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TOPIC

DESIGN AND AUTOMATION OF THE HUMAN TALENT MANAGEMENT
PROCESS BY COMPETENCES FOR TÉCNICA DEL NORTE
UNIVERSITY

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Design and Automation of the Human Talent Management Process by Competences for “Técnica del Norte” University

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Abstract— This article introduces the procedure applied for automation of the human talent processes of the Técnica del Norte University’s Human Talent Direction, through software development methodology RUP and whose modules are: definition of profiles and jobs valuation, personnel selection, performance assessment and training of staff implementing the competences management model, currently considered as the best technical tool for the development of human capital. At same time the obtained software has been integrated into the university system interacting with Process Management and Strategic Planning systems.

The need comes from the limited integration of the processes of this particular area; and what was achieved was to reduce the costs for implementing many activities that until then were done manually as well as accessibility and reliability to have consistent information.

Key Words — Training, valuation, competences management, profiles, staff, human capital, recruitment, human talent.

I. INTRODUCTION

CURRENTLY human capital management involves not only have a collection of curriculums vitae or do pay employees operations. The importance it has acquired has led to new ways to apply; as if there is no motivated and achievement-oriented people, productivity does not reach the levels required by an organization. However, a management system at organizational level needs to rely on technological tools to speed up operations that it involves.

Handled processes in Human Talent Management at “Técnica del Norte” University were not supported by a software to manage information. The previous version of the system allowed recording information on curriculums vitae and contracts; while processes involving staff management performed manually through the use of office packages, causing a lack of structure and distortion of it.

A. ISSUE

The Human Talent Management has difficulty managing activities related to their processes because these are not automated.

This issue directly affects employees in this direction by the slowdown of the processes because they don’t have an information system that speeds up execution of the same and consequently UTN administrative officials who are harmed when making paperwork relative to the direction.

The generated impact is that the activities performed manually an offset occurs in the information, causing an inefficient management of information, and staff uses unnecessary time in operations that must be handled by a computer system.

A successful solution would be to implement a computerized system of quality supported by an efficient software development methodology that will allow a significant reduction of resources used to run the process.

B. POSING

The limited integration of processes has led to pose the proposal of automation of those involved in staff management: definition of the job profile, selection, performance assessment and training based on competences management.

Define a job involves establish the necessary requirements to exercise the same: formal education, knowledge and competences. It also involves describe their functions and place it in the processes involved. To do this, the information related to the processes must be previously registered. The process’ activities are taken into account when defining the job functions and so locates the job within the processes.

Job valuation leads to classification and this is shown in the area of job description. It is done through the weighting of several factors that influence the performance of a job. The resulting value in points will determine the Group, Occupational Role Occupational and related pay job according

to pay scale decreed by the “Relaciones Laborales” Ministry of Ecuador.

Personnel selection involves four stages: recruitment where vacancy for a post is published; *preselection* where candidates are selected according to the percentage of compliance with the requirements of the vacancy profile; *selection* where it selects the top-rated candidates according to the information on the results achieved in each of the tests given to candidates and *induction* where necessary privileges are granted to new employees about the system, to familiarize with the institutional environment.

Performance assessment is divided into three parts: evaluated by objectives, competency assessment and service assessment. *Assessment by objectives* involves evaluating compliance with these. For this, the income AOP (Annual Operating Plan) through the Planning System is required. Currently the information is entered only by dependency but it is expected that's socialize their importance and performance to each employee previous agreement with his superior.

Competences assessment was made based on the job profile. The assessment method 360° where the employee is evaluated by others from different hierarchies (superior, peer, subordinate) and applies itself.

Service assessment refers to the claim forms that fill the users accessing a service of the institution. These users can be external and internal assessment and depends on whether the final score of the assessment is reduced.

Training consists of preparing the annual plan of training management, to approve the plan and evaluating the training that have been approved by the participants assigned to each.

