Our Story: Leveraging Open Source to Develop an Enterprise CMS

Carleton Content Management System (CCMS)
Web Services, Computing and Communication Services
Carleton University
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OUR STORY: LEVERAGING OPEN SOURCE TO DEVELOP AN ENTERPRISE CMS

1. INTRODUCTION

In conjunction with the Carleton University Web Services’ presentation at the 2010 Ontario Universities Computing Conference (OUCC), the purpose of this whitepaper is to document the project lifecycle of the Carleton Content Management Solution (CCMS); a project which is currently in its second year and to date, has successfully migrated over 135 of Carleton University’s Faculty and Departmental web sites. In publishing this whitepaper, the Carleton University Web Services department provides visibility and credibility to this unique venture and serves as a guideline to other academic organizations who are contemplating similar endeavours in their quest to centralize their web platforms. This document resides on the CCMS website as a testament to this journey and provides lessons learned to enhance potential future visions.
OUCC ABSTRACT, PRESENTED BY ANDREW RIDDLES AND MARY KATHRYN ROBERTS

Current and prospective students and prospective staff and faculty alike look to Carleton University’s websites as a reliable source of information. At Carleton University, as with many universities, each department is responsible for the design, creation, branding, content, and support of their website. As a result, we end up with a disjointed look and feel where the university brand is not always conveyed. In 2007, Carleton began addressing this issue with a project to implement a University-wide content management system (CMS). The CMS had to be secure, fully customizable, easy to use and robust enough to handle the 100+ sites planned for migration. This presentation intends to share lessons learned and challenges met including:

- **Platform selection**: Our decision to move from our originally-selected legacy CMS into an open source CMS solution (WordPress)
- **Buy in**: Our strategic process to centralize web content management in a University environment
- **Support**: Our commitment to provide support to over 180 clients without compromising service quality
- **Technical hurdles**: Our goal to provide a secure, scalable, and usable solution

Through extensive customization of an open source tool, Web Services has created an innovative product to enable us to deliver a modern and effective content management solution at Carleton. As our migration project completion date approaches, we can confidently say that our project has been a tremendous success. We now look to further leverage the CMS in the hopes of creating the ultimate web experience for visitors to Carleton University’s websites.

2. **“THE WEB IS YOUR UNIVERSITY”: THE IMPORTANCE OF THE WEB IN THE POST-SECONDARY ENVIRONMENT**

A powerful, online presence is paramount in the post-secondary sphere. The World Wide Web is typically the first means of introduction for potential new and current students and parents to Carleton and is their key resource when conducting research about preferred programs versus traditional printed publications. According to a recent study, 82% of student respondents stated that a University’s web site was the number one factor when considering
their post-secondary application choices. Carleton University’s Carleton.ca domain has over 40 million page hits per year and receives millions of visitors from around the world. As a result, these pages must be current, accurate, and attractive and feature a strong Carleton University branding scheme. Pre-CMS, Carleton’s web sites were not centralized and were administrated (funded, designed, branded, created, and supported) on a per-department basis creating a disjointed and dated look and feel among the sites.

FIGURE 1 DISJOINTED WEB PRESENCE

Reasons for this include the fact that some departments have smaller budgets and cannot allot the necessary funds to maintain their web design. Other web sites were outsourced to external web design vendors, or developed by co-op students in advanced programming languages such as JavaScript, PHP, ASP, and CSS which are inaccessible to many non-technical staff members, making the site content difficult to update. In addition, an established documentation and design process was lacking in some departments and the transfer of knowledge regarding site maintenance and necessary updates was not centralized. Overall, the

use of the web to roll out new University branding was extremely difficult, costly, and time-consuming.

Such an *ad hoc* approach had a negative impact on Carleton’s reputation and credibility as an innovative and technologically-advanced institution. As not only is the University’s homepage the gateway and first impression made to future students, so too are individual administrative, faculty, and departmental pages. Therefore, the need for a fresh re-branding and site overhaul was apparent and thus, Carleton’s Content Management Solution project was conceived.

