

Evaluation and Comparison of the Conceptual Frameworks of CMS

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Abstract — Content management systems (CMS) present an optimal response by maintaining the work flow of the information and, mostly, creating and organizing the companies' knowledge. However there is a large perplexity about the functionalities that characterize CMS and about the differences with less performing CMS. This paper aims to show the comparison between different CMS and then prepare the conceptual framework after removing the shortcoming discussed over the comparison. For this basis, the writers formulate a hypothetical comparison between the functionalities of CMS and those of the systems they are often confused with. The consequence consists of performing definitions for CMS and the other systems for managing information. Content Management products are analyzed, compared and evaluated by using a special table created to point out the actual functionalities of the products offered on the market, despite vendors' declarations.

Keywords-Content Management System;Web CMS;Open Source;Sharepoint;Wordpress;Drupal.

I. INTRODUCTION

In answer to the question about who wrote the first CMS are varied, that includes Roxen and Blitzen, Ingeniux, and Vignette. The chief characteristic was a very structured development environment to make simpler the complex management. If one could not know how to play around with HTML, they probably were helpless in doing their work [1].

Most often these websites were design and developed by web agencies rather than by software firms and every agency had their own web designers who could write HTML code [2].

The major evolution of CMS development was led by software firms who revised the functionality and started to build today's CMS. The main features which were slowly built in under the evolutionary process which included WYSIWYG text editing, search, and many more features [2].

CMS became more demanding in respect to feature and web agencies needed both the technical skills, as well as designers, to fulfil each client's demand for their own CMS [4]. Content management (CM) is the collection of tasks that support the collection, managing, and publishing of information in any way. Content can be any type of file mode [1]. It can take any form such as documents, multimedia files (audio or video files), or any other file type that follows a content lifecycle requiring management [2].

It often consists of the following basic

Roles and responsibilities:

- Creator: main responsibility includes the creation the content.
- Editor: responsible for the makeover the article on the content.
- Publisher: responsible for releasing the article or the content for use.
- Admin: main responsibility to control access permissions to folders and files and
- Assigning: access rights to users.

A. Define Content Management System (CMS)?

A content management system (CMS) is a computer application that allows publishing, editing, or modification of content, as well as site maintenance, from a main page [2]. The content consists of HTML, XML, and other documents and media files on WORLD WIDE WEB. This content can be published manually by editing and organizing files on a file system [3]. The file system is then exposed to the web through a web server, requiring much technical expertise and tedious work. Content management systems store the content which can be any format in database. The system by automation takes the content out for further operations [4].

Content management system is a concept that is created to guide people to manage and publish the documents in a more professional and automated layout. Everything that includes document management system, to a media asset management system, to a portal, to a blog system could be considered a Content Management System [3].

Content management system increases the pace of the content updating process and makes it abstract for a normal user. They are very often used for editing, controlling, versioning and publishing specific content [4].



Figure 1: Popular CMS applications

Below are some of the CMS applications (Figure 1).

- Blogs: explanation on a meticulous theme;
- News: reading newspapers online;
- Wikis: expose to public editing.

The characteristics of Content Management Systems vary widely from system to system; many simpler systems provide only a limited characteristics, while others, especially much more complex.

- Sharing and storing data;
- Control access right based on user role;
- Can view, edit, publish, etc. ;
- Enables storage and retrieval of data;
- Control data validity and verification;
- Reduce the complexity of report writing;
- Management of documents, videos, texts, pictures, etc.
- Articles etc. [2].

II. TARGET USER OF CONTENT MANAGEMENT SYSTEM

A. *Firms need a content management system:*

- To reduce the redundancy of the same content
- Publish the content in multimedia platform.
- Publish the content in different languages.

B. *Publications that these organizations produce might include:*

- Technical documentation (software documentation, user's manuals)
- Reference materials (standards guides and previous report)
- Training materials (e-learning programs, testing booklets)
- Marketing materials (Newsletter, brochures) [15].