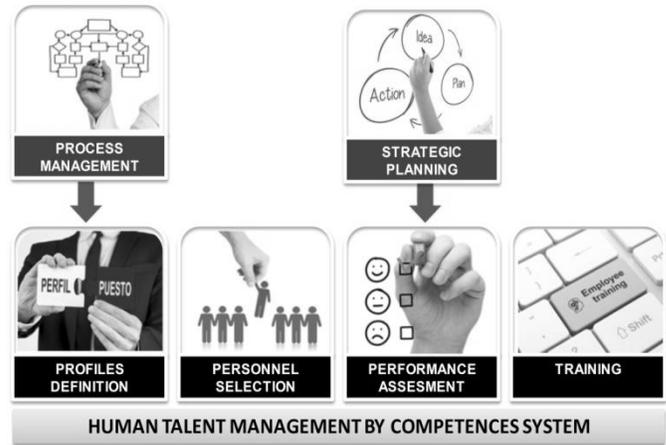
The construction of this software has begun with the process design of human talent management that serves as input for the elaboration of the artifacts used in the software development methodology RUP (Rational Unified Process).

C. POSITIONING

The software product that runs these processes has been termed as "Human Talent Management by Competences System" intended primarily for employees of the Direction of Human Talent Management in the UTN and the administration in general as part of speeding up operations is also given for their participation.

This system stores information of human talent processes described in section posing. It allows you to manage the different activities of the Direction by a simple and friendly graphical interface. It also provides a quick access and updated information from anywhere that has access to the database.

Fig. 1 Scope of Competences Management System



Source: Own

D. PROJECT OBJECTIVES

- a) Design the Human Talent management by competences processes for the institution.
- b) Use the tools that own the North Technical University in automating the process of managing human talent competitions.
- c) Apply RUP in the development and implementation of the system.
- d) Designing computer system architecture.
- e) To develop a suitable framework for the development of system tests to verify proper operation.
- f) Implement the system and put it into production so that users dispose of this.
- g) Do user and technical manuals to provide access to the system.

II. METHODOLOGICAL FRAMEWORK

A. HARDWARE AND SOFTWARE RESOURCES

For the development and implementation of the management system of human talent by competences, it has been used hardware resources, software and communications.

Table I indicates that resources are managed for the project.

**TABLE I
RESOURCES SPENT IN PROJECT**

RESOURCE	TOOL
HARDWARE	Applications server housing and system operation.
HARDWARE	Database server for storage of information entered through the system.

RESOURCE	TOOL
SOFTWARE	Oracle Database 11g: for database installation.
SOFTWARE	Toad for database management and data analysts of the stored information.
SOFTWARE	Oracle Developer Suite - Designer for database modeling.
SOFTWARE	Oracle Developer Suite – Forms Builder for design application user interfaces.
SOFTWARE	Oracle Developer Suite – Reports Builder for design of system reports.
SOFTWARE	JDeveloper – for the artifacts design of RUP related with software architecture.
SOFTWARE	Bizagi for process modeling.

Source: Own

B. RUP METHODOLOGY

As noted in the previous section it was chosen RUP as a methodology for software development also known as iterative and incremental [1] Development not only because it is the standard development methodology in the TI Direction in UTN but also for being a set adaptable to the context and needs of each organization principles.

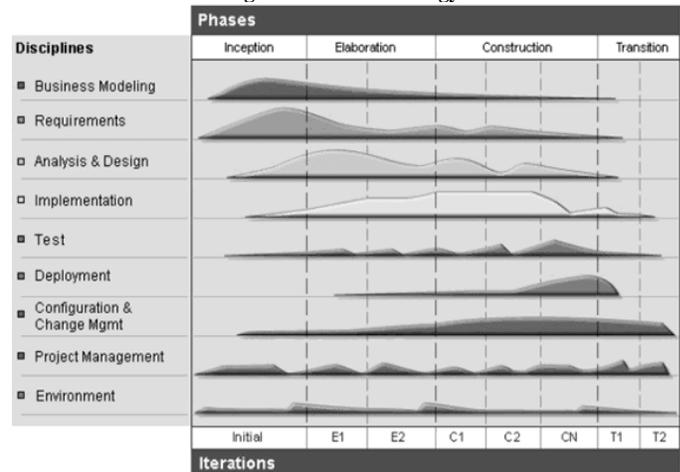
The Rational Unified Process is a software development process and with the Unified Modeling Language UML is the most widely used standard methodology for analysis, implementation and documentation of systems.

This methodology is characterized by:

- Disciplined way of assigning tasks and responsibilities.
- Seeks to implement best practices in Software Engineering.
- Iterative Development.
- Administration requirements.
- It focuses on architecture.
- Change control.
- Visual modeling software.
- Verification of software quality.

The methodology states that the software development process is structured as a four-phase process, considered as a mini project consists of one or more iterations and various disciplines that replicate iteratively and incrementally. This strategy allows the software product steady growth during development.

