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| **Architecture Driver Specification** |
| Human Resource Management |
|  |
| Define architectural drivers and the development strategy for HRM system. The document was written follow the online template for architectural drivers specification |
|  |
| **HRM Team** |
| **11/3/2011** |
|  |

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**Revision History**

|  |  |  |  |
| --- | --- | --- | --- |
| Date | Version | Author | Description |
| 11/4/2011 | 1.0 | Tường Nguyễn | Update use case, technical constraint, project overview and quality attributes |
| 11/7/2011 | 1.0.1 | Tân Trần | Update quality attribute description and scenarios for performance |
| 11/7/2011 | 1.0.2 | Tân Trần | Update scenarios for modifiability |
| 11/8/2011 | 1.0.3 | Tường Nguyễn | Update use case |
| 11/8/2011 | 1.0.4 | Tân Trần | Update scenarios for usability and availability |
| 11/9/2011 | 1.0.5 | Tường Nguyễn | Update use case diagram, use case description |
| 11/22/2011 | 1.0.6 | Tường Nguyễn | Update Function Priority, QA Priority, Technical Constraints |
| 11/25/2011 | 1.0.7 | Tường Nguyễn | Update Scenario of Performance, Availability |
| 11/29/2011 | 1.0.8 | Tân Trần | Update Scenario of Scalability, Security |

1. Introduction

# 1.1 Purpose

The function of Human Resources departments is generally administrative and common to all organizations. Organizations may have formalized selection, evaluation, and payroll processes. The HR function consists of tracking existing employee data which traditionally includes personal histories, skills, capabilities, accomplishments and salary. To reduce the manual workload of these administrative activities, Van Lang University began to electronically automate many of these processes by introducing specialized Human Resource Management Systems.

# 1.2 Definition and Acronyms

|  |  |
| --- | --- |
| **Name** | **Description** |
| HRM | Human Resource Management |
| HRM Staff | The employee who is working in Human Resource Department |
| VLU | Van Lang University |

2. Project Overview

HRM is particularly developed for human resource management in university / colleges. The system consists of key modules:

* Personal information management
* Employee labor contract management
* Recruitment & training processing
* Payroll
* Administration panel - Utilities

3. Architecture Driver Overview

The architectural drivers presented in this document include:

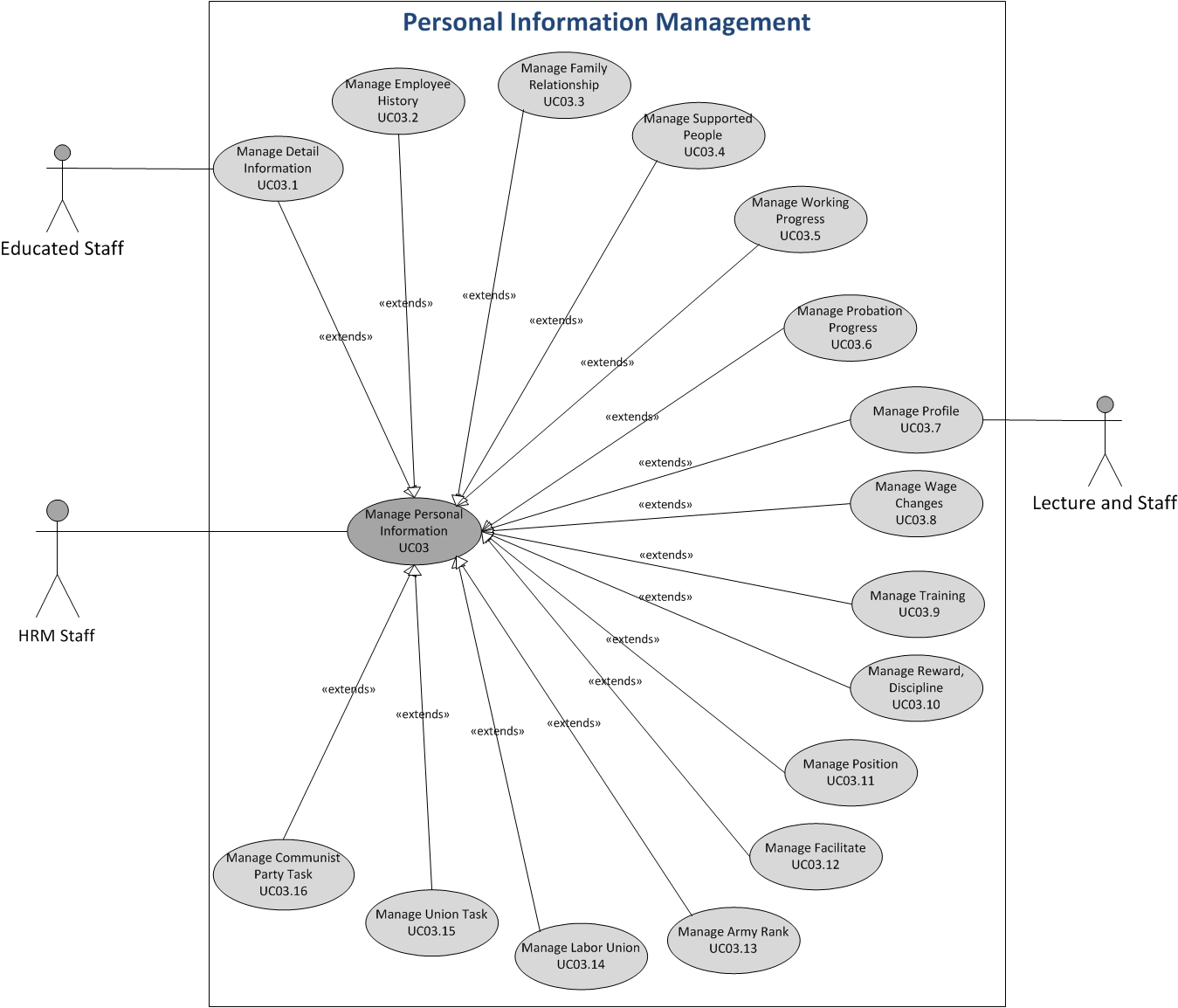
* **Functional Requirements:** These requirements are presented in the form of specifications and use cases.
* **Quality Attribute Requirements:** These requirements are presented in the form of quality attribute scenarios.
* **Business Constraints:** They include schedule, cost, and procedural demands that will impact how the system is designed or implemented
* **Technical Constraints**: they specify that a particular product, tool, language, OS, platform, network, protocol, algorithm, and so forth must be used in the system.

These architectural drivers will influence the architectural design and implementation of the project. Additionally, they will impact the schedule and quality of the project. As a whole these architectural drivers define the scope of the project.

