APPENDIX

EXHIBIT A

STATE OF MINNESOTA

DISTRICT COURT

COUNTY OF HENNEPIN

FOURTH JUDICIAL DISTRICT

DANIEL GORDON, MICHAEL STOLEE, VOCAL SIGNS, INC., DAVID ELLINGSON, KARI A. WALLACE, RECLAIM CENTER, INC., Individually and On Behalf of All Others Similarly Situated,

Plaintiffs,

v.

MICROSOFT CORPORATION,

Defendant.

Case Type: Class Action

Case No. 00-005994
JUDGE BRUCE A. PETERSON

Technical Expert Report of Professor David Martin

CONFIDENTIAL

June 2, 2003

TechAct 14, De-Documenting Namespace Extensions

Time period: 1994-96

Microsoft products: Windows 95 (including "Chicago" beta)

Companies or products affected: WordPerfect, Quattro Pro; possibly Lotus (Notes and cc:Mail), Stac, Symantec, Netsoft, Oracle, others.[516]

Brief explanation: Windows 95 has a feature that lets applications add new "namespace extensions" or "virtual folders" to the Windows 95 shell (e.g., Explorer[517]). For example, the Recycle Bin, Control Panel, and Briefcase are namespace extensions.[518]

During the "Chicago" beta leading up to Win95, Microsoft began documenting this feature so that ISVs could create namespace extensions, as well as browse the existing ones. The documentation started to appear around the time of Chicago M6 (Beta 1; 'M' = milestone) in June 1994.[519] The documentation Microsoft provided then was sufficient to start work on namespace extensions, i.e., for a company to make an investment of developer time, but insufficient to produce a complete namespace extension.[520] Based on Microsoft's documentation, ISVs including WordPerfect started creating namespace extensions, and Microsoft knew this.[521]

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[516]Harral depo., Dec. 12, 2001, p. 88 mentions Quattro Pro as well as WordPerfect. Gates memo (see below at note 522) targets WordPerfect (WP), Lotus Notes, and cc:Mail. MS email (see note 526 below) lists Stac, Symantec, Netsoft, and Oracle.

[517]The use of "e.g." rather than "i.e." is deliberate: it appears that this feature is supported by the shell32 OS DLL, and is not necessarily restricted to the Explorer shell itself. If so, this would be additional evidence for TECHACT 2. (On the other hand, shell32 also seems to "know about" Explorer specifically, which might be seen as an example of "commingling" of code?)

[518]See e.g. David Campbell, "Extending the Windows Explorer with Name Space Extensions," *Microsoft Systems Journal*, July 1996 (*http://www.microsoft.com/msj/archive/S332.htm*). Namespace extensions are also supported in Windows NT 4.0. *http://msdn.microsoft.com/msdnmag/issues/01/11/XPShell/XPShell.asp* implies they are supported on XP; DUMPPE utility (*http://www.tbcnet.com/~clive/dumppe.zip*) confirms presence of SHELL32.174 (SHCreateShellFolderViewEx).

[519]For example, the Chicago pre-Beta SDK (June 1994) contained sample code called "regext" that showed how to present the contents of the Windows registry as a shell folder. (See collection of emails from 1995-96, discussing namespace extensions at *http://www.compware.demon.co.uk/huey/w95vfd.txt*.) MSPCA 1018625-30 says M6 (Beta 1) was May 1994, will include IShellFolder.

[520]Richardson depo., p. 213: "The documentation for the APIs was produced in an incomplete state with the promise that the additional APIs would be provided at a later date. Rather than producing the additional documentation, they retracted the original documentation." See also Richardson depo., p. 83.

[521]See Robert Muglia depo., Oct. 1, 2001, p. 167, discussing IShellBrowser: "it became clear that third parties wanted to take advantage of these sorts of capabilities. In fact, ISVs started calling them. The interfaces actually started getting used by third parties because people explained how to use it and it got out and third parties started building applications that took advantage of it." Microsoft was specifically aware that WordPerfect was relying on the shell APIs: WP "called and talked to [Microsoft] premiere support [PSS] about these APIs and the use of them on a regular basis" (Richardson depo., Dec. 13, 2001, p. 82).

In October 1994, shortly before Chicago M7 (Beta 2), Bill Gates decided that Microsoft should stop documenting the feature. In an Oct. 3, 1994 email titled "Shell plans – IshellBrowser," Gates said "I have decided that we should not publish these extensions. We should wait until we have a way to do a high level of integration that will be harder for likes of Notes, Wordperfect to achieve, and which will give Office a real advantage."[522]

Gates's memo – a stark instruction to manipulate Windows APIs to disadvantage applications competitors – was implemented almost immediately. One week after Gates's email: "Based on the recent decision, we are hiding one of [the] shell extension mechanisms ... Became private (i.e., name space extension mechanism): IShellBrowser, IShellView, IPersistFolder, ICommDlgBrowser."[523] The concealment of the name-space extension mechanism was reflected in the next SDK that went out to ISVs, about the time of Chicago M7 (Oct.-Nov. 1994); shell documentation that had previously been available was now absent.[524]

The reasons that were given to ISVs were completely different from those in Gates's internal memo: ISVs were instead told that the namespace extension feature was unstable

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[522]FLAG 042508; MX 9030733; FLAG 087459

[523]Satoshi Nakajima (a developer who worked on the shlobj.h header file), "shlobj.h delta done: Making IShellBrowser internal," Oct. 10, 1994, MS98 0103243. It also notes that IShellFolder and IEnumIDList "[b]ecame read-only public interface (read-only means no customized implementation)," likely meaning that existing namespaces can be browsed, but without the ability to create new ones. (Nakajima's email was discussed briefly in Slivka DOJ depo., Sept. 3, 1998, pp. 133-136.)