Fig. 2 RUP Methodology



Source: RUP Model

During the development period worked artifacts using the methodology provided in its different phases, the most relevant to this case:

- 1) *Inception Phase*: The problem is explored. Artifacts related to project management and requirements.
- 2) *Elaboration Phase*: The problem domain is analyzed, the foundations of the architecture are established and the greatest risk is eliminated. It delves into the critical points of architecture.
Artifacts: Procedures Manual and Use Cases.
- 3) *Construction Phase*: Product operational capacity incrementally through successive iterations is reached. It implements, integrates and tests components, characteristics and requirements, which have not been brought to this stage, obtaining a beta version of the product.
Artifacts: Logical, Development and Physical Views.
- 4) *Transition Phase*: The product was placed in the hands of end users, which will last for several development versions. The documentation is complete, enables the user in product handling, and general tasks related to the setting, configuration, installation and usability of the product is made.
Actions: Testing and Implementation
Deliverable: Software product and manuals.

The procedures required to implement these phases have been formalized in the direction of Computer so software developed has gone through this process and generated the documentation.

III. RESULTS

A. PROJECT MANAGEMENT

The activities related to this stage establish a framework of management system for human talent competitions.

Table II shows the breakdown of the main activities related to project management

TABLE II
PROJECT MANAGEMENT ACTIVITIES

ACTIVITY	ARTIFACT
Project Planning	Software development plan.
Risks Management	Evaluated and updated risks list in each iteration.

Source: RUP Model

In the project development risks greater impact that can affect normal development were defined. Table III shows all major.

TABLE III
RISKS LIST

CODE	RISK
RI-03	Some activities carried out in the institution are not properly formalized.
RI-05	The respective planning system and adequate monitoring is performed to verify compliance with the goals.
RI-07	The end user does not participate actively in the project.
RI-10	Create false expectations on the authorities of the institution and system users.

Source: RUP Model

B. REQUIREMENTS

The theme of the requirements is always crucial in any software project. He has repeatedly said that most of the problems of software products are in the stage of defining requirements. Usually these problems are the most expensive to repair. Another reason why the requirements stage is crucial is the fact that a complete intersection of the interests of all stakeholders are given elsewhere in the development process of software project.

In the software development project human talent management by competences, the needs of the Users / Stakeholders are defined in the Vision Document.

The specification of requirements needed not only to meet the needs of the users but also the flow of the processes that are intended to be converted in software. Since not had this information we proceeded to documentation and modeling of them. He started from knowing how the processes are organized in the institution and how are grouped according to their contribution and added value to the fulfillment of the institutional mission.

In Fig. 2 is seen as the processes are classified in the UTN (“Técnica del Norte” University) [2].

Fig. 3 UTN Processes Classification

Categoría	Área de Procesos
Dirección y Gobierno (DYG)	DYG.AE. Análisis del Entorno
	DYG.DE. Dirección Estratégica
	DYG.GC. Gestión de la Comunicación
	DYG.GV. Gestión del Valor
	DYG.GR. Gestión del Riesgo
Generación de Valor (GDV)	DYG.GMC. Gestión de la Mejora y el Cambio
	GDV.INV. Investigación
	GDV.DOC. Docencia
Asesoramiento y Apoyo (AYA)	GDV.VIN. Vinculación
	AYA.AI. Auditoría Interna
	AYA.AJ. Asesoría Jurídica
	AYA.SG. Secretaría General
	AYA.PI. Planificación Institucional
	AYA.ICI. Información y Comunicación Institucional
	AYA.ACH. Administración del Capital Humano
	AYA.BU. Bienestar Universitario
	AYA.AF. Administración Financiera
	AYA.ACB. Administración y Control de Bienes
	AYA.AP. Administración de Proyectos
	AYA.GTI. Gobernanza de las TI
	AYA.CG. Control de Gestión
AYA.ARB. Administración de Recursos Bibliográficos	

Source: Management Model UTN 2011

In addition to complete the requirements specification is investigated on competencies and their application in the management of human talent. The *competence* is "demonstrated ability to apply knowledge and skills ability" [3] and *competences management* is the set of procedures that allows "select, evaluate and develop people in relation to the competences needed to reach organizational strategy." [4]

The most recognized bibliography in Latin America is the corresponding to that of Dr. Martha Alles whose doctoral thesis "*Incidencia de las competencias (características de personalidad) en la empleabilidad de profesionales*" marked the starting point for the publication of many of her books on human talent management and consulting services in Latin America, books that cover the following aspects: definition of profiles [5], recruitment [6], performance assessment [7] and staff training. [8]

