

Performance Analysis on Content Management Systems: A Case Study of Drupal and Joomla

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Abstract

Nowadays, a company's website plays an important role in its production and business. It helps promote the products, introduce the company profile and provide information on its activities. As not everybody in a company is an IT expert, a company needs easy-to-use software to help manage and control its website content with less technical knowledge. One of the best solutions for such is the use of Content Management Systems (CMSs). This study aimed at performing a comparative analysis of two most commonly used CMSs, drupal and joomla, based on certain parameters, stating their criteria and suggest which is best suitable for the specified functionalities. Two online shopping web applications were created with the same functionalities using Drupal and Joomla. Sampled users were employed to visit the sites and later filled an online questionnaire to capture their view and GTmetrix was also used to analysis the technical aspect of the two web applications. The result of the analysis based on users perspectives shows that, in terms of E-commerce solutions such as online shopping, drupal is more modular ready platform and can easily configured for the needs with more powerful modules such as commerce kickstart, ubercart. Joomla tend to be more content publishing friendly platform and while it may be quicker to set up in the long run, it will be less featured without putting in an extra effort. The result of the technical analysis shows that in a site page with only textual information, drupal gives faster response and load on time since the page did not use any javascript file, so drupal is giving its best for the site having textual information.

KEYWORDS: *Drupal, Joomla, GTmetric, Content Management Systems*

I. INTRODUCTION

Nowadays, a company's website plays an important role in its production and business. It helps promote the products, introduce the company profile and provide information on its activities. As not everybody in a company is an IT expert, a company needs easy-to-use software to help manage and control its website without technical knowledge. One of the best solutions for such is Content Management Systems (CMSs). A CMS is a computer application that allows publishing, editing and modifying contents, organizing, deleting as well as maintenance from central interface. CMS are often used to run websites containing blogs, news and shopping. A CMS provides the necessary infrastructure for multiple persons to effectively contribute content and collaborate throughout these life

Content Management Systems Content Management Systems Content Management Systems cycles. With the growth of the internet, fundamental CMS needs have also grown, no longer can information be published online in a manual process and be left unattended.

Choosing the best content management system for your website is a very big decision, a lot of people and organizations uses quite vague criteria to help them make this important decision. Without a clearly defined set of requirements, you will be immersed by fancy functionality that you will never get to use. A CMS will be a company's critical tool for showcasing their products, services, and opinion online. It will also be the strategic tool use by the marketing and Search Engine Optimization (SEO) functions within a business. Each CMS may have unique procedures to manage workflow.

Some users uses inappropriate CMS for sites with specified functions and features since they do not have vast knowledge of the type of CMS they tend to use, they just pick one of the CMSs . In other not to make effort wasted, this project will study the requirement of both CMSs, Drupal and Joomla, which will make user choose the best suitable CMS applications for their websites depending on how they want it to be, features to be included, number of users who will be operating it. This project will give broad understanding of two particular CMSs, Drupal and Joomla, since they are the most commonly used content management systems.

This Project aimed at performing a comparative analysis of two most commonly used CMSs, drupal and joomla, based on certain parameters, stating their criteria and suggest which is best suitable for the specified functionalities.

II. Different Content Management System

Content Management Systems are traditionally implemented as document/information 'repositories' of information – generally a content storage location powered by a database technology, with rigorous security controls on the repository to control and audit access to the

information stored within. These controls encompass things like:

- User authentication (login);
- Role-based access (check in /check out, edit, make new versions, create/store new content);
- Workflow (initiate, review, approve, comment);
- Auditing [4] [6].

A. Wordpress

Wordpress is web software you can use to create a beautiful website or blog. It started in 2003 with a single bit of code to enhance the typography of everyday writing. Since then it has grown to be the largest self-hosted blogging tool in the world, used on millions of sites and seen by tens of millions of people every day. Wordpress is a free and open source blogging tool and a content management system (CMS) based on PHP and MySQL. It has many features including a plug-in architecture and a template system. Wordpress is currently the most popular blogging system in use on the Internet. As a free and open source platform, Wordpress relies on peer support. The primary support website is Wordpress.org [7].

B. Drupal

Drupal is a free software package that allows anyone to easily publish, manage and organize a wide variety of content on a website. Hundreds of thousands of people and organizations are using Drupal to power an endless variety of sites. Drupal you can easily build many different types of web pages - from simple web blogs to large online communities. Drupal design is not as fancy as this of Joomla!, but it is very easy to customize, has built-in search tool and search-engine friendly URL's as an extra module, discussion capabilities and news aggregator. [8].

