

OSS WEB TECHNOLOGY SUPPORTING TICKET MANAGEMENT OSS WEB

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Abstract - The present work aims to show the development stages that were carried out in the elaboration of a web application through Open Source Software (OSS) open source tools; available at no cost to be used, examined, altered and even redistributed by external users [1], over time it has become a movement and a way of working that transcends the production of software [2]. Through OsTicket in OSS, the timely follow-up of technical support requests for equipment maintenance is automated with digital tickets, prioritizing the areas of high demand and therefore effective attention. The status of the support is immediately recorded to update the stage of attention reported by the web system on the graphical interface for real-time consultation.

Keywords: OsTicket, OSS, technical support, tickets, Web.

Abstract -- The purpose of this paper is to show the development stages that were carried out in the development of a web application using Open Source Software (OSS) open source tools; available at no cost to be used, examined, altered and even redistributed by external users [1], over time it has become a movement and a way of working that transcends software production [2]. Through OsTicket in OSS, timely follow-up to technical support requests for equipment maintenance is automated with digital tickets, prioritizing high demand areas and therefore effective attention. The status of the support service provided is immediately recorded to update the stage of attention reported by the web system on the graphical interface for consultation in real time.

Key words - OsTicket, OSS, technical support, tickets, web.

INTRODUCTION

OsTicket is a free version tool that allows the creation of web sites that includes an efficient ticket management, widely used by different customers around the world, includes a powerful ticket filtering system that ensures that the distribution within the organization of the same is correct, ensuring an orderly environment of the information, which is why it was chosen for the implementation this work.

The site is hosted on Xube, which provides optimized servers for increased performance and extreme security. In addition, it provides basic functions such as software updates to advanced security measures, data protection and smooth business performance [4].

It integrates information management with PHP, defined as an open source language popularly suitable for web development [5]. It offers freedom of choice of operating system and web server [6].

State of the art

At present there is a very different current aimed at the development of free distribution software, highlighting the importance of the construction and management of Web sites in organizations, both for their projection on the Internet and for their internal needs with intranets in the organizations. According to a publication of the Jornadas Españolas de Documentación in 2005, disseminating the scope of its Web site that updates contents with OSS tools. "The free software movement in this field is in continuous expansion" [7].

In Peru, the creation of a web site based on OSS includes tools such as PHP as a successful information manager in the project "sistema académico web para el instituto tecnológico superior de la industria del cuero del cantón cotacachi" for the leather sector, in conjunction with NetBeans and published digitally by the Universidad Técnica del Norte [8].

Problem

The company has an outdated information page and does not have a dashboard to streamline the contracting of services offered, nor a ticket system to follow up on customer requests and incidents.

Currently, the process for contracting services, support and customer service is done through phone calls, email, or Whatsapp messages. The lack of an efficient information system makes these processes slower, more costly and requires the use of manual methods.

Justification

Currently the business organization in the technology sector offers technical support services and training courses to customers in different states and municipalities of the Mexican Republic. The goal is to integrate the processes they perform through a web page to optimize time and human effort.

In addition to this, managing customer requests and incidents is done through phone calls, emails or WhatsApp messages. By automating these processes, the company will improve communication with its customers and between internal departments, as well facilitate the contracting of services.

The technical support system serves to facilitate communication and tracking of user problems, as well as centralizing and organizing information about support requests. A technical support system is essential to optimize the work of your company's support agents. The following data corroborates this.

According to Zendesk's CX Trends 2023 Report: 66% of consumers who interact often with support say a bad interaction with a company can ruin their day; 75% of leaders say their goal is to make customer service feel more conversational and less transactional [9]. This is data that shows the importance of understanding what support departments are and how to manage them efficiently.

For the above described, it is justified the creation of a website that implements for its efficiency digital tickets and the timely management of technical support to customers under priority areas for their efficient attention.

