Comparative Study of Open Source Content Management Systems (CMS) in Digital Era

Mahesh Hembram
Saha Institute of Nuclear Physics, Kolkata, West Bengal, India
E-mail: mahesh.hembram@saha.ac.in

Abstract - **Content Management System (CMS) is the software that can be used to organize, control or manage contents of a website. The data can include texts, links, images, videos, HTML documents and other form of media. The CMS can be free open source software where it can be downloaded and installed free of cost or sometimes it may be a paid depending upon the packages of the software. The reason for the paid software is that some annual maintenance may be needed in future and to upgrade the software. Three basic CMS software Open source, Proprietary and Software as a service has been discussed with their platform of application and supported databases. It was found that this soft ware has used different types of platforms to integrate the software. The installation process of one of the free open source software WordPress also has been discussed in this topic. The purpose of the CMS is to help users to best design their websites. The aim of the study is to comparatively study the features and perspectives of different content management systems. Research and review methodology has been adapted to retrieve the contents for the above title. It was found that maximum number of CMS database used PHP or JAVA platform to design the soft ware and few CMS soft ware used other platforms like ASP.NET, PERL, PYTHON, C++ and others to design the software.**
Keywords: **Content Management System (CSM), Web Content Management System (WCMS), Open Source Software, Word Press**

I. INTRODUCTION

There are three basic types of CMS software (1.1) Open source (1.2) Proprietary (1.3) Soft ware as a service CMS. Here only the open source CMS has been discussed briefly.

A. Open Source Software: Open source software can be downloaded free of cost. There is no upgrade fee, contract. However, with open source soft ware one may have to pay for technical charges during installation and setup, customization of software beyond core offering, for template, add-ons, plugins, staff training, regular update of soft ware. We can install and manage open source soft ware in a web server. It helps in different business need such as plug in for e-commerce, optimize content of search engine.

Examples of open source soft ware are: Word Press, Joomla, Drupal, Magneto, SharePoint, Dot CMS, Open CMS, Plone.

B. Proprietary Software: Proprietary or commercial CMS software is built and managed by company itself. Using such CMS involves buying a license fee to use the soft ware, paying monthly or annual maintenance charge to update the soft ware. Examples of different proprietary CMS software are: Kentico; Microsoft SharePoint; IBM Enterprise Content Management; Shopify; Sitecore, etc. Few lists are given in table II.

C. Software as a Service (SaaS) CMS: These are virtual solutions and hosted in the cloud and based on subscription model on a per-user based. These include web content management soft ware, web hosting, and technical supports with a single supplier. The pricing of the soft ware includes, amounts of data transfer, i.e. band width from customer side; data storage; ongoing supports [2].There are two types of cloud content management system.

D. Fully Cloud CMS: These are proprietary systems under the supplier's control, so it isn't always possible to customize or alter their functionality to suit customer's needs.

E. Partial Cloud CMS: This is located on user cloud web server, where customer can modify the functionality, either with add-on modules or by altering the source code.

F. Features of the Cloud CMS are: Costs are generally low; SaaS supplier deals with upgrades, maintenance and technical issues; the software is accessible from any computer, laptop or mobile with an internet connection; packages are easily scalable. User can add more sites or users as needs changes [3].

II. WEB CONTENT MANAGEMENT SYSTEM

Web Content Management System is a program that helps in maintaining, controlling, changing, and reassembling the content on a web page. It provides website authoring, collaboration, and administration tools that help users with little knowledge of web programming languages or mark up languages create and manage website content.

Types of Web Content Management Systems are

A. Offline Processing: It is purely an offline process of all content, applying template before publication to generate web page.

B. Online Processing: In this process templates are applied online; it may generate HTML when the user visits the page. These system supports add-on that extends system capability. These include features like blogs, wikis, web store, photo gallery.