[524]For example: "MS documented them in M6, but removed documentation in M7" (Sept. 1995 non-MS email quoted in *http://www.compware.demon.co.uk/huey/w95vfd.txt*).
However, Muglia depo., p. 165, denies all this: "Q. Do you know if those interfaces were ever published? A. Yes, they were. Q. When? A. Very shortly after Bill sent the mail saying they shouldn't be published. Almost immediately.... MR. ROSENFELD: Do you want to know why, counsel? MR. BISHOP: Q. I'm wondering why they would go against Bill Gates' instructions. A. It wouldn't be the first time."
But Muglia's "almost immediately" is wrong. For example, a Microsoft book published in the summer of 1995, *Programmer's Guide to Microsoft Windows 95* (Redmond WA: Microsoft Press, 1995), in its chapter on "Shell's Namespace," has nothing about IShellBrowser or IShellView, and has the following note for IShellFolder::CreateViewObject: "This member function is reserved for use by the shell and should not be called by applications" (p. 194). IShellFolder::CreateViewObject is how a third-party namespace extension would provide an IShellView, and IShellView::CreateViewWindow is how namespace extensions get to IShellBrowser (see e.g. Dino Esposito, *Visual C++ Windows Shell Programming*, Birmingham UK: Wrox Press, 1998, pp. 543-549). Thus, in the summer of 1995, Microsoft was not documenting how to create a namespace extension.
The *Microsoft Systems Journal* article from July 1996, referenced above in note 518, refers to what even then was still "preliminary documentation on Explorer's name space mechanism."
A Microsoft article from as late as Oct. 1996 refers to "a yet-to-be documented message, the WM_GETISHELLBROWSER message" ("PRB: IShellFolder::CreateViewObject() Causes Access Violation," Q157247, Oct. 10, 1996, *http://support.microsoft.com/support/kb/articles/Q157/2/47.asp*).
There is plenty of additional evidence to disprove Muglia's claim that Gates's Oct. 1994 email wasn't implemented, and that the documentation was released "almost immediately." In fact, the documentation was discontinued almost immediately, and not provided again until sometime in 1996 (see note 537).
As further disproof, Gates himself makes the opposite assertion from Muglia's – claiming that IShellBrowser was *never* documented or even implemented; see "Proof" below.

and/or incompatible with the shell in MS's then-forthcoming Cairo OS.[525] These explanations not only differed from the reason given in Gates's email; they are implausible (see below).

ISVs were not only told the wrong reasons why the documentation was pulled; they were also told that the feature *would not exist* in Win95 and/or that it would be substantially different from that upon which they had been relying.[526]

Microsoft's API/documentation change impacted ISVs. As one MS email notes, "This caused significant changes in many of their development plans…".[527] Depositions taken from ex-WordPerfect employees confirm the negative impact of this decision,[528] and WordPerfect complained (or considered complaining) to the DOJ about it as early as July 1995.[529]

Despite Microsoft's retraction of its existing namespace-extension documentation, and failure to complete the documentation during the Win95 beta, namespace extensions did exist within Win95. Microsoft used namespace extensions as part of the Microsoft Network (MSN) and in email clients.

It was internally suggested that MS remove namespace extensions from these products because "no one in the world outside of Microsoft … will buy the argument that they are

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[525]See e.g. Eric Meyers depo., Sept. 28, 2001, p. 180: "Well, just a few months before Microsoft Windows 95 shipped, Microsoft retracted those APIs.... They told us that they didn't feel that they were stable enough, is what they told us. But they suddenly went away."

[526]E.g., "we proactively notified ISVs (Stac, Symantec, Netsoft, Oracle, etc.) who were actively developing using these interfaces and told them that (1) the functionality of running in an integrated window *was gone* and (2) they were strongly discouraged from using the modified apis at all because of compatibility risks" (Brad Struss, "FW: Shell extensibility and ISVs," Aug. 10, 1995, MS98 0120900-2, emphasis added). Similarly, "we went and told the ISVs that there was a lot that they could do in the system with respect to extensibility BUT they *COULD not* integrate into the explorer (like the control panel and briefcase) as we had previously mentioned was possible" (MS98 0120901, Aug. 8, 1995, emphasis added).

[527]"… but they understood and pushed forward" (MS98 0120900, Aug. 10, 1995). They would likely have not been as understanding if they had seen Gates's email.

[528]See Meyers depo., pp. 176-83, 314-5; Richardson depo., pp. 77-85, 92-93, 108-9; Harral depo., pp. 82-89, 95, 99-106

[529]See e.g. Bruce Brereton, "DOJ Inquiry Reply," July 13, 1995, NL2 000071. Item #1: "MS removed the ability to hook into the Explorer. That is why we are doing our own Open Dialog/Name space browser from scratch. I also don't know if MS apps are going under the covers and extending the explorer themselves." (Harral depo., p. 98, discussing this email, says this refers to taking existing information that Explorer knows, and presenting it in an app.) Item #3: "The largest area that has held us up has been that Microsoft initially published integration features (plug & play, shell integration, etc.) and then pulled the features without letting us know." (Harral p. 99 says WordPerfect saw the desktop coming to play a more significant role; Brereton's #3 reflects the revere capability from #1: taking features in apps and integrating them back into the shell, "shell extensions.") Item #7: "Support for shell integration was dropped because they were not ready to publish how to do shell integration with NT/Cairo and they did not want us going down a road they were unwilling to support later. The bad thing about that is that their own software does do some integration with the same." (Harral pp. 104-5 says this is the same issue as #1 and #3.)

'part of Chicago' and get the interface while others don't. This is an impossible sale."[530] But Microsoft in fact *did* go on to use namespace extensions in MSN (forums appeared as folders, for example)[531] and in its Internet Mail client in 1995-97.[532] As one MS email noted, "This is the EXACT thing we told ISVs they could (and should) not do!"[533]

Microsoft also used namespace extensions in a utility called cabview,[534] and eventually in Microsoft Office, to support its "Web Folders" feature.[535]

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[530]Brad Silverberg, email exchange with Tom Evslin, Oct. 3, 1994, MX 5117033 (GX 398). Evslin had suggested that Capone (codename for the email client for Exchange Server 4.0) and Marvel (codename for MSN) "are part of the Chicago shell (or can be positioned that way)," a good example of the cynical (or at best arbitrary) way in which Microsoft employees sometimes make technical claims of what software "is part of" or integrated into other software when it suits their purpose.

[531]For example, MSN's "interface is considerably superior to any of its rivals, partly because of the tight integration with the operating system. Forums appear as folders, documents as icons with properties, resembling any other object on the desktop. In fact, once the user has negotiated the attractive introductory screens, the display resembles a *Windows 95* disc file listing" (*PC User* [UK], Oct. 4-17, 1995, quoted in *http://www.aslib.co.uk/caa/abstracts/open/95-1694.html*).

[532]See Douglas Boling, "Internet Mail, Lite," *Microsoft Internet Developer*, Sept. 1996 (*http://www.microsoft.com/Mind/0796/flux0796.asp*) on the Internet Mail (IM) client, part of MS's "Athena" project: "A look under the hood demonstrates how the mail client hooks so tightly into the user interface of Windows 95. The mail client is implemented as a name space extension to the Windows 95 shell. Essentially, a name space extension is an OLE-compliant DLL that exposes the newly documented IShellFolder and IShellView interfaces. It communicates back to the Explorer through the IShellBrowser interface." IM was designed for IE3, and in IE4 and higher was supplanted by Outlook Express (see *http://cws.internet.com/mail-msmail.html*, which has April 1997 mailnews.zip for download). (Note that Outlook Express relies heavily on undocumented exports from shlwapi.dll.)

