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"GEOGRAPHIC INFORMATION SYSTEM (SIG), FOR NATURAL HERBAL OF THE TECHNICAL UNIVERSITY OF THE NORTH"

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GEOGRAPHIC INFORMATION SYSTEM (SIG), FOR NATURAL HERBAL OF THE TECHNICAL UNIVERSITY OF THE NORTH

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Spanish Summary. El presente proyecto de grado es el desarrollo de un "Sistema de Información Geográfica (GIS), para el herbario natural de la Universidad Técnica del Norte" apoyado de la metodología de desarrollo de software ágil como SCRUM que ayude con el cumplimiento del mismo. El proyecto consta de cinco capítulos: En el capítulo I, describe la localización de la institución en donde se implementará el proyecto, además del planteamiento del problema, justificación, objetivo general, objetivos específicos y el alcance que tendrá el proyecto. En el capítulo II, se explica lo que es un herbario natural, infraestructura de datos espaciales (IDE), base de datos espacial, servidor de mapas, servidor de aplicaciones y una descripción de la metodología SCRUM. El capítulo III, se fundamenta en el estudio de herramientas de desarrollo del software. El capítulo IV, es el desarrollo del proyecto, en donde se describe las fases que tiene la metodología SCRUM. Por ultimo en el capítulo V, se describe las conclusiones y recomendaciones obtenidas en la realización del proyecto.

El sistema cumple con todos los requerimientos obtenidos en el centro de investigación biológica Herbario UTN, además GISuiendo el estándar Darwin CORE, para el intercambio de información sobre la diversidad biológica con otras instituciones.

Keywords

SIG, IG, Datos biológicos, Oracle BI, SCRUM.

Abstract. *This present degree project is the development of "Sistema de Información Geográfica (SIG), for herbario natural of the Technical University of the North" supported of the software development methodology such as SCRUM that helps with the fulfillment of it. The project features with five chapters: In chapter 1, it is described the location of the institution in which it will implement the project, also of the approach of the problem, justification, general and specific objectives and the scope that the project will have. Chapter 2 explains what is a natural herbal, Spatial Data Infrastructure (SDI), spatial database, map server, application server and a description of SCRUM methodology. In Chapter 3, it is established in the investigation of software development tools. In chapter 4 is the development of the project, in which it is described the phases that the methodology SCRUM have. Finally in chapter 5 conclusions and recommendations concerning this project is presented. The system complies with all the requirements gotten in the biological investigation center, "Herbario UTN", also following the standar Darwin CORE, to the interchange of the information about the biological diversity with another institutions.*

Keywords

GIS, IG, Biological Data, Oracle BI, SCRUM.

1. Introducción

The Ecuadorian government, assuming world leadership in recognizing the rights of nature has established strategic objectives within the National Plan for Good Living 2013 - 2017, so that the target 7 states: "Ensuring the rights of nature and promote environmental, territorial and global sustainability. " [1]

In compliance with the National Plan for Good Living, the Technical University of North UTN through the Faculty of Engineering in Agricultural and Environmental Sciences FICAYA, he has seen the need for laboratories and programs of biological and environmental research to help with studies biodiversity, conservation of renewable and non-renewable resources.

Given that laboratories and programs of biological and environmental research FICAYA have a need to publish and share information. Arises the need for a geographic information system GIS, it will bring much to the development, innovation and technology, through the

improvement of the registration process, publication and location of geographic data.

2. Materials and methods

To develop software, today is essential to use the same methodologies that help get quality products. There are several methods that can be applied in developing this project including traditional and agile methodologies.

2.1 Development Methodology

The system development process took the steps of the SCRUM agile development methodology suggesting the creation of the product stack, requirements definition, tasks and development (Spring). The main features of Scrum are:

• is oriented teams to develop systems and products iterative and incremental way in scenarios where requirements change rapidly.

• Helps control the chaos of conflicts of interests and needs.

• It is a way to improve communication and maximize cooperation.

• It is a way to maximize productivity.

• It is scalable to multiple projects and the entire organization. [2]

SCRUM PHASES:

Planning: In this phase all the collection of information and user requirements is performed.

Iterations: This phase takes the user stories, tasks planning for user story, in addition to acceptance tests.

Implementation: The phase where the project is implemented.

