CHAPTER 88

Implementation of free and open-source geotechnologies in a sanitation company

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ABSTRACT
This work describes the implantation of free geo technologies, using free and open-source software, to disseminate the geospatial information of the Bahia Water and Sanitation Company (EMBASA). EMBASA is the concessionaire responsible for basic sanitation in the State of Bahia. This article also describes, besides implantation, an analysis of the saved costs by the company over the years.

Keywords: geotechnologies, free software, basic sanitation.

1 INTRODUCTION

Geotechnology is a type of information technology, which works with data geographic and technologies correlated with This one type in given away. Among at geotechnologies, the Geographic Information Systems (GIS), the in management in banks in Data Geographical (SGBD), O Global Positioning System

(GPS), the Georadar and the orthophotos (Aragon & Campos, 2009).

Lately, at geotechnologies has awakened much interest of companies, what manage infrastructure. This is because they allow the manipulation of information spaces aimed at tackling complex demands that involve geographic coordinates (Martin, 2019) (Aragon, 2020).

In the context of geotechnologies, GIS stands out. This special type of system of information allows the spatial view of the information associated with the databases geographic. A GIS can be applied in several analyzes contemplating demands operational, tactics and strategic (CHAMBER, 1996).

Despite the known benefits from a GIS implementation, the The implementation process of this type of system involves high costs of licensing software , demanding of organizations to need in hiring in consulting specialized services (Aragon, 2020). As a result, few companies are able to implement a GIS in set with your area of technology gives information. Aiming mitigate you high costs in licensing, one alternative It is O use and adoption in software free (SOFTWARE FREE, 2022).

it is understood per software free, all program in computer what allows O your use unrestricted. O software free he must to allow, also, what O your code source be open. This one type in software , generally, It is sustained per several developers scattered in several countries (Aragon & fields, 2009) (Martin, 2019).

In this context, this article describes the implementation of free geotechnologies, in in particular, GIS and DBMS based on free and open software allowing the company save on software license costs. This article describes the process of implantation in one company of sanitation basic of state gives Bahia in Brazil.

2 MATERIALS AND METHODS

In the first phase of the project, a survey was carried out on which best free, open and free technologies that were available and with a community active. Have a community of developers keeping the project free software active and up-to-date is something fundamental for the choice. In this research, priority was given to software that did not require licensing costs (FREE SOFTWARE, 2022) (DAVIS, 2007). This was a criterion established for the implementation of geotechnologies in the projects of the company EMBASA, which was used as a case study of this job. Therefore, technologies what, although free, demanded any value for use were

2.1 DISCARDED.

Among the technologies studied, the GeoMoose environment was adopted with the MapServer map server, QGIS and the PostGIS Database (GEOMOOSE, 2022) (QGIS, 2022). It was noticed what these technologies are free, open, without costcom license and robust. It was observed with the research, that they are used in several large companies, especially QGIS (ARAGÃO and CAMPOS, 2009) (Martin, 2019). Finally, the costs of licenses of proprietary software were surveyed aiming estimate the value saved by the company to to adopt software free.

3 RESULTS

The adoption of free software for the implantation of geotechnologies in the EMBASA made the geographic data more accessible per a larger number of users (EMBASA, 2022). It is implementation allowed democratizing the use in systems in information geographic arriving The users experts and no experts. At gestures commercial and operational, for example, have been improved. These will be described below. improvements.

Company managers can use geographic data in the geographic information to visualize consumers and their correlated data. Consumers can be spatially grouped according to their type (residential, industrial or large consumer). This can be arranged in the form of thematic maps, that allow the use in Colors aiming to filter spatially the consumers.

Figure 1 shows an example of a thematic map. In this figure, the user can view the inhabited, under construction, uninhabited properties, among others, according to the legend that can also be seen in Figure 1. In this way, it is possible to perceive concentration of inhabited properties in certain parts of the city and prioritize the supply in these regions. As a background on the map, you can view the orthophotos of County, this It is, images georeferenced, O what check larger wealth in detail in analysis geographic.

Figure 1: view of a thematic map from properties

UMF property Situation
Habitated
Construction
Inhabited
Ceased Construction
Demolished
Temporary Occupation
Ruins.
Terrain

Figure 2 shows the same map as Figure 1, but with an operational view. In Figure 2, the drinking water distribution networks can be visualized in blue. In addition Furthermore, by clicking on each line in blue, the user will be able to access operational data of networks of water supply as diameter, material and extension.

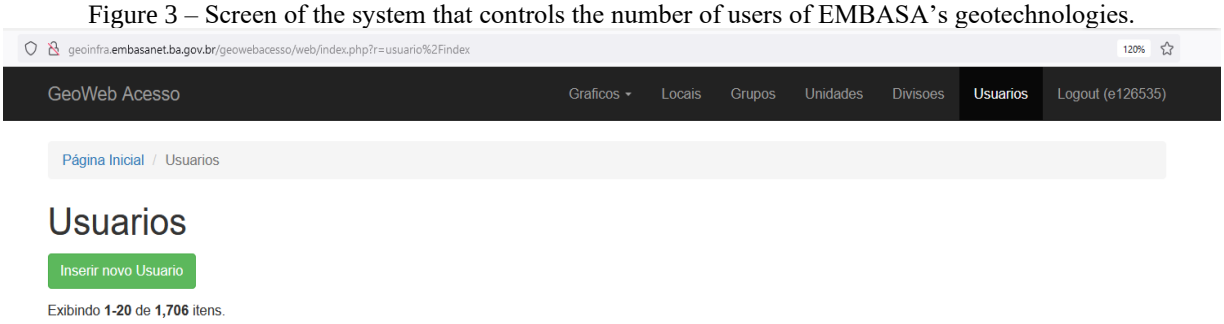
Figure two: map showing at networks of water supply

Figures 1 and 2 show the GIS screens based on free geotechnologies and free. No there was none cost with O licensing of software for O development of these systems. Two examples of use can be seen that allow better management commercial and company operating.

Geotechnologies help managers in decision making. they can do analysis spatial complex involving questions as: Where they are concentrates my consumers? Where is my water supply network infrastructure and sanitary sewage? The use of a GIS tool is essential to respond to questions like these. Tabular data without an associated spatial view is not enough to answer The these questions, that involve the aspect geographical.

Currently, the geographic information systems implemented at EMBASA have 1706 registered users, which represent almost 40% of the employees of company (Figure 3). Therefore, The company allows what 1706 users use at geotechnologies without any costs with license in software .

Figure 3 – Screen of the system that controls the number of users of EMBASA's geotechnologies.



If the company wants to add new users over time and meet all The force in job gives company, no there is none off-side, then all at technologies are based free. Therefore, it is concluded that the adoption of free software allows to the project be scalable.

For It is made comparative, case were adopted a software owner, what has a cost in lathe in 100 dollars to year, per license, this It is, per user, The company it would have what deal with a cost of approx. 170,600 dollars per annum. O project is implemented since 2007 and the projection of the economy is of 2,559,000 dollars during these years old. This one value saved he can to be directed for The update of park technological, as well as for others demands of the area in technology.

3 CONCLUSIONS

THE implantation of geotechnologies described in this article allowed O development of geotenological solutions that serve users without adding costs for the company. It is worth noting that the technologies described in this article were based software free, open and free.

It is concluded that, as it is based on free and free technologies, the project enabled significant savings for the company. Furthermore, these technologies they can to be personalized for others contexts, making O project scalable of Score in economic and functional point of view. The following future work is pointed out: the realization analysis to study whether the technologies described in this article allow the expansion of functionalities without add complexity in development.

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