



TECHNICAL UNIVERSITY OF NORTH

FACULTY OF ENGINEERING IN APPLIED SCIENCE

CAREER IN ENGINEERING COMPUTER SYSTEMS

TECHNICAL REPORT

THEME:

LIFTING AND IMPLEMENTATION OF PROCESSES AND PROCEDURES FOR
COMPUTER SUPPORT CENTER (HELP DESK) DECENTRALIZED
GOVERNANCE OF SAN MIGUEL DE IBARRA.

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Lifting and implementation of processes and procedures for the help desk center of GAD - Ibarra

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Abstract - This paper is made in order to raise and implement processes and procedures for the Center for Computer Support (Help Desk) Self-Government Decentralization of San Miguel de Ibarra, so an analysis of the current situation was performed using the SWOT tool for the initial diagnosis, then a study of the theoretical basis and accompanying was made based project as ITIL, and how it defines the process of Help Desk, it was investigated on the development technologies used by the GAD- I. After defining the process proceeded to the creation of the solution following the methodology of GAD-I, ie, software that supports this process using the framework Symphony version 1.4.6, PostgreSQL Data Base, for the ExtJS View Implementation, Relational Mapper Doctrine as Objects.

Keywords: computer support, software, symfony, ITIL

1. Introduction

Today information technology has penetrated so rapidly in various sectors of society, today a computer is almost essential in any company, business or home, which necessarily entails a given time need support, either for maintenance or repair of the various problems that arise.

On several occasions the transfer of the professional is to solve easily solvable problems via remote either by phone or by support through intranet, which relieves the end user the knowledge to achieve some independence to solve simple problems and provide an efficient service and effective.

That is why the Department of Information Technology and Communication, following its strategic plan and based on the "Administrative Resolution No. 44: Structure and Organizational Process Management GAD San Miguel de Ibarra", sees the need to lift Processes and Create Center Support, which has standards, standards of care, management and troubleshooting , in order to monitor and control problems and incidents that occur in the daily development tasks.

The purpose of this work is to define Support processes, based on the analysis of strengths, weaknesses, opportunities and threats which have the need to create a software that allows managing user requirements, adhere to the institutional realities.

1.1. Information technology and communication (ICT)

The information technology and communication (ICT) are a set of services, networks, software and devices

that are intended to improve the quality of life of people in an environment, and integrate an information system interconnected and complementary.

1.2. Infrastructure Library Information Technology (ITIL)

Developed in the late 1980s, the Infrastructure Library Information Technology (ITIL) has become the default global standard in IT Service Management. Started as a guide for the government of the United Kingdom of Great Britain, the base structure has proved useful for organizations in all sectors through its adoption by many companies as a basis for consultancy, education and software tools support. It belongs to the OGC, but is free for use.

1.3. ITIL Structure

Analyzing Service Management to find users' requirements and contrasting it with the user groups, the OGC designed this scheme spanning five overlapping elements.



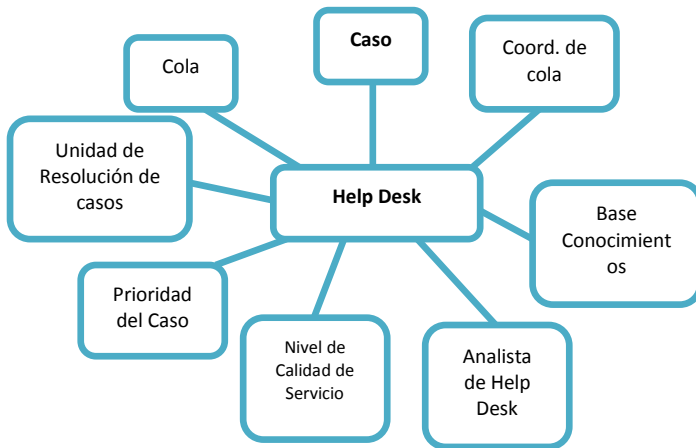
Source: OGC, 2012, ITIL v2.0 – Service Support

The focus of this project focuses part of the Computer Support Service.

