

# Performance Comparison and Evaluation of jQuery with AngularJS

Navnath N. Chavare<sup>1</sup>, A. V. Nadargi<sup>2</sup>

<sup>1,2</sup> Department of Computer Engineering, Sinhgad Institute of Technology Lonavala, Pune, Maharashtra, India  
<sup>1</sup>nnchavare9@gmail.com,<sup>2</sup>nadargi.ajay@gmail.com

\*\*\*

**Abstract** - World Wide Web (WWW) is presently growing with remarkable pace because of the improvement of new technologies. WWW started as a means of exchanging information in the form of static HTML pages. It has now come to a stage where intricate computational tasks can be executed by the websites or web applications. This evolution of WWW witnessed incorporation of different web technologies at different phases. JavaScript is one of such important web technologies. It provides features that allow interactive and computational capability in websites and web applications. Right from its inception JavaScript has changed drastically by the introductions of various JS libraries. jQuery is one of such libraries. jQuery remarkably improves the performance of a website. However, recent introduction of AngularJS claims many benefits over traditional JS libraries. This paper considers AngularJS as a case study and evaluates its performance with respect to certain criteria and compares it with traditional frameworks like jQuery.

**Key Words:** SPA, DOM, CSS, JSON, User Experience

## 1. INTRODUCTION

World Wide Web is rapidly evolving through the advancement of advanced technologies that provide added computational capability to the traditional webpages. At the time of its inception WWW was just intended to perform the task of information exchange in the form of static web pages written with the help of tags to assign syntactical meaning to the information being interchanged. Later, the concept of CSS was introduced to give a uniform styling to multiple webpages easily. With the use of CSS websites now became more attractive. However, they didn't have functionality that could provide its users a means to interact with it. This problem was solved by the introduction of the JavaScript. JavaScript is a higher-level language that is particularly used in order to provide computational capability to the static web-pages. Thus, due to the use of JavaScript in the static web-pages websites now became more alive.[2]

The functionality of interactivity stands on the notion of the Client-Server Model where client asks for something and server serves it. In WWW client asks for information and server serves the desired information to the client. With the help of JavaScript client became capable of sending information to the server. JavaScript also enabled clients to manipulate the information sent by the server to analyze it. This feature of JavaScript led to the development of advanced web-applications which are capable of fetching

and manipulating large amount of data over Internet. This feature requires manipulation of HTML DOM (Document Object Model). Right from the JavaScript there came various methods for DOM manipulation to change the style and content of a webpage. However, there are many issues that need to be considered in order to make DOM manipulation easy. DOM manipulation is an extra overhead for the programmers as they need to keep track of every element of the DOM. jQuery improved the DOM manipulation to much larger extent.[2][4]

However, recent technological framework of AngularJS which is developed by the search engine giant Google promises many new features that jQuery does not support. AngularJS is intended to build Single Page Applications (SPAs) or the websites that run on the notion of SPAs. AngularJS is much more than just a simple JS library. It can be rightly referred as a client-side JavaScript Framework used to build Single Page Web Applications.[4]

## 2. Single Page Applications (SPAs)

SPAs differ from traditional applications in the way they work. In traditional web applications the flow of process takes place as follows.

1. Browser initiates a requests to server
2. Server sends a webpage along with the respective assets (HTML and JavaScript)
3. Browser loads the entire webpage
4. User clicks on a link (initiates a new request)
5. Server responds with new webpage and assets
6. Browser loads up entire webpage again

Obviously, the layouts like this are not quite efficient. To tackle this problem, the concept of SPA was introduced. SPAs work as follows.

1. Browser initiates a requests to server
2. Server sends a webpage along with the respective assets (HTML and JavaScript)
3. Browser loads the entire webpage
4. User clicks on a link (initiates a new request and asks for the information that is only going to need to update the webpage)
5. Server responds JSON data

6. Browser loads the JSON data into the existing webpage to update it.

This mode of working significantly makes the processing faster and efficient thereby improving the performance of the page.

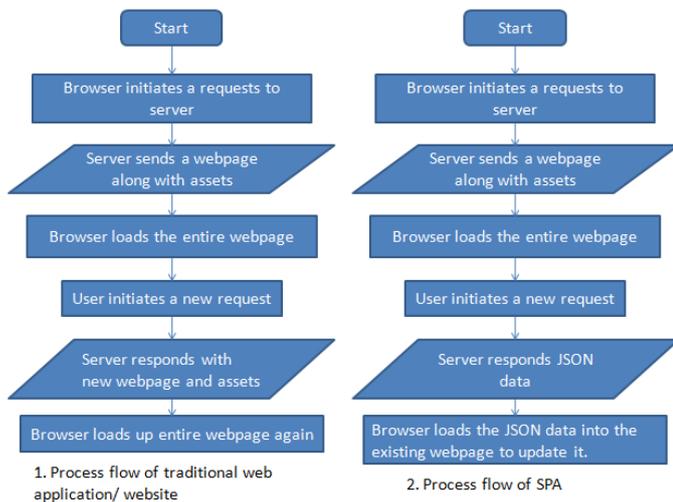


Fig. 1.1 Difference between traditional website and SPA

The increasing numbers of applications these days are building their own APIs. They do this to interface with the mobile applications. They might also do this so that other developers can build applications that communicate with their application. They might also build APIs to communicate with front end applications. SPAs can get advantage of this notion and communicate with such applications at the backend.

