

UNIVERSIDAD TECNICA DEL NORTE



FACULTY OF ENGINEERING APPLIED SCIENCE

SCHOOL OF COMPUTER SYSTEMS ENGINEERING

**Development of a system of inclusion working and tracking of
graduates for the “Universidad Técnica del Norte”**

TECHNICAL SUMMARY

Ricardo Xavier Ruano Collahuazo

Ibarra – Ecuador

July 2011

TABLE OF CONTENTS

| | |
|------------------------------------------------------|----|
| 1. Introduction | 1 |
| 2. Scope | 2 |
| 3. Development Tools | 2 |
| 4. Benefits..... | 6 |
| 5. Positioning | 6 |
| 6. Users and Stakeholders..... | 7 |
| 7. Product Overview | 8 |
| 8. Product Features | 9 |
| 9. App Use Cases | 13 |
| 10. Restrictions..... | 15 |
| 11. Installing and Configuring the Database | 15 |
| 12. Weblogic, Application Server configuration | 17 |
| 13. Conclusions and Recommendations..... | 18 |
| a. Conclusions..... | 18 |
| b. Recommendations..... | 19 |

INDEX OF FIGURES

| | |
|-----------------------------------------------|----|
| Figura 1. Project Outline | 2 |
| Figura 2. Oracle ADF Architecture | 3 |
| Figura 3. ADF implements the MVC pattern..... | 5 |
| Figura 4. Product Overview | 8 |
| Figura 5. UC. Candidates Module..... | 13 |
| Figura 6. UC. Companies Module..... | 14 |
| Figura 7. UC. Admin Module..... | 14 |

INDEX OF TABLES

| | |
|-------------------------------------|---|
| Tabla 1. User Summary..... | 7 |
| Tabla 2. Capabilities Summary | 9 |

1. Introduction

With the advent of new web 2.0 technologies and social networking is becoming increasingly common for companies selectors and the famous "headhunters"¹ use these platforms to identify talent in their candidate² selection processes. There are many companies entering the social networks in search of information about a candidate when they opened a recruitment process and are interested in finding a profile or test the market^[1].

In the "Technical University of the North" the university's relationship with the company and its graduates has always been limited and the line of communication and feedback has been weak when getting answers on critical issues such as work demands, suitable profiles, occupational sectors requested, location and job objective, job satisfaction and current activities of graduates is unclear or even unknown. Only have events been held with local businesses and some alumni, obtaining some information.

Given the tremendous need to address the issues raised has been essential to have a solution that allows a closer relationship between the university and the company by encouraging the work of our professionals and therefore monitoring of these with the University, for this we developed and implemented a system that manages an employment agency serving the most important requirements relating to: job search for the candidate and recruitment of suitable personnel for the company, the monitoring of graduates for the University, this system integrates the current academic system, and uses platform Oracle Fusion Middleware³ for an application with the potential provided by the Fusion applications and MVC⁴ architecture. Thus, with the introduction of this system we find a direction that facilitates access to employment opportunities, and success in

¹**Headhunter:** is someone who recruits people to name a company or a corporation, usually a person working on contingency contracts. May or may not usually work for an agency, but most of them have many customers and act as a representative of the third.

²**Candidate:** Entity that takes the role of a user seeking employment or wish to advertise within the system can only take this role, enrolled students, faculty, staff and alumni of the UTN.

[1] "Asterico más:", September 2009, <http://comunidadoraclehispana.ning.com>

³**Oracle Fusion Middleware:** is a portfolio of proven software for clients, ranging from portals pre-integrated and managers of process to application infrastructure, developer tools and business intelligence.

⁴**MVC:** is a style of software architecture that separates data from an application, the user interface and control logic into three distinct components. The model is the management system, database and business logic controller is responsible for receiving input events from the view.

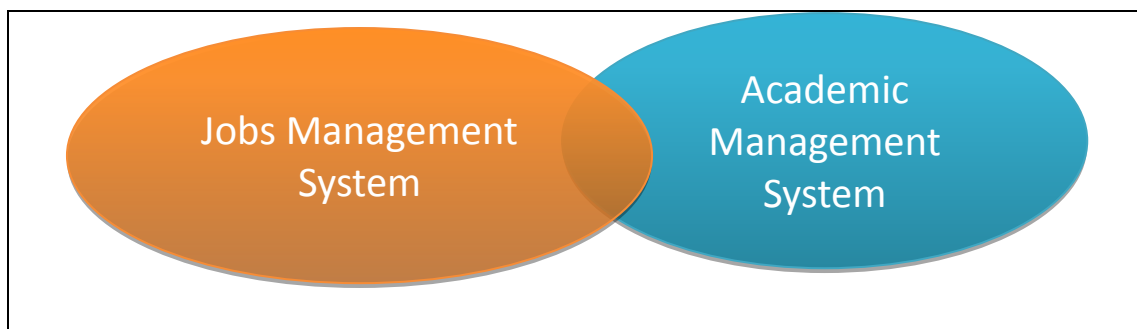
understanding the labor market from new tools with new approaches based on offering a professional resource guaranteed by the university.