[533]"The prerelease Athena PIM now displays capabilities contrary to what we have been telling our ISVs" (MS98 0120900, Aug. 10, 1995); Athena (MS's lightweight mail client) is "not only using the namespace extensions but they are also displaying themselves in the scope (left) pane and view (right) pane. This is the EXACT thing we told ISVs they could (and should) not do!" (MS98 0120901, Aug. 8, 1995). Silverberg replies that "athena is part of windows" so it's okay (MS98 0120900, Aug. 11, 1995), which is amusing given his earlier statement that no one outside Microsoft would "buy" the claim that a mail client is part of Windows (see note 530). More important, this sidesteps the fundamental point: MS had told ISVs that the feature was going away entirely (see note 526 above).

[534]*Microsoft Systems Journal*, July 1996: "The Cab File Viewer extends the name space to allow Explorer to browse into CABinet files." Cabview was part of Microsoft's "Power Toys" suite (*http://www.microsoft.com/windows95/downloads/contents/WUToys/W95PwrToysSet*); the CABVIEW files are dated August and October 1995. George Pit, the author of cabview and a developer of the namespace-extensions code (along with Sato Nakajima [see comment to fcext.h file included with 1993 Chicago DDK]), confirmed in an Oct. 1995 email that cabview uses "'private' stuff" and "internal functions" (in *http://www.compware.demon.co.uk/huey/w95vfd.txt*). (Note that namespace extension feature was later pulled from cabview source code: see *http://msdn.microsoft.com/msdn-files/026/000/017/readme_txt.asp?frame=true*)

[535]See msonsext.dll, "Microsoft Office Name Space Extension" (1999). For example, "Web Folders installs as a namespace (or shell) extension with an icon in My Computer (root object in Windows Explorer)" (Q195851, March 17, 1999, *http://support.microsoft.com/default.aspx?scid=kb;EN-US;q195851*; see also *http://msdn.microsoft.com/library/en-us/off2krk/html/75t5_5.asp*, March 5, 1999: "The Namespace Extension allows users to browse, open, and save documents on a Web site as easily as they work with files on a local hard disk").

Until approximately April 1996, Microsoft was still telling ISVs that they could not create namespace extensions.[536] Microsoft did eventually (between April and July 1996) start reintroducing documentation for creating namespace extensions.[537]

By then, it was too late for WordPerfect, which had already undertaken a large engineering effort to replace the features which Microsoft had told it were gone. In fact, WordPerfect now to go back and "retrofit" its code to match Microsoft's belated documentation.[538] WordPerfect for Windows 7.0 came out in October 1996; it treats single files as folders in order to browse clipart archives; see Figure J below.[539] It would have been particularly appropriate for WordPerfect to rely on the namespace extensions built into Windows for this purpose. Instead, WordPerfect lost significant amounts of time and had to scuttle some planned features (see "Effects" section) because documentation for namespace extensions was made unavailable to them. Thus, WordPerfect was misled into sacrificing costly developer resources to rewrite code that did not in fact need to be rewritten. Given the interest other ISVs also took in namespace extensions, it is likely others besides WordPerfect were also harmed.

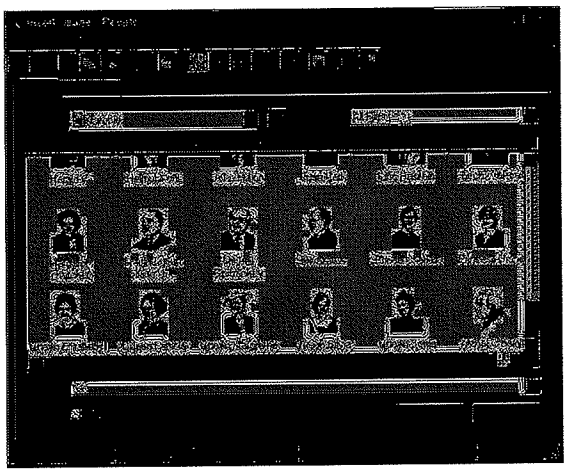

Figure J: Browsing clipart in Corel WordPerfect 7: treating a single file as a folder

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[536]Joe Belfiore, March 21, 1996 email "RE: Creating namespaces?", in *http://www.compware.demon.co.uk/huey/w95vfd.txt*: "these have been 'b-list' in the past".

[537]The *Microsoft Systems Journal* article from July 1996, referenced above in note 518, refers to what by then was *still* "preliminary documentation on Explorer's name space mechanism." Microsoft's EnumDesk and MFCEnum examples are from May 1996 (see "Windows 95 Virtual Folders," *http://www.compware.demon.co.uk/huey/_w95vf.htm*). (MS also released CabView sample code in April 1996, but this possibly was not a namespace extension; at some point, CabView ceased being a namespace extension sample, and SampView became MS's namespace-extension code sample; see note 534 above.)

[538]See Richardson depo., p. 92

[539]This was the first 32-bit version of WordPerfect, and the first version designed for Windows 95 (see e.g. *Computer Reseller News*, Nov. 11, 1996, p. 206; but note *InfoWorld*, Feb. 12, 1996, p. 1, reporting that "PerfectOffice 7.0 was scheduled to ship by the end of last year but was delayed when Novell Inc. decided to sell off its WordPerfect group. Corel now plans to help PerfectOffice users finally catch the 32-bit wave when it ships its Corel PerfectOffice in April" – in fact, it wouldn't ship until October).

Proof:[540] The key is that Gates's Oct. 1994 email -- targeting WordPerect and Lotus as the basis for removing IShellBrowser documentation -- is the identical conduct that the depositions by ex-WordPerfect employees have complained about. Richardson, Harral, and Meyers do not mention IShellBrowser by name. Instead, they refer to "name spaces" and "name space extensions."[541]

Given that email by one of Microsoft's namespace developers identifies IShellBrowser (and IShellView) as parts of the "name space extension mechanism" to become private after Gates's email,[542] and given that numerous developer resources identify IShellBrowser as part of namespace extensions,[543] there should not be any question here.

