INVESTIGATION, INSTALLATION AND IMPLEMENTATION OF AN OPEN SOURCE CONTENT MANAGEMENT SYSTEM

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The objective of this thesis was to investigate, install and implement the open source content management system Joomla for Vaasa Centre of Open Source Solutions. They are actually looking for a universal CMS that can be used as web portal or web shop or web bookings. The initial CMS being used by the centre lacks some of their required features. The Linux Apache MySQL and PHP, LAMP server was installed in order to run the Joomla CMS on it.

I was able to implements the required features they are looking for with the open source Joomla CMS, in the web portal I had series of extensions and plug-in that to implement different tasks, likewise for the web shop and web bookings. Joomla does not require the user to understand or know how to code before he can manage the system. It is faster and saves time. It can be controlled remotely using a web browser, you can edit, modify wherever, whenever you like. It is also universal. The Joomla community is always there for whoever is having problems or issues with the system.

Though the CMS worked fine, but there are still some short comings with some part of the systems. It is not SEO friendly. There are too many files in the system and better extension are not free, like the most of the better booking/reservation extension are not free.
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1 INTRODUCTION

Technology is moving at a speed of light. Weather you move with it or you decides to stop it keeps moving. The introduction of web 2.0 has been a tremendous innovation in the web community. With the moving trend of the internet and web design, virtually every business, schools, companies, individuals are building or using the web and its applications. They could use it for portal, web shop, e-commerce, community sites, media and many more. Therefore, many web sites are designed without knowing any programming language or HTML or XHTML or XML or PHP. As for some people, they prefer starting their web site from scratch that is hard coding, while some can manage their web site with the use of content management system without writing several codes or mark-up languages. The free and open source community has also played an important role in the development of some content management system, for example Joomla which I am about to investigate and implement.

The purpose of this project is to investigate and implement the open source content management system Joomla for Vaasa Centre of Open Source Solutions (VCOSS). Initially, the centre website was being managed with another content management system called e107. Now my duty is to investigate and implement the Joomla. Joomla is a free and open source content management system that is used to build and manage website (like portal, web shop, web booking, magazine, and e-commerce). The Joomla CMS is expected to display some certain features like easy to install, easy to use, easy to maintain, easy to find support through forum, easy to find templates and extensions and other features. Furthermore, like every other web site, Joomla should be able to have features like image, video, forum, blog, RSS feed, newsletter, map, pdf library and support with display and many more on the front end.

Before Joomla can be setup, there must be an existing server. In this project, the LAMP (Linux Apache MySQL PHP) server is used. The LAMP is also a free and open source solution which means it is free to download and install. After installing and configuring Joomla on the server, a password will be set for the administrator and the database (MySQL). The administrator login to the back end of the Joomla page and carry out different settings like adding of contents, designing, editing of videos, editing of text, changing of templates which can be launched on
the front end of the system in the browser as website. Compare to hard coding the website from start, this help to save time and resources.

1.1 Open Source

For one to say software is open source, it must meet up with the open source initiative license and the also support the GNU license. Open source is sometimes misinterpret to free software. Free software according to Richard Stallman “When we call software “free”, we mean that its respects the users’ essential freedoms: the freedom to run it, to study it and change it, and to redistribute copies with or without changes”. (Why Open Source misses the point of free software By Richard Stallman copyright 2007, Updated 14/04/2010). So many people believe open source came out of free software. Some even combined the two, both free and open source software to form FOSS. Most people define open source based on their various need or usage. An individual will modify or change the source code of open source software to suite his need. Some commercial company uses the source code to make similar commercial software. In general, open source is the free access to the design, development, and redistribution of the source code of particular software.

