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**"STUDY OF THE METHODOLOGY OF BUSINESS RULES ORIENTED TO THE USE
OF A RULES ENGINE OF PRODUCTION"**

AUTOR: CHAMORRO CHUQUÍN FRANKLIN GERMÁN

DIRECTOR: ING. JOSÉ LUÍS RODRÍGUEZ

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STUDY OF THE METHODOLOGY OF BUSINESS RULES ORIENTED TO THE USE OF A RULES ENGINE PRODUCTION

CHAMORRO CHUQUÍN FRANKLIN GERMÁN

e-mail: frank_tp76@hotmail.com

SUMMARY: In the development of software applications architects, engineers and software analysts to the arduous task of getting user requirements that are the business rules of a situation of real modeling world, which will then be translated into code face source at the stage of development of such applications, for this reason this research aims to provide an initial guideline for future research that will lead to improvements in software development in the Business Logic layer of the architecture of a software application.

The need for this issue arises because when the business rules that govern the company using a software application, they have to be changed for strategic reasons the company itself or by the laws of the environment that unfolds; you have to stop the application and navigate within the source code of the application to make the required changes.

This work focuses on using a methodology for rules of valid business for use in a rules engine production to try to reach a solution quality, achieving the decoupling of application layer business logic architecture software, which is not necessary to hide the

business rules within source code but have them exposed.

KEYWORDS: business rules, rules engine production business logic.

1. INTRODUCTION

At the beginning of an application software development it consisted of a sort *of black box* which remained hidden implementation and the different components are mixed to put it into operation. As time progresses jointly started appear methodologies tools to apply in order to be reliable to get a better quality product. It began to develop methodologies and tools that often the people responsible for development were required to adapt to you to achieve your goals. And most of the time focused on software application itself but forgot the reason why the software application was made. The different methodologies and software tools began to cover different stages of software development; each of them with their respective regulations. This caused processes and business rules with the company which is governed be hidden in the source of different programming languages

that were used to develop systems software code.

There is currently a variety of methodologies and tools that facilitate the development of software. Methodologies separating the information, and applications that manage them. There are tools developed through inference engines and management systems of production rules that allow to use these rules and have a much clearer separation of these rules and the system that handles.

Neglecting the greater good that a company such as business rules makes both human and technological resources are lost because sooner or later it is necessary to navigate a large number of lines of source code application to modify the logic of company.

2. OBJECTIVES

2.1 General

Deploying a Virtual Shop of crafts for the company SPECIAL ENCHAPES producers of furniture decoration accessories.

2.2 Specific

- Document the methodology of business rules.
- Investigate the operation of the engine production rules DROOLS.
- Use the RUP methodology for web application development.
- Develop a Virtual Crafts shop in JSF technology to integrate the rule engine DROOLS production.

- To validate the web application.

3. JUSTIFICATION

At present, companies choose to optimize their resources through the implementation of systems that automate their business management processes, as these systems are effective and provide great benefits for the company, either in time, money and effort. At the same time, the constant technological and scientific advancement requires companies to adopt new ways of processing information and modern means to make the information is transferred in the shortest possible time, to your destination.

Promote the use of inference engines or systems of production rules that manage business rules in the business logic is a good way to reduce the technology gap. Since a company's staff who master the rules of business and personal computer technology dominates. Applications with this type of technology that will allow is that business rules have more significance in the management of the company and dependence will decrease technologically trained personnel.

This will allow the business rules are open and ready to be used and modified without greater effort to master more than the business rules. With the Web technology available software development tools freely licensed, you can do that systems are robust,

scalable and secure. By using tools freely licensed as drools and JSF based on the design pattern MVC (Model, View, Controller) software, you can make the application through layers, which will make integration.

The implementation of Web application, will be carried out with the use of Open Source tools.

The benefits of putting into production a virtual shop for handicrafts producers SPECIAL ENCHAPES company furniture decoration accessories are designed to sell and promote the crafts that are made; and promote the same way the parish of San Antonio de Ibarra.

4. SCOPE

The document contains modules that are part of the Implementation of the Virtual Shop crafts for ENCHAPES company SPECIAL producers of furniture accessories and services available to users.