C. Joomla

Joomla is an award-winning content management system, which enables you to build Web sites and powerful online applications. Many aspects, including its ease-of-use and extensibility, have made Joomla the most popular Web site software available. Best of all, Joomla is an open source solution that is freely available to everyone. Joomla is one of the best and most widely used CMS applications. It is suitable for creating corporate websites or intranets, online magazines, community-based portals and more. It has numerous built-in features as well as a large selection of

extra modules and components which will enhance the value of your website and will enrich your visitors' experience. [8]



Fig. 1 Background of CMS

III. Related Works

According to Bryan ruby(2013) who quoted justin kerr, Robert nowak, jet pixel(2013) said that writing a comparison of any two content management systems can be challenging. This is especially true when the CMSs in the comparison are open source and each CMS has a legion of followers ready to pounce on anything you write that they perceived as false.

According to Trey Gardner (2013), in cost conclusions, Joomla default support for basic content types and a structural hierarchy makes it much faster and less expensive to implement structured sites content. Most Joomla sites employ its general-purpose article content type as the main method for containing the web page content, and use the default categories/subcategories systems to keep things organized. In contrast, drupal sites require implementers to plan and create content types first before meaningful content build-out can begin. This process takes at least a handful of hours; much longer for sites with specialized content items and complex content relationships. In general, drupal site structural build-out will take at least 50 percent more time than conducting the equivalent work on joomla sites. Since both these CMSs are highly competent on individual basis, it is necessary to go a step deeper to analyze their differences. The comparisons are: technical expertise, standard of sites, highlights, best suited cases, caching, versions, security,

and support. In short, both drupal and joomla are equally competing with the availability of the vast number of additional extensions and modules. It is at your discretion to choose the CMS that best suit your requirement.

According to Bernard Kohan (2010), adding features and custom functionalities are not an easy tasks especially on a drupal CMS platform. It is more like that the end-user will need to hire an experienced programmer for this. Drupal is one of the more bloated and complex cms applications and will cost more to set up, customize and maintain than any other solution. If the website owner is a small company and cannot afford to hire an experienced computer software user to manage his/her content, joomla is a good fit.

According to Cameron rahman(2013), three main objectives to crating a successful websites; site visibility has become increasingly important as more and more hits are made with search engines with any given set of keywords. No CMS can completely manage search engine optimization (SEO), but they can help by automating search engine friendliness (SEF). Capturing the user's attention is addressed once the user has found your site. The layout needs to be attractive and easy to digest while providing a clear focus on what your site is all about.

A great website will hold its user's interest so they explore pages beyond the homepage and will return later for more information. This is supported by content which your sites's page hold. Updating and contributing more material is vital to your site's longevity.

In order to differentiate between the big three CMSs, drupal, joomla and wordpress, we will use a set of criteria based off of these primary website objectives for comparism;

- Search engine friendliness
- Ease of structural and design development
- Site content management accessibility

According to alec (2011), for a very large commercial project, I can see a justification for choosing drupal. On a big project, most of your expense will be custom development anyway- everything has to be optimized and integrated, so you don't care one way or another about a myriad of plugins which you will probably not use. Joomla should die a violent death. We did our first CMS project in joomla and the previous year redeveloped a couple of

existing sites in joomla. Our best developers threatened to quit if I accepted any more joomla work. Such crappy, convoluted spaghetti code they'd never seen. And these developers have had ample chance to see the worst side of wordpress. The only justification for a site in joomla that it's legacy or that you are part of an international network standardized on joomla and the mothership discourages anyone from leaving the central platform. Wordpress is the platform of choice in my opinion for the small, medium or large business. Whatever holes you can find in wordpress (editorial management process, ecommerce, membership site) are easily solved with high quality plugins. The cool part about wordpress is that the core is kept clean so that you aren't forced to load code you don't need if you want a simple weblog. Thus wordpress can be a weblog, a corporate information site, a membership site, a store or an international news network.

IV. Methodology

This study focused on comparing two most popular content management systems; drupal and joomla. Here, the two CMSs were evaluated by building two similar web applications (e-Commerce App) in each of the two CMSs. Afterwards, the applications were hosted in the public domain where users can gain access to them, sample users from different location were employed to visit the sites and then filled an online questionnaire to capture their views in order to evaluate the performances of the websites on certain criterions.

Design of the application was done in three phases:

- Database design
- Interface design
- Linking the interface to database

In CMSs, databases are not created separately since they have been bundled with the CMSs itself. All that was needed was to install appropriate Application Programming Interface (API), and use MYSQL database wizard to create the database by following the steps one after the other. The user interface design was done closely follow the functional decomposition of the components and was linked to the database for proper updating, retrieving and manipulation of data. The links to the two websites are; www.halimay.fastech.com.ng and www.halimart.fastech.com.ng

V. Performance Analysis and Result

In testing the two web applications, an online questionnaire was created. After the development of the two web apps, sample users were employed to surf through the two web

applications at different time and location and later filled the online questionnaire in order to capture their view. The

table below shows the result of the analysis based on the users.