SCRUM ROLES

Product Owner: The person who makes the decisions, and that really knows the business and its product vision. It is responsible for writing the ideas customer orders by priority and places them in the Product Backlog. [3]

Scrum Master: The Scrum Master acts as a facilitator for the product owner and team. The ScrumMaster does not manage the team. The ScrumMaster works to remove barriers that obstruct the team sprint achieve its objectives. This helps the computer to remain creative and productive while ensuring their successes are visible to the product owner. The Scrum Master also works to advise the owner of the product on how to maximize the return on investment for the team. [4]

Scrum Team: usually a small team and have authority to organize and make decisions to achieve your goal. It is involved in estimating effort Backlog tasks. [3]

2.2 Development Tool.

Oracle Business Intelligence 11G

Business intelligence is the part of responsible business management of the collection, processing and presentation of relevant information to facilitate decision-making. In addition to providing the information that users of the system need modern business intelligence systems are capable of detecting threats and opportunities automatically and notify them to the right user at all times. [5]

Most business intelligence applications includes a spatial or geographic feature. Oracle database includes Oracle Spatial, which can store spatial data such as maps and points of interest along with the data for analysis, and the feature of Oracle Fusion Middleware MapViewer can do these spatial data in the form of interactive maps based in the web. [6]

ORACLE LOCATOR

Oracle Locator (Locator), is a feature of Oracle Database Standard Edition. Locator provides basic functions and services available on Oracle Spatial. GIS provides significant capabilities typically required to support Internet and wireless services based GIS solutions and applications. Locator is available with Standard, Enterprise editions of Oracle Database and Oracle Database XE (Express Edition). [7]

MAPBUIDER

MapBuilder is a standalone application that lets you create and manage mapping metadata (styles, themes and base maps) that is stored in the database. For example, this tool is used to create a style or change the definition of a style. Besides handling the metadata, the tool provides interfaces to preview the metadata (to see how a line style displayed on a map) and spatial information. [8]

ORACLE MAPVIEWER

Oracle MapViewer is a J2EE web application that is used to represent maps in a web page. It can be deployed on most J2EE application servers (such as OC4J, Apache Tomcat, Weblogic etc). Web-based applications, as OBIEE 11g can embed maps into their web pages simply by calling Oracle MapViewer.
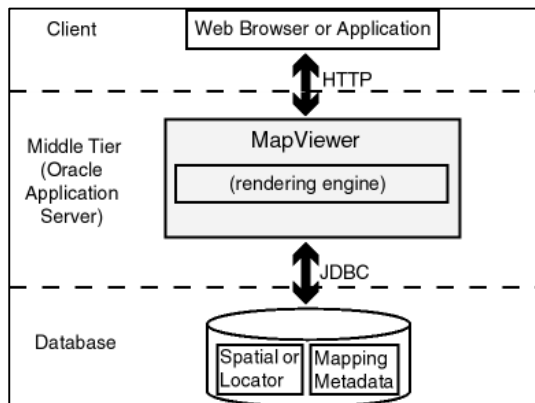
Then Oracle MapViewer architecture shown.

**Figure 1:** Architecture of Oracle MapViewer

Font:
http://www.oracle.com/technetwork/es/articles/adf/tutorial-integracion-mapviewer-11g-1657308-esa.html

3. Resultados

With the study of obtaining the geolocation information of a herbarium specimen UTN has implemented a geographic information system (GIS) that helps you find the point on the map where a specimen was collected.

