WindSock SRM V1.3 - Windows Performance Analyser

FreeWare by Chris Hewitt, CompuServe 100036,133   Copyright (c) 1992 Technical Pixies

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WindSock measures your system's performance from the point of view of Windows. It uses Windows API calls where appropriate, and measures the speed of the CPU, video, and disk.

This utility can be useful both in the selection of hardware, and to measure the effects of changes in system configuration like new video driver or disk cache software. One of the 1.3 Beta testers actually discovered that he had been sold a Clone 486/25 with "33" set on the case LEDs instead of a real '33 ("oops sorry, I don't know how that could have happened...").

Please report any bugs/suggestions to Chris Hewitt on CompuServe ID 100036,133.

What the windows show:
      Main Window   Video and Disk Test Window

Tuning for Windows:
      CPU Speed   Memory
      Disk   Video

 WindSock Options

The WindSock Options Dialog controls various option settings for WindSock.
These settings are saved in a WINDSOCK.INI file in your windows directory.

Option Settings:

Wave Logo
> When this control is checked, the 'Sock' logo is animated when WindSock
> is running as an Icon. Turn this off if you find it distracting.

Float on Top
> When this control is checked, WindSock will 'float' above any other window on
> the screen (both as an Icon and a Window).

Start Iconic
> If this control is checked WindSock will launch as an icon rather than as a full
> window.

Test Every n Seconds:
> This control allows you to set the interval at which WindSock measures the
> CPU Index of your system. This figure can be set between 1 and 60 seconds.

Test for n Milliseconds:
> This figure controls the length of the CPU Index test loop. Set this longer for a
> more accurate figure, and shorter to save CPU resources. The test may be
> varied between 100 and 900 Milliseconds.

 Save Test Data

This Dialog enables you to comment and save test information. The results of your latest test are saved in a file called WINDSTAT.TXT in the directory that WindSkRM was run from. This is useful if you are carrying the utility around on a floppy to evaluate systems.

The dialog is invoked from the Video and Disk Test window. Before you perform the video and disk tests, allow the CPU figure to stabilise. Set the CPU test interval to 3 or 4 seconds, wait for a test to complete, then push the VDTest button. After the video and disk test, push the save button. The test results are displayed, along with a comments field, which allows you to annotate the test results. Push the OK button to append the new test data to the file.

You may edit the WINDSTAT.TXT file yourself at any time.

Main Window

The initial screen which is displayed when you invoke WindSock shows several items of information about your hardware and software, and two speed indicators, a bar and a numeric LED, which indicate the relative speed of your CPU. When the program is running minimised (as an icon) the CPU speed figure is displayed on the icon.

The information presented is: the CPU type, if a math co-processor is present, the base physical memory of the machine, the amount of extended memory available, the version of Windows being run, the current Windows Mode, the amount of Windows Heap currently Free, and the size of your swapfile.

The CPU index is an indicator of the general performance of your CPU (excluding floating point), larger numbers are better. The ^ marks below the bar indicate current (mid '92) average performance figures for various motherboards based on Intel 80x86 CPUs. The speed is calculated once every test interval, and is the number of test loops completed in 100ms. If you use your mouse or run another program while WindSock is active, this number will drop.

There are 5 control buttons along the bottom of the window. About, Help, and Quit are self-explanatory. VDTest tests your system's video and disk performance, then displays the results (this will take 5 seconds). Optns invokes a dialog which enables you to alter various program options.

All main window commands are available when the program is minimised in the window's system menu. In order to use this menu, click once on the icon

Video and Disk Test Window

This window shows you two sets of bars and LEDs representing the system's Video (screen) and Disk performance. The legend below the bars (Poor, OK, Good, Great) gives you some feel for what the numbers mean. The Save button allows you to save performance information to a file.

Video performance is tested by painting a weighted set of lines, bitmaps, and text using the Windows API. Your machine's video speed is determined by several factors: how fast your video card runs, your CPU speed, and memory caching.