C. Hybrid Processing: This system combines both off line and online processes.

Advantages of WCMS: Easy customization, low cost, easy to use, work flow management,

Disadvantages of WCMS: High maintenance cost, cost of implementation, latency issue, tool mixing, security.[4]

III. COMPARATIVE STUDY

1. Open source
2. Proprietary
3. Software as a service CM,
4. CMS Platform,
5. Graphical presentation of CMS platform.

TABLE I COMPARATIVE STUDY OF OPEN SOURCE CMS [5]

CMS Category	Content Management system		
	Platform	Supported Data base	Licenses
D-Space	Java	Oracle, Postgre SQL	BSD licenses
Fedora Commons	Java	MySQL, Oracle, Postgre SQL, Mulgara	Apache License
Magnolia	Java	H2, Derby, MySQL, PostgreSQL, Oracle, MSSQL	GNU GPL & proprietary
E-Prints	Perl on mod Perl	MySQL, Maria DB	GNU GPL
Drupal	PHP	Maria DB, Microsoft SQL Server, MySQL, Oracle, Percona Server	GNU GPLv2+
Joomla	PHP	MySQL, Maria DB, Percona	GNU GPL
WordPress	PHP	MySQL, Maria DB	GNU GPL

TABLE II COMPARATIVE STUDY OF PROPRIETARY CMS

CMS Category	Platform	Supported Data Base	Licenses	Web Content Management	Group Web Content Management	Enterprise Content Management
Altitude3.Net	ASP.NET	SQL Server	Proprietary	Yes	Yes	Yes
Dot CMS	Java	Oracle, SQL Server, MySQL, PostgreSQL	Proprietary	Yes	Yes	Yes
Episerver CMS	ASP.NET	SQL Server	Proprietary	Yes	Yes	Yes
Pulse CMS	PHP	Flat-file database		Yes	No	No
Documentum	Java	Oracle, SQL Server, DB2	Proprietary	No	No	Yes
Sitecore	ASP.NET (Webforms or MVC)	SQL Server (2005, 2008, 2012), Oracle	Proprietary	Yes	Yes	Yes

TABLE III COMPARATIVE STUDY OF SOFTWARE AS A SERVICE CMS

CMS Category	Content Management system					
	Supported Data Base	Operating System	Licenses	Web Content Management	Group Web Content Management	Enterprise Content Management
Alfresco Cloud	Java, JSP, java script	Cross Platform	Proprietary	No	Yes	Yes
Cloud CMS	Java, JavaScript, Node.js	Cross Platform	Apache 2.0 open source drivers,	Yes	Yes	Yes
Crafter CMS Cloud	Java, GraphQL, and JavaScript	Cross Platform	GPL, Commercial	Yes	Yes	No
DotCMS cloud	Java	Cross platform	GPLv3	Yes	Yes	Yes
Microsoft Office 365	Visual C++, C++	Windows, macOS, Android, iOS	MS SharePoint, MS Lync, MS Exchange, MS Office	Yes	Yes	Yes
O3Spaces	Java	Cross platform	Proprietary	Yes	Yes	No
OU Campus	PHP, ASP, .NET, ColdFusion	Cross platform	Proprietary	Yes	Yes	No

