SINDH UNIVERSITY RESEARCH JOURNAL (SCIENCE SERIES)

Silverlight Streaming Software Application: Features Based Analysis of Programming Languages

A. R. SOOMRO, J. A. MAHAR, H. SHAIKH, F. A. SURAHIO

Department of Computer Science, Shah Abdul Latif University, Khairpur Mir's, Pakistan

Abstract: Silverlight framework is widely used for internet applications such as video streaming, animation and communication. These days, it supports to development tools for Common Language Infrastructure (CLI) type languages that are used to create programs and libraries. These languages have taken a place as event driven environment. Frequently and rapidly Silverlight applications are writing through the CLI and selection of the right programming language for these Silverlight application is still a problem for developers. Therefore, general characteristics comparison between four CLI types visual programming languages are presented in this paper and these are compared under the peculiarities; browser compatibility, rich media extension, keyword along data types and cross platform. Furthermore, video media streaming player Silverlight application is developed as an instance to test languages characteristics. This effort could help developers to choose better programming language among them for Silverlight applications.

Keywords: Silverlight; Common Language Infrastructure; Development Tools; Event Driven Environment

1. INTRODUCTION

Visual programming languages (VPLs) have been playing crucial role in these days, moreover, these are considering as CLI type languages. Thus, several rich internet applications (RIAs) are being developed by the programmers under the .Net framework platform. C++, VB, C# and FoxPro are also working under this framework development tool. These RIAs are rapidly adopting modern technologies like, Silverlight and Adobe Flash Player for online media streaming, communication via thin client (Cheng, 2010).

Microsoft Silverlight is an application framework commonly supports to writing and running rich internet applications and it is similar to Windows Common Foundation (Cheng, 2010). Developers are using this framework for media streaming, chatting inbox and other multimedia tasks through the visual programming languages Like C#, VB.Net, Visual C++ and Visual FoxPro etc (Rajesh, 2013). These VPLs are based on event driven environment and Silverlight is used in these languages to design and develop an attractive interface of the application either interactive web application or desktop application. Furthermore, 65% of browsers has been adopted Silverlight to view contents (Wang, 2012).

In Silverlight, User's friendly interfaces are declared in Xtensible Application Markup Language (XAML)and compiled through .Net framework development tools (Shirish, 2012). Likewise, it further

helps to graphics acceleration, deep zooming, smooth streaming, media formation extensibility, pivot viewer, pixel shade and skinning-style. These features was not included with older version but, now a days, Silverlight 5 has given all these features and also provided much better environment to mobile applications under the .net framework event driven environment (Lu, 2012).

On the other side, VPLs are providing massive amount flexibilities to developer to design and execute applications and kept all languages at one place in Visual Studio development tool particularly used for Web services (Sha, 2010). Through-out studio, developer can easily select particular programming language from listed languages like, VB, C#, C++, FoxPro and JavaScript etc.

Due to familiarity of these above first four languages having different characteristics, almost developers are become confuse while choosing the right one programming language for right one task with Silverlight. Due to this reason, the possible step to provide brief general features comparison between selected languages under four attributes are taken in consideration and developed online media streaming and chat messenger applications as an instance via selected languages to get better results in term of Buffering time, Compatibility, graphic acceleration and bit rate support. This research contribution could be beneficial for researchers, developers as well as those who want to switch from one language to another one.

++Correspondence Author: *Email* Javed Mahar: mahar.javed@gmail.com

2. COMPARISON OF FOUR PROGRAMMING LANGUAGES

VPLs are giving incredible facilities to programmers to develop two and three tier applications and also providing an environment to design libraries, plug-in applications and object components extensible. C++, VB, C# and FoxPro are common VPL supporting to event driven and object based environment. Thus, four important characteristics; browser compatibility, rich media extension, keyword along data types and cross platform are compared in selected VPLs and each one description is given below.

Brower Compatibility

Most of the online media streaming and sending messages applications are not running in most of the browser due to plug-in un-existence or require Ajax controller. As earlier mention that Silverlight is used to RIAs interactive applications, so, the Silverlight is better choice with C++ and this languages supports to Silverlight plug-in on any browser. But, with VB.net, it requires additional libraries to run on browsers despite opera does not support yet (Piyush, 2015). On the other side, C# also supports to browsers and eliminated compatibility issue but, the FoxPro is still not supporting to this feature.

