Development of Information System for Management Technology Infrastructure of Universidad Técnica del Norte.

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Abtract. *The Universidad Técnica del Norte has institutional mission, form excellent professionals, so apply continuous improvement. Therefore it stipulates that after the race should make a thesis where students demonstrate what they have learned, to fulfill this purpose undergraduate work called "DESARROLLO DE SISTEMA INFORMÁTICO PARA LA GESTIÓN DE LA INFRAESTRUCTURA TECNOLÓGICA DE LA UNIVERSIDAD TÉCNICA DEL NORTE", which streamlines care problems of technological equipment of users or employees and in turn keep track of these cases to better care. So this graduation project described in this article was developed.*

In this article the problems faced by the UTN regarding the management of corrective and preventive maintenance and customer service process (Help Desk), along with the description of the project that will be outlined a possible solution.

Keywords

Help Desk, Software.

Resumen. *La Universidad Técnica del Norte tiene como misión institucional, formar excelentes profesionales, por lo que aplica la mejora continua. Por ello estipula que al finalizar la carrera se debe realizar un trabajo de grado donde el estudiante demuestre lo aprendido, para cumplir este fin se realizó el trabajo de grado denominado "DESARROLLO DE SISTEMA INFORMÁTICO PARA LA GESTIÓN DE LA INFRAESTRUCTURA TECNOLÓGICA DE LA UNIVERSIDAD TÉCNICA DEL NORTE", que permite agilizar la atención de problemas de equipos tecnológicos de los usuarios o empleados y a su vez llevar un registro de estos casos para una mejor atención. Así se desarrolló este proyecto de grado descrito en el siguiente artículo.*

En este artículo se detalla los problemas que ha enfrentado la UTN con respecto a la gestión de los mantenimientos correctivos y preventivos y el proceso de atención al usuario (Help Desk), además de la descripción del proyecto con el que se dará una posible solución.

Palabras Claves

Help Desk, Software.

Introduction

Throughout history, our university has undergone many changes in both infrastructure, and academically. One of the most important is the technological equipment which has changed the way of working of each of the people. The University has begun to understand how important technology in both hardware and software for the operation of its processes.

Problem

Since the technology park has been growing at the Technical University of the North, they began to cause problems of management of corrective

and preventive maintenance as well as how to monitor these processes.

One of the main problems is the lack of organization to the attention of the problems or incidents reported by preventing users optimize their work and increase productivity while waiting for this service.

Still further a process of preventive and corrective maintenance is not held, this project aims to create and automate that process.

Finally we can distribute the workload among technicians of different areas of the university and thus speed up the process of decreasing customer service response times, guaranteeing the handling of their cases and helping decision making administrators each area of support.

Justification

Development of Infrastructure Management Application Technology will allow the Technical University Northern solve many problems. The construction and implementation of such solutions take time and effort. It should be noted that a poorly planned automation, will only increase the already existing problems and create a chasm between users and the system itself causing a mismanagement of the technological infrastructure. Automatic and dynamic effective solutions become routine processes and reduce human error by eliminating manual tasks that are redundant.

To achieve optimum results, the software interacts with end users, so that they can report your problem and check the status of rescission.

Automated Technology Infrastructure Management tools vary widely in their characteristics, hardware platforms, software, market, cost and functionality. However, regardless of these differences, the basic elements that must contain these systems should focus on the following aspects:

Troubleshooting: Required to improve both technical accuracy and speed. This feature depends on the product. It can range from simple text search engine, to expert systems utilizing artificial intelligence.

Ability to scale problems: This feature allows a task is forwarded to a technical specialist to perform some other action. This usually occurs when a task reports an incident cannot be resolved by the operator of the Help Desk, or when the action requires technical skills. The rules for scaling problems are stored in the database product and can be changed by the personnel who are authorized.

Recovery: It is the next logical step, after performing the administrative functions of registering the task reports an incident and obtain all possible information on the problem presented. The information retrieval always occurs during the first attempt to solve the problem presented. The most common approach is using the normal search engine's database to find historical records; same as those shown similar problems have been resolved.

Report Generation: Generate and customize reports using the database to extract and identify the type of problems received, detect trends in the system, among others.

