

# Web Technology Usage of Leading New Zealand Websites

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## ABSTRACT

This paper presents an investigation into the web technologies that are used by leading websites within New Zealand. The top 20 New Zealand based websites were analysed to determine the underlying technologies that were being used, this included: web servers, server side frameworks, content management systems, specific JavaScript libraries and frameworks, and analytics services. The results are discussed in light of New Zealand web technology education and also compared and contrasted with global trends. Ultimately the study provides a snapshot of the web technologies currently used by leading New Zealand websites and suggests areas of focus for New Zealand tertiary web technology education.

**Keywords:** Web Technology, New Zealand

## 1. INTRODUCTION

Web development and related technology education has become an essential component of information and communications technology (ICT) tertiary education in New Zealand. Web development and design is often embedded within broader ICT degrees and diplomas (UCOL, 2015) as well as taught as standalone programmes (Vision College, 2015; WelTec, 2015). The New Zealand Qualification Authority (NZQA) began an ICT focused Mandatory Review of Qualifications (MRoQ) in 2013 which has recently concluded (NZQA, 2015a). The ICT MRoQ was scheduled as part of a nation-wide review of qualifications. The ICT MRoQ process was essentially initiated in order to “reduce the duplication and proliferation of qualifications on a national scale, and to ensure that qualifications are useful, relevant and valuable to current and future learners, employers and other stakeholders” (NZQA, 2015a). The ICT MRoQ process has resulted in a new suite of 14 national ICT qualifications, within this suite exists a 240 credit level 6 diploma focused primarily on web development, the New Zealand Diploma in Web Development and Design (NZQA, 2015b). This new web development and design programme is one of only two dedicated 240 credit diplomas at level 6 (the other being focused on software development). This outcome is a strong indicator that web development and design is not only an essential component of ICT education but has now emerged as a primary strand within the ICT industry and should have programmes of study that reflect this status. While few would argue with the importance of including web development and design with ICT tertiary education, not many would agree perfectly on what should be taught within those programmes beyond the fundamentals of HTML, CSS, and JavaScript. Beyond these fundamental technologies exists a plethora of content management systems (CMS), development frameworks, server side scripting languages, stylesheet frameworks, and JavaScript frameworks.

To help illustrate the enormity of the web technology

spectrum it is useful to examine technology monitoring and comparison web services. For example, CMSMatrix.org, a site dedicated to comparing and contrasting the features of different content management systems currently lists 1,297 different CMS's (CMSMatrix, 2015). Although many of these CMS's likely hold little or no market share, those that do still outnumber what could reasonably be covered in a single tertiary education programme. W3Techs.com, a website that monitors the global market share of web technologies currently monitors the top 80 CMS's in terms of market share (W3Techs, 2015a). W3Techs also currently lists 18 different server-side scripting languages and actively monitors the top nine in terms of market share (W3Techs, 2015b). Interestingly, although only four client-side scripting languages are listed and monitored (W3Techs, 2015c), within the JavaScript category 29 unique JavaScript libraries (or frameworks) are listed with 16 being actively monitored (some of which are integrated JavaScript and CSS development frameworks such as Bootstrap) (W3Techs, 2015d).

Accordingly, the focus of this paper is to determine which of these available web technologies are most commonly used within some of New Zealand's top websites (in terms of traffic). It is hoped that the results of this study will help inform web technology educators in the New Zealand tertiary education sector. Specifically, it aims to identify which technologies are most commonly used by top New Zealand websites and to also compare and contrast these results with global trends. The ultimate goal is to provide a measuring stick that web development and design educators can use to assess the relevance and currency of their specific course content. The following section will provide additional background information and will present current relevant global web technology usage statistics.