“We do not want to agglomerate more and more people without a fixed course. We want to exploit 2.0 technologies in an effective manner.”

2. Scope

It has developed and implemented a software application institutional, that resolve issues search and access to job for the University community and recruitment for companies and consultants who contribute to the graduate follow-up, this attached to standards and guidelines of university management.

The system provides for the registration of candidates which are validated in the academic system of the UTN, management curriculum vitae, management of the privacy curriculum vitae, password management, postulations visualization, surveys of graduates; For businesses include the system registration, jobs ads, management of postulations, curriculum vitae filter, password management, password recovery, including search ads, email notifications of new messages and recent activities.

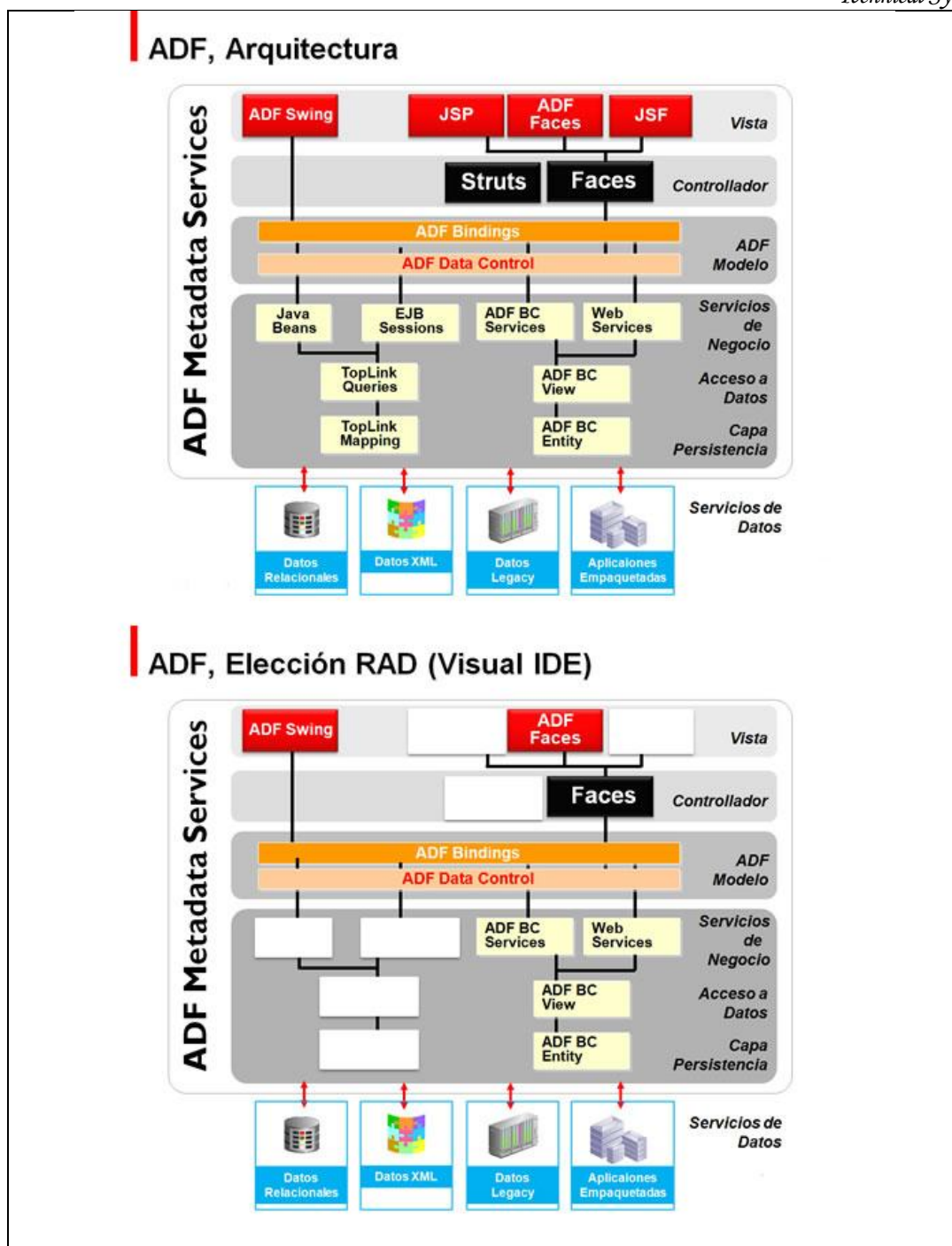


Source: Own

Figure 1. Project Outline

3. Development Tools

To develop this project we use Oracle ® Database, Oracle ® Developer Suite, Oracle ® Fusion Middleware, the Oracle ADF framework and JDeveloper 11g IDE.



Source: [2]

Figure2. Oracle ADF Architecture

The main features of Oracle ® Database 10g are:

- Oracle ® Database 10g, the database is based on Grid technology and designed to help companies optimize the performance of their technology tools, both hardware and software.