Disk performance is calculated from the weighted result of three tests: physical (reading an uncached file then writing another on the default hard disk), cached (reading the file we just wrote), and tempfile (writing to then reading from your Windows tempfile directory). Disk performance is dependant on disk speed, hardware caching, and software caching.

These numbers will probably be quite low on entry-level and uncached machines under Windows 3.0. This is intentional, and allows for the impact of Windows 3.1, which improves video and disk performance, and 486DX-based machines which would be right off the scale otherwise. The results of various tests that I have conducted show that a fast CPU and cache have a greater effect on Windows performance than a 'super' disk drive or video card.

Windows 3.1 delivers a 10-15% improvement in video speed over 3.0 (depending on the application and Video driver), and a 5% improvement in I/O speed (without SmartDrive). SmartDrive 4.0, which is included in the Windows 3.1 package, can double your I/O throughput if used with write caching turned on (the default). When using SmartDrive 4.0 cached writes, the figures for both video and disk speed will sometimes vary dramatically, because SmartDrive often decides to flush it's cache in the middle of the test.

The Video and Disk figures may vary between tests due to other system activity that occurs during the several seconds that the test are running. Perform these tests several times in order to get a feel for the comparitive speed of the system.

CPU Performance Considerations

Windows 3.0 is a lot slower than DOS for most applications. There is nothing much that you can do about this other than buying a faster machine. A 386SX/20 should be OK for a normal Windows user (Word processors and spreadsheets), if you have a 286, you should be seriously thinking of upgrading.

Another option is to upgrade to Windows 3.1 (if you are a Windows 3.0 user). Windows 3.1 includes a lot of tuning in the API, and you should see improvement in video speed and general application performance. This performance improvement is not reflected in the CPU index figure, because this measures the raw machine CPU performance. Since most Windows CPU usage is by video API functions (it is a GUI after all), the change in the video performance figure between 3.0 and 3.1 will be your most accurate gauge of CPU improvement. This will probably be a 10-15% improvement, although applications that were slow because they spent a lot of time doing video API stuff may seem to go **much** faster. The 3.1 device drivers are generally faster too.

Due to the overheads of the Windows API, CPU speed also has a significant impact on your disk and video performance. This is especially true of machines which have SRAM cache which will deliver much better video and disk performance than an uncached machines with the same speed CPU.

Memory Size and Allocation

You should have at least 2MB of memory to run Windows. Adding more memory (at least 2MB) is a good idea, because you can use it as a disk cache with SmartDrive or some other disk caching software.

Memory usage is the most critical factor in windows performance which you can control (memory speed is probably more important, but you can't fix that short of getting a faster machine). Your major control is over the Size of the SmartDrive.

Typical SmartDrive assignments for various memory sizes (Windows 3.0 only) would be:

Memory	SmartDrive Size	
	Normal	Minimum
1MB	384KB	256KB
2MB	1MB	512KB
4MB	2MB	1MB
8MB	2MB	1MB

i.e. for an 8MB system use: "DEVICE=SMARTDRV.SYS 2048 1024" in CONFIG.SYS

Performance improvements from a larger SmartDrive cache size are usually minimal after 2MB. The actual optimum cache size for your machine is dependant on your application load. Experiment with various sizes to determine the best size for your machine.

Windows 3.1 users should probably accept the default SmartDrive configuration. At this release (4.0) SmartDrive has a tendency to lock your system if you let it have too much memory. The default configurations (for 4.0) are about half of the sizes I have suggested for Win 3.0. Experiment by all means, but not with important files open!

Many Windows applications use temporary files. These are usually placed in the directory identified by the TEMP environment variable. This directory should be on your fastest hard disk, or if you have enough memory (4MB or more), in a RAM disk. 256KB is usually enough for a RAM disk, assigning more may result in unnecessary swapping when your applications run out of real memory. Microsoft suggests not using a RAM disk at all unless you can think of a good reason why you should, because SmartDrive (especially SmartDrive 4.0) may actually be faster than RAMDrive especially when using 'look-ahead' buffering techniques (the default).