Table 1: performance analysis and result

PERFORMANCE ANALYSIS AND RESULT IN COMPARISM OF DRUPAL AND JOOMLA CMS				
CRITERIAS	DRUPAL(YES)	DRUPAL (NO)	JOOMLA (YES)	JOOMLA (NO)
SITES MET TO THEIR EXPECTATIONS	84.60%	15.38%	61.50%	38.46%
EASY TO MOVE FROM ONE PAGE TO ANOTHER	79.80%	15.38%	100%	0%
KNOW ABOUT THE WEBSITE	23.70%	76.90%	15.38%	84.60%
TECHNICAL SUPPROT	53.80%	46.18%	38.46%	61.50%
VISIT FREQUENTLY	61.50%	38.46%	69.20%	30.70%
QUICK SHOPPING	69.20%	30.70%	61.50%	38.46%
WELL DESIGNED	76.90%	23.10%	76.90%	23.10%
EASY TO UNDERSTAND	76.90%	23.10%	84.60%	15.38%
USER FRIENDLY	100%	0%	92%	7.69%

The below chart represent the table above

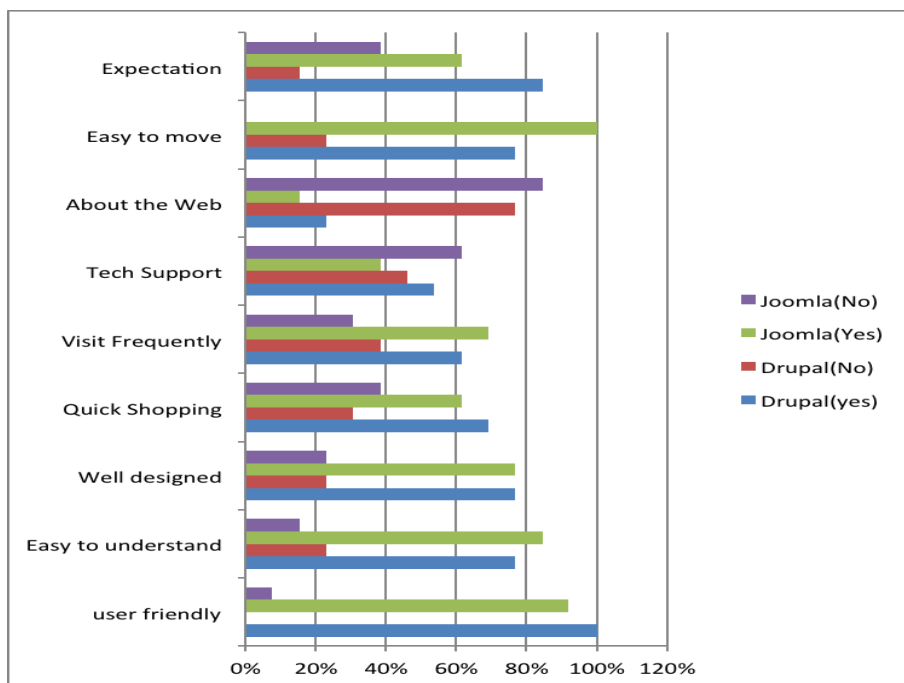


Figure-1 Bar Chart result for the online questionnaire survey

Result Discussion

From figure 1 above, 84.6% of the users said the site made with drupal met their expectations while 61.5% said the site made with joomla met their expectations. Also,

approximately, 80% of the users said it easy for them to move from one page to another on the drupal site while in the joomla site, 100% of the users said its easy to move from one page to another. Other results are analyses below.

- Know about the web: in the drupal site, 23.7% said they have to learn a lot about the website before using it effectively, 76.9% said they do not have to in the Joomla site, 15.38% said yes, 84.6% said no.
- Tech support: In the drupal site, 53.8% said they needed technical support, 46.15% said no, while in the Joomla site, 38.46% said yes, 61.5% said no.
- Visit frequently: In the drupal site, 61.5% said they would like to use the website frequently, 38.46% said they would not like to. In the Joomla site, 69.2% said they would like to, 30.7% said no.
- Quick shopping: In the drupal site, 69.2% said they completed their shopping in a reasonable amount of time, 30.7% said they didn't, while in the Joomla site, 61.5% said they were able to, 38.46% said they were unable to
- Well designed: In the drupal site, 76.9% said it was well designed, 23.1% said it wasn't. In the Joomla site, the same percentages were analysed.
- Easy to understand: In the drupal site, 76.9% said it was easy to understand, 23.1% said it wasn't while in the Joomla site, 84.6% said yes, 15.38% said no
- User-friendly: in the drupal site, 100% said it was user friendly. In the Joomla site, 92% said yes, 7.69% said no.