[2] BBR, “ADF: El Framework de desarrollo de Fusion”, 2009, <http://www.bbr.cat/presentaciones>

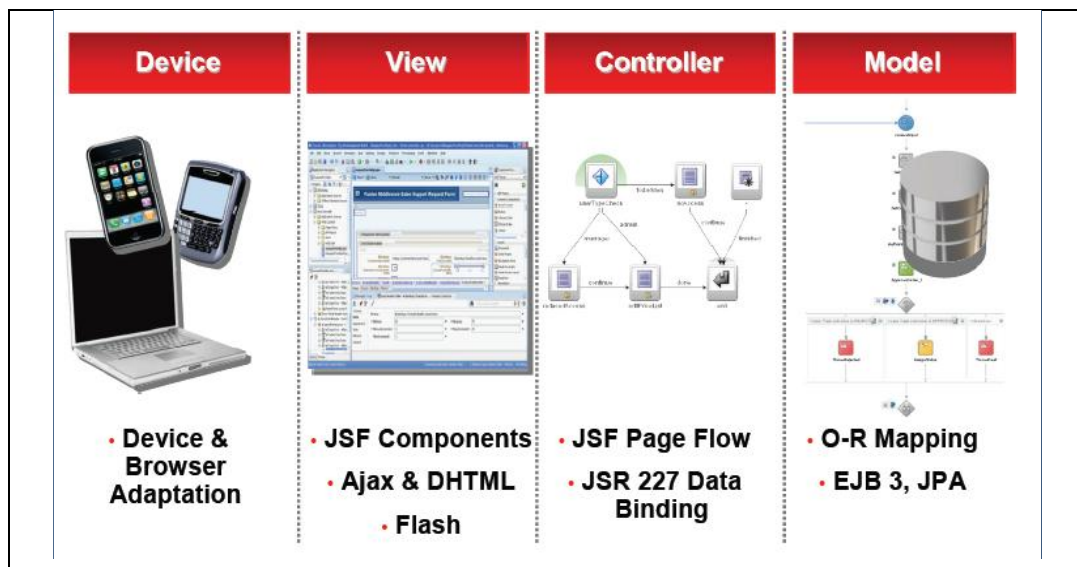
- This new database Oracle ® is designed to work effectively with both small SMP servers and servers, to network environments and grid's business. Oracle ® Database9i/ 10g incorporates features such as automating the setup and management, making it a cost effective and easy tool to use.
- Oracle ® Developer Suite is the most complete integrated development environment that combines the power of application development and business intelligence tools in a single package that is based on the latest industry standards.[2]
- Oracle ® Fusion Middleware is the most complete family of pre-integrated middleware leader in the sector. Oracle middleware products include a highly compatible architecture, for greater flexibility and investment protection. Only Oracle provides the middleware portfolio that drives the company to:
 - o Increase capacity for growth and change.
 - o Improve knowledge of business operations.
 - o Mitigate risk and drive compliance.
 - o Increase productivity and process efficiency^[3].
- ADF (Application Development Framework Oracle) is a meta-framework. There is no doubt that in the JEE world there are many frameworks and point solutions of high quality, but are just islands of functionality (presentation, services, data). A Meta-framework offers a certified technology stack able to meet most requirements and with a life cycle very similar to the application that will be developed. The objectives of ADF are:
 - o Increased productivity
 - Shorter learning curve
 - War of the complexity
 - All types of developers
 - o More usability

^[2]Oracle, "Overview of Forms Server", 2009,
http://www.uriit.ru/japan/Our_Resources/Doc_iAS/forms.6i/a83591/chap02.htm

^[3]Oracle, "Oracle Fusion Middleware", 2010, <http://www.oracle.com/lang/es/products/middleware/index.html>

- Web 2.0⁵
- Ajax⁶, JSF⁷, multichannel
- Standards-based development
 - EJB 3 (JSR-220)⁸
 - JSF (JSR-127): Trinidad⁹
 - Data Binding (JSR-227)¹⁰
 - Portlets (JSR-168)¹¹

ADF is the heart of Fusion Applications and incorporates pre-built kit components for building applications this implements the MVC pattern [4].



Source:^[2]

Figure3. ADF implements the MVC pattern

⁵Web 2.0: is the representation of the evolution of traditional applications to applications focused in the end-user . Web 2.0 is an attitude and not just a technology.

⁶Ajax: is a web development technique for creating interactive applications or RIA.

⁷JSF: is a technology and framework for Web-based Java applications that simplifies the development of user interfaces in Java EE applications.

⁸EJB 3 (JSR-220): The goal of Enterprise JavaBeans (EJB) 3.0 is to improve the EJB architecture by reducing its complexity from the developer point of view.

⁹JSF (JSR-127): is a standard or specification that defines the architecture and API that simplifies creation and maintenance of Java Server Faces

¹⁰Data Binding (JSR-227): defines a standard way for tools to implement the interactions between user interfaces and services, regardless of the technologies being used to implement.