### 3. “IF YOU BUILD IT, THEY WILL COME”: MIGRATING TO A CMS

Our main service offering is that we can provide a solution to this *ad hoc* University web site issue and, essentially, the project evolved organically as this is a common issue and goal of other Canadian post-secondary institutions in their quest to assimilate their web presence. However, Carleton University is one the first Universities to implement this model to this extent, that is, using an open-source CMS for wider coverage and taking it beyond a blogging tool, to a main, centralized platform. Other North American Universities have been using WordPress, which is the largest, self-hosted blogging tool in the world, as a supplementary application or as a newsroom reporting tool. Carleton is one of first to use it as their enterprise CMS.

To deliver a solution, we started by looking at software and supporting that software with a dedicated web team. In 2005, the executives of the Carleton University web and portal steering committee met to discuss a centralized, online solution and to try and provide answers for the many unknowns at the time. As a web portal\(^2\) had already been purchased, the preference for resourcing reasons was to try and use the current portal in our proposed web solution. To populate the web portal with content, we attempted to leverage the existing content management system. (This product is now referred to as the legacy CMS.)

\(^2\) The My Carleton University web portal by provider SunGard Higher Education provides a centralized hub of information for students, faculty and staff. It provides single sign on (SSO) access to other University systems such as Carleton Central, WebCT, and Library Services.
The legacy CMS was based on a document management system and was back-engineered to function as a web content management system. The legacy CMS was comprised of four applications which included a user interface, document repository, Oracle® Database, and a Java application web server. Although the legacy CMS was designed to interface with the My Carleton portal, it did not serve our overall project needs. It was costly, infrequently upgraded and did not have an online support community. The Adobe® Dreamweaver® and Contribute® CS5 products were also evaluated but overall, there were not a lot of suitable products for our needs available. The possibility of third-party web development was also considered but the additional cost and post-design support could not be justified. At this point, an open source system had not yet been considered due to the lack of available open source content management systems and at the time, it was not popular to use such systems.

One of our major lessons learned as part of this process is that a better-planned software selection process is required for a project of this scale because once the decision is made to implement the software, it is challenging to reverse-engineer the product to fit into your product as opposed to choosing the perfect product to fit your project’s preconceived goals and plans. Keep the following points in mind when evaluating your software product:

- Do not associate a project name with a product name.
- Your evaluation should be comprehensive.
- An evaluation should be conducted by web design experts and not project management whose mandate it is to save costs with a packaged and supported product.
- If you do not perform a thorough evaluation, be prepared to change products and to deal with more resistance.
- Consider how clients would respond to the product choice. Is the product accessible and easy for non-technical users to use? How long would training the clients take and would they be able to retain the knowledge in the event they use the product irregularly? You want to ensure you clients have positive feedback about the product choice as it reflects upon your project overall.

Product evaluation is key and all contributing project members, especially those web developers who will be implementing the product, should have a greater input in the product selection.
4. “IT WAS THE BEST OF TIMES, IT WAS THE WORST OF TIMES”: ROLLING OUT THE LEGACY CMS

With the selection of the legacy CMS product confirmed, we began to implement our rollout strategy using four pilot web sites: Faculty of Public Affairs, Law, Human Resources, and Athletics. These sites were selected based on their size and high visibility within the Carleton online community. The Information Systems Steering Committee (ISSC) was formed and includes representatives from the Academic and Administrative community. The ISSC mandate is to oversee the University’s information systems including IT development, allocating project funding and resources, and resolving issues.

After the successful migration of the pilot web sites into the new legacy CMS, the project moved forward and identified 103 Carleton University web sites that would participate in the CMS project. These web sites were selected and prioritized on the basis of their strategic impact for Carleton University, that is, they had high visibility and received the greatest amount of visitor traffic, were prepared to migrate into the new template, and impact on other websites. A timeline was established providing two years for project completion. The following full-time roles were required between 2007-2009 on an ongoing basis to staff this project.

**TABLE 1 STAFFING REQUIREMENTS**

<table>
<thead>
<tr>
<th>Title</th>
<th>Job Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Manager</td>
<td>Allocated available resources, and managed the staff.</td>
</tr>
</tbody>
</table>

...We determined preparedness based on their overall enthusiasm about wanting to participate in the migration project and they also needed to have at least one staff member who was willing to assume the role of Work Group Manager to work with Web Services and oversee the migration of their site.

