

# Software Upgrading and the Related Issues

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## Abstract

This paper takes Microsoft Internet Explorer (IE) and Microsoft Visual Studio .NET (VS.NET) as examples to study software upgrading and the related issues. The public browser statistics information from three different sources was used in IE study. The author's experiments were used in VS.NET study.

The IE example suggested that the software version (IE7.0) with more new features on the user interface took longer time to be accepted by the market and it could have negative impact on the software's market share. The VS.NET example suggested that some new features might cause usability issues to the existing users and some important existing issues should be addressed in the higher priority than introducing some of the new features. Further research is required to confirm these suggestions. Further research is also required to answer the initial questions effectively.

*Keywords:* Software upgrade, usability, acceptance time, market share.

## 1 Introduction

You upgrade your software when you buy a newer version of the same software. This is different from a patch or a software update, which almost always free of charge (Elmblad). Software tools are upgraded frequently in recent years. While these upgrading can make certain improvements on the software quality and address some of the existing usability issues, they might also introduce extra complexities to the software tools. These complexities might increase the software learning curve. In some of the software tools, the ways to perform tasks are changed. These introduce difficulties for existing users and might introduce new usability issues. In some of the cases, while many new features were introduced, some important usability issues still remain.

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The initial motivation of this paper was to answer the following questions:

- When it becomes necessary to upgrade a software tool to a new version?
- How long time period is suitable? How the decision is made?
- As educators, what are the factors which should be considered when we make a decision to move to a new version of a piece of software?

Two software examples were used in this paper: Microsoft Internet Explorer (IE) and Microsoft Visual Studio .NET (VS.NET). The public browser statistics information from three different sources was used in IE study. The author's experiments were used in VS.NET study.

The rest of the paper is organised as the followings: IE is studied in section 2, VS.NET is studied in section 3. The results and the future work are discussed in the final section.

## 2 IE

Table 1 shows the recent release times for IE (Wikipedia a, b, c and d, W3schools a).

**Table 1: IE Recent Release Times**

Version	Release Time
IE4.0	September 1997
IE5.0	March 18, 1999
IE6.0	August 27, 2001
IE7.0	October 18, 2006

From Table 1 we can see that, it took around two years from IE4.0 to IE5.0 and from IE5.0 to IE6.0. However, it took more than five years from IE6.0 to IE7.0.

IE5.x supports more CSS2 features, bi-directional text, ruby character, XML/XSL and more CSS properties (PCWorld, Wikipedia b, Wikipedia f, Wikipedia h).

IE6.x introduced more CSS changes and bug fixes. IE6.x was to be more secure and more W3C-compliant (Floodgap HELP, Wikipedia c, Wikipedia f, Wikipedia h).

IE7.x supports PNG alpha channel, tabbed browsing, more CSS bug fixes, RSS platform integration, new UI, quick tabs. IE7.x improves performance, stability, security, application compatibility and final CSS

adjustments (Microsoft Windows, Wikipedia d, Wikipedia f, Wikipedia h). Obviously IE7.x introduced more new features, particularly in the user interface area.

In this section, we study the issues related to the acceptance of a new version of a piece of software. The browser information is taken from three difference sources (EWS, TheCounter.com and W3schools b). Two groups of data were taken from each source: major browser market share information and the market share information for the different versions of IE. The time period from 1998 to 2008 is covered. However, only information from 2002 to 2008 is available from both of the w3schools and TheCounter.com. Two time points were selected for each year. We tried to make the time interval between the two time points as close to six month as possible. Browsers covered are Microsoft (MS), which includes IE4.x, IE5.x, IE6.x, IE7.x and other versions, Firefox (FX) as well as Netscape (NS).

