Front-End Web Development
Critical Assesment

Adam Hai

Module Leaders: Dave Everitt & Fania Raczinski

November 16, 2016

Word Count: 3428

1. Reddit

Reddit is a social news aggregation, web content rating and discussion website.[1] It has a registered community of members who submit content such as text posts and direct links, each registered user can vote up or down submissions on a post and the most positive posts across all the sub-reddit pages reach the front page to which we will be analysing as can be seen in Figure 1.1.
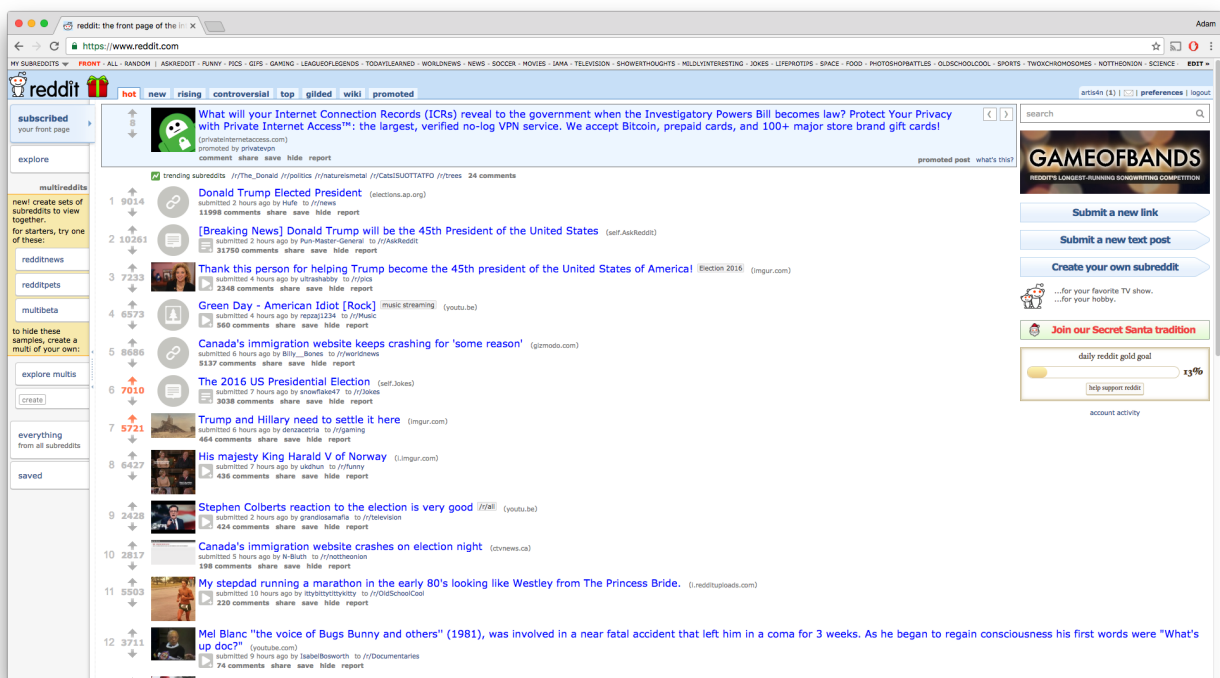