1.2 Content Management System

This is a tool used for the management of content in a system. Mostly, it is called CMS content management system. There are several CMS used in the industry today, by individual, government, community, social networks depending on the nature or purpose of the website. There are enterprises, commercial, open source CMS. The most popular ones are the open source CMS which is written in languages like PHP, C#, Java, Python, Perl and many more. The CMS can support different database such as Oracle, PostgreSQL, MySQL, ADOdb, XML, SQLite and many more. In this project, the MySQL database was used and it is a free and open source. CMS can be used for several purposes depending on what VCOSS intend to do on the website be it blogs, portal, gallery, wiki, social network, news, forum, e-commerce, web shop and many more. Hence, in this project, the CMS Joomla will be downloaded, Installed, configured and investigated for the company’s requirements in the next section.
1.3 Requirements and Specifications of the Company

The company’s requirement is the first priority in this project. VCOSS, UCOSS and Openkvarken web site are the major concern for now, their plan is to explore Joomla features and switch if it meets up with their requirements. However, some features will be added to the web sites in order to make a complete web page. Normally, a web 2.0 compliant is meant to have a menu, link, logo, banner, RSS feeds, user login and newsletter. Hence, all this required features of a website will be fully implemented in this project without any exceptions.

Firstly, this project is meant to implement web portal that will have images, banners that can change or link to another website, videos, menu links, logos, forum, RSS feed and a map that shows the name of partners when a mouse is hovered over each location. This entire task will be done within the Joomla default extensions and modules/components except for the map and forum. In this project, a simple template was used which is easy to change or adjust without damaging any content from the front end of the website. The template adjustment and sizing from the CSS or HTML file is implemented using Mozilla add-on called firebug.

The second task is to implement web shop where user can login, add product to cart and purchase products online. In Joomla, there are many extensions that can carry out this task, but in this project a free extension called virtuemart which will be explained in details in section 4.2.1. The third task is to implement web booking/reservations which can allow booking of hotel, house, cars and any other form of booking. For the web booking/reservation of Joomla, the checkfront plug-in was used to monitor the booking and images. Though some other free extensions were tested but were not successful and not indicated in this report.
2 TECHNOLOGICAL REQUIREMENTS

2.1 Operating System

The Joomla CMS supports the three common operating systems GNU/Linux, Mac and Windows. However, in this project a free and open source operating system GNU/Linux. The GNU/Linux is free and open source operating system which has so many distributions. The Debian distribution, Ubuntu, is used to setup the server and after proper setup, Joomla was installed on it. On the command prompt the use of “apt-get install [package name] ”, is used for the installation of apache, php5 and MySQL which complete the other part of the LAMP as depicted below.

Most of the Linux distribution comes with free packages that one can easily download and install. This distribution can run on both new and old personal computer PC, and supports different network file systems.

2.2 Apache

Apache web server is one of the web servers that are commonly used in the industry today. A web server allows the display of a web page or content on the World Wide Web using a web browser. This is due to compatibility and support of application programming interface API that it has. The latest version being the Apache2, is available on the UNIX and Windows, it support IPv6 and has enhance cache and proxy modules. Apache is free and open source system that can be downloaded and installed for free. It is compatible with the MySQL database, Oracle and several scripting languages like PHP, Python, Perl and so on. There are so many configuration involved in the installation and configuration of the Apache2 server, but for the project the necessary ones are used. The installation of Apache2 is implemented with the command prompt “sudo apt-get install apache2”. With this command, the Apache is downloaded and installed. Having installed Apache, a test is needed to examine its operation. This is done by starting the Apache with this command “sudo /etc/init.d/apache2 start” and later terminating it with this command “sudo /etc/init.d/apache2 stop”.

When the Apache2 is confirmed working, the MySQL database will be install.
2.3 MySQL

MySQL is a free and open source database developed by Sun Microsystems and now acquired by Oracle Corporation. Since the General Public License GNU license is followed this makes the source code free for everyone to change, redistribution and download. MySQL is a relational database management system that can be installed on Linux, Mac OSX, Solaris, NetWare, and Windows (MySQL Developer Zone, An introduction to Database Normalization). MySQL has been developed with a GUI application called MySQL query browser for administrating and managing the MySQL server database while working with data. This GUI interface makes it easy to use and administer. In this project, the phpMyAdmin which is also a GUI application is used to administer and manage the MySQL database. However, MySQL was installed through the command line interface of the GNU/Linux operating system by issuing the following command “sudo apt-get install mysql-server”.

