

# Performance and Security Measure of Highly Performed Enterprise Content Management System

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## ABSTRACT

“ENTERPRISE CONTENT MANAGEMENT SYSTEM” (ECMS) is an extension to CONTENT MANAGEMENT SYSTEM (CMS). In this paper we will see the performance measure and security measure of website that is developed and hosted using three different platform, One website we have made in LIFERAY(open source enterprise content management system) and MYSQL as database, Second we have made using JSP and MYSQL as database run on the free web space, third we have made again using JSP and MYSQL as database but we have bought web space from provider. We will compare all three websites to see which one has the better efficiency or which can handle the better stress using the webstress tool developed by us, for the performance measure of all three websites. We have evaluated the performance by considering following parameter 1)Performance Test 2) Stress Test 3) Ramp Test and security measure by considering following parameters 1) SQL INJECTION 2) CROSS-SITE SCRIPTING on the above three websites

## General Terms

Enterprise Content Management System, Web Stress Tool, Content Management System, Liferay Enterprise Content Management System

## Keywords

CMS, DMS, ECMS, LMS, WCM, WECM

## 1. INTRODUCTION

ECMS is an extension to the CMS, nowadays there are many different existing ECMS in the market available, but the AxCMS.net is the one of the world's first ECMS. AxCMS.net is an award-winning, multilingual and multi-site compatible solution completely free of charge. The way organizations conduct business has evolved since the first ECM systems began appearing on the market twenty-plus years ago. The tools and technologies we rely upon to meet our business objectives have become more powerful and integrated, revolutionizing the way we communicate and collaborate. The types of content we rely upon have grown to include documents, forms, images, audio/video, email messages, instant messages, web content, and more. And the regulatory atmosphere within which we do business has evolved, bringing with it new demands with regard to digital information privacy, security, and stewardship [3]. Document management is one of the oldest and important technique and it emerges out of ever growing amount of information being created within big organizations and also document management is important for legal processes as a proof of

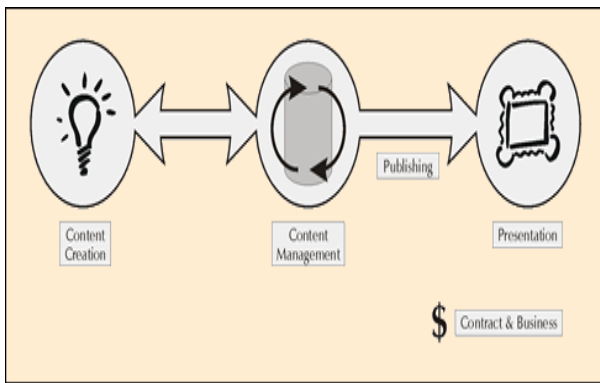
something or some incident has really happened. In the traditional method where the hard copy use to exist for every document there is always a limitation regarding the storage and retrieval of amount of information. With the introduction to electronic system of managing the documents like MS-office now there is no limit of storing and retrieval of data with the increase in the technology the amount of data that to be managed is also increasing. With the increase in the document that need to be managed the MS-office, excel etc are not alone sufficient, we need to make new and different software to manage documents depend on their type, access permissions, sensitivity of data etc. The need for establishment of a properly designed and implemented ECMS is because there is an exponential and astronomical growth of raw data that is required to be accessed quickly in present day scenario for a well-organized and controlled access.[2]. In today's world there are many software's those are especially made for the Enterprise Content Management but in this paper we will do analysis and categorize all popular ECMS and based on our analysis we will suggest which ECMS suits a particular enterprise according to its use and also the advantages.

## 2. WHAT is ECMS?

Enterprise Content Management Systems is a system is a multi-step process in sequential order first we do creation then at last we do retrieval and editing of information/knowledge in digital fashion including raw, semi processed or fully processed content handling text, images/graphics/animation, audio/video etc., in real time or otherwise as needed ECM tools and strategies allow the management of an organization's unstructured information, wherever that information exists. Nowadays whether it is a small enterprise or a big everyone needs there documents to be placed properly and can be reused easily, so to have an ECMS is a better solution but to have a correct ECMS depending on our enterprise is also very important. In later sections of this paper we will see how to choose a better suited ECMS. Beyond these, the greatest benefit the CMS can provide is to support your business goals and strategies. For example, the CMS can help to improve sales, increase user satisfaction, or assist in communicating with the public [5].