...Some Carleton University web sites such as the Graduate Studies site drives visitor traffic too many other University sites featuring Graduate programs. News posts created on a specific department site also feed into other department sites establishing a connection between the two sites.
<table>
<thead>
<tr>
<th>Role</th>
<th>Responsibilities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Project Manager</td>
<td>Ensured project was delivered on time and under budget, established first point of contact with departmental Work Group Managers, and provided site sign-off.</td>
</tr>
<tr>
<td>Web Architect</td>
<td>Served as project technical lead, designed template, and ensured project rollout.</td>
</tr>
<tr>
<td>Web Developers (2)</td>
<td>Served as technical leads for individual web site migrations, managed web content facilitators, and web migrators.</td>
</tr>
<tr>
<td>Web Content Facilitators (2)</td>
<td>Provided training, support, development of support materials, site mapping in preparation for migration, and managed revised site content.</td>
</tr>
<tr>
<td>Web Content Migrators (2-4)</td>
<td>Transferred text, images, and other assets from the legacy web site to the new template. Ensured consistency in formatting and presentation in page development.</td>
</tr>
</tbody>
</table>

After migrating 30 of the 103 identified sites using the legacy CMS, or reaching 20% of the project target, many challenges were encountered with this platform. Overall, the platform was not as user friendly as initially predicted causing problems with loading times, accessibility, and flexibility. A web developer and facilitator on the Web Services team used large portions of their pre-estimated work time on resolving support issues, and when clients received news about these problems it impacted their willingness to buy into the project. At this rate, our completion target was slipping and we would not be able to deliver our initial estimates by the end of the project. As a result, we decided to pitch an open source CMS and achieve buy-in from both executive committees and academic teams.
5. “SIMPLE MATHEMATICS”: (LEGACY CMS + HURDLES)(xCMS + ADVANTAGES)=OPEN SOURCE BUY-IN AND EXECUTION

We presented our case for abandoning the legacy CMS for a new, open source strategy to the Carleton Communications and Computing Services (CCS) Managers. Our presentation strategy was to pitch the idea of using an open-source CMS which offered less technical hurdles and was accessible to a wider user community. We needed to present a well-constructed argument that would convince senior management to move away from a product in which they had already invested. Our case included the following key selling points:

✔ It is easier to achieve buy-in when you believe in the tool. Given the current momentum of the success of the pilot project, at this point our long-term project goals could be achieved by remaining with the legacy CMS or by updating to an open-source platform. The question was the speed at which we could reach these goals. We believed in the power of an open source solution and that it was our duty to the long-term success of the project and client support to try and effect change now.

✔ You can persuade senior management and University administration to divest from a purchased solution if you are comprehensive in your evaluation of an alternative solution.

✔ A successful solution breeds success and achieves a momentum of buy-in, that is faculties which initially opted out later asked to come back into the migration project when the news spread about the positive results of migrating to the new platform.

✔ A significant amount of time and money would be spent on supporting the legacy CMS versus WordPress. Most of the web developer’s time was spent logging calls to the legacy CMS customer support team. This time and money could be better invested in other areas such as upgrading web server technologies and increasing staff. There was also growing dissatisfaction with the use of the legacy CMS among our clients as dealing with troubleshooting issues was taxing on their resources as well. It was very difficult to sell them on converting to this tool that we didn’t believe in ourselves and we felt that we were not presenting them with a very honest solution. The availability of the source code provided a greater continuity and security against financial collapse when
compared to the vendors of key platform products. The overall time and cost-saving measures offered by the WordPress platform would allow us to meet project goals on time, and under budget.

✓ WordPress was suggested as the replacement CMS as it was the least expensive and most reliable solution on the open source market. By converting to WordPress, it was still feasible to migrate the remaining 150 web sites in the time allowed. The value of the open source system is that software does not have to be downloaded on the client workstation which would reduce the risk of further troubleshooting issues. Our case in support of converting was made when demonstrating the working capabilities of WordPress versus the legacy CMS. While running both on separate, comparable laptops, the laptop running the legacy CMS crashed highlighting the benefits of open-source.