¹¹Portlets (JSR-168): Java Portlet Specification (JSR168) enables interoperability of portlets between different web portals. This specification defines a set of APIs for interaction between the portlet container and portlet that guide the areas of personalization, presentation and safety.

[2] BBR, “ADF: El Framework de desarrollo de Fusion”, 2009, <http://www.bbr.cat/presentaciones>

4. Benefits

- The system manages an employment network which enables alumni tracking, obtain information on the labor market demands, objectives and work status of the candidates, information and applications for companies interested in recruiting, allowing to have centralized information quickly and without duplication of data.
- The graphical user interface shortens the learning curve for its ease of use.
- Have a system made with current technology which contributes to technological development of the institution.
- Processes fast, efficient and homogeneous.
- Provides for the inclusion and employment of graduates of UTN graduates, as they may apply to ads or your ads.
- Information Systems at the University are unified in this way there is no duplication of data.
- With the collected information the University may analyze the profiles defendants, in order to improve the curriculum of studies.

5. Positioning

Business Opportunity

This system allows to the "Universidad Técnica del Norte" have a tool that facilitates the job inclusion of alumni, by inserting an alternative tool to existing jobs networking on the Internet, supports the professional and your curriculum vitae, providing the applicant applied to a work offered by the company's website, the importance of this system is the centralization of all data obtained from the different processes for further analysis of the labor market requirements, running track graduates and as the analysis of the academic curriculum is taught in the classroom. It also has a database of companies, institutions and human resources consultants to register with the system; you may contact directly with the companies and maintain a close relationship with the business.

The system allows access to utilities through the Web, quickly and easily without intermediaries which allows for quick and easy access to data through its user-friendly graphical interfaces.

6. Users and Stakeholders

Stakeholders are directly involved in the definition and scope of this project. Below is the list of stakeholders

User Summary

| Name | Description | Stakeholder |
|---------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------|
| System administrator | Person from Information Department which administers the system of inclusion working and tracking of graduates | Manage in a functional way the system (managing parameters, check records, managing accounts and roles, to maintain the system against new requirements). |
| Functional System Administrator | Person of the University Welfare Department that administers the system. | Manage the system: access to the statistics and reports, sending Mailing. |
| Candidate User | Alumni, graduates, students, staff and faculty who use the system required both to enter your resume, search for jobs or internships, or your ads. | Register with the system, register / update resumes, post notices, apply for job searches, update your personal information, respond to polls. |
| Company User | Public or private companies, governmental and nongovernmental institutions, Human Resource Consultants, Independent Professionals. | Register in the system, update your details, find or recruit staff, post ads, manage applications and curriculums vitae. |

Source: Own

Table 1. User summary

User Environment

Alumni, graduate students enrolled, employees and teachers are active users of the system and can apply for job ads, they keep the curriculum vitae updated, registered and updated information regarding the demand for labor, experience and education.

Users: candidates and companies enter the system using a web browser, if you use "IE" it should be superior to version 6, it can do so from a computer with any operating system is a system hosted on a Web public server, anyone connected to the Internet

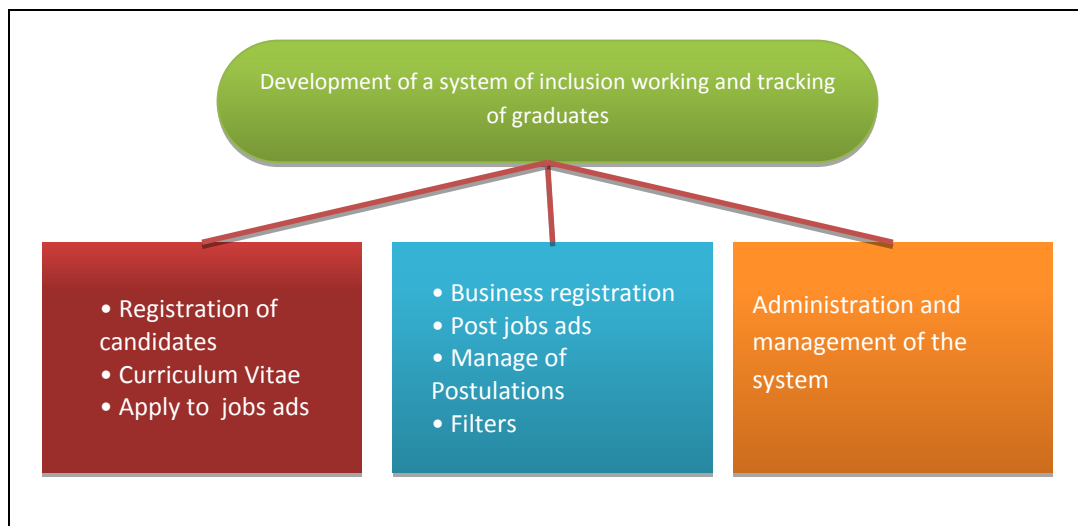
can view the site by accessing the url directly or via links located on the Web UNIPORTAL, registered users can authenticate and enter the application designed for each according to their role. This system has many features of a Windows application with the patency of the web interfaces and therefore users will be familiar with their environment through the use of rich user interfaces.