### 2.1 General Anatomy of ECMS

In this section we will have a look on the general anatomy of any ECMS. In all present ECMS we will get this anatomy only.



Source: **KM Column JUNE 2003 So, what is a content management system?**

([http://www.steptwo.com.au/files/kmc\\_what.pdf](http://www.steptwo.com.au/files/kmc_what.pdf))

**Fig 1 Anatomy of a Content Management System**

The functionality of a content management system can be broken down into several main categories:-

- content creation
- content management
- publishing
- presentation

Each of these will be explored in the following sections. The CMS manages the entire lifecycle of pages, from creation to archival.

- Content creation

At the front of an ECMS is an easy-to-use authoring environment, designed to work like Word. This provides a non-technical way of creating new pages or updating content, without having to know any HTML.

- Content management

Once a page has been created, it is saved into a central repository in the ECMS. This stores all the content of the site, along with the other supporting details. This central repository allows a range of useful features to be provided by the ECMS: Keeping track of all the versions of a page, and who changed what and when. Ensuring that each user can only change the section of the site they are responsible for. Integration with existing information sources and IT systems.

- Publishing

Once the final content is in the repository, it can then be published out to either the website or intranet. Content management systems boast powerful publishing engines which allow the appearance and page layout of the site to be applied automatically during publishing. It may also allow the same content to be published to multiple sites.

- Presentation

The content management system can also provide a number of features to enhance the quality and effectiveness of the site itself. As an example, the CMS will build the site navigation for you, by reading the structure straight out of the content repository. It also makes it easy to support multiple browsers, or users with accessibility issues. The CMS can be used to make your site dynamic and interactive, thereby enhancing the site's impact [4].

## 2.2 TYPES of ECMS

There are many different types of the Enterprise Content Management System available, depending on our requirement that what type of data an enterprise want to manage there are different types of ECMS are listed below.

### 2.2.1 Web Enterprise Content Management System (WECMS)

Web content manages the data related to the websites or manages the online data, its very difficult to manage big web sites so Web Enterprise Content Management System (WECMS) helps in managing the web content. It is used to assist big organization in automating various aspects of web content creation, content management, and delivery. [2]. Delivery to the Web is its primary format, but many WECMS systems also deliver to wireless devices.

### 2.2.2 Document Management System (DMS)

The Document Management System (DMS) mainly focuses on the storage and retrieval of self-contained electronic data in the document form. Generally, The DMS is designed to help the organizations to manage the creation and flow of documents through the provision of a centralized repository.

### 2.2.3 Content management system (CMS)

The CMS assist in the creation, distribution, publishing, and management of the enterprise information. These systems are generally applicable on the online content which is dynamically managed as a website on the internet or intranet. The CMS system can also be called as 'Web Content Management' (WCM).

### 2.2.4 Library management system (LMS)

Library management systems facilitate the library technical functions and services that include tracking of the library assets, managing CDs and books inventory and lending, supporting the daily administrative activities of the library and the record keeping.

### 2.2.5 Records management system (RMS)

The RMS are the record keeping system which capture, maintain and provide access to the records including paper as well as electronic documents, efficiently and timely.

### 2.2.6 Learning management system (LMS)

Learning management systems are generally used to automate the e-learning process which includes the administrative process like registering Students, managing training resources, creating Courseware, recording results etc.

### 2.2.7 Geographic information system (GIS)

The GIS are special purpose, computer-based systems that facilitate the capture, storage, retrieval, display and analysis of the spatial data.

### 2.2.8 Digital imaging system (DIS)

The DIS assists in automation of the creation of electronic versions of the paper documents such as PDFs or Tiffs. So created Electronic documents are used as an input to the records management systems.

