

Drupal CMS for the Design of Dynamic Website in Improving Theme Customization

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Abstract—In this paper, it is described how CMS can be implemented in building up of websites dynamically. Drupal is an open source CMS (Content Management System) which allows organizing, managing and publishing the content. The users who neither have knowledge of coding nor developing a website could manage the website on their own. Dynamic has the meaning that the content and the fields in the website can be changed as per the requirements. The user who is managing the website will be provided with templates through which the information in the website can be changed. It is implemented with the help of modules, libraries and themes available in Drupal. Compared to any other CMS, Drupal is more powerful and flexible though it is somewhat complicated to build the website.

Keywords: Drupal, CMS, Dynamic

I. INTRODUCTION

The Content Management System(CMS) is a software which stores all the data and is made available on the website. Drupal is a very powerful CMS and can be used for building large and complex websites. It uses PHP based template and allows non-technical users to add and edit the content without any HTML or Web design knowledge. Using Drupal CMS, it is easy to interact with other websites or technologies as Drupal can handle complex forms and workflows. It is available with more than 16000 modules which can be addressed with Drupal core and add-on modules. Drupal makes it easy to create and manage the site and translates anything in the system with built-in user inter faces. It connects one website to other websites and services using feeds, search engine connection capabilities, etc. Since it is an open source software, it requires no licensing costs[2]. The website which is built using Drupal will generate big server loads and will never open with a slow internet connection. In recent years, Drupal developed websites rose rapidly, not only for personal website or blog, more and more large-scale enterprise portals, commercial companies, social networking websites, universities, forums; but also, for professional e-commerce website that also started using Drupal to build their own online platform. Drupal also describes itself as a Web application framework. When compared with notable frameworks, Drupal meets most of the generally accepted feature requirements for such web frameworks.

Drupal runs on any platform that supports both: a Web server capable of running PHP and a database to store

content and configuration. Although Drupal provides a sophisticated API for developers, basic Web-site installation and administration of the framework require no programming skills. Marketers and web developers can easily create and manage great web and mobile experiences using Drupal. Customizable themes are provided where users can customize the themes as per their requirements. Modules expand Drupal's functionality through which users can add additional features to the website. It's a great choice for creating integrated digital frameworks. It can be extended with one, or many, of thousands of add-ons. Drupal is a powerful framework that has inspired a new generation of digital experiences. It is an essential part of marketing ecosystem with content-first, commerce-first and community-first marketing solutions to achieve the business goals [1]. The client's business goal can be achieved through the Drupal digital experiences that grows rapidly and gain the power of the largest open source community. Drupal has great standard features, like easy content authoring, reliable performance, and excellent security. But what sets it apart is its flexibility; modularity is one of its core principles. Sometimes it can be stated that Drupal is not a user-friendly interface because it requires advanced knowledge and few basic things about the platform to install and modify and it is not compatible with other software.

II. CMS ARCHITECTURE

CMS is implemented in PHP language, so it can run on a variety of servers, such as Windows and Apache server. CMS also supports MySQL database. It allows more than one website to share a same database. Only need to use prefix to distinguish each other. Another situation is that every website owns their data base. Certainly, there is no any impact to our scheme no matter which situation is. To make the proposed scheme work, the method almost is same under the two different situations [6]. There are 46 tables in the database installed with default where the tables of extended modules are not included. One of them are related to user's information. It is the user's table keeps all user's information when to install a website use CMS. When we install extended modules to make our website powerful, the data base of Drupal will generate related tables [3]. Clearly, the information of user's and the stalled modules in different website are independent each other before we modify.

The architecture of CMS (in figure1) contains the following layers and menus:

A. Users

The Drupal community possess a set of users named as Users and they send a request to a server using Drupal CMS and web browsers, search engines, etc. acts like clients.

B. Administrators

Administrator has the right to provide access permission to authorized users and will be able to the unauthorized access. All the privileges for managing content and administering the site will be provided by the Administrative account.