Figure 1.1: Reddit Frontpage– https://www.reddit.com/

1.1 Website Content

On Reddit the website content is delivered using HTML5 in a very clear specific format as it contains a rating system only the top 25 user rated posts reach the front page. This is organised using separate div classes for each individual post which contains the characteristics such as the total number of votes, name, rank, etc. Text based posts are common but you are also able to post images and videos which can been seen in-line without leaving the website. Reddit also consists of multiple sub-reddits which use the primary open-source codebase that is in python as well as a node-platform which enables easy rendering and page navigation on a React + Redux stack. Some of these sub-reddits decide to make considerable differences to the CSS that is used as to have their own personal look and feel. Looking at Figure 1.2 you can see how all the subreddits connect into a universe like structure of different topics where the heart is the front page.
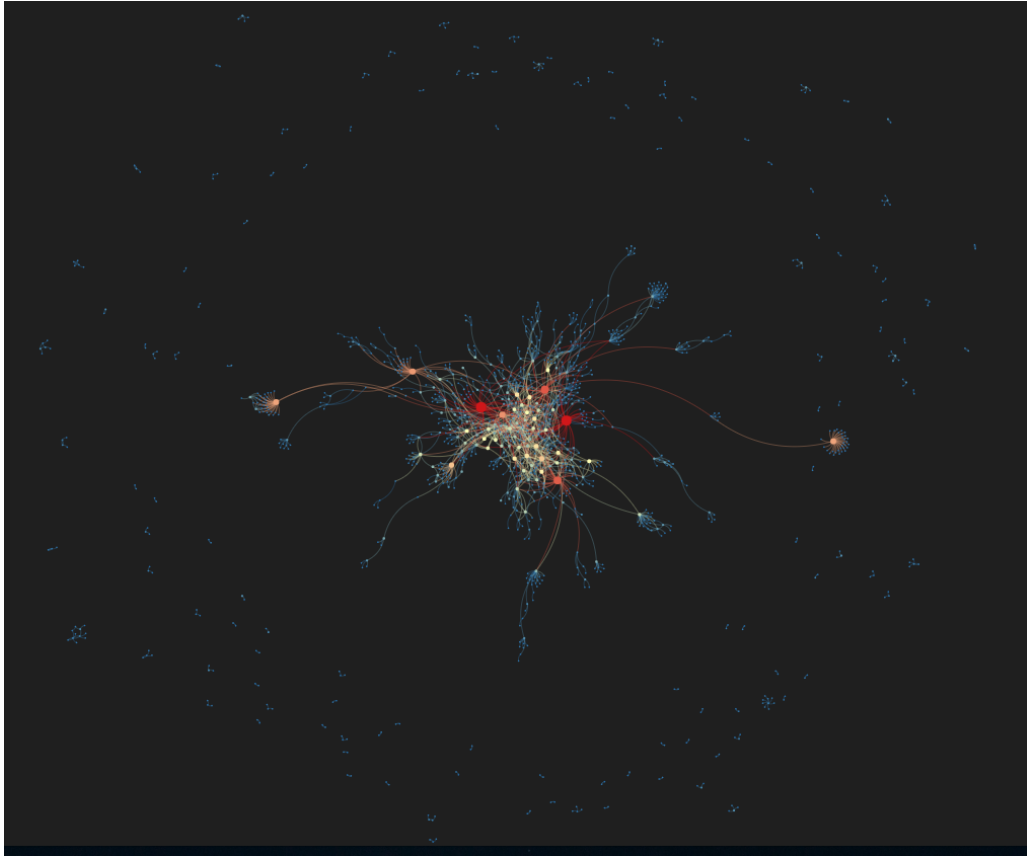
Figure 1.2: Diagram of subreddits

1.2 Technology

1.2.1 External APIs

Most of the APIs on the Reddit front pages are internal although they do use the Google analytics API which enables them to collect, configure, and report on user-interactions with their online content.[3] However the subreddits do branch into specific categories which then allow them to have control to add their own APIs for certain features such a /r/leagueoflegends[4] which contains an API with riot games to view upcoming championship matches.

1.2.2 Frameworks, Libraries & other components

Surprisingly Reddit had originally been written in Lisp but in December 2005 decided to switch over to Python,[5] this was mainly due to development in Python being fast and the code being much clearer and as the code for Reddit itself wasn't complex pretty much all the old HTML, Javascript and CSS from the original version was used with 80% of new Python code written in one week it allowed Reddit to develop much more efficiently in the long run.

Nonetheless, the framework that is used by Reddit is pylons[6], this framework was founded to develop web application framework technology in Python The first package from the Pylons Project was the Pyramid web framework. Pyramid is a minimalistic, platform-independent MVC object publishing web framework. Ink is a front-end framework that is used by Reddit as well this enables quick development of UIs using HTML, CSS and JavaScript similar to the twitter bootstrap. This provides simpler ways to create modern layouts and provide implementations of common interface elements such as tree view, tabs, form validators, and more.

There is also a great use of libraries on Reddit, the main JavaScript ones being JQuery which simplifies how HTML documents are traversed, how events are handled, and performs animations as well as Ajax interactions.

Another JavaScript library which is used is Backbone.js this supplies structures to JavaScript-heavy applications which is incredibly useful for Reddit. Modernizier is also used which allows you to target specific browser functionality in the stylesheet which is used.

	Total	Popularity	Traffic	Version
Technology Score	**56**	52	61	
Client-side Programming Languages	75	100	51	
Markup Languages	65	77	54	
SSL Certificate Authorities	48	16	79	
Social Widgets	31	12	50	
Traffic Analysis Tools	70	91	49	
Reverse Proxy Services	49	14	83	

Figure 1.3: Reddit technology score

1.3   Website code

1.3.1   Structure

Generally the structure of Reddit is quite basic with an underlying core CSS design that echos throughout all the subreddits. This design limits the top 25 voted posts to the front page and allows user interaction through individual JavaScript scripts. One particular user interaction is the ability to view in-line 3rd party images and videos, this is done using the expando.js file which is AJAX friendly and is immediately recognised as a script and allows you to dynamically display a larger image or video screen size if clicked which is seen in .[2] The website is very responsive and uses CSS3 to define various breakpoints extensively throughout the CSS file where it attempts to create the best possible layout based on the size; there is also a mobile layout for Reddit which has a completely different design to be more user friendly however you are provided with the choice if you would like to switch back.