## 2.3 VARIOUS ECMS

A successful and effective ECM system is not merely an application that organizes and stores content, it is a fully-

integrated platform and architectural framework that enables unfettered collaboration, stewards enterprise content throughout its life-cycle, and empowers greater productivity. An ECM system is an organization's virtual ecosystem[3]. There are many different ECMS present in today's market, we are listing here some of the popularly used ECMS and they are as follows

### 2.3.1 Drupal

Drupal is an open source web content management framework for building Internet portals, corporate web site, e-commerce sites, and more. It is the one of the best because of its ease of use, vast number of modules and it has a great user, developer and community to keep it updated .

### 2.3.2 Word Press

Word Press has a web template system using a template processor. Users can re-arrange widgets without editing PHP or HTML code; they can also install and switch between themes. The PHP and HTML code in themes can also be edited for more advanced customizations. Word Press also features integrated link management; a search engine-friendly, the ability to assign nested, multiple categories to articles; and support for tagging of posts and articles [4]. It is simple in use and good for the single user blogs, with a large number of themes and module available online .

### 2.3.3 Joomla

Joomla is one of the most popular and it has the one of largest community, then any other ECMS. Here we will get everything we need to develop social networks, ecommerce, & archive sites.

### 2.3.4 Media Wiki

It invents the new way of networking on the web and it is the one of the best ECMS for the collective authoring of documents, and it powered one of the best and most powerful site on net i.e. Wikipedia.

### 2.3.5 Liferay

It is the one of the newest and most powerful ECMS for building portals, and offers a professional look and feel that sets it apart from the other platforms.

### 2.3.6 TYPO3

It is the most complex and professional CMS platforms, TYPO3 are popular for business websites, especially with European companies .

### 2.3.7 Moodle

Moodle is the one of the most unique CMS platforms on this list, designed specifically for Course Management and Education, and used for online learning platforms .

### 2.3.8 Dolphin

It is used for those developer's who wish to develop the latest in social networking, with an industry standard look and all of the features of the popular online communities.

### 2.3.9 Pligg

It is a Digg clone that provides social bookmarking functionality for websites, allowing users to post links, vote them up or down, and leave comments.

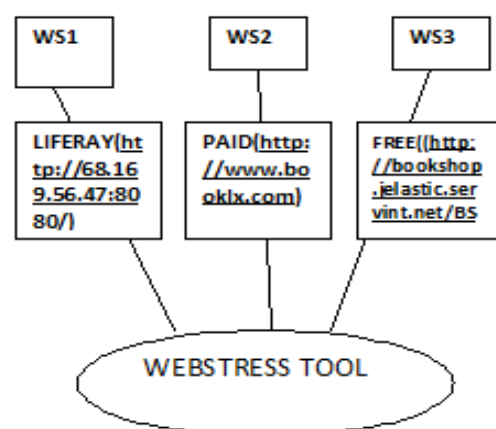
### 2.3.10 Movable Type

Movable Type is the main challenger to Word Press for a personal blog platform, and supports multiple users, Themes, and Tags .

## 3. IMPLEMENTATION

After doing a detailed literature survey and study we formulated methodology to design a model based on two parameters i)Performance ii) Security.

First of all we will see the setup of all three websites. First website WS1:- developed using Liferay and MYSQL as database and its URL is <http://68.169.56.47:8080> , second one WS2:- developed using JSP and MYSQL as database, this website we are hosting on paid hosting package and its URL is <http://www.booklx.com> and the last one WS3:- developed using JSP and MYSQL as database, this website we are hosting on free hosting package and its URL is <http://bookshop.jelastic.servint.net/BS>.

