

Design and Development of Web Content Management Based on Automatic Content Reflection

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Abstract—Nowadays, digital information on the Internet has become immense due to the heavy presence of activities on the Internet and global marketplace. With this development, managing web content becomes critical. Hence, Content Management System (CMS) came into existence. It is a generic framework for creating, managing and publishing digital documents.

CMS framework is of great demand in the market today due to internal pressure from organization to enhance service delivery and improve efficiency in handling information. CMS is an ideal tool to improve the performance by means of streamline process.

The main contribution of this paper was to design and implement a simple prototype of Content Management System that reflects some extend what CMS framework does. The system adopts three layers of technical architecture. The paper will demonstrate the essential need for a standard framework of CMS.

The simplicity of the overall content management system was in response to the growing changes in information technology that makes the processes easy and straightforward.

Keywords— Content Management System, Integrated Content (CMS), Management System (ICMS). Web Content Management System (WCMS)

I. INTRODUCTION

In the early days of record keeping system, data were stored manually using various means, such as files and cabinets. Maintaining such data became critical as cases of missing important information that supports decision making and organization's operations decline due to inconsistent data keeping system.

Today, going through evolution and technology, the mission of the organization to keep track of information and to streamline business processes is considered with maximum priority. Various digital ways of keeping data and information have emerged.

Content Management System (CMS) was introduced along the way to facilitate data storing and information sharing on the internet. The feature of content management system as a tool is the separation of content from the container.

Content Management System (CMS) has emerged with multidimensional purposes; organizations used CMS based on the style of their operation and implement it to suit their business needs.

Since every piece of information within an organization can be described as content, therefore a software tool that manages a web document and information is said to be a Content Management System (CMS) too. Consequently, CMS is a general phenomenon that all organizations and businesses that have an online presence are using.

The paper focuses on research by reviewing some the related system to find out some their lapses, this carried out in other to discover the possible ways which will lead to better design and development of WCMS.

The paper is organized as follows: I: The Introduction. II: The Content Management, This provides a synopsis of content management system. III: Automatic Content Reflection IV: Application.

II. THE MANAGEMENT OF CONTENT

A. Content

Content is all information and knowledge available to the visitor website. The content can be a set of document, text or multimedia. The internet technology provides the visitor with the capability to either view or downloads the content. The document can be structured in many forms such as static or dynamic with a database. Web data is a collection that describes the use of web resources [1].

1) *Static Site*: Managing static pages were very hectic especially when the numbers of pages are increasing in the site. It's difficult to capture content to a common page and maintain the relationships between the pages. Reorganizing of the site during the evaluation of the architecture require a computer knowledge and programming skills [1, 2].



Fig. 1. Static page access.

2) *Dynamic Site*: A web page is structured using HTML document. The pages are arranged in a combination of width and length, which indicate the topology of the website [3]. The idea behind the dynamic site was to organize the sites through the use of a database that links to pages written using different languages. Dynamic websites are more advantageous than static sites, the content of the pages are generated based on the user input or request from the system and therefore, any response from them are considered to be optimal response. Figure 2 shows how a request of a page is sent and treated before the display to the user's site.

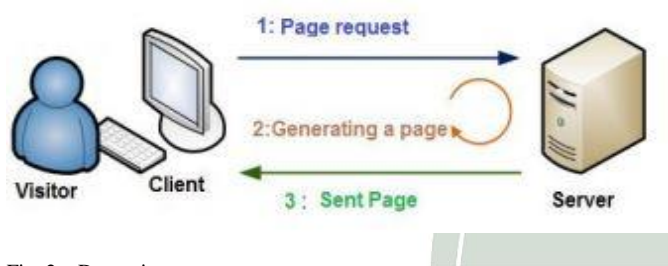


Fig. 2. Dynamic page access.

B. Issues in CMS

Due to the current improvement in the information technology, industries are generating more data every day over the web and management of the data is happening to be too complex. It is becoming a hectic job for them to organize the data in a systematic way before presenting it to the end users. From creation to modification and management of data has to be done by a technical or professional user, this leads to less efficiency, more cost, inadequate security and inconsistency.