III. TYPES OF CONTENT MANAGEMENT SYSTEMS

CMS can be any structured and can manage anything as a team or individual. From managing simple static website content, to allowing combined documentation across the Network Globe, CMSs perform many Operations. Its packages are divided into two divisions named as Enterprise CMS and Web CMS [4].

A. *Enterprise CMS*

Enterprise Content Management (ECM) is a very professional and formal means of managing and storing documents and other content, that relate to the company's operations. These advanced IT packages are generally unique solutions, delivering effective content management in an organization [6].

CMS are in place to enables an organization to become more practically efficient and effective in respect to of price and consumption time, which enables increased correctness and usage. It also helps in reducing the error and response times. They may also include some functions that deal with invoicing and billing, and resource issues, relations, and document management and sales domain [1].

CMS brings data management near to the user's abstraction phase; so many users can contribute their individual piece of information to a very organized system [4]. This type of CMS is generally used by large e-Commerce organizations. E-commerce websites are those that have a shopping cart designed to sell items online. The examples of such CMS used for e-Commerce websites are OS-Commerce, Magneto etc [1][7].

B. Web CMS

Today, we all are able to put our idea on the web without knowing any technical skills. But if we move back twenty years, the only method that could create a website was by using 'HTML'. Products like Dreamweaver and Net beans were not available; this meant that if one wanted to develop a website then he/she wanted someone with higher programming skills to write it. Also once they had written it, one still needed someone with programming skills to modify it, as modification contain reading HTML code to determine where to modify the data [8].

A Web Content Management System (WCMS) is a software application that enables user to manage the website authoring, collaboration, and administration. These tools developed to enable users to make and control website data, easily. An abstraction layer presents the content to the website visitors based on the set of templates [9].

WCMS were introduced to seek out the problems of non-technical users adding low-level content to a website. WCMS is a web application used to modify the content on web pages [1, 8].

A WCMS can be helpful to:

- Manages tiny piece of information (web pages);
- Interconnect the flow of information.
- Main focus on content creation,
- Content control, modification, and web maintenance tasks
- the user with a platform that requires no technical knowledge
- Languages to create and manage content.
- Publishing engine that enables the modification of the content
- Provide to a website a guest view
- Validated and verification before publishing to a website [1] [8].

The major step to manage web content is to choose what kind of information one want to publish. The variety of content to be published depend what type of tools will be required. For example, if one wants to post an article, the architecture of the site will differ from a site who wants to upload videos tutorials.

Making content organized will not only make it easier for viewers to transverse the website, but will also help to avoid conflicts like content overlap or repetition. WCM tools are available that can solve most of these problems. When searching for a right WCMS, a user should first analysis its requirements whether require a simple CMS or complex CMS [10].

IV. WHAT IS AN OPEN SOURCE?

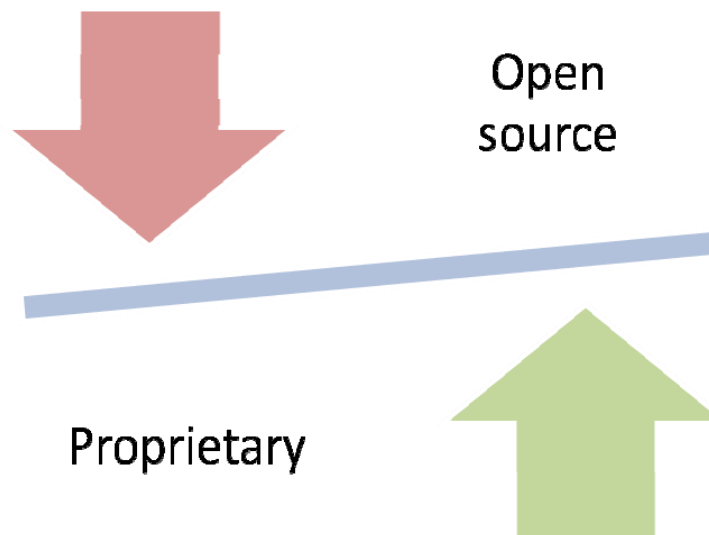


Figure 2: Classification of software types

Figure 2 [9] shows that software is of two types such as open source and proprietary. “Open source” is define as a key distinction in software domain. It means the source code is freely available to use, but it also has very wide scope of implementations. While proprietary software is created, distributed by the IT Companies, with open source software is maintained by the communities of programmer.