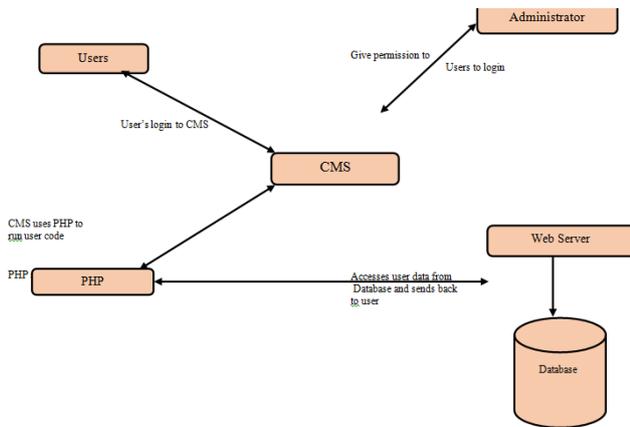


Figure 1: CMS Architecture

C. CMS (Drupal)

CMS-Drupal is a free and open source Content Management System (CMS) that allows organizing, managing and publishing the content and is built on PHP based environments. CMS is very flexible and powerful and can be used for building large, complex websites [8]. It is very easy to interact with other websites and technologies using Drupal CMS.

D. Web Server

Web server is a server where the user interacts and processes requests via HTTP (Hyper Text Transfer Protocol) and serves the files that form web pages to web users. The communication between the user and the server takes place using HTTP.

E. Database

Database stores the user information, content and other required data of the site. It is used to store the administrative information to manage the Drupal website [9]. Drupal uses the database to extract the data and enables to store, modify and update the database.

III. PROPOSED WORK

Most of the websites built are not dynamic and the user needs to approach the website developer every time the

changes are needed. This is considered as inefficient since the user is unable to manage the website independently. In order to overcome this, Drupal is enforced in building up of the websites which are dynamic.

The designing of the dynamic website starts by creating own themes and installing the necessary modules to perform the functionality of website [7]. Templates are provided to the non-technical users where in the modifications in the website would be done using them. Taxonomies play a prominent role in classifying website content which display specific content based on taxonomy terms. Drupal taxonomy has mainly – term: to describe the content; vocabulary: the set of terms. Optimizing themes is a very important aspect. Media files like high quality images, videos, audios and flash can affect the website and slow down the speed resulting in low performance. Try reducing the size and number of media files or maybe you can avoid using flash. Java files can also affect the performance and speed of the website. To compress this, enable the Aggregate JavaScript files from the Administration→Configuration→Development→Performance in the bandwidth optimization section. Drupal has blocks and regions. Blocks are container objects that are used to organize the content of a website. It can be displayed in the regions on a page. In Drupal, content type defines the style in which contents are collected and displayed. When Drupal is being installed, by default two content types will be fixed and they are Articles and Basic page. When the core is enabled and contributed modules by visiting Modules the other content types can be utilized. Every content is either published or unpublished. Published content is open for visitors to view while unpublished content cannot be viewed [5]. This feature is used to hide the content from public view without deleting it. Menu Management is the important part to navigate through Drupal admin page. Content helps in creating, managing and finding new pages. The table gets displayed with the detail of the articles, i.e. status, title, updated, author and operation (Edit and delete). Structure includes the blocks, manage content types, add new menu links to the site and manage administrative tagging of content. Configuration is an important part in the Drupal backend. Any changes done in the configuration, will affect the entire website. Reports display the information of available updates, recent log messages, and site security.

Drupal uses PHP scripting language and template.php is the basic PHP file which loads for every page in the website. Template.php contains theme functions and pre-process functions. The base theme's name has to be replaced by the sub-theme's name. Initially template gets loaded after which page. tpl.php gets loaded and respective pages load and the information is displayed [10]. The initial step in building a website is creating up a basic page and an article. Content types are created and then the structure is selected under which the created content types are

provided and select the content type which is required and save the process.

The improving of theme customization is carried out with:

A. Structure

Structure provides options such as blocks, content types, menus, taxonomy and views.

B. Blocks

Blocks can be added under created regions using which configure option and it can be edited and configured.

C. Content Types

Content types can be used to edit and manage fields, display options are provided which allows the content could be hidden.

D. Taxonomy

Taxonomy helps in creating drop-down and tagging option is provided which links the content.

E. Nivo Slider

Nivo slider is a simple method of adding slides to the slideshow.