1.4. Help Desk

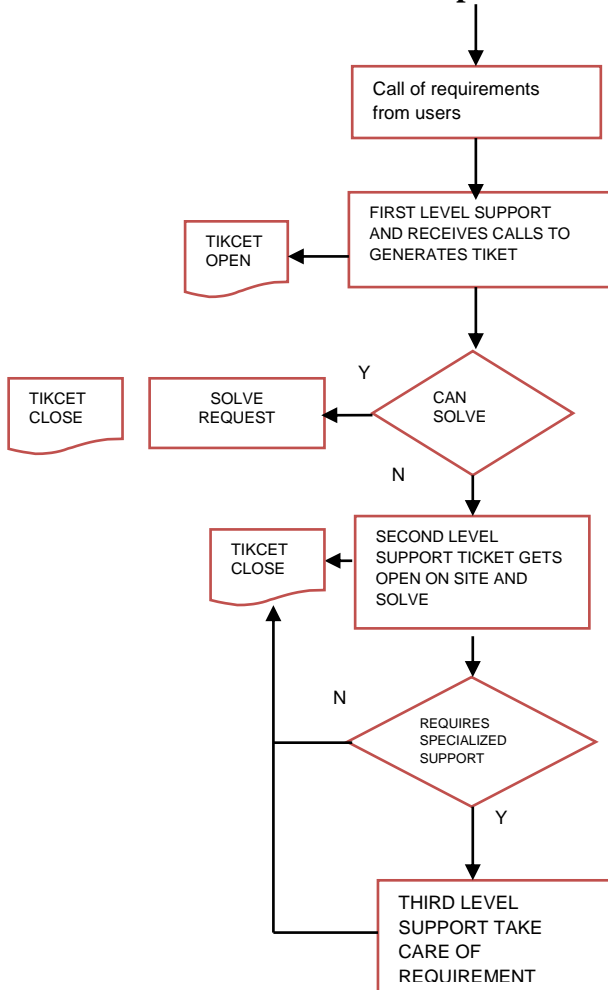
As its name says, is a help desk, where services are provided about technical support (software errors, hardware errors, Inquiries, etc.). Helps increase productivity and increases the satisfaction of internal users (when the service is provided within a company) and external (when a public service)

1.5. Basic Elements of Help Desk



Source: The Author

1.6. Structural Process Center Help Desk



Source: Running an Effective Help Desk / Barbara Czegel. – 2nd ed

In the chart above shows how a case is resolved by the Help Desk that starts with a user requirement that is

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served on the first level and a ticket is opened, if solved, ie, remotely, the ticket is closed and case. If you can not solve the case, it goes to Level Two, in fact, is necessary to attend the event on the site, if the case requires specialized or service provider's problems mount, the case goes to third level and is moved Specialized Support to without losing monitoring by the Centre Help Desk.

It is common for support centers take the name Service Desk, which basically covers the same aspects of a Help Desk and for purposes of the present study is considered equal. The main functions of a central Help Desk listed below:

1.7. Activities and Functions Service Center

- a) Incident Management: The first line of support for users is the Help Desk.
- b) Information Center: You must be the main source of information for users, announcing new versions or products.
- c) Supplier relations: Responsible for the relationship with external service providers maintenance.

2. Materials and Methods

The tools used in this work are:

- a) PostgreSQL Database
- b) Java Script
- c) ExtJS
- d) HTML
- e) JSON
- f) PHP Programming Language
- g) Development Symfony Framework

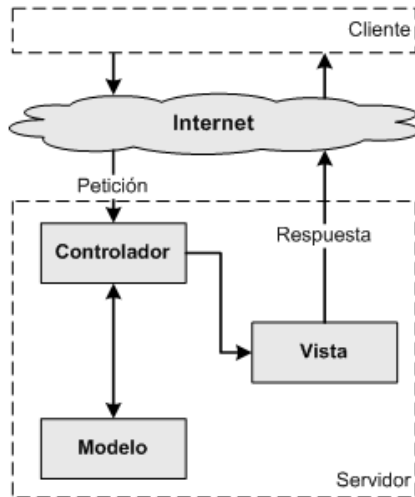
2.1. MVC pattern

Symfony is based on a classic web design pattern known as MVC architecture, which consists of three levels:

- The Model represents the information that the application works, that is, your business logic.
- The View renders the model into a web page that allows the user to interact with it.
- The Controller is responsible for processing user interactions and makes appropriate model or vision changes..

