Analysis Report for the SVG and Avalon Technologies

Introduction

UnitPix is a stand-alone online multimedia visualization tool which is developed by my information technology company in 2006. Unitpix can be used for various multimedia visualization purposes such as online teaching, presentation, etc. The first version of UnitPix is UnitPix V1.0 and at the moment the company is working on the second version (V1.1) with new options and enhanced graphic environment. As enhancing the graphic and visualization environment of the software, one of leading programmers in the development team proposed to develop the user interface of the software by using SVG format under W3C recommendations. Before go for a method like SVG, the company has to consider other options and evaluate all possible options. The latest technology by Microsoft “Avalon” was the other option to implement the User Interface. Therefore the company analyses both technologies (SVG and Avalon) in order to choose the best way to enhance the user interface of UnitPix. In this analysis, the company considers to analyze overall benefits, drawbacks, drivers for cost benefits, compatibility issues of both technologies. Besides the report provides technologies have been used in both SVG and Avalon and some additional information which may useful for the final decision.

SVG

Scalable Vector Graphics (SVG) is a XML markup language which uses for rendering rich, interactive graphics and multimedia applications. Scalable means the image can be transform without loosing the quality. Vector means lines which uses to create the image. In other words SVG images consist of line graphics, not dots or pixels like raster images.

As a growing media type, SVG is mostly use for web graphics with other W3C standards such as XML, CSS, XSL, Logo creation, Online Maps such as google maps etc., designing Graphical User Interface for Web based applications, Data visualization such as drawing charts etc. Further SVG is using in many different areas such as internet, intranet, mobile phone etc.

There are many SVG based softwares which can be use to edit, illustrate, import, export SVG files. Some of SVG softwares are:

- **Inkscape:** This is an open source software which can be used for SVG illustration in Linux, Windows and Mac OS platforms.
- **Sodipodi:** This open source SVG editing software is based on Incscape.
- **The Batik SVG Toolkit:** This open source software can be used to render, generate, and manipulate SVG graphics in Java programs.
- **Adobe Illustrator:** This software supports both import and export SVG images. The software is a commercial version.
- **CorelDRAW**: This software also supports import/ export SVG graphics. The software is a commercial version.
- **Sketsa:** This software is a cross-platform SVG illustration software which is not free to use.
- **Xara Xtreme:** This open source software can be used to export and import SVG graphics in Linux platform.

Since SVG is an open source project by W3C, most of SVG softwares are free to use. Therefore developers will be able to create or implement their project for free or for low cost.

Pros and Cons

Advantages

There are many advantages of using SVG formats over other image formats. SVG is open-source format which can be used, viewed and edited for free. Since SVG format is based on XML, SVG files can be read, edit by using many tools such as notepad, windows wordpad, Macromedia Dreamweaver, Inkscape etc. Further SVG is easy to create or illustrate and animate images because it uses XML languages. Also a SVG webpage can be stored in a single text file with all illustrations or animations, unlike ordinary html with group external links for images or animations. This helps to reduce the file size, speed the page loading time, save the hosting space and optimized the website because it's all readable and understandable text for developers and search engines. As I mentioned above most of SVG creation softwares are free to use. Also SVG codes are

easy to understand because it a text based coding method not a binary coding method. File sizes of SVG files are smaller than other formats such as JPEG, GIF etc. As I mentioned above SVG are scalable graphics and can be printed under any resolution and SVG uses less bandwidth. Further SVG files use a color profile in order to render colors more accurately and it can be displayed in any monitor, pda, mobile phone or internet browser. SVG files can be zoomed without any quality loss. Text in SVG files can be selectable and searchable. Therefore SVG files are excellent for internet based work and maps. Also SVG graphics can be accessed by users with visual disabilities by using voice or Braille software. These softwares use text description to describe the graphic. Further SVG images can be identifies as data by standard XML applications or other applications which do not know anything about graphical representation of the data because of the SVG readable coding pattern. Since SVG is a text based XML language it can be produced images by using data from databases. Therefore database driven SVG images can be easily modified and update which is ideal for web based projects. SVG files are compliance with other languages such as XML, DOM, CSS, XSL etc. Therefore SVG can be styled using either CSS or XSL. Since SVG is based on XML, it has all the advantages that XML has. Such as vendor-neutral, platform-neutral, common interchange format that is almost universally supported etc. Further SVG is able to work with Java technology. SVG not only includes several features which are part of the "Synchronized Multimedia Integration Language (SMIL) 1.0 Specification", it also allows future versions of SMIL in order to use animated or static SVG files as media components. In addition SVG graphics can be animated and it supports features like filters, masking, clipping, transformation etc.