The code has been 'minified' to increase performance however is incredibly coherent where everything follows a top-down structure, all the CSS class names have been labelled intelligently with each of the posts containing their own unique div which updates dynamically using JavaScript. There are not many animations as apart from basic highlighting as the page contains a rather simplistic layout however some subreddits tend to alter the up-vote functions cause a custom animation to occur and they also provide users with custom flairs; a view of the mobile theme can be seen in Figure 1.4.

1.3.2   Navigation

Navigation on Reddit is rather straight forward, if it is a text post that has been created it and you click the title it will transfer you to the comments page where you are able to read what users have posted, but if it is a 3rd party URL such as Youtube or Imgur if you decide to click the title it will take you directly to the aforementioned page although you can still click the comment button to be taken to the comments page. You are also provided with a list of popular subreddit pages at the top of the website which redirect you to them, however as there is a significant amount a search function has been provided for the user to find more specific subreddit page. This layout is so basic it is even followed through on the mobile web-page which provides the exact same functionality.

1.3.3   Technical issues and code faults

As Reddit is one of the busiest websites on the Internet and is ranked number 25 globally with 1.2 billion visits[7] it needs to be incredibly robust, therefore for the majority of the website it functions fine. However in the console I did get a 502 Bad Gateway error for a gif which is a HTTP status code that means that one server received an invalid response from another server. Nonetheless this highlighted it was using nginx software for its web server but the error code could possibly not be with Reddit but the browser itself. Apart from this issue there was only some inefficiency where code was also included for legacy browsers such as IE8 & IE9 but as there is still quite a big population of users for them it can be forgiven.
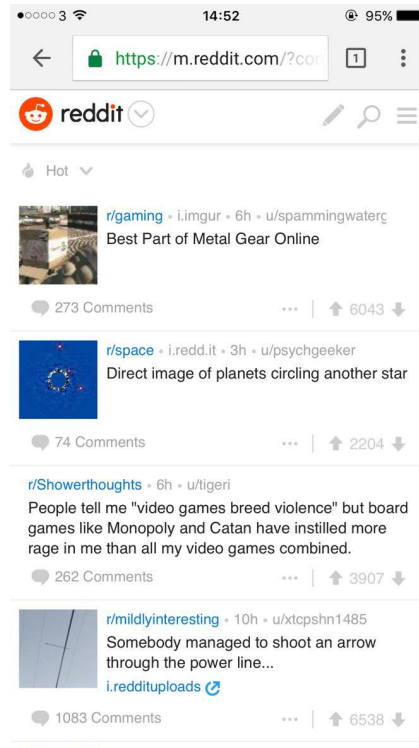