Open source content management systems are flexible and useful in many ways. A user can choose the code and the technology according to its requirements. The open source can easily be extended and integrated according to the need. It's of free of cost for the software, and anyone can download and install it. An open source CMS takes a lot of time. A user needs to put a lot of efforts into the implementation and maintenance [11].

V. COMMERCIAL CMS

Commercial CMS systems have many advantages over open source CMS systems. The important feature of a commercial CMS system is that the vendor has control over the entire platform and it creates a more user friendly and secure end product. Commercial CMS systems are not open source, so possible hacker exploits are much less likely. Some commercial CMS systems are “well programmed” and well documented, with an extensible architecture which allows a third party programmer to follow the source code, and create additional enhancements to the CMS, without further issues.

In addition, license fees for Share Point is very expensive, is another disadvantage. Other Commercial CMS systems are highly complicated and extremely complex [12].

VI. COMPARITIVE STUDY OF CMSS

Figure 3 [13, 14, 15] compares different existing CMSs. It tells about flexible, fit and user-friendly features used in CMS [13]. It also provides information on features and support & maintained for theses CMS.

So the CMS choosing the criteria is being divided into seven factors. The following factors are

- Features: The features and services provided by the CMS.
- Fit: Adaptability in the platform used by the firm or the company
- Friendly: User friendly that enhance the usage
- Flexible: Enables the easier modifications as per the requirement of the users
- Future: Define the future prospective and usage of same CMS in longer run
- Time period: It means the time period required by developer to develop the CMS as required
- Maintenance: It follows' the simplicity to maintain the system to a non technical user.

Technologies/ Requirement	Eroom	Share point	Assembler	Exo platform	Drupal	IBM Smart Cloud	Google Apps	IBM Connections
Features	+++	+++++	+++	+++++	+++++	+++++	++++	+++++
Fit	++++	+++++	+++++	+++	++++	++++	+++	+++++
Friendly	++++	+++	+++	+++++	+++	+++	++	+++++
Flexible	+++	+++++	++	+++	+++	++++	+++	++
Future	++	+++++	++++	++++	+++	++++	+++++	++++
Time period	+++	++	+++++	+++	+	++++	++++	+++
Maintenance	++++	++++	+++++	+++	++	+++++	+++	+++
Total	23	29	27	26	21	29	24	27

Figure 3: Comparison of different type of Content Management System

So the above matrix grade the factors on the basis of different CMS (open source and licensed). The '+' symbol shows the positive influence or more and '-' sign show less or negative influence.



Figure 4: Content Management System-Drupal

Share point (Figure 6 [20]), Drupal (Figure 4 [21]) and Wordpress (Figure 5 [22]) are the few of the most often CMS being used today. Drupal is one of the most efficient and complex system. It requires higher level of programming knowledge when it comes to modification. Share point has far better user interface than any other. It is very easy to do the drag and drop modification. The design layer is almost the same as for every CMS [20].

