

Importance of MVC framework in Web Development

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Abstract : In this current competitive world developers design User Interface using MVC framework to get the user-friendly interface because of three interconnected parts in MVC. The main purpose of separating this interconnected part is to separate the internal depictions of the important information that are shown and used by the user. By the decoupling of the important components, the developer can reuse the code that helps to work side by side for the development of the project. The three layers of MVC framework are Models, Views and controllers This paper briefly explains the comparison with the famous three tier framework, a famous web-based platform ASP.net MVC, advantages and disadvantages of the MVC framework, and future technologies that can replace the MVC framework in the web development applications. This paper briefly explains about the models, views and controllers of the MVC model with their main functionalities in the development of the web applications

Terms--ASP.net, controller, MVC, model, view

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I. INTRODUCTION

There is an exponential growth in the Internet as many research technologies and companies are spreading the information in the Internet every day. Due to the enormous data being rapidly used on the internet, full stack developers are in need to find a better framework which increases the performance and all the required parameters for client user friendly interface to communicate with the company websites. Compared to business logic of the company there will be more changes in the User Interface. Because of the tight coupling of the Business Layer and User Interface there is a high difficulty in reducing the coupling between these important layers. Hence, developers came with a solution of MVC framework which expands the scope of the applicability and the reusability. The 3 layers of MVC framework are Models, Views and controllers.

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1.1 Model:

Model is one of the principal layers of the 3-layer MVC framework. Model shows the records in the database and is used to represent the output to the users with the help of views. Application data is controlled by the models. Models consist of the functional specification, application data, business logic. A model can be of one single object or it may have many different objects. All the database operations like create, update and delete are performed by the Models in the MVC framework.

The data values model in MVC framework must follow some of the rules like it must contain the logic crud operations on database data and must have an API that shows data and the operations that are performed on it. Some of the rules that must be not satisfied are it should not show management of values in database and it should not contain any of the logics that is related to the exhibition of the display

1.2 View:

Views are the user interface created by the designer to interact with the client. Views represents the data that is present in the models. Its main duty is to exhibit all the values that are present in the model. The view always exhibits the important information to the user but completely hides the unimportant information to the client and confidential information of the company

1.3 Controller:

A controller is the link between the model and view in the MVC framework. The controller main function is to acknowledge the client's request with respect to the model. Model is responsible for exhibiting the changes in data in model on the view so that client can actually interact with the system with all the latest information. In MVC framework for every view there is a model corresponding to the view and its controller responsibility to always maintain the sync between those two layers according to the client requirements.

The main interaction between these components happens in the following steps. At first the controller gets the input from the client and the view exhibits the model in a specific format where client interacts with the view. The controller after getting the data will execute the appropriate operations on the models after verifying all the validations the data is sent to the model of the MVC framework.

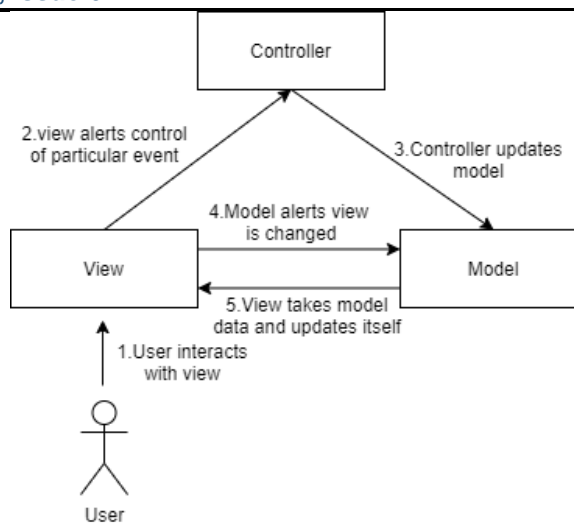


Fig 1 Generic MVC model

II. COMPARISON WITH 3 TIER FRAMEWORK

Three-tier framework:

Three tier framework is one of the most well-known software application framework. 3 tier framework consists of 3 layers basically they are presentation tier, application tier and data tier. The main benefit of this framework is these 3 layers have their own infrastructure hence developers can work independently with each other. The presentation tier is the communication layer and the user interface where the clients interact with the application. The main functionality of the presentation tier is to exhibit the information and get the information from the user. Application tier is known as the heart of the 3 tier framework. Application tier consists of the business logic where all the processing of the data from presentation layer takes place. The data tier is also known as the database tier Data tier is the back end of the application. In 3 tier framework the data tier and presentation tier cannot exchange the information without the interference of the application layer and all the communication goes through the application layer.

