Critical Comparison Of PHP And ASP.NET For Web Development

Atul Mishra

AbstractL This paper critically compares PHP and ASP.NET for development of web application (WA)which was developed as a part of a module's assessment. These languages have been evaluated for development of WA functional requirements and features. In other words, the main area where the comparison of these languages has been applied is potential requirements of Car Sales Web Application. The paper begins with defining these technologies and comparing fundamental architectural variances. This paper also explore and compare suitability of selected technologies for comparing features involved in imposing restrictions on accessing navigation and functionality, validation and proactive behaviour involved in validating user input from the browser, providing users feedback, overall time consumed in development and associated security issues.

Index Terms: ASP.NET, Database Interactivity, Dynamic Content, Markup Reusability, Persistence, PHP, Proactive Behaviour, Security, Validation, Web Application.

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1 INTRODUCTION

To date, many frameworks and technologies are available that are efficient and effective for implementation of anyweb application WA. Nevertheless, it is crucially important to compare and contrast suitable technologies for the kind of web application (WA) being developed. As a part of module's assessment a WA for Car Sales has been developed and implemented in PHP. Furthermore, it is to compare the chief functional requirementof developed WA with ASP.NET. The WA primarily has the ability to handle and interact with both structured and unstructured data; structured data such as relational models having details of users and cars and unstructured such as images and other multimedia elements.Furthermore, authentication, authorisation, security threats and implementation in a strict time bound environment of WA should considerably be evaluatedwhich can be addressed by substantiallycomparingsuitable and available technologies.

2   DEFINITIONAL COMPARISON OF LANGUAGES AND POPULARITY

PHP (PHP: Hypertext Preprocessor) is an open source general-purpose scripting language that is specifically suited for web development and can be embedded into HTML [16]. PHP is much like C language for the Web development [3], [5]. The syntax structure is fundamentally the same, making it flexible and easy to implement any WA. On the other hand, according to Microsoft Corporation ASP.NET is unified Web development model that includes services necessary to build enterprise web applications with a minimum of coding and offered on a free licencing agreement. It is event-driven programming model and part of the .NET Framework. ASP.NET pages get access to classes of .NET Framework and web application can be coded in any language compatible with the common language runtime (CLR), including C# and VB. To date, most of the web applications over the internet are developed using PHP based frameworks and ASP.Net. PHP is the most popular framework and ASP.Net is the second most popular framework currently used by sites.

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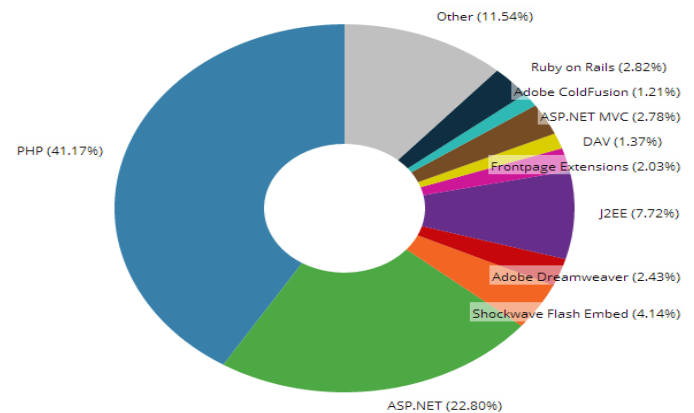- *E-mail: neo.atulmishra@gmail.com*

Figure 1: Framework Usage Statistics[1]

3 ARCHITECTURAL COMPARISON

ASP.Net pages are completely object-oriented whereas pages in PHP can either be procedural or object-oriented. ASP.NET page executes on the server like PHP and generates mark-up, such as HTML, WML or XML, which is sent to a browser for rendering [15]. Web server and operating system (platform) required for ASP.Net is strictly Internet Information Services (IIS) and Windows platform, respectively. However, PHP is compatible with most of the available platforms and web servers [3], [15], [16].