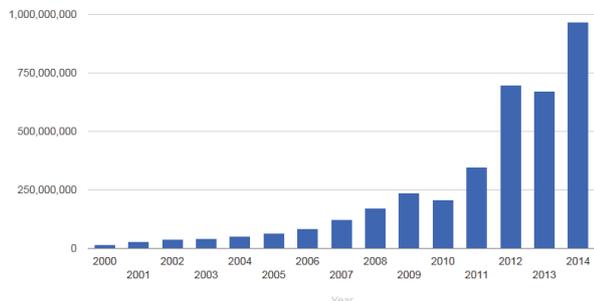
## 2. BACKGROUND

Globally, usage and development of the World Wide Web and related resources is on the rise (Pinfeild, et al., 2014; Berners-Lee, 2010). Since its inception by Tim Berners-Lee in a small office in CERN in 1981, the World Wide Web has grown dramatically (Berners-Lee, 2010). The 1 billion website milestone was reached in September, 2014, as reported by NetCraft in their October, 2014, Web Server Survey

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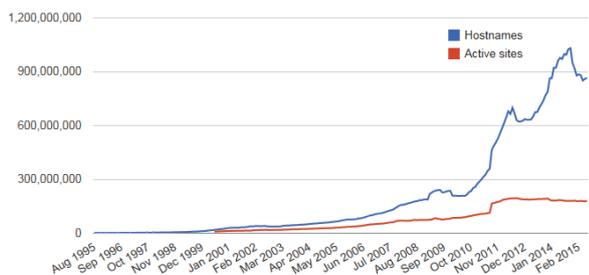
This quality assured paper appeared at the 6<sup>th</sup> annual conference of Computing and Information Technology Research and Education New Zealand (CITRENZ2015) and the 28<sup>th</sup> Annual Conference of the National Advisory Committee on Computing Qualifications, Queenstown, New Zealand, October 6-9, 2015. Michael Verhaart, Amit Sarkar, Rosemarie Tomlinson and Emre Erturk (Eds).

(NetCraft, 2014). It should be noted that the 1 billion 'website' measurement has since dropped back into the 970 million range due to naturally fluctuations in domain name registrations. Furthermore the measure is based on unique hostnames (a name which can be resolved, using a name server, into an IP address), which also includes parked domain names. Nevertheless, the statistic is impressive when viewed in light of historical data, particularly when the last decade is considered (see figure 1).



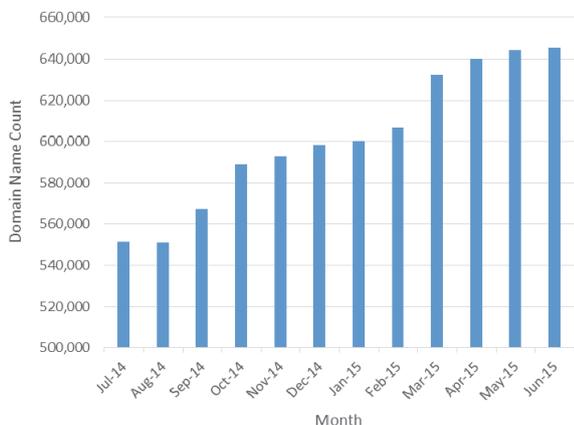
**Figure 1. Global Website Count over Time**  
(InternetLiveStats, 2015)

Even when the number of websites globally is viewed in terms of active sites the numbers are still considerable reaching over 170 million (NetCraft, 2015).



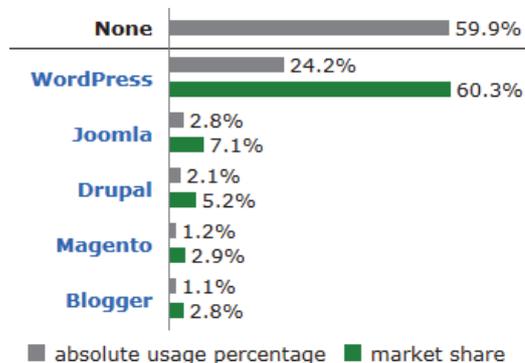
**Figure 2. Active Website Count over Time** (NetCraft, 2015)

According to the New Zealand Domain Name Commission there are currently over 645,000 second level domain names in New Zealand (i.e. those domain names ending with .nz), this figure has increased by almost 100,000 over the last year alone (see Figure 3) and of course this does not include other websites developed within New Zealand with alternative domain names. These figures help illustrate the web development and design is a growing industry both globally and within New Zealand.