**Table 2: EWS IE Market Share Information**

Date	IE4.x	IE5.x	IE6.x	Other
19/01/1998	37.8%			62.2%
19/07/1998	61.7%	.5%		37.8%
19/01/1999	73.3%	3.3%		23.3%
19/07/1999	59.1%	29.9%		11.0%
19/01/2000	32.2%	63.2%		4.6%
19/07/2000	22.0%	74.4%		3.7%
19/02/2001	9.4%	89.0%		1.7%
19/08/2001	5.9%	89.6%		4.4%
19/01/2002	3.3%	62.2%	34.1%	.3%
19/07/2002	.1%	50.1%	48.1%	0%
19/01/2003	.7%	31.0%	68.2%	.1%
19/03/2003	.9%	28.1%	71.0%	.0%
29/01/2004	.3%	11.2%	88.5%	.0%
19/07/2004	.2%	11.6%	88.2%	.0%
04/01/2005	.1%	10.5%	89.4%	.0%
19/07/2005	.1%	4.7%	95.2%	.0%
19/01/2006	.0%	2.8%	97.0%	.1%
19/07/2006		5.1%	92.7%	2.1%
19/01/2007	.0%	3.5%	70.1%	26.4%
19/07/2007		1.6%	59.3%	39.1%
19/01/2008		1.1%	44.2%	54.7%
19/05/2008	%	1.4%	52.9%	45.7%

Table 2 shows the market share information for the different versions of IE from EWS. EWS is an instructional computing environment for the College of Engineering at UIUC, provided by CITES | Departmental Services (EWS). Table 1 show that IE5.0 was released on 18/03/1999. Table 2 shows that on 19/01/2000, after less than one year of the release, IE5.0 took 63.2% market share, which is more than half market over the other versions of IE. On 19/02/2001, after less than two years of the release, IE5.0 took 89.0% market share, which is most of the market over the other versions of IE.

Table 1 show that IE6.0 was released on 27/08/2001. Table 2 shows that on 19/07/2002, after less than one year of the release, IE6.0 took 48% market share and it stayed growing after that, which is almost half market over the other versions of IE. On 29/01/2004, after two and the half years of the release IE6.0 took 88.5% market share, which is most of the market over the other versions of IE.

Table 1 show that IE7.0 was released on 18/10/2006. Table 2 shows that on 19/05/2008, after one and half years of the release, IE7.0, together with all other versions of IE, took 48% market share, which is still less than the market share of IE6.0 (52.9%).

The above data shows that IE5.0 was accepted by the market quicker than IE6.0, IE6.0 was accepted by the market quicker than IE7.0. To verify this, we need to check the statistics information from the other two sources.

**Table 3: TheCounter.com IE Market Share Information**

Date	IE4.x	IE5.x	IE6.x	IE7
Nov 2002	1%	44%	47%	
Dec 2002	1%	41%	50%	
Feb 2003	1%	38%	53%	
Aug 2003	1%	34%	59%	
Jan 2004		18%	74%	
Jul 2004		16%	77%	
Jan 2005		8%	80%	
Jul 2005		5%	83%	
Jan 2006		4%	86%	
Jul 2006		2%	82%	
Jan 2007		1%	63%	20%
Jul 2007		1%	52%	19%
Jan 2008			42%	37%
May 2008			37%	40%

Table 3 shows the market share information for the different versions of IE from TheCounter.com. TheCounter.com provides accurate, up-to-the-minute reports on how your web pages are being used by visitors to your site (TheCounter.com). Table 3 shows that in December 2002, after about one year and half year of the release, IE6.0 took 50% market share. In January 2004, after about two and half years of the release, IE6.0 took 74% market share, which is most of the market over the other versions of IE.

Table 3 shows that in May 2008, after one and half years of the release, IE7.0 took 40% market share, which is less than half market over the other versions of IE.

From the above data, we can not find sufficient information about IE5.0. However, it does confirm that IE6.0 was accepted by the market quicker than IE7.0.

**Table 4: W3schools IE Market Share Information**

Date	IE4.x	IE5.x	IE6.x	IE7
Jan 2002	1.0%	55.7%	30.1%	
Jul 2002	0.5%	40.1%	44.4%	
Jan 2003		29.3%	55.3%	
Jul 2003		20.3%	66.9%	
Jan 2004		15.8%	68.9%	
Jul 2004		13.2%	67.2%	
Jan 2005		9.7%	64.8%	
Jul 2005		5.9%	67.9%	
Jan 2006		5.5%	60.3%	0.2%
Jul 2006		4.2%	56.3%	1.9%
Jan 2007		3.0%	42.3%	13.3%
Jul 2007		1.5%	36.9%	20.1%
Jan 2008		1.5%	32.0%	21.2%
Apr 2008		1.0%	28.9%	24.9%

Table 4 shows the market share information for the different versions of IE from W3schools. W3Schools is a web developer's portal, with tutorials and references relating to web development subjects, including HTML, XML, CSS, and JavaScript. W3Schools advocate making web pages that validate against the W3C's standards. (W3C, W3schools b). Table 4 shows that in December 2002, after about one year and half year of the release, IE6.0 took 50% market share. In January 2004, after about two and the half years of the release IE6.0 took 74% market share, which is most of the market over the other versions of IE.