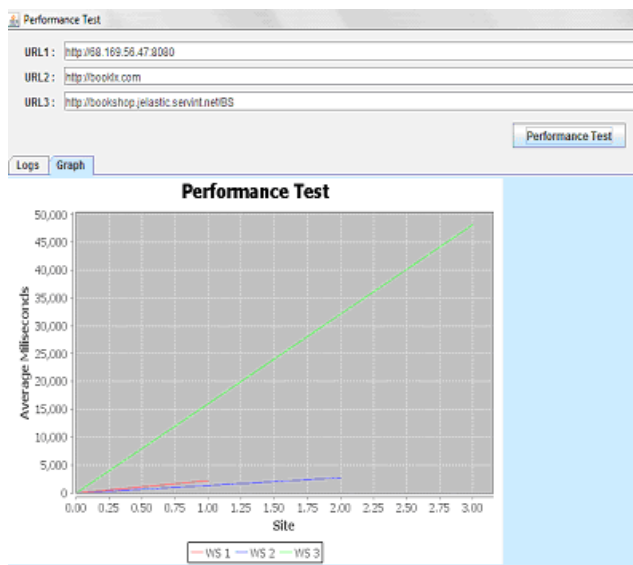


**Fig2 : Arrangement of websites**

**STEP1 PERFORMANCE MEASURE:** - In Performance Measure we will check the Performance of all three websites with the help of WEBSTRESS TOOL based on following parameters

1) **PERFORMANCE TEST:** - This is used to check the performance of website with single hit, to check the average time required by a particular website.

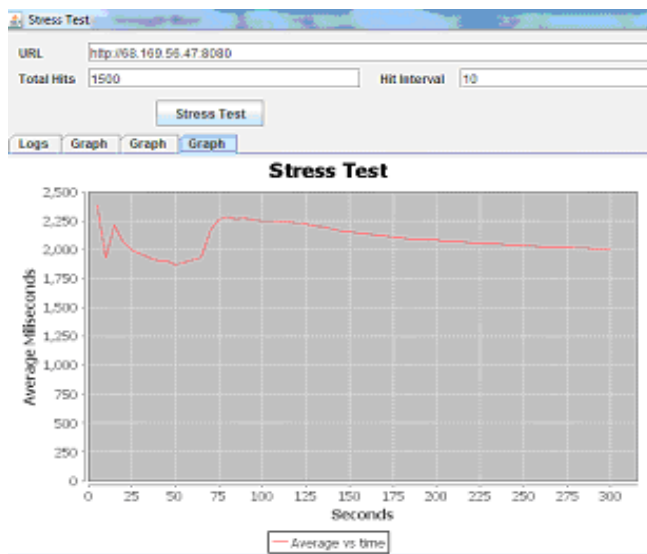
Here we will compare the performance all three website and check which website has better performance.



**Fig 3 Graph of performance test for W1,WS2, WS3**

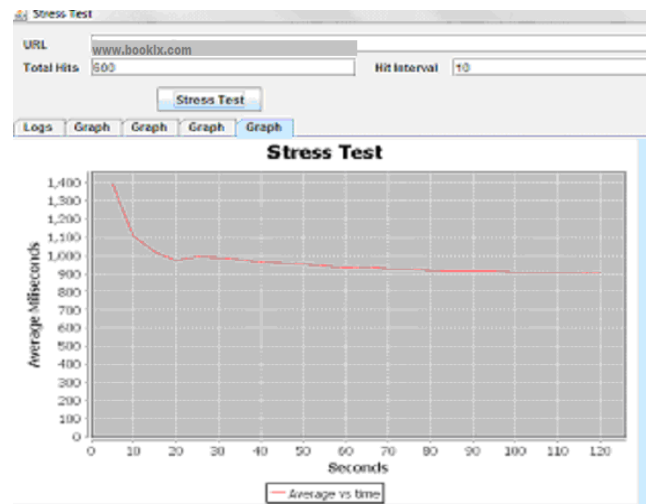
From fig3 we can say that the order of performance is WS1 has highest performance its takes avg time of 3748 milliseconds then WS2 took 137736 milliseconds and last WS3 took 251907 milliseconds.

2) **Stress Test :-**The stress test will check whether how much stress i.e. how much hit a particular website can handle For the calculation of stress test we have taken hit interval as 10 sec uniformly for all three websites.