✓ We required a platform that could aggregate content across a wide spectrum of mediums. RSS news feeds were growing in popularity but the legacy CMS was not capable of allowing us to integrate this feature.

One key in the attractiveness of a product stems from how it evolves as you do not want to invest in a stagnant product that is rarely upgraded. When product versions become few and far between, it’s likely time to revisit your product choice. We were attracted by the “evergreen” nature of the WordPress product given the quarterly upgrade average. WordPress developers continuously work on this product to improve functionality. For instance, they have recently released WordPress Version 2.9 which includes value-add features such social media integration tools and a commenting option, an improved built-in image editor, photo slideshow option, custom events calendar creation, and direct video URL embeds. The blogging tool development community has an increasing user base and spearheads the continuous improvement of the product. The simple fact is, in moving to WordPress we would have access to all of these easy-to-use features, a massive development community, enjoy no-fuss platform installation, and with the additional benefit that the product is free.

In addition, moving to WordPress would allow our Web Services team to evolve organically and expand our CMS capabilities. With WordPress customization and scalability, we would be able to offer special, tailor-made web sites for University departments whose current web sites did not fit within the common scope and framework of our target migrated sites. For instance, in some new future initiatives, we are able to offer online support for Carleton
University hard copy publications such as Carleton Now, Research Works, Carleton University Magazine (Advancement), Faculty Newsletters, and the Admissions Course Catalogue. To further enhance Carleton University’s reputation as an innovative institution, it would be a logical endeavour to support traditional hard-copy publications in an online format. This also leads to a reduction in effort, costs, and negative environmental impact, as well as increased sustainability.

The positives in moving to an open-source CMS were overwhelming. The arguments supporting its implementation, along with thorough research and the success we achieved with using WordPress to produce RSS feeds helped persuade the Carleton CSS management team to adopt the new CCMS based on WordPress.
6. “I CODE BETTER IN MY WORDCAMP T-SHIRT”: ONWARDS WITH WORDPRESS

Although an open-source content management system was investigated during the first phase, it was not a serious contender as open-source systems were not popular due to potential security risks. However, in going forward, the more an open-source platform was considered, the more apparent the advantages of moving to an open-source platform became. An execution plan was created that outlined how we planned to move to an open source system and what it could accomplish for this project as an enterprise web content management system.

Our plan included the following key factors:

- Open source can be used to deliver an enterprise solution.
- Support can be purchased for open source solutions. However, you probably won’t need to rely on your purchased support because you can leverage the global online development community for issues resolution for zero investment. This minimizes your technical troubleshooting costs and resources.
- LDAP and Single Sign On (SSO) configuration.
- Minimum impact on our clients.

AN ENTERPRISE SOLUTION

Commonly known for its blogging capabilities, WordPress CMS is a robust, open source, user-friendly, publishing platform. Being open source, it has a large number of followers in the technical community who are keen to improve the product. WordPress has enterprise-support, available from Automattic, and runs on an Apache HTTP web server, requires PHP, MySQL and is OS independent. As WordPress requires less components and special installation requirements, it reduces costs given that fewer servers are needed for functionality, and it reduces load times. It has seemingly conquered the taboo of open source being perceived as “bad”, “unreliable”, and “rogue” and as per the stereotype, programmed by a renegade developer in his parents’ basement (think Kevin Smith’s character in Die Hard 4). It is likely still valid to suggest that most think purchasing a software package is a safer solution as the transaction of funds also guarantees support. This, however, is a misconception. You may pay a lot of money for a product but it does not necessarily mean that the funds are going back into
the product to improve it. Where previously organizations believed they were correct in spending a lot of money on licensing in order to receive support, they often received neither the product they wanted nor the support they required.

The following figure and table provide a comparison between the legacy CMS and WordPress support and functionality.