Figure 1.4: Reddit mobile theme

2. Linode

Linode is a virtual private server provider which offers multiple products and services to its clients. It's flagship product is cloud hosting services which are created using high performance SSD Linux servers at competitive prices, allowing you to choose your own distro as well as providing a 40Gbps throughput with multiple levels of redundancy. An overview of the homepage that is analysed can be seen in figure 2.1
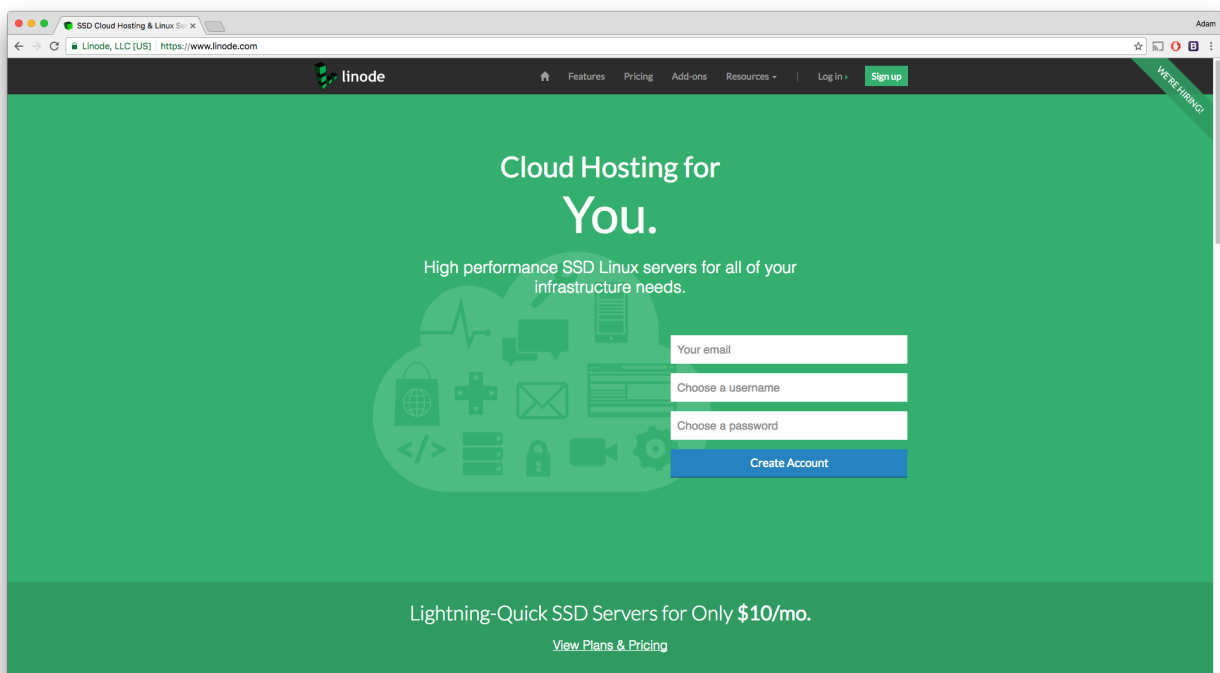

Figure 2.1: Linode homepage - https://www.linode.com

2.1   Website Content

Content on Linode is delivered using HTML5 which can clearly be identified from the doc declaration and the tags used such as header. The website uses a very basic modern design which uses individual section tags for the three main sections on the homepage and then uses div tags with class names to further organise the sections. There is an account creation form on the main page however the majority of the main page is just an advertisement of the services provided and testimonials. It is clear this website has been modelled off an open-source bootstrap front-end web framework[8] and is using a modified version of its JavaScript and CSS.

2.2 Technology

2.2.1 External APIs

Google Font API is the first noticeable API on Linode which allows the website to choose from an intuitive and robust directory of open source designer web fonts[9]. Another API which is used is jQuery, this is a fast, small, and feature-rich JavaScript library which makes things like HTML document traversal and manipulation, event handling, animation, and Ajax much simpler with an easy-to-use API that works across a multitude of browsers[10].

2.2.2 Frameworks, Libraries & other components

Bootstrap is the front-end web framework that is used on Linode, it contains HTML and CSS-based design templates for typography, forms, buttons, navigation and other interface components, as well as optional JavaScript extensions. Therefore, Linodes website easily and efficiently scales with a single code base, from phones to tablets to desktops with CSS media queries.[11] Vast documentation is also provided for common HTML elements, dozens of custom HTML and CSS components, and a wide range of jQuery plugins which the site also utilises.

As also mentioned previous another framework which Linode utilises is the JavaScript framework jQuery. This is a cross-platform JavaScript library designed to simplify client-sided scripting of HTML and is currently the most popular today[12]. Linode uses jQuery's syntax to make it easier to navigate a document, select DOM elements, create animations, handle events, and develop Ajax applications. The noConflict() jQuery method this is due to many other JavaScript frameworks being used on the website which effects the $ sign as a shortcut, therefore this method releases the hold on the shortcut identifier so that the other scripts can use it[13]. The function code used for this can be seen in Figure 2.2.

Figure 2.2: Linode noConflict() method

A vast amount of libraries are used, the first of them which I discovered that Linode use is a JavaScript library called SyntaxHighlighter; this is a fully functional self contained code highlighter. Another embedded script that Linode uses is a Javascript code prettifier this is an open-source script created by Google that makes source-code snippets in HTML prettier[14]. There are also various types of analytical technology that was used such as Google Analytics, Optimizely, Crazy Egg, and KISSmetrics. Therefore, this provides a sizable insight into the traffic and various different aspects about the website which in turn allow informed decisions to be made. The web server is also run on the popular Nginx which reddit had also used however Linode had achieved a higher technology score as can be seen in Figure 2.3 as it most likely needs to express more due to it being a seller of cloud web servers.