Reports are generated in PDF format. The system interacts with the modules of the Academic System.

7. Product Overview

The areas to be treated by the system are: Search and selection of personnel for the company, job search by the candidate, followed by graduates of the University, the system was designed so that it is classified within the concept of Internet social networks as it allows users to interact based on interests such as job search and staffing needs. The work focused on designing a separate system that easily integrates with the existing academic system of the UTN.

Product Overview



Source: Own

Figure 4. Product Overview

Capabilities Summary

| User Benefits | Features supported |
|------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| The process of the Job system will be full and comprehensive job search and recruitment, as well as the location of UTN graduates. | The system includes everything from the registration and validation of users to the verification of resumes by the company. The use will be free and conducted by end users in a systematic and orderly manner. The University will have a tool that allows its graduates to locate and analyze labor demands. |
| The university will have a centralized tool to locate and notify the university community and the registered companies. | Be recorded the particulars of candidates and companies with notification via email. |
| It is highly available. | Access to information via the Web allows users immediate access from anywhere in the world. |
| Very simple for management and analysis of information. | Allows you to generate various types of reports and query functions. |

Source: Propia

Table 2. Capabilities Summary

8. Product Features

Validation and registration of the candidate

The system allows users to register as candidates; this record is validated against the academic system of the UTN.

Management of Curriculum Vitae

The system provides the register and update of the curriculum vitae in a predefined format, you can manage visibility, downloading and emailing the curriculum.

Level privacy of the resume

The candidate may determine any level of confidentiality for your resume, he can select the private option that allows view the resume only to the companies than receives the nominations of the candidate or the option public which means that companies to which the candidate submitted their applications as well as the

companies that accessing the database system can view the full content of the resume.

Candidate's Personal Information

The site allows you to update your address, phone, cellular location of the candidate, updating and / or recover the password, you can upload / update a photo that is used for the profile and if you do not have a picture in the academic system this is used in resume.

Monitoring Questionnaire for Graduates

The website checks the type of candidate, if this is a graduate or graduate UTN it must respond to alumni tracking surveys before any other process.

Search job postings

The application offers specialized search engines based on keywords, occupational sectors, localities and hierarchies of work offered is available for anonymous users and registered.

Postulations of candidates to job postings

The site allow the candidate applying to a job, he can writes a letter prior to application to a job, also the system allows you to view applications made to verify status and company's response to this application.

Recent job postings and job postings by area, location and hierarchy

The system allows display on the home pages and search pages, recent job postings, job postings by occupation areas, by hierarchy and by places where offer the job in a public way.

Notifications via email to the candidate

The system allows you to receive email notifications of the activities of the candidate, when update your resume, when apply to a job.

Companies register and validation

The system should allow the registration of companies or human resource consultants or anyone interested in finding staff.

Launch and management of Job postings

The system allows the company publish job postings that may be issued for a maximum of one month, these ads can be edited in the first 48 hours after its publication, in addition the system provides the management of these classified ads as active, inactive or closed.

Company Information

The system allows you to update company data, contact details, you may update and / or recover the password, the system also allows you to upload and update the company logo to be used in the profile and in the notices published.

Manage the postulations to the job posting

The site allows the company manages the postulations to job postings; so, you can view, sort and download resumes, and respond to the applicant.

Filtros de hojas de vida para los anuncios de empresas

The system allows the company creates and manages filters that filter the resumes sent to a notice of the company, and then manage the filtered CV.

Notifications via email to the company

The system allows receive email notifications of the activities of the company, when a notice is published again, and apply the candidates to the ads.

Manage and administer registration requests

The system allows administrators and super administrators view and respond to requests for registration in the system of both candidates and companies.

Manage and administer Candidates

The app allows administrators and super-administrators, search a particular

candidate and manage the state and all proceedings relating to the candidate.

Manage and administer Companies

The app allows administrators and super-administrators, search a particular company and manage the state and all proceedings relating to the company in question.

Manage and administer Business Ads

The system allows administrator and the super-administrator, the search and management of all notices issued by companies.

View and extract statistics and reports

The system allows administrators and super-administrator, the visualization and extraction of statistical graphs and reports in regard to labor market requirements, the consistency between work experience and academic background of candidates.

Send bulk email notices of jobs posting to the candidates

The system allows administrators and super-administrator, send email notifications of job postings to candidates according to the employment goal of these.