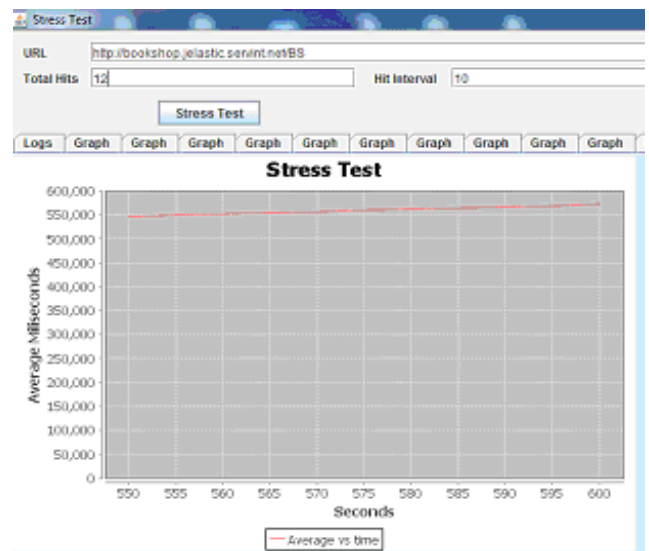
**Fig 4 Graph of stress test for WS1**

From fig 4 shows that WS1 can handle 1500 hits at a time



**Fig5:-Graph of Stress test for WS2**

From fig 5 we can say that WS2 takes 600 hits at a time and it is 60% less than the WS1.



**Fig6:-Graph of Stress test for WS3**

Fig 6 shows that ws3 takes only 12 hits at a time. It is 98.2 % less of WS1 and 98%less of WS2.

3) **Ramp Test:-**In Ramp test we check for the success and error and one value we take as the bench mark and check the performance of all sites.

Here we are taking bench mark value as 350 hits with this benchmark value we will test all the three websites and see the performance.

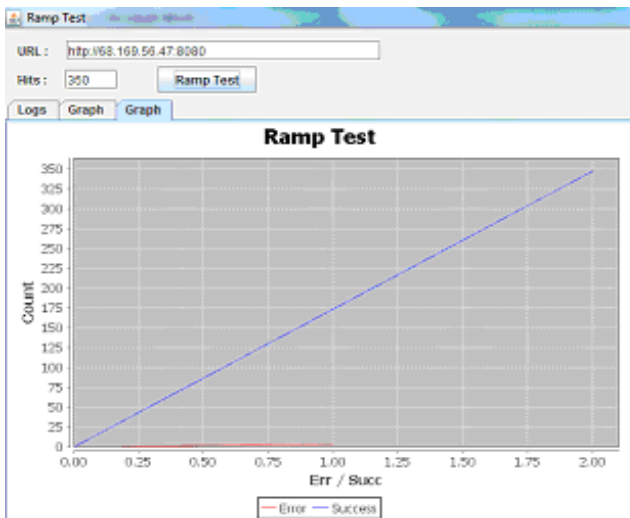


Fig 7 Ramp Test of WS1

From above fig7 we can see that out of 350 hits there is 3 error hit and 347 success hit so its 99.15% success

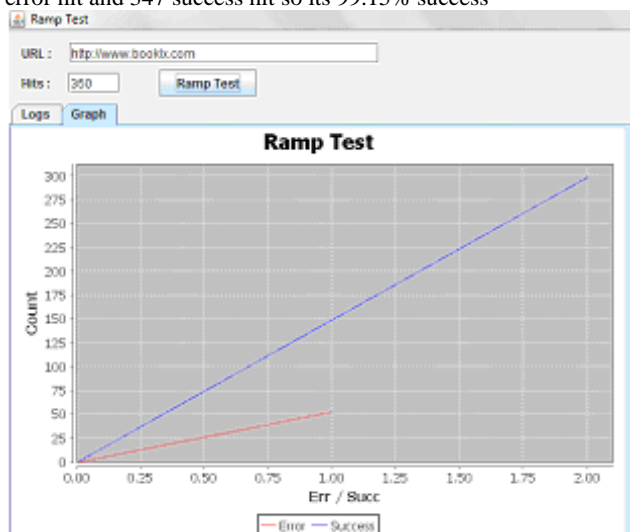


Fig 8:-Graph of Ramp Test for WS2

From above fig8 we can say that 52 error hits and 298 success hits are there so it is 85.15% success.