4 DATABASE INTERACTIVITY

Both ASP.Net and PHP have rich APIs for handling database connections. Therefore, both frameworks are designed to work closely with a wide variety of relational as well as NoSqldatabases including Oracle, MS SQL Server, MySQL, and MongoDB. However, as a choice of database for developing web applications, MySQL has been preferred the most among PHP developers [4], and in the case of ASP.Net, MS SQL Server has been preferred the most. PHP offers three different APIs to connect to MySQL, out of which mysqli and PDO extensions are currently recommended [16]. These APIs are useful for several database operations, for instance, in the developed WA, to execute a query on the database mysqli_query() has been used. Similarly,for fetching rowsmysqli_fetch_row() andmysqli_fetch_array() have been used, and for counting the number of rows returned on query executionmysqli_num_rows() function has been used. On

the other hand, in ASP.Net, data is accessed and manipulated typically using ADO.NET[9]. It contains a set of classes that expose data access services to the developer. DataAdapter and the DataReader are objects typically used for retrieving relational data and storing it in memory. Another practice of DataAdapter object can also be data manipulation (CRUD operations). There are also data controls such as Data Grid that connects to data source non-programmatically and displays result in interface with automated paging, thus, making the implementation easier with greater security.

5 GENERATING DYNAMIC CONTENT

In developed application, there is a feature to fetch data from database and display result in tabular format. For addressing these set of tasks in ASP.Net, combination of web controls, such as Label and TextBox can be used, however, there are data-bound controls such as the Grid View, Data Grid, Data List, Form View, Details View, Repeater, and Microsoft Char that be utilised and they are specific to this task. Data-bound web server controls are bound to a data source control which makes it simple to display modify data in the web browser. However in PHP,scriptcan be directly embedded into HTML pages[2], [5]. In contrast, HTML tags can also be printed using PHP for generating dynamic contents, typically by using echo or print functions to print HTML tags on a web browser.
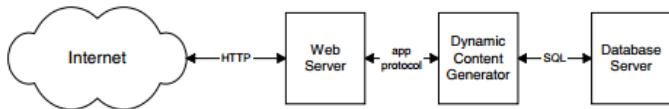

Figure 2: Typical configuration of a dynamic content Web site [2]

6 WEB USER STATE AND PERSISTENCE

In the developed application, there is need to authorise user for accessing pages that require authentication or login. Therefore, for achieving web user state or persistence (sending values across pages) in PHP there are three possible mechanisms including session, cookies and query strings. However, in ASP.Net user states can be managed by using mechanism that are describe for PHP and apart from that states are managed using application state which is a global storage mechanism and profile property which is like session but the only difference is that the data is not lost when a user's session expires.

7 MARK-UP REUSABILITY

The developed WA has needed to repeat source code containing HTML mark-up for header and footer on every page, for each page must have consistent look and feel. Such repetition should be avoided [13].Downsides of code repetition include time consumption, and if the code has spread in many pages,then editing becomes tedious and also there is chance of bugs and defects. In contrast, reusing code provides developer a convenient way for user interface reuse and better refactoring experience. To achieve mark-up reusability in PHP, the developer has included the HTML source code containing header and footer in separate PHP files and included them in every page using require_once() which is identical to require()

function but avoids inclusion if the file has previously been included [16]. In ASP.Net, however, for doing similar task concept of MasterPage can be utilised typically by using Master Page class. The master page acts as a template container for merging content pages in WA, providing a useful means for sharing structure, mark-up and content across every page of WA [13].

8 INPUT VALIDATION AND PROACTIVE BEHAVIOUR

In Car Sales WA, validation and sanitisation of values from user input or query string is needed. For instance, in the registration and login module there is need to check the values against empty or null values, pattern match such as email, and type match such as telephone number. The table below highlightsvarious available mechanisms in sanitation and validation in both technologies.

