INCREASEWEB APPLICATION PERFORMANCE BASED ON ROR (RUBY ON RAILS)

Janne Umapathi[1], Dr. Vishal Khatri[2]
[1]Research Scholar, Department of Computing and Information Technology, Himalayan University, Itanagar, Arunachal Pradesh, INDIA.
[2]Research Guide, Department of Computing and Information Technology, Himalayan University, Itanagar, Arunachal Pradesh, INDIA.

Abstract
This paper helps to develop an evaluation based on the web based application in the creation of number framework and tool that facilitated the development process. Web application is mainly referred to make faster web development that has a huge effect on the CSS animation. Ruby on rails is a particular framework which plays a significant role in the CSS animation and the web designing. It is also to improve the performance of web development and also optimize the response time of the benchmark application which is made by this development. The first concept is the object documented model which is roughly divided into two groups, the first group is optimizing the development and the second group is manipulating the asynchronous request. This paper mainly helps to develop and evaluate the overall performance of the web based application. However ruby on rails development application mainly provides a better experience of use simulation and CSS animation. As per the development in this work this might be grounded and laid for the development to improve the web application as well.
Keywords: web application, Database, Application development, Web browser, MVC

1. Introduction

Today, it is very important to say that web services and applications play a great rolein our daily lives. It has numerous aspects of life in the society[1]. Web application executes the resources of the page at the side of the client. It helps to generate various Web pages dynamically that contain different languages like XML, HTML. It is classified into various categories like chat sites, online shopping websites, telephone directories, social networking sites, mail services and so on. These web applications assist to minimize business costs, serve a cross platform and centralize information for the sake of securing and backing easily.

This study has presented various services, web applications performance to improve Ruby. Here it has given emphasis on a specific web architecture known as - RoR (Ruby on Rails). This method is depends on programming language(Ruby) that is multi paradigm dynamically. This study has expressed various key factors of improvement of web application, for example RoR is remarkable from these aspects these days. It can be said that API is very effective for Rails framework with the help of various developments for moving to Single Page Application (SPA). It is very helpful for achieving substantive development in the page of application without creating any code complexity.

2. Request handling of web application

Each and every step of the web application browser and server **is** very important to understand by the users during navigation in an exact page. At this moment the page is ready to display the particular page on the browser that is very important to optimize and comprehend web application performance.
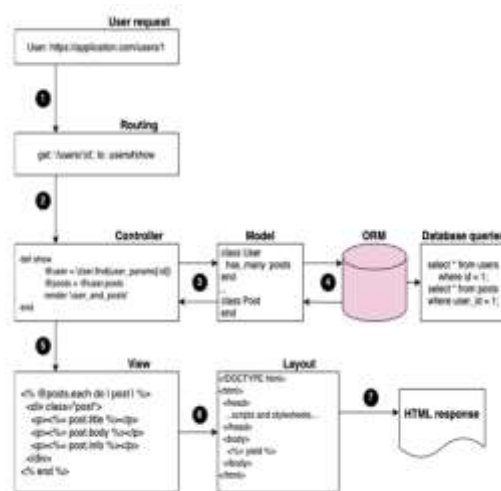
Fig 1: Web application server
(Source: Curie et al., 2019)

The above figure has expressed a process of application request handling of Rails application elaborately. It can be said that the initial step of this process is user request. Depending on the conversation of end user two various types of requests are differentiated:

- **Explicit request:** First interaction of the user begins when the user has entered or clicked the URL (Uniform Resource Locator) in a particular address bar of the browser. Then a request appears to the user that is associated with a request method named GET HTTP request.

- **Implicit request:** This request mainly happens in the background without direct actions of the users and direct knowledge of the users. For instance, this initiate requests are connected with the method of POST HTTP request.

For the first time, a host navigates DNS for requests. Next TCP as well as TLS (Transport Layer Security) keys are very effective if they create issues of connection before the given request [2]. A proper HTML document has been assembled with the help of Meta information, script and style tags and combining fragments. The layout application defines an HTML page. In this study the process of changing HTML document from server to another untreatable page on the critical endearing path has explained-

- The elements of HTML are stored in the Document Object Model tree.
- In this document CSS (Cascading Style Sheets) that derives the CSSOM Tree.
- Both DOM and Custom Trees are an outstanding mingle into Style Tree or Render depending on computed styles.
- Extractsaplingfacts is important to start height, station and breadth of every section that is Layout.
- The last step is painting where blocking scripts have ended executing that helps the page to be interactive.