2.2. MVC architecture

The MVC architecture separates the business logic (the model) and the presentation (view) as a simpler application maintenance is achieved:



Fuente: (Symfony 1.4, la guía definitiva, 2012, tomado de http://www.librosweb.es/symfony_1_4/)

2.5. Description of Procedure

2.5.1. Activity 1 - Manager: User

Log in help desk assistance system h.d.a.s

The process of requesting support to the area of Hardware and Communications Directorate of ICT starts, having detected a problem in the operation of your computer or technology component, which prevent the development of normal activities, for that the user enters Assistance System Help Desk (H.D.A.S), entering your card for validation and assets assigned to it will show as a custodian.

2.5.2. Activity 2 - Manager: User

Assigned assets? Correctly?

If the list of deployed assets is not correct go to the Department of fixed assets and manage the correction in asset allocation. Otherwise go to the activity 3.

2.5.3. Activity 3 - Manager: User

Select an asset register for the event (optional)

If the user can select a desired asset deployed to associate the requirement you want to report list.

2.5.4. Activity 4 - Manager: User

HELP WANTED BY KEY WORDS IN THE KNOWLEDGE BASE

Search the Knowledge Base by using words or description of your problem and stored a number of cases and the basic steps of each case is presented.

2.3. Lifting Process

After an interview to the chief of the department of computer support area, it is determined that there is NOT a manual process of resolving cases, nor is there a process of Help Desk defined as such by which this paper raises a number process and standardized and optimized to support the work of support staff and thus give optimal support to users of the institution. The main purpose of the standardization process is that this knowledge can be captured and used quickly and can be shared among staff support area.

2.4. Defining new process Technical User Support

The definition of the overall process was carried out in the proper format GAD-I, and described below, it is the result of the improvement over the original process that served as the source is acknowledged.

This aims to address and resolve the impact of information technology and communications which cause service disruption, reported by users through timely care so they can continue with the normal execution of their activities.

2.5.5. Activity 5 - Manager: User

Resolved user? (self-help)

Follow the basic steps presented according to your search and if could resolve itself goes to No.7 activity. Otherwise go to activity 6.

2.5.6. Activity 6 - Manager: User

Send Request

Send a request for assignment of a technician and follow the care process, if you can write the specific observations that fall within your requirement. Receives a number of formal and an approximate solution time.

2.5.7. Activity 7 - Manager: User

Keeping requirements as self-help

After following the basic steps, terminated its requirement and saved cone Self Help for this case history remains.

2.5.8. Activity 8 - Manager of Hardware and Communications

Get Registered Request In The H.D.A.S

The Head of the constantly checks his tray of cases or reporting requirements to activate and assign them to a wizard.



2.5.9. Activity 9 - Manager of Hardware and Communications

Is there personal the request to attend?

If there is no staff to handle the request go to activity # 10. Otherwise go to activity # 11.

2.5.10. Activity 10 - Manager of Hardware and Communications

Assign a time of attention to request

Assign a reasonable time following the request and informs the user that the service time has changed.

2.5.11. Activity 11 - Manager of Hardware and Communications

Assign a a technical requirements for the attention of Head of Communications and Hardware assigns a technician to heed the request of the user.

2.5.12. Activity 12 - Manager: Assistant Technology

The Incident Is Known?

If the incident is known goes to step # 13, otherwise go to step # 15.

2.5.13. Activity 13 - Manager: Assistant Technology

Looking for solutions knowledge base and apply (1st level support)

Using H.D.A.S the assigned technician checks the steps to the solution and applied remotely if possible either through a phone call or through remote control tool equipment.

2.5.14. Activity 14 - Assistant Technology, Manager of Hardware and Communications

Incident was resolved?

If the incident was resolved remotely go to Step 21, otherwise go to step # 15 and must apply to the Head of Hardware and Communications to escalate the case to the next level.

2.5.15. Activity 15 - Manager: Assistant Technology

Go to place to investigate and / or solve the incident (2nd level support)

If the incident requires the transfer of technical workplace Username applicant must print the guide user attention. You should apply the solution or investigate the incident to implement a solution. See **FOR-3.9.9.1**

2.5.16. Activity 16 - Manager: Assistant Technology

Do I need to bring your computer hardware unit and communications and / or send or external warranty repairs?

If necessary, the technician moves the computer for diagnostic facilities Unit Communications Hardware and go to Activity # 18. Contrary case goes to Activity # 17.