4. Functional Requirement

# 4.1 Use case Modeling

# 4.1.1 Use case Level 1

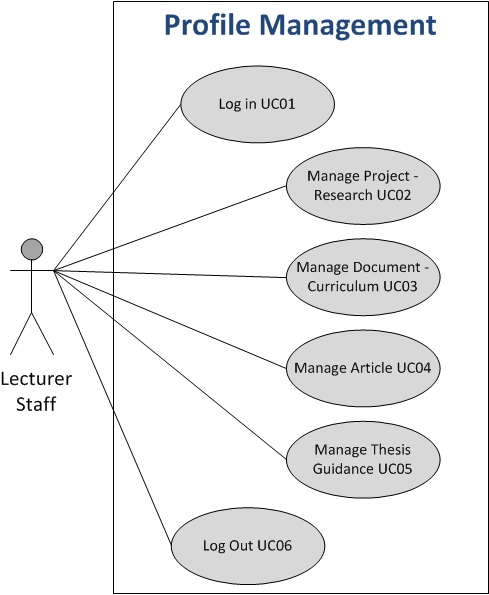


*Figure 1: Use case diagram Level 1 for HRM System*

|  |  |  |  |
| --- | --- | --- | --- |
| **ID** | **Use Case** | **Description** | **Actor** |
| UC.01 | Manage Detailed Information | Allow the HRM staff to record the detailed information of the staff/lecture | HRM Staff/ Educated, Staff |
| UC.02 | Manage Employee History | Allow the HRM staff to record the information of this staff before working in Van Lang University. | HRM Staff |
| UC.03 | Manage Family Relationship | Allow the HRM staff to record the family relationship of staff | HRM Staff |
| UC.04 | Manage Task | Allow the HRM staff to record the information about the process of work this staff at the working place. | HRM Staff |
| UC.05 | Manage Position | Allow the HRM staff to keep track of changing in the position and academic title of the staff | HRM Staff |
| UC.06 | Manage Wage Progress | Allow the HRM staff to keep track of changing in wage of the staff at the Van Lang University | HRM Staff |
| UC.07 | Manage Reward or Penalty | Allow the HRM staff to record the process of reward or penalty of the staff | HRM Staff |
| UC.08 | Manage Facilitate | Allow the HRM staff to record the providing the facilitates for the staff | HRM Staff |
| UC.09 | Manage Profile | Allow the HRM staff and lecture to record the updating about the change in profile of the staff | HRM Staff/ Lecture |
| UC.10 | Manage Training | Allow the HRM staff to record the information that related to the course, result of training… | HRM Staff |
| UC.11 | Manage Probation | Allow the HRM staff to keep track of probation process of the staff | HRM Staff |
| UC.12 | Manage Supported People | Allow the HRM staff to record the number of supported people, for the purpose of the family allowances. | HRM Staff |
| UC.13 | Manage Army Rank | Allow the HRM staff to record the information of the staff when they worked in the army before returning the VLU | HRM Staff |
| UC.14 | Manage Labor Union | Allow the HRM staff to record the information of the lecture/staff when they have joined in the labor union at the VLU | HRM Staff |
| UC.15 | Manage Union Task | Allow the HRM staff to record the changes of the staff when they have joined union activities | HRM Staff |
| UC.16 | Manage Communist Party Task | Allow the HRM staff to record the changes of the staff when they have joined party activities | HRM Staff |

*For more detail, referencing to SRS document*

# 4.1.1 Use case Level 2



|  |  |  |  |
| --- | --- | --- | --- |
| **ID** | **Use Case** | **Description** | **Actor** |
| UC.01 | Manage Project – Research | Allow the HRM staff or lecture can update the information about the project/research in lecture’s profile | HRM Staff/ Lecture |
| UC.02 | Manage Document Curriculum | Allow the HRM staff or lecture can update the information about the document/curriculum in lecture’s profile | HRM Staff/ Lecture |
| UC.03 | Manage Article | Allow the HRM staff or lecture can update the information about the article in lecture’s profile | HRM Staff/ Lecture |
| UC.04 | Manage Thesis Guidance | Allow the HRM staff or lecture can update the information about the thesis/guidance in lecture’s profile | HRM Staff/ Lecture |