However, Bob Muglia has denied in deposition that Gates's Oct. 1994 email led to the retraction of documentation for IShellBrowser.[544] And one MS email -- the one noting that Microsoft's email client was doing exactly what ISVs had been told not to do -- also asserts that Microsoft had provided some sort of documentation: "So for the last year we have been distributing 'b-list' documentation to ISVs that were interested in the interfaces but always told them that this was not a desirable thing to do because these interfaces would most likely disappear in the future...".[545]

Given the trustworthiness of this email as to how MS's software was using the APIs, the claim that there was some documentation being distributed can't be dismissed out of hand, even though numerous software developers were "interested" in the interfaces but unable to get any documentation.[546] Perhaps MS was continuing to provide a select handful of ISVs with the old incomplete doc that was pulled before M7? Or is it possible MS actually did have complete or at least adequate namespace extension doc, and was only giving it to selected ISVs? This is unlikely, given the doc's incomplete state even when it was made public in mid-1996.[547] There does not appear to have been any ISV usage of these features until the documentation was finally published in mid-1996.

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[540]The following probably sounds like it belongs in the "Tech" section, but what's discussed here is not Microsoft's possible technical justifications for withdrawing the namespace extension documentation, but rather a denial that Gates's email has anything to do with it.

[541]E.g., Harral depo., pp. 85, 87; Richardson depo., p. 78 (which appears to incorrectly identify the relevant WordPerfect version as 6.0).

[542]See above at note 523.

[543]See e.g. the *Microsoft Systems Journal* (July 1996) article in note 518 above, and Dino Esposito's shell programming book in note 524 above.

[544]See note 524 above.

[545]"Shell extensibility and ISVs," Aug. 8, 1995, MS98 0120901. The April 1996 MSDN CD defines the "B-list" in xplrext.txt, which also described the Windows 95 Explorer Namespace Extension Mechanism: "B-list APIs are interfaces that are not official Win32 API. Use of B-list APIs is strongly discouraged since these APIs will not necessarily be supported on future releases. Use B-list APIs at your own risk." See Belfiore in note 536, MS 0186415, Sept. 1993. Also MSPCA 1104216 on netscape and RNAPH.DLL Re: B-List API (see TechAct 13). Discussed in Muglia depo., pp. 154-156.

[546]See the large set of emails at *http://www.compware.demon.co.uk/huey/w95vfd.txt.*

[547]See note 537 (*MSJ*, July 1996 re: "preliminary documentation").

Taking the opposite approach from Bob Muglia, Bill Gates on the other hand seemed to deny in deposition that the IShellBrowser feature itself was ever *implemented* at all,[548] therefore calling into question whether his "we should not publish these extensions" email is really talking about the same thing as what WordPerfect complained about.

Gates's deposition testimony asserts that Microsoft did implement shell name space extensions, but that IShellBrowser is something completely different, and was never implemented. But according to the Microsoft Developer Network (MSDN), "The IShellBrowser interface is exposed by Microsoft Windows Explorer and the Open File common dialog box to provide services for namespace extensions."[549]

According to Gates, "name space extensions were done, but all those let you do is navigate the name space, and then when you get to something, then you open a top-level window." Gates may be confusing the creation of namespace extensions with the smaller issue of whether these namespaces run "rooted" or "non-rooted." Rooted namespaces (such as Microsoft's 1995 cabview utility; see Figure K below) are what only let you "open a top-level window." Non-rooted namespaces (such as Network Neighborhood; see Figure L below) are also browseable within the left-hand pane of Explorer. Non-rooted namespaces run in the same single process as Explorer, whereas rooted namespaces can run in a separate Explorer process; the importance of this will become clear below.

In any case, *both* namespace extension types were implemented in Windows 95. Yet after Gates's Oct. 1994 email, Microsoft told developers that *neither* type would be available. Both types remained undocumented – yet used by Microsoft software – until mid-1996. According to *Microsoft Systems Journal*, there is "no code difference between the two" types of extension.[550] Thus, Gates's attempted distinction between namespace extensions and the subject of his Oct. 1994 email is not persuasive.

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[548]Gates depo., pp. 298-300: "We didn't do the iShellBrowser feature. Q. So you didn't need the extensions? A. Well, the idea is -- and we still haven't done this, which is -- you know, it's now eight years later.... [Q.] are the iShellBrowser extensions the same as the shell name space extensions? No, no. The shell name space extensions were done, but all those let you do is navigate the name space, and then when you get to something, then you open a top-level window." Gates's Oct. 1994 email was also briefly discussed in Gates DOJ depo., Sept. 2, 1998, pp. 155-158.

[549]*http://msdn.microsoft.com/library/en-us/shellcc/platform/shell/reference/ifaces/IShellBrowser/IShellBrowser.asp*

[550]*MSJ*, July 1996 (see note 518 above).

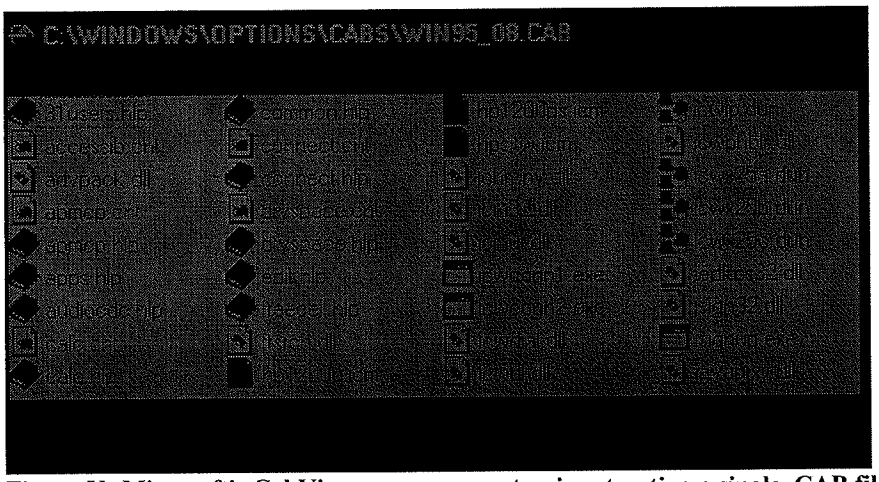

Figure K: Microsoft's CabView namespace extension: treating a single .CAB file as a folder