2.5.17. Activity 17 - Manager: Assistant Technology

Meet the incident based on research and made the knowledge base

Implement the solution according to data from the knowledge base or investigation.

2.5.18. Activity 18 - Manager: Assistant Technology

Procedure for repair and maintenance of hardware or shipping warranty provider (3rd level support)

If the equipment is within the warranty period the equipment will be shipped to the supplier or if it is a device that requires a special repairs also be sent, and the guide sent / receipt is printed. See **FOR-3.9.9.2**

2.5.19. Activity 19 - Manager: Assistant Technology

Incident was resolved?

If after applying the known solutions and investigate the incident, this does not resolve to go to Activity # 20, if the incident was resolved to go to Activity # 21

2.5.20. Activity 20 - Manager: Assistant Technology

User report reasons for which the incident has no solution

Inform the user about the reasons why the problem has no solution, maybe you need a change of equipment.

2.5.21. Activity 21 - Manager: Assistant Technology, Manager of Hardware and Communications

Complete the process and close as if "resolved" o "resolved change equipment"

Should close the case by noting the respective observations and changing its status to "Resolved" means that the incident was resolved without making any changes to equipment or component, or "Resolved change equipment" when the incident was resolved by changing equipment or component.



2.5.22. Activity 22 - Manager: Assistant Technology, Manager of Hardware and Communications

Do I need to register the solution to the incident the knowledge base?

When he was an unknown incident, whether to log the solution in the knowledge base will activity # 23, otherwise go to Activity # 24.

2.5.23. Activity 23 - Manager: Assistant Technology, Manager of Hardware and Communications

Arrange a meeting to discuss and record in the knowledge base found the solution.

It should request a meeting with the team with the support team to reach a definitive solution to the incident protocol, then enter this case the system H.D.A.S and the knowledge base.

2.5.24. Activity 24 - Manager of Hardware and Communications

VERIFY THAT THE INCIDENT HAS SERVED AND REGISTERED CORRECTLY.

You should verify that the incident has been resolved appropriately and that everything is properly registered.

2.5.25. Activity 25 - Manager of Hardware and Communications

End of Process

2.6. Standardization and optimization of processes

Standardizing processes and ranking was done based on its type which is based on the severity and level of involvement in the continuity of work, these are:

2.6.1. Type of Case:

Incident: It's a situation that affects a high percentage of the user's work and can be solved in a short time.

Problem: It is a situation that affects the user's work and needs more time to be resolved.

2.6.2. Case Category:

Software: It is a situation that does not affect the user's computer software.

Hardware: It is a situation that does not affect the user's computer hardware.

2.6.3. Cases Subcategory:

Virus: Refers to cases having to do with the spread of virus in the computer.

Operating System: Refers to cases affecting the operation of the OS.

Applications: Refers to cases having to do with the malfunction of the applications , such as office automation.

Network: This refers to cases affecting the network connection either hardware or software.

Drivers: Refers to cases of lack of drivers or uninstalling them.

BIOS: Refers to cases such as the BIOS, low battery misconfiguration parameters, etc.

Antivirus: Refers to cases affecting antivirus eg Deconfiguration or revocation of licenses.

Printer: Refers to malfunctions print either hardware or software.

Device: This refers to the cases of the input or output devices, eg keyboard, mouse, monitor, etc.

Mainboard: Refers to cases of failure eg burnt mainboard , socket failure , etc.

2.6.4. Process Cases Computer Support Help Desk

The Knowledge Base will consist of tasks that must be performed for case resolution (Resolution Protocols), and then a general model is detailed as an example.