Comparison

Three tier framework is linear because data tier and presentation tier cannot directly with each other application layer must be present for the intercommunication of other two tiers whereas the MVC framework is a triangular because both the model and the view can communicate with each other for example whenever the data in the model is updated, model alerts the view that it is updated and the view grabs the model data and updates itself but this doesn't happen in the 3 tier framework. MVC framework is mainly designed to make user interface code easier to maintain and MVC pattern is mainly used a larger portion of the UI code can be unit tested but 3 tier framework is designed totally for a different reason the main reason it is designed is to divide the entire application into 3 meaningful parts such as business logic, user interface and data storage

Most of the developers consider MVC is better than 3 tier framework when MVC is combined with the Convention over configuration. Convention over configuration is a software paradigm used by the software frameworks that attempts to decrease the number of decisions that a developer using the framework is required to make without necessarily losing flexibility. Because of this combination there is a better and easier code maintenance by learning the MVC framework conventions it is easier to maintain your own and foreign code.

III. ASP.NET MVC FRAMEWORK

Microsoft developed a Web application framework known as the ASP.net MVC which is basically a MVC framework. ASP.Net is an open source software.

Features:

- ASP.net MVC grants feasibility for the test-driven environment by default because User interface logic, input logic and business logic are separated with each other
- Data injection and inversion of control are supported by ASP.net MVC. For creating an object, a class is used but the concept of Data injection developer can directly inject objects into the class. Inversion of control is the concept in which if an object depends on the other object then the first object should get the second object from a configuration file. Because of Inversion of control concept it lets to do unit testing
- Features like windows authentication, form authentication output and input data caching, health monitoring, session and profile management, URL management are being provided by the ASP.net MVC framework
- ASP.Net components are highly customizable because the components like view engine, policy like action method parameter serialization and URL routing policy can be easily replaced
- ASP.net provides a strong URL mapping component which will not include any extensions that consists of the file names and these URLs are searchable and perfectly provide services like representational state transfer addressing and search object optimizations.

The C # programming language is widely used in ASP.net mvc for programming the controllers. There are two methods to create the views one is by the razor pages which have cshtml extension and other is aspx which have the aspx extension aspx. As the controllers and the models are developed using C # programming language they have cs extension at their file name.

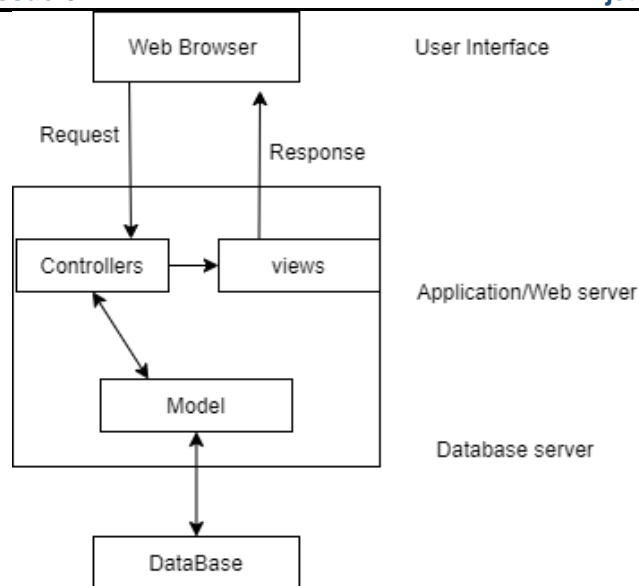


Fig 2 ASP.Net MVC Framework

There are so many Integrated Development environments that can deploy the web application by the assistance of MVC framework. This Integrated Development environment can be chosen with the convenience of the developers whether the chosen IDEs can fulfill the requirements of the developer. Some of the famous IDEs are Visual Studio -Visual studio gives developer the advantage of creating the ASP.net MVC project with the complete features and it is the most preferred tool for the developers. Microsoft sql server management studio which is used as the tool for the database and there are tools like the NetBeans, GlassFish server used for the Java Enterprise edition for the MVC framework.