	Total	Popularity	Traffic	Version
Technology Score	65	74	56	
Client-side Programming Languages	75	100	51	
JavaScript Libraries	73	98	48	
Markup Languages	65	77	54	
SSL Certificate Authorities	54	38	69	
Web Servers	56	56	56	

Figure 2.3: Linode technology score

2.3 Website Code

2.3.1 Structure

Overall the structure of Linode presents a clean and modern feel with the entire website being modelled from the Bootstrap front-end framework. Through using this it has allowed Linode to have both a fluid desktop and mobile theme that has a variety of different interactions and animations that has been utilised hence this allows easily and efficiently scale the website depending on what device it is being viewed on. In turn the responsiveness continues flawlessly throughout the website where multiple breakpoints have been defined to create the most ideal layout possible. This echos throughout the mobile theme as well where a coherent design has been developed to provide the same experience in a much smaller scale.

Performance is particularly decent as the code has been 'minified' and a genuine attempt has been made to increase the speed of the site loading however using Google PageSpeed Insights[15] certain flaws had been highlighted that has caused a certain depreciation in the speed of the page loading as there is some render-blocking which causes the above-the-fold content to wait before being rendered. Nonetheless, apart from text animations not much of the technology has been utilised as it is a rather simplistic website which only tries to highlight its main target of selling Cloud hosting; a view of the mobile theme can be seen in Figure 2.4.
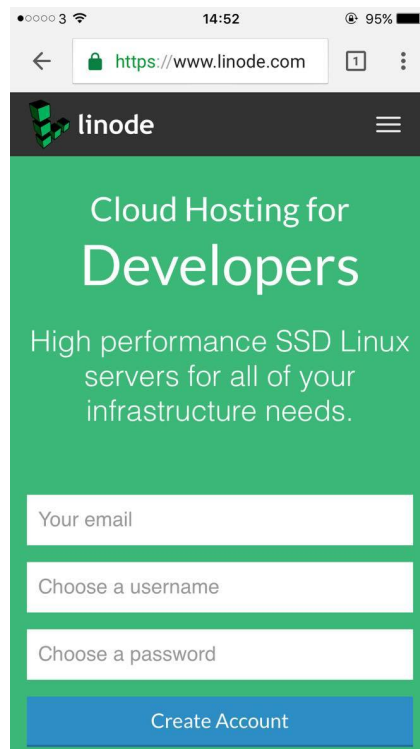

Figure 2.4: linode mobile theme

2.3.2 Navigation

Navigation throughout Linode is fairly simplistic where there is a navigation bar at the top of the page which takes you to the main aspects of the site. Hyperlinks are also used extensively throughout the website for key words and as well as buttons to create an account for the website as well as direct links to twitter testimonials. You are also provided with a majority of links at the end of the web page which takes you to various social media and other useful informative pages about the website such as its Terms Of Service and Privacy Policy. Overall the navigation is very coherent and provides a great user experience for finding exactly what they want.

2.3.3 Technical issues and code faults

Generally the website doesn't contain any code faults as it has been developed quite well using a robust front-end framework, although Leverage browser caching is a significant issue which is having a negative effect of both the desktop and mobile website loading this could be resolved if they set an expiry date or a maximum age in the HTTP headers for static resources to instruct the browser to load previously downloaded resources from local disk rather than over the network. Also according to Google PageSpeed Insights [15] various images and resources have not been compressed and decrease the speed of the site loading on both the mobile and desktop but not significantly. Nonetheless, the website overall has been developed to a high standard and contains very few flaws.