Table 4 shows that in May 2008, after one and half years of the release, IE7.0 took 40% market share, which is less than half market over the other versions of IE.

From the above data, we can not find sufficient information about IE5.0. However, it does confirm that IE6.0 was accepted by the market quicker than IE7.0.

Next, we study the market share information for different browsers and try to get an understanding which version of IE helps to gain the market and which version of IE contributes in losing of the market.

Table 5 shows the market share information for different browsers from EWS (EWS). From the time point right before IE5.0 was released, 19/01/1999, to the time point right after IE5.0 was released, 19/07/1999, IE had gained the market share from 38.5% to 48.6%, and it kept that trend to the time point of IE6.0 was released. From the time point right before IE6.0 was released, 19/08/2001, to the time point right after IE6.0 was released, 19/01/2002, IE had gained the market share from 79.8% to 84.6%, and it stayed at that level for at least another year. From the time point right before IE7.0 was released, 19/07/2007, to the time point right after IE7.0 was released, 19/01/2008, IE had lost the market share from 41.3% to 35.7%, and it kept that trend to the current time point.

**Table 5: EWS Browser Market Share Information**

Date	MS	NS	FX	Other
19/01/1998	38.5%	58.5%		3.0%
19/07/1998	48.6%	47.1%		4.3%
19/01/1999	48.3%	48.5%		3.1%
19/07/1999	57.9%	38.4%		3.6%
19/01/2000	60.3%	36.1%		3.6%
19/07/2000	69.3%	25.9%		4.8%
19/02/2001	71.4%	25.4%		3.2%
19/08/2001	79.8%	15.0%		5.3%
19/01/2002	84.3%	11.1%		4.6%
19/07/2002	82.9%	10.5%		6.6%
19/01/2003	84.9%	9.6%		5.6%
19/03/2003	82.8%	11.3%		5.9%
29/01/2004	76.9%	11.8%		11.3%
19/07/2004	73.6%	12.8%		13.7%
04/01/2005	66.2%	15.3%		18.5%
19/07/2005	67.3%	20.7%		12.1%
19/01/2006	62.0%	28.0%		10.0%
19/07/2006	49.9%	19.8%		30.3%
19/01/2007	54.1%	23.2%		22.8%
19/07/2007	41.3%	19.9%		38.7%
19/01/2008	35.7%	24.2%		40.0%
19/05/2008	28.1%	18.5%		53.4%

**Table 6: TheCounter.com Browser Market Share Information**

Date	MS	NS	FX	Other
Nov 2002	92%	3%		
Dec 2002	92%	2%		
Feb 2003	92%	3%		
Aug 2003	92%	4%		2%
Jan 2004	92%	2%		5%
Jul 2004	93%	2%		5%
Jan 2005	89%	0%	1%	9%
Jul 2005	88%	1%	8%	2%
Jan 2006	90%	0%	6%	2%
Jul 2006	84%	1%	10%	4%
Jan 2007	84%	0%	11%	5%
Jul 2007	72%	10%	13%	2%
Jan 2008	79%	0%	14%	2%
May 2008	77%	0%	16%	5%

Table 6 shows the market share information for different browsers from TheCounter.com (TheCounter.com). At the time point after IE6.0 was released, November 2002, IE had the market share of 92%, which is the highest level in IE history from this source, and it stayed at that level for about two other years. From the time point right before IE7.0 was released, July 2007, to the time point right after IE7.0 was released, January 2008, IE had

gained a very small market share from 72% to 79%, and it stayed that level to the current time point.

