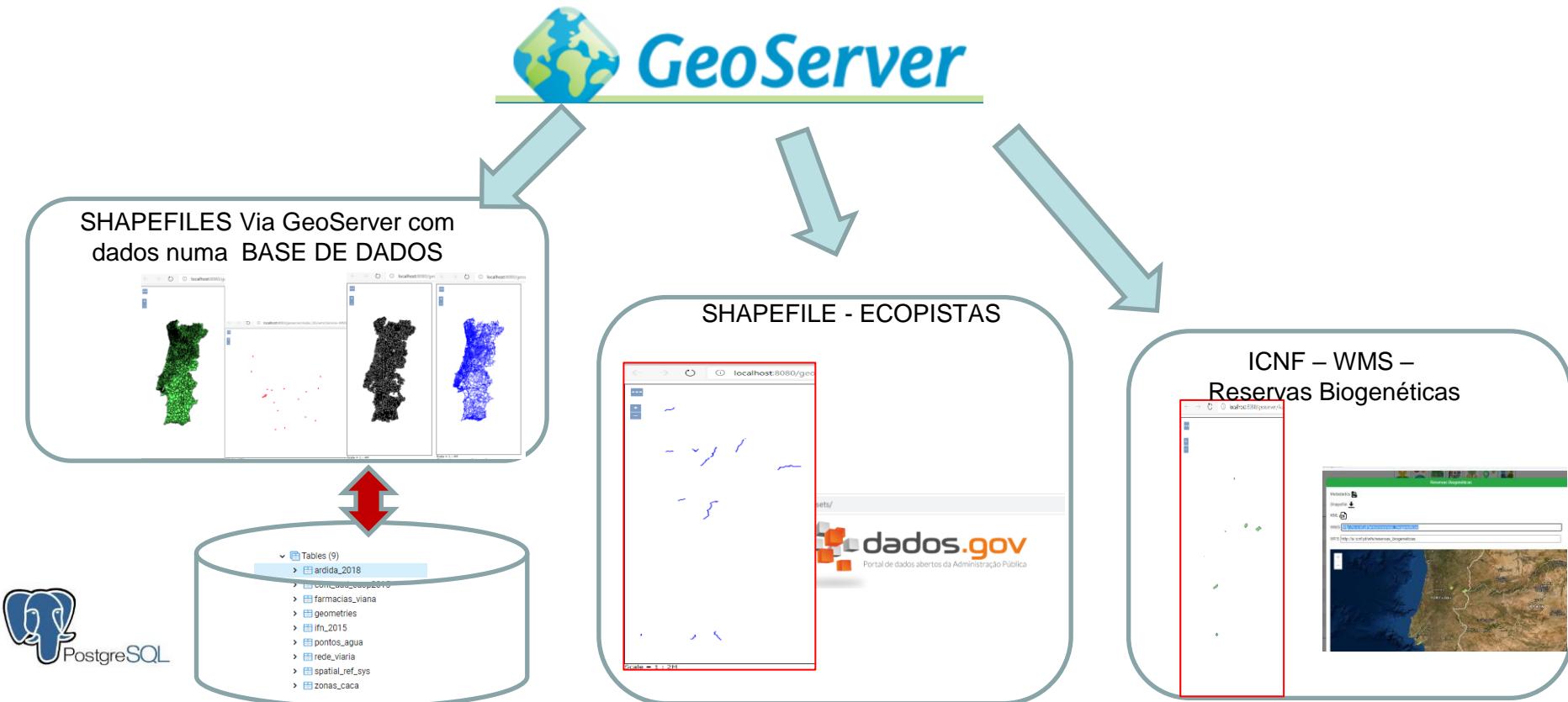
1. Instalação do Geoserver

Selecione a última versão e o tipo de sistema operativo onde vai instalar o geoserver:

Tutorial WebSIG

■ Objetivo Geral: Preparar a Estrutura de servidores de suporte a um WebSIG

5º Interligar o Geoserver com os dados geográficos da base de dados e criar os serviços WFS, WMS;



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■ Objetivo Geral: Preparar a Estrutura de servidores de suporte a um WebSIG