**FIGURE 3 WORDPRESS AND LEGACY CMS GOOGLE SUPPORT**

**TABLE 2 WORDPRESS AND LEGACY CMS FUNCTIONALITY**

<table>
<thead>
<tr>
<th>Feature</th>
<th>WordPress</th>
<th>Legacy CMS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Web-based</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>Template and theme</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>Available Support</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>Versioning control</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>Roll-based workflow</td>
<td>✔</td>
<td>✔</td>
</tr>
</tbody>
</table>
Our Story: Leveraging Open Source for an Enterprise CMS Solution

Database-driven pages ✔

RSS feeds ✔

Licensing cost ✔

**Open Source Support**

Enterprise-level support for open source is a growing trend that those in the know should capitalize on. When we first began this project, you could opt to purchase WordPress support for $2500\(^5\) USD if that made your organization feel more comfortable with using the product. You will probably never need it, but again, you can buy in as your safety net.

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\(^5\) The basic WordPress support package now includes more features and starts at $15 000.00 USD.
We initially purchased security support to ensure added approval from management but after 12 months, during which we logged a single support request (with a one-minute turn-around time), we cancelled our support and now rely on the growing online support community. You can obtain universal support by Googling your technical issue. In fact, we argue that there is less of a problem with receiving reliable technical support with an open-source system than with a purchased software product as open source code opens up the technical playing field to receiving global support. When individuals are invested in a product, they want to develop solutions very quickly as it impacts revenue, career development, company prestige, and so on. For example, we detected a security hole in WordPress Version 2.85 and within less than 12 hours, a solution was devised by developers from around the world. WordPress released a patch and our sites were upgraded with a few days.

IDENTITY MANAGEMENT

The next task was to plan a web authentication strategy which could be accomplished through the LDAP server which would link into the CCS managed Active Directory Windows accounts. By using the services of a Computer Science co-op student, we developed a customized plug-in to allow LDAP to associate a user’s credentials on Carleton University’s main network with the security group we had set up for each individual website. By implementing SSO to eliminate the creation of additional user credentials, WordPress became even easier to access for our clients.

In some ways, open source code is more vulnerable to potential security threats, so we spent 20% of our allotted project time on security troubleshooting. As a built-in feature, in the event of a security threat WordPress support sends us instant notification via RSS feeds.

CLIENT IMPACT

The customization and implementation of WordPress as Carleton University’s standardized web platform is now officially recognized in the community as the Carleton Content Management System (CCMS). The final task in our move to the CCMS was implementing a plan to streamline the migration process for minimum client impact. We needed to engage clients in our plan and provide them with a solid strategy in repositioning their web sites via a review and efficient migration to the new platform. The following advantages were included in our pitch to get our clients onboard with using an open source platform:

- **Separation of content from presentation** – The CCMS would empower non-technical content editors to focus more on content development versus overall web site design,
consistency, and layout.

- **Centralized support** – Once their site had been migrated, clients would receive in-house CCMS training and ongoing troubleshooting and documentation support.

- **University standards-compliant web pages** – The CCMS template would be rolled out across the Carleton.ca domain ensuring a similar look and feel among all University web sites.

- **Web publishing autonomy** – Individual staff members, of all technical skill sets, can contribute to their web site content without the need to pass content through an editing-approval-web design-upload framework. This ensures content creation is immediate and is up-to-date saving valuable publishing time and resources. The implementation of CCMS substantially minimizes the time for content to go-live which means web site visitors are getting the information they require faster.

- **Focus on customer service** – The seamless nature of the migration project and the user-friendliness of CCMS generated an abundance of client satisfaction. The success of this solution achieved a momentum of buy-in with clients who had initially opted out of the project asking to participate in the project once they had seen the results of their counterparts. Until all sites were completely migrated, we offered continued to support for clients still using the legacy CMS platform to maintain a stable publishing environment for all clients. In addition, once sites go-live and are managed by clients, given the ease of using CCMS, site administrators would be able to focus on service delivery versus product issues.