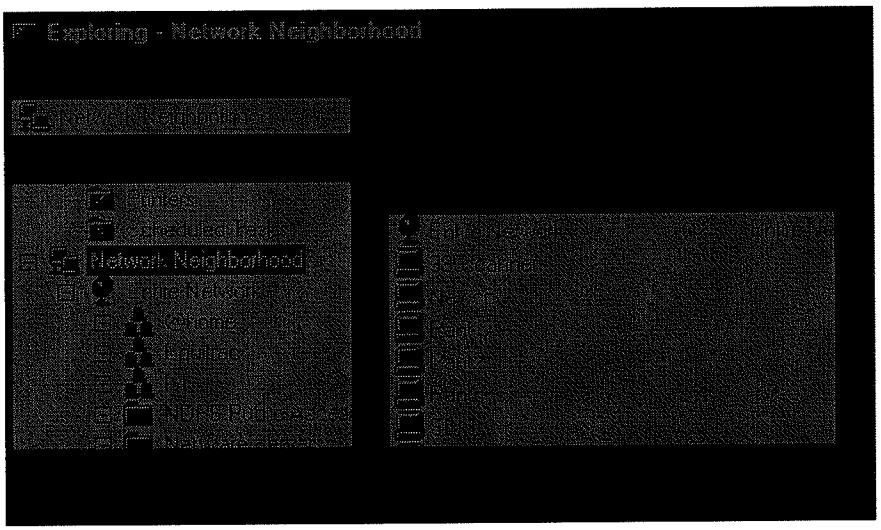

Figure L: Network Neighborhood

Microsoft's exclusionary intent: As noted above, Gates's Oct. 1994 email explicitly says that he wants to not publish the extensions until MS has something that will be harder for Lotus Notes and WordPerfect, and that will give MS Office an advantage. This directly confirms the suspicions expressed in the depositions taken from ex-WordPerfect employees.[551] The email also says of the Office/REN team -- "Ren" was the codename for the MS Outlook email client[552] -- "If we felt we could expand this team easily to help Office, *beat Notes*, be a source of future shell technology and be compatible *then I would say the extensions are ok.*"[553] This shows Microsoft's willingness to change the Windows platform, not to benefit Windows, but because it failed to give MS applications sufficient

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[551]E.g., Meyers depo., p. 159: "that's the interesting thing ... Word for Windows didn't need to use these shell APIs, okay?" See also Muglia depo., p. 167, notes that Gates's memo "talks about how difficult it would be for Office applications to take advantage of this, and, in fact, later on they did."
[552]Muglia depo., p. 168.
[553]emphasis added; see note 522.

leverage over non-MS applications. Similarly, "I don't think the integration will have a marked effect in terms of Capone competing with cc:Mail."

It was recognized within MS that APIs used by e.g. its email client should be documented. As early as September 1993, Brad Silverberg noted, "we clearly have to publish whatever api's capone uses."[554] The failure to document these APIs until long after the release of MS products that used the APIs (see above on MSN and Internet Mail), combined with the knowledge that the APIs "clearly" have to be documented, shows that the failure to re-document the APIs was intentional.

Lack of technical justification: Microsoft appears to have four explanations for its retraction of the Windows 95 namespace-extension mechanism during the Chicago beta: (a) this was during a beta, so anything goes; (b) the mechanism as originally described to ISVs would cause system instability, because namespace extensions would run in the same memory address space as Explorer; (c) it was incompatible with Cairo; and (d) because of (b) and (c), Microsoft knew the mechanism was going to change. In essence, Microsoft says that the mechanism wasn't soup yet. Microsoft deposition cross-examination questions have focused on (a) and (d).

A few general comments before discussing each individual justification:

First, note that Gates's Oct. 1994 email expresses no concern over instability or Cairo compatibility. Muglia says this is the background context for the email, but it doesn't seem to appear in the message.[555] Gates's message focuses instead on MS's then-current inability to exploit the namespace extensions in a way that WordPerfect, Lotus Notes, and cc:Mail couldn't use (WP in fact was heavily exploiting namespace extensions based on the incomplete beta documentation, and MS knew this).

There apparently was a conflict between the Win95 and Cairo groups on who should "own" the shell,[556] and this does appear to be part of the background to Gates's email. Perhaps Gates used WordPerfect/Lotus as a way to decide between two choices. If so, the Chicago group won in that the mechanism stayed, but the documentation was pulled, so the mechanism would essentially be Microsoft-only until it better understood how to exploit the capability.

Second, Gates's email on not publishing the extensions explicitly says "This is not to say that there was anything wrong with the extensions – on the contrary they are a very nice piece of work." Gates's acknowledgement that there was nothing wrong with the extensions explains why he does not mention supposedly fatal flaws like (b).

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[554]MS 0186416

[555]Except note the following sentence from Gates's memo: "This means that Capone and Marvel can still live in the top level of the Explorer namespace, but will run separately." This is the only allusion to the instability issue of running in a separate address space from Explorer. The email also talks about the Cairo shell, but in a different context from the namespace extensions.

[556]See e.g. David Bank, *Breaking Windows*, NY: Free Press, 2001, p. 50.

Third, the Gates email is about a decision to not "publish" the APIs. There's no suggestion about pulling the APIs themselves, and in fact it's clear from the note that they will continue to be used "for MS provided views such as control panel, and can use them for other MS-provided views that don't create a large compatibility or ISV issue." Similarly, Brad Struss in August 1995 wrote of "the decision to *not expose* the shell extension api's."[557] Thus, any Microsoft justification has to explain a refusal to publish or expose an existing API that Microsoft was continuing to use (was this perhaps some kind of dangerous weapon with which ISVs, unlike MS, couldn't be trusted?).

Fourth, Silverberg in August 1995 went on to write that the decision was based on considerations that "no longer operate." Thus, any Microsoft explanation should confine itself to some technical consideration that had ceased to operate by August 1995. This would rule out justification (b), for example.

(a) *During a beta, anything goes.* MS attorney Bettilyon essentially asked Richardson in his deposition whether an API during beta can really be said to exist. "There wasn't even an actual API set. There was documentation that said we're anticipating creating certain APIs, this is what we're thinking of creating?"[558] Richardson disagrees with this question, noting that the functionality *had* been created, and that the issue is strictly one of whether ISVs will be allowed to use this already-created functionality: "The APIs and the functionality remained, but the documentation was not provided."

Another point that might be made is that Microsoft didn't replace the API documentation with something else; it simply yanked it, without any replacement or suggestion on what ISVs should use instead, until namespace-extension documentation was re-introduced in mid 1996.

(b) *Instability: Extensions ran in the same process as Explorer.* In a letter to ISVs from ca. March 1996, Joe Belfiore noted: "With the current implementation of the Windows 95 shell, all of the applications that make up the shell run in the same process.... Under the current extension mechanism, that means that any outside application that was written as a shell extension via IShellView and IShellFolder, would also have the capability to bring down the entire shell, or be brought down if another shell extension failed."[559]

Belfiore's ISV letter notes: "Microsoft has decided to rearchitect the processes slightly. The current plan is to separate the Desktop/taskbar process from the rest of the explorer extensions that live in the shell namespace.... Now, if a shell process goes down, the desktop and taskbar will still be active, and you can relaunch the other applications easily." Note that Belfiore refers to this as a "slight" change.

