

AUTOMATIONS OF PROCESS CARTOGRAPHIC PUBLISHING USING WEB MAPPING TOOLS

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BACKGROUND AND OBJECTIVES

The production of cartographic mapping has undergone many transformations over the years, through extensive use of analog instruments to digital media. Currently, much of this process is accomplished with the help of computers, requiring a large investment in computer systems. In the early 90's came a movement called Free Software, which aims to reduce dependence on technology to large multinational organizations that dominate many segments of information technology. Thus, several programs were developed for general use and replacing it satisfactory so-called proprietary software. Lately, it has also been developed Software for the area of geoprocessing. The objective of this study is to evaluate the use of such applications in the production of cartographic mapping and to realize that the publishing of a cartographic sheet of the Charter CIM using programs distributed following the philosophy of Free Software.

1. THE CARTOGRAPHIC PUBLISHING

The cartographic publishing consists of the following steps:

- Organization of the geographic features in the categories of information;
- Assignment of symbols to point elements;
- Creation of the polygons of surface elements;
- Assignment of the correct presentation for polygons, lines, points and texts;
- Repositioning of the texts, to avoid collisions;
- Creation of Frame of the sheet of CIM Chart;
- Fill the marginal information of the frame of the sheet;

As seen in Figure 1.a, the vector file does not store any presentational characteristic, so it is necessary to assign the appropriate symbols for each element. The lines should be presented with the color, thickness and type of stroke according to the convention adopted. The same is true for all polygons, points and texts as in the example in Figure 1.b.

Some specific elements are represented by points, which have to be replaced by their corresponding symbols.



a) Elements before publishing cartographic



b) Elements after publishing cartographic

Figure 1. Steps Cartographic Publishing

2. APPROACH AND METHODS

Currently, in general, the cartographic publishing is performed in Geographic Information Systems (GIS) proprietary and often require customization to accomplish this task satisfactorily. This paper presents a proposal to bring together different Open Source Software to perform the specific tasks of cartographic publishing, leveraging what each does best.

For this we used a web map server, taking advantage of its facilities for the presentation of geographic features, a System Manager Database with spatial extension to store and manipulate the map data and a Geographic Information System, for viewing and editing of cartographic features, and an application developed to mediate the entire process and automate some steps. In Figure 2 we illustrate how it will be used each application.

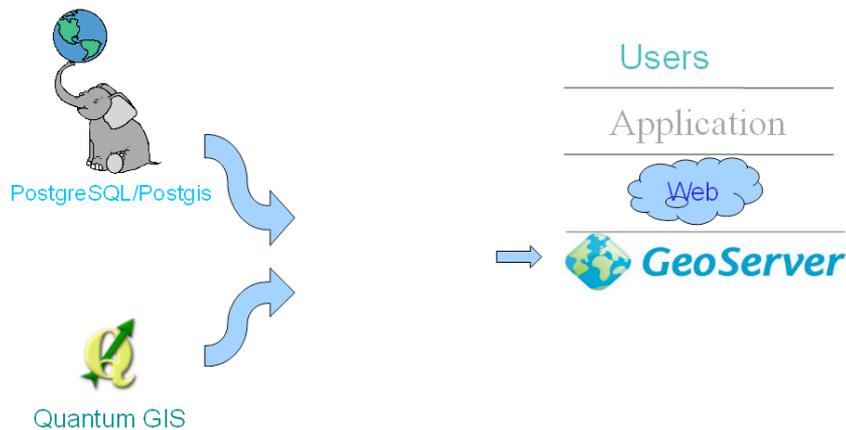


Figure 2. Applications used in this work

2.1 Using the Web Map Server

The GeoServer, a Web Map Server, is responsible for the presentation of the cartographic features, ie the application is responsible for symbolization in accordance with the styles identified in the specification of the CIM Chart.

The cartographic features of the CIM Chart are stored in the database server, and presentation styles are created in the Geoserver to symbolize each feature.

2.2 Use System Manager Database and GIS

In the creation of polygons to hypsometric color presentation was necessary to use a Geographic Information System (GIS). At this stage the geometry used as the basis was the isometric curves. This geometry is linear, with which to create a polygon for assigning a fill color corresponding to the range of altitude. In this process we used the Qgis (<http://www.qgis.org/>), a free and open source GIS and functions of Postgis.