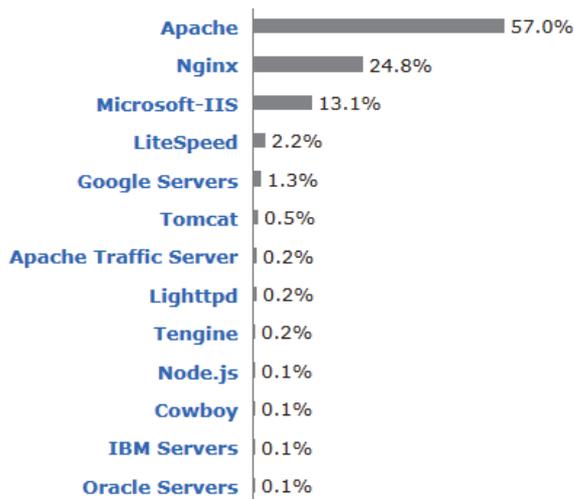
**Figure 3. New Zealand 2LD's**  
(Domain Name Commission, 2015)

The leading content management system globally according to w3Tech.com is WordPress which holds a staggering 60% share of the CMS market (W3Techs, 2015a). Perhaps even more impressive is the fact that WordPress holds an absolute market share of approximately 24%, this indicates that almost one quarter of the sites on the World Wide Web run on the WordPress content management system (W3Techs, 2015a). Other leading CMS's include Joomla, Drupal, Magneto, and Blogger (see Figure 4, note: only the top five CMS's are shown see reference for full graph).



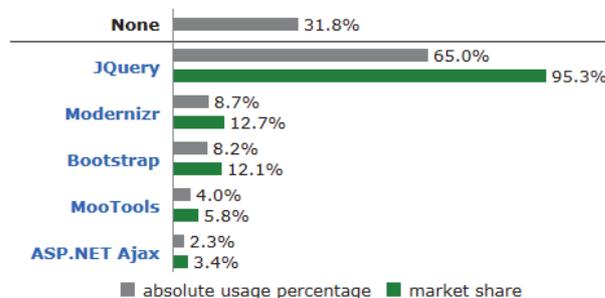
**Figure 4. CMS Market Share** (W3Techs, 2015a)

Web server market share is spread across a number of different solutions, the most dominant being the Apache web server, followed by nginx, and Microsoft's IIS (see Figure 5).



**Figure 5. Web Server Market Share** (NetCraft, 2015e)

The JavaScript library/framework market is currently dominated by JQuery, followed by Modernizr, Bootstrap, MooTools, and ASP.NET AJAX (see Figure 6).



**Figure 6. JavaScript Library Market Share**  
(W3Techs, 2015d)

In addition to the W3Techs data, Libscore.com also provides similar statistics related purely to JavaScript libraries.

Libscore scans the top 1 million sites on the web (in terms of traffic) and collects JavaScript library statistics (Shapiro, Chase, & Chen, 2015). Libscore reports JQuery as having a 69% usage rate, Modernizr with 13.9%, and yepnope 10.5%.

The global statistics provide an interesting overview of what the web technology sector is doing at a very high level. However, finding data at a regional level is not quite as easily obtainable. Having equivalent data and trend information with a New Zealand focus would be beneficial from an education perspective, for example, is there a content management system that is widely used within the New Zealand market that doesn't have a strong presence in the global market? Are there JavaScript libraries used primarily in New Zealand? Accordingly, this paper aims to begin work in this area by examining the web technologies utilised by some of New Zealand's leading websites. The goal is to ultimately provide regional information for web technology educators in New Zealand.

### 3. METHOD

The first step in examining the web technologies that are used by leading New Zealand websites was to determine a suitable research sample. For this, the researchers used Alexa web traffic rankings filter by New Zealand (Alexa, 2015). Although there is some debate about the reliability and importance of Alexa rankings (Novak, 2014), for the purposes of this study they were deemed acceptable by the researchers.

The Alexa rankings for New Zealand essentially lists the most accessed websites by New Zealanders (Alexa Rank, Table 1).

