Web Application Development and Tackling the Problems

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Abstract: *This research paper discussing the useful tips and techniques that are used while developing the professional website and tackling the problems in website development. We will also discuss the appropriate software architecture patterns which should be used in a website. Then we will go through the website development process, in that we will discuss the way how we can make the process more efficient and effective by making changes in some of the phases to get more better results. We will also go through the problem faced by the user and we will understand the technical terms such as code reusability, deployment, production, requirement gathering and many more.*
Keywords: *Website Development Process, MVC Model, Architectural pattern, Tackling Website Problems.*

I.   1.Introduction

The website is like a backbone to every business nowadays, as the business is a concern you all invest a lot of time and efforts for the outcome of the respective business. The business you are in appeals your profession and professionalism. That's why the website should also look professional and it should show the mirror of the business the customer is in to.

Before creating any website we should get the necessary information on the website need to be created and the customer's requirement needs to be taken into consideration. Depending on the website we should select the appropriate model for the development of the website application. Once the process is discussed we will follow a particular software development architecturepattern depending on the requirement we have collected from the customer.

Most necessary thing while developing a website is choosing the appropriate programming language which should be taken into account for development as well as the framework which can be used to make the website more secure and friendly for developing the website.

II.   Software architecture patterns

2.1. What is software architecture patterns?

An **architectural pattern** is the most effective and sustained solution to the reuse the solution of the most common problems which can be occurring problem in software architecture. Architectural patterns aremore or less similar to software design pattern but have a wide scope. The architectural patterns showcase various issues in software engineering, such as in obstruct the limitation in the computer hardware performance which is more likely to cause the problem while development, high accessible and minimise the risk in business. Some architectural patterns have been implemented within software frameworks itself.

2.2. Which software architecture patterns should be use?

All architecture patterns have some pros and cons depending on the website been created one should wisely the architectural pattern. The most common used architectural pattern are:
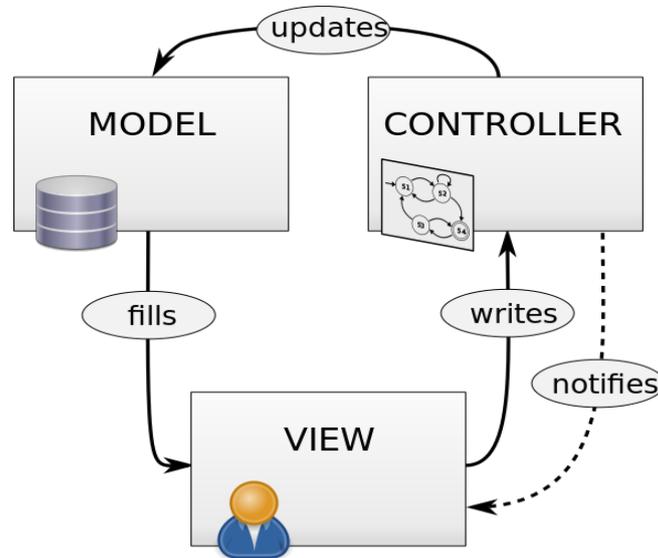
- Model-view-controller pattern
- Layered pattern
- Blackboard pattern
- Master-slave pattern
- Event-bus pattern
- Pipe-filter pattern
- Broker pattern
- Client-server pattern
- Peer-to-peer pattern

III. Using MVC Model for Effective Web Application Development.

Over the past few years, software development had a variety of changes. The important change that could have occur in the past few years, is the use of MVC pattern for development of the web application. The Model–view–controller (MVC) is a software architectural design for implementing user interfaces on computers.

3.1. How MVC pattern works?

MVC patterns separates the giveninput, processing, and output in a web application. This model divides itself into three interconnected parts called the model, the view, and the controller.

3.2. What makes MVC so much effective to be used in web Application Development?

- Faster in development process.

MVC act as rapid and parallel development of the application, it means one can work on one part of the project and others can keep changing the same project in the meantime. Even one can change the business logic of the website in controller that won't affect the development process.

- Ability to provide multiple views.

This pattern provides us with multiple views, and also is useful for code reusability as one view can be used for multiple times depending on the user interface.