The above problem can be summarized as follows:

1) *Proper Structure and Data Model*: Because of improper structure, the CMS requirements are not presented. In the end, many organizations faced problem whenever they wish to integration with other business systems. In addition to the enormous amount of time, effort and cost required for updating a simple site there is also the risk of losing important data content.

2) *Inadequate Workflow*: For organization work successful, there is a need for division of labor among the content users and to handle concurrent operation.

3) *Insecurity*: When an application lacks security, it could create risk as people can easily copy its features and concept. To overcome it, the code should be designed in one's own way to protect the CMS.

4) *System Administration*: It is good to have a browser-based administration so that it can allow the user perform their tasks ranging from scheduling tasks to manually flushing caches via the browser.

C. Related Works

Several related kind of CMS exist in the market, some are in-house development and some are commercial applications. Different scholars have published many research papers based on CMS one of those papers is "e-learning using content

managements system ". CMS is a system that facilitates the creation, retrieval and editing of information. Reem and Afaf propose the use of some free software's to group together and install inside CMS to serve educational website instead of commercial. This is to say by using the new extension new features of E-Learning will be added in addition to displaying the content [7]. The drawback of this paper is the usage of the commercial application while I in the other hand focus on in-house development so as to have a clear set of requirements before development.

[5] In the paper Title "Administrative and Academic Staff Performance Using Content Management Technology" the paper present an interactive dynamic system based on CMS on which a range of problems concerning administrative and academic aspect of universities can be analyzed to create some policies which will be used to overcome the problems. The system provides full blown automation of administrative and academic performance management [5].

In the other hand, the system limits itself from integrating with other application, but full pledged CMS must have the ability to be integrated with different systems so as to deliver better services.

III. PROPOSE ICMS REQUIREMENTS

A. Content Management

The system would provide a central repository in the CMS that stores all its data content. This will help to keeps track of all the changes done to the pages, ensures each user can only change the section of the site they have access rights, integrates existing information sources and IT systems [6].

B. Content Delivery

The system would provide a powerful publishing engine which allows the content in the repository to be published in any sites that may have different appearances.

C. Authorization

Each user (staff) must be authenticated through simple username and password.

D. Workflow

The rules of workflow will be different for each user, and each piece of content [7].

IV. ARCHITECTURE OF ICMS

The architecture of the system consists of three components: The presentation feature or human/computer interface and data access.

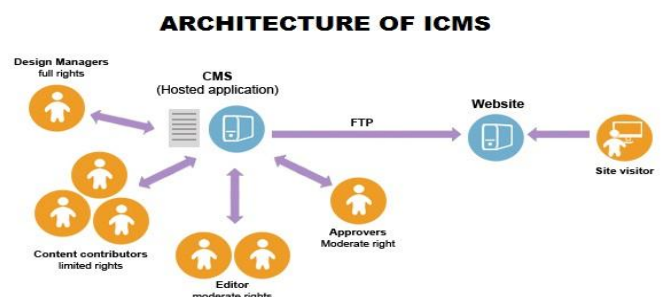


Fig. 3. LEVEL 1 (ICMS ARCHITECTURE).

The architecture of the integrated content management system (ICMS) was diagrammatically represented and explained in Figure: 3, it shows how ICMS application interacts with the users and web server with the view to produce content item and display it on the web browser for the users[4,5]. The procedure start after the content is created.

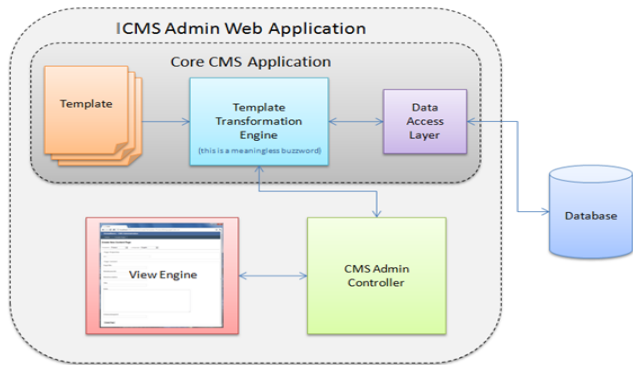


Fig. 4. LEVEL 2 (ICMS Architecture).