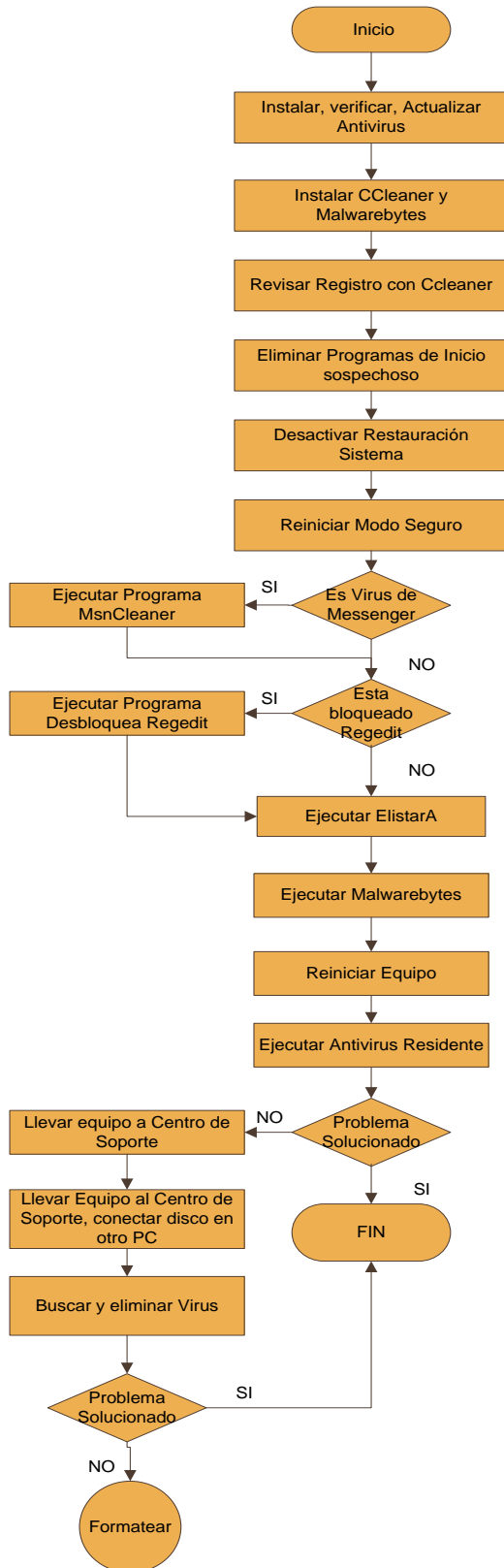
As the table and flow shown below, it was possible to design 23 general cases of software and hardware, of which 52 protocols Resolving Software and protocols Resolution 36 cases were detached Hardware, later we will see an example of the above protocols, which constitute the information stored in the software development to complete this work.

General Case Disinfection of Virus

Type	Problem
Category	Software
Subcategory:	Virus
Keywords	Slow, off equipment not run program,
Symptom:	virus detection
Steps:	Chapter IV

Source: Author

**Illustration
General Case Disinfection of Virus**



Source: Author

2.6.5. Sample Resolution Protocol cases

Case: Detecting and removing Viruses and other malware

Symptoms:

- a) Abnormal behavior equipment
- b) Slowness when using applications
- c) The Modem is connected to the Internet without user authorization
- d) The number to dial the modem is changed to another unknown
- e) Applications show mistakes or terminate unexpectedly.
- f) They open windows or unsolicited applications
- g) Strange on startup applications are loaded.
- h) Changes to the home page of the Web browser, without allowing to restore the original.
- i) User files or folders , shortcuts showing in its place of the same name are hidden.
- j) Change in the context menu , new options is.
- k) A message countdown , then the computer shuts down displays.
- l) Change of name and / or extensions of the user's files , especially those in office , and hiding them.
- m) Change in log form , not the user list , only window to enter user name and password appears .
- n) The Task Manager does not run
- o) Files and folders without authorization in each removable device that connects to your computer are created.
- p) The resident shows Antivirus detection message constantly virus..

Level of Support

- a) Second level, on-site care, service use guide..

Solución:

- a) Install, update or verification Antivirus (Recommends AVG Antivirus) .
- b) Install CCleaner
- c) Install Unlocker
- d) Install and update Malwarebytes
- e) Inspect Tickets Start System with CCleaner
- f) Disable and / or delete nonstandard system applications or common inputs.
- g) Search and delete the suspicious files path .
- h) Temporarily Disable System Restore .
- i) Restart the computer in "Safe Mode"
- j) Sign in Default User .
- k) Run Malwarebytes
- l) Remove the detected elements
- m) Restart computer if needed , in normal mode
- n) Run antivirus Resident .
- o) Remove the detected elements
- p) Fill the service guide for reporting the solution and contribute to the history of user attention.