- Support for JavaScript framework

MVC can be integrated with various JavaScript framework, which means we can use pdf, office and AJAX very easily in it. It also supports asynchronous technique, which helps the webpages to load at much faster rates.
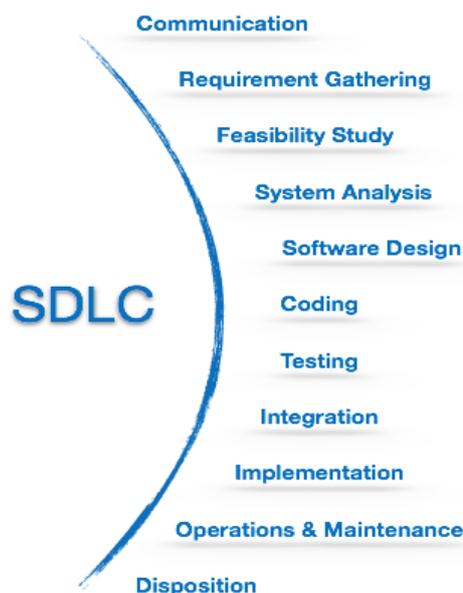
- Easy to manipulate the code.

Any developer can easily manipulate the code it won't affect other developers in the project. For any application user interface changes more often, so it is important if we manipulate a certain user interface it should be change in that part only, by MVC it is made possible.

- Security

MVC also provide security as anyone cannot access the model with the help of the view, i.e. only the controller can access the model, so no change can be make from client side to the model.

IV. Website development process

According to the traditional development process, we use to use appropriate Software Development Lifecycle (SDLC), but the problem with this process was if some changes has to make then we have to redo entire process or have to wait for the turn of the process to finish. Among which Iterative model was well used but the problem with the iterative model is if a new requirement comes in to picture then we have to wait for entire process to finish of development and redo all again.

To avoid this, one can use flowing phase which are explain in detail below:

- Requirement gathering.
- Planning.
- Signing the Quotation.
- Building the design as per requirement.
- Implementation of the website.
- Testing the Website.
- Client side testing.
- Deploying the website on the hosting server.
- Maintenance of the website application.

4.1. Requirement Gathering:
Initially the development team key members should witness the client in person to gather all the requirement they need in the website. Each and every minutia is taken into consideration and is been noted down for development purpose. In this what kind of website need to be created? What are the features client required in it are all taken in to consideration as well as colour scheme of the website is also considered in this phase.

4.2. Planning:
It is the most crucial phase of the development process. In this we decide the schedule of all the phases, i.e. how much time and cost we would require to complete the project, and chose the time wisely and appropriately depending on the development time.

4.3. Signing the Quotation:
Once the planning is done the quotation is been created by the gathered requirement and is been signed by both the parties. Quotation should be as simple as possible and should have cover all the details of the website development including the estimate time frame. If in case the client need some more functionality in the later state then is should be stated in quotation as well.

4.4. Building the design as per requirement:
User interface plays an important in all the website development it is the key to the customer's satisfaction, client will only see the user interface of the website so it should be as per the mark to create a proper sober and professional design depending on the company standards and requirements gather by the team. It should have proper layout as per the designing standard and should have clear commenting in the design code for better understanding of the development team in later stages. Once the design has been created as per the colour scheme of the client, it should be send to the client for the design verification so that there should not be any change in the future to the design.

4.5. Implementation of the website:
Once the website design has been approved we should divide the layout according to the components what can be reuse, such as header, navigation, widgets, footer etc. This components has to been included in the master layout page for extending in the views.
We should use services, helper functions, and controllers of implementing the business logic. Services are more like singleton that are more likely we can use again and again in the code whereas helper function are used if same code are required by more than once. Helper function are very use full in reusability of the code it reduces the line of code and make the development look professional and standardized.

4.6. Testing the Website:
The website should be tested once every module is been created. It prevents the rework if the website is not up to the mark. The testers should not that the website is as per the requirement assign by the requirement gathering team. We can use various testing techniques such as, black box, white box etc. It's because the code we have written may be right but it may have logical errors which cannot be identified until we examine each and every module once. As the process is completed we send the website to test by client for final check.

4.7. Client side Testing:
Once the website is been tested by the development team it is ready for deployment but before this we need to make sure the website satisfy the client requirement for that purpose we test the website at the client side by giving him access to the websites frontend and backend. Once the client gives approval we deploy the site.

4.8. Deploying the website on the hosting server:
Main thing we need to understand before deploying the website is which hosting service we should be using. If the website is normal with little bit of static content then it appropriate to use shared hosting. If the site has dynamic content and is been created for someone where traffic on the website is more than average, it is strongly recommended to use the VPS hosting as it takes the load all by itself and is very fast then the shared hosting, if the website is a product it's better to use cloud hosting for better service.

4.9. Maintenance of the website application.
Once the website is deployed the work is not over the website is under the maintenance depending on the client. In the maintenance phase the client go thought the website thoroughly and finds the nukes in the website so the website should not break during the customers use. The time interval for this phase is decided at the requirement gathering phase.

V. Importance and need for website
People now a days are proceeding toward implementing of digital technology in their life, to catch with this modern world website is the must for every business. Website represents the profession in which the person is, as well as it reflects the organizations motive towards their business. So every person or business website should be created in a professional way. The main perspective that make the website so much useful that we can access it form anywhere and from any place.