While installation is going on, a password for root user will be asked to set. Now, to confirm the MySQL database weather it is running, the following command was issued “sudo netstart -tap | grep mysql”. After confirming, the phpMyAdmin was launched on the browser to open and create database through the GUI interface. The Figure 1 below shows the login page of the GUI databases.

![phpMyAdmin login page](image)

**Figure 1. phpMyAdmin login page**

For this project, three different databases will be used to implement the different web applications. The portal, Joomla and booking database are used represent the portal, web shop
and booking web site respectively. This is shown below in Figure 2. From the database client manager, a database can be easy created by typing the name of the database in the box beneath the word create database and click to launch the database.

![List of Databases](image)

**Figure 2. List of Databases**

### 2.4 PHP

PHP is an open source scripting language which focuses on web development. “The PHP license is a BSD-style license which does not have the "copy left" restrictions associated with GPL”. (http://www.php.net/license/: PHP Manual). The PHP scripts can be used in the server-side scripting, command line scripting and writing desktop applications. PHP can also be used to design web site. However, the content management CMS that I am investigating, “Joomla”, is mainly written in PHP. This is compatible with most operating systems like Linux, Microsoft Windows, Mac OSX and several databases like dBase, IBM DB2, MySQL, PostgreSQL, Oracle, and many more. Basically, for the project, PHP was installed and configured with the Apache2 and MySQL on the Linux operating system. The PHP is capable of outputting different content files like HTML, XHTML, XML, images, PDF and Flash movies. PHP has syntax which is similar to C, C++, java and Perl. PHP 5 is used in the installation because it is the latest version
and all the weaknesses of other version had been fixed. The installation is shown as follow in the command “*sudo apt-get install php5 libapache2-mod-php*”.

Hence, after implementing the major server and database requirement before installing and setting up the CMS Joomla, the network architecture will be in the form of the diagram in Figure 3 below. Where the client can access the server or database from anywhere (if outside routing is allowed).

![Diagram of network architecture](image)

Figure 3. The network architecture of the database and server.

3 METHODS

With respect to the investigation and implementation of the Joomla CMS, the installation and functionality will be considered and in the later part of the section the result will be shown. Hence, what I will be concentrating on will be the requirements of the client (VCOSS). Joomla cannot exist alone, there has to be a server in which the Joomla CMS will now be installed on it. As stated above in the previous sections, Joomla will be installed on the LAMP server being configured in the initial sections of the project. Joomla is a system with both the front end and the back end. The front end is used for displaying the web site while the back end is used for
administrating the web site like adding plug-in, extensions, templates, banners, restrictions of users and many others. For this section the installation of Joomla, installation of modules, extensions, installation of images, installation of templates, administrator navigation, site maintenance and community support will be put into consideration.

3.1  Joomla Installation

For Joomla installation, there are seven (7) stages involved. But before going into the installation proper, the Joomla package must be downloaded from their official web site http://www.Joomla.org/download.html. This is the official download site and the latest version will be downloaded and installed (version 1.5.15 Full package). Having done the pre-installation check like creating a database, the web server (apache2) is up and running, then the Joomla installation is ready for installation. Firstly, the language check as shown below in the Figure 4.

![Figure 4. The first step for Joomla installation (Language check)](image)

The “Next” button is clicked to proceed to the next step. This is the pre-installation stages, where you have to check if all the items are supported. This is shown below in Figure 5.
The next step is to go through the GNU General Public License. This is shown below in Figure 4.

Figure 5. Step 2 for Joomla installation (pre-installation check)

Figure 6. Step 3 Joomla installations (GNU License)

In the fourth step, the database was configured in the Joomla as shown in Figure 7. But before configuring the database in the Joomla interface, the MySQL database must have been configured and running. This is shown through the database client manager called phpMyAdmin in Figure 1. That means the database name; username and password of the configured MySQL
database must correspond to that of the Joomla to allow interaction between the database and the CMS.