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TABLE IV COMPARATIVE STUDY OF CMS PLATFORM

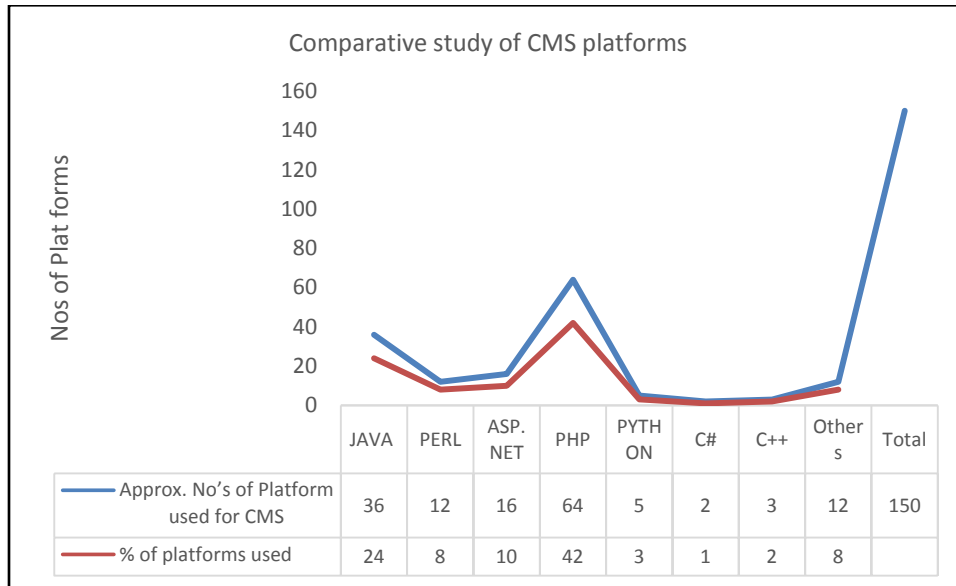| Platform of CMS	Approx. No's of Platform used for CMS	% of Platforms Used
JAVA	36	24
PERL	12	8
ASP.NET	16	10
PHP	64	42
PYTHON	5	3
C#	2	1
C++	3	2
Others	12	8
Total	150	

Fig.1 Comparative study of CMS platforms

IV. INSTALLATION GUIDE TO WORDPRESS: AN OPEN SOURCE WEB CONTENT MANAGEMENT SOFTWARE

Fig. 2 Setup configuration file

A. Detailed Instructions

Step 1: Download and Extract;
Step 2: Create the Database and a User; using php MyAdmin