**Table 1. Research Sample**

Website	NZ Rank	Alexa Rank	Industry/Focus
Trademe.co.nz	1	5	Shopping
Stuff.co.nz	2	6	News
Nzherald.co.nz	3	7	News
Anz.co.nz	4	14	Banking
Westpac.co.nz	5	16	Banking
Asb.co.nz	6	17	Banking
Metservice.com	7	21	Weather
Kiwibank.co.nz	8	22	Banking
Tvnz.co.nz	9	24	Television
Bnz.co.nz	10	33	Banking
Ird.co.nz	11	35	NZ Revenue & Tax
Seek.co.nz	12	41	Job Seeking
Realestate.co.nz	13	44	Real Estate
Xero.com	14	47	Accounting
Airnewzealand.co.nz	15	50	Air Travel
Thewarehouse.co.nz	16	51	Shopping
Nzpost.co.nz	17	57	Post
Vodafone.co.nz	18	61	Telecommunications
Mylotto.co.nz	19	62	Gambling
Spark.co.nz	20	63	Telecommunications

From this ranked list the researchers decided to take the top twenty New Zealand based websites, this was to exclude

globally based and focused websites (e.g. Google, Facebook, YouTube, etc.) and to focus on those websites primarily for, and located in, the New Zealand market (NZ Rank, Table 1). The twenty websites that formed the research sample were are listed in Table 1.

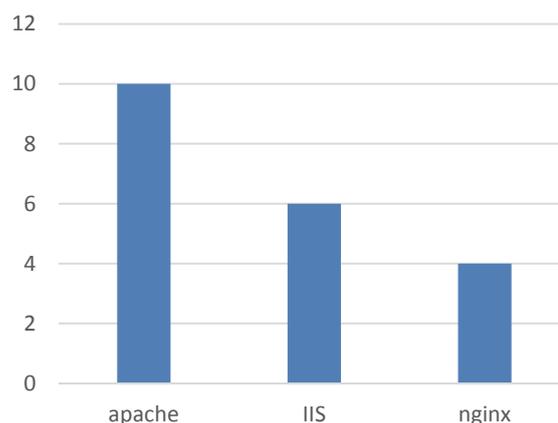
Once the top twenty New Zealand based websites had been determined they were then analysed to determine the underlying web technologies that were being used. The analysis primarily involved the use of the BuiltWith.com website which can we used to examine the utilised technologies of a given website provided a valid URL (BuiltWith, 2015).

The results of each BuiltWith.com query were recorded in a spreadsheet and the collective results were then analysed in conjunction with the global trends data from W3Techs. The results are presented in the following section.

### 4. RESULTS AND DISCUSSION

Given the research sample, the first finding that is worth considering is the make-up of the top twenty New Zealand based websites. Of the twenty, five were banking websites (25%), two were news websites (10%), two were shopping websites (10%), and two were telecommunications websites (10%), the remaining with one website each were: accounting, air travel, gambling, job seeking, NZ revenue and tax, postal services, real estate, television, and weather. It is worth noting that the majority of these top websites essentially provide services common to all New Zealanders (e.g. banking, news, shopping, etc.). In some instances the websites represent businesses who essentially hold a monopoly or are single service providers within a given market (e.g. Trademe.co.nz, Metservice.com, Mylotto.co.nz, etc.). Accordingly, it is worth noting that although these websites can be considered New Zealand's leading websites (in terms of traffic) they may not necessarily be representative of the majority of New Zealand websites.

The webservers used by the research sample were found to be apache, Microsoft IIS, and nginx (see Figure 7). These results are comparable to the global data however the market share IIS and nginx are reversed for the research sample.



**Figure 7. Webservers Usage**

The results also revealed that the six websites that were using the Microsoft IIS webservers were also running websites built on the ASP.NET framework. The apache and nginx were either not using a framework (six), or were using J2EE (three), or PHP (six), also some websites were using multiple frameworks (e.g. PHP and J2EE).

Eleven of the twenty websites were found to be using some type of content management system. Interestingly, in contrast

with the global trends, WordPress did not feature, nor did Joomla, Magento, or Blogger. Adobe CQ and SilverStripe were both used by three of the websites each, while Drupal and Websphere were used by one each, finally three other website were reported as using some type of unknown content management system. The presence of SilverStripe amongst the New Zealand websites is particularly interesting as SilverStripe is a New Zealand born, Auckland based content management system.