**Figure 7. Step 4 Joomla installations (Database configuration)**

The fifth step is to configure the FTP which is better to be keep blank as shown in the Figure 8 below.

**Figure 8. Step 5 Joomla installations (FTP configuration)**
For this next step, the site name, email and admin password is added. The sample data is not compulsory to install but it can serve as a guide while navigating through the web site. This is shown in Figure 9 below.

It sample data contains general information of Joomla and its community. It is a simple web portal that one can use to learn how to create a simple web portal. Basically, most first timer is encouraged to use the sample data in order to get use to the system.

![Image](image.png)

**Figure 9. Step 6 Joomla installations (Main configuration)**

This is the final step that shows that the installation is complete. But the installation file has to be deleted for security reason before the site can be launched properly. This is shown below in Figure 10 below. After deleting the installation file, you can either login or launch the web page immediately without any further adjustment in any file.
Figure 10. Step 7 Joomla installations (Complete installation)

The sample web site can be launched as shown below in Figure 11.

Figure 11. Default Joomla web page (sample page)

(Hagen Graf; Building Joomla Website with Joomla! 1.5, Chapter 2 Installation of Joomla! page 39). For the installation of Joomla, it takes little time when you are doing it for the first time but
once you are use to it, it is just clicking and very fast. There was no coding involve while I was installing the Joomla since the server is up and running.

3.1 Administrator Overview

The administrator point of view cut across how the admin can navigate through the backend of Joomla in order to create a webpage. Generally, Joomla has a simple GUI back end which helps the administrator to easily find his or her way through. However, Joomla has a default text editor TinyMCE which makes all the creation and editing of contents easy. Though you have to create a content >>category >> section>>article. Joomla has so many languages depending on what language the clients want. The language setting is also easy to access and install. In addition, the Joomla extensions, templates are easy to install and enable.

3.2 Extension Installation

Extensions are applications or packages that are capable of increasing the potentials and features of Joomla when installed on the CMS. This increases the functionality of the Joomla like the images, document, forum, map and many more. In Joomla, the major extensions are the components, modules, plug-in, languages and templates. These extensions are easy to install. They are usually installed through the backend of the Joomla administrator page. All I need to do is to download the extension, browse for the download and install. No need to unzip, the Joomla systems automatically unzips the file. In addition, installation of extension can be carried out through other means by using the URL links of the extension file or by also going to the directory of the file located in the server (Hagen Graf; Building Joomla Website with Joomla! 1.5, page 66). This is shown in the Figure 12 below.
3.3 Template Installation.

The template is the theme of the website. This can be changed into various form and colour depending on VCOSS requirement. Usually the templates can be installed and changed through the backend of the Joomla administrator page. In the template manager when a template is about to be changed, a radio button by the right hand side of the desired template is checked and followed by the default button at the right corner of the page is clicked to confirm the changes (Hagen Graf; Building Joomla Website with Joomla! 1.5, page 67). This is shown below in Figure 13. The installation of a template is similar to that of other extensions like the module, plug-in, component and languages. From the extension manager, you can choose either to use the uploading of the file from the PC or installing from the directory located in the server (ftp) or using the URL. Though for the first time of installing a template, it is necessary and important that the mode of the file or directory was changed. Most Joomla templates come in a block form and little bit rigid to adjust. Hence with the help of Mozilla add-ons called firebug, I was able to make adjustment to the CSS or PHP file of most of the template I used during the project. However, it is important to first know where and how you want to place your contents.
In creating a simple web site, it is necessary to have menus, links, news feed, banners and many more. In Joomla CMS, without reading the instruction manual or guides, most of the icons on the backend can easily help to indicate what type of function each of them can perform. The Figure 14 below shows the backend of the Joomla. After login into the backend, the menu on top and the icons of the Cpanel is straight forward to use no complexity. In creating a simple web site, it might take time but most of the actions that will be implemented will be clicking and typing no coding. The Cpanel has five major icons as shown below in Figure 15; the add new article, article manager, front page manager, section manager, category manager, media manager, menu manager, language manager, user manager and the global configuration. The major article part of each page has a simple text editor TinyMCE, this makes Joomla easier to use and create page content.
Figure 14. Joomla Backend login.