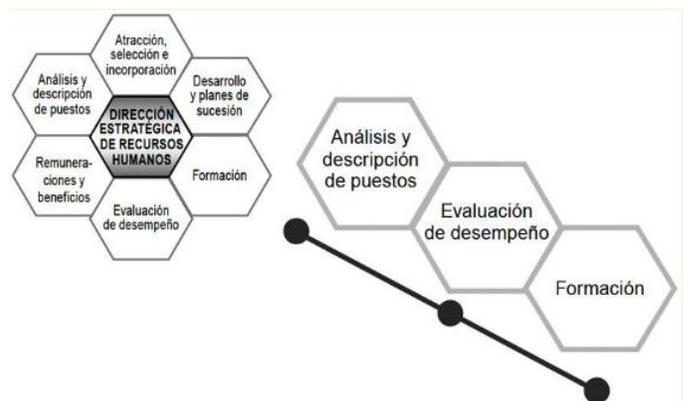


Fig. 4 Global scheme by competences according to Martha Alles

C. ARCHITECTURE

The architecture in the RUP methodology is one of the most important artifacts produced as it is understood by each of the stakeholders in the project.

This architecture is based on the "4 + 1" View Model, it's a model designed by Philippe Kruchten to describe the architecture of software systems based on the use of multiple concurrent views, [9] where each view refers to a set of interests of different stakeholders of the system.

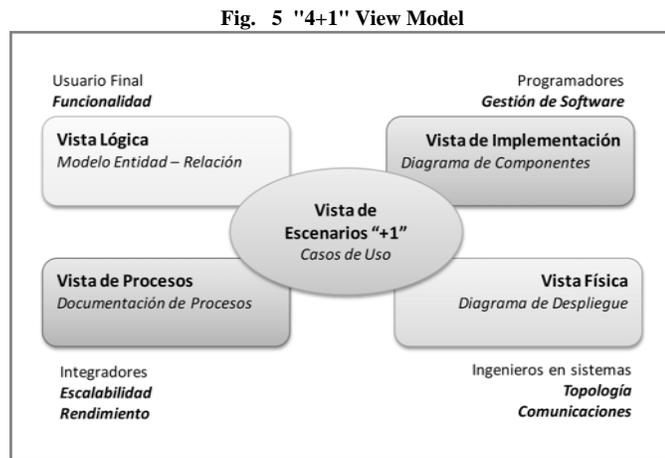


Fig. 5 "4+1" View Model

Source: Kruchten: "4+1" View Model of Software Architecture

Not all software architecture requires the "4 + 1" full view. The views that are not useful may be omitted from the description of architecture, such as the physical view if there is a single processor and process view if there is one process or program. For very small systems, it is possible that the implementation logic and views are so similar that do not require separate descriptions. **The scenarios are useful in all circumstances.**

With respect to the notation for each view, Kruchten said that "the model 4 + 1 view is pretty generic: you can use another notation and tools described, as well as other design methods, especially for logic decomposition and processes.

An example of representation is presented for each view. Full documentation is on paper thesis project [10] and the application in its CD.

1) Logical View

It is represented by the model entity - relationship describes the design of the database software as it is a data-oriented application.

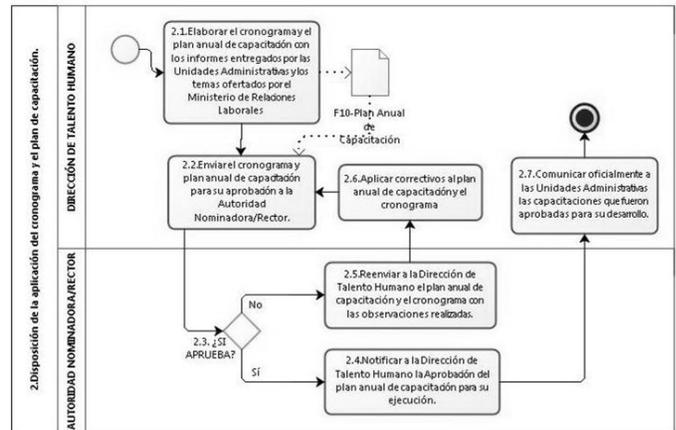
2) Process View

For the design of this view the standard notification process modeling known as BPMN 2.0 or *Business Process Management Notation* [11] was applied.