In addition to reposition the text of localities, names of river should follow contour of the lines, then we need to change the position in which texts are plotted. The Geoserver provides an additional feature that allows the configuration of a parameter, to display the names following contour of the lines, so it was used to render the names of the rivers.

2.3 The Application Developed

In making the frame was necessary to develop an application for its preparation and filing, requiring also the database with information on each sheet as name, nomenclature index, etc... The figure 3 show the framework used in the developed solution.

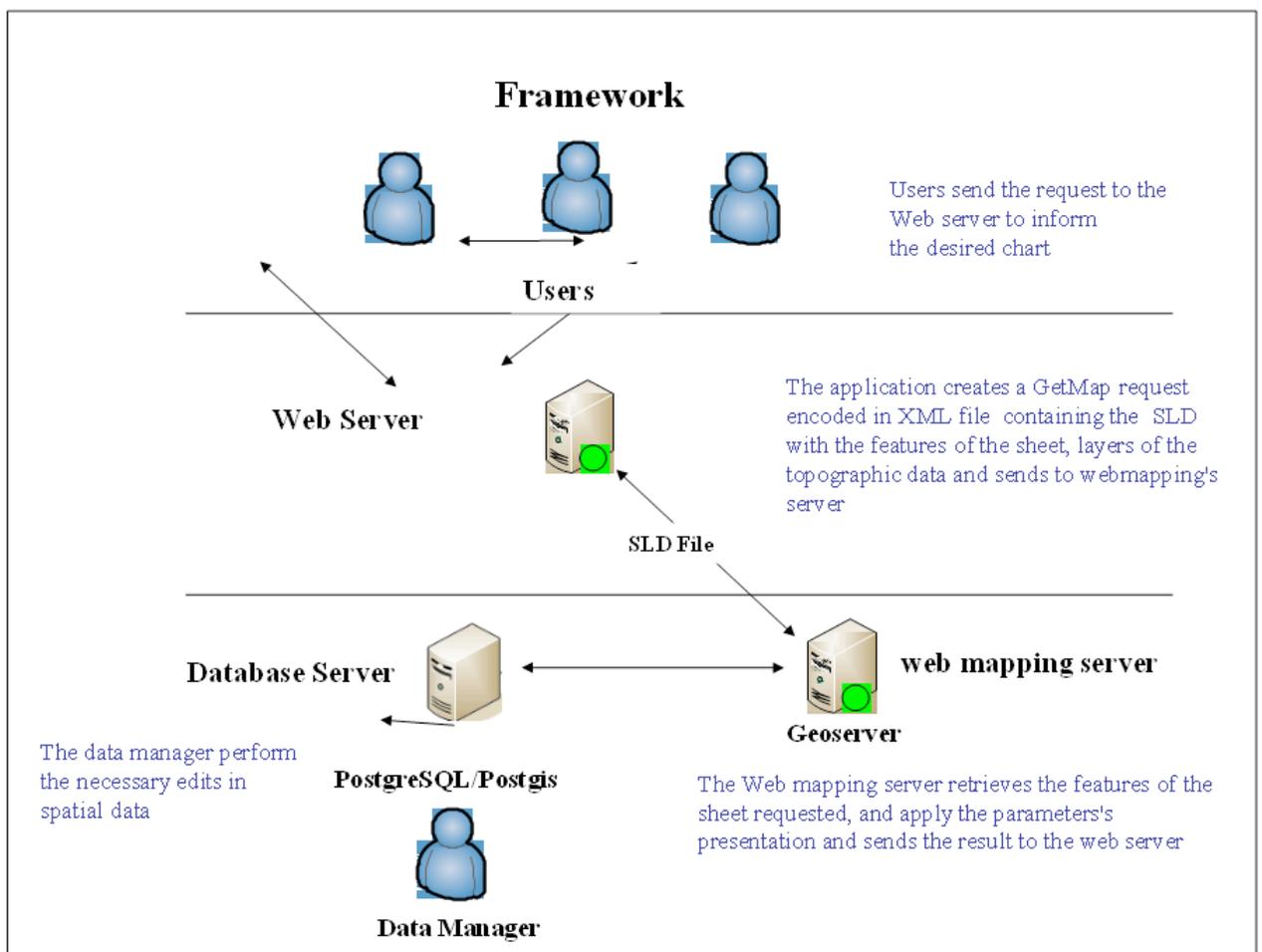


Figure 3. Framework used in the developed solution

The application was developed using Java servlets technology and JSP, it creates a GetMap request encoded in an XML file containing a document SLD. Upon request, the application creates the elements of the frame in GML format and incorporates in the SLD, as well as styles for each element of the frame.