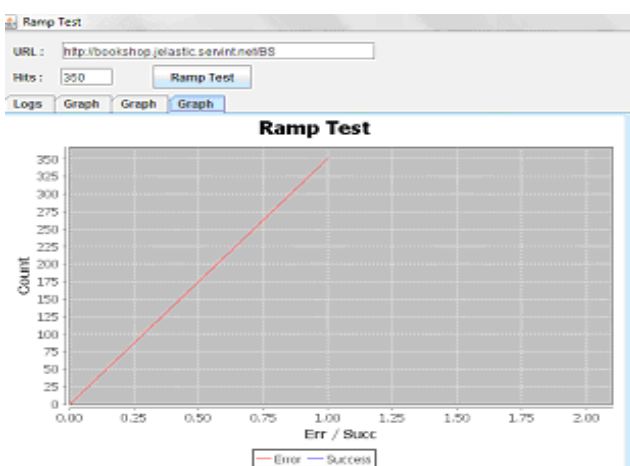


Fig9:-Graph of Ramp Test for WS3

From fig9 we can say that it has 350 error hits and 0 success hits, it has 0% success

**STEP 2 SECURITY MEASURE:-** - In Security Measure we will check that how secure our website is for all three websites based on following parameters.

1) Dos Attack:-It is an attempt to make a computer resource unavailable to its intended users.

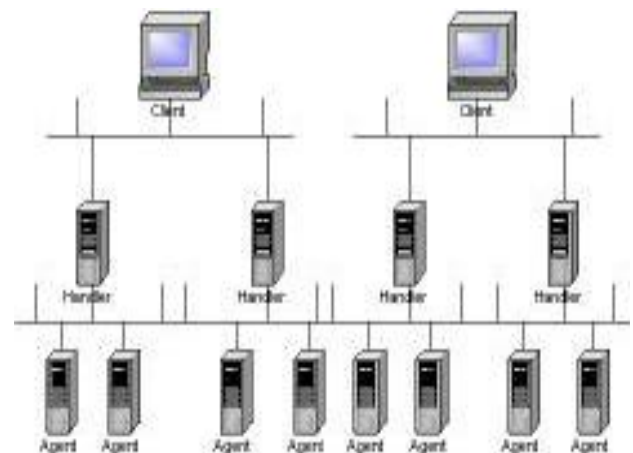


Fig10 Steps for Dos Attack

**Step1** ping to the site on which we want to do the DoS Attack, to get the ip address

**Step2** ping<space>ip address of site<space> -l 65500<space>-n 1000000<space>-w 0.00001

-l sent size of buffer , -n the number of Dos attempt , -w waiting time after one ping attack.

**Step3** Wait for atleast one hour and check the website, we will not be able to use the resources.

When we attack on WS1, WS2 and WS3. WS2 and WS3 will down and WS1 will work properly.