The Web application will have the following features, for different users:

- Username and password for login.
- Customer Management.
- Management of Crafts.
- Management of Craftsmen.
- Management Cart.
- Order Management.
- Management business rules through the management system BRMS DROOLS business rules.

Project modules.

This project will develop the following modules:

System Security Module: Performs user authentication for both the management module to module Shopping Cart.

Management Module: Management as artisans in this option are performed creating, updating, and deleting a craftsman. Management handicraft. - This option will perform the creation, updating, deleting a craft.

Management request. - This option order status is updated.

Cart module: Allows the user registered to buy crafts.

Reports: Artisans Report, Crafts Reports, most bought Handicrafts

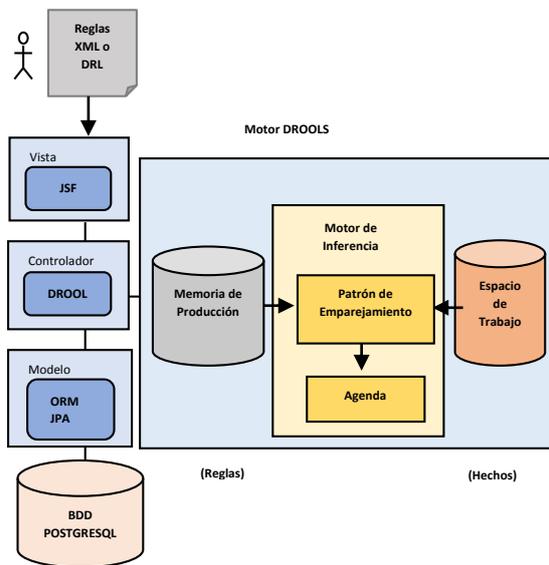
5. STUDY METHODOLOGY

BUSINESS RULES AIMED AT THE USE OF ENGINE PRODUCTION RULES

Software developers face the need to change the rules of business application software in hidden lines of source code every time the environment changes where the application is used. This type of problem is because the man takes place in a dynamic world and software systems have to adapt to change. The purpose is to define high-level application requirements "deploy a virtual crafts store ENCHAPES SPECIAL FOR

PRODUCING COMPANY
ACCESSORIES DECORATION
FURNITURE".

5.1 Architecture



The architecture proposed for implementation of application described below.

There is an Application Server JBoss-AS where is running the Virtual Store "SanAntonioStore" so that the system has to work a framework JSF user interfaces for server-side Web applications based on Java technology (. Juan José Sánchez Meroño, 2009, page 48) which respond to requests made by the user through the web; JSF access the PostgreSQL database through the Managed Beans interacting together with a container which allow EJBs perform basic CRUD operations using JPA persistence layer; these components also they are the basis for the integration of production rules engine Drools Expert who is in the business

layer design pattern Model-View-Controller.

In PostgreSQL it has created the database name SanAntonioStore which is structured in the public and tablespace SanAntonioStore scheme.

The administration of business rules would be made by Guvnor Drools is a management system business rules with web user interfaces.

The Administrator user can manage the business logic business rules through Guvnor through a Browser. Likewise the user Administrator may access the Virtual Store for administration of the data model and users registered customers and anonymous visitors or have web access via a browser on the InterNet.

6. DEVELOPMENT PROJECT

PHASE HOME

PROJECT OVERVIEW

Here defines high-level requirements of the application "deploy a virtual crafts store ENCHAPES SPECIAL FOR PRODUCING COMPANY ACCESSORIES DECORATION FURNITURE".

To implement this application the methodology of business rules and the rule engine Drools production which is a production rule system based on the RETE algorithm OO (Wikimedia Foundation, Rete algorithm, 2014), which is used meets the implementation of the JSR-94 specification (standard business rules engine and

framework (Framework) company for construction, maintenance, and strengthening of company policies in an organization, application or service (Wikimedia Foundation, Drools, 2014)) that defines a set of functions and procedures that should provide a rules engine in Java. Thus giving an automated model able to modify the business rules of a company, facilitating the availability of the rules for editing, display, tracking that meet the requirements of the company.