- q) Check the normal system operation .
If the problem persists :
- r) Check the physical condition of the equipment , to avoid claims
- s) Carry the team to the support center
- t) Remove the hard drive and plug it into another machine to look around and remove viruses , and if this does not work go to the next step.
- u) Get Backup of personal user data
- v) If the user has proprietary systems , coordinate with the provider to backup and reinstall .
- w) Request driver to lose internet user .
- x) Format the team .
- y) Fill the service guide for reporting the solution and contribute to the history of user attention.
- z) Deliver the equipment to the user

3. Result, Development Solution

The proposed construction of a Management Information System : Users, Cases and Solutions to provide IT Support service has been produced in the context of the development of the thesis for obtaining the title of Systems Engineering at the Technical University of North (UTN) in the Faculty of Applied Engineering Sciences (FICA) .

The implementation of the project is completely done in the GAD San Miguel de Ibarra, in the Direction of Technology, which currently provides the IT Support to internal users of the institution.

The Development Team was composed of :

- a) **Manager:** Marcelo Rea
- b) **Tracker and Tester:** Marcelo Rea
- c) **Programmer :** Marcelo Rea

The system will be used in intranet GAD Ibarra has been rated the best type of application that suits the technological growth and it was decided that the system is Web , given the increasing rise of Web Applications .

The project based on the MVC model, which is applied in the development of projects of the institution and also a general level in the currently developed projects .

Was chosen as the language PHP , leaning on the Framework Symfony 1.4 versatile platform, their performance and that the institution is currently developing all of your projects with this language and integration is needed in addition to the interface extjs be used because an interface is needed it is easy to use, to optimize the display of devices and has a higher efficiency in terms of user time and system response , as this framework is very comfortable to use and elements in presentation is very attractive.

The database will be created in PostgreSQL 9 because it is a Management System database, as well as being robust and versatile platform, and is also used in the institution with great success.

In order to have the finished software should follow the methodology of the institution so they had to take steps which are briefly explained:

3.1. Steps in the Development methodology

- a) **Memorandum of Application Software Development:** It is represented by the letter of acceptance of the thesis development at the institution.
- b) **Allocation of Project:** It is represented by the letter of acceptance of thesis development in the institution and the author logically assigned project .
- c) **Meetings with the areas of users and technical staff to raise software requirements:** several meetings to be clear about the requirements of the areas that will use the software were performed.
- d) **Development of Technology:** the project was prepared and submitted for correction and approval. In this document it had to capture modules and software will reach.
- e) **Documents, list, prioritizes and selects the criteria:** This is done in the user stories that eventually totaled 7, which were developed in logical order and sequence.

To attach the battery of this product in which the stories were made are as follows.

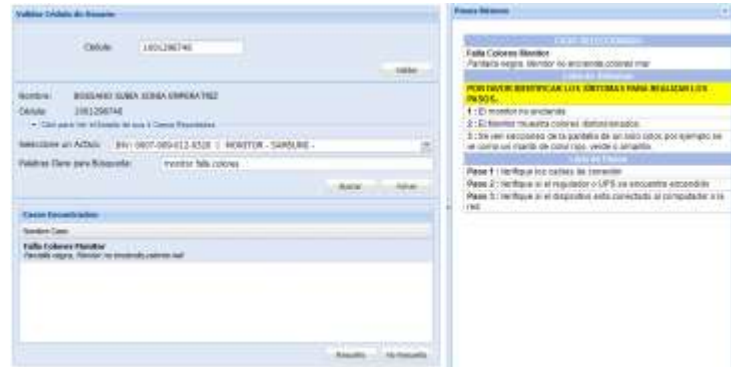
Product stack		
PRODUCT STACK		
ID	Name User stories	Priority
1	Validate identification number and Show Assets	HIGH
2	Search by keyword case	HIGH
3	Save Self help or report a case	HIGH
4	Management of Computer Equipment	MEDIUM
5	Case Management	HIGH
6	Queries and Reports	MEDIUM
7	Management Knowledgebase	HIGH

After analyzing user stories, assess their priority for the business has been classified in the following iteration planning.