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[557]MS98 0120900, emphasis added.
[558]Richardson depo., p. 213.
[559]Attachment to email from Joe Belfiore to Andrew Schulman, March 21, 1996, in *http://www.compware.demon.co.uk/huey/w95vfd.txt*.

This sounds like a reference to what became the "DesktopProcess" setting. For example, in a 1996 MS note on NT 4.0: "By default, the Windows NT 4.0 Desktop, Taskbar, and Explorer run in a single process using multiple threads. If you modify the registry, enabling the DesktopProcess entry, the Taskbar and Desktop will run in one process with each instance of Explorer in a separate process."[560] The setting was also implemented in Win9x. Importantly, DesktopProcess is turned *off* by default. There appear to be problems when using DesktopProcess=1.[561]

Significantly, Microsoft was meanwhile working to put Internet Explorer and Explorer into the same process space.[562] This has been cited as an importance source of Windows instability,[563] yet Microsoft forged ahead. Microsoft's important OLE technology (later renamed ActiveX; see TechAct 15) also involves running multiple components within the same process space.[564]

Given the numerous other problems with Windows 95's memory model,[565] it's difficult to see what made namespace extensions so uniquely problematic that ISVs had to be kept from using them – especially when MS itself was using them.

Thus, the acknowledged problem of namespace extensions running in the same process as Explorer seems like a pretext for a decision that was made for other reasons. Again, Gates's memo says nothing about same-process problems; it does talk about Office vs. WordPerfect and Lotus.

Also indicating that this issue could not have been the reason for pulling the namespace extension APIs, the July 1996 *Microsoft Systems Journal* article on namespace extensions makes no mention of the separate-process issue. How could the process problem be important enough to have the APIs hidden, yet not important to be mentioned when the

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[560]"How to Run Windows NT Explorer as a Separate Process (Q156366)," http://support.microsoft.com/default.aspx?scid=kb;EN-US;q156366

[561]See e.g. *http://support.microsoft.com/default.aspx?scid=kb;en-us;Q181562*, *http://support.microsoft.com/default.aspx?scid=kb;en-us;Q228502*.

[562]See e.g. *http://support.microsoft.com/default.aspx?scid=kb;en-us;Q167715*: "In Internet Explorer 4.0 Integrated Browser Mode, the Windows shell and the Web browser run in the same process space."

[563]E.g., Judge Jackson's Findings of Fact ¶ 174.

[564]Lotus's Noah Mendelsohn had made this point to Microsoft in late 1994: "isn't this an incredibly powerful opportunity for those writing Trojan horses, viruses, etc?" (IBM 7510374395; see TECHACT 15). (Mendelsohn has turned out to be right, but not necessarily because of process-space issues: see Richard Smith, "Accidental Trojan Horses: Security problems in Windows 98 PCs," Aug. 1999, *http://www.computerbytesman.com/acctroj/index.htm*.)

[565]See Schulman, "*Unauthorized Windows 95* Update." (*http://www.oreilly.com/centers/windows/update/unauthw.html*), especially the RUSSROUL, RANDRW, MEMPROBE and FILL sample programs, and Schulman, "Windows 95: Architecture" (*http://www.oreilly.com/centers/windows/brochure/architecture.html*): "DOS Memory Usage," "Protected from DOS?," "The Dangerous Memory Model," "Trashing System Memory," and "Private Address Spaces? Not!" Also see Matt Pietrek, *Windows 95 System Programming Secrets*, Foster City CA: IDG Books, 1995, e.g. p. 63: "The shared memory address spaces (below 4MB, above 2GB) are almost completely unprotected. Both Win16 and Win32 applications can scribble all over sensitive system data areas." Microsoft designed it this way.

APIs were finally unhidden? Or did the Explorer process change that Belfiore refers to makes the problem transparent to ISVs? Given the history of problems with DesktopProcess, the latter seems unlikely. Belfiore's letter says, "An ISV still has three choices, write their own application (using the sample code provided), run rooted, or integrate fully into the primary explorer." As the word "still" indicates, these are precisely the same choices ISVs could have had in 1994, when Microsoft pulled the plug on namespace extensions. Most important, note that "rooted" extensions (which can run as separate processes from Explorer) were not documented either.[566] In any case, as of 1998, it was *still* generally true that "a namespace extension runs in the same address space as Explorer."[567]

(c) *The extension mechanism was incompatible with Cairo.* "Cairo" was a planned version of Windows NT that Microsoft never released as a product.[568] According to Robert Muglia, the (unstated) context for Gates's Oct. 1994 memo was that publishing "this set of APIs called iShellBrowser ... would make it difficult for us to transition to the Cairo shell, because the mechanisms that iShellBrowser used ... were primitive in one way, but hard to replicate in another way compared to the mechanism that the Cairo shell was creating."[569]

Joe Belfiore's letter to ISVs (ca. March 1996) claimed: "Due to some architectural limitations of the current design, Microsoft originally chose not to publish these mechanisms until the design could be changed to work robustly on both Windows 95 and Windows NT. With the upcoming beta release of Windows NT, these limitations have been addressed, and the extension mechanisms will be published."[570]

The Microsoft email that notes that MS's own software is doing exactly what ISVs were told not to do observes that "The rationale at the time was that the interfaces were difficult to support especially on NT." Then, discussing the MS Internet Mail's use of namespace extensions, it notes: "What's strange about all of this is that it looks like this product works fine on NT as well."[571] (Thus, the "rationale" of NT compatibility appears to have been spurious?)

Meanwhile, Microsoft was insisting that, to be certified for the "Designed for Windows 95" logo for their products, ISVs had to test their products on NT as well as on Win95. Belfiore's ISV letter ends with this point: "Remember that in order to get the Windows

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[566]See above at note 550.
[567]Dino Esposito, *Visual C++ Windows Shell Programming*, Birmingham UK: Wrox Press, 1998, p. 563.
[568]Muglia depo., p. 17.
[569]Muglia depo., p. 166.
[570]See note 559.
[571]MS98 0120900-901. In his reply, Brad Silverberg notes that his team "did 'make darn sure NT is kept in mind' from the beginning for the shell, which is why it ported so easily. we have the x-platform [cross platform] responsibility and we deliver on it. we have one shell team..." (MS98 0120900).