There is a wide variety of languages and tools that give

users the ease of modeling processes, through the use of the components used in this type of notation: containers, activities, events, gateways, connection objects, artifacts, among others.

Fig. 6 Training Sub process



Source: Own

The process modeling is performed in accordance with the information obtained from the laws and regulations set by the "Relaciones Laborales" Ministry and applied to the public sector servers:

- Ley Orgánica de Servicio Público (LOSEP) [12],
- Norma Técnica de Definición de Perfiles y Valoración y Clasificación de puestos [13],
- Norma Técnica de Reclutamiento y Selección de Personal [14],
- Norma Técnica de Evaluación del Desempeño [15] y
- Norma Técnica de Formación y Capacitación [16].

The design and process documentation contained in the document Procedures Manual. In Table IV are listed the processes involved.

TABLE IV
SYSTEM HUMAN TALENT BY COMPETENCES PROCESSES

CODE	PROCESS
AYA.ACH.1.1.1	Recruitment.
AYA.ACH.1.1.2	Selection.
AYA.ACH.1.1.3	Hiring.
AYA.ACH.1.1.4	Induction.
AYA.ACH.1.2.1	Performance Assessment.
AYA.ACH.1.3.1	Staff Training.

Source: Own

3) Scenarios View

To this view the Unified Modeling Language (UML) which is useful for specifying, constructing, visualizing, and documenting the artifacts of a system of object-oriented

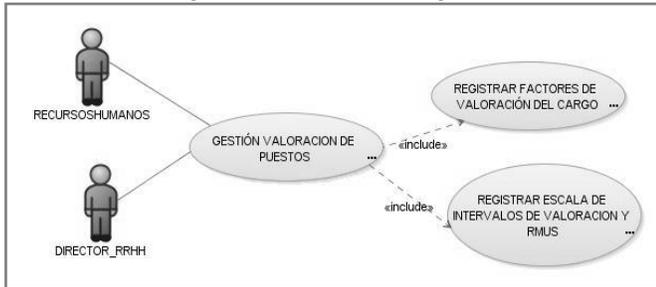
software was used. [17]

Despite being oriented data modeling use cases system was considered as illustratively shown interaction with users and software is the input information for the execution of the tests.

Before the modeling which users interact with the system and what was their role in the flow of its operations were determined. So the following are specified:

- 1) ADMINISTRADOR: Formed by users administer the system at level of users management.
- 2) RECURSOSHUMANOS: Formed by Human Talent Direction end users.
- 3) EMPLEADO: Formed by end users these are administrative area employees. They have access to some parts of the application.

Fig. 7 Jobs Valuation Management



Source: Own

Use Cases Specification, whose artifact of the same name, is developed according as established in the Procedures Manual documentation. In Table V some Use Cases determined for the project are shown.

TABLE V
SYSTEM HUMAN TALENT BY COMPETENCES USE CASES

CODE	USE CASE
UC-01	Users Management.
UC-02	Registration of processes and functions.
UC-03	Jobs Profiles Management
UC-04	Jobs Valuation Management.
UC-05	Recruitment Management.
UC-06	Pre selection Management.
UC-07	Selection Management.
UC-08	Induction Management.
UC-09	Staff Assessment Management.
UC-10	Staff Training Management.

Source: Own

4) Implementation View

In this view the interaction between software components in

the development environment is specified. UML is also used for its design. In Fig. 8 it can be seen an example.

Fig. 8 Components Diagram of Reports



Source: Own

In Table VI the list of components diagrams that integrate software are indicated.