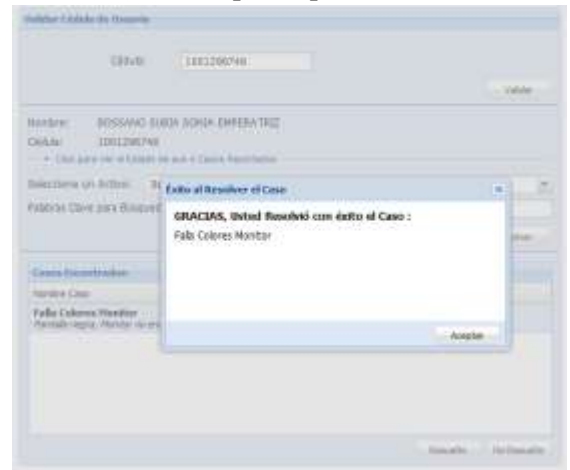
Initial Planning Iterations

Ite r	Stories	Description	Date	Dur.
1	Application User (Frontend)	Story 1 Validate identification, Show Assets	18/03/2013 31/03/2013	80
		Story 2 Search by keyword case	1/04/2013 07/04/2013	40
		Story 3 Save Self help or report a case	8/04/2013 14/04/2013	40
2	Gestión Administrativa (Backend)	Story 4 Management of Computer Equipment	15/04/2013 28/04/2013	80
		Story 5 Case Management	29/04/2013 26/05/2013	160
		Story 6 Queries and Reports	27/05/2013 9/06/2013	80
		Story 7 Management Knowledgebase	10/06/2013 23/06/2013	80
TOTAL				560 h

**Result of Story 2
Search by keyword case**



**Result of Story 3
Save Self help or report a case**



f) Results of Iterations

After the initial planning, development outcomes were obtained:

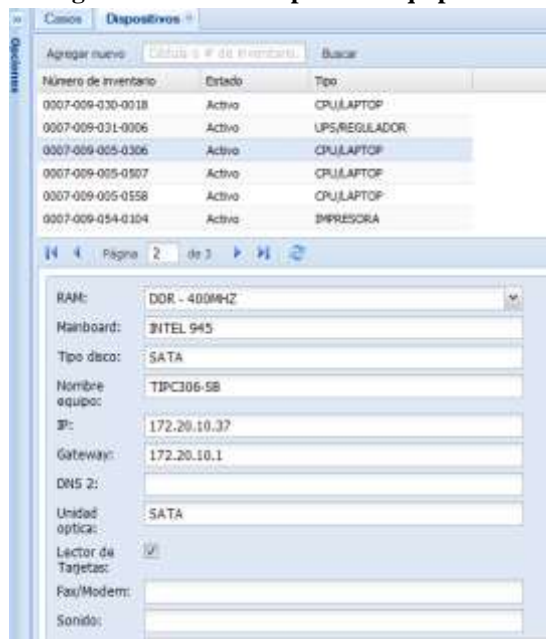
**Result of Story 1
Validate identification, Show Assets**



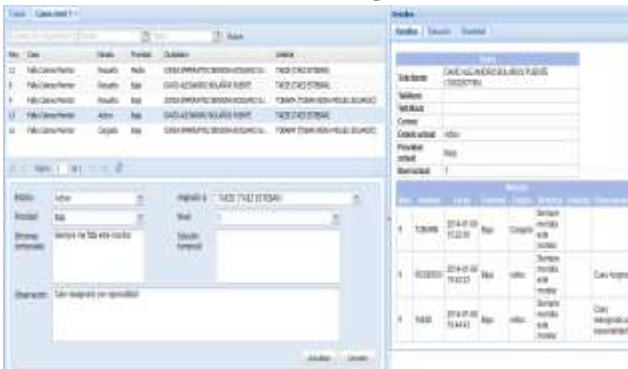
**Result of Story 3
Save Self help or report a case**



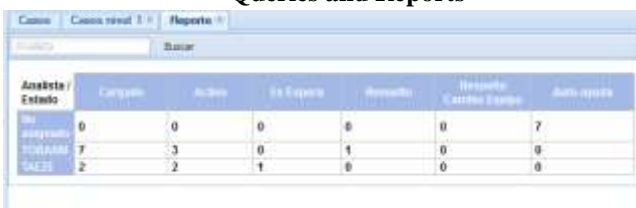
**Result of Story 4
Management of Computer Equipment**



**Result of Story 5
Case Management**



**Result of Story 6
Queries and Reports**



**Result of Story 7
Management Knowledgebase**



g) Design of the Database

After collecting and analyzing user stories, requirements, and define the project design of the database which is made according to the standards of design and development the institution was performed.

Several meetings to correct design database were performed and after making corrections have optimum final design was obtained.

h) Integrate User Manuals and deliverables

At the end the finished system development and user manuals and technical, which are used to instructional System Administration was obtained.

i) Training User

For System Administration, training the staff responsible was made and the knowledge to use end user also transmitted.