Benefits:

- Test driven development can be implemented better in ASP.net MVC framework
- As the framework is divided into 3 independent main components it is easy to manage whole application
- ASP.net MVC enables to control rendered view pages completely
- Due to complete direct control overview pages it is easier to upgrade with fast evolving front end and because of this there is better accessibility
- If a project needs a large number of developers, then ASP.net MVC is suggested because it is easy to control the application behavior.
- The features provided by the ASP.net increases the responsiveness

IV. ADVANTAGES AND DISADVANTAGES

Advantages of MVC framework are as follows:

- The Complexity of MVC framework is less because it divides its principal components into 3 parts in the form of the Model, View and the controller.
- With the help of the front controller developer can generate web applications with the help of the routing
- Server based forms are not supported by the MVC because of this reason the complete authority lies in the hands of the developer
- Because of the front controller instead of configuring many web servers the configuration of the single front controller is enough
- The front controller also gives centralized control and because of this MVC manages more than one incoming request.
- Developers can make their own view engine as compared to old traditional way the syntax is easy to understand
- MVC supports the test-driven development so developer can write unit test cases first and write the code
- Maintenance of the project is very simple as all main components are divided into 3.
- Default responsive web site template is also provided by the latest versions of ASP.net MVC
- In MVC framework many developers can work on different modules at a time and one developer is independent of the other developer work
- MVC framework provides different levels of security at different levels on different components because developers can protect the portions of the application behind the firewall

Disadvantages of MVC framework are as follows

- The deployment of the project using MVC is a difficult task
- It is tough to master programming the modules in the MVC framework a good knowledge on pattern is essential
- jQuery, JavaScript and ajax are frequently used because of this the complexity of the programs is increased
- Grasping the movement of data in modules is quite difficult
- For developing the small projects MVC framework is not suggested as it bit complicated
- MVC framework is bit difficult to understand
- There is need to have tough rules to be followed on the methods
- Developers cannot view the preview of the design pages like aspx. To view the design developer needs to run the view
- With the relaxed layer approach even with a small change in lower level interfaces will make us percolate to the higher levels.

As every framework has its own advantages and disadvantages above mentioned are some of the pros and cons of the MVC framework.

V. FUTURE OF MVC

MVC is widely used to create web applications but after React and component-based framework was introduced in 2015 front end developers prefer unidirectional framework for client side. Which makes the application faster and more responsive on the client side. Component based framework is becoming very popular where it focuses on decomposition of design into individual functional and logical components that represent a well-defined communication interface containing methods, events and properties.

Most of the desktop applications and android applications are being developed using MVVM framework. The full form of MVVM is Model-View-ViewModel. MVVM framework facilitates a separation of development of the graphical user interface with the help of mark-up language or GUI code. In MVVM view model is a value converter which means that viewmodel is responsible for exposing the data object from model in such a way that objects are easily managed and presented.

MVC framework is popular and widely used but looking at developments in new methods and tools to create applications it is clear that new frameworks may be introduced which may be more powerful than the existing ones.

VI. Conclusion

The Model-View-Controller framework was introduced by Trygve Reenskaug in the 1970s. In 1996 the MVC framework popularity peaked and from then on, it has been in use for developing user interfaces and applications. When developers started taking the concept of single page application seriously, they borrowed practices that were already well established for server-side framework. At that moment, all the popular server-side frameworks involved some sort of implementation of the classic MVC model.

The MVC framework separates an application into 3 components: Model, View, Component. A component of MVC framework is used to handle specific development aspects of an application where model includes all the data and its related logic, view handles user interaction and presents data and controller is an interface between view and model. It can be integrated with many scripting languages which makes it easy and powerful to develop applications. Since MVC framework can certainly be embedded into future languages that are going to boom into the industry, it is important for anyone who works in MVC to be familiar with the current trend of technologies.

Many new frameworks are being developed and introduced to developers. MVC was one of the application frameworks using which many applications have been developed and deployed, but it may be replaced by a better framework in the future.

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