It can be said that the application server has explained the process of assembling an HTML page that is known as Server- Side endearing and indicates to monolith applications.

3. How Ruby on Rails works on web performance

Ruby on Rails are generally an accessibleapplication. Web development is mainly committed with the help of the assumption and how todesign thesoftware industries. However it is mostly used for designing to make CSS animation not complicated. It is mainly to develop an opportunity to model the view of controllers and also increase the self-ascribed guiding principle [3].

The DRY (don't repeat principle) is emphasizing the tendency to avoid repeating in the same knowledge. Instead of this repeated functionality may be migrated into a special component like helper, concerns, mixing and much more. On the other hand conversation is made though the development of the opportunity and it is overridden into the web performance.

Based on the conversation on configuration suggested that rails may be described like an opinionated software application to enable and share the functionality without any core repetition. Most of the conversation might be enabled for the quick development of CSS animation. Ruby on rail was the primary factor behind the ruby program and language.

3.1 Cache

Based on the context of web application and web development coaching is defined the entire HTTP response, hence HTML fragments may be stored to the users related to the repeated request [5]. However the entire execution of application process must beelude to determine whether the request is present in the cash, if the request is present then it is going to take the second execution stage of the cash entry.

Rails mainly provides the time stamp for the modification of the CSS animation. Cache keys mainly provide the timestamp with the modification and creation of the system objects. It is a partial view which is being modified with the help of the modification.

3.2 Database

In every web application page database point is important to retrieve data from one database point to another database point, it is also showing the database access that can be another performance of an application. It is mainly important for the most of the users to establish a better animation [4]. It is also essential to include only essential information on the web page application and also has important considerations in terms of application performance.

```
users = User.limit(10)
users.each do |user|
puts user.posts.inspect
end
```

(a)

```
users = User.includes(:posts)
users.each do |user|
puts user.posts.inspect
end
```

Fig 2: an N+1 Query problem, B resolving the problem

Based on the execution of the code presence on the above 2a figure, most of the database queries retrieved the first 10 users and other users retrieved the post based on their id. The objective is being made with the help of developing some specific relationship and setting it to the core framework of Rails.

Based on the figure b, it has been allowed to achieve a substantive performance boost to compare with the first example [7]. First query is mainly retrieved within a
Development and the second query needs to be executed behind the post to the user id list.

3.3 Ruby on rails module

Rails are a general-purpose framework that has a number of components that may be used to maintain and construct various online applications [9]. In some applications, modules are redundant and can be turned off. Web APIs can use this module to enable the Ruby on Rails gem library, but they'll be integrated into the Rail framework instead [6]. In terms of ORM, the Ruby on Rails module simply provides the bare essentials.

4. Software implementation

It was necessary to install benchmark applications for better animation performance in order to measure the influence of various forms of web application performance. The modern free-driven social networking software, on the other hand, is distilled down to its simplest form. This application, on the other hand, has a number of endpoints, each with a different number of database request items. a list of possible test points is provided in table 1.

End point	Database	Counted element	Description
/Feed	Highly evaluated database needed and high number of queries are executed	High, each port has 250 HTML elements available.	Timeline delays of post, which is being authorized by the current user that are followed by the current users.
/post/:id	Medium, different tables need in the database schema	Low, the entire HTML page count is 300.	Displayed only a single post along with the relevant information
/user/:id/ followers	Low, Multiple	Moderate, for each user 50 HTML elements are currently available.	Set up a table with all of the current users' flowers, as well as any other relevant data. .

5. Performance

Measurements

In the field of local network environment performance measurements were definitely performed with the help of a single user using rails performance Gem. There are various series of performance measurements [8]. These series are taken for exact configurations following each and every optimization step very carefully. Besides, it is found that more extensive series play a great role to establish various and important performance metrics depending on application configuration that is optimized as a final configuration. The rail performance Gem plays a great role to serve data in the Database and View (Model) Layers that has a usage for conjunction with internal profiling abilities of Rails. It can be said that Google chrome has built its measuring tools in browsers that can be utilized for taking time to the primary loading where the page is ready for loading. Here some important metrics has been described those are taken for the sake of baseline application-

- **Time (VW) -** Time is obtained for monitoring and calculating the moments of receiving the pages at the initial stage and the moment of rendering the page fully in the field of Client Rendering application.
- **Time (DB) - This** timer is derived from the Rails internal monitoring. It spent in another application named Model Lyre.