TABLE VII
SYSTEM HUMAN TALENT BY COMPETENCES COMPONENTS DIAGRAMS

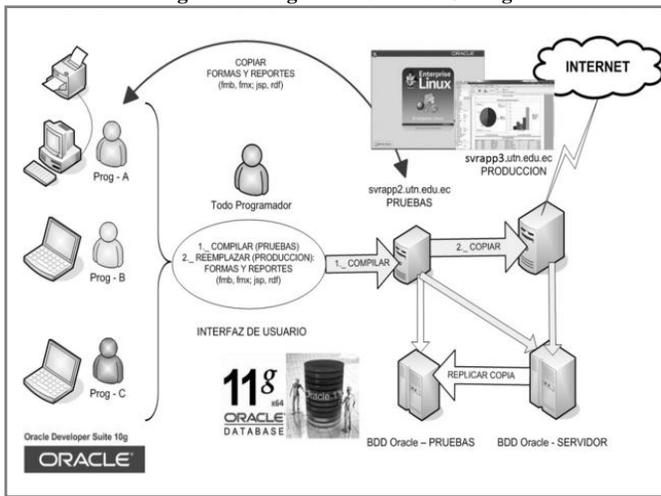
CODE	COMPONENTS DIAGRAM
DC-01	Profiles Definition.
DC-02	Jobs Valuation.
DC-03	Reports.
DC-04	Recruitment.
DC-05	Pre selection.
DC-06	Selection and Induction.
DC-07	Selection Reports.
DC-08	Assessment Reports.
DC-09	Assessment by Objectives.
DC-10	Assessment by Competences.
DC-11	Service Assessment.
DC-12	Training Plan.
DC-13	Approval of plan.
DC-14	Participants by training.
DC-15	Training Reports.

Source: Own

5) Physical View

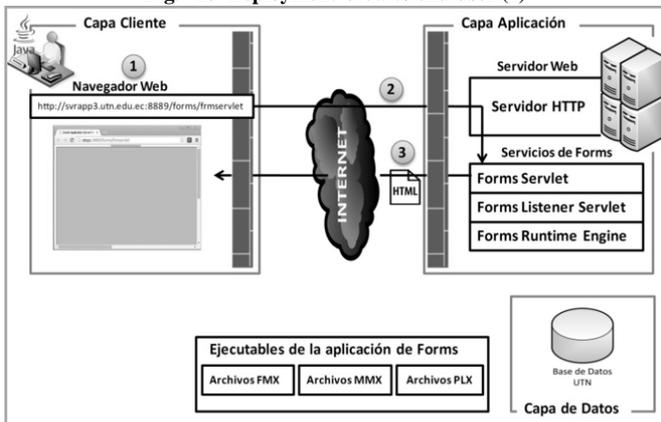
In Fig. 9 the physical model is presented and in Fig. 10, Fig.11 and Fig. 12, the logic model of software running.

Fig. 9 Testing and Production Setting



Source: "Dirección de Informática UTN"

Fig. 10 Deployment View to end-user (1)

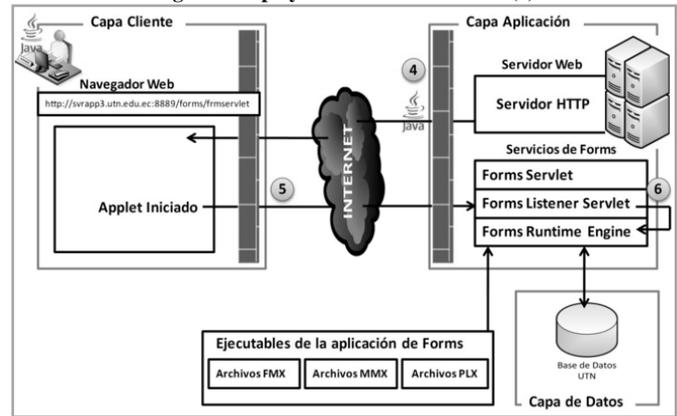


Source: Own

- 1) The user accesses the URL that indicates a Forms application should be executed.
- 2) The Oracle HTTP Server receives a HTTP request from client browser and transmits it to the Forms Servlet.
- 3) Forms Servlet creates and sends an HTML page that contains all the information to start a Forms session.
- 4) The Oracle HTTP server downloads an applet client after verifying that has not yet been downloaded.
- 5) The applet contacts the Forms Listener Servlet to start the session.
- 6) The Forms Listener Servlet set a connection with Forms Runtime Engine, which is connected to the database if it

is necessary and it loads the executable files of the application.

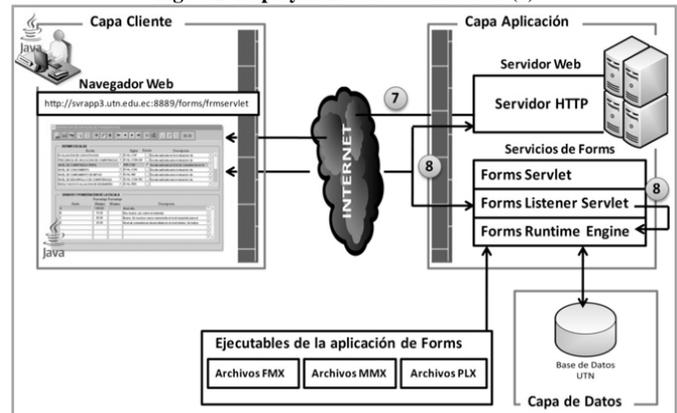
Fig. 11 Deployment View to end-user (2)



Source: Own

- 7) Forms applet deploy the user interface application in the browser.
- 8) The Forms Listener Servlet manages communication between the Forms applet and the Forms Runtime Engine through the HTTP server.