### 3. MATHEMATICAL MODEL

Let, Loading Time for the sample module developed in jQuery and AngularJS is  $L_{jq}$   $L_{ng}$  respectively

Similarly,

$$\text{Transition Time} = T_{jq} T_{ng}$$

$$\text{Complexity of Code} = C_{jq} C_{ng}$$

Let,  $S_1, S_2$  be the sets of criterions to measure performance of web technology.

$$S_1 = \{ L_{jq}, T_{jq}, C_{jq} \}$$

$$S_2 = \{ L_{ng}, T_{ng}, C_{ng} \}$$

The project finds out the result that,

$$S_1 > S_2$$

### 4. jQuery vs AngularJS

This paper aims to compare the AngularJS with jQuery on the basis of certain criterions.

### Size and Complexity of the code

The size of the code built using AngularJS is quite less than that of jQuery. This is due to the advance methods AngularJS incorporates to avoid the complexity of DOM manipulation. This is the thing where jQuery lags behind as it made it necessary for its user to keep track on DOM elements in order to manipulate it. AngularJS provide DOM manipulation through a new technique of Data Binding. For that purpose it uses its own concepts of Directives and Expressions. In this technique user need not keep track of DOM elements which was in the case of jQuery.<sup>[4][7]</sup>

```

<!DOCTYPE html>
<html>
<head>
<script src="https://ajax.googleapis.com/ajax/libs/jquery/1.12.0/jquery.min.js"></script>
</script>
$(document).ready(function() {
  $("#btn1").click(function() {
    $("#test1").text("Hello world!");
  });
});
</script>
</head>
<body>
<p id="test1">This is a paragraph.</p>
<p>Input field: <input type="text" id="test3" value="Mickey Mouse"></p>
<button id="btn1">Set Text</button>
</body>
</html>
  
```

Fig 1.1 Code to Manipulate HTML elements in jQuery

```

<!DOCTYPE html>
<html>
<script src="http://ajax.googleapis.com/ajax/libs/angularjs/1.4.8/angular.min.js"></script>
</script>
<body>
<div ng-app="">
<p>Input something in the input box:</p>
<p>Name : <input type="text" ng-model="name" placeholder="Enter name here"></p>
<h1>Hello {{name}}</h1>
</div>
</body>
</html>
  
```

Fig 1.2 Code to Manipulate HTML elements in AngularJS

### User Experience

User experience is the important criterion that determines the success of any technology. AngularJS clearly proves to this in case of Web Applications or the websites that run on the notion of manipulation of information, typical example of which is an ecommerce portal (Paytm).<sup>[4][7]</sup>

### Loading Time

As AngularJS is not just a JavaScript library but a client-side JavaScript Framework it provides much more features than that of jQuery. It makes the transition from one link to another, over the webpage, easy. This reduces the loading time of the page.<sup>[4][7]</sup>

### Security

AngularJS hides the actual structure of URL of the page in the browser, so that the client gets no idea about the directory

structure at the server where the data resides. This increases security of the data over the server. [4][7]

[7] Google Inc., <https://docs.angularjs.org/guide/introduction-Developer-Guide-for-AngularJS>

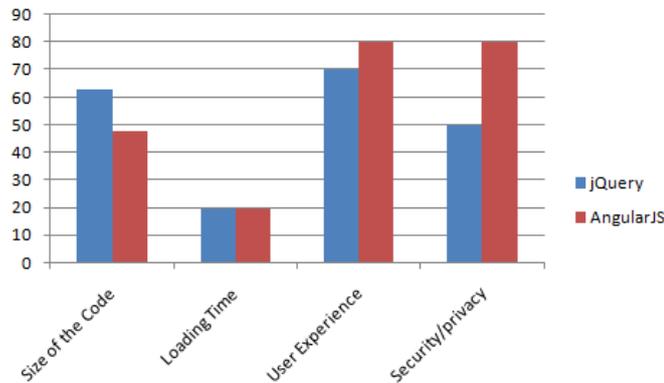


Fig 1.3 Performance Comparison of jQuery and AngularJS

## 5. CONCLUSIONS

Thus it can be concluded that the AngularJS is more efficient than the existing client-side web technology - jQuery. However, the area in which AngularJS gives the best performance is SPA (Single Page Applications) and not simple Websites.

## ACKNOWLEDGEMENT

I would like to thank Prof. A. V. Nadargi for his precious guidance. I am also very thankful to my PG Co-ordinator Prof. M. S. Chaudhari and HOD Dr. S. D. Babar. Without them this work would not have been materialized.

## REFERENCES

[1] Kai Lei, Yining Ma, Zhi Tan, "Performance Comparison and Evaluation of Web Development Technologies in PHP, Python and Node.js", 2014 IEEE

[2] Keshab Nath, Sourish Dhar and Subhash Basishtha , "Web 1.0 to Web 3.0 - Evolution of the Web and its Various Challenges" 978-1-4799-2995-5/14 20 14 IEEE

[3] Michael Butkiewicz, Harsha V. Madhyastha, and Vyas Sekar, "Characterizing Web Page Complexity and Its Impact", IEEE/ACM TRANSACTIONS ON NETWORKING, VOL. 22, NO. 3, JUNE 2014

[4] Rohit Dhand, "Reducing web page post backs through jQuery Ajax calls in a Trust based Framework", 978-0-7695-4817-3/12 2012 IEEE

[5] CHEN Li-li and LIU Zheng-long, "Design of Rich Client Web Architecture Based on HTML5", 978-0-7695-4789-3/12 2012 IEEE

[6] Monti Babulal Pal and Dinesh Chandra Jain, "Web Service Enhancement Using Web Pre-Fetching By Applying Markov Model", 978-1-4799-3070-8/14 2014 IEEE.