**Table 7: W3schools Browser Market Share Information**

Date	MS	NS	FX	Other
Jan 2002	86.8%	7.9%		2.8%
Jul 2002	85%	7.3%		3.5%
Jan 2003	84.6%	4.0%	4.0%	
Jul 2003	87.2%	2.7%	5.7%	1.7%
Jan 2004	84.7%	2.4%	5.5%	1.5%
Jul 2004	80.4%	2.2%	12.6%	1.6%
Jan 2005	74.5%	4.5%	16.6%	1.9%
Jul 2005	73.8%	3.1%	19.8%	1.2%
Jan 2006	66.0%	3.6%	25.0%	1.6%
Jul 2006	62.4%	2.7%	25.5%	1.4%
Jan 2007	58.6%	1.5%	31.0%	3.2%
Jul 2007	58.5%	1.4%	34.5%	3.4%
Jan 2008	54.7%	1.3%	36.4%	3.3%
Apr 2008	54.8%	1.0%	39.1%	3.6%

Table 7 shows the market share information for different browsers from W3schools (W3schools b). At the time point after IE6.0 was released, January 2002, IE had the market share of 86.8%, which is almost the highest level in IE history from this source, and it stayed at that level for about two other years. From the time point right before IE7.0 was released, July 2007, to the time point right after IE7.0 was released, January 2008, IE had lost the market share from 58.5% to 54.7%, and it stayed that level to the current time point.

The above data suggested that IE5.0 and IE6.0 had positive impact on IE market share and IE7.0 had negative (or non-positive) impact on IE market share. Of course, this can be discussed. As the information from the three sources could have their limitations and many other factors could contribute to the IE market lose, e.g. other browsers' improvement.

Who had gained the lost market? Table 6 and Table 7 consistently suggested that Firefox had gained the market share from IE. From the author's observation, the user interface of IE7.0 is quite similar to that of Firefox. However, Firefox has been using that user interface for long time, so its users don't have to learn it now. On the other hand, IE6.0 users need to learn those new user interface features. One of the contributions of IE7.0 is that it fixed many CSS bugs (Reference). However, those bugs did not exist in Firefox in the first place. These need further research to confirm.

### 3 VS.NET

In this section, we study software upgrading related issues by using VS.NET as an example. Table 8 shows the recent release times (Wikipedia e) of VS.NET. From Table 8 we can see that, it took more than two years from VS.NET 2002 to VS.NET 2005 and VS.NET 2005 to

VS.NET 2008. However, it took only one year and two month from VS.NET 2002 to VS.NET 2003.

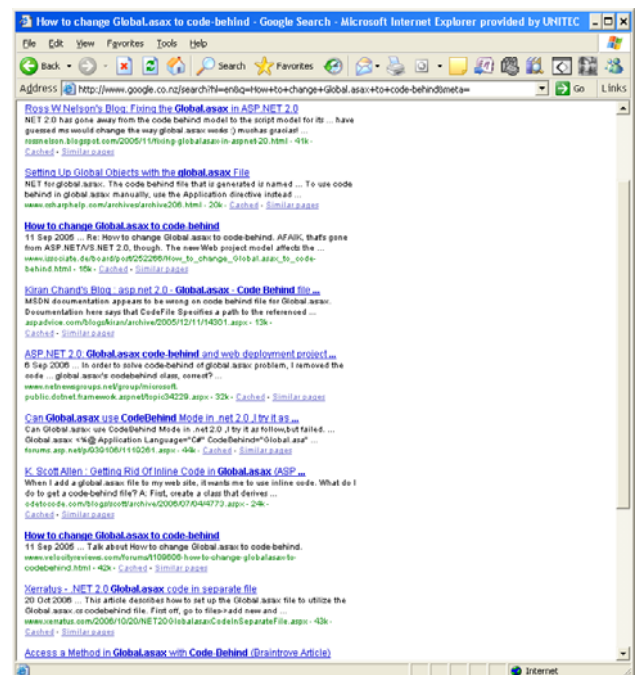
Microsoft Visual Studio is the main Integrated Development Environment (IDE) from Microsoft. It can be used to develop console and graphical user interface applications along with Windows Forms applications, web sites, web applications, and web services in both native code as well as managed code for all platforms supported by Microsoft Windows (Wikipedia e).

**Table 8: VS.NET Recent Release Times**

Version	Release Time
VS.NET 2002	February 2002
VS.NET 2003	April 2003
VS.NET 2005	October 2005
VS.NET 2008	November 2007

In VS.NET 2002, a managed code development environment using the .NET Framework with C# and Visual Basic .NET was first introduced (Wikipedia e). Microsoft introduced a minor upgrade to Visual Studio .NET called Visual Studio .NET 2003 (Wikipedia e).