The templates are also easy to download and install or make changes when the need be. The admin right comes with hierarchy that is the super administrator, administrator, registered, ordinary members.

Figure 15. Joomla Cpanel view (Backend)
3.5 Site Maintenance

The CMS Joomla is maintained and updated virtually all the time. Whenever the bugs and issues in Joomla had been resolved, a stable release is declared. These bugs and issues are taking care of by the development team or community members. Most of the issues are gotten from the forum or tracker. All this has to do with the Joomla CMS maintenance release which is not of great concern to my client because they are interested in maintaining the web site not developing the system. For Joomla web site maintenance, it can be done basically by the administrator except if he decided to give it out to someone who is capable of doing it. The maintenance makes the web site less vulnerable to attacks and increases its search engine optimization. Most of the things that are expected to be maintained for the client web site are news updates, calendar updates, images or photos updates, videos updates, contacts updates, articles updates, projects updates and many more.

3.6 Community

Community support for Joomla CMS is one of the strong points in Joomla. Joomla support have over 300,000 members in its forum, over 200,000 forum post, thousands of extensions, latest blogs, news site, tips, documentation and all sort of it. All this can be gotten from it Joomla official web site www.Joomla.org. The community page host multiple news feed from around the Joomla networks, it allows quick and easy navigation to the events, user groups, blogs and so on. From the community page the Joomla connect can help get to news feed where there is latest extensions, latest templates and there security release. In the forum, it is easy to use and broken down into sections. Most questions or problem of Joomla can be found in the forum and there solutions. In the extension directory, most extension release or will be found there, if it is commercial or free, if it is compatible with Joomla 1.5 or Joomla1.0. We can also search for an extensions, plug-ins, add-ons and so on. The documentation page has also improved a lot, such that if you are a developer you can easily see the API, the framework of Joomla, core code and many more. In the community page the latest version of Joomla can also be downloaded.
4 RESULTS

In this part, I will be discussing the various scenarios of the task given that is the web portal, webshop, web booking/reservation. However, their flexibility, how easy to install extensions, adding of multiple authors and how easy to manage and use web portal, web shop and web booking of a Joomla CMS will also be included. In carrying out these, there is certain modules, components and templates one need to download in order to implement these tasks and meet up with the requirements. A default Joomla application can not fit in any of these web applications without downloading an extension. However, the default templates can work well with most of the web applications requirement depending on what the VCOSS wants.

4.1 Web Portal

The web portal contains information of the company, their partners, their clients and links of other web pages of the company under review. Joomla web application by default without any alteration can be used as simple web portal. Although, if an additional features like the event calendar, flashes, forum, map and many more are to be added, all I need to do is to download and install. For the VCOSS requirements, I am meant to create links, videos, newsletter, rssfeed, maps, images and user login account. In the portal page below in Figure 16, the page shows how the VCOSS frontpage will look like. With menus, links both internal and external, videos, polls and images.
On the menu listed on the left hand side, there is a company map which shows the location of different company who are into open source. The Company map can be created from an extension called HTML map. This extension has a component, module and a plugin which must be enabled and published before they can be displayed on the front end of the Joomla web page. To implement this map image of VCOSS has shown below Figure 17, firstly download the map and copy into the Joomla CMS. From the HTML map component in the backend, I added the required images for VCOSS and UCOSS. However, before uploading the images I shaped the required portion using paint (for example Vaasa) with red colour, added the URL and the coordinate of the each shapes. With this, once the mouse is hovered over it, it indicates the region or city with the colour red and showing sign of clickable action.
In addition to the menu listed on the right hand side is the forum extensions which is added to the web portal in order to meet up with VCOSS, UCOSS requirements. This extension component is called fireboard which is used for forum. This also have a backend Cpanel integrated to Joomla components. The administrator uses the Cpanel to monitor the activities of the user, the time and posted topic, the number of members, their posts and replies. This is just like every other forum where you can post a discussion, topic or thread, reply to the post and add image on the avatar part. But before a user can post or reply to threads or discussion he needs to register an account in either the web portal or the forum. The Cpanel of the fireboard is shown below in Figure 18, while the front end of the forum is shown in Figure 19.
**Figure 18. FireBoard FrontPage**