Overall objective

Create a site that integrates a system for service contracting and management of requests and incidents of maintenance support to customers through tickets. *Specific objectives*

- Develop the organization's information page.
- Implement a shopping cart for the contracting of services.
- Implement ticket-based support system.
- Implement knowledge base, users can find answers to common problems without opening a ticket.
- Upload the site domain xube.com.mx

The scope of the project

Target customer identification. Create a clear value proposition.

Development and integration of forms. Web site content creation.

Implementation of a shopping cart for the contracting of services from the corporate page. Integration of the ticketing system in the corporate website.

Knowledge base with frequent problems. Organic positioning of the corporate page.

Automated ticket tracking.

Delimitation of the project

Electronic invoicing through the site. Payment gateway will not be implemented.

The contracting will only remain as an order.

It is used for the development of the Open Source systems project based on PHP language.

DEVELOPMENT

The ticketing system was implemented using Osticket, an open source solution that allows to manage and organize technical support solutions in an efficient way, the process started with the identification of the most common problems. The company has a repository of service sheets written by technical support experts.

These sheets outline the incidents experienced customers and the proposed solutions.

Subsequently, we proceed to the qualification by departments and sub-departments. Four main departments are established: service, warranties, help desk, technical support. See image 1.



Diagram of departmental structure.

Knowledge base

Two knowledge bases are developed to facilitate access to relevant information, based on the service sheet repository, highlighting the most common incidents.

External knowledge base

This database is intended for customers and offers informative articles about the brands with which we have an agreement. They are organized into categories to facilitate understanding and resolve frequently asked questions. Below is a chart that categorizes the frequently asked questions. See image 2.



Image 2. Frequently Asked Questions.

Internal knowledge base

Intended for internal staff, it contains training videos on the use of software such as SoftRestaurant. The objective is to facilitate the learning process for employees. The interface of the internal knowledge base is shown below. See image 3.



parameters, such as site name, case size and time zone. These settings are essential for the system to work properly in a specific environment.

Ticket Panel

Here you configure the settings related to ticket creation and handling, such as alerts and email notifications for departments and administrators, as well as ticket queues, which allow you to classify tickets.

according to their status (open, closed, pending, etc.) facilitating the efficient management of support requests.

Forms Panel

The forms dashboard allows administrators to create and customize forms to be used for customers to report issues from the website. These forms are designed to collect key information, allowing the support team to resolve incidents more efficiently. To create a form, you must: Assign a name to the label, define the type of field (length, visibility, optional or required), create a variable to process the information. See image number 4

Etiqueta	Tipo	Configuración	Visibilidad	Variable	Eliminar
Nombre Establecimiento	Respuesta corta	☒ Configuración	Requerido	nombrest	☐
Nombre Local	Respuesta corta	☒ Configuración	Opcional	loc	☐
Dirección	Respuesta corta	☒ Configuración	Requerido	direc	☐
Ciudad	Respuesta corta	☒ Configuración	Requerido	ciudad	☐
Estado	Respuesta corta	☒ Configuración	Requerido	estado	☐
Tipo de Negocio	Respuesta corta	☒ Configuración	Requerido	tipo neg	☐
Seleccionar de Servicios	Opciones	☒ Configuración	Requerido	servicios	☐
	Respuesta corta		Opcional		
	Respuesta corta		Opcional		

Image 4. Customized Forms

Help Topics Panel

Help topics organize and categorize support requests in OsTicket, improving ticket management. Topics can be divided into subtopics, making navigation easier for both users and support agents. Custom forms can be added to each topic, allowing detailed incident information to be collected. See image number 5.

Temas de ayuda	Estado	Tipo	Prioridad	Departamento
☐ Atención a clientes	Active	Público	Normal	Atención a clientes
☐ Garantías	Active	Público	Normal	Garantías
☐ Mesa Ayuda	Active	Público	Normal	Mesa Ayuda
☐ Soporte Técnico	Active	Público	Normal	Soporte Técnico

In this panel you manage the agents that will be part of the support team. New agents can be added by creating users and passwords, assigning them specific roles and permissions. In addition, agents can be organized into teams and assigned tickets according to their area of expertise. See image 6.