The above ICMS level 2 Architecture shows the overview of the interaction between the core application and basic applicants. The core template transformation engine commutate with the initial template and data access layer which at the same time communicates with the database for data access, this process is initiated when the admin (Publisher) open the system to published some content.

V. AUTOMATIC CONTENT REFLECTION

Once the final edited content is present in the repository, then the content will automatically publish to the users end whether the system is in internet or intranet.

The Presentation layer displays content to a web visitor based on a set of the template. The templates use the publishing engine to set how the layout will be applied to the content automatically; this helps to provide a high standard appearance and a consistency among the pages.

VI. APPLICATION

A. Development environment

We used the following software for the development of the ICMS.

- PHP VERSION 5
- MY SQL VERSION 5.

```

1 <html>
2 <head>
3 <title></title>
4
5 <link rel="stylesheet" href="style.css" media="all">
6 </head>
7 <?php
8 if(isset($_GET['cat']))(
9     $cat = $_GET['cat'];
10 )
11 else
12     $cat = "all";
13 >?>
14
15 <body>
16 <div><?php include("includes/header.php"); ?></div>
17 <div><?php include("includes/navbar1.php"); ?></div>
18 <div><?php include("includes/main_content.php"); ?></div>
19 <div><?php include("includes/sidebar.php"); ?></div>
20
21
22 <div id="Footer">Footer</div>
23
24
25
26
27
28 </body>
29 </html>
    
```

Fig. 5. Source Code of the home page.

Below are the files that enable the realization of integrated content management system (ICMS).

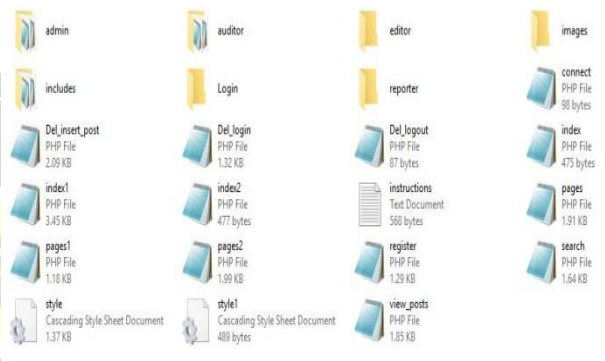


Fig. 6. Overview of the System Structure.

VII. RESULTS

Now having the ICMS ready to use, the following are the working steps which we can use to gather the benefit of the system from it.

Steps for working with ICMS:

- After opening the system the home page will appear as shown in figure 7.
- Clicking the login link on the home page, the system will redirect you to the login page as shown in figure 8.
- The staff enters his/her user id, password and role which determine the page he/she will be redirected to, as shown in figure 8. After pressing login button the user will be taken another page based on his credentials.
- The process of creating the content start with Reporter (staff) Figure 9, the reporter responsibility is creating the post, on successful creation, the post will automatically publish to the editor (page) as shown in figure 10.
- After login, the editor can edit all the post sent by publisher. After editing on submission, the post will automatically publish to the auditor page as shown in figure 11.

- The auditor is the responsible for taking the final decision, he ensures that the content can serve the purposed before releasing to the end users.
- If the auditor approves the content, the system will automatically make that specific post available to the users as shown in figure 12.



Fig. 7. ICMS HOME.

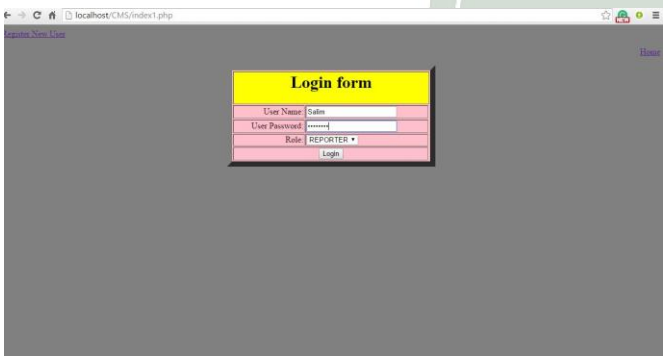


Fig. 8. ICMS Unified login.