Statistics evaluation equipment failures: The system will allow data analysis by tracking statistics computer.

General Purpose

Implement a Technology Infrastructure Management for Technical University of North using a software development methodology.

Scope

The Technical University of North will have a Management System Technology Infrastructure, for this is taken as baseline the thesis developed by Mr. Marcelo Giovany Rea Reyes with the theme: "Rise and implementation of processes and procedures to Support Center computer (Help Desk) Decentralized Autonomous Government of San Miguel de Ibarra. " System Technology Infrastructure Management perform the following functions:

- **Help Desk**

The main aim of the help desk is to provide proactive and reactive support to the end user.

Reactive Support: Solve problems that user reports, such as malfunctioning of PCs, printers, software packages, among others.

Proactive Support: Works teaching the user to perform tasks to help them avoid common pitfalls associated with PCs, printers, software packages, among others.

- **Monitoring**

The tracking module allows publishing the list of tickets depending on certain criteria. You can post:
- ✓ Only new unassigned tickets.
- ✓ Only tickets assigned to you.
- ✓ Only tickets planned.
- ✓ Only tickets are on hold.
- ✓ All tickets that have not been closed.
- ✓ All tickets closed and resolved.
- ✓ All tickets closed but not resolved.

- **CAU(customer service center)**

This module incidents are created, you can specify the priority of the issues, the source of demand, material or program involved, author, category, allocation and total intervention duration (useful for incidents historical)

- **Statistics**

You can get statistics based on different criteria. For each of them a summary table and / or graphics elements available.

- ✓ Global Stats.
- ✓ For incidents (author, group, category, priority, source of the request, technical, business)
- ✓ By titles (features computers)
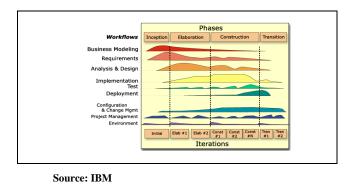- ✓ By Material

- **Maintenance Control Computer and Inventory Update.**

This is the second phase of the computer system in general, what it is is to make preventive and corrective computer monitor, for this there is a process by the Department of Technology and Information Technology Development at the University thereof having agreements with companies engaged in maintenance, then what is to be done in this module:

- ✓ Automate the process of preventive and corrective maintenance of computer equipment with the companies providing this service maintenance.
- ✓ As usual all good material is intended to wear out and suffer damage, so that the good undergoes depreciation, take into account that the good also will could increase physical (hard disk, RAM, video card) as an appreciation of the good is produced, which will be reflected in the Assets Control module and so in this way a properly synchronize data asset.

Development methodology

For software development, RUP is used. Rational Unified Process is a methodology used in software engineering to standardize the process of project development. "*RUP, iterative development promotes and organizes the development of software into four phases, each consisting of one or more executable iterations of the software at this stage of development*".

Source: IBM

Ilustration 1 RUP Phases Description.

In the **Inception** phase will take place:

✓ **Software Development Plan:** The document in which a general approach to the whole project is provided.
✓ **Vision Document**: This document describes the main features that the project will be described.
✓ **Requirements**: A System Requirements document will be presented by the user, detailing the features that will.

In the **Elaboration** phase will take place:

✓ **Use Case Model:** Here you define which functions are allocated to each system user role. A diagram of use case specifications and use cases will be shown.
✓ **Document architecture**: the most important architecture diagrams that composed this system, as the architecture of the tool, the integration of the modules is displayed, the database diagrams and activity diagrams of the processes with the procedures manual respective.
✓ **Design**: prototypes of Web pages with their features and functionality will be modeled.

In the **Construction** phase, the implementation of the structural basis of applications such as database schema and web pages with their validations are performed.

In the **Transition** phase, the system will be tested with real data and train users in their management of applications, and will be formally transferred to the documentation of the project, indicating the conclusions and recommendations.
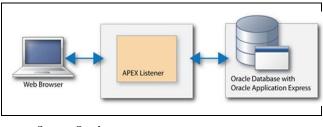
Tools

The Application Server that is used in this project is Oracle Weblogic 11g, with the development tool APLICATTION EXPRESS Oracle (Apex) in version 4.2.3. This tool is fully compatible with the Oracle database so it will be easy connections to it.