Initializing of data in the system

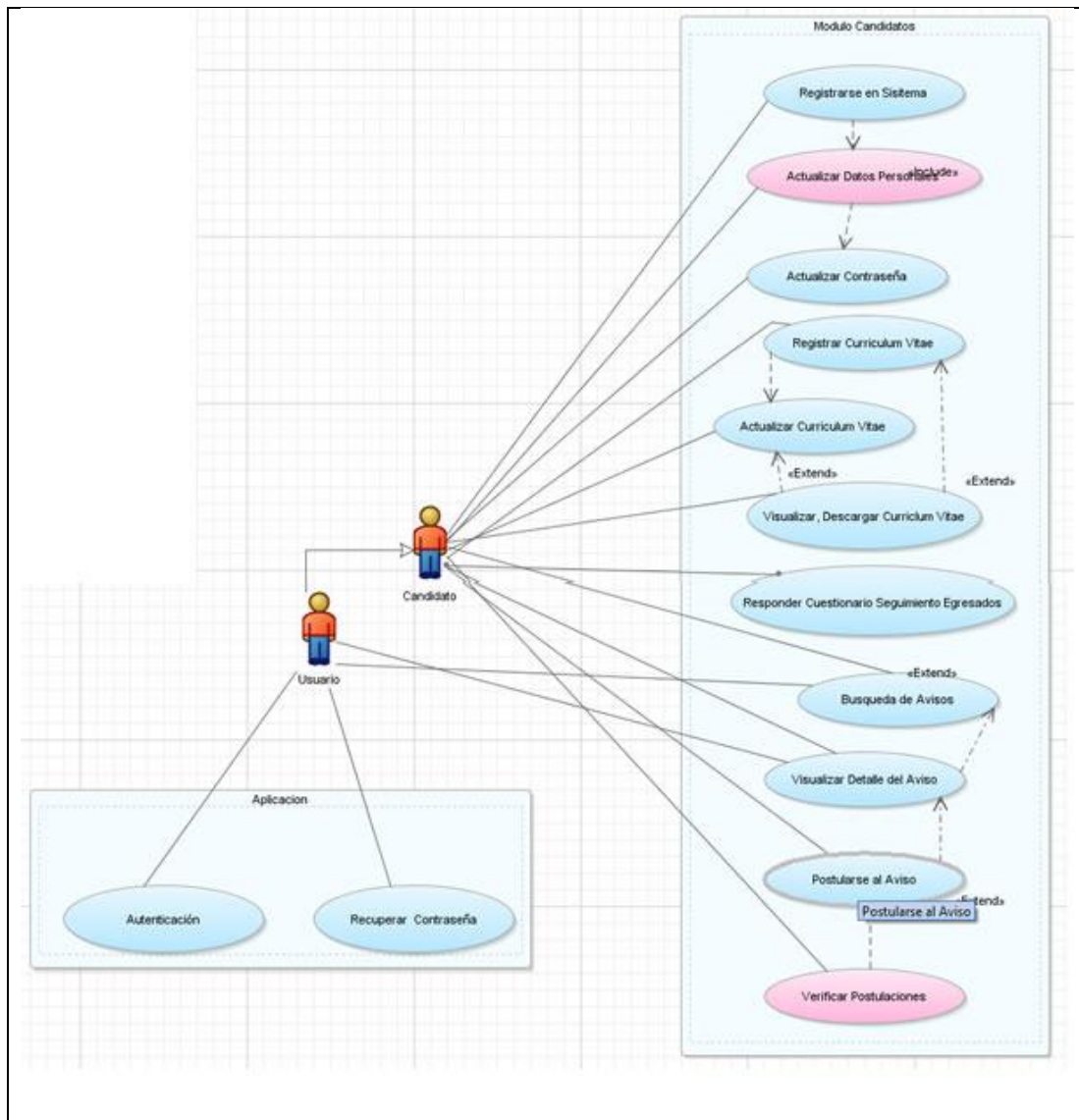
The system allows the super-administrator, the registration system operating parameters such areas, sectors, industries, wages, hierarchies and other types of data needed.

Managing users and roles

The app server provides management roles for users, update passwords and user creation and deletion.