The aim is to collect, analyze and define the needs of high level and characteristics of the virtual store for SPECIAL ENCHAPES company producing accessories for furniture decoration which will be implemented in web environment and manipulate customer information, crafts, artisans, orders, and the restrictions required for proper operation. The online store will contribute to the optimization of material and human resources of the company "SPECIAL ENCHAPES", increasing productivity and sales of handicrafts prepared by the company.

7. SOFTWARE DEVELOPMENT PLAN

The aim of the project planning software is to provide a Framework (conceptual and technological support structure defined, usually with specific devices or software modules, which can be the basis for the organization and development of software

(Wikimedia Foundation, 2014)), to enable those involved in the project make reasonable estimates of resources and planning costs during processing.

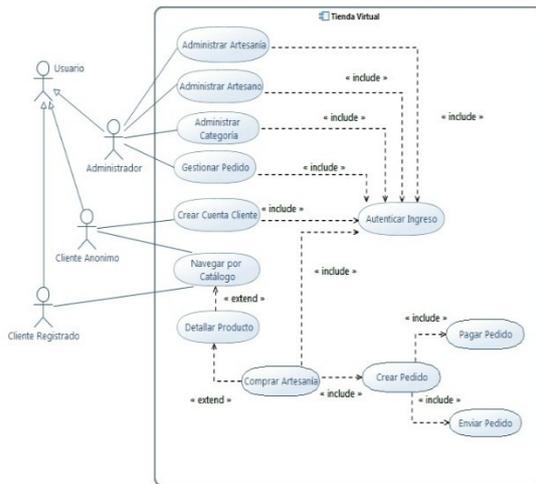
These estimates are made within a period of time in which the home is limited, and as the project progresses software will be updated regularly until completion thereof. Besides these estimates pose scenarios so that project results may be limited.

For the development of the Virtual Store the RUP (Rational Unified Process), allowing it to use its rules to define the project and in the same way allow better organize both development and documentation were used.

7.1 Processing Steps

The requirements will be established using a model of use cases including use case diagrams using stereotypes that allow better identify project functions performed by actors and users of the system. Therefore the use cases determine the functional requirements of the system, in other words description, basic flow, alternative flow, pre-conditions and post-conditions.

The following use case shows an overview of the Virtual Store.



7.2 Construction Phase METHODOLOGY OF BUSINESS RULES:

In the construction phase of the 4 principles of the methodology used rules:

Separate, Track, Externalize, Place or locate the rules. You are given a sequential identifier called RN to start. These rules are in natural language within the context of business.

You are given a sequential identifier called in to begin with. These rules are in natural language within the context of business.

R1: If there is an active state registered customer and there is one or more registered active state and exists in stock crafts

Then register the order with your details or crafts

R2: If there is an active state registered customer and there is one or more registered active state and exists in stock and crafts handicrafts is on offer

Then update the total amount of craftsmanship multiplying by 1 percent

discount

R3: If a registered customer with an active state and there is one or more crafts registered with active state and exists in stock and total order amount is greater than or equal \$ 50.

Then update the total order amount by multiplying by 10 percent discount

R4: If there is an active state registered customer and there is one or more registered active state and exists in stock and the total number of crafts is greater or equal 5 Units crafts

Then update the total order amount multiplied by the discount of 5 percent

R5: If a customer registered with active status and category Wholesale and there is one or more registered active state and the total number of crafts equals or exceeds 50 units

Then update the total order amount multiplied by the discount of 1 percent

R6: If there is an active state registered customer and the purchase date is between a start date and an end date and there is one or more registered active state and the total number of crafts is greater or equal to 2 units
Then update the total order amount by multiplying by 0.5 percent discount.

Removing classes

Data model or definition of Acts

Client: User ID

Name and Surname

Category

State

Craft Category: sequential ID

Description

State

Crafts: Craft ID

Name

Category

Stock

Supply

State

Order: Identifier

Customer

Amount

Date

State

Details Order: ID

Order

Crafts

Amount

Quantity

Cost

State

Translation of business rules to a meta-model business rules.