Rich Media Extension

Plenty of media streaming players are not supporting to run any type of media extensions. These days, Silverlight has been prevented from this issue with VB.net, C# and C++ programming languages but, the FoxPro does not due to absence of extension library object control. This control is recently introduced by the Microsoft along first three languages except FoxPro. It does not mean that developers are not able to use Silverlight, but, only could not take advantage from this perspective (Ruchi, 2016).

Thus, sending and receiving message applications are not running in most of the browser due to plug-in un-existence or missing Ajax controller component. As earlier mention that Silverlight is used to RIAs interactive applications, so, the Silverlight is better choice with C++ and this languages supports to Silverlight plug-in on any browser. But, with VB.net, it requires additional libraries to run on browsers despite opera does not support yet (Piyush, 2015). On the other side, C# also supports to browsers and eliminated rich extension issue but, the FoxPro is still not supporting to this feature.

Keyword along Data Type

Keywords are also known as reserve words mean those keywords that developer cannot use as variable or as a class name. Almost keywords are same found in all VPLs. Basic keywords like, if, else, switch and case etc are exist in both selected programming languages. Thus

common data types are available in C#,C++, VB.net and FoxPro (Gaurav, 2003). But, object data type is missing in FoxPro. Blob data type is present despite it consume more memory and often developers are avoiding to use it (Garcia, 2003). Another aspect is available in all visual programming languages, each data type and their sizes are change and also way of declaration is entirely different that each other (Kim, 2013).

Cross Platform

The word cross platform is representing to run on any operating system in the computer science. Moreover, it is type of a program that does not need special preparation to run over the platforms. Most of the machines having Windows environment is creating trouble while running those programs that made by the Linux or UNIX operating systems. Thus, Microsoft has been announced recently, now, developers are easily develop android smart application that run across the platform and also play a immersive better role in today programming field. Unfortunately, VB.net and FoxPro are not considering as open source or cross platform languages. Similarly, C++ programs can run multiple devices over different operating systems and make that comes with RC2 update in Visual studio enables to developers to create dynamic program easier, faster and more reliable than precede programs. Furthermore, mobile integrations and compiled network modules also could run on every operating system (Ibrahim, 2004).

The summarized brief general characteristics comparison is given in **(Fig.1)** that depicts the each peculiarity or availability with Yes and No. it has no doubt that comparison of different languages are quite difficult and takes more time to sort it however, it is tried to pay attention to those aspect that are very important and necessary to know about it.

VB.Net	Features	Availability	Remarks
1	Browsers Compatibility	No	
2	Rich Media Extension	Yes	Require Aditional Libraries
3	Keywords and Data Types	Yes	but Limited
4	Cross Platform	No	

C#	Features	Availability	Remarks
1	Browsers Compatibility	Yes	-
2	Rich Media Extension	Yes	-
3	Keywords and Data Types	Yes	-
4	Cross Platform	Yes	-

C++	Features	Availability	Remarks
1	Browsers Compatibility	Yes	
2	Rich Media Extension	Yes	but limited
3	Keywords and Data Types	Yes	but limited
4	Cross Platform	No	

FoxPro	Features	Availability	Remarks
1	Browsers Compatibility	No	
2	Rich Media Extension	No	
3	Keywords and Data Types	Yes	
4	Cross Platform	No	

Fig.1.Features Availability in Selected Programming Languages

3. DEVELOPEDSILVERLIGHT VIDEO MEDIA STREAMMING APPLICATION

In this development section, the video media streaming player (VMSP) application is designed under the Visual Studio development software tools and its detail description is given below.

VMSP is divided into two modules; (1) Design and (2) Coding. In Design stage, XAML is used to design interface. The layout of the media player, animation script and auto responsive spans are declared in this module. Column and Row definition tags are used to define rows and columns of the screen where Silverlight media control placed inside. Media Element is actual component dragged into data context boundary.