Disadvantages

The main drawback of SVG format is not many browsers support SVG. Since SVG is still in infancy level, there are might be compatibility issues with SVG files. For an instance users may need SVG compatible softwares in order to view SVG files. Most of internet browsers now have built-in pluggins. For an instance latest versions of Opera and Mozilla Firefox browsers support SVG. Internet browsers like Internet Explorer and Apple Safari need a pluggin in order to view SVG files. Therefore users may need to install a SVG viewer (Ex: Adobe SVG viewer). Internet Explorer does not support object

tag. Therefore there might be difficulties of rendering the SVG file. Also objects work if the XHTML file is accessed it locally but it's not working when the XHTML is accessed through a web server (http).

Avalon

Avalon is a graphical subsystem attribute of .NET Framework 3.0. Avalon is based on XAML which is XML-based vector graphic markup language. Also Avalon can be written in C#, Visual Basic, .NET or any language with .NET Common Language specification (CLS).(**Fig 01)** These applications are bit similar to Windows forms applications. The name "Avalon" is just a code name for Windows Longhorn display system and final Longhorn interface system is knows as "Windows Presentation Foundation" (WPF). Avalon has a clear separation between user interface and business logic which helps to avoid interference of designer work and development work. Most of softwares for Avalon will have both program code and XAML design code. The software is integrated to Windows Vista. However Microsoft expecting to release updates with Avalon for previous Windows versions such as XP and Windows Server 2003. Avalon applications can be installed in the PC or can be viewed on the internet (Internet Browser).

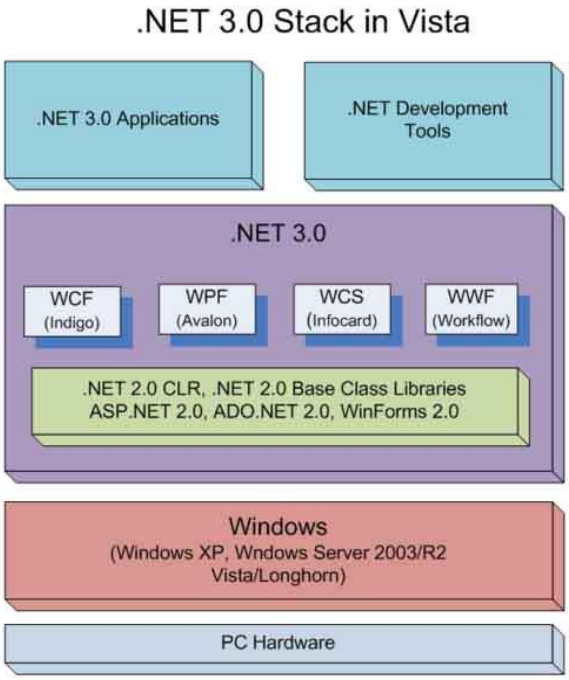

Fig 01

There are few Avalon development tools and add-on. Some of tools are:

- **Microsoft Cider:** This is an add-on for the Visual Studio 2005 which use for Avalon application development. This add-on can be downloaded free from Microsoft site. But users have to purchase Visual Studio.
- **Microsoft Expression Blend:** This application is a designer-oriented tool which can be used to create Avalon applications with 2D and 3D graphics, text and form contents. This tool can be generated XAML code can be use with other tools.
- **Microsoft Expression Design:** This tool is a bitmap and 2D-vector graphics tool which can be use to export it as XAML.
- **Electric Rain ZAM 3D**: This tool can be used for creating 3D models which can be exported as XAML.
- **Mobiform Aurora**: This application is an alternative for Avalon user interface creations.
- **Xceed DataGrid for WPF:** This application provides DataGrid control for Avalon.

All of above applications are commercial products which are not free, except Microsoft Cider. But Microsoft Visual Studio is not free to use. Therefore users have to have or buy Microsoft Visual Studio in order to use Microsoft Cider.

Pros and Cons

Advantages

Avalon allows good control, design and development of visual features of windows applications. It has combination of user interface, 2D and 3D drawing, fixed and adaptive documents, advanced typography, vector graphics, raster graphics, animation, data binding, audio and video. All the graphics in Avalon will be routed via Direct3D and it will helps to provide more advanced graphic features. For an instance this will provide user interface, documents and other media formats in highest resolution. When routing graphics via Direct3D, Windows will be able to pass on graphic tasks from Computer CPU (Central Processing Unit) to graphic card GPU (Graphic Processing Unit). Avalon

can be use to implement applications which are locally installed on to the computer (Standalone Applications) by using MSI (Microsoft Installer) or ClickOnce as well as XAML browser applications (XBAP) which are installed on a web browser (Internet Explorer Mozilla Firefox). Standalone applications have fully access to the local computer resources and on the other hand XBAPs will be run under a partially trust sandbox environment without full access to the local computer. Further all the Avalon functionalities are not offered for XBAPs.