F. Views

Views provide display option which allows users to add fields and filter criteria of header, footer and pager options.

G. Appearance

Appearance contains themes options where in each theme has its own regions defined.

H. People

The administrator has the privileges to add an user and providing them the proper access to the website.

I. Modules

Modules provide installing new modules and configuring them as per the requirements.

J. Configuration

It has people option which provides account settings and user location. Content authoring has file system and image styles [4]. Search and metadata provides URL aliases where the URL of the particular page can be edited.

K. Reports

It displays the status of libraries installed and field list.

Each page request is handled by Drupal. Technically, when a server receives a URL request, drupal instantly takes care of the internal path & separates it from the domain name. Each page request goes through index.php and it is found in the root directory of Drupal.

The following is the algorithm of how each page request is being handled by Druapl.

```
HANDLE_PAGE_REQUEST_DRUPAL()
```

```
Step 1: define('DRUPAL_ROOT', getcwd());
```

This defines a constant, DRUPAL_ROOT, containing the file path to the Drupal installation.

```
Step 2: require_ once DRUPAL_ROOT . '/includes/  
bootstrap.inc';
```

This used as a constant, to load bootstrap.inc in the includes/subdirectory. bootstrap.inc and contains PHP code. Drupal uses the *.inc extension to prevent files from being executed directly. This way, to plug-in into bootstrap.inc and get back a valid page

```
Step3:drupal_bootstrap(DRUPAL_BOOTSTRAP_FULL);
```

drupal_bootstrap() does the initialization. It basically checks for a connection to the database, loads modules, loads needed data into memory, and prepares everything for the final line of code in index.php.

```
Step 4: menu_execute_active_handler();
```

The menu_execute_active_handler () function handles the page request. This is the part that takes the half of the URL and produces a web page for the end users.

IV. ANALYSIS AND TESTING

The analysis of the website is the complete examine of the website. The initial analysis includes to assure that the mobile is web-responsive. Responsive Design is the design of the system responds/adapts depending upon the layout of the device [16]. The primary reason to keep your design responsive is to increase the reach of your application to a larger user base using an array of devices.

A responsive design improves the usability of the product. before the advent of mobile Internet communication devices, Developers used to make their applications compatible with screens of various resolutions. This can also be called making the design responsive. In today's world, where more and more users are consuming information on the mobile devices, there is a need to handle the changing viewports and hardware [11]. Irrespective of how the website looks, the responsive design can be achieved. This is rather a functional aspect than a design aspect, even though the functionality is achieved by the designer.

Figure 2 depicts the results of the particular webpage that is tested, and it has the scale as set by the user. The testing techniques such as Functionality Testing, Usability Testing, Interface Testing, Database Testing, Compatibility Testing, Performance Testing, Security Testing and Crowd Testing are done. Further the website is deployed into the production.

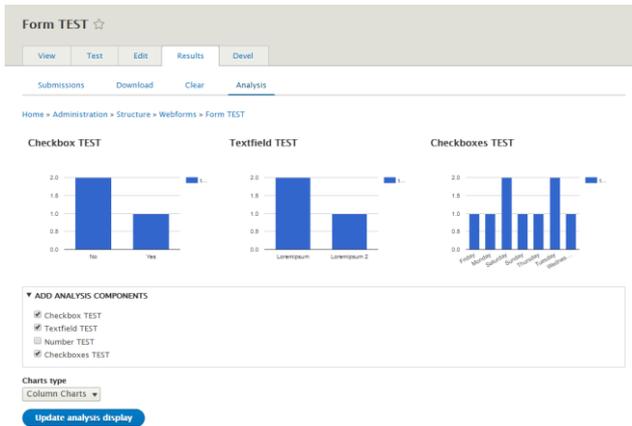


Figure 2 : Column Chart of Web form Testing

Testing the website includes the search of potential bugs before it is made live or before the code is moved into the production environment. During this stage issues such as that of web application security, the functioning of the site, its access to handicapped as well as regular users and its ability to handle traffic is checked.

V. CONCLUSION

Templates are provided to non-technical users using which they can manage the whole website independently. Templates are built using modules and themes supported by Drupal. The pages built using Drupal generate high server load and hardly open with a slow internet connection. This could be overcome in future enhancement.

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