In coding phase, the suitable methods, variables, classes and their events to access song address are used properly according to the requirement and nature of the software application. The Uniform Resource Locator (URL) navigation methods enable the software practitioners to access the web address of the required song. Different methods have been used to develop media streaming player and list of methods that used to create this software application are given in **(Table-1).**

Thin client is used to send request to access the URL of the required songs and then the Silverlight media element play methods supports to execute the address and run song given on to the text object. Thus, (**Table-1**) shows methods that used for particular action. The software application is developed with four selected languages and both are following same methods but different in writing program structure because, C# and C++ uses braces, on the other side, VB and FoxPro do not have need to use braces. The execution process of VMSP is given in **(Fig.2).**

Table-1 Used Methods for VMSP Development

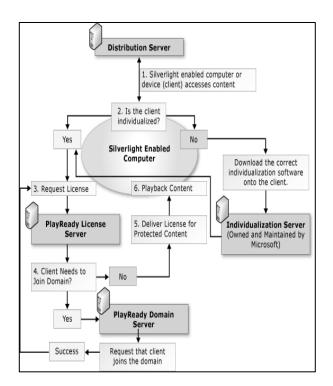| Methods Name	Description
Navigate()	Used to access web address
Play()	Supports to play a song
Stop()	Used to stop songs
Pause()	play and resume song
Set Current Position()	Used to set duration
Seekbar ()	To find out position
DispatchTimer	To dispatch song time

Fig.2 Execution Process of Developed Software Application

In fact, the distribution server is providing supporting contents if it is not already installed for initializing Silverlight and this one is product of Microsoft. Once it ensures then it send for requesting a Silverlight play ready license. This license takes little time while debugging and checks either client has needed to join songs domain or not. If it is required then it moves to actual domain of hosting where always songs are available like YouTube and others dedicated servers. Silverlight enables on computer deliver required license for playback content and thus song will play after getting license managing and maintain by Microsoft like Amazon services.

4. RESULTS

In this results section, the developed software application is tested and achieved results of five attributes that belongs above four parameters that has compared. The results of the application are given below along each language.

VMSP results with VB.Net

Now a day, software testing tools (Chayanika, 2013) have given a tremendous facility to test any type of application similarly some open source and commercial testing tool are selected to test application attributes like, compatibility, aspect video ratio, deep zoom, bit rate and buffering time. The calculated results of VMSP attributes are given in **(Table-2)**.

Table-2VMSP Calculated Results with VB.Net

Selected Language	Parameters	Calculated Results
VB	Compatibility	Yes
	Aspect Video Ratio	2:3
	Deep Zoom	2x1000
	Bit Rate	1200Kbps
	Buffering Time	7s

VMSP results with C++

C++ is found much better than VB.Net in term of results. It is quite famous that C++ is better from the graphic acceleration perspective and might be this is the reason that C++ has given support under the best quality image by viewing its video aspect ratio. Thus, calculated results with C++ are given in **(Table-3).**

Table-3 VMSP Calculated Results with C++

Selected Language	Parameters	Calculated Results
C++	Compatibility	Yes
	Aspect Video Ratio	4:2
	Deep Zoom	3x1000
	Bit Rate	2400Kbps
	Buffering Time	5s

VMSP results with C#

C# is providing cross platform functionality and that is the reason it has taken incredible position in programming market. The achieved results are high in term of bit rate and also it has been observed that, C# has taken less buffering time. The calculated results in C# is given in **(Table.4)**

Table-4VMSP Calculated Results with C#

Selected Language	Parameters	Calculated Results
C#	Compatibility	Yes
	Aspect Video Ratio	4:2
	Deep Zoom	3x1000
	Bit Rate	3200Kbps
	Buffering Time	2s

VMSP results with FoxPro

The acceptable results are not received with FoxPro during getting results of VMSP. Several times, different videos URLs are given to the system but unfortunately, the positive response could not get any response from site except an error that indicates Adobe flash player required. It is observed that Silverlight plug-in does not work with FoxPro and that is why the results are not calculated. **(Fig.3)** is given that shows error that is received while testing of the developed software application.

5.   DISCUSSIONS

Silverlight is really an effective plug-in for rich internet applications and providing a facility to make your application more colorful and change the behavior of traditional built-in objects. It is developed VMSP application in four selected programming language and it is noticed that only way of program writing structure has changed otherwise all methods are remain same. Moreover, this VMSP has been tested in each programming language that completely based of visual that is why these are known as visual programming. Thus, core parameters that should be included in such kind of applications are tested including, compatibility, aspect video ratio, deep zoom, bit rate and buffering time.