R1:

Si existe un Cliente.Estado = 'S' y Artesanía.Estado = 'S' y Artesania.Stock > 2

*Entonces Pedido.Importe = Suma (DetallePedido.Cantidad * DetallePedido.Costo)*

R2:

Si existe un Cliente.Estado = 'S' y Artesanía.Estado = 'S' y Artesania.Stock > 2 y Artesania.Oferta = 'S'

*Entonces Pedido.importe = Suma (DetallePedido.Cantidad * DetallePedido.Costo) * 0.01*

R3:

Si existe un Cliente.Estado = 'S' y Artesanía.Estado = 'S' y Artesania.Stock > 2 y Pedido.Importe >= 50

*Entonces Pedido.importe = Pedido.Importe - (Pedido.Importe * 0.1)*

R4:

Si existe un Cliente.Estado = 'S' y Artesanía.Estado = 'S' y Artesania.Stock > 2 y Suma (Artesania.Cantidad) >= 5

*Entonces Pedido.importe = Pedido.Importe - (Pedido.Importe * 0.05)*

R5:

Si existe un Cliente.Estado = 'S' y Cliente.Categoria = 'Mayorista' y Artesanía.Estado = 'S' y Artesania.Stock > 2 y Suma (Artesania.Cantidad) >= 50

*Entonces Pedido.importe = Pedido.Importe - (Pedido.Importe * 0.05)*

R6:

Si existe un Cliente.Estado = 'S' y Artesanía.Estado = 'S' y Artesania.Stock > 2 y Suma (Artesania.Cantidad) >= 2 y Pedido.Fecha Entre FechaInicial y FechaFinal

*Entonces Pedido.importe = Pedido.Importe - (Pedido.Importe * 0.05)*

7.3 TRANSITION PHASE

7.3.1 IMPLEMENTATION OF WEB SITE

For application deployment to cloud the following parts are needed

- Installing and configuring an application server in this case JBoss 7.
- Installing and configuring the PostgreSQL database.
- Installation and Configuration Management System Business Rules-Guvnor Drools.
- Installation and configuration of the Virtual Store San Antonio Store.

7.3.2 SPECIFICATIONS TEST CASE

Evaluation of the test

Test Case: Create new category for handicrafts.

Test Case: Create New Craftsman

Test Case: Create New Crafts

Test Case: Create New User

Test Case: Create a sale of handicrafts

8. CONCLUSIONS

- The development of this application helps the company ENCHAPES SPECIAL producers of furniture decoration accessories to bring an orderly and systematic way trade and economic transactions carried within it.
- The integration of the tools and framework that was used in the development of the application is achieved through the design pattern

Model-View-Controller for Web applications together with the Java EE 6 platform to clearly identify Frameworks in each layer.

- The modeling of business rules using the methodology proposed rules, can fulfill the objective of separating, track, externalize, place or locate the business rules for changes in the future without the need to compile and deploy the application again if not through rules management System Guvnor.
- The modeling of the application in RUP allows for updates in the future; the system is designed for that task, where he or administrators can make changes that are required and the implementation of other modules.
- It was found that the management together with Guvnor Drools 5.5 is satisfactory to manage business logic, since the rules administered through a Web interface.

9. RECOMMENDATIONS

- You must be careful when choosing integrated development environments (IDEs) as this helps or hinders the integration of the different layers represented by the Frameworks that were part of the application.
- Collect information from the whole context of the company to separate, track, externalize, place or locate the highest number of business rules at the beginning of system development to avoid

redesigning the rules, database and application.

- The sponsoring company available infrastructure and connections needed to implement and installing the application, and avoid setbacks in the evaluation and testing of the system; and access to the system from the Internet.
- That for the start of construction of a new application in which you decide to use a rule engine Drools 6 version as it is much more transparent integration.
- We recommend using a rules engine production when the number of rules of business logic is complex and numerous.
- It is recommended to the authorities of the University and the Faculty seek agreements with other institutions for students and future professionals apply their knowledge and at the same time have more opportunities in the workplace.
- To our teachers, it is important to encourage research into new technologies since these can reach more optimal and quick solutions.

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