Visual Studio 2005 provides a range of tools that offer many benefits for individual developers and software development teams. Visual Studio 2005 was upgraded to support all the new features introduced in .NET Framework 2.0, including generics and ASP.NET 2.0. The IntelliSense feature in Visual Studio was upgraded for generics and new project types were added to support ASP.NET web services. Visual Studio 2005 also includes a local web server, separate from IIS, which can be used to host ASP.NET applications during development and testing (MSDN, Wikipedia e).



**Figure 1: The Search Results about Global.asax Code-behind Issue**

While the above changes benefited the users, they introduced issues to the users at the same time. In particular, when things are not working in the ways you are used to. For example, the way how to work with Global.asax was changed. VS.NET 2005 won't even let you create a global.asax with a code-behind file in any new website you create. Many VS.NET 2003 users were asking "How to change Global.asax to code-behind" (IT Community bytes). A search on "How to change Global.asax to code-behind" from <http://www.google.co.nz/> on 26/5/08, showed that all the top 10 results were about Global.asax code-behind issue, and they were all published during year 2005 and 2006, which was around the time that VS.NET was released. Figure 1 shows the screen dump of the search results. This suggested that some new features might cause usability issues to the existing users.

While many new features were introduced in VS.NET 2005, some existing issues are still not addressed. For example, in ASP.NET, A correct connection string should be

```
Dim ConnStr As String =
"PROVIDER=Microsoft.Jet.OLEDB.4.0;
DATA SOURCE=" &
Server.MapPath("/wad08s1/wadexercises/
database1.mdb") & ";"
```

A small spelling error on word "SOURCE", for example "SORUCE", would cause the error message given in Figure 2. This error message would not be helpful to identify the problem. An error message like "the connection string is not correct" would make more sense. And this is exactly the same message we had got from VS.NET 2003 in this situation. This suggested that some existing issues should be addressed in the higher priority than introducing some of the new features.

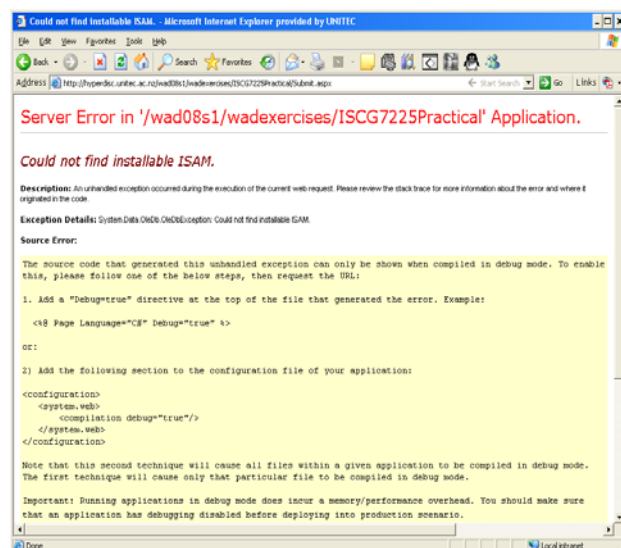


Figure 2: An Error Caused by a Spelling Mistake

The above two software examples could suggest that new and more are not always better. Sometimes, probably the simpler the better.

## 4 Discussion and the Future Work

This paper uses the upgrading of IE and VS.NET as examples to study software upgrading related issues. The IE example suggested that the software version (IE7.0) with more new features on the user interface took longer time to be accepted by the market and it could have negative impact on the software's market share. The VS.NET example suggested that some new features might cause usability issues to the existing users and some important existing issues should be addressed in the higher priority than introducing some of the new features. These are helpful to answer the initial questions. However, further research is required to confirm these suggestions.

Further research is also required to answer the following questions effectively:

- When it becomes necessary to upgrade a software tool to a new version?
- How long time period is suitable? How the decision is made?
- As educators, what are the factors which should be considered when we make a decision to move to a new version of a piece of software?

Most of the references used in this paper are website reference; some of these websites are authorized, for example, MSDN, Microsoft and W3schools. Many references are from Wikipedia as well. In those cases, the citations in the Wikipedia were checked, and also the author's knowledge was used to verify the references.

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