Among them, VB.Net is given better result and providing functionality of aspect video ratio of 2:3, from the deep zoom it provides 2000 zooming command and after that it stuck and did not produce any result. Thus, it supports 1200 kbps that is also feasible and only 7s VMSP buffering time recorded during playing. VB.net does not support extra high graphic acceleration and other parameter due to its familiarity with business applications. But, C++ is tested with same parameters and achieved better result than VB.net in term of Aspect Video Ratio. C++ is famous in graphic acceleration and that is the reason, it has noted with 4:2. Similarly, if a video size is better than automatically bit rate, deep zoom affects and that is why we achieved 3000kbps and 3000 zooming feature. It is also noted that C++ 5s buffering time during playing songs. VB.Net and C++ found compatibility with all browsers for Silverlight developed VSMP application.

As we know that C# is similar to C++ but different in platform. This programming language these days is giving open source program development facility. This is the reason that we have tested and achieved all parameters result same from deep zoom, compatibility and aspect video ratio perspective. But, it is observed that C# only take 2s to playing video. It is common that every language that has been introducing in computer industry bringing new features. Might be this is the reason that VMSP is recorded with 2s while playing videos. Unfortunately, fruitful results are not received with FoxPro because it requires adobe flash player plug-in, FoxPro does not support to Silverlight Plug-in and has not been integrated yet by Microsoft.

6.   CONCLUSION

Briefly characteristics of four Visual Programming Languages have been compared and developed VMSP under Silverlight technology in this paper. Moreover, it is observed that, VB.Net is sufficient from this type of application and provided better results in term of deep

zoom and compatibility. But, C++ is much better found than VB.Net especially in buffering time. Thus, we have calculated high and best result of five parameters with C# and unfortunately, better results are not achieve with FoxPro except only an error. This bit effort could be helpful for programmers while choosing right languages for media streaming.

REFERENCES:

Chayanika, S., S. Sangeeta, and S. Ritu, (2003). A Survey on Software Testing Techniques. International Journal of Computer Science, 10(1), 381-393.

Cheng, G. X., and S. Q. Hu, (2010). System architecture and pattern research of RIA based on silverlight. Computer Engineering and Design, 8(31), 1706-1709.

Garcia, R., J. Jarvi, A. Lumsdaine, J. G. Siek, and J. Willcock, (2003). A Comparative Study of Language Support for Generic Programming. 18th Annual ACM Conference on Object-Oriented Programming, Systems, Languages and Applications, California, USA, 115-134.

Gaurav, J., K. Pooja, and K. Tanu, (2003). Comparative Study of C, Objective C, C++ Programming Language. International Journal of Engineering and Computer Science, 2(1), 202-206.

Ibrahim, T. (2004). A Comparative Evaluation of. net Remoting and JAVA RMI. Inquiry: The University of Arkansas Undergraduate Research Journal, 5, 86-93.

Kim, D., E. R. Murphy-Hill, C. Parnin, C. Bird, and R. Garcia, (2013). The Reaction of Open-Source Projects to New Language Features: An Empirical

Study of C# Generics. Journal of Object Technology, 12(4), 1-1.

Lu, Y., Z. Qiu, X. You, H. Zhang, and L. Chen, (2012). Design and Implementation of Rich Web GIS Application Framework Based on SilverLight and

REST Services. Journal of Geo-Information Science, 2, 007-012.

Piyush, S. G. (2015). Comparative Between Object Oriented Programming Languages: Java and C++. International Journal of Advance Research in Computer Science and Mgt. Studies, 3(3), 367-371.

Rajesh, S, (2013). Application of Web Silverlight. International Journal of Combined Research and Development, 1(2), 1-6.

Ruchi, S., (2016). Comparative Study of Programming Languages. International Journal of Advance Research in Computer and Communication Engineering, 5(8), 511-514.

Sha, A., S. Rawat, and S. Pundir, (2012). Design, Implementation and Integration of Heterogeneous Applications. International Journal of Computer Applications, 54(5), 11-16

Shirish, P., S. Sameer, D. Pranali, (2012). Application Development using WPF. International Journal of Advance Research in Computer Engineering and Technology, 1(4), 480-483.

Wang, J., (2012). Silverigh Based Distance Teaching Applications. International Conference on Information Computing and Applications, Chengde, China, 133-137.