5. Quality Attribute Requirements

# 5.1 Quality Attribute List

|  |  |  |  |
| --- | --- | --- | --- |
| **System quality attributes** | | | |
| **ID** | **Quality attributes** | **Description** | **View** |
| QA.01 | **PERFORMANCE** | The ability of HRM software to handle many user interactions (50 users) when the HRM staffs modify the Personal Information. The response time of HRM system for each user interaction will be improved about 3-4 seconds and the resource for each interaction will be reduced. | Stakeholder |
| QA.02 | **PERFORMANCE** | The performance when the user use browser to access for modifying the “Personal Information”. It allows the HRM staff to modify the information or lectures can update their profile everywhere only with browser. The response time for updating profile is about 4-6 seconds | Stakeholder |
| QA.03 | **PERFORMANCE** | The performance when the HRM staffs want to import the data (decision) to save in HRM system. The time for importing data is about 5 seconds for 500 rows and 20 columns.  The time for exporting data is about 5 seconds for 500 rows and 20 columns | Stakeholder |
| QA.04 | **SECURITY** | The HRM use WCF service so that the user will not know the path of database server and database is protected from attackers.  The HRM is also support the authentication function to assign the permission to users. Each user can access or see the button depend on their role. There are…. | Technical |
| QA.05 | **USABILITY** | -The HRM system have the consistent screens and easy to uses. In addition, the personal information is grouped into different category so that it will be easier to find the information  -The HRM system provide adequate user document including help, user manual and tutorials for user guidance  -HRM system supports to show multiple views. | Stakeholder |
| QA.06 | **SCALABILITY** | Now, the HRM system uses SQL Database server but the HRM can also run on other database MySQL | Stakeholder |
| QA.07 | **MODIFIABILITY** | The HRM system supports the developers or maintainer can easy add new function or modify the current function whenever the business rules are change. The first release of HRM system just focuses on “Personal Information Management”. However, there will be more modules, which will be added to system in next release, for example recruitment, insurance…modules | Technical |
| QA.08 | **MODIFIABILITY** | The HRM allows modifying the user interface (UI) includes the screen layout, text, GUI images… | Technical |
| QA.09 | **MODIFIABILITY** | The HRM allows modifying the client from using Silverlight to Windows Form (WPF) | Technical |
| QA.10 | **AVAILABILITY** | The HRM will have periodically backup of database to ensure that whenever the database server is crashed, the data will not be lost. In more detail, before crashing about 60 minutes, the server will warn and ask the user what data need to be backup to be able to work at home. | Technical |

# 5.2 Quality Attribute Scenario

## *Key Quality Attributes- Performance*

|  |  |  |  |
| --- | --- | --- | --- |
| **Title of scenario:**  **Ability to handle many user interactions when they modify the “Personal Information”** | | **ID: QA.01** | **Version: 1.1** |
| **Last Changed: 11/25/2011** |
| **Quality attribute:** Performance | | **Characterization ID:** QAS.01 | |
| **Describe stakeholder role proposing the description:** The HRM staffs, Architect | | | |
| Source(s) of the stimulus | The HRM staffs who responsible for modifying the “Personal Information” | | |
| Stimulus | Updating or Modifying the “Personal Information” in both detailed and extended information. | | |
| Relevant environmental conditions | The HRM system is in normal mode.  The number of user transactions is 10. | | |
| Architectural elements | The HRM system | | |
| System response | The HRM system process all transaction:   * Update the new information to database * Log the transaction. | | |
| Response measure(s) | The response time for each transaction is about 2-4 seconds. | | |

|  |  |  |  |
| --- | --- | --- | --- |
| **Title of scenario:**  **The performance when the user use browser to access for modify the “Personal Information”** | | **ID: QA.01** | **Version: 1.1** |
| **Last Changed: 11/25/2011** |
| **Quality attribute:** Performance | | **Characterization ID:** QAS.02 | |
| **Describe stakeholder role proposing the description:** The HRM staffs, Architect | | | |
| Source(s) of the stimulus | - The HRM staffs who want to modify personal information (detail and extend) at somewhere (not at VLU) by using browser through Internet to access HRM system  - The Lectures/HRM Staff who want to update “Profile Management” (in extended information) at somewhere (not at VLU) by using browser through Internet to update the topic, article, or curriculum… | | |
| Stimulus | Updating or Modifying the “Personal Information” in both detailed and extended information. | | |
| Relevant environmental conditions | The HRM system is in normal mode. | | |
| Architectural elements | The HRM system. | | |
| System response | The HRM system process all transaction:   * Update the new information to database * Log the transaction. | | |
| Response measure(s) | The response time for showing is about 2 seconds. | | |