3.2. Final analysis

In a software project costs can be determined such as the value of pc's, servers, programming hours and hours of analysis and design, software, office supplies and others, but the benefits can not all be represented monetarily, is that the following analysis will address these points and more

3.3. Costs

Hardware Costs

ESTIMATION	Estimation	Real Value
[15] Application Server to host	900	0
[16] 1 PC to handle calls to the support center	700	0
[17] 1 Laser Printer	130	0
[18] 1 Phone	70	0
[19] Materials structured cabling installation for the Network.	50	0
[20] 1 Desk	150	0
TOTAL	2,000	0

Software Costs

ESTIMATION	Estimation	Real Value
[21] Database Server PostgreSQL	0	0
[22] Application Server Apache	0	0
[23] Cost Development 6 months (\$400/month)	2400	2400
[24] Cost Research and Experience (6 years) for the Technical Support process.	6000	6000
[25] Cost of Eclipse IDE for development.	0	0
TOTAL	8400	8400

Cost of Supplies

ESTIMATION	Estimation	Real Value
[26] Paper	20	20
[27] Pens, DVD's	5	5
[28] Anillados	5	5
[29] Impresión Documentos	50	50
TOTAL	70	70

Miscellaneous costs

ESTIMATION	Estimation	Real Value
[30] Mobilisation	60	60
[31] Extra Training	100	100
[32] Internet	150	0

[33] Contingencies	100	100
TOTAL	410	260

3.4. Benefits

The benefits of this project are reflected in saving time support staff, saving the user time to seek help, and better organization for having the defined process and support the task support system.

The benefits are listed below:

- The main benefit of the project is the organization and improving the process of care for end users , as these may require care in an organized manner.
- End User GAD -I get quick and organized by search the Knowledge Base and the presentation of the basic steps to self-help solutions.
- End users will benefit directly to gradually acquire basic knowledge to solve their problems.
- The Area Networking Hardware and offering support to users, have a useful tool to meet the requests of the users, as well as having a control and monitoring applications made.
- The technical work will save time because users following the basic troubleshooting steps avoid unnecessary transfers of technicians.
- The head of the Department support has control on the states of the user requirements and can also arrange working time technicians, resulting in resource optimization.
- Support staff have organized the technical data of the computing devices of the institution, without affecting the asset database.
- The benefit also extends to the department of Assets, and the system does a validation of IT assets associated with the user and if the information is outdated or incorrect the user is prompted to update this particular department fixed assets.

4. Conclusions

After completing this work we can conclude that :

1. The service end-user support in the GAD- I, was defined simply and worked haphazardly, as users flocked to address all IT to seek care.
2. The Help Desk process serves to organize care computer support to end users in the GAD -I.
3. The implementation process optimizes Help Desk support staff work, saving time on unnecessary visits.

4. End Users will have software to help them solve their basic problems and save you lost time stopping their work activities.
5. Support staff have an important tool to organize, attend and solve the requirements of software users.
6. Using the Knowledge Base allows all staff can access the requirements and solutions to efficiently assist users in need.
7. The development methodology GAD -I software lets you create an organized manner and in accordance with the actual needs of the institution.
8. The implementation of the MVC model, allows the creation of applications organized and easy to maintain.
9. Using the Symfony framework allows an organized, quick and easy developments following programming standards which allow quickly understand the composition of systems.
10. Using Doctrine ORM , facilitates the use of queries to the database and allows the application to communicate with any database without having to change my application.
11. Using ExtJS to create the application view totally enriches the interface, improving usability and optimizes the workspace to get more done.
12. Use PHP as the programming language used to develop light and fully functional in terms of the current requirements of users and applications developers.
13. Capture in this project all the years of experience of the author, providing computer support allowed to collect, organize and synthesize knowledge was dispersed.

Thanks

Eternal gratitude to the University North Technical and Engineering Faculty Applied Sciences especially the teachers Engineering Degree in Computer Systems who with their knowledge has given me the opportunity to beat staff, academic and intellectually.

In particular I do extensive recognition gratitude to Mr. Irving Reascos, as director thesis, as their knowledge and experience has: a successful guide for the development of this degree work.

People who gave me information and suggestions for the development of this project.

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An eternal gratitude to God for the blessings received and life opportunities.

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