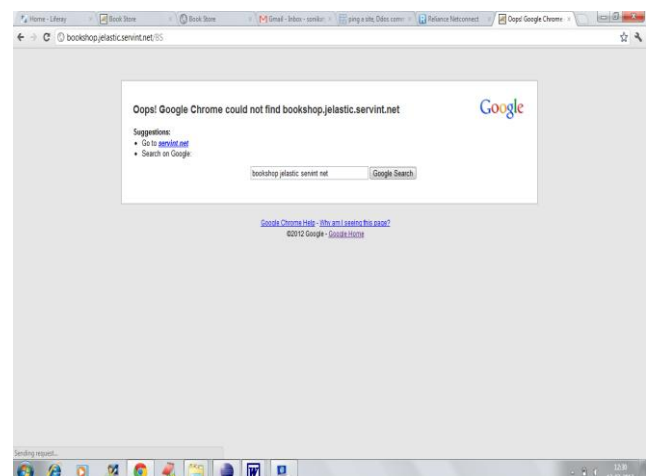


Fig11 WS3 after DoS attack

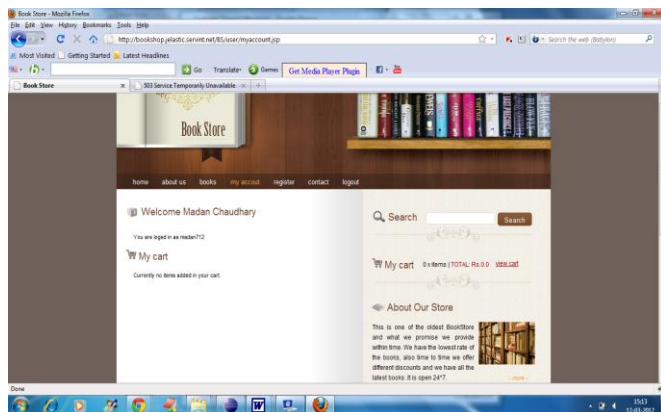
Fig11 shows that after the DoS attack we will not be able to use the website ,same will be the case with WS2,but WS1 will work properly.

2) **SQL Injection:-** A **SQL** injection vulnerability can occur when a poorly-written program uses user-provided data in a database query without first validating the input. This is most often found within web pages with dynamic content.

Here in this we will write the **SQL** injection query in the login form and check whether we will be able to login with fake user or not, same query we will write for WS1,WS2 and WS3.The query that we have used

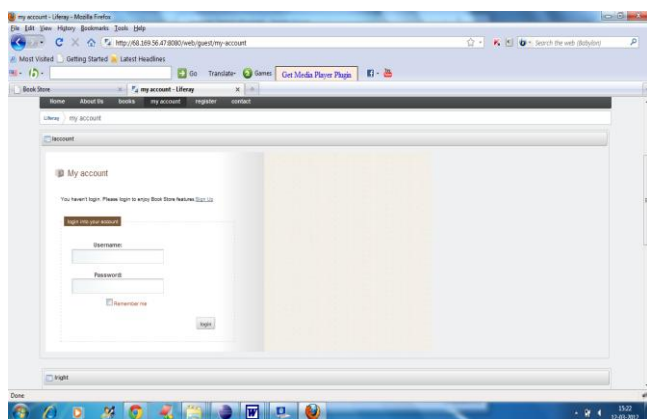
```
'or'1'='1
```

We will provide same query for username as well as password. The above query will always returns a value true so we will be able to login if the security is not there, we will login with any of the registered user.



**Fig12 shows SQL injection on WS3**

Fig 12 shows SQL injection on WS3 and we were able to login with the already registered user and same is the case with the WS2 , but in WS1 we will not be able to login like in fig 13

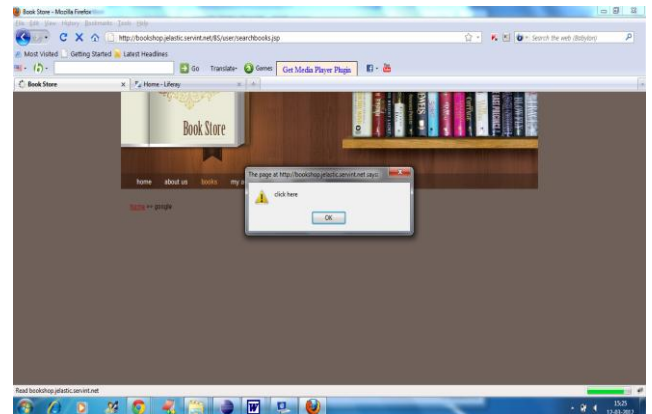


**Fig13After SQL injection on WS3**

3) **Cross-Site Scripting:-** Cross site scripting (also known as XSS) occurs when a web application gathers malicious data from a user. The data is usually gathered in the form of a hyperlink which contains malicious content within it or any popup box like click here and will take to some malicious content

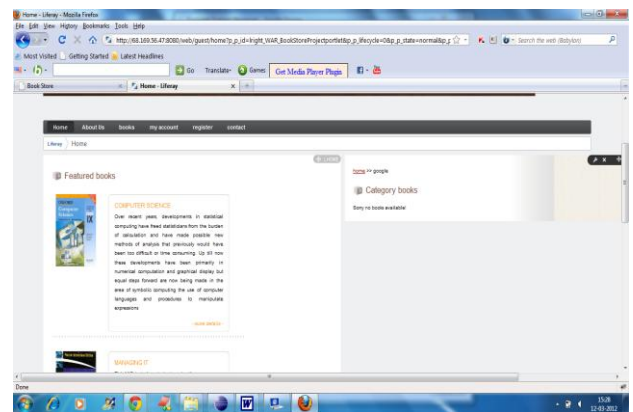
Here we will write the below scripting in the search box of all three websites.

```
google<script>script('click here')</script>
```