Tipo de categoría:

- ☐ Destacado en la barra lateral de la página principal
- ☐ Público (publicar)
- ☒ Privado (interno)

Información de Categoría: [Ver más info](#)

Principal:

Categoría padre:

Categoría de nivel superior: [Ver más info](#)

Nombre de categoría:

Descripción de la categoría:

Image 6. Create an Agent.

Pages Panel

This panel allows administrators to create and manage information pages within the system, such as support policies or support center information. These pages are useful for providing additional information to both agents and customers. See image 7.

Agregar Nueva Página

Página de información:

Nombre:

Tipo:

Estado:

Contenido de la página:

Image 8. Creating information pages.

Dashboard Ticket

It provides an overview of system activity, showing statistics on tickets, including their status (open, closed, pending, etc). This tool is essential for monitoring the performance and workload of the support team. See image 8.

Dashboard Sistema de tickets

Company

Admin 1 | Panel Administrador | Perfil | Salir

Panel de control

Usuarios

Dashboard

Base de conocimientos

Abierto (15)

Mis tickets(2)

Cerrado(80)

Pendiente(5)

Ticket	Última Actualización	Asunto	De	Prioridad	Asignado a:
008-001	20/05/2024 10:23	Contar comando	Luis Antonio Rumbao	Normal	Atención al cliente
008-002	18/05/2024 10:25	No prende PC	David Perez	Normal	Soporte Técnico
008-003	16/05/2024 20:00	No funciona comando	Patricia Torres	Normal	Soporte Técnico

Image 8. Ticketing System Dashboard.

Knowledge base

It is a crucial tool for the organization and distribution of useful information for both the support team and end users. To optimize its use, categories and subcategories are established to help structure the content in an orderly manner. In this section it is configured whether the information is for internal access (only for the support team) or external access (for customers). This segmentation ensures an adequate knowledge management, making it easier for the information to reach the right audience in an efficient way. See image 9.

Automatic Responses

The system allows you to configure automatic responses

Nombre:

Correo Electrónico:

Nombre de teléfono:

Nombre de móvil:

Autenticación:

Nombre de usuario:

Estado y configuración:

Image 7. Knowledge base.

for specific events within the ticket lifecycle. For example, when a ticket is created or resolved, the system automatically sends a predefined message to the customer, improving the efficiency of the support team and ensuring consistent communication. This feature not only streamlines the process, but also generates confidence in users by receiving quick and professional responses. See image 10.

Estado:

Departamento:

Respuestas Predefinidas:

Archivos adjuntos predefinidos (opcionales):

Image 9. Creating Automatic responses.

FAQ

It is a key part of the knowledge base, providing quick answers to the most common user questions. To add an article, you enter the name of the question and in the answer field you can include a variety of resources, such as images, videos, PDF files or links to external platforms such as YouTube or Vimeo.

This makes it possible to create a rich and complete FAQ that meets the users' IT needs in a clear and accessible way. See image 11.



Image 10. Adding a FAQ.

Informative Page Design:

Layout of the Support Center. An informative web page called "Landing Page" was developed to provide users with information how the ticketing system works and the knowledge base, as well as the process for creating an account and generating a ticket. This site acts as the Support Center, providing clear guidance for users to interact with the system efficiently. See the layout in image 12.



Image 12. Landing Page Layout.

Informative page design: Media Query code and drop-down menu.

The design of the support website was optimized through the use of media queries, which ensure that the site is fully responsive. This allows users to navigate comfortably from any device, whether mobile, tablet, laptop or desktop computer. Bootstrap library media queries were used to ensure standard compatibility. In addition, a drop-down menu was implemented, which improves site navigation by allowing users to quickly access the information they are looking for. This optimizes the user experience and allows users to quickly access the information they are looking for. This optimizes the user experience and facilitates access to resources. image 13 and 14.



Image 13. Mobile Media Query.