3. Imgur

Imgur started as a simple, no-limits platform to share images online. With the launch of the homepage gallery it has allowed the community to choose and comment on the most interesting and popular images on the web. Also as Imgur is a very stable website for hosting images and has an incredibly popular API that a lot of programs utilise, this and many of features allow users to explore, share, and discuss using the most popular image hosting website on the Internet. An overview of the homepage can bee seen in Figure 3.1.
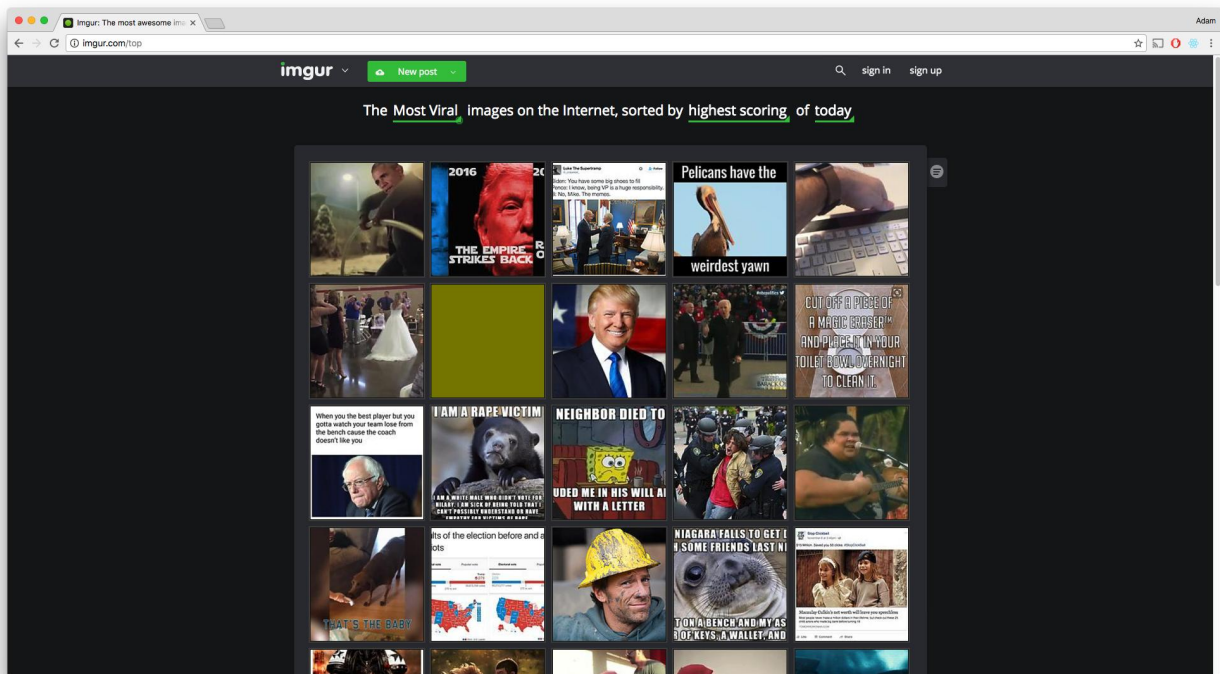

Figure 3.1: Imgur homepage - https://www.imgur.com/

3.1   Website Content

Surprisingly content on Imgur is delivered using XHTML 1.0 Strict which can be identified from the doc declaration this therefore means that the website has to strictly conform to the XHTML 1.0 documents which are restricted to elements and attributes from XML and XHTML 1.0 namespaces[16]. As with the previous websites Imgur has gone with the trend of presenting a basic design with the standard nav bar located at the top of the page and a collection of images in a div container each with their own specific div and class names. The page also continues to show more images dynamically the more that is being scrolled and you are also allowed to change the categories you would like to view; this is all done using multiple JavaScript frameworks and CSS3 which can be identified by looking at features such as border-radius in the main CSS file.

3.2 Technology

3.2.1 External APIs

Imgur uses multiple external APIs one of them is the common Google Font API which was also used by Linode, this allows them to choose from a range of designer web fonts to keep the overall design of the website looking clean and modern[9]. Multiple JavaScript APIs are also used and one specific one is the jQuery API which is accessed through Google Hosted Libraries[17], checking through the HTML code it was highlighted that this had specifically been used just for the Internet Explorer browsers as can clearly be seen in the code in Figure 3.2.

```
<!--[if !IE]> -->
<script type="text/javascript" src="//ajax.googleapis.com/ajax/libs/jquery/2.1.1/jquery.min.js"></script>
<script type="text/javascript">
if(typeof jQuery === 'undefined') {
    document.write('<script type="text/javascript" src="//s.imgur.com/include/js/ext/jquery.2.1.1.min.js"><' + '
        /script>');
}
</script>
<!--<![endif]-->
```

Figure 3.2: Loading jQuery with Google Hosted Libraries

3.2.2 Frameworks, Libraries & other components

Imgur uses a variety of JavaScript frameworks and scanning through the code I uncovered that it was using React some of this code can be seen in 3.3 which renders an element to upload on the page. This is an open-source JavaScript library for building user interfaces and is maintained by Facebook[18], this enables websites such as Imgur to have an interactive UI and efficiently update and render components to data changes.

```
<script>
    var ReactDOM = window.ReactDOM || window.React;
    ReactDOM.render(React.createElement(Imgur.Upload,
        {
            privacy: Imgur.Environment.auth.album_privacy,
            host: Imgur.Environment.host,
            instance: 'global',
            emitter: imgur._.emitter,
            has_access: false,
        }),
        document.getElementById('upload-global'));
</script>
```

Figure 3.3: React code

Another library that I discovered Imgur uses is node.js, as in the header 'X-Powered-By:Express' was sent therefore indicating that it is currently being run using ExpressJS. This is a minimal and flexible Node.js web application framework that provides a robust set of features for web and mobile applications[19]. It also has a myriad of HTTP utility methods and middleware to enable the creation of quick and robust API develeopment; furthermore, Express provides a thin layer of fundamental web application features without obscuring Node.js features leading to a high performance application.