Apex is a tool for web applications very easily and quickly, which benefits the development of the applications and makes the time to optimize as long as the PL / SQL code are well designed. This tool is connected directly to the database, since it is a component that is installed in the Oracle database.

Making a web application in Apex has benefits as the usual dynamic action forms that avoid having to manually develop mechanisms using javascript or AJAX code own. You can include plug-ins that help place grouped dropdown lists, text fields with mask effects in and out of windows, or other elements.

Applications are made in Apex, you can export and import the database into a SQL script type, which facilitates portability and draw backs. Then APEX architecture shown.

Apex has the capability to integrate with SQL language, PL / SQLalso with HTML so facilitating the integration of the database with web applications.

To access an application that Apex is needed on the server is installed and configured correctly so APEX_LISTENER access the application from a web browser.

Source: Oracle

Illustration 2 Architecture Oracle Application Express Listener

Results

The design and implementation of the system has made based on existing systems in the UTN so has not made changes to the hardware architecture or software, but have added components in the database that are related to previously created.

The information presented in the Management System Infrastructure Technology NTU is charged in the same database which have the rest of the modules of the integrated system. So you can say it is a system with a centralized database, allowing the integration of the modules both fixed assets and human resources.

Lifting Process User Support allows better organize the incidents reported by users which optimizes the work of users and support staff.

The web system solves as many incidents as self-help by the end user to optimize handle this human and technological resources in the Department of Computer Technology and Development at the Technical University of the North.
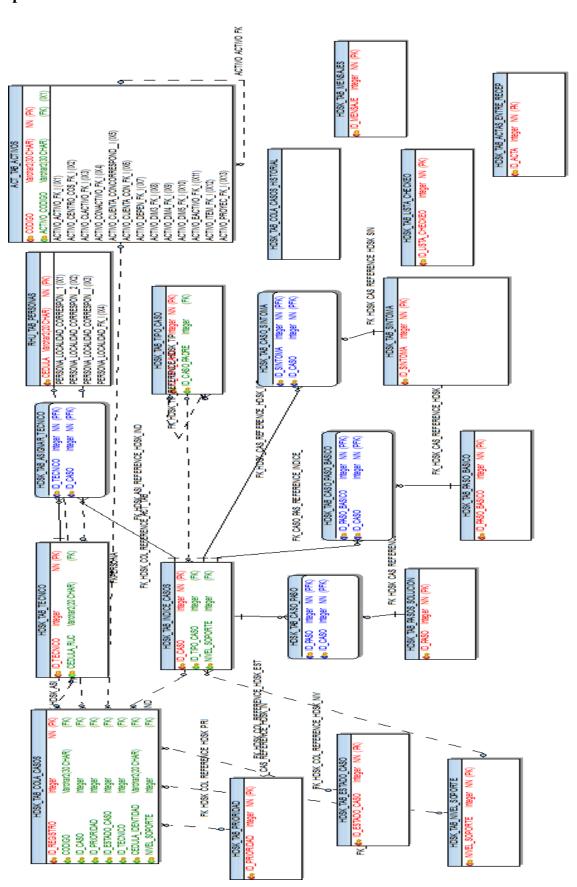
The web system through its reports and statistical graphics allows us to see which cases are reported more frequently, users most often requested support, assets that have problems constantly, among others, allowing us to help decision making.

Some benefits that were obtained with the implementation of the system are described below:

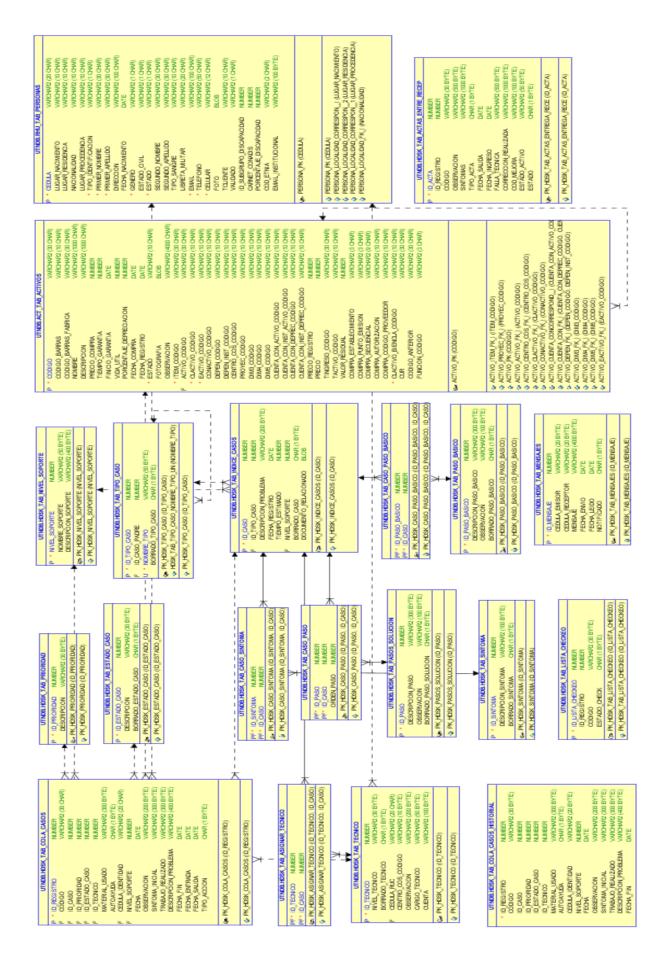| IMPACTS	BENEFITS
Economic	• Improving processes, saving time and use of human talent. • Savings in maintenance and reuse of hardware and software. • Better control of preventive maintenance of assets to avoid the cost of repair.
Social	• Increase the prestige of the Technical University of North. • Increased end-user satisfaction in this service.
Technological	Expansion and improvement of the quality of software UTN
Ecological	• Reduction of impressions and / or use of paper. • Improved life of computer avoiding the generation of electronic waste.

Source: Own

Table Project Impacts and Benefits

Conceptual Model

Physical Model

Conclusions

The service user support in the Department of Computer Technology and Development of the Technical University of North did not work in a proper and organized way, because users are not satisfied with the care of the service.

Lifting Process User Support allows better organize the incidents reported by users which optimizes the work of users and support staff.

The web system solves as many incidents as self-help by the end user to optimize handle this human and technological resources in the Department of Computer Technology and Development at the Technical University of the North.

The web system through its reports and statistical graphics allows us to see which cases are reported more frequently, users most often requested support, assets that have problems constantly, among others, allowing us to help decision making.

By using Apex as a tool it was possible to develop a user-friendly application, easy to use and maintenance.

As a web application allows users to access it from anywhere where you have an internet connection.

The system being developed in the Oracle platform, which is used in most applications University, has been possible easy integration with other modules of the Integrated System of UTN.

The software development methodology RUP, which is where the Department of Technological Development and Computer for computer systems development is based, yielded quality software following the policies and parameters established by it.

End using their attention guaranteed support through the issuance of tickets, which prevents users visit where the technician is usually what happens, so that makes this a better organization and management of this service.

The burden of support incidents of late different cost centers of the university (Faculties, Graduate Institute, University Welfare building, etc.) which helps provide timely care in every area of the university is distributed users noted above.

By automating the process of both internal support and external improves performance and efficiency of care to end users, also you have evidence as forms of support, information database, statistics, including those which are very necessary for a possible internal and external audit.

Recommendations

Self help strengthen the level of end users so that there is good management culture equipment.

Constantly update and refine the knowledge base, for the advancement of technology in both software and hardware is growing rapidly, to achieve better results in solving support issues; as a good structuring and developing the knowledge base depends on the success of self-help level end users.

Conduct training to technicians and users constantly so they can operate the system in a right way and also suggestions for better communication between these two actors is achieved.

Debug information Fixed Assets module as in this there may be incorrect data such as asset managers, asset characteristics, location, among others.

Update and refine the information of end users to be updated as extensions, phone numbers, outbuildings, email, etc. so we can contact information to end users.

It is recommended that frequent meetings with staff support the feedback process, the knowledge base.

It should improve service and Internet server resources dedicated to Oracle APEX of the institution they are very important for the proper functioning of web system factors.

Encourage the use of the system to end users by publicizing the advantages and benefits accruing to use new technological tSelf help strengthen the level of end users so that there is good management culture equipment.

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