Since Avalon supports vector graphics, it has common vector graphics features such as image scaling without quality loss, consisting of lines instead of dots and pixels. Similar to SVG applications, Avalon provides some built-in 2D tools and options such as brushes, pens, transforms, geometries etc. In addition it supports 3D rendering provided by Direct3D which SVG doesn't support and this facility is provided by Direct3D. Therefore Avalon can be used for 3D User Interface, 3D documents and for 3D media. On the other hand Avalon supports most of other image formats such as JPEG and supports video for formats WMV, MPEG and AVI. Further Avalon can be used for time based animations and it does not support frame based animations. Further Avalon supports text rendering by using ClearType which can provide for sub-pixel positioning, natural advance widths, and Y-direction anti-aliasing. In addition Avalon suppors OpenType text features as well. Avalon has built-in features which allow software developers to bind and manipulate data within the application. It supports following 3 types of data binding:

- One time: Where the client ignores updates on the server
- One way: Where the client has read-only access to data
- Two way: Where client can read from and write data to the server

Avalon has some built-in user interface controls such as button, menu, and list box. Also it has some built-in image effects such as dropshadows and blurring. Some other effects can be created easily such as reflections. Also Windows Imaging Component (WIC) for Avalon can be used to write image codecs for specific image formats.

Disadvantages

The main drawback of Avalon is it's not free to use. Since Avalon is .NET Framework dependant, users has to pay for .NET. It is the same even for C# and Visual Basic languages. On the other hand at the moment it's only coming with Windows Vista which most users do not have as the operating system. Therefore users may need to upgrade their computers or have to wait until Microsoft release an Avalon update for previous Windows versions. Unlike SVG, Avalon does not support mobile devices. It is only supports Windows XP and above versions at the moment. As I mentioned above, Avalon takes the advantage of graphic card by passing on graphics task to the graphic cards GPU. Since Avalon take advantages of latest graphic cards, users may need to have latest graphic/ VGA cards or may need to use software emulation if the graphic card does not support. Also Avalon is still in initial stage and therefore problems, errors, compatibility issues may occur when users start using it. Further since the technology is new it is difficult to find resources such as sample coding, tutorials, plug-ins etc.

Analysis

Consider about advantages and disadvantages of SVG and Avalon to use in this project, SVG has more advantages and less disadvantages over Avalon. Additionally as I mentioned in the introduction UnitPix is an existing software, which only considers to be enhanced its user interface by using either SVG or Avalon. Therefore application development facility that Avalon has it self may not be important to this particular scenario. Avalon is more complex because it has more options and features on it and SVG is simpler because it has basic user interface elements which can be used to develop more attractive and efficient user interface depending on developer's talent. Since Avalon is new to the computer world we cannot find actual on going projects by Avalon. Therefore even we can trust Microsoft; we cannot trust and rely on Avalon. Also at the moment Avalon is only comes with Windows Vista and the company a need to upgrade computers to Windows Vista in order to use Avalon. On the other hand SVG is a growing and well reputed format and can be found resources, on going projects etc. Further SVG is mostly recommended for web base projects and UnitPix is a web based application. Even some browsers does not support SVG natively, there are plug-ins which can be found for free in the internet. Since UnitPix is a web based software, it's

involved with web programming languages such as CSS, XML which are supported by SVG.

Considering about these reasons, the company can use SVG for the user interface design of the UnitPix.

Conclusion

In this scenario our company consider about enhancing the user interface design of an existing product called UnitPix. The company identifies this can be done by either using SVG or Avalon. SVG and Avalon are latest technologies to create user interface designs for applications and for the web. Therefore company decided to analyze both technologies and choose the most suitable technology to this particular situation.

Both SVG and Avalon have their advantages and disadvantages. Especially SVG is an open source technology and Avalon is commercial which only comes with Windows Vista at the moment. Since UnitPix is already developed software and the company needs SVG or Avalon only to develop its user interface, there is no need to have more options and facilities that are not related to interface design. For an instance Avalon can be used for application development as well.

Considering about all of advantages and disadvantages SVG is the most suitable way of enhancing the user interface of UnitPix tool. Therefore the company does not need to spend money no this particular scenario and can easily find appropriate SVG open source softwares such as Inkscape to illustrate, edit etc. SVG if needed.

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