Image 11. Media Query Tablets

Local email pipelines in the ticketing system. In this section, an API was integrated that allows the system administrator to efficiently manage incoming emails. All emails arriving in the inbox registered in the ticketing system are directly linked to the main Dashboard. This feature facilitates the organization of emails and improves ticket management, enabling detailed tracking and faster response. See image 15.



Image 14. Api Email Pipeline.

How to Generate a Ticket?

The following are the steps to generate a ticket within the ticketing system:

- 1) Login: Go to the top right and click on "Login". See image 16.



Image 15. Login Ticket.

- 2) Login Credentials: Enter your username and password, then click on "Login". See image 17.



Image 16. Enter Credentials.

- 3) Open a New Ticket: Once inside the system, search and select the option "Open a new ticket".
- 4) Select Department: The system has four departments that address different help topics: Customer Service, Help Desk and Technical Support. See image 18.



Image 17. Select Department.

- 5) Completing the Form: For this example, we select the customer service department to request a quote. The procedure is the same for all departments, only the forms to be completed vary.
- 6) Fill in the data: Complete the required information, which includes contact and facility information. You must also select whether you are quoting a product or a service. See image 19.

Póliza
¿Tiene Contratada una Póliza?
• En caso afirmativo, por favor ingrese el número de póliza a continuación.
• En caso negativo, deje el campo vacío.

Número de Póliza

Atención al cliente
Estimado/a cliente para poder apoyarte en su trámite, requerimos de la siguiente información:

Nombre Completo del Contacto *

Correo Electrónico Alternativo del Contacto *

Número Telefónico del Contacto *

Nombre Sucursal o Establecimiento *

Selección de Servicios *

Tipo de Negocio *

Domicilio *

Image 18. Fill Form.

- 7) Ticket details: In this section, include a descriptive title of the problem and a detailed explanation. If you have a photo that provides more context, you can attach it. When finished, click on "Create ticket" to submit your request. See image 20.



- 8) Logout: The experts will work to provide an answer as soon as possible when you are finished go to "Logout" to log out of the system.

How to consult a knowledge base Article Externally?

To access the knowledge base, it is not necessary to have an account, just go to the "Resource Center" section, where you will find the knowledge base designed exclusively for customers.

This section includes categories related to ASPEL AND NATIONAL SOFT.

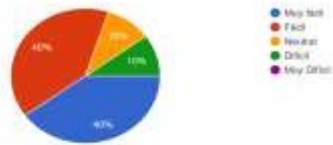
DISCUSSION AND ANALYSIS OF RESULTS

In relation to the ticketing system, a survey was carried out using GOOGLE forms, where

evaluated a total of 20 customers with 5 questions related to system performance. The results obtained were positive and are detailed below:

Question 1: Customers find our ticketing system easy to use, with 80% of them falling between the "Very easy" and "Easy" options. The other 20% are in the "Neutral" and "Difficult" range. See image 21.

¿Consideras que nuestro sistema de ticket es fácil de usar para reportar problemas o consultas?
20 respuestas



Question 1 Use of the system.

Question 2: Regarding the response time for attending to requests, 80% of the clients think that it is "Very fast" or "Fast". The remaining 20% rate the service as "Acceptable". See image 22.

¿Cómo calificarías el tiempo de respuesta del sistema de tickets para atender tus solicitudes?
20 respuestas



Question 2 Response time.

Question 3: Communication through the ticketing system is considered clear and effective by 65% of the clients, "Strongly Agree". The remaining 35% are distributed between "Agree", "Neutral" and "Disagree". See image 23.

¿Consideras que la comunicación a través del sistema de tickets es clara y efectiva?
20 respuestas



Question 3 Communication.

Question 4: Regarding the website interface, 90% of customers rate it as "Very intuitive" or "Intuitive". Only 10% consider it "Neutral" or "Not very intuitive". See image 24.

¿Cómo calificaría la interfaz del sistema de tickets?
20 respuestas



Question 4 Site interface.

Question 5: Comparing the ticketing system with the use of WhatsApp, 70% of customers say that the ticketing system is "Much more effective" or "More effective". 15% consider both to be equally effective, while the other 15% think that the ticketing system is "Less effective" or "Much less effective". See image 25.