Fig. 9. ICMS Reporter page.

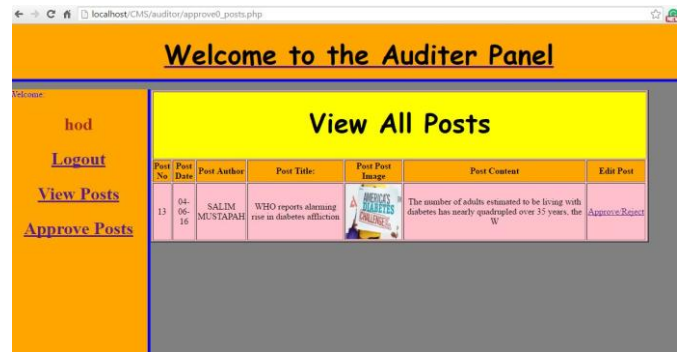


Fig. 10. ICMS Editor page.

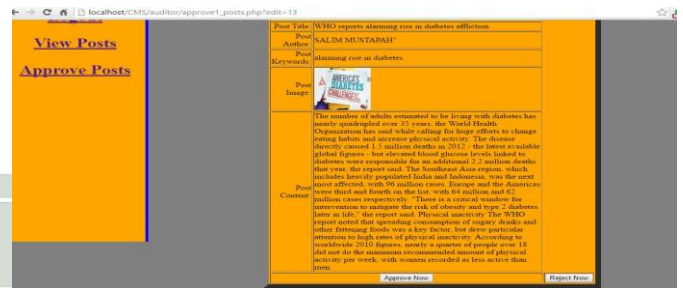


Fig. 11. ICMS Auditor pages.



Fig. 12. ICMS End User page.

CONCLUSION

A web content management system has being developed based on the method of automatic content reflection. Several problems have being solved such as problems related to content creation publishing, validation and optimizing to provide automated publishing of contents to end users. The content management procedure is good, it include the features such the registration of persons that are responsible for accessing the admin site for managing the content. This provides a better workflow and seamless collaboration between the persons responsible for managing the contents.

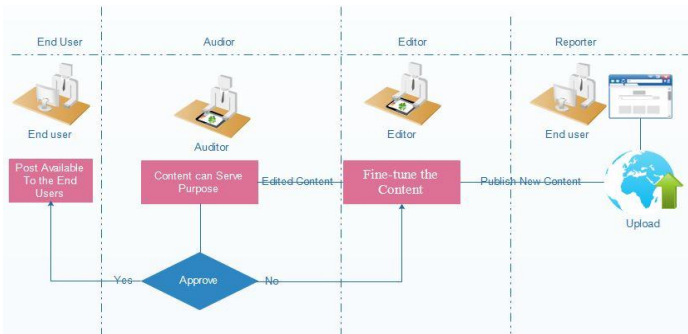


Fig. 13. ICMS Work Flow.

One of the key features that make ICMS exceptional is better collaboration and workflow as shown in Figure 13. Publishing of contents must pass through the protocols from one system admin to another to so as to have an effective verification before publishing the content.

FEATURE ENHANCEMENT

Further improvement can be added to the Integrated Content Management System (ICMS) website to add its functionality and modernized it in response to the changes of technology or when additional functions are required. The following are the list of some enhancements.

- **Label-Based Access Control (LBAC):** Though the idea of LBAC and how to use it had not being discussed, but it is imperative to restate it in this section. LBAC can be used to strengthen security access to the content object.

It enforces control based on level or hierarchy of the content.

- **Improve content search using Search Engine Optimization (SEO).** SEO is a new approach to search engines; it improves the visibility of the website or a web page in search engine. SEO will use intelligent means to search content from the repository irrespective of location.

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