![FireBoard FrontPage](image-url)
4.2 Web Shop

The Joomla web shop is just like every other web shop or online shopping. This involves the customer buying directly or shopping by adding to cart or basket and making an online payment directly through different means. There is several web shop extensions used in Joomla CMS both commercial and non-commercial. But since a default Joomla web application does not have a web shop plugin embedded in it, I downloaded a free (non-commercial) extension called virtuemart. This extension is the one playing the major role in the webshop.

4.2.1 Virtuemart

The virtuemart is a module/component which has it Cpanel integrated into the component of Joomla. The virtuemart itself is elaborate and comprehensive to study. Mostly when the virtuemart is downloaded and installed in Joomla, it can be found in the component directory. When found in the component and plugins it is enable for it to show on the front end. From the
backend, the admin can add or change so many features or functions of the virtuemart like controlling the price of the product, uploading product image, register user(activate user) or restrict them, set product price, change country, change currencies, change mode of payment, change type of shipping mode and includes tax or discount percent and many more. The Figure 20 below shows the backend Cpanel of the virtuemart.

![Virtuemart CPanel from Joomla backend](image)

**Figure 20. Virtuemart CPanel from Joomla backend**

The front page also known as the homepage as shown in Figure 21 below, shows the images of different product, the categories of different shopping products, user login and menu links. After so much adjustment of webshop templates and extension, I was able to implement the webshop. From this webshop, a product can either be selected from the categories of product or clicking the images of the front page. The Figure 22 below shows how to check a list of product and add to cart. However, before a product can be purchased you must register as a member and login. Though the administrator must confirm your account before you can officially use the account.
There are four steps involved in making orders;
• Shipping address: This is a scenario where the login customer/user confirms his or her shipping address after adding to cart or basket. Then click the Next button.
• Shipping method: This will show different shipping methods involved like the DHL or UPS. Then click the Next button
• Payment method: This will list all the payment method involved for you to choose your preferred one. For example Visa, Mastercard, Paypal, etc Then click the Next button
• Complete order: This will only show s mark sign to confirm your order.

The Figure 23 below shows the four steps.

![Figure 23. Four steps for making Orders](image)

4.3 Web Hotel Booking and reservation

The web hotel booking and reservation is a web application that is used to make reservation for hotels, resort, car hiring and some others things that are related to hotel reservations. In Joomla, there are different extensions/plugins that can achieve this task, but most of the available ones that are being rated by the audiences are commercial. For this project I will be using a non-commercial extension/plugin to carry out the task given. The extension is called checkfront.
4.3.1 Checkfront

The checkfront is quite an easy plugin to download and install just like every other extension. This is an independent extension that is integrated into Joomla. It is mandatory to register an account in the checkfront website (www.checkfront.com). A userID will be given after the registration. When logged in, a secure port (https :) dashboard page appears where I can manage all bookings, reports, inventory, uploading, rules, traffics and others. But the major disadvantage about the checkfront is that all the inventory and bookings is being managed from their database meaning if the database crashes all the inventory and bookings is also gone. So it is therefore advisable to get a commercial reservation extension if the financial capability is there. The Figure 24 below shows the dashboard interface of the checkfront, the products and their prices on the checkfront.