Step 3: Set up wp-config.php;
Step 4: Upload the files; In the Root Directory in a Subdirectory.
Step 5: Run the Install Script; Setup configuration file finishing installation; install script troubleshooting.
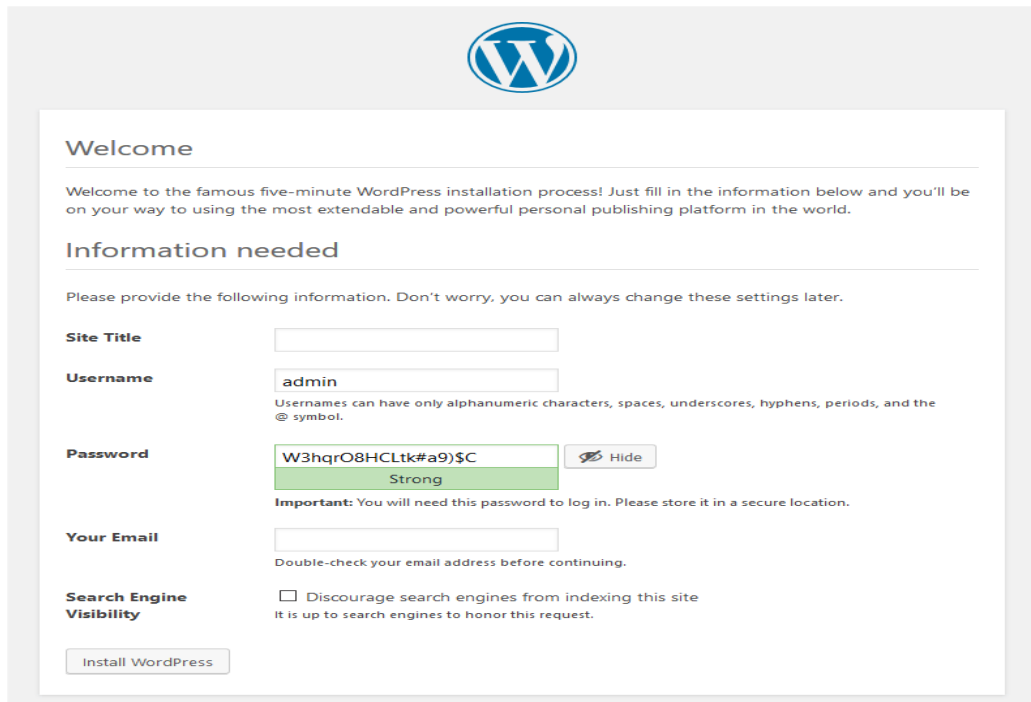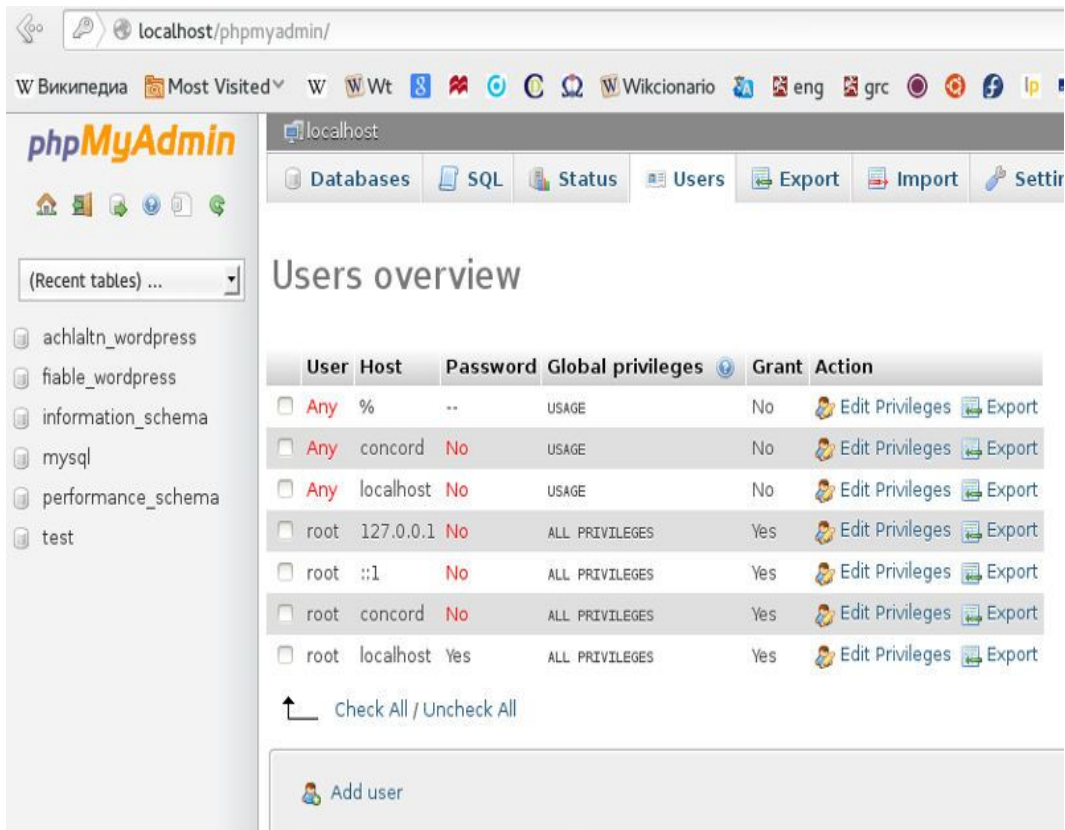

Fig. 3 Finishing Installation

Fig. 4 Overview of Word Press

B. Common Installation Problems

1. It can be seen a directory listing rather than a web page.
2. It can have lots of headers already sent errors.
3. It can have an error connecting to database message.
4. Image/MP3 uploads may not work [6].

V. DISCUSSION

To solve the problems regarding installation of Word Press one can follow the installation guide from Word Press support. Word Press is free open source software based on PHP and MySQL. It is the most widely used CMS software in the world and as of May 2019, it powers more than 30% of the top 10 million websites and has an estimated 60% market share of all websites built using a CMS.

VI. CONCLUSION

This paper represents the most commonly used content management software to develop and initiate the websites for office work, business purpose or any other institutional related management works. It was found that maximum number of CMS database used PHP or JAVA platform to design the soft ware and few CMS soft ware used other platforms like ASP.NET, PERL, PYTHON, C++ and others to design the software.

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