Once WordPress was fully customized and support-ready, the final challenge was determining the most efficient way to migrate the 30 University web sites currently supported on the legacy CMS to the CCMS. The migration needed to be seamless, both code and web-wise, with minimal impact on and from the client. Each University department had unique content and we needed to provide our clients a way for them to maintain their content long after their web site moved through our project. In addition, each department was staffed by individuals with varying degrees of web management and technical skills and CCMS offered our clients added time-saving measures such as fewer technical issues and eliminating the need to FTP files across servers. CCMS is one-stop web page creation. If our clients had access to a workstation, they had access to CCMS and their web site. They could create and edit pages from anywhere.
7. “A STAR IS BORN”: THE CCMS MIGRATION PROJECT

The CCMS mandate is to provide a core service to all Faculty and Departmental web sites under the Carleton.ca domain to bring them in-line with the Carleton branding and template. The CCMS migration process involves the following key steps:

1. Identification and review of existing web sites under the Carleton.ca domain that are well-positioned conversion candidates.
2. Consultation between departmental web site Work Group Managers and the CCMS team regarding site architecture, special requirements, and migration timelines.
3. Installation and configuration of the CCMS site and customized plug-ins and migration of site content into the new CCMS template.
4. Training and ongoing support for content managers.

![CCMS Process Diagram]

**FIGURE 5 CCMS PROCESS**

**NOTE:** For additional information on the CCMS migration process, please visit our web site at: [http://www.carleton.ca/ccms/about-ccms/](http://www.carleton.ca/ccms/about-ccms/).

The CCMS project currently staffs nine members comprised of two Web Developers, two Web Facilitators, one Web Trainer, and four Web Content Migrators. To date, the CCMS team has successfully delivered 135 web sites on-time and under-budget, for 100 clients in two years.
and continues to provide ongoing, centralized support through regular WordPress upgrades, bug tracking, troubleshooting, and up-to-date on-line help documentation and tutorials.

The success of our project is built on our client and staff satisfaction. CCMS’ reputation speaks for itself and clients and staff alike are excited about the prospects of using it as their web site maintenance tool. The CMS project has attracted and retained top, dedicated employees proficient with emerging web trends. WordPress has contributed to and maintained staff satisfaction as they enjoy the ease and flexibility with working with the tool, and the adaptability of the tool to emerging trends and features.

CCMS COMPONENTS

The CCMS features the following key components that are standard to every site migration project:

- **SINGLE TEMPLATE AND THEME** – The master CCMS template is themed according to Carleton University branding fonts and colour scheme and aims to establish consistency among Carleton’s web sites across the organization. Subject to approval, templates can be customized and adapted to fit specific departmental and faculty logos and themes as required.
• **NEWS, EVENTS and CALENDAR FEATURES** – The tools for news and events listings is dynamic, archivable, and can be categorized according to commonly-posted topics such as Visiting Lecture Talks and Seminars. Standard fields allow for a consistent presentation of news and events, and the calendar can be used to display event listings for easy searches.

• **CUSTOM FIELDS** – The added flexibility of custom fields allows users to create standard fields for common web site data such as contact details and faculty listings. The creation of custom fields ensures a consistent look and feel among Carleton’s migrated sites.

• **CUSTOM PLUG-INS** – WordPress offers thousands of plug-ins that you can download and customize to your web site needs. CCMS carefully selected and customized key plug-ins that enhanced the functionality of our web offering such as My Page Order, Super Cache, and All in One SEO Pack.

• **SITE MAPPING** – A Web Content Facilitator works with departmental web site administrators to create a site navigation map. To ensure a consistent look and feel, a standard page order in the left-hand navigation panel is followed (for example, News, About, Prospective Students, Current Students, etc.). However, custom page ordering is also possible based on departmental requirements.

• **LDAP** – To support identity management, a customized plug-in was developed to allow LDAP to associate the user’s log-in into CCMS with their network accounts, that is, we enabled SSO to avoid the creation and maintenance of additional authentication credentials making CCMS even easier to access for our clients.

• **SEARCH ENGINE OPTIMIZATION** – WordPress automatically tags web site page content with metatags to allow search engines such as Google to index web pages based on certain keyword searches. This eliminates the need for users to manually tag their web pages based on keywords that may not be accurate based on web site content.