¿Qué tan eficaz consideras que es el sistema de ticket en comparación con el uso de WhatsApp para resolver sus problemas?
20 respuestas



Question 5 Comparison with WhatsApp.

In addition, a graph is presented that visualizes the activity of tickets created during the month of May, highlighting May 21, when 14 requests were received. This shows how the ticketing system has been of great help to the expert in charge of attending to all clients, allowing him to efficiently handle a high volume of requests and improve the quality of the service offered.



Discussion

For the authors of "web framework design for the dynamic development of applications" of the University of Colombia, the PHP programming language par excellence simple and widely used in the development of web software, stands out from the use of other languages such as "scripting" or interpreted languages like Perl, Asp or JSP tend to produce code that is difficult to maintain and not very efficient. In addition, they refer that the design patterns in tendency are those that focus on separating the presentation (HTML pages, CSS naturally born OSS) of the logic or backend, PHP favors the conversion of the backend to the frontend.

database data mapping because of its support Object Oriented Programming [10].

In Peru, the authors at the Universidad Nacional José María Arguedas, state that the use of PHP as an OSS software in their project published as "Development of a Web Information System based on free software" increased with positive comments of 73.6% their performance experience among web users of the site, highly significant decrease of costs in economic resources (50%) and times in the processes (5.8%) of academic management [11].

From Cuba in the project called "Open Source Alternative in the implementation of an IoT system for the measurement of air quality", they have made incursions with OSS to eliminate with certainty the erroneous measurements previously automated, they successfully developed a system for the Internet of Things (IoT) that acquires data outdoors, through sensors using open source code that guaranteed the speed and security in the collection of external data.[12]

Systems based on open source standards have been created to develop successful applications that allow a high degree of interoperability and portability on hybrid cloud computing, such as the project entitled "Hybrid cloud computing architecture based on open source technology" in Argentina. Partializing storage in public and private clouds at the same time. By doing so, they secure sensitive data in private Clouding. [13].

CONCLUSIONS

The integration of the website with the ticket system complements, updates and primarily streamlines the company's communication with its customers, having a complete architecture that accompanies the customer from the search for products or the hiring of any service within the website, to the follow-up after the purchase by event requests, incidents, alerts or recommendations of the same.

The above statement is supported by the statistics obtained from the tools that were integrated in both systems, as well as by the survey conducted and the testing period carried out by the members of the technical support area of the company and web development.

Having a higher user traffic on the website compared to the one that existed previously; in addition to showing in detail the products and services that the company offers. [The company offers.

In addition to the ticket system, we obtained a log that visualizes and monitors in detail the frequency of use of the system. A centralized communication channel is available to optimize response times of the technical support area. Thus

as well as, high efficiency in handling high volume transaction requests.

Expansion of the information generated from the web to Andorid and IOS mobile devices for 24/7 consultations to all customers. Additionally, dynamic creation of executive reports for decision making with impact on management levels.

Within a period of no more than 1 year, additional technological research can be carried out to the development presented by adding modules to the system that consider Machine Learning, following the trends that foresee that 58% of the activities at work will be automated thanks to cognitive machines in the next 10 years.

The companies that are betting on it in a total way are Google and Facebook. Smartphones and Tablets will become the Open Source devices par excellence [12].

In less than 6 months, Artificial Intelligence can be driven within this web ticketing system, as it is a very short step away, open source has been the main promoter that AI has taken a leading role and its impact on large companies in these times. Being free to use, it reduces its cost significantly by creating models with powerful AI and fast implementation. [13]. The only challenge will lie in paradigm shift by the unavoidable and radical transformation required to programmers during the software life cycle (SDLC) as it involves from planning, design and implementation of this project based on generative AI, where at each stage there is a review of optimization with the same AI [14].

The immediate future of this research based on applied computing does not imply additional financial costs to the company due to the very nature of OSS, which, being open, is enriched only by the contributions of the creators who constantly improve it around the world. It is a universal language of technology that advances faster [15].

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