Beyond the frame, are also incorporated into the SLD the layers of CIM Chart, previously created on the server.

The XML file created by the application is sent to the WMS server via HTTP POST, which returns a PDF file with the sheet requested.

3. RESULTS

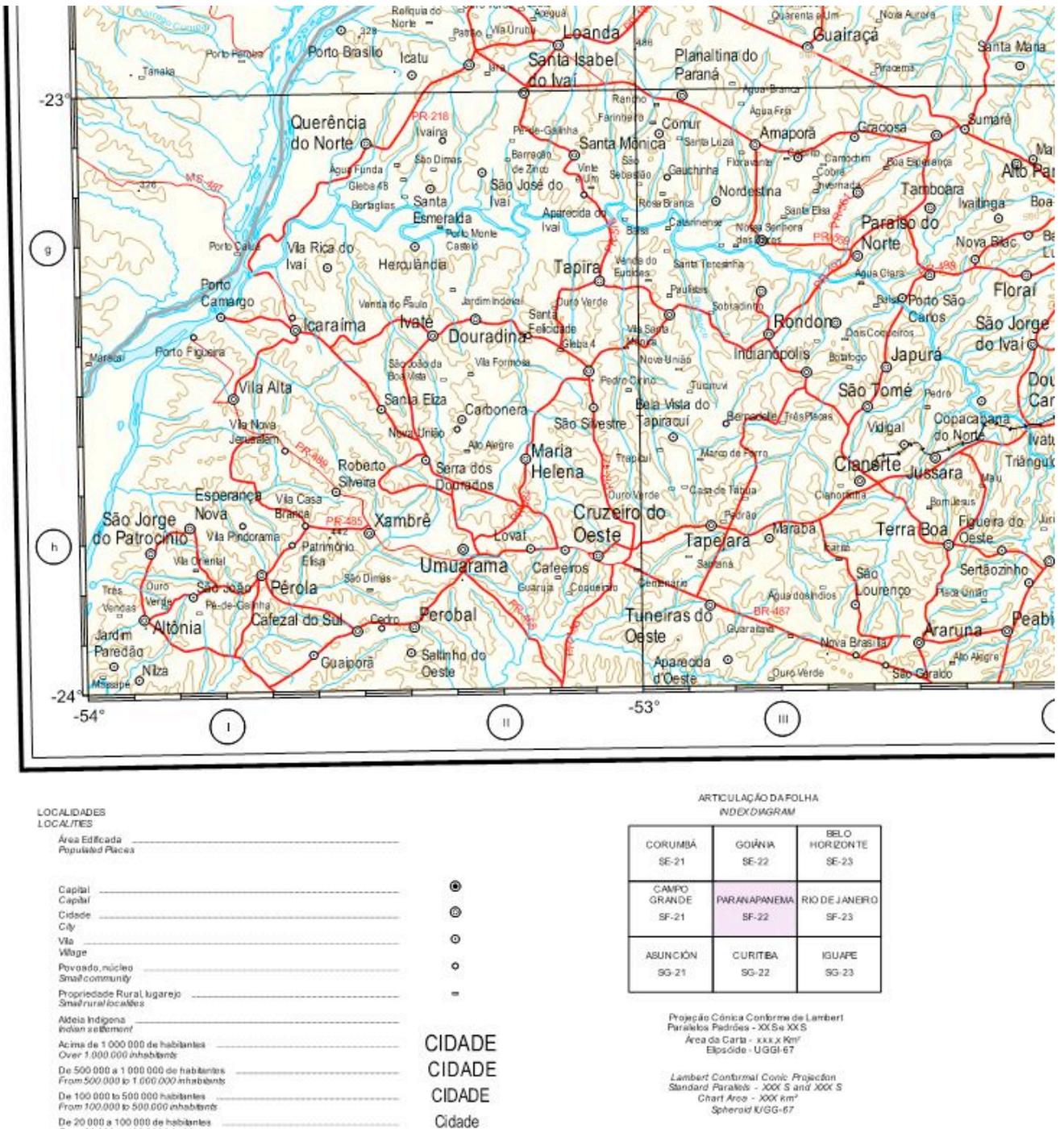


Figure 4. Results Obtained

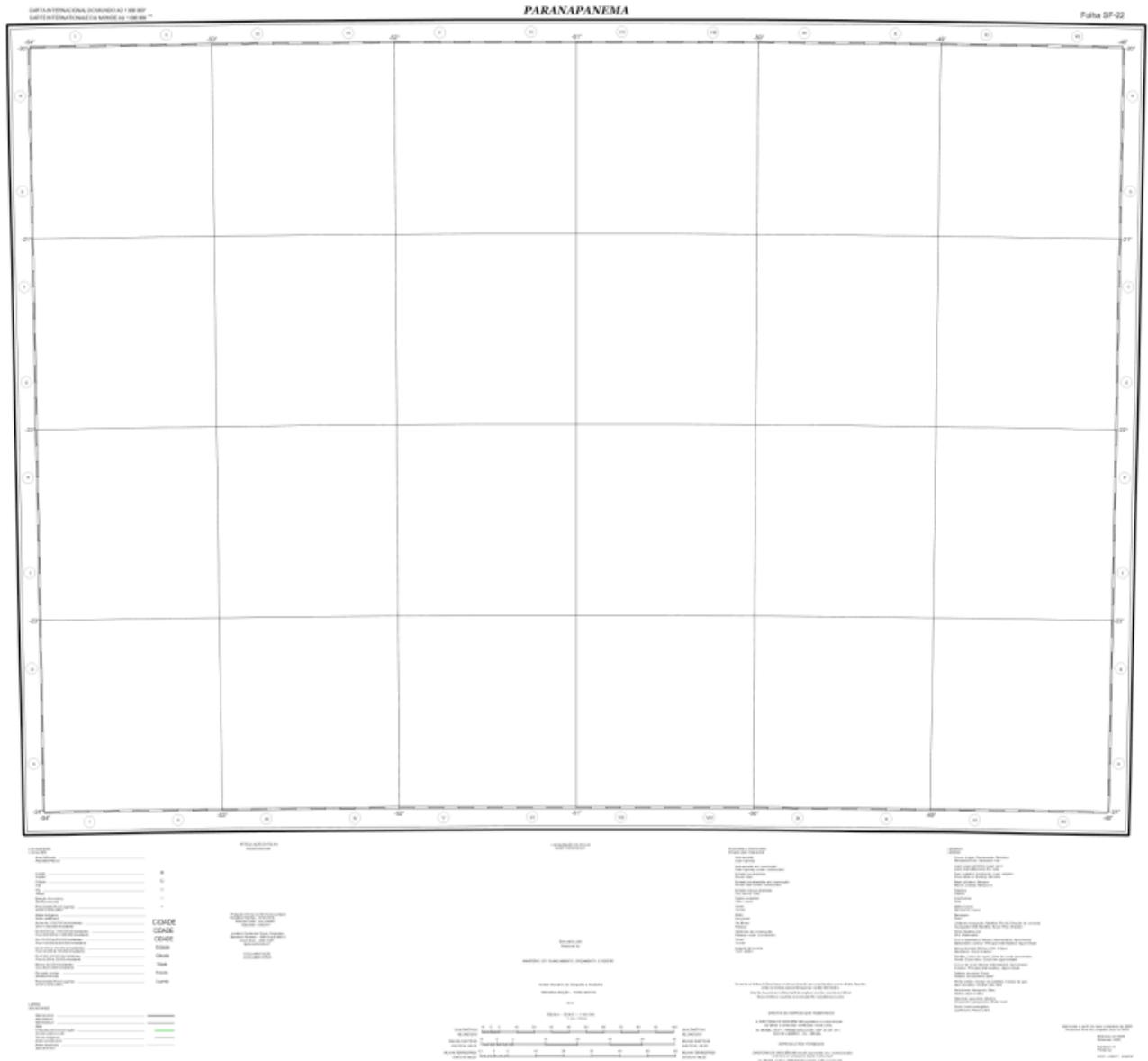


Figure 5. Frame of sheet of the Chart Cim

The Figures 4 and 5 above show the result achieved with the cartographic features symbolized by geoserver and the frame created by the developed application.

4. CONCLUSION AND FUTURE PLANS

The initial objective was achieved satisfactorily using free technologies proving reached the stage of maturity of the programs developed according to this philosophy.

The result, though incomplete, shows that it is possible to produce a map using free technologies and web services for spatial data.

In future, we intend to compare the time of production of a cartographic sheet of the Charter CIM using the method presented and traditional, and extend the method to chart production at other scales.