Exceeding the global trend, the JQuery JavaScript library was found to be used by 19 of the 20 websites (see Figure 8). This 95% usage rate is notably higher than the absolute global market share which was reported as 65%, it also higher than the Libscore rating of 69% (see Figure 4).

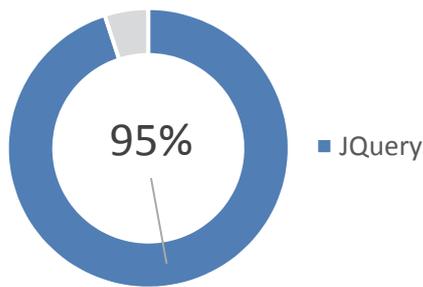


Figure 8. JQuery Usage

In a similar trend, the Modernizr JavaScript library was found to be used by 13 of the 20 websites (see Figure 9). Again, this 65% usage rate is higher than the absolute global market share of 8.7% for Modernizr and the Libscore rating of 13.9%.

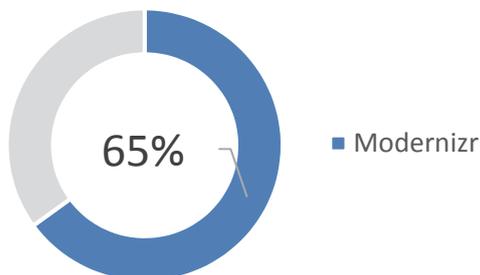


Figure 9. Modernizr Usage

Interestingly, Bootstrap did not feature amongst the research sample, this 0% usage rate is obviously lower than global measurement of 8.2%. Furthermore, a JavaScript workaround featured in 12 of the sites (60%), this workaround was the html5shiv (Irish, 2011).

An additional finding revealed that all sites from the research sample were using analytics and tracking tools. In fact, aside from the Inland Revenue Department (IRD), multiple analytics and tracking tools were being utilised with the Stuff.co.nz website utilising a collection of 25 tools for analytics and tracking. In a similar theme, the majority of sites (17) all were utilising web advertising systems within their sites, again Stuff.co.nz leading the pack with 52 different advertising systems in place.

## 5. CONCLUSION

This paper set out to investigate the web technologies used by the top 20 leading New Zealand websites. A research sample of 20 sites was selected based on Alexa traffic rankings. These sites were then analysed to determine their underlying technologies, which were then compared to global trends and averages. The study reveal that Apache, Microsoft IIS, and

nginx were the most popular webservers, and server-side frameworks that were utilised were ASP.NET, PHP, J2EE. The study also found that the WordPress content management system was not used by the top 20 New Zealand websites despite a global absolute market share of 24.2%. Instead the Adobe CQ and SilverStripe CMS's were the most common amongst the sample (15% each). JQuery, Modernizr, and html5shiv were the most commonly used JavaScript libraries with JQuery being utilised by all but one site from research sample. Finally the majority of the research sample were also found to heavily use advertising and analytics and tracking systems within their websites.

In terms of web technology education in New Zealand, the results suggests some key technologies should be taught in addition to fundamentals of HTML, JavaScript, and CSS. Based on the findings of this study, the researchers would recommend the following. Multiple web servers should be covered including: Apache, Microsoft IIS, and nginx. Content management systems that would be worth covered are WordPress (due to the global market share), SilverStripe (due to NZ market share and connection to NZ), and potentially Adobe CQ (rebranded as Adobe Experience Manager). JavaScript libraries that should be specifically taught JQuery and Modernizr, with other possible libraries including Bootstrap (due to global market share) and html5shiv. Finally, to provide industry standard web development expectations integration of analytics and tracking systems, as well as advertising systems should also be included.

However, the researchers recognise the limitations of the study due to the size and make-up of the research sample. Accordingly, future work will look to expand the size of the research sample in order to capture a more robust data. Nevertheless, the findings should still be of interest to web development educators in New Zealand and provides an initial picture of web technologies being utilised within the New Zealand market.

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