Fig. 12 Deployment View to end-user (3)



Source: Own

D. TESTING

According to the documentation of use cases we proceeded to apply the tests and document their results in the document Test Cases Specifications. In Table VII test cases used in the project are listed.

TABLE VII
SYSTEM HUMAN TALENT BY COMPETENCES TEST CASES

CODE	TEST CASE
PC-01	Jobs Profiles Management
PC-02	Jobs Valuation Management.
PC-03	Recruitment Management.
PC-04	Performance Assessment Management.
PC-05	Staff Training Management.

Source: Own

E. DEVELOPMENT

In the final stage of system development of human talent management by competences, a set of activities related to development were implemented.

Although there was no formal procedure that details such actions, it always had the templates and detailed actions in various documents of the department of Systems Engineering.

In Table VII these "deliverables" of the development phase of the software are detailed.

TABLE VIII
SYSTEM HUMAN TALENT BY COMPETENCES DELIVERABLES

DELIVERABLE	PURPOSE
Software Product	Having properly completed the software artifact to begin implementation.
System installed on production environment	Having the software artifact properly installed and set in final production platform.
Technical Manual	Detailing the necessary actions to implement the software product in the customer site.
User Manual	Guide the user through the operation and system flow.
Procedures Manual	Show in detail the flow of the processes involved in the software project.

Source: Own

The design of the application forms is done through Oracle Forms Developer is a development tool used to create applications to insert, select, update or delete data from an Oracle database in an environment based on online forms [18].

The reports were designed under Oracle Reports Developer is the development tool for creating reports from database tables in formats such as HTML, RTF, PDF, XML, Microsoft Excel and RDF [19].

Obviously the design of the entity-relationship model was developed in Oracle Database 11g is an object-relational database management system developed by Oracle Corporation which is mainly characterized by: (a) transaction support, (b) stability, (c) scalability and (d) multi platform support [20].

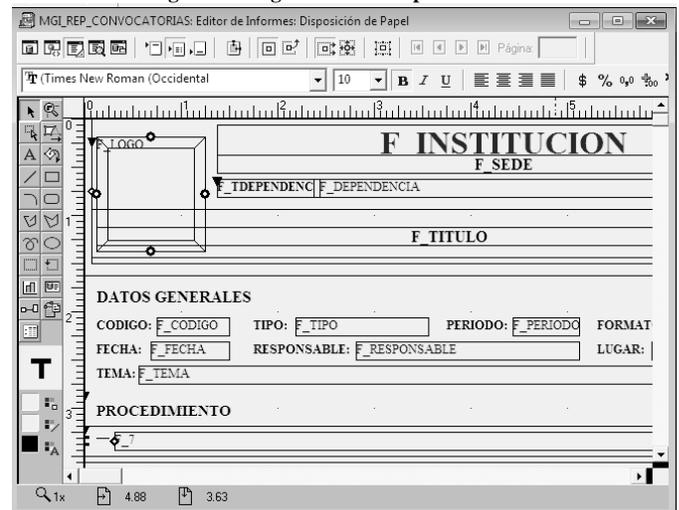
In Fig. 13 a form application is shown. All other forms applications follow the same template. In Fig. 14 the design of a report in Reports Builder is shown and the Fig. 15 shows this design at runtime.

Fig. 13 Oracle Forms Builder Application Form



Source: Own

Fig. 14 Design in Oracle Reports Builder



Source: Own

Fig. 15 Report View on running



Source: Own

IV. CONCLUSION

It was possible to conclude the development of the human talent management by competences system much against of the problems that arose. In this case it was not possible to mitigate the risk RI07 as stakeholders not actively involved in project development. This project was based on research by her author as there were no contributions from technical experts in human talent management.

The management process modeling tools becomes increasingly common but it is expected in the future that happens to use it as a simple design platform flowcharts to a application development platform; because that is the true usefulness of these suites, as in the case of Bizagi.

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