Server Message Block (SMB) Protocol and Multi-access to Files

White Paper

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Server Message Block (SMB) Protocol

Server Message Block (SMB) is a request-response protocol used for sharing files, printers, serial ports, and miscellaneous communications between nodes on networks such as named pipes and mail slots between computers.[1] This message format is used by Microsoft® Windows and DOS. It is also referred to as "Common Internet File System" (CIFS). SMB and CIFS nomenclature may also be used by non-Windows computers that access data in Windows machines.[2] There are several products that use SMB to enable file sharing across different operating system platforms.

World Software supports SMB 1 without issues. World Software can support SMB 2 if you add certain registry keys later described in this document. As a workaround, you can choose to disable SMB 2. However if you prefer to maintain SMB 2 features, then you can add registry keys while still using Worldox and maintaining a high level of data integrity. The following section provides details for doing this.

Worldox Support for SMB 2 via Additional Registry Keys

Users of document management systems such as World Software Corporation's *Worldox® GX3* and case management systems such as *CaseWare*[3] have reported issues caused by SMB when multiple people have tried to access a single file. For example, sometimes one user is accidentally able to overwrite data from another user when several users are reading and writing operations to the same file on a network share. Microsoft is aware of this problem and documented symptoms, causes and resolutions on their support forum at http://support.microsoft.com/kb/2028965.

Note: *You may see an error message if you apply the Microsoft SMB 2 hotfix to a PC that already has the latest Windows updates from a service pack or patch. The error says, "The update is not applicable to your computer." The reason is because those files or new versions have already been installed on that PC.*
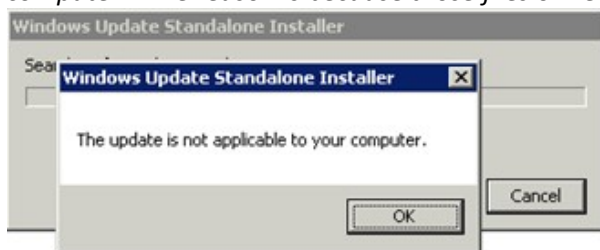
World Software has identified the problems observed with SMB 2 (and possibly SMB3) and Worldox. The cause is that by design, Microsoft caches file input/output (I/O). Although this caching method improves speed, it comprises data integrity. The following link describes the issue in more detail:

https://blogs.msdn.com/b/winsdk/archive/2009/07/10/file-exists-access-getfileattributes-findfirstfile-findnextfile-stat-behavior-over-smb-2-0.aspx?Redirected=true

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[1] http://www.pcmag.com/encyclopedia_term/0,2542,t=SMB&i=51543,00.asp
[2] http://www.samba.org/cifs/docs/what-is-smb.html
[3] http://www.caseware.com/support/caseknowledge/kb-271

Fortunately, SMB 2 will work with Worldox and will not cache file I/O by if you add certain registry keys to the **WDREGKEYS.INI** file. Under

[HKEY_LOCAL_MACHINE\System\CurrentControlSet\Services\Lanmanworkstation\Parameters]

Add the following keys:

DirectoryCacheLifetime=dword:0
FileNotFoundCacheLifetime=dword:0
FileInfoCacheLifetime=dword:0

Worldox added those keys to the **WDREGKEYS.INI** file that is shipped with the GX3 installer. However they are disabled in the INI file because they are Local Machine keys. In that case, they would require Admin elevation under User Account Control (UAC). Worldox tries to avoid setting any Local Machine keys, but in this case there is no choice.

Administrators may choose to do the following:

- Push these keys through other means

or

- Have Worldox push the keys, but then a Worldox Administrator must elevate under UAC. This could become a problem since every update will require this action.

SMB and Potential File Corruption during Multi-access

This section describes problems that can occur if you use Worldox and SMB 2 without adding registry keys to the **WDREGKEYS.INI** as described in *Worldox Support for SMB 2 via Additional Registry Keys*.

World Software is aware that file corruption might occur when using Windows Vista or Windows 7 with Windows Server 2008 with SMB 2.0. For example, profile data has been lost during batch operations such as Move or Copy. SMB 2 has also been known to hinder network performance. It is recommended that you disable SMB 2 in these environments, or at least monitor for signs of problems. Please read the Worldox Knowledge Base support article entitled "Worldox Server Moves: planning, key issues" at https://knowledgebase.worldox.com/2014/08/worldox-server-moves-1-planning-key-issues/ for details about modifying the registry or disabling SMB 2 to avoid damage to files.

Various errors caused by SMB 2 have been reported from other companies and sources outside of World Software Corporation. Some SMB issues have been fixed in Windows 7 and Windows Server 2008 R2. Try to disable SMB 2 to try to pinpoint SMB 2 issues.[4] You can also make some registry changes. Settings for SMB 2

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[4] http://support.microsoft.com/kb/2696547

are stored in **HKEY_LOCAL_MACHINE\System\CurrentControlSet\Services**.[5] Some reported performance issues are:[6]

- A message, "ERROR_NOT_LOCKED (158)", occurs when multiple applications perform file I/O operations to the file share. One of the applications on a client fails and then all of the applications cease to work. You can use the Process Monitor to troubleshoot I/O activity of multiple applications.[7]
- Time-out issues are caused when the SMB 2 client is running Windows Vista or Windows Server 2008 if a server that is running SMB 2 does not respond to FSCTL_SRV_NOTIFY_TRANSACTION requests. Microsoft has developed a hotfix that specifically corrects this problem.[8]
- If a path contains a junction point, you cannot access shared files or folders on Windows 2008 or Vista computers. You can apply a hotfix from Microsoft to resolve this issue.[9]
- Copying large files between two Windows Vista or Windows Server 2008 computers may be extremely slow. A supported hotfix is available from Microsoft.[10]
- Files are corrupted on a Windows Server 2003-based PC when you try to use the local UNC path to copy the files. The reason may be that you have installed Internet Protocol version 6 (IPv6) on a computer that is running Windows Server 2003 with SP1. You can download updated files for 2003 from Microsoft that will fix this problem.[11]
- Users of the Mac OS X have reported problems connecting to multiple directories on a single SMB share if directories had different logins. You can try to avoid this issue by having aliases for your SMB server point to the same IP address.[12]
- Caching issues in SMB 2 can occur with application that runs Windows 2008 SP1 (or later) and Windows Vista SP1 (or later). You can disable SMB 2 to fix the issue.[13]
- Opportunistic locking of files allows clients to lock files and locally cache information without the risk of another user editing the file. Registry keys for opportunistic locking are only available for SMB 1. You cannot disable opportunistic locking for SMB 2.[14]

Conclusions

This document describes various scenarios and troubleshooting tips related to SMB 2 and possible file corruption. At the time of this publication, we can offer the following conclusions for this topic:

- Adding registry keys described in *Worldox Support for SMB 2 via Additional Registry Keys* allows you to use Worldox and SMB 2 without issues.

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[5] http://www.support.tabs3.com/main/r11309.htm#SM2

[6] http://www.support.tabs3.com/main/r11309.htm#SM2

[7] http://support.microsoft.com/default.aspx?scid=kb;en-us;979521

[8] http://support.microsoft.com/default.aspx?scid=kb;en-us;978491

[9] http://support.microsoft.com/default.aspx?scid=kb;en-us;974103

[10] http://support.microsoft.com/default.aspx?scid=kb;en-us;958702

[11] http://support.microsoft.com/kb/911897

[12] http://hints.macworld.com/article.php?story=20090408122756546

[13] http://social.msdn.microsoft.com/Forums/en-US/os_fileservices/thread/832d395b-6e6f-4658-8dbb-120138a4cd7c

[14] http://support.microsoft.com/kb/296264

- Disabling SMB 2 will certainly avoid any issues with this problem.
- If you are using SMB 2, apply Microsoft's hotfixes for SMB 2 to <u>both</u> server(s) and <u>all</u> workstations that may run Worldox.
- While lab testing indicates that registry changes and hotfixes do have an effect on the problem, it cannot be guaranteed. However, lab testing and other manufacturers indicate improvements after using these SMB 2 hotfixes with database products like Worldox.

Microsoft hotfixes and information can be found on their support forum at
http://support.microsoft.com/kb/2028965.

World Software Corporation may update this white paper at a later date after more results from field testing are gathered and analyzed.

If you experience any of the problems listed in this document while using SMB 2, please contact your Worldox Value-added Reseller (VAR) or World Software Tech Support as soon as possible.

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