95 Compatible Logo, you must also test on NT. It is especially important that you test your shell extensions on NT as well."[572]

Interestingly, Microsoft allowed itself to do a Win95-only namespace extension: MSN. As late as 1998, MSN was not supported on Windows NT, and was therefore ineligible for the "Designed for Windows 95" logo.[573]

While Microsoft was able to pick and choose the situations in which NT compatibility made sense, and while Microsoft's own products of course had no need for the "Designed for Windows 95" logo, ISVs that needed the logo[574] were being burdened with the extra costs of compatibility for what was then a niche OS[575] that they otherwise in many cases felt they did not need to support.[576]

Thus, to the extent that NT compatibility was a rationale for pulling the plug on ISV use of namespace extensions, this would be consistent with the Win95 logo campaign to "raise rival's costs" by foisting NT compatibility on ISVs, while MS allowed itself to pick and choose where NT compatibility was appropriate for its own products (including its MSN namespace extension).

(d) *The mechanism was subject to change; it wasn't soup yet.* In its cross-examination of Meyers, Microsoft asked: "the reason that you were given by Microsoft for retracting those APIs was that they were unstable; is that right? ... [A.] they said that they didn't feel that they were ready... for release.... [Q.] Did you challenge Microsoft's assertion that the APIs weren't ready? A: I'm sure that we did. We knew that there were a few problems but we didn't ... see them as a compelling reason to drop the support."[577]

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[572]See note 559 above. (Since Windows 95 didn't live up to its memory-protection claims [see note 565], Microsoft may have figured that forcing "Designed for Windows 95" applications to also run on NT would make these apps less likely to crash Windows 95.)

[573]See Q166090 (*http://support.microsoft.com/default.aspx?scid=kb;EN-US;q166090*): "MSN, The Microsoft Network, is not currently supported with Windows NT." Apparently it could be made to work with some tweaks described in the MS note. This MS note is undated, but see a *Computer Reseller News* (Jan. 12, 1998) article titled, "MSN lacks company logo – Microsoft Network, Windows NT Remain Incompatible" (*http://www.eric.com/sections/whoise2/WorkProduct/MSN-1.htm*).

[574]Bill Gates denied this in a *InfoWorld* (Nov. 21, 1994) interview: "Who needs the logo? It's our logo. We own the logo, but they don't need the logo. They can sell their software without the logo. So what's the big deal?"

[575]NT as a niche OS in 1994-7: combined FY94 worldwide sales of NT Workstation and NT Server: 104,862 (FLAG 105228); FY96: 513,871 (MSCA 610); FY97: 2,382,801 (MSCA 357). Thus, Microsoft was insisting upon compatibility with an OS that sold far less than 1 million copies, as a condition for receiving the "Designed for Windows 95" logo. Meanwhile, Windows 95 itself sold over 7 million copies in its first few months (see *http://www.microsoft.com/msft/earnings/FY96/q196.htm*).

[576]See extensive discussions of the Win95 logo's NT requirement in Meyers depo., pp. 267-276, and David Miller depo., Nov. 2, 2001, pp. 43-59. NL20000350-51: "I recommend we call upon the DOJ to look into Microsoft's logo program before we are required to spend valuable development resources to support Windows NT." See also NL20000578.

[577]Meyers depo., p. 313.

Indeed, any "unstable" feature of these APIs must have been quite small, because a June 1995 version of Microsoft's CabView namespace extension -- relying heavily on precisely the ostensibly "unstable" APIs pulled by MS -- continues to run, to this day, under Windows 98 SE.[578] This version of CabView uses the SHCreateShellFolderViewEx API, which remained undocumented until Aug. 2002, when it appeared as part of the court-approved "Settlement Program."[579]

In Oct. 1995, MS namespace developer George Pit told one non-MS developer who had reverse engineered and then provided partial explanations for some of the namespace APIs: "the thing that alarmed me most was the use of GetProcAddress to use SHCreateShellFolderViewEx. I realize *this is the one call that gets you the most functionality for the least amount of effort*, but this is also the one call that I can guarantee you will not work in Nashville."[580] ("Nashville" was the codename for the planned successor to Windows 95.[581])

Yet, as just noted, this most convenient of namespace extension APIs in fact continues to work in Windows 98 SE, so that the June 1995 CabView that relies on it continues to work. In fact, the following namespace extensions in Windows 98 SE all use the

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[578]This version of cabview.dll includes an import of shell32.174 (the long-undocumented SHCreateShellFolderViewEx).

[579]Searching Microsoft's web site on July 4, 2002, for "SHCreateShellFolderViewEx" had produced 0 results, as did "SHCreateShellFolderView" (without the "Ex"). Searching for "CreateShellFolderView" produced 1 result: *http://www.microsoft.com/msj/defaulttop.asp?page=/msj/archive/s332a.htm.* This is the sample code associated with the July 1996 *Microsoft Systems Journal* article; it contains source for a version of CabView that, rather than call the SHCreateShellFolderView API inside Windows, instead has its own CreateShellFolderView function, which gets an IShellView; it is called from CCabFolder::CreateViewObject.
Some non-MS web sites explained the SHCreateShellFolderView API, e.g. *http://www.codeproject.com/shell/shlext.asp?print=true#SHCreateShellFolderViewEx*: "This function enables you to use the same mechanism as Microsoft for displaying the contents of your namespace extensions. This function creates the Shell View for you, including the most important interfaces like IShellView. This function makes sure you will handle everything the way you should. It provides an easy interface for otherwise difficult tasks like changing the toolbar. When calling this function, you pass a callback function that gets called to handle all kinds of events, enabling you to customize the shell view." Interestingly, whatever justifications Microsoft may have tried to provide for keeping such APIs undocumented, this very API, SHCreateShellFolderViewEx, was finally documented – seven years after the public release of Windows 95 – as part of the court-approved Settlement Program (see *http://msdn.microsoft.com/library/en-us/shellcc/platform/shell/reference/functions/shcreateshellfolderviewex.asp* and *http://msdn.microsoft.com/library/en-us/dnapiover/html/api-overview.asp*).

[580]Quoted in Curt Hagenlocher, "More Shell Folder News from George P," Oct. 10, 1995, in *http://www.compware.demon.co.uk/huey/w95vfd.txt*, emphasis added.

[581]"I believe NASHVILLE was the code name for the followon to Chicago" (Carl Sittig depo., May 30, 2001, p. 294). However, plans changed, and "Memphis" was released as Windows 98.

SHCreateShellFolderViewEx API that was undocumented until the "Settlement Program" in Aug. 2002:[582]

- CDFVIEW (Channel Definition File View)
- MSIEFTP (Microsoft Internet Explorer FTP Folder Shell Extension)
- MSTASK (Task Scheduler interface DLL)
- RNAUI (Dial-Up Networking User Interface)

The same API is also used in WCESVIEW (Mobile Devices Shell Extension), part of Microsoft's ActiveSync software for mobile devices, which was written in 2000.

This hardly sounds like an "unstable" API. Indeed, in the same email that gave his "guarantee" that SHCreateShellFolderViewEx would not work in "Nashville," George Pit went on to note that Microsoft was planning to use "a very similar mechanism, so extensions that have already used 'internal' function should need only a few changes."

Microsoft should not ship APIs that truly aren't ready. But when an API is ready enough for Microsoft to use it, and when the API continues to operate years later, the API can hardly be called "unstable," nor is there any valid justification for not documenting it.

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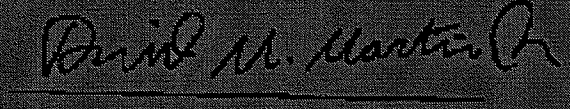
[582]This can be confirmed by running Microsoft's dumpbin utility: "for %f in (\windows\system*.dll) do dumpbin /imports %f >> dll.log" and then searching dll.log for imports of shell32.dll 800000AE (shell32.174).

Executed on June 2, 2003 in Lowell, Massachusetts



David M. Martin Jr.

EXHIBIT B

IN THE IOWA DISTRICT COURT FOR POLK COUNTY

JOE COMES, RILEY PAINT, INC., an Iowa corporation, SKEFFINGTON'S FORMAL WEAR OF IOWA, INC., an Iowa corporation, and PATRICIA ANNE LARSEN, Plaintiffs, vs. MICROSOFT CORPORATION, a Washington Corporation, Defendant.	:	No. CL82311

EXPERT REPORT OF RONALD S. ALEPIN

June 2, 2006

1. SDM

WordPerfect developers tried to develop menus and dialogs that mapped the rich functionality their users were accustomed to with their character-based product. Microsoft's Word for Windows was an application with comparable menuing requirements. The WordPerfect developers, using Microsoft's documented interfaces could not make their program work. They called Microsoft's Technical Support for assistance but could not get their problem resolved. They studied Microsoft's product and observed that it did not encounter a similar problem. Word did not use the documented interfaces – presumably because they did not work. This alone cost WordPerfect almost 3 man-years of time.[392]

2. De-documenting Namespace Extensions

Windows 95 has a feature that lets applications add new "namespace extensions" or "virtual folders" to the Windows 95 shell (e.g., Explorer). For example, the Recycle Bin, Control Panel, and Briefcase are namespace extensions. During the "Chicago" beta leading up to Windows 95, Microsoft began documenting this feature so that ISVs could create namespace extensions, as well as browse the existing ones. The documentation started to appear around the time of Chicago M6 (Beta 1; 'M' = milestone) in June 1994. The documentation Microsoft provided then was sufficient to start work on namespace extensions, i.e., for a company to make an investment of developer time, but insufficient to produce a complete namespace extension.[393] Based on Microsoft's documentation,

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[392] See Harral deposition, pp. 50 – 62.

[393] Richardson deposition, p. 213: "The documentation for the APIs was produced in an incomplete state with the promise that the additional APIs would be provided at a later date. Rather than producing the

ISVs including WordPerfect started creating namespace extensions, and Microsoft knew this.[394]

In October 1994, shortly before Chicago M7 (Beta 2), Bill Gates decided that Microsoft should stop documenting the feature. In an Oct. 3, 1994 email titled "Shell plans – IshellBrowser," Gates said "I have decided that we should not publish these extensions. We should wait until we have a way to do a high level of integration that will be harder for likes of Notes, WordPerfect to achieve, and which will give Office a real advantage."[395]

Some of the APIs at the heart of Microsoft's de-documentation of the namespace extensions were finally disclosed as part of the DOJ settlement.[396] As noted below, even today Microsoft has not documented all Windows interfaces used by its middleware.[397]

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additional documentation, they retracted the original documentation." See also Richardson deposition, p. 83.

[394]See Robert Muglia deposition, Oct. 1, 2001, p. 167, discussing IShellBrowser: "it became clear that third parties wanted to take advantage of these sorts of capabilities. In fact, ISVs started calling them. The interfaces actually started getting used by third parties because people explained how to use it and it got out and third parties started building applications that took advantage of it." Microsoft was specifically aware that WordPerfect was relying on the shell APIs: WP "called and talked to [Microsoft] premiere support [PSS] about these APIs and the use of them on a regular basis" (Richardson deposition, Dec. 13, 2001, p. 82).

[395] MX 9030733

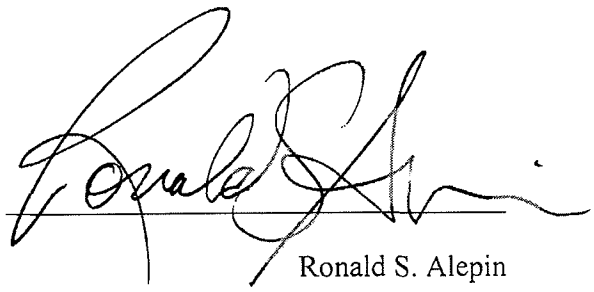
[396]See http://msdn.microsoft.com/library/en-us/dnapiover/html/api-overview.asp (e.g., E.g., SHCreateShellFolderViewEx).

[397]See http://members.ozemail.com.au/~geoffch@ozemail.com.au/samples/win32/shell/settlement.htm, http://members.ozemail.com.au/~geoffch@ozemail.com.au/samples/win32/shell/missing.htm. It appears that shlwapi.dll is particularly important. Only after Geoff Chappell brought up this topic at a Microsoft employee's blog a few of the interfaces (relating to Dynamic Pointer Arrays, DPA) were belatedly documented See http://blogs.msdn.com/dmassy/archive/2005/03/22/400689.aspx, http://members.ozemail.com.au/~geoffch@ozemail.com.au/samples/win32/shell/comctl32/functions/dpa/shdocvw.htm, and http://members.ozemail.com.au/~geoffch@ozemail.com.au/samples/win32/shell/comctl32/functions/dpa/index.html.

than capable of addressing the needs of many users. In the network computer alternative world, Microsoft's OS monopoly likely would have ended because many users would have purchased network computers with commodity operating systems other than Windows.

4. Media Player

Playing digital movies and digital music is another reason for consumers to purchase and use computers. Control over the format in which digital content is recorded for playback enables a firm to dominate the emerging markets for appliances that play this content. The Media Player "alternative world" that would have emerged absent Microsoft's challenged conduct is one in which consumers can purchase specialized appliances – not necessarily from Microsoft and not necessarily a PC. Vendors with better digital content features in their appliances could compete against PCs for users interested in the multimedia aspects of computers.[436]



Ronald S. Alepin

The NC together with its applications is different from the Corel Java application suite described in Professor Bennett's report.

[436] Consider how video game consoles are adding networking and DVD playback capabilities.