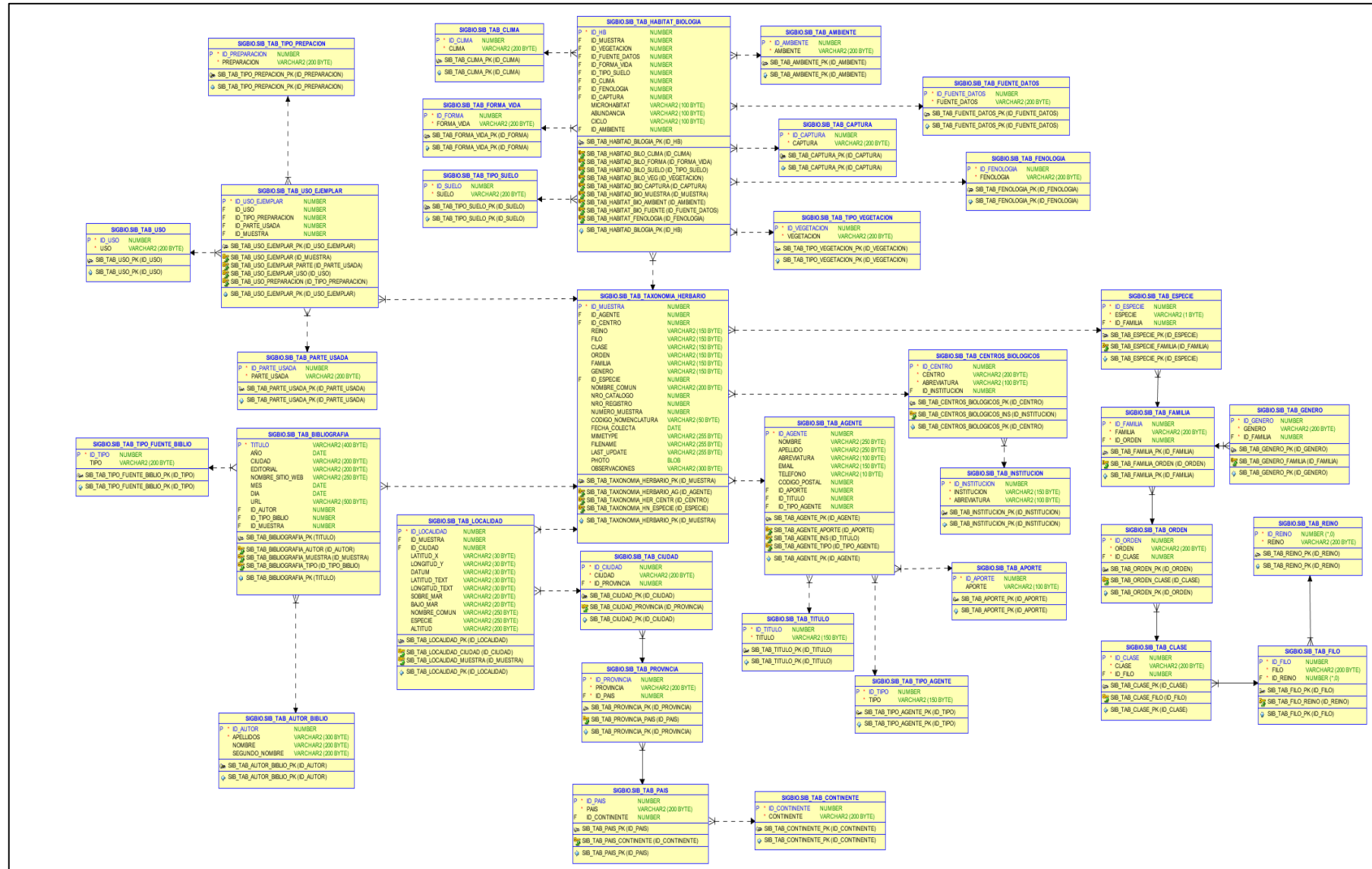Below is a figure of the dashboard geolocation species shown.
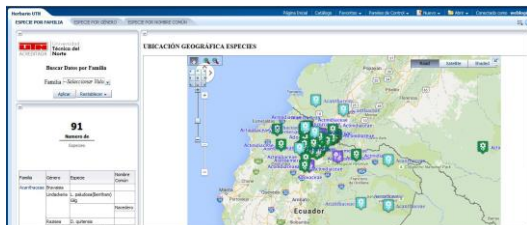
Figure 2: Relational and GIS spatial entity BIO

4. Conclusions

After making a diagnosis of the current situation in the search for geographic information of the species of herbal North Technical University. The usefulness of this tool to support biological research and in the display instead of collecting the species is found.

Studying the behavior that have allowed natural herbal clearly know the taxonomic information and features. Which facilitated the development of the GIS system, and in turn know the place of collection according to a taxonomic identifier (family, genus, species).

After making the study of technological tools GIS was determined as engine Oracle Database 11g, for analysis and import of layers and maps Oracle BI to be a friendly tool the user to display layers in the map viewer form fast, flexible and interactive for users. These tools being a great help to the user in interpreting and georeferencing of geographic information.

The architecture proposed as: Server MapViewer maps, geographic data analysis solution based on Oracle 11g and Oracle BI integrated technological architecture of the UTN, will be the basis for building the future of an IDE (Spatial Data Infrastructure) and to exchange information with other institutions related to biodiversity.

For system development methodology was used SCRUM agile development include allowing the user and achieving functional deliver products and services tailored to the business logic in a short time.

Thanks

Bibliographic references

[1] Plan Nacional del Buen Vivir. (2014). *Buen vivir*. Available at: http://www.buenvivir.gob.ec/objetivo-7.-garantizar-los-derechos-de-la-naturaleza-y-promover-la-sostenibilidad-ambiental-territorial-y-global#tabs2

[2] Gutierrez, D. (2011). Métodos de Desarrollo de Software. Available at: http://www.codecompiling.net/files/slides/IS_clase_13_metodos_y_procesos.pdf

[3] Gallegos, M. (2013). *Metodología de Desarrollo de Software*. Available at: http://openaccess.uoc.edu/webapps/o2/bitstream/10609/17885/1/mtrigasTFC0612memoria.pdf

[4] (James, 2010). *Metodología Scrum*. Available at: http://scrummethodology.com/

[5] Augusto, C. (2013). *Oracle BI*. Available at: http://onegolive.com/que-es-la-inteligencia-de-negocios-bi.aspx

[6] Oracle. (2011). *Oracle BI*. Available at: http://www.oracle.com/technetwork/issue-archive/2011/11-may/o31bi-354140.html

[7] Oracle. (2010). *Oracle Locator*. Obtenido de http://docs.oracle.com/cd/E18283_01/appdev.112/e11830/sdo_locator.htm

[8] Oracle. (2006). *Oracle Map Builder*. Obtenido de https://docs.oracle.com/cd/B14099_19/web.1012/b14036/vis_mapbuilder.htm

The author.

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