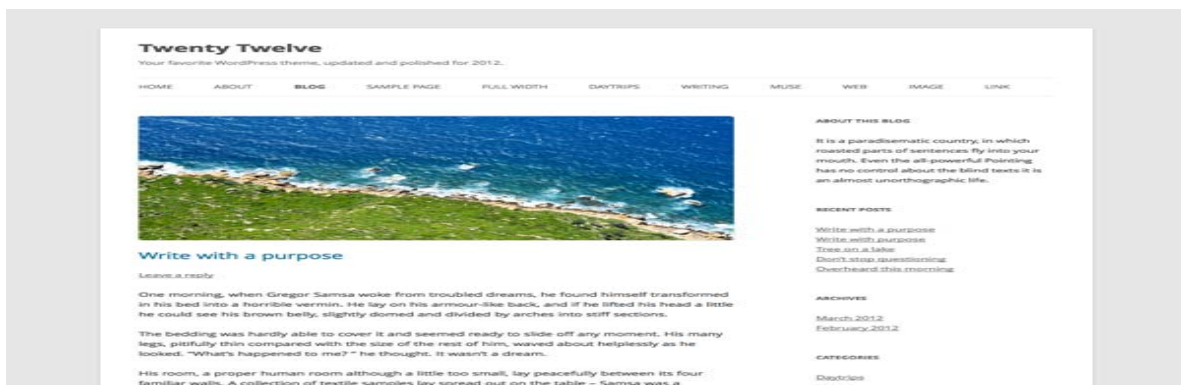


Figure 5: Content Management System-Wordpress

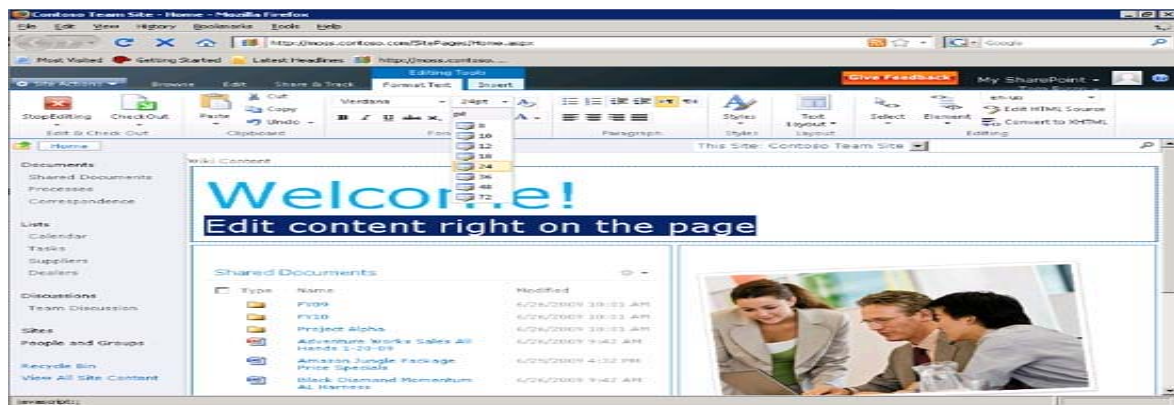


Figure 6.: Content Management System-Sharepoint

Word press is the versatile product for blogging and publishing websites and it provides a very simple and user friendly interface. There are a lot of publishing features are available in the Word press [20].

VII. PROBLEMS IN THE EXISTING OPEN SOURCE CMS

The main objective of a CMS is to make it easy for even a non-technical computer user to maintain and manage content. There are various CMSs available in the market, but deciding which is the most preferred will mostly depend on the user's requirements and the budget.

Both Drupal and Share point have a very complex and confusing administration [1].This is because both these CMS have very advanced features in compare to the MS like Word press. For example, polling feature in CMS on different topics in the form of one or more answers, or news feeds, which provide syndicated content (RSS and Atom feeds).This makes the CMS complex and difficult to use [7,8].

Usually there will be some expectations by the users in terms of the complexity and the simplicity of using a CMS. For example, if the website only requires a few static pages with some moving images, then a simple CMS will be best to use [14].

However, if the need for the webpage required to have multiple dynamic pages like blogs, video and audio, a forum, a calendar, and an e-commerce function, then it is better to choose an advance CMS. Inevitably though, that CMS is going to be a little more complex to maintain [15].