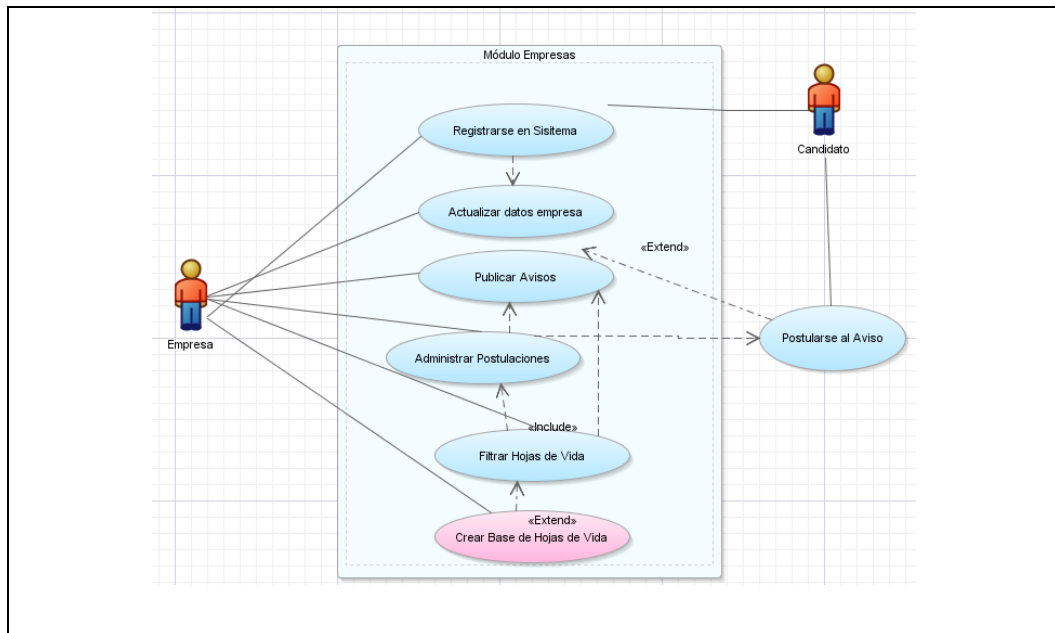
9. App Use Cases

The frontend application only defines the relative roles of candidate and company.



Source: Own

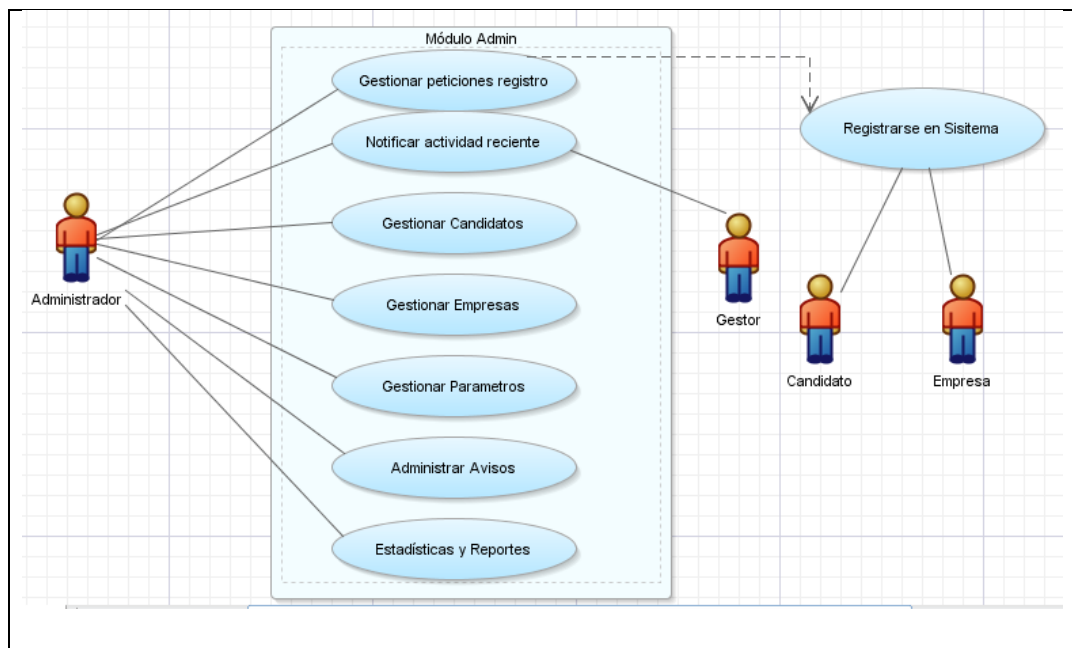
Figure 5. UC. Module candidates



Source: Own

Figure 6. UC. Companies Module

The aim of the management interface is the complete management of objects model.



Source: Own

Figure 7. UC. Admin Module

10. Restrictions

Only candidates can register and use the system graduates and graduates who stated in the academic system, teachers and active employees duly registered with the central database of the NTU, students with enrollments of no more than 6 months old. The user passwords are managed by the same.

Candidates must appear in the academic system at the Technical University North to implement the registration and validation in the jobs system.

To access the system, the user must have Internet access and have a Web browser that is superior to Internet Explorer 6.

11. Installing and Configuring the Database

It is important if you are installing, first you should down the firewall, if you use Windows 7 must first set up and connect to the network the computer where you intend to install Oracle, then we place ourselves in the control panel and disable the warning messages that allows the execution of applications that comes by default in the OS.

It is recommended that the duration of the installation the computer is connected to the network, may be that because they do not recognize any input or output through the network, the oracle service is not starting correctly.