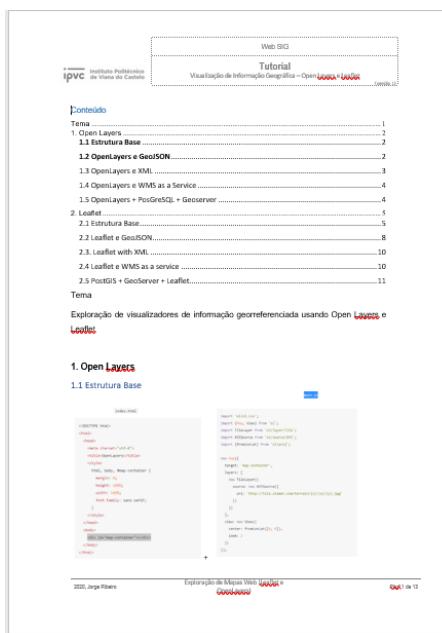
- 1º Instalar a plataforma de base de dados geográfica PostgreSQL;
- 2º Importar as shapefiles para a base de dados e visualizar a informação geográfica;
- 3º Visualizar a informação das shapefiles no visualizador Quantum GIS;
- 4º Instalar o servidor de mapas Geoserver;
- 5º Interligar o Geoserver com os dados geográficos da base de dados e criar os serviços WFS, WMS;
- 6º Utilizar um visualizador web (leaflet, mapbox, openlayers) para visualizar a informação geográfica, via Geoserver ou diretamente na base de dados geográfica;**

Tutorial WebSIG

■ Objetivo Geral: Preparar a Estrutura de servidores de suporte a um WebSIG

6º Utilizar um visualizador web (leaflet, mapbox, openlayers) para visualizar a informação geográfica, via Geoserver ou diretamente na base de dados geográfica;

Execute os tutoriais base de introdução ao OpenLayers e Leaflet



Exploração de visualizadores de informação georreferenciada usando OpenLayers e Leaflet

Conteúdo:

- 1. Open Layers
- 1.1 Estrutura Base
- 1.2 OpenLayers e GeoJSON
- 1.3 OpenLayers e XML
- 1.4 OpenLayers + WMS as a Service
- 1.5 OpenLayers + PostgreSQL + Geoserver
- 2. Leaflet
- 2.1 Estrutura Base
- 2.2 Leaflet e GeoJSON
- 2.3 Leaflet com XML
- 2.4 Leaflet e WMS as a service
- 2.5 PostgreSQL + Geoserver + Leaflet...

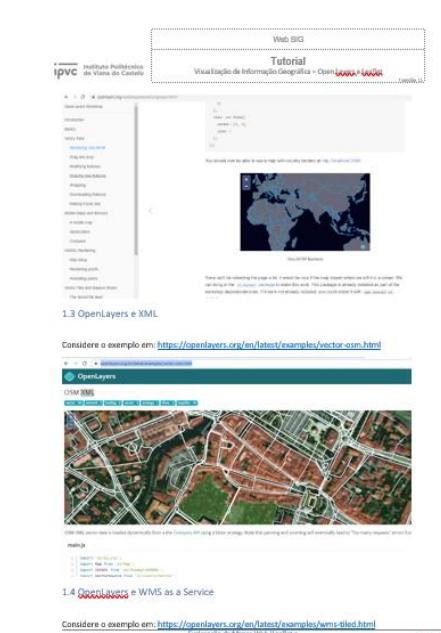
Resultados:

1.2 OpenLayers + GeoJSON

Considerar o exemplo do tutorial disponível em:

- Países: <https://openlayers.org/en/latest/examples/geojson-vt.html>
- Workshop: <https://openlayers.org/workshop/en/vector/geojson.html>

Exploração de Mapas Web



Exploração de Mapas Web

Conteúdo:

- 1. OpenLayers
- 1.1 Estrutura Base
- 1.2 OpenLayers e GeoJSON
- 1.3 OpenLayers e XML
- 1.4 OpenLayers e WMS as a Service
- 1.5 OpenLayers + PostgreSQL + Geoserver
- 2. Leaflet
- 2.1 Estrutura Base
- 2.2 Leaflet e GeoJSON
- 2.3 Leaflet com XML
- 2.4 Leaflet e WMS as a service
- 2.5 PostgreSQL + Geoserver + Leaflet...