If the webpage needs complex attributes, the best concept is abstraction. An interactive interface should make most common tasks more prominent and easy [16]. There were various researches done by the research labs on the basis of usability of technology which figure out the various usability problems in terms of CMS administration and management [17].

VIII. PERFORMANCE FOR DEPLOYED APPLICATIONS

How we measure the performance of the CMS. It deals with the respond time. Response time deals with the communication lag between the client and the server. Suppose any page gets loaded from the server to a client machine, the client machine stores some data on its webpage so when that page gets reloaded it takes less time to load compared to the first time. In case of data information, different CMS have different response time than without the caching, while they may reduce to certain extend. It seems that every CMS has different caches handling property in memory [18, 19].

IX. TO BUILD OR TO BUY?

There is no unilateral path to develop a CMS. When selecting between writing/modifying a new CMS for manually and using an existing CMSs. Points in the terms of information need to be considered.

1. The functionality and features define complexity.
2. Choosing a system which is closely match the requirements and what would it cost to implement from sketch a new CMS?
3. How often is the CMS required?

If the requirements are simple, and if it is not urgent, it would be effective and very less expensive to create your own CMS. Else, investigating the different existing CMSs is needed before starting to use one [1, 4].

A. Using an existing CMS

Pros:

- Lots of hosted solutions and online support can be provided for the off-the-shelf CMS. These products also provide live help and support system is very much dedicated to help the webpage [3].
- There are forums which discusses the issues faced while installing or using
- Help to the new user to overcome common problems.
- Anyone can be an administrator if the main administrator is unavailable.
- Once the website is integrated into the CMS, anyone can manage the content.

Cons:

- Research time in choosing the right match is more than the time to develop the System. There are a lot of varieties available in the market, but each of these products has distinct features. So one needs to go through each of them and their features and select the closest one [2].
- An open source CMS is likely to have multiple functionalities that are not required by a basic website, increasing the latency rate of the site [19].
- Most of the Open Source CMS have a steeper learning curve. So it's difficult for a first time user to understand all the modules.
- Bug fixes and security updates are released by the vendor. Installing a new version of these CMS systems is complex and convoluted and it needs disabling all existing modules prior to an upgrade [12]
- Much more limited in terms of customization

B. Building your own CMS

Pros:

- Total control over the features: The developers are familiar with the system and are able to build new features quicker [19].
- Low cost. It will be cheap to build one meeting product to do what is needed.
- Understandable, it will be easier for everyone in the firm to understand it.
- No bug fixes from others unlike the existing open source CMS.

Cons:

- It is difficult for companies to make their own CMS because of lack of in-house professionals.
- Only you understand it and can fix it. So its developer dependent system.

X. ADVANTAGES OF THE CMS

- Easy to administer.
- The user interface is user-friendly.
- It's easy to import the web links in the CMS.
- Easily creates editable regions just like folder and sub folder.
- It features easy menu page creation
- Content formatting, file uploading.
- The ability to add a new style sheet or modify the existing ones.
- The workflow will only allow the newly created page to be visible to the users.
- The administrator approves and publishes the forum.
- The audit trail report displays the information regarding the numbers of click and views [4, 18].
- Files can be modified or deleted very easily.

XI. CONCLUSION

In this paper, the different CMS has been compared and analyzed. The paper will guide for choosing a better CMS according to the needs. Each CMS has its own sets of characteristics and advantages which makes it better from others. According to this paper, all the content management systems has importance in some circumstances and conditions, so it is entirely reliant on the web application tasks that which content manage system is going to be used. On the demands and the budget, CMS needed for a system can either be built from base or one can use a predetermined open source product. The important feature to target about while building a CMS is interactive and user-friendly administration. It should include important CMS functions like separation of layout and content, formatting the content with editor and managing the workflow for the content approval before it is published to the users.

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