5.1. What Customers Want?
Six out of ten customers expect the brands to have access online, everything is now accessible online so to make your brand available in the market everyone should have website.

5.2. It Provides Social Proof:
Nowadays people before buying any product or brands they first check the review of that brand, which influence the buying decisions. Since buyers look for your product online there should be testimonials column which should be included in the website that is the great way to impress potential buyers.

5.3. Don't need to have coding skills:
Some CMS nowadays provide the users with the user interface from which they can build the entire website without knowing the coding and designing at all. CMS such as WordPress, Drupal and Joomla etc. can be used depending on the site preference, but it's better to use frameworks as it save a lot of memory and processing times that are not taken in consideration in CMS.

5.4. Never close Up the Business at any time:
Some customers like to shop at any time so your business should be open all the time so to make it available all the time it's better to set up the business online with the help of website one can be available at all the time and everywhere. Every customer is happy as they can get the products on their time.

5.5. Showcase your product and services:
By the help of your website you can display your products or outline your services with images that best represents the product, one can also provide a short video tutorials or downloadable PDF instructions to show case all your service and product as it gives hesitant customer no reason to go anywhere else to purchase the product or accept your services.

VI. Tackling the Problems while developing the website
6.1. What it's going to cost?
No one know what require to buy, or how much detail work will be required before calling the project complete. So to overcome this problem we stick to the budget we quoted in each phase in planning phase. If the budget is tight then we can help to prioritize the features so that all the critical once are done before the budget is exhausted.

6.2. Requirement is not clearly defined.
Most of the problem are faced if the requirement is not clearly defined as developer will develop according to the requirement, to overcome this problem in the quotation signing phase one must state all the requirement to the client as per understanding and if it satisfy the customer then it can be signed by this there will be no problem on non-clear requirement.

6.3. Requirement need to be change for business reasons:
Sometimes so happens is, customer change the requirement in the middle of the development phase, which can lead to the stuck in the development phase which is a huge problem in the development process, to overcome this problem there should be a part in the quotation that states if the requirement is change up to certain level then extra charges and time will be taken in consideration towards the project. This saves the cost to building back the application and also gives ample of time for development team.

6.4. How can a non-technical person able to access the website and make changes to it.
Not every time the technical team will be available for the service as the maintenance period is over the development team is done with the work, if any changes need to be made then they have to again contact and redo the contact and pay again. This problem can be overcome if costumer get access to the admin panel of the website where the client will be able to do modification up to a certain level it would reflect on the website. If client need major change then they can extend the contact.

6.5. Code Flexibility:
Most important problem while developing a website application is its flexibility of code that it can be use on different browsers and all its functionality works properly. To overcome this problem developers and testers should do cross browser testing on the code so all the browsers should support the website and properly represent to all its customers and client.

6.6. How can I prevent my site from been hacked?
The threat now a days in give personal detail to any website is it may be hacked, someone might know your details and may miss use it, to tackle this problem we can encode the data while on the go to the database and also for the safer side we can store the data in the encoded format as well. Website can be make secure at the server side by server side security techniques.

6.7. Avoiding Spammers:
Spammers are bots that keep on requesting your service and make the service not available to all the users, it is like DOS attack the website where person keeps on attacking your website and makes it inaccessible to all. To overcome we can use captcha which is not likely to be breakable by the bots and is very much secure as it cannot be manipulated by the bots.

6.8. Writing same code again and again:
It's better to use helper functions in this we write the code that can be accessible to entire application and if any part require the data it can access the code by calling the function and importing it, this is also called code reusability as same code is used again and again by different methods and ways.

6.9. Problem in business logic:
It is the most common error as we see the code is compiling and executing in a proper way but the output is not up to the mark, to overcome this problem we must reconsider the code we can use the debugger to debug the code and execute by giving the input with the help of debugger we can see the logical problem which is arise in business logic.

6.10. Code complexity:
Complexity of the code also play an important role in development and can also lead to the problems such as performance issue, memory loss, website loading speed reduced. Many developers write the code but the coding logic can be different for different developers it depends on experience as well as the logic of the developer. One can write the query in 10 lines and some query can give the expected output in 2 lines also, with reduces the complexity in code.

VII. Conclusion

Thus we have discussed about the how we can make a website more effective, we go through the software development process in a better way, which helps us to tackle many problems. We have also seen different architectural pattern that can be used for software development. In this we have gone through problems along with the solution and have given elaborate definition of MVC pattern and why it's effective in development process and reasons to use the MVC pattern. We go through the problems while developing the website and have discuss the solution in a most effective way.

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