|  |  |  |  |
| --- | --- | --- | --- |
| **Title of scenario:**  **The performance when the HRM staffs want to import the data (decision) to save in HRM system.** | | **ID: QA.01** | **Version: 1.1** |
| **Last Changed: 11/25/2011** |
| **Quality attribute:** Performance | | **Characterization ID:** QAS.03 | |
| **Describe stakeholder role proposing the description:** The HRM staffs, Architect | | | |
| Source(s) of the stimulus | The HRM staffs | | |
| Stimulus | The HRM staffs want to import the data, the decisions into database of HRM system | | |
| Relevant environmental conditions | The HRM system is in normal mode. | | |
| Architectural elements | The HRM system | | |
| System response | All of data and decision are imported into database of HRM system. | | |
| Response measure(s) | The response time for importing data is about 5 seconds for 500 rows and 20 columns. | | |

## *Key Quality Attributes- Modifiability*

|  |  |  |  |
| --- | --- | --- | --- |
| **Title of scenario:**  **Ability to add new functionalities/modules such as recruitment, insurance… modules** | | **ID: QA.05** | **Version: 1.0** |
| **Last Changed: 11/7/2011** |
| **Quality attribute:** Modifiability | | **Characterization ID:** QAS.04 | |
| **Describe stakeholder role proposing the description:** Architect | | | |
| Source(s) of the stimulus | The developer, end-users | | |
| Stimulus | The first release of HRM project is focusing on Personal Information Management module. But in next release the user wish to   * Add new functionalities/modules including recruitment, insurance, labor contract, payroll, assessment management, reward and penalty management, labor management modules | | |
| Relevant environmental conditions | The HRM system is in build time | | |
| Architectural elements | The HRM system client and server side | | |
| System response | -Locates places in architecture to be modified.   * The UI component on client side * The services and business flow on server side.   -Makes modification without affecting other functionality  -Tests modification  -Deploys modification | | |
| Response measure(s) | The time for adding: 2-3 days  The resource for adding: 2 resources (one for integration and the other for testing and deploy) | | |

|  |  |  |  |
| --- | --- | --- | --- |
| **Title of scenario:**  **Ability to modify the user interface (UI)** | | **ID: QA.05** | **Version: 1.0** |
| **Last Changed: 11/7/2011** |
| **Quality attribute:** Modifiability | | **Characterization ID:** QAS.05 | |
| **Describe stakeholder role proposing the description:** Architect | | | |
| Source(s) of the stimulus | The developer, end-users | | |
| Stimulus | Modifying the user interface includes the screen layout, text, GUI images… | | |
| Relevant environmental conditions | The HRM system is in build time | | |
| Architectural elements | The HRM system client side | | |
| System response | -Locates UI part for modification  -Makes modification without affecting the functionality in other tiers  -Test the modification. | | |
| Response measure(s) | The time for modifying: 1-2 days (depend on the size of modification)  The resource for adding: 1 resources (one for modifying and the other for testing and deploy) | | |

|  |  |  |  |
| --- | --- | --- | --- |
| **Title of scenario:**  **Ability to modify the client from using Silverlight to Windows Form (WPF)** | | **ID: QA.05** | **Version: 1.0** |
| **Last Changed: 11/7/2011** |
| **Quality attribute:** Modifiability | | **Characterization ID:** QAS.06 | |
| **Describe stakeholder role proposing the description:** Architect | | | |
| Source(s) of the stimulus | The developer, end-users | | |
| Stimulus | Wish to modify the client side from using Silverlight (web browser application) to windows form application (WPF) | | |
| Relevant environmental conditions | The HRM system is in build time | | |
| Architectural elements | The HRM system client | | |
| System response | -Locates part for modification   * The View and Model component   -Makes modification without affecting the functionality in other tiers  -Tests UI | | |
| Response measure(s) | The time for modifying: 5-7 days  The resource for adding: 2 resources (one for modifying and the other for testing and deploy) | | |