**Fig14:- WS3 after Cross-Site Scripting**

Fig 14 shows that Cross-Site Scripting is possible in WS3 and same is the case with WS2, but its not possible in WS1 and we can see in Fig 15



**Fig15:- WS1 after Cross-Site Scripting**

#### **4. ANALYSIS**

From the implementation we can see that the Liferay works better performance wise as well as security wise, this can be infer from following table

**Table 1 COMPARISON of ECMS as per USE**

| Name          | License          | Language       | Best Suited for                                |
|---------------|------------------|----------------|--|
| Drupal        | GPL              | PHP            | e-commerce sites                               |
| Word Press    | GPL              | PHP            | Single/multiple users or blogs                 |
| Joomla        | GPL              | PHP            | e-commerce sites and Social Networking Website |
| Media wiki    | GPL              | PHP            | Websites/Portals/Business Websites             |
| Liferay       | MIT              | Java, PHP,Ruby | Websites/Portals/Business Websites             |
| TYPO3         | GNU              | PHP            | Websites/Portals/Business Websites             |
| Moodle        | GNU              | PHP            | E-Learning/Course Management                   |
| Dolphin       | Creative Commons | PHP.           | Social Networking Website                      |
| Pligg         | GPL              | PHP            | Social Bookmarking                             |
| Movable Types | GNU              | Perl           | Single/multiple users or blogs.                |

From the above two tables we have analyzed that if we make any ECM site using Liferay it will be more secure and its performance will also be high, it supports many scripting language and lat it is open source.

## 5. CONCLUSION

From the analysis of the implementation we can very easily conclude that the WS1:- developed using Liferay and MYSQL as database and its URL is <http://68.169.56.47:8080> , is better then the WS2:- developed using JSP and MYSQL as database, this website we are hosting on paid hosting package its URL is <http://www.booklx.com> and WS3 developed using JSP and MYSQL as database, this website we are hosting on free hosting package and its URL is <http://bookshop.jelastic.servint.net/BS>. WS1 has performance time can handle much stress and no of hits are also much higher ,it is more secure against the Dos Attack, SQL Injection and Cross-Site Scripting. We can conclude that the Enterprise Content Management Using LIFERAY is having much High performance and also much more Secure.

## 6. FUTURE SCOPE

As with the increase in growth of no of documents and important data related to company or any big enterprise, the need of secure and much more reliable ECMS is needed and this project we can test many more parameter using the Web

**Table 1 comparative table of Performance and Security measure**

| Test                   | WS1                             | WS2                               | WS3                               | Comments   |
|------------------------|---------------------------------|-----------------------------------|-----------------------------------|--|
| Performance Measure    |                                 |                                   |                                   |  |
| 1)Performance Test     | 3748<br>millisec<br>avg<br>time | 137736<br>millisec<br>avg<br>time | 251907<br>millisec<br>avg<br>time | WS1 takes less time than WS2 and WS3.              |
| 2)Stress Test          | 1500 hits                       | 600 hits                          | 12 hits                           | WS1 can have maximum no of hit as than WS2 and WS3 |
| 3)Rapid Test           | 347-s<br>3-errors               | 298-<br>success<br>52-<br>error   | 0-<br>success<br>350-<br>error    | WS1 has least no of errors than WS2and WS3         |
| Security Measure       |                                 |                                   |                                   |  |
| 1)DoS attack           | not able to attack              | able to attack                    | able to attack                    | WS1 more secure                                    |
| 2)SQL injection        | not able to attack              | able to attack                    | able to attack                    | WS1 more secure                                    |
| 3)Cross-Site Scripting | not able to attack              | able to attack                    | able to attack                    | WS1 more secure                                    |

Stress tool and here as we have concentrated only on the main three types of attack , we can include more attacks to test it and with the increase in Demand of the type of changes or the security level, we can enhance the our present ECMS.

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