• **WEB ANALYTICS** – As an additional service to our clients, CCMS configures client sites for Google Analytics to enable site administrators to monitor visitor traffic to their sites through report categories such as New and Returning Visitors, Languages, Search Engines, and Bounce Rates. With CCMS’ weekly Google Analytics blog postings, administrators can receive additional advice and tips on how to best monitor and configure their web site reports to maximize their online presence.
• **ADVANCED WEB TECHNIQUES** – With the implementation of simple html code, users can insert modal windows, Ajax, and iFrames to enhance their web content by creating pop-up windows, graphics and videos, and links to other web pages and content.

• **ADDITIONAL INNOVATIVE FEATURES** – The creation of an image gallery and slideshow, the ability to embed and stream video directly on a site, and custom image banners design allow departmental and faculty sites to display their individuality and enhance their web site.

8. **“LIFE IS LIKE A BOX OF CHOCOLATES”: CCMS LESSONS LEARNED**

In summary, those contemplating similar projects might take away the following lessons learned throughout this project:

• **Evaluate** – Make sufficient time to thoroughly evaluate a product before purchasing it. Do not reverse-engineer your project framework to fit your software. Your software choice should always fit your project requirements and objectives to avoid future hurdles. Your evaluation should result in a software solution which establishes added buy-in opportunity. You must also believe in your software to achieve buy-in because the more passionate you are about your selected product, the more convincing your argument will be to achieve acceptance from managers, clients, and project staff.

• **Easy** – Software that comes with a large price tag and continuous support is not necessarily the best product for you. We switched from a $300K product investment to something that was virtually free. The concept of free software is no longer a taboo area and many organizations in today’s economy are capitalizing on open source products and freeware to reduce costs.

• **Evolve** – You do not want to be stuck with a stagnant product. Many upgrades allow you to tailor your product to your specifications and have control over which version you choose to upgrade. Open source brings with it a global online community with 24/7 troubleshooting accessibility. If you have an issue, it is almost certainly guaranteed that another web developer in another part of the world has encountered the same issue.
and has a proven solution. You will no longer have to re-invent the wheel and spend valuable resources on troubleshooting issues.

- **Extend** - Your tool must be flexible and scalable to accommodate other potential future projects your web team may pursue. If your product was purchased with the sole purpose of accomplishing only a few, specific tasks, you may be limiting your team’s creative potential. Dream big with your product and make it happen!

9. **“THE FUTURE’S SO BRIGHT, I GOTTA WEAR SHADES”: THE FUTURE OF CCMS**

The future is bright for the CCMS project. Recently, the CCMS project branched off from Carleton University CCS to form the CSS Web Services department. The CMS project has been a great success and has achieved added credibility in the form of:

- ✔ Increased project funding and staff contract extensions to continue site migrations.
- ✔ The recent celebration of the [Carleton University Service Excellence Award](#) for “making the Carleton web presence one that can be seen as a leader in innovation.”
- ✔ The culmination of our efforts seen presented at the 2010 Ontario Universities Computing Conference.
- ✔ The increase in custom web project requests from across the University.

Web Services is currently pursuing future, innovative web solutions in partnership with CCS Management and University Administration. These include providing custom web services for non-standard departmental web sites, online support for Carleton University hard copy publications such as *Carleton Now*, *Research Works*, and *Carleton University Magazine*, and homepage remodeling strategies featuring enhanced access to news and events via mobile-ready homepages, and homepage customization based on web analytic data.
The Web Services department looks forward to continuing to provide the Carleton community with value-added web solutions and leveraging future web and technology trends to establish new and innovative initiatives to establish Carleton as a leading technological institution.

Check out our web site at http://www.carleton.ca/ccms/ for additional information about our project, client feedback, and team profiles and photos.
## ADDITIONAL RESOURCES

<table>
<thead>
<tr>
<th>Resource</th>
<th>URL</th>
</tr>
</thead>
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Glossary

Adobe® Contribute® CS5: A web publishing and website management tool that integrates authoring, reviewing, and publishing in a WYSIWYG HTML editor. The software is targeted towards non-HTML web developers.

Adobe® Dreamweaver® CS5: A code-driven, web development application for more advanced web developers that allows development in multiple coding languages such as HTML, PHP, ASP, and XML.

Ajax: Asynchronous JavaScript and XML. A group of interrelated web development techniques used to create interactive web applications. With Ajax, web applications can retrieve data from the server asynchronously in the background without interfering with the display and behavior of the existing page. The use of Ajax techniques has led to an increase in interactive or dynamic interfaces on web pages.