To import the entire database

First we must install Oracle 10g with the SID: UTNDB

Then we can install Toad for managing the database once this is done we must enter the system with the user bdd there we must create the tablespace called ACADEMICO or run the following code through sqlplus:

```
SQL>CREATE TABLESPACE ACADEMICO DATAFILE
'C:\oracle\product\10.2.0\oradata\utndb\ACADEMICO01.DBF' SIZE 640M
AUTOEXTEND ON NEXT 10M MAXSIZE UNLIMITED

LOGGING

ONLINE

PERMANENT
```

```
EXTENT MANAGEMENT LOCAL AUTOALLOCATE  
BLOCKSIZE 8K  
SEGMENT SPACE MANAGEMENT AUTO  
FLASHBACK ON;
```

We then create the utndb user in the tablespace ACADEMICO with the following permissions:

```
GRANT SELECT ON DBA_USERS TO UTNDB WITH GRANT OPTION;  
GRANT DROP USER TO UTNDB;  
GRANT ALTER USER TO UTNDB;  
GRANT CREATE USER TO UTNDB;
```

We do this so that the utndb user has access to dba_users view of the sys user, because in various procedures of our app, we use this view. Then once inside Sql Plus, users must authenticate as sys, by running the following lines:

```
SQL> connect system/password as sysdba;  
SQL>CREATE USER UTNDB  
IDENTIFIED BY VALUES '5C03C3EA63CDEC90'  
DEFAULT TABLESPACE ACADEMICO  
TEMPORARY TABLESPACE TEMP  
PROFILE DEFAULT  
ACCOUNT UNLOCK;  
  
-- 4 Roles for UTNDB  
GRANT SELECT_CATALOG_ROLE TO UTNDB;  
GRANT MGMT_USER TO UTNDB;  
GRANT DBA TO UTNDB WITH ADMIN OPTION;  
GRANT AQ_ADMINISTRATOR_ROLE TO UTNDB WITH ADMIN OPTION;  
ALTER USER UTNDB DEFAULT ROLE MGMT_USER, DBA, AQ_ADMINISTRATOR_ROLE;  
  
-- 8 System Privileges for UTNDB  
GRANT GLOBAL QUERY REWRITE TO UTNDB;  
GRANT SELECT ANY TABLE TO UTNDB;  
GRANT CREATE TABLE TO UTNDB;  
GRANT DROP USER TO UTNDB;  
GRANT ALTER USER TO UTNDB;
```

```
GRANT UNLIMITED TABLESPACE TO UTNDB WITH ADMIN OPTION;  
  
GRANT CREATE USER TO UTNDB;  
  
GRANT CREATE MATERIALIZED VIEW TO UTNDB;  
  
-- 1 Object Privilege for UTNDB  
  
GRANT INSERT, SELECT, UPDATE ON SYS.DBA_USERS TO UTNDB WITH GRANT  
OPTION;
```

If the installation will proceed from a backup of the database, we have a backup, for import the backup to our database server, should open a terminal and proceed to import the dmp using following code:

```
C:\>imp system/feñix file=UTNDBREDEMPLEOS.DMP fromuser=utndbouser=utndb
```

12. Weblogic, Application Server configuration

Weblogic is the application server of Oracle for the deployment of J2EE applications, today is the technology for deployment on web servers that Oracle bet.

Previously weblogic must have been installed in our computer, you have several options to accomplish this task, in this example we use the next version: first, you should download the JDeveloper version 11.1.1.3.0 of Oracle's official website, this installer includes version 10.3 of WebLogic, I'm not going into details of this task for being too simple so you can highlight is that when you run the installer above should be selected to be installed weblogic.

13. Conclusions and Recommendations

a. Conclusions

- The implementation of the system of inclusion working developed by the University, means the increased of possibilities for graduates and students to obtain employment commensurate with their training, supported in the prestige of the institution.
- The system of inclusion working, addition of technological knowledge of the tool, requires know deeply the logic of search and recruitment by human resources.
- The registration of resume and job searches in the current system, means a data source accurate, fast and economical.
- When Using Oracle Middleware technology, you can view the high degree of productivity that are using a development framework, however when using ADF productivity is directly proportional to the depth and experience you have in the use of technology in each of the layers..
- The use ADF Business Components layer for the model becomes the best option for the business relationship models in a MVC architecture that dramatically improves other similar technologies such as TopLink, EJB or the same hibernate.
- The management of RUP methodology for software development introduced in the university has been very helpful, allowing a clear understanding in all phases of a project, its structure requires the developer to document the entire process from the beginning development, production testing and tuning, with a detailed record of all changes made in the course until the end of the same.

b. Recommendations

When deploying the system of inclusion working and tracking of graduates must take into consideration the following recommendations will help the smooth functioning and performance of the system:

- To meet the objectives, it is essential to active participation of users.
- Coordinate with responsible agencies, the promotion of the system within and outside the institution.
- Entrust management and administration of system to qualified personnel within the institution.
- Coordinate the use of the system within the faculties, taking as the main tool for publishing notices of both jobs and internships.
- Take advantage of implementing and experience of Oracle Middleware technology in the technological infrastructure of the university for the next generation of processes and computer systems that require the use of web business platform.
- Take advantage of implementating of the system for the incremental development of various processes and modules within the application by postgraduate students, such as the implementation of business intelligence using Oracle Discoverer, implementation wap system in the work inclusion system.
- Verify each quarter the availability of smtp relay server, used for sending email within the application.
- Each time you upload a new version of the application to the app server, stop and delete the previous version so as not to cause conflicts of reference data sources and security domains.

- Coordinate with the technical staff responsible for maintaining the enrollment system, changes and procedures that runs on the person and enrollment tables to reflect these changes in the labor inclusion.