## *Key Quality Attributes- Usability*

|  |  |  |  |
| --- | --- | --- | --- |
| **Title of scenario:**  **Ability to make user feel comfortable** | | **ID: QA.03** | **Version: 1.0** |
| **Last Changed: 11/8/2011** |
| **Quality attribute:** Usability | | **Characterization ID:** QAS.07 | |
| **Describe stakeholder role proposing the description:** Architect | | | |
| Source(s) of the stimulus | The end-users | | |
| Stimulus | Want to feel comfortable and easy to use with the UI | | |
| Relevant environmental conditions | The HRM system is in run time | | |
| Architectural elements | The HRM system user interface | | |
| System response | * The personal information is group into different category so that it will be easier to find the information. * HRM support the help and tutorial for user guidance. * HRM system supports to show multiple views. | | |
| Response measure(s) |  | | |

|  |  |  |  |
| --- | --- | --- | --- |
| **Title of scenario:**  **Ability to make user feel comfortable** | | **ID: QA.03** | **Version: 1.0** |
| **Last Changed: 11/8/2011** |
| **Quality attribute:** Usability | | **Characterization ID:** QAS.08 | |
| **Describe stakeholder role proposing the description:** Architect | | | |
| Source(s) of the stimulus | The end-users | | |
| Stimulus | Want to minimize the impact of the error | | |
| Relevant environmental conditions | The HRM system is in run time | | |
| Architectural elements | The HRM system user interface | | |
| System response | * The error message will be shown when the error occur and direct the way to fix the problem to user * User can cancel the operation when the errors occur. | | |
| Response measure(s) | Cancellation takes less than 2 seconds | | |

## *Key Quality Attributes- Availability*

|  |  |  |  |
| --- | --- | --- | --- |
| **Title of scenario:**  **Ability for working when the server crashes** | | **ID: QA.07** | **Version: 1.1** |
| **Last Changed: 11/25/2011** |
| **Quality attribute:** Availability | | **Characterization ID:** QAS.09 | |
| **Describe stakeholder role proposing the description:** Architect | | | |
| Source(s) of the stimulus | The HRM database server | | |
| Stimulus | Before crashing about 60 minutes, the server will warn and ask the user what data need to be backup to be able to work at home. | | |
| Relevant environmental conditions | The HRM system is in normal mode | | |
| Architectural elements | The HRM database | | |
| System response | The system will back up the data that the user request | | |
| Response measure(s) | Database connection timeout: 60 seconds  The time for automatically backup depends on size of data  Time for preparing the server: 1 hour | | |

## *Key Quality Attributes- Scalability*

|  |  |  |  |
| --- | --- | --- | --- |
| **Title of scenario:**  **Ability to run on multi database** | | **ID: QA.07** | **Version: 1.1** |
| **Last Changed: 11/29/2011** |
| **Quality attribute:** Scalability | | **Characterization ID:** QAS.10 | |
| **Describe stakeholder role proposing the description:** Architect | | | |
| Source(s) of the stimulus | The HRM database server | | |
| Stimulus | Now, the HRM system uses SQL Database server but the HRM can also run on other database MySQL | | |
| Relevant environmental conditions | The HRM system is in normal mode | | |
| Architectural elements | The HRM database | | |
| System response | The system can work well with new database | | |
| Response measure(s) | The time for changing to new database: 3 days | | |

## *Key Quality Attributes- Security*

|  |  |  |  |
| --- | --- | --- | --- |
| **Title of scenario:**  **Ability to protect the database from attacker** | | **ID: QA.07** | **Version: 1.1** |
| **Last Changed: 11/29/2011** |
| **Quality attribute:** Security | | **Characterization ID:** QAS.11 | |
| **Describe stakeholder role proposing the description:** Architect | | | |
| Source(s) of the stimulus | The unauthorized user | | |
| Stimulus | Access and attack database server | | |
| Relevant environmental conditions | The HRM system is in normal mode | | |
| Architectural elements | The HRM database, HRM server | | |
| System response | The HRM use WCF service so that the user will not know the path of database server and database is protected. | | |
| Response measure(s) |  | | |