- **Time (DOM)-** Here the time calculates timing of page loading and its fully rendering in the browser and Profiling tool of Google chrome assists to measure time.

5.1 Result analysis
Here some optimizing steps have been described at below-

- At the first step it is important to solve preloading optimizations and the N+1 Query problem [12]. Next, page loading time is minimized due to optimal resources, view time, database time as predicted.
- Secondly, switching the straightway of the Client -Side Rendering that provides a decrease loading time of Feed endpoint page to increase time spent in the field of the View Layer.
- Usage of an important version, API of the Rails framework is very effective to communicate with serialization and database processes.
- Next it is important to access the data that enhances communication efficiency depending on data.
- The Last step is a clarification about Object level serialize caching where intensive data, endpoint data are beneficiated.

5.2 Comparison with the Baseline Application
Extensive series helps to compare the optimized version and baseline of type application. To keep a continuous data flow between optimized version and baseline non- cached optimized application is very effective that works as a benchmarks. Page loading time has divided into different parts like the server Response Time that indicates to the request time until the finalizing of application server with sending a response and other Rendering Time that is oppose to server response time and the DOM time [11].

6. Conclusion
The main goal of the article is to describe web application development and its optimization in Ruby on Rails based applications. The initial load response might be developed with various aspects like web application and CSS animation. However the relationship between the web application and animation build a universal tool that can help to recognize the problem in web application development.

References

[1] Klochkov, D. and Mulawka, J., 2021. Improving Ruby on Rails-Based Web Application Performance. *Information*, *12*(8), p.319.

[2] Yan, C., Cheung, A., Yang, J. and Lu, S., 2017, November. Understanding database performance inefficiencies in real-world web applications. In *Proceedings of the 2017 ACM on Conference on Information and Knowledge Management* (pp. 1299-1308).

[3] Yang, J., Yan, C., Wan, C., Lu, S. and Cheung, A., 2019, May. View-centric performance optimization for database-backed web applications. In *2019 IEEE/ACM 41st International Conference on Software Engineering (ICSE)* (pp. 994-1004). IEEE.

[4] Chhetri, B., 2018. Web page development using the rails framework.

[5] Grosch, A., Waldmann, M., Göbbert, J.H. and Lintermann, A., 2020, November. A Web-Based Service Portal to Steer Numerical Simulations on High-Performance Computers. In *European Medical and Biological Engineering Conference* (pp. 57-65). Springer, Cham.

[6] Shao, S., Qiu, Z., Yu, X., Yang, W., Jin, G., Xie, T. and Wu, X., 2020, September. Database-Access Performance Antipatterns in Database-Backed Web Applications. In *2020 IEEE International Conference on Software Maintenance and Evolution (ICSME)* (pp. 58-69). IEEE.

[7] Radygin, V.Y., Kupriyanov, D.Y., Merkusheva, A.S. and Hotelov, D.A., 2018. Development of a Mathematical Model for Analyzing the Performance of Operators of Web-oriented Information Systems. *KnE Engineering*, pp.41-48.

[8] Inna, V.S., Dyfuchyn, A., Leshchenko, K. and John, D., 2017, September. Web application for visual modeling of discrete event systems. In *2017 Internet Technologies and Applications (ITA)* (pp. 86-91). IEEE.

[9] Lima, H. and Eler, M.M., 2021. C++ Web Framework: A Web Framework for Web Development using C++ and Qt.

[10] Curie, D.H., Jaison, J., Yadav, J. and Fiona, J.R., 2019, November. Analysis on Web Frameworks. In *Journal of Physics: Conference Series* (Vol. 1362, No. 1, p. 012114). IOP Publishing.

[11] Yan, C., Cheung, A., Yang, J. and Lu, S., 2020. View-Driven Optimization of Database-Backed Web Applications. In *CIDR*.

[12] Pandi, V., Perumal, P., Balusamy, B. and Karuppiah, M., 2019. A novel performance enhancing task scheduling algorithm for Cloud-based E-health environment. *International Journal of E-Health and Medical Communications (IJEHMC)*, *10*(2), pp.102-117.