Apache: An open source HTTP server for UNIX, Windows NT, and other platforms. The first version of Apache was programmed in 1995 by a group of volunteer programmers called the Apache Group. However, because the source code is freely available, anyone can adapt the server for specific needs, and there is a large public library of Apache add-ons.

Application Server: A server program in a computer in a distributed network that provides the business logic for an application program. The application server is frequently viewed as part of a three-tier application, consisting of a graphical user interface (GUI) server, an application (business logic) server, and a database and transaction server. The term application server sometimes refers to Java Enterprise Edition (J2EE) application servers.

ASP: Active Server Page. An HTML page that includes one or more scripts (small embedded programs) that are processed on a Microsoft Web server before the page is sent to the user.

Automattic Inc.: A web development corporation founded in August 2005 and designed the WordPress open source blogging software.

CCS: Computing and Communications Services. Carleton University’s enterprise service organization, which provides information technology services to 23,000 students and
approximately 3000 faculty and staff. CCS is organized into eight groups operating under the direction of the Chief Information Officer.

**CMS**: Content Management System. Web application software used to manage and create a large collection of web content including HTML documents and their associated images.

**CSS**: Cascading Style Sheet. A programming language used to describe the presentation and formatting of structured documents, such as web pages, written markup languages such as HTML, XML, and XHTML.

**iFrame**: An HTML element, `<iframe>`, that allows a visual HTML browser window to be separated into segments, or windows, each of which can show different content. This allows for content single sourcing, as repeating parts of a layout can be used in one frame, while variable content is displayed in another.

**JavaScript**: A prototype-based object-oriented scripting language used to enable programmatic access to computational objects within a host environment. Although also used in other applications, it is primarily used in the form of client-side JavaScript, implemented as part of a web browser, providing enhanced user interfaces and dynamic websites.

**LDAP**: Lightweight Directory Access Protocol. a protocol for managing credentials and allowing access on network or system

**Migration**: The CCMS process of transferring text, images, and other assets from legacy (old) department web sites to the new WordPress template. The migration process ensures consistency in formatting and presentation in web page development.

**Modal windows**: A child window on a web page that displays a dialog box, image, or video that requires users to interact with it before they can return to operating the parent application.

**Open Source**: Public domain software that is produced and developed to promote access to the end product’s source materials. The software is either free to download or has code which is free and downloadable for users to adapt.

**PHP**: Hypertext Preprocessor. A widely-used, general-purpose scripting language that was originally designed for web development to produce dynamic web pages. For this purpose, PHP
code is embedded into the HTML source document and interpreted by a web server with a PHP processor module, which generates the web page document.

**SEO:** Search Engine Optimization. The process of improving the volume or quality of traffic to your web site from search engines such as Google, Yahoo, or Bing. By using SEO software applications, it enables you to further increase your site’s accessibility and search engine ranking. This is achieved through tailoring your site content to feature specific keywords that search engines index when listing your site in a visitor’s search.

**SSO:** Single Sign On. A property of access control which allows users to log into software systems at a single entry point and then access multiple applications and services without being prompted to log in again at each of them.

**SunGard SCT:** SunGard Systems and Computer Technology. A software company based in Wayne, Pennsylvania that provides software and services to 1600 education, financial, and public sector institutions worldwide. SunGard Higher Education powers the MyCarleton web portal.

**WebCT:** Web Course Tools. An online proprietary virtual learning environment now owned by Blackboard Learning Systems used by many academic institutions to support their on-site and e-learning course offerings. With WebCT, instructors can add tools such as discussion boards, mail systems and live chat, along with content including documents and web pages. Students can access their course materials, assignments and examinations, and course grades online.

**WordCamp:** A regularly-scheduled, global conference event for WordPress users, developers and potential adopters. WordCamp attendees receive a t-shirt which is known to grant the wearer magical web development powers.

**WordPress:** An open source CMS, often used as a blog publishing application powered by PHP and MySQL. It was launched by Matt Mullenwig in 2003, and currently has 202 million users worldwide.
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