6. Constraints

# 6.1 Technical Constraints

|  |  |  |
| --- | --- | --- |
| **ID** | **Constraint name** | **Constraint Description** |
| TC.PIM.1 | Database | The system database will be developed using SQL server |
| TC.PIM.2 | Development framework | .Net 4.0, WCF, Silverlight, Entity framework |
| TC.PIM.3 | Network | Network is ADSL/Mega WAN |
| TC.PIM.4 | Programming language | Using C#, program and fix code on XML file or properties of XML file |
| TC.PIM.5 | Language | Default language is Vietnamese |
| TC.PIM.6 | Third-party | - Using Microsoft Word, Excel for documenting, importing, and exporting the data  -Using Telerik to design the interface |

# 6.2 Business Constraints

|  |  |  |
| --- | --- | --- |
| **ID** | **Constraint name** | **Constraint description** |
| BC.PIM.7 | Time limitation | The end of the project is in April 31st,2012 |

7. Prioritization

# 7.1 Priority Scale

The priority scale has been defined priority of functional requirement.

|  |  |  |
| --- | --- | --- |
| Priority (numeric) | Priority (name) | Description |
| 1 | Must Have | Must be present in the end product at all costs. |
| 2 | Should Have | Very important features that distinguish a system from others, significant to users and business. |
| 3 | Nice to have | Customer would greatly appreciate implementation of these features. |

# 7.2 Difficulty Ranking Scale

The difficulty ranking scale has been defined on the basis of complexity and effort. Complexity is defined as how difficult the design of a solution is and whether the team has previous experience in designing or implementing such a design. Both measures, for complexity and effort, are relative to each other.

|  |  |
| --- | --- |
| Difficulty (numeric) | Description |
| 1 | High complexity and large amount of effort required |
| 2 | High complexity or large amount of effort required |
| 3 | Moderate complexity and medium amount of effort required. |

# 7.3 Functional Requirement

The lower priority, the higher importance

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **ID** | **Functional Requirement** | **Stakeholder ranking** | **Difficulty Ranking** | **Priority** |
| FR.01 | Manage Detailed Information | 1 | 2 | **1** |
| FR.02 | Manage Extended Information | 1 | 1 | **1** |
| FR.03 | Manage Employee History | 2 | 2 | **2** |
| FR.04 | Manage Family Relationship | 1 | 2 | **2** |
| FR.05 | Manage Task | 1 | 3 | **2** |
| FR.06 | Manage Position | 1 | 1 | **1** |
| FR.07 | Manage Wage Progress | 1 | 1 | **1** |
| FR.08 | Manage Reward or Penalty | 2 | 2 | **2** |
| FR.09 | Manage Facilitate | 3 | 3 | **2** |
| FR.10 | Manage Profile | 1 | 1 | **1** |
| FR.11 | Manage Training | 1 | 1 | **1** |
| FR.12 | Manage Probation | 2 | 3 | **2** |
| FR.13 | Manage Supported People | 1 | 2 | **2** |
| FR.14 | Manage Army Rank | 3 | 3 | **3** |
| FR.15 | Manage Labor Union | 3 | 3 | **3** |
| FR.16 | Manage Union Task | 3 | 3 | **3** |
| FR.17 | Manage Communist Party Task | 3 | 3 | **3** |

We choose function which have high priority (>1) to deliver in given schedule, the other function will defer because they are not value with stakeholder and high risk. If we choose to implement them, the late delivery will occur.

# 7.4 Quality Attribute Scenarios

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **ID** | **Quality attributes** | **Difficulty ranking (1,2,3)** | **Stakeholder ranking** | **Priority** |
| QA.01 | Performance | 1 | 1 | **1** |
| QA.02 | Security | 1 | 1 | **1** |
| QA.03 | Usability | 1 | 3 | **3** |
| QA.04 | Scalability | 2 | 1 | **2** |
| QA.05 | Modifiability | 3 | 1 | **1** |
| QA.06 | Availability | 3 | 2 | **3** |