Various other libraries are utilised, typically jQuery which has proved to be incredibly popular featuring on both Linode and Reddit but I have identified Imgur using two entirely different ones as well. The first being Moment.js this allows Imgur to Parse, validate, manipulate, and display dates in JavaScript[20] so that it can seamlessly control aspects of the site such as images that have only been uploaded to day. The second being Socket.io which is an open-source library created by MIT that enables real-time bidirectional event-based communication[21] and allows Imgur to work on every platform, browser or device, focusing equally on reliability and speed. As

this is rather a basic website that doesn't contain many functions the technology score is incredibly similar to Reddits as can be seen in Figure 3.4.

	Total	Popularity	Traffic	Version
Technology Score	**57**	53	61	57
Client-side Programming Languages	75	100	51	
JavaScript Libraries	68	98	48	57
Markup Languages	34	24	44	
SSL Certificate Authorities	47	16	79	
Social Widgets	63	73	53	
JavaScript Content Delivery Networks	67	85	49	
Traffic Analysis Tools	49	17	81	
Reverse Proxy Services	49	14	83	

Figure 3.4: Imgur technology score

3.3 Website Code

3.3.1 Structure

Structure is incredibly important to get right on websites going with a basic design and Imgur achieves this well by clearly organising the images into a grid layout to present them clearly in chronological order. XHTML was a strange choice to use however Imgur have incorporated various different types of user interactions such as hovering over an image allows you to see the amount of views, points, and the user who submitted it; also it allows you to up-vote or down-vote the image in real-time. Responsiveness continues through onto the mobile layout as well which appears to be almost identical with similar animations and hovering over elements producing various effects hence fully utilising CSS3 and javascript frameworks.

Performance is generally rather good and has made a genuine attempted to 'minify' code where possible. It slightly quicker overall than Linode according to Google PageSpeed Insights[15] however Reddit still wins significantly on performance in comparison. One of the only main concerns is certain images have not been optimised and seeing as this is an image hosting website you would expect them to have the best compression algorithms. Nonetheless, the simplicity style has echoed through all three of the modern websites evaluated and Imgur has performed its task more than adequately in hosting images as well as creating a community around them; a view of the mobile theme can be seen in Figure 3.6.

3.3.2 Navigation

Navigation is incredibly straight forward on Imgur where a minimalist nav bar contains a drop down list of the main functions of the website. All the images on the front page take you directly to a comment page specifically for that image which has its own unique tag; this page provides users with a variety of features such as linking to social media with plugins or commenting and replying on peoples comments as well as providing you with more options to view different images. Looking at all the features the navigation on Imgur provides exactly what the user needs without unnecessary clutter and achieves its main purpose exactly as the other two sites reviewed did.

3.3.3 Technical issues and code faults

Imgur is an incredibly popular website similar to Reddit it generally doesn't have many technical issues and code faults. However, it does suffer from optimisation flaws, like Linode certain images have not been optimised

and there is a lack of leverage browser caching which decreases the load speed of the mobile website. Also as highlighted in the previous two websites legacy code for outdated IE browsers is also being used and whilst examining the HTML source code I stumbled upon a rather humorous stylesheet name which can be seen in Figure 3.5. In conclusion no major faults with the code or technical issues have been observed and imgur has been developed to a high standard as have the previous two websites.

```
<!--[if IE 9]><link rel="stylesheet" href="//imgur.com/include/css/ie-sucks.css?0" type="text/css" /><![endif]-->
```
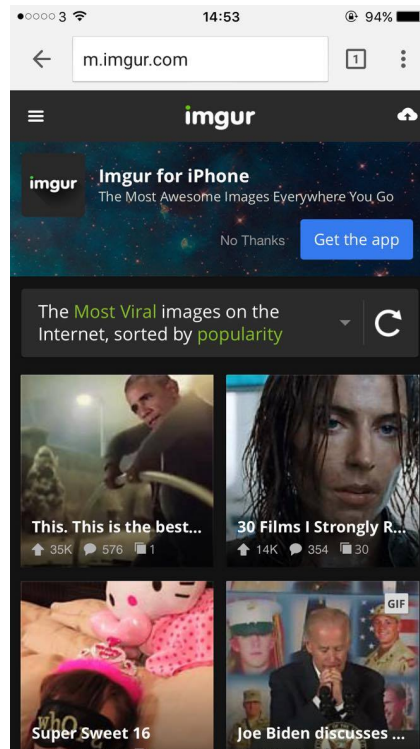
Figure 3.5: Imgur stylesheet name