![Checkfront Dashboard](image)

**Figure 24. Checkfront Dashboard**

From the homepage shown below in Figure 25 a customer can make reservation and pay online through paypal or visa or mastercard. This reservation contains two categories the hotel and car hire. There is also an image changer which shows the picture of different hotels that are available.
5 ANALYSIS

Basically, looking at each web application in the section above be it the web portal, web shop or the web booking it is quite difficult to differentiate it from a standard web page or web applications. This shows how far the Joomla CMS have been able to solve VCOSS and UCOS problem concerning web application. However, this does not really mean the Joomla CMS is a perfect system or is not having problems or bugs. But the fact still remains that in my own little way I have been able to investigate, configure and get to the bottom of the nagging issues of VCOSS and UCOS. Joomla is a universal system that already has a framework that can
communicate with the database, creates pages dynamically, allows customization and has many extensions for whichever purpose you need it for (Advantages of Joomla Content Management System; By Jan Pascal, May 14, 2010). For all the displayed web application above, there is no coding from scratch of any kind from my part. It will be stressful and time consuming for one to start coding each web application from scratch. That is part of the new features the web 2.0 has brought to the recent world. Though to some people, they think the CMS is just clicking and typing alone. But what it entails is more than just clicking and typing. It has a built in support for multiple languages and one can access or control it remotely using a web browser from anywhere at any time.

It is worth noting that before I was able to implement this project successfully, it requires me to understand the markup languages HTML, XHTML, CSS, database and little of PHP knowledge. In addition, while using the LAMP server I had to learn some GNU/Linux shell commands in order to implement or solve some problems.

Joomla CMS is an interacting CMS which has most of it major menus as an icon that depicts what they do without any previous understanding. It is highly recommended for a starter who is interested in CMS to start with Joomla CMS. Furthermore, I can access my Joomla CMS website both the backend (administrator) and the front end (webpage) from anywhere in as much my server is still running. The same thing applies if the administrator is more than one.

The Joomla CMS have some short comings; there are too many files to manage in the database, if a change is to be made in the code one need to study each file which is pretty much. (Herman, The disadvantages of a Content Management System; posted 01/05/2007) In addition, from my research I realised that most of the better extensions for web booking/reservations are commercialised and some extensions or plugins are free but during installation I realised I will need a support from the owners of the extension which is not also free in this case. This makes the checkfront of the web bookings/reservation an imperfection solution.

6 CONCLUSIONS
The purpose of this project was to investigate and configure the open source content management system Joomla for the purpose of web portal, web shop and web bookings. The major features that have to be present in a web site must be all present. The task was carried out absolutely fine and successful. Starting from setting up a server and database before moving into the installation of Joomla CMS, the whole process looks pretty easier simply because I was familiar with it and it does not involve using any programming language.

The html map and the fireboard forum of the web portal was an accomplishment for me since the previous CMS VCOSS is using does not have this two features. The web portal is comprehensive enough as a universal web portal. Though if later in the future an improvement is needed, the Centre can hard code their interested portion into the extension since it is free and open source. Every other part of the web portal also works fine.

For the web shop, the virtuemart is playing the main role, without the virtuemart extensions the web shop is useless. As for a system that is universal, it should not be depending totally on a plug-in, what if the virtuemart is having errors or bugs, and does it mean there is no web shop. The web booking just like every other web site, has it pros and cons, but it situation is worse out of other two web site. The web booking should not be depending on another website database because of security reason. Does it mean once the database of the checkfront is damaged, all the customer information will be damaged as well, that is why the checkfront is not recommended for VCOSS or UCOSS. However it is clearly stated in the disclaimer of the checkfront that they are not responsible for any damage that might take place as regard their user account database or web page. For the Joomla CMS a better web booking or reservation extension is recommended for the centre but it might be a commercial extensions. Though majority of the web booking is not free that is it is commercial extensions.

Lastly, it is recommended that VCOSS, UCOSS and small and medium company business should use the Joomla open source CMS due to the fact that it saves time, saves resources and have many extensions for free.
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