#	Problem	ASP.Net	PHP
1	Check null values	Required Field Validator	is_null, isset
2	Validated against a particular pattern	Regular Expression Validator	preg_filter, FILTER_VALIDATE_REGEXP FILTER_VALIDATE_EMAIL
3	Particular fields are of a particular data type (telephone)	Achieved Manually	FILTER_VALIDATE_INT, FILTER_SANITIZE_NUMBER_INT
4	Compare Password	Compare Validator	Achieved Manually
5	Range Age Check	Range Validator	Achieved Manually

Table 1: Comparison of Validation Techniques

In ASP.Net framework validator controls are the main elements combined for validation and proactive behaviour solution [14]. The errors appear and disappear immediately after the incorrect input is entered or corrected. This prompt reaction makes it proactive and enhances user experience. Therefore, user can correct the errors before submitting the forms. This mechanism prevents post-backs, saving the user time and reducing the sever load. However, in order to achieve pro-activeness in PHP, client side scripts such as AJAX has to be implement. In the case of validating user input, PHP has Data Filtering extension for filters data by either validating or sanitizing it.

9 OVERALL DEVELOPMENT/EVOLUTION LIFE CYCLE

The development of any web application must encompass extremely short development/evolution time [8], besides having a great flexibility, maintainability, and adaptability to sustain with market requirements. Therefore, from all the above sections it can derived that ASP.Net supports

automated in-built features for implementing several functionalities which can make development/evolution time quicker and rapid. On the other hand, to achieve rapidness in plain PHP (without using frameworks), it typically depends on the developer(s).

10 SECURITY THREATS AND COUNTERMEASURES

The most of the attacks (SQL Injection in particular) are exploited by user inputs [11]. The attacker in some way manipulates the queries executed over the database. Plain PHP code is vulnerable toSQL injection and Cross-site scripting (XSS) attacks therefore using frameworks such as CakePHP and CodeIgniter attacks can be avoided [7]. So, in the case when these frameworks are not used enforcement of security explicitly depends on developer and coding practices used. In the developed WA, however, user input has been constrained and sanitised using various in-built PHP functions (suggested in section 7). These in-built PHP functions enforce security to filter SQL Injections, Cross Site Scripting (XSS) and also Denial-of-Service (DoS) attacks. Nevertheless, captcha image validation is more relevant to prevent DoS attacks. Furthermore, disclosing database error information has been avoided by implementing exception handling. Apart from all the counter measures listed above, in ASP.Net, type-safe SQL parameters can be used for data access.By using type-safe SQL parameters, the valueis treated as a literal value, and SQL Server does not treat it as executable code [10].

11 CONCLUSIONS

It can be concluded that for development of Car Sales WA both technologies ASP.Net and PHP are suitable. Both technologies are also relatively similar in programing paradigm, for instance, both supports for object oriented programming. However, there are certain architectural differences including the way script is compilation and events are handled. While comparing the popularity, PHP is found to be more popular than ASP.Net and together these technologies share approximately 65% of total websites available over the internet. Both technologies have rich APIs for handling various database connections. Nonetheless, it can be established that ASP.Net is reasonably compatible with MS SQL Server whereas PHP with MySql. Moreover, for generating dynamic content, particularly from database, ASP.Net provides various automated tools for handling connection, displaying content in tabular form, and also supports automatic paging, as a result, making the development more rapid. On the contrary, for implementation of these functionalities,in PHP, it depends on logic derived by developer and by taking use of some in-built functions, making it often time consuming. Similarly, for consistent interface design and mark-up reusability, ASP.Net in built with automated feature, however, in PHP it is achieved manually depending on coding practices. It has been found that security in web applications is often breached from users' input. The kind of attacks web application is vulnerable to includes SQL Injection, Cross Site Scripting (XSS) and Denial-of-Service (DoS). In order to prevent these attacks, both technologies have rich functions and libraries that are capable of filtering users' input against various parameters.

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