Figure 3.6: Imgur mobile theme

Bibliography

[1] Reddit. Wikipedia. N.p.: Wikimedia Foundation, Web. 10 Nov. 2016. `https://en.wikipedia.org/wiki/Reddit` (Last accessed Nov 2016)

[2] Top, Dynamic Drive. Dynamic drive DHTML scripts- Expando image script. 2016. Web. 10 Nov. 2016. `http://dynamicdrive.com/dynamicindex4/expandoimage.htm` (Last accessed Nov 2016)

[3] Google Analytics — Google developers. Google Developers, n.d. Web. 10 Nov. 2016. `https://developers.google.com/analytics/` (Last accessed Nov 2016)

[4] TheEnigmaBlade. League of legends /r/leagueoflegends. reddit, 13 Jan. 2010. Web. 10 Nov. 2016. `https://www.reddit.com/r/leagueoflegends/` (Last accessed Nov 2016)

[5] Shuffman56. On lisp. Upvoted, 5 Dec. 2005. Web. 10 Nov. 2016. `https://redditblog.com/2005/12/05/on-lisp/` (Last accessed Nov 2016)

[6] Project, The Pylons, and contributors. Pylons project: Home. n.d. Web. 10 Nov. 2016. `http://www.pylonsproject.org/` (Last accessed Nov 2016)

[7] Digital world market intelligence platform. SimilarWeb.com, 31 Oct. 2016. Web. 10 Nov. 2016. `https://www.similarweb.com/` (Last accessed Nov 2016)

[8] Bootstrap (front-end framework). Wikipedia. N.p.: Wikimedia Foundation, 8 Nov. 2016. Web. 11 Nov. 2016. `https://en.wikipedia.org/wiki/Bootstrap_(front-end_framework)` (Last accessed Nov 2016)

[9] Google fonts. Google Fonts, n.d. Web. 11 Nov. 2016. `https://fonts.google.com/about` (Last accessed Nov 2016)

[10] Foundation, jQuery. JQuery API. 2016. Web. 11 Nov. 2016. `http://api.jquery.com/` (Last accessed Nov 2016)

[11] Otto, Mark, Jacob Thornton, and Bootstrap contributors. Designed for everyone, everywhere. n.d. Web. 11 Nov. 2016. `http://getbootstrap.com/` (Last accessed Nov 2016)

[12] Foundation, jQuery, et al. JQuery. Wikipedia. N.p.: Wikimedia Foundation, 6 Nov. 2016. Web. 11 Nov. 2016. `https://en.wikipedia.org/wiki/JQuery` (Last accessed Nov 2016)

[13] JQuery the noConflict() method. n.d. Web. 11 Nov. 2016. `http://www.w3schools.com/jquery/jquery_noconflict.asp` (Last accessed Nov 2016)

[14] Syntaxhighlighter/syntaxhighlighter. GitHub, 23 Mar. 2016. Web. 11 Nov. 2016. `https://github.com/syntaxhighlighter/syntaxhighlighter` (Last accessed Nov 2016)

[15] PageSpeed insights. n.d. Web. 11 Nov. 2016. `https://developers.google.com/speed/pagespeed/insights/` (Last accessed Nov 2016)

[16] XHTML 1.0 - normative definition of XHTML 1.0. n.d. Web. 12 Nov. 2016. `https://www.w3.org/TR/xhtml1/normative.html` (Last accessed Nov 2016)

[17] Hosted libraries — hosted libraries — Google developers. Google Developers, 14 July 2016. Web. 12 Nov. 2016. `https://developers.google.com/speed/libraries/` (Last accessed Nov 2016)

[18] Facebook, et al. React. Facebook Code, 2016. Web. 12 Nov. 2016. `https://code.facebook.com/projects/176988925806765/react/` (Last accessed Nov 2016)

[19] StrongLoop. Express - Node.js web application framework. 16 June 2016. Web. 12 Nov. 2016. `http://expressjs.com/` (Last accessed Nov 2016)

[20] Moment.js. n.d. Web. 12 Nov. 2016. `http://momentjs.com/` (Last accessed Nov 2016)

[21] Socket.IO. Wikipedia. N.p.: Wikimedia Foundation, 22 Sept. 2016. Web. 12 Nov. 2016. `https://en.wikipedia.org/wiki/Socket.IO` (Last accessed Nov 2016)