VI. Website Page Analysis

After developing the same page in the two CMSs as mentioned above, statistical analyses of the page

Table 2: Page parameter with only text

CMS	PLT	PS	Total request	Total files	CSS	Total JS files	PLT after caching	PS after caching
Joomla	935 ms	515.9kb	26	8		6	716ms	470kb
Drupal	520ms	52kb	18	7		0	382ms	32.9kb

Below Table 3 shows parameter value comparison of the page with textual information and calendar object. If Joomla is compared with text as well as one object, Joomla's PLT is seen increased by 75 M.S While in the case of Drupal it's PLT is increased by 247 M.S, but in case of PS it is seen that Joomla's PS is slightly increased around 4 KB, on the other hand Drupal PS is double.

Table 3: Page parameter with text and calendar object

CMS	PLT	PS	Total request	Total files	CSS	Total JS files	PLT after caching	PS after caching
Joomla	1010ms	519.7kb	27	8		6	729ms	475kb
Drupal	767ms	110kb	31	8		3	440ms	79.4kb

performance from hosted server were measured using GTmetrix. The two case study websites were taken into consideration based on the following parameters;

- Page Load Time (PLT): in Mile Second (MS).
- Page Size (PS): Total Size of the page in Kilo Byte (KB).
- Total Request (TR): Number of request sends to the server to load the page.
- Total cascading style sheet (CSS) files: Number of CSS files used by CMS to make a page.
- Total java script (JS) files: Number of JS files used by CMS to make a page.
- PLT after caching: when page load first time some of its content store in cache memory so when we load that page again only rest of the data which is not in cache will load from the server so it decrease load time.
- PS after caching: As system cache used to decrease the PL T it also reduces PS as mention above.

From the below Table 2, it is seen that except PL T, Joomla has higher values compare to Drupal. By comparing normal PS and PS after caches, it is seen that Joomla caches 45.9 KB of data in memory when page gets loaded for second time. In the same way if we compare normal PLT with PLT after cache, Joomla reduces 219 MS. When PS comes in picture Drupal has smallest PS compared to others. It does not use any JS file even. As it takes very less time in page load, it gives faster response to the request. But it also stores good amount of data in cache memory as well as it reduces PL T up to 3198 MS. Therefore, from the below table it is clearly seen that Drupal is giving its best for the site having textual information.

When we talk about total request Drupal take 150% more request compared to previous one. Data in Table 3 shows that Joomla handle load better than Drupal. In other sense it can be said that Drupal's calendar plug-ins consume more size compared to Joomla.

Below Table 4 shows page performance criteria having text and objects like calendar, clock, and image gallery. After giving comparative load to page when measured it is seen that Joomla was having 165 M.S. differences compared to only text information. Drupal's page time increased dramatically having countable difference of 2523

M.S. while considering PLT as main criteria, Joomla won the battle. Drupal has deducted 2468 M.S in the next PLT after cache it means that it works faster after caching. Even if Joomla's PS is three time higher than drupal its PL T is 3 times lower than drupal, it interprets that Joomla handle load better and is performing well with local server.

Table 4: **Page parameter with text and multiple objects**

CMS	PLT	PS	Total request	Total CSS files	Total JS files	PLT after caching	PS after caching
Joomla	1100ms	682.2kb	44	8	9	816ms	623kb
Drupal	3290ms	195.5kb	36	8	5	822ms	136.2kb

Conclusion

In the software development business today, Content management systems (CMS) is a valuable tool that helps Organisations deliver targeted information for visitors interested in their products and services, there are many software packages available; however selecting a CMS is sometimes difficult because trend and evaluation data does not always coexist in the same reports and it can easily be concluded that these CMSs work best for certain functionalities. In the aspect of joomla, if the site you want involves serving of various pages and blog-like while keeping to a consistent style and the ability to author page easily, joomla will fit your needs, it work best when building simple site and more suitable for a non-IT person who intend to be the administrator of his/her site. In the aspect of drupal, if you need an advanced system with specific content appearing in different ways on different pages in different places, then drupal ability to have complex content relationships and access control of content will allow the flexibility to fit in any project, drupal work best when building a complex site and if you don't have any understanding in programming before, it takes longer period to learn how to use drupal. In terms of E-commerce solutions, drupal is more modular-ready platform and can be easily configured for your needs, with more powerful modules such as commerce kickstart. Joomla tend to be more content publishing friendly platform and while it may be quicker to set up, on the long run it will be less featured without putting in an extra effort.

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