Resultados:

1.2 OpenLayers + GeoJSON

Considerar o exemplo em: <https://openlayers.org/en/latest/examples/vector-ogr.html>

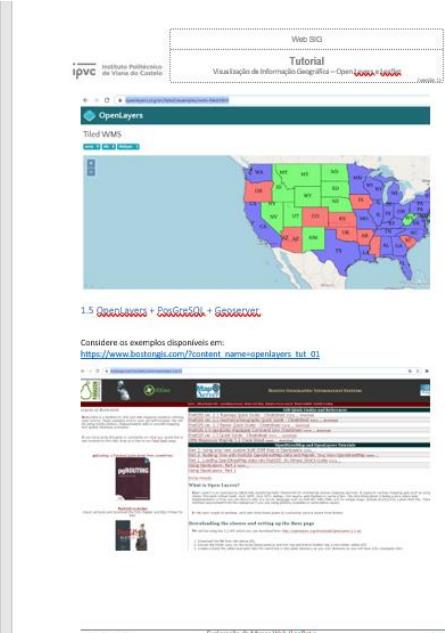
1.3 OpenLayers + XML

Considerar o exemplo em: <https://openlayers.org/en/latest/examples/vector-xml.html>

1.4 OpenLayers e WMS as a Service

Considerar o exemplo em: <https://openlayers.org/en/latest/examples/wms-tiled.html>

Exploração de Mapas Web



Exploração de Mapas Web

Conteúdo:

- 1. OpenLayers
- 1.1 Estrutura Base
- 1.2 OpenLayers e GeoJSON
- 1.3 OpenLayers e XML
- 1.4 OpenLayers e WMS as a Service
- 1.5 OpenLayers + PostgreSQL + Geoserver
- 2. Leaflet
- 2.1 Estrutura Base
- 2.2 Leaflet e GeoJSON
- 2.3 Leaflet com XML
- 2.4 Leaflet e WMS as a service
- 2.5 PostgreSQL + Geoserver + Leaflet...

Resultados:

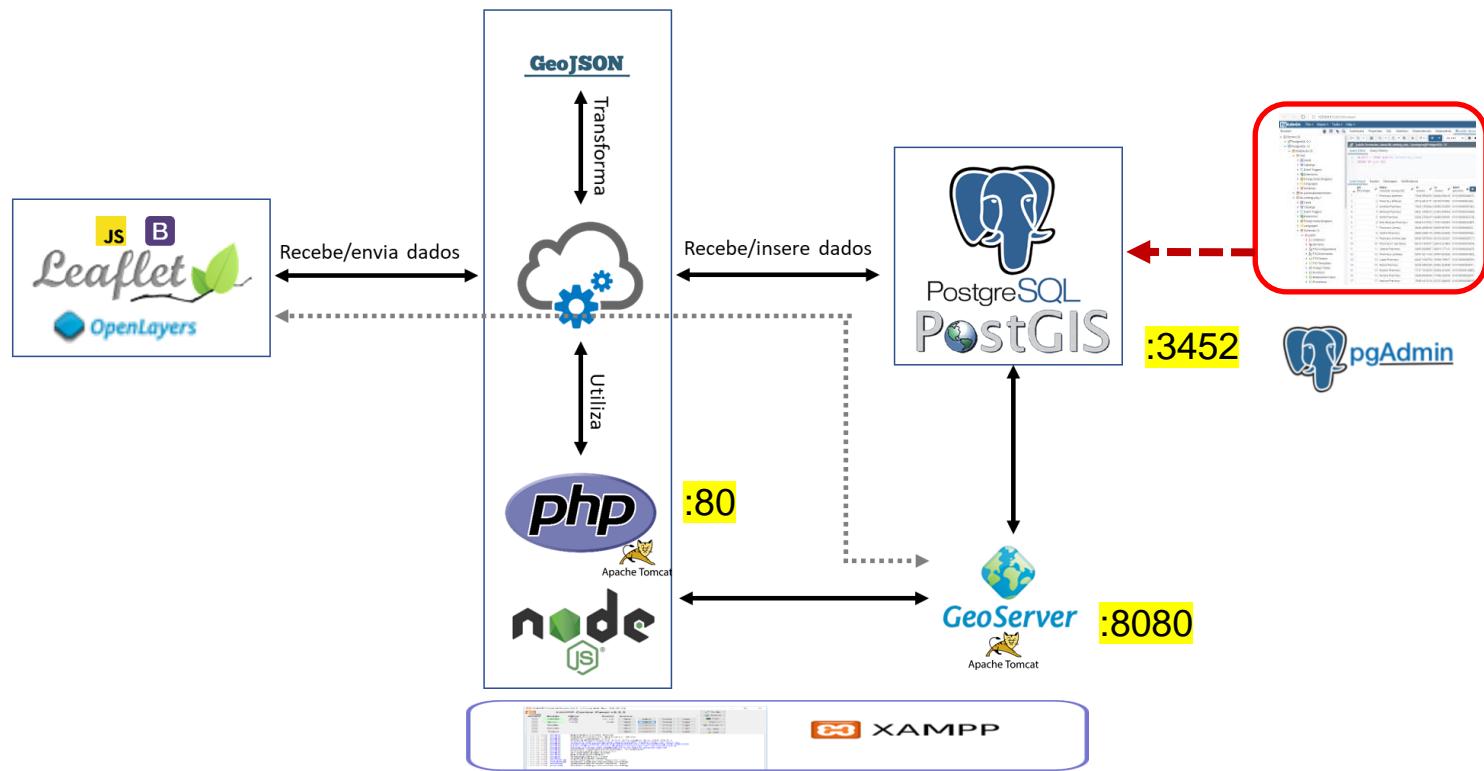
1.5 OpenLayers + PostgreSQL + Geoserver

Considerar os exemplos disponíveis em:
https://www.bestofgis.com/?content_name=openlayers_tut_01

Exploração de Mapas Web

Tutorial WebSIG

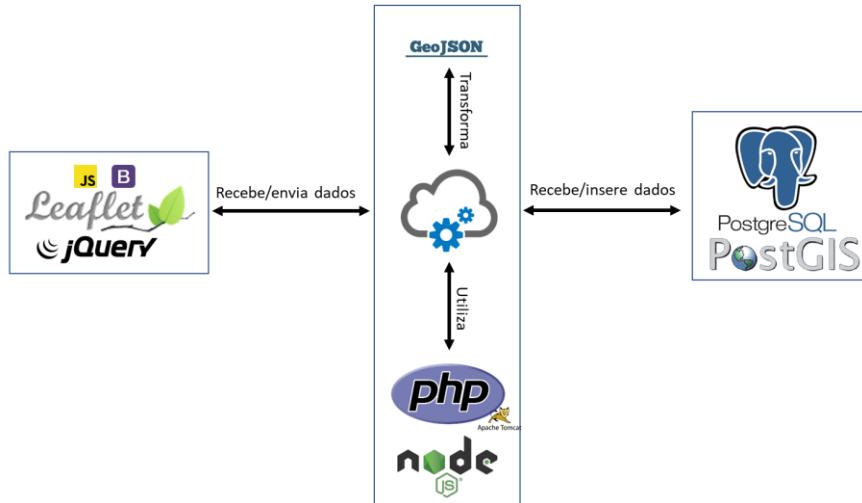
■ Objetivo Geral: Preparar uma estrutura de servidores de suporte a um WebSIG



Tutorial WebSIG

Estrutura Geral

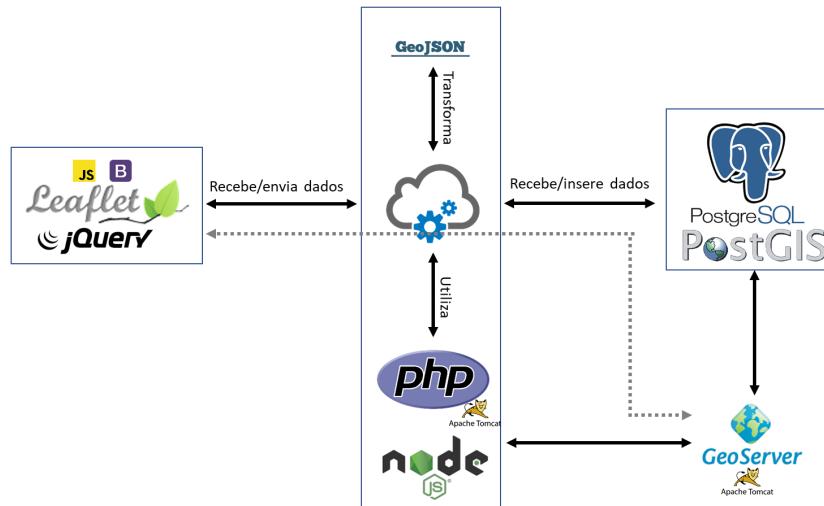
Arquitectura Sem Servidor Cartográfico:



Tutorial WebSIG

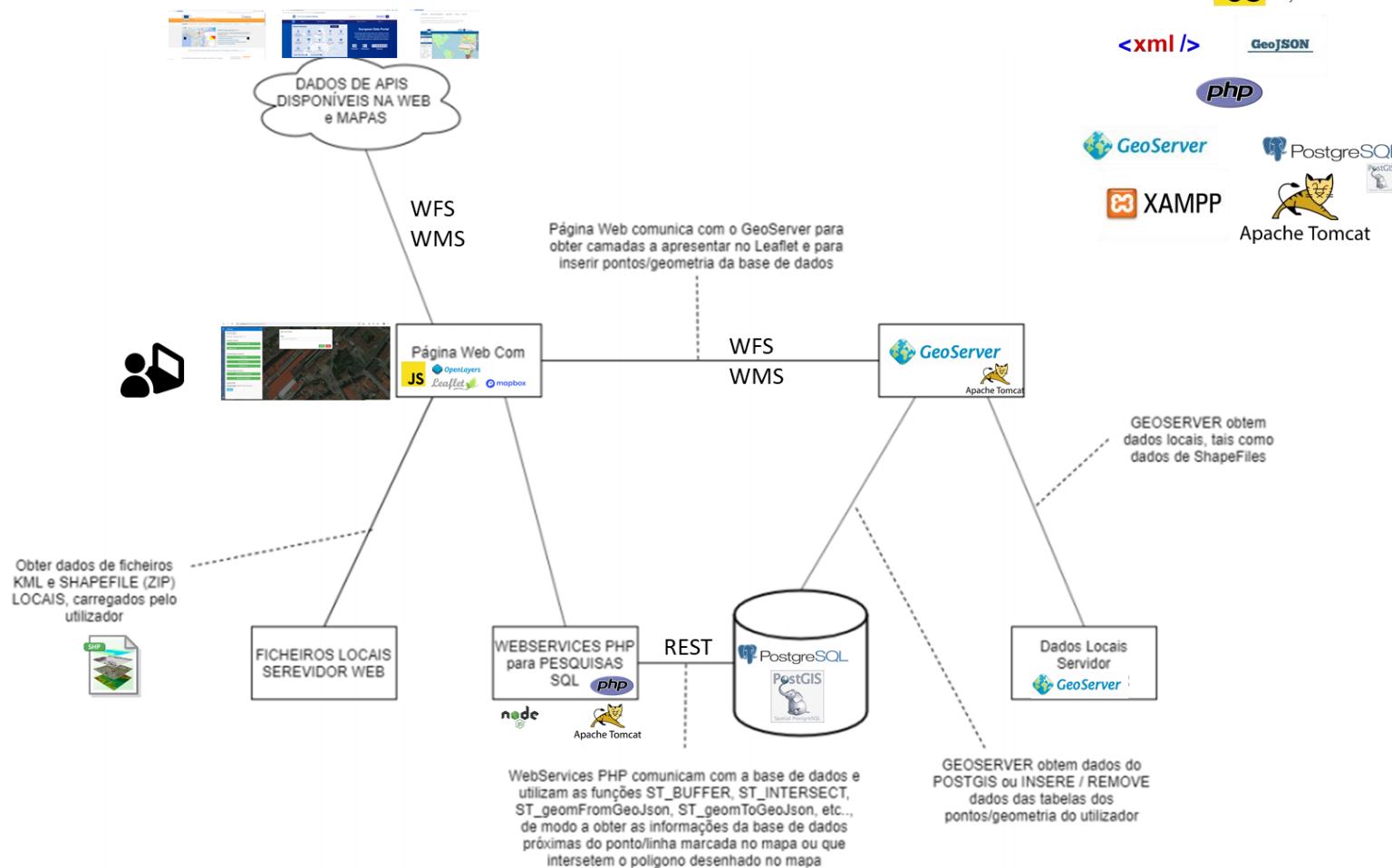
Estrutura Geral

Arquitectura Com Servidor Cartográfico:



Tutorial WebSIG

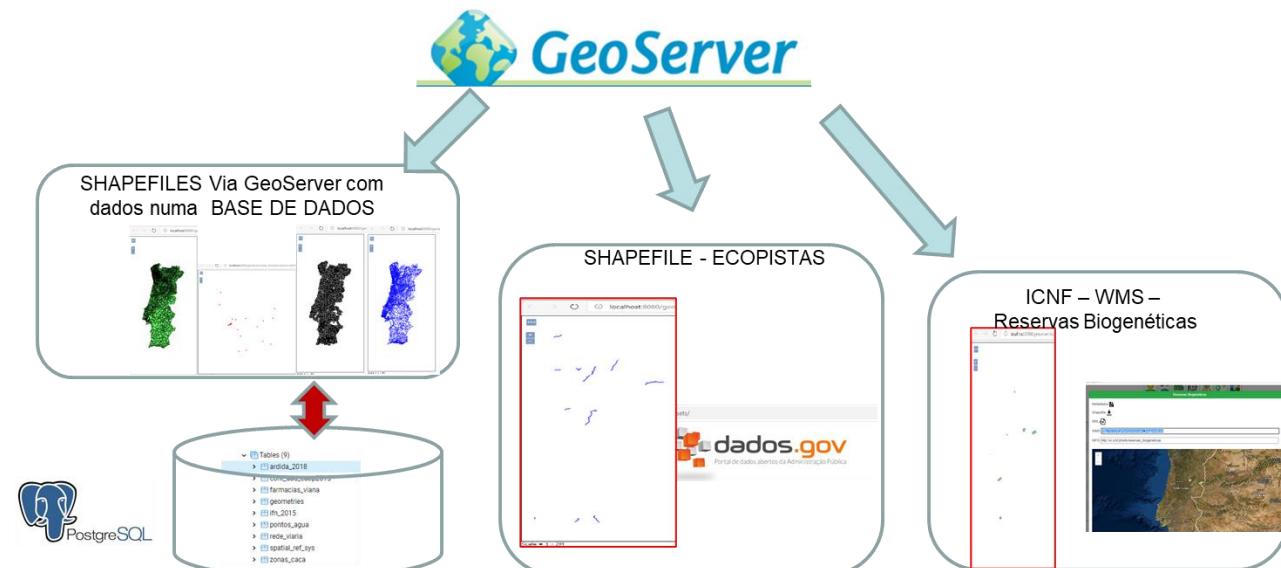
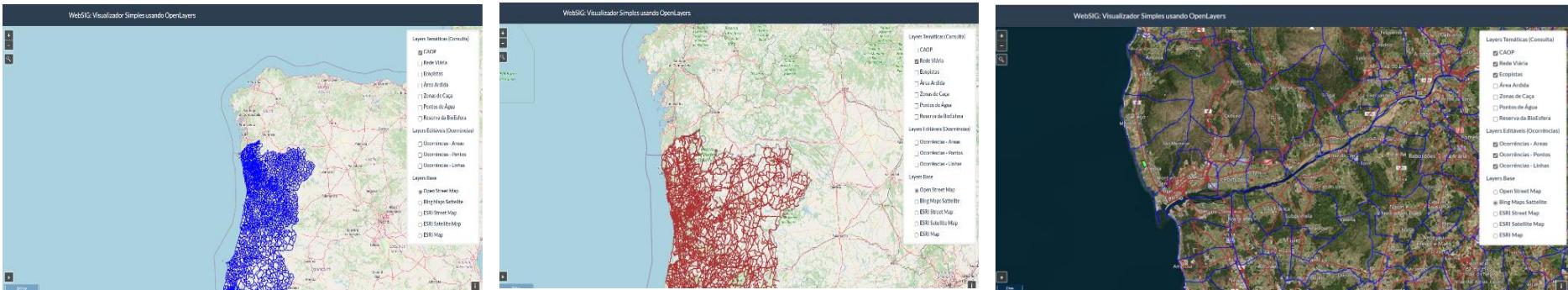
1.



Tutorial WebSIG

■ Objetivo Geral: Preparar a Estrutura de servidores de suporte a um WebSIG

Visualizar a informação Geográfica e executar operações geográficas



Tutorial WebSIG

■ **Objetivo Geral: Preparar a Estrutura de servidores de suporte a um WebSIG**

Visualizar a informação Geográfica de Satélites:

