

Installing and Configuring Workstation Cache

Introduction

WSCACHE is a combination of a read-only RAM cache and a read-only swap file cache. It improves the performance of hard drives, CD-ROMs, and network drives by moving the data from a relatively slow media to a faster media for later access by an application.

Performance Objectives

This module is designed to introduce you to the basic installation and configuration of the Workstation Cache. It is not designed to be a general guide to configuring or managing LANtastic. It is assumed that you already have the knowledge and skills to:

- Log into a LANtastic server.
- Redirect a drive from the workstation to the server.
- Edit a text file with the DOS editor or LANtastic's LED program.
- Execute standard DOS commands for displaying information like MEM.
- Create directories and copy files to them.

When you have completed this module, you should be able to do/understand the following:

- Explain the intended purpose of WSCACHE and under what circumstances it can help performance.
- Load and configure WSCACHE from the command line.
- Use the DOS and Windows version of WSUTIL to make changes to WSCACHE settings.
- Explain the limitations of WSCACHE.

Hardware Requirements

- Two machines running LANtastic 6.0 or higher and connected together in a working network.
- Each machine with a minimum of 8 megabytes of ram.
- Each machine running DOS 5.0 or higher.

Functionality

- When caching hard drives, WSCACHE reads blocks of data from the drive and stores it in RAM. If subsequent file requests access data within this cache, the effective speed of the hard drive becomes that of the RAM, close to instantaneous in relative terms.
- When caching CD-ROM or network drives, WSCACHE reads blocks of data from the drive and stores them in a swap file on the local hard drive. If the swap file is large enough, and the subsequent file requests access data in the swap file, the effective speed of the CD-ROM becomes the speed of the hard drive, from well over 200 msec or longer down to 8-12 msec.

IMPORTANT: WSCACHE only caches files opened in EXCLUSIVE or DENY WRITE modes. Executables and overlays that open in shareable mode will not cache unless attrib'd to read-only. This also applies to shared data files that are opened for browsing; for example, NFO files in Views.

- WSCACHE works at the INT21 level rather than the INT13 level like Lancache and Smartdrive. For this reason, it is not as likely to encounter compatibility conflicts. However, WSCACHE, must be loaded after SERVER to eliminate any possibility of file corruption causes by SERVER intercepting an INT21 call before WSCACHE sees it.
- WSCACHE is not recommended for use on a dedicated server. It provides minimal performance increase for shared resources.
- WSCACHE can be used on a diskless workstation by loading the TSR from the server with the appropriate parameters to cache the network drive. Avoid putting WSCACHE.EXE in the image file itself, though, because of its size. Use the DISKSIZE=0 option (explained later in this module) to disable the local swap file.

Compatibility

- WSCACHE will not load unless the NOS 6.0 redirector is in memory.
- WSCACHE will not load over NOS 5.1 (Simply LANtastic).
- WSCACHE will not work with OS/2.

Other General Requirements

- 300Kb of conventional memory for the installation program. Uses a DOS install Or is installed automatically by the NOS
- S-DOS versions 3.3 or later; or DR DOS 5.0 or later. As usual, DOS 3.2 is not recommended. Installation program.

- Minimum CONFIG.SYS settings:

FILES = 40
BUFFERS = 30

- 600K free hard drive space without swap file, 4.6Mb with swap file

WSCACHE requires 60k - 100k of conventional memory for the TSR itself. If sufficient upper memory is available, the entire program will load high. If not, it will divvy itself between low and upper memory. Example:

Name	Total	=	Conventional	+	Upper Memory
-----	-----		-----		-----
SYSTEM	27549 (27K)		24477 (24K)		3072 (3K)
HIMEM	1168 (1K)		1168 (1K)		0 (0K)
EMM386	3120 (3K)		3120 (3K)		0 (0K)
COMMAND	2912 (3K)		2912 (3K)		0 (0K)
win386	91024 (89K)		76400 (75K)		14624 (14K)
WSCACHE	67696 (66K)		21424 (21K)		46272 (45K)
WIN	1600 (2K)		1600 (2K)		0 (0K)
COMMAND	3152 (3K)		3152 (3K)		0 (0K)
SHARE	22544 (22K)		0 (0K)		22544 (22K)
AEX	3616 (4K)		0 (0K)		3616 (4K)
AILANBIO	9456 (9K)		0 (0K)		9456 (9K)
NODERUN	3488 (3K)		0 (0K)		3488 (3K)
AILANBIO	20928 (20K)		0 (0K)		20928 (20K)
REDIR	21456 (21K)		0 (0K)		21456 (21K)
Free	516784 (505K)		516784 (505K)		0 (0K)

The size of the TSR will increase if performance parameters such as files and buffers are set high.

Features and Command Line Switches

WSCACHE features are implemented via command line switches. Here is a list of those switches and their function. The letters in parentheses designate abbreviations for the commands. The syntax for a command line switch is:

WSCACHE SWITCH=parm SWITCH2=parm

or

WSUTIL SW=parm SW2=parm

ALLFILES=[A-Z]

(AF=)

Drives to cache all file access.

This option will cache every file regardless.

DANGER: DO NOT use the ALLFILES option for network drives. File corruption is highly likely.

BLOCKSIZE=[n]

(BS=)

Sets the size of the record blocks saved in the read-ahead swap file. WSCACHE determines the optimal block size based on the MEMSIZE setting (50% of available extended memory by default). Setting BLOCKSIZE to its maximum value of 16 will not necessarily maximize performance. To maximize performance, tweak the BLOCKSIZE in small increments. When in doubt, leave it out.

CDROM=[A-Z]

(CD=)

Defines a drive as a CDROM drive.

Has same effect as the SLOW command. A drive defined as a CDROM drive will cache to a swap file. WSCACHE caches local CD-ROMs to the swap file. Use the SLOW switch to cache network drives mapped to CD-ROM resources.

DISKPATH=[path]

(DP=)

Specifies the directory where WSCACHE will keep its swap file. Example:
DISKPATH=C:\TEMP

IMPORTANT: Don't put the swap file on a compressed volume. Also, don't make a RAMdrive for the swap file. This defeats the purpose of the RAM cache.

DISKSIZE=[n]

(DS=)

Set the size of the swap file in K bytes.

WSCACHE takes up to 4 Meg of disk space by default (or 50% of unused space, whichever is less). You can disable the swap file entirely by specifying DISKSIZE=0.

DRIVES=[A-Z]

(D=)

Set which drives to cache.

If using another cache such as Lancache or Smartdrive, don't cache the same drives.

WSCACHE will not cache floppy drives unless designated by this switch.

Example: WSCACHE D=EFH-KR

The example caches disk E, F, H through K, and R

MAXFILES=[n]

(MF=)

The maximum number of files WSCACHE will hold in the cache.

MEMLEFT=[n]

(ML=)

Amount of memory in Kbytes not used for WSCache.

MEMSIZE=[n]

(MS=)

Size of RAM cache in K bytes. By default WSCACHE will use 50% of available RAM (Extended, XMS or EMS).

IMPORTANT: WSCACHE does not negotiate RAM use under Windows as does Lancache or Smartdrive. (ie, LANCACHE CACHE=2048 WINDOWS=512)
Set MEMSIZE to the maximum desired value under Windows.

MEMTYPE=***

(MT=EMS)

Where *** represents the three types of memory: EMS, EXT, or XMS. The default is XMS, if available. Will take EMS by default if the RAM switch is set on EMM386 with no size parameter.

MPX=[C0-FF]

Specifies the multiplex ID. The default is C0.

READAHEAD=[Z]:n

(RA=)

Tells WSCACHE to read 'n' blocks on each drive access.

Max value for "n" is 99. Don't max out "n". You can improve the performance of a CDROM resource by increasing this value, but we do not recommend using WSCACHE as a file server.

The optimal value depends on CD-ROM speed (streaming and access latency) and number of files concurrently accessed from a single drive.

REMOVABLE=[A-Z]

(R=)

Specify a floppy drive, Bernoulli or Syquest drive. Use the CDROM switch for CDROM devices.

SLOW=[A-Z]

(S=)

Specify which drives will cache to the swap file.

Example: SLOW=DJR

This will cache the D, J, and R drives to the swap file. Use this switch to cache slow network drives and network drives that point at CD-ROM resources.

SMALLFILES=[Y,N]

(SF)

Prevents caching files smaller than the value for BLOCKSIZE. This prevents thrashing the cache with a myriad of tiny files that take up space and eat all the cookies with no improvement in performance.

Windows with lots of fonts or Norton Commander can degrade performance without this switch.

REMOVE

(REM)

Removes WSCACHE from memory. Will not give back the memory unless it's the last TSR.

Example: WSCACHE /REM

VERBOSE

(V)

Displays configuration information at startup. Example:

```
LANtastic (R) Workstation Cache (WSCACHE) v1.00
Copyright (C) 1992-1994 C&D Programming Corp. modified work by ARTISOFT Inc.
Swap file disabled.
Using UMB to store tables and buffers.      Using Multiplex Id 0xC0.
Allocating 512k of XMS memory.
Using 171 blocks for storage.              Block size is set to 3k bytes.
Allocating 21k for file table.            Will cache 141 files at a time.
Caching the following drives: C-Z

Using 21424 bytes of low memory.
Using 30656 bytes of high memory.
--- LANtastic WSCache Installed ---
```

The WSUTIL Program

Workstation Cache includes a utility program, WSUTIL, that displays cache parameters and makes on-the-fly changes to cache settings. It has these requirements and limitations:

- WSUTIL will not load unless WSCACHE is in memory.
- WSUTIL requires about 200K to run and leaves nothing resident.
- WSUTIL will load either in DOS or Windows. It is compiled with a "glue" program that combines the DOS and Windows interfaces and features into one executable.

WSUTIL (DOS)

The DOS features are implemented by command line switches. Here is a list of those switches and their function. The letters in parentheses designate abbreviations for the commands. The syntax for the command line switches is:

WSUTIL SWITCH=parm or WSUTIL SW=parm

ALLFILES=[drive list]

(AF=)

Changes the drives affected by the ALLFILES command. **IMPORTANT:** Do not use ALLFILES for network drives.

FLUSH=[drive list]

(F=)

Flushes the cache for the drives in the list.

FLUSH=*

(F=*)

Flushes all drives.

HELP

(H,?)

Displays help text.

LIST

(L)

Lists the files currently held in RAM and swap file cache. Example:

LANtastic (R) WorkStation Cache Utility (WSUTIL) v1.00
Copyright (C) 1992-1994 C&D Programming Corp. modified work by ARTISOFT Inc.

Reads	%Hit	File Size	Open Files in WSCache
0	0%	0	C:\TEMP\AOCNAICH
49396	66%	61656	C:\WINDOWS\SYSTEM\ARIALI.TTF
28	0%	28	C:\TECHNET\TNET0994.FLT
47253	39%	4134276	\\WINQSERV\CD-ROM\TNET0994.IDX
70591	80%	182143	\\WINQSERV\CD-ROM\TNET0994.AUX
10882	24%	290334050	\\WINQSERV\CD-ROM\TNET0994.MVB
386723	66%	438544	C:\TECHNET\MSIN.EXE
33802	72%	36864	C:\WINDOWS\SYSTEM\DDEML.DLL
4402	98%	9936	C:\WINDOWS\SYSTEM\LZEXPAND.DLL
7231	99%	9008	C:\WINDOWS\SYSTEM\VER.DLL
3490	0%	75490	C:\WINDOWS\SYSTEM\KRNL386.EXE
11529	99%	12800	C:\WINDOWS\SYSTEM\WIN87EM.DLL

PARAMS

(P)

Displays current WSCache parameters. Example:

LANtastic (R) WorkStation Cache Utility (WSUTIL) v1.00
Copyright (C) 1992-1994 C&D Programming Corp. modified work by ARTISOFT Inc.

```

+-----+
| Parameters for WSCache |
+-----+
ALLFILES=
BLOCKSIZE=3
DISKPATH=C:\WSCACHE.SWP

```

DISKSIZE=0
 DRIVES=C-Z
 MAXFILES=141
 MEMSIZE=510
 MEMTYPE=XMS
 MPX=c0
 REMOVABLE=
 SLOW=
 SMALLFILES=Y
 TABLES=UMB

RESET

(R)

Resets WSCACHE statistics.

STATS (default)

Displays status of WSCACHE.

STATS is the default switch if no others are used:

Statistics for WSCache					
Memory Total	3397kb	Disk Total	0kb	File Total	101
Memory Avail	3397kb	Disk Avail	Disabled	File Avail	101
Block Size	6kb				
Read Requests	0	Read Hits	0	Read Hit Rate	0%

SWAPFILE=E|D

(S=E|D)

Enables and disables the swap file.

WSUTIL (Windows)

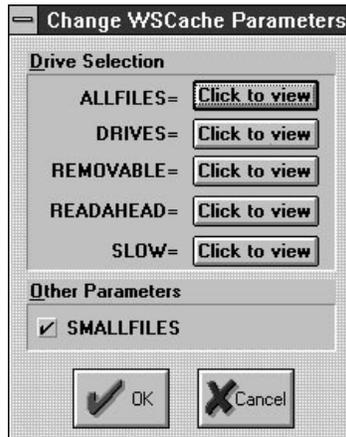
The Windows version of WSUTIL implements the DOS features with a Windows flair plus a couple of additional features:

The command line parameters of the DOS face can be accessed from the OPTIONS menu.

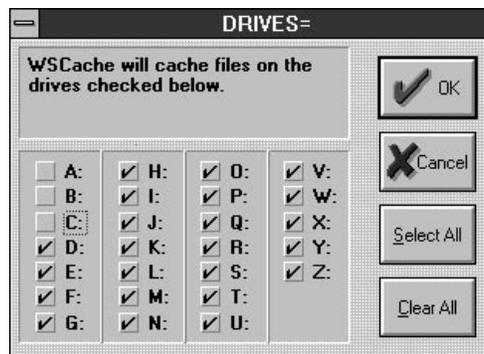
The screenshot shows a window titled "WSUtil" with a menu bar containing "File", "Options", and "Help". Below the menu bar is a table titled "WSCache Statistics" with the following data:

WSCache Statistics					
Memory Total	255 Kb	Disk Total	*disabled*	File Total	141
Memory Avail	0 Kb	Disk Avail	*disabled*	File Avail	125
Read Requests	3234 Kb	Read Hits	799 Kb	Read Hit Rate	25%

The WSCACHE parameters can be changed on the fly using the Change Parameter option.



If you select DRIVES, you'll get a popup to select the drives to cache. The changes you make here will take effect as soon as you press OK.

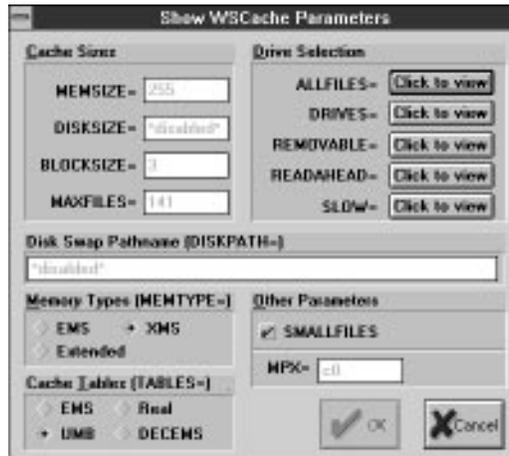


If you select SLOW from the Change Parameter menu, you might be warned that this is not possible if the swap file has not been enabled.

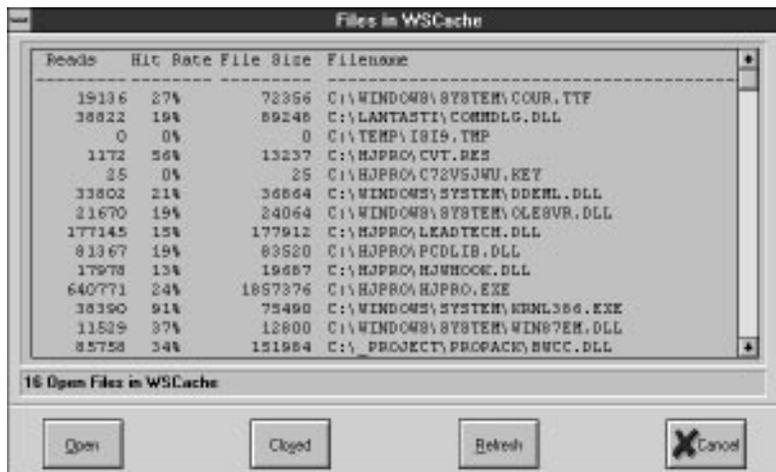


This must be done when first loading WSCACHE using the DISKSIZE parameter on the command line or in the NETWORK.OPT file.

You can view the current status of the parameters (same as PARMS switch) with the Show Parameters option.



You can display the list of files in the RAM and swap file cache (same as LIST switch) using Show File List option.



Performance Tips

- Use FASTOPEN (DOS 6.x)

NOTE: This will not improve performance for CD-ROM or network drives

- Set BUFFERS to a minimum of 30 in CONFIG.SYS
- Load WSCACHE high.
- Specify TABLES=REAL or TABLES=UMB on WSCACHE's command line or in the .OPT file. When using the TABLES=REAL option, WSCACHE's will usually require more memory then when the TABLES=EMS or TABLES=UMB option is used.

- Set the DISKSIZE option as high as possible. This increases speed because more of the slow device's data will be stored on the hard drive.

NOTE: Only local CDROM drives and drives specified by the SLOW parameter are cached to a swap file.

- DEFRAG the drive containing the swap file.

IMPORTANT: Remove WSCACHE from memory before performing this procedure.

- Use the SMALLFILES=N option. This keeps tiny files from filling up the cache.
- If you are caching very large files, greater than 128Mb, increase BLOCKSIZE. Experiment to find an optimum size.

If the local hard drive gets slower using WSCACHE:

- Lower the amount of RAM set aside for WSCACHE. (Ex: WSCACHE MEMSIZE=2048)
- Use Lancache or Smartdrive to give write-back caching.
- Reduce block size until performance is optimized. This will change the amount of read-ahead caching. (Ex: WSCACHE BLOCKSIZE=4)
- Verify that BUFFERS is set to a minimum of 30 in CONFIG.SYS

EXERCISE 1: LOADING AND TESTING WSCACHE

The performance results you can expect from using WSCACHE can vary due to many factors. The rules of benchmarking this product are the same as any other network product. Your mileage may vary due to the thousand and one factors that influence your network. In general, it is critical to remember that you will see NO performance increase when caching data files that are not opened in an exclusive mode. Most data files are not opened in this manner unless they are marked as Read Only. It would be very unusual to have data files marked as Read Only, because then you could not write back to them if needed.

IMPORTANT: The files sizes, names, benchmarktimes and other information listed in this exercise are specific to the machines they were run on. The filenames, sizes, etc. you see on your machines may be different, but the concepts of this exercise are still the same.

Even running these exercises on the same machines could yield different results for any number of reasons. The object of this exercise is to familiarize you with the configuration and the effects of certain configuration changes on performance. The file copying used in this exercise is only one area where WSCACHE could possibly improve performance.

First, you need to setup both machines properly for this exercise.

1. Boot one machine as a LANtastic server, the other machine as a workstation.
2. On the server, create a directory called C:\SVRTEST.
3. Copy all of the files from the Windows directory to this new directory with the command `COPY C:\WINDOWS*. * C:\SVRTEST`.
4. Now do a directory of C:\SVRTEST. It should look something like this abbreviated example:

```
Volume in drive C is ARTISOFT
Volume Serial Number is 367B-0E06
Directory of C:\SERVER

.                <DIR>      05-25-95  7:10a
..               <DIR>      05-25-95  7:10a
SETUP            EXE  422,080   11-23-93  9:07a
SETUP            HLP  41,453    11-23-93  9:07a
SETUP            TXT  41,754    11-23-93  9:07a
WIN              INI   3,717     05-25-95  7:09a
WINHELP          EXE  256,192   11-23-93  9:07a
SYSTEM           INI   1,958     05-25-95  7:09a
....
....
....
    79 file(s)    7,838,496 bytes
                    50,196,480 bytes free
```

5. From the workstation, redirect a drive F to the server's C-DRIVE resource.
6. On the workstation, create a new directory called C:\TEST.
7. Change to the directory C:\TEST.
8. Using the DOS Editor or your favorite text editor, create a file in this directory called TIME.DAT.
9. In this file, enter only ONE carriage return, then save the file.
10. Next create a file called TIMEREC.BAT. The file should contain these lines:

```
time < time.dat > time.txt
copy f:\svrtest\*. * c:\test /y
time < time.dat >> time.txt
type time.txt
```

This file will be used as a crude, but effective benchmarking tool. What this file does is:

- Run the DOS TIME command, using the carriage return from the TIME.DAT file as input to automatically hit return so you don't have to. The output from the time command is saved to a file called TIME.TXT. This will be the starting time of the file copy.
- Copy all of the files from the SVRTEST directory on the server to the TEST directory on the workstation. The Y assumes you have DOS 6.x and need to avoid the overwrite error.
- The TIME command is executed again with the output appended to the TIME.TXT file. This will be the ending time for the file copy.

- The last line simply displays the contents of TIME.TXT on the screen.

If you subtract the starting time from the ending time, you will get an approximate time for the file copy. All numbers in this exercise are rounded to the nearest second. Not exactly admissible in a court of law but still a good indicator of the copying time.

The output from the file TIME.TXT should look something like this:

```
Current time is 3:17:04.41p
Enter new time:
Current time is 3:17:33.41p
Enter new time:
```

In this example, the difference in the two times is approximately 29 seconds.

11. At the workstation, run the batch file TIMEREC.BAT. This will perform a standard file copy with no caching on the workstation. Note the time. In our example, it is about 50 seconds.
12. At the workstation's keyboard, type WSCACHE D=F<enter>. The D=F tells WSCACHE to cache the F drive. You will see a message that WSCACHE loaded.
13. Type WSUTIL <enter>. This will display the default settings for WSCACHE. They should look something like this:

Statistics for WSCache					
Memory Total	3397kb	Disk Total	0kb	File Total	101
Memory Avail	3397kb	Disk Avail	Disabled	File Avail	101
Block Size	6kb				
Read Requests	0	Read Hits	0	Read Hit Rate	0%

You will notice the default cache size is about 4 meg.

14. Type WSUTIL L <enter>. This will display the current contents of the cache in memory. It should look like this:

LANtastic (R) WorkStation Cache Utility (WSUTIL) v1.00
Copyright (C) 1992-1994 C & D Programming Corp. modified work by ARTISOFT Inc.

No files are currently in the cache.
15. Run TIMEREC.BAT again. This will perform the file copy with the cache running for the first time. Note the time. In our example it is about 43 seconds.
16. Type WSUTIL <enter>. Notice there is no change in the statistics.
17. Type WSUTIL L <enter>. It still says no files in the cache. Why is that?

Remember that WSCACHE only caches files opened in EXCLUSIVE or DENY WRITE modes. This means the files have the DOS attribute of Read Only.

18. At the server, make sure you are in the C:\SVRTEST directory.

- 19. Type ATTRIB <enter>. You will see that the files in this directory ARE NOT marked Read Only. They do not have the 'r' attribute. For the sake of this test, lets go ahead and mark them.
- 20. At the servers C:\SVRTEST prompt, type ATTRIB +r <enter>.
- 21. Type ATTRIB <enter>. You will see now that all of the files have the 'r' attribute.
- 22. Back at the workstation, run TIMEREC again. Note the time. In our example it is 43 seconds.
- 23. Type WSUTIL <enter>. It should now display something a little different.

Statistics for WSCache					
Memory Total	3397kb	Disk Total	0kb	File Total	101
Memory Avail	0kb	Disk Avail	Disabled	File Avail	95
Block Size	6kb				
Read Requests	7839268	Read Hits	276992	Read Hit Rate	3%

There is now a hit rate of 3% and some read hits to make note of.

- 24. Type WSUTIL L <enter>.

LANtastic (R) WorkStation Cache Utility (WSUTIL) v1.00
 Copyright (C) 1992-1994 C & D Programming Corp. modified work by ARTISOFT Inc.

Reads	%Hit	File Size	Closed Files in WSCache
655	0%	655	\\STATION-6\C-DRIVE\SVRTEST\PWRSYNC.001
158	0%	158	\\STATION-6\C-DRIVE\SVRTEST\WINFILE.001
1864	0%	1864	\\STATION-6\C-DRIVE\SVRTEST\SYSTEM.001
3690	0%	3690	\\STATION-6\C-DRIVE\SVRTEST\WIN.001
681	0%	681	\\STATION-6\C-DRIVE\SVRTEST\PWRSYNC.INI
4194304	4%	4194304	\\STATION-6\C-DRIVE\SVRTEST\WIN386.SWP

There are now some files in the cache! Could it be working?

- 25. Run TIMEREC again. Note the time. In our example it is now 48 seconds.

How can that be? With the cache active and something in it, shouldn't the time now improve?

The answer to that question is, not necessarily. Once again, performance improvement depends on what kind of file accesses you have, what files are being accessed, and about 1000 other factors. But don't give up hope. There are a few switches you can use to fine tune this setup.

One item to make note of is that we are using about 4 megabytes of ram to cache about 8 megabytes of files, and according to WSUTIL, one of the files is about 4 megabytes in size. The small memory cache we have cannot adequately cache this information. We need to have WSCACHE utilize a Swap File on the local hard disk to increase the amount of virtual memory in our cache. This swapfile can only be enabled when WSCACHE is first loaded.

- 26. Unload WSCACHE by typing WSCACHE/REM <enter>. This removes it from memory.
- 27. Now type WSCACHE D=F S=F. This will load WSCACHE with the default swap file of 4 megabytes. The swapfile is enabled automatically by the S (Slow) parameter.
- 28. To check this, type WSUTIL P<enter>. This is another way to display the current settings.

```
LANtastic (R) WorkStation Cache Utility (WSUTIL) v1.00
Copyright (C) 1992-1994 C & D Programming Corp. modified work by ARTISOFT Inc.
ALLFILES=
BLOCKSIZE=10
DISKPATH=C:\WSCACHE.SWP
DISKSIZE=4090
DRIVES=F
MAXFILES=101
MEMSIZE=3390
MENTYPE=XMS
MPX=c0
REMOVABLE=
SLOW=F
SMALLFILES=Y
TABLES=UMB
```

- 29. Notice the default swap file is C:\WSCACHE.SWP. This is a HIDDEN file in the root directory. To view it, change to the root directory.
- 30. Type DIR , <enter>. The ", " is a an undocumented DOS command that will display all files, even hidden ones. You should see the filename in the list.

IMPORTANT: This file will not be deleted automatically when you exit WSCACHE. If you want to recover the disk space, you will need to change to the directory with the swap file and type:

```
ATTRIB -R-S-H WSCACHE.SWP <enter>
DEL WSCACHE.SWP <enter>
```

This will remove the file . If the swap file function is enabled during loading, it will be re-created

- 31. Run TIMEREC again. Note the time. In our example it was 53 seconds.

32. Run WSUTIL again.

Statistics for WSCache					
Memory Total	3390kb	Disk Total	4090kb	File Total	101
Memory Avail	0kb	Disk Avail	10kb	File Avail	28
Block Size	10kb				
Read Requests	7839268	Read Hits	498176	Read Hit Rate	6%

There is a change in the Read Hit Rate but no apparent improvement in the time.

33. Run WSUTIL L again. You will notice many more files listed in the cache but still very little "hit" percentage.

Lets try increasing the size of the swapfile.

34. Unload WSCACHE by typing WSCACHE/REM <enter>.
35. Type WSCACHE D=F S=F DS=8192 <enter>.
36. The DS= (Disk Size) parameter sets the swap file to 8 megabytes.
37. To verify this, run WSUTIL again and you will now see that the swap file is 8192.
38. Run TIMEREC again. The time in our example is now 34 seconds. This is the first real improvement we have seen.

To be sure we are starting out with a clean slate, lets clear the cache.

39. Type WSUTIL F=* <enter>. The F=* will clear the cache.
40. Type WSUTIL L to verify there are no files in the cache.
41. Run TIMEREC again. This time it is back to 54 seconds. Why? Because we flushed the cache. But now there is something in the cache from this file copy.
42. Type WSUTIL L <enter> to verify this.
43. Run TIMEREC again. Now the time is down to 29 seconds! **While this does not seem like much, it is almost a 50% improvement over an uncached file copy.**

It may be possible to tweak this performance a little more with some of the switches. You could try:

- A larger file cache. This could be memory, swapfiles or a combination of both. Like anything else, there will be a point of diminishing returns where increasing this will make no difference.
- SMALLFILES=N so the cache is not filled up with small files.

What is important to remember is that there is no perfect formula for configuring WSCACHE. What will always be needed is a little trial and error to find the optimal settings.

EXERCISE 2: OTHER CONSIDERATIONS FOR WSCACHE

The main rule to consider in using WSCACHE is:

Will the benefits exceed to costs?

The benefit is obviously faster performance on a network drive. The cost is available DOS memory and processing time.

When WSCACHE was loaded with its defaults, it took up this much memory:

Modules using memory below 1 MB:

Name	Total	=	Conventional	+	Upper Memory
----	-----		-----		-----
WSCACHE	55,952 (55K)		21,376 (21K)		34,576 (34K)

When we changed the swap file to 8192, it took up this much memory:

Name	Total	=	Conventional	+	Upper Memory
----	-----		-----		-----
WSCACHE	68,832 (67K)		21,376 (21K)		47,456 (46K)

That's about 13 K more memory being used. It is being loaded high, but what if you have no available upper memory? Then it will have to load low, using up more precious conventional memory.

Using a Switch File

Like all LANtastic programs, it is possible to put each option you would normally place on the command line into a switch file. The text file must have an .OPT extension. A sample file would look like this:

```
DRIVES-Z
SLOW=F
MEMSIZE=4000
;for the cache
DISKSIZE=8000
BLOCKSIZE=8
; to display starup info
VERBOSE
```

You can use comments anywhere in the file as long as they are preceded by a (;). You can also use full commands or abbreviations.

To use the option, you would load WSCACHE like this:

```
WSCACHE @C:\LANTASTI\WSCACHE.OPT <enter>
```

Where this file could come in handy is if you had more than one configuration you wanted to run. You could create one file for heavy caching when you can afford to give up more memory or use a larger swap file, then you could have another file for light usage that doesn't use up as many resources.

If time permits, experiment with using a switch file. Also try some of the other settings available for WSCACHE using your current benchmark to see if there are any more performance gains to be achieved in your particular test setup.

SUMMARY

Workstation Cache is designed to increase workstation performance by caching data primarily from a network drive. Although it can be used on local drives, it makes more sense to use Lancache or Smartdrive if all you are caching is local drives. The results you can expect depend on what kind of accesses you make across the network and how much you can afford to give up in local resources like memory and disk space. The most important points to remember about this product are:

- It will only cache files opened in the EXCLUSIVE or DENY WRITE modes. This usually means that the files it will cache need to be marked as READ ONLY with the DOS ATTRIB command. Because of this, you would not expect to see any performance increase when accessing data files, but should see some if accessing program files across the network.
- The degree of performance is also dependent on the parameters you use with the program. A little fine tuning or trial and error is usually going to be needed to obtain the maximum yield from this program.

END OF TRAINING MODULE

Installing and Configuring Workstation Cache

**Module UTIL.01
Revision1
5/30/95**

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Prepared by Curt Langley

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