To set TEMP directory:
        In AUTOEXEC.BAT use: "SET TEMP = C:\TMPFILES"

To setup a 256KB RAM disk:
        In CONFIG.SYS use: "device = c:\windows\ramdrive.sys 256"

If you have Expanded memory, you can convert it to Extended memory (which windows uses) with the appropriate software.or hardware switches.

You should create a permanent swapfile if you require extra virtual memory to run applications in Enhanced 386 mode. If you are using a swapfile you should still use a reasonable amount of memory for the disk cache. If you do have enough real memory for your applications to run, you should use Standard Mode which is faster than Enhanced 386 mode.

Disk Considerations

Windows uses your hard disk intensively. Windows programs tend to be large, and application programs often use tempfiles. In 386 Enhanced mode the disk may be heavily used for application swapping. Use Standard mode if you have enough real memory. You should use disk <u>caching</u> software to minimise actual disk accesses. See under Memory Tuning in this help file for recommended SmartDrive sizes.

A caching disk controller card will improve your system's performance, but it is usually better to spend your money on extra extended memory which can be configured as either <u>Heap</u> or disk cache.

If you are experiencing very poor application performance due to disk I/O, you should consider using caching software or hardware which allows disk **writes** to be cached (most only cache reads). SmartDrive 4.0 (which comes with Windows 3.1) has this capability (in fact it is the default). This option is reasonably safe, but if your system is halted before the write buffer is flushed to disk, you can lose data. The buffer is flushed at least every 5 seconds, so if you wait that long before turning your machine off, you should be OK. The following DOS command forces SmartDrive to flush it's buffers:

      SMARTDRV /C

If you have any difficulties with SmartDrive 4.0 write caching use:

      SMARTDRV.EXE C D

in your AUTOEXEC.BAT file to turn off write caching while maintaining read caching (in this example for the C and D drives).

Video Tuning

Video speed is dependant on the speed of your CPU, video card and video device driver. Some systems allow video BIOS to be placed in high conventional memory (640KB-1MB), or to be cached with fast RAM. Use these options if you can.

Some video cards implement common Windows video functions (BitBlt, TextOut etc.) in hardware/firmware. These cards improve video speed dramatically.

If you are using higher display resolutions (800x600 etc) or more than 16 colours, you may notice that your video slows down quite a bit (depending on the card and video driver).

Windows 3.1 is 10-15% faster than Windows 3.0 on video I/O (depending on the driver). The standard drivers for Windows 3.1 are also improved. The standard super VGA (800x600x16) driver seems to be just as fast as the old VGA driver.

Base Physical Memory('Real' memory):
Usable memory below 1MB as determined by the BIOS POST routine.
Usually limited to 640KB.

Extended Memory:
Extra (above 1MB) conventional memory installed on your system, usually on the motherboard.
Windows comes with HIMEM.SYS which manages extended memory. Some machines can utilise memory between 640KB and 1MB as extended memory..

Expanded Memory:
Extra memory available via an expanded memory manager. Often installed on a special card.
Windows comes with a driver, EMM386.SYS, which manages expanded memory. Expanded memory can be converted to extended memory for windows use. Check the manual for your expanded memory board or software.

Test Interval:
The interval between CPU index tests. This can be varied between 1 and 60 seconds in the options dialog.

Windows Mode:
Windows 3.0 can run in 3 modes: Real, Standard, and Enhanced (3.1 does not support Real).
Real mode uses the base physical memory ('real' memory) of the machine, it can also utilise Expanded memory.
Standard mode uses base and extended memory. Windows runs faster in Standard mode than in Enhanced mode.
Enhanced mode requires a 386 or 386SX machine with 2MB of memory. Enhanced mode allows you to use a swapfile (virtual memory).

System Heap:
The memory available to Windows to run applications, includes base, extended and virtual memory.

Swapfile:
A disk file used as virtual memory in Enhanced 386 mode

tempfile directory:
The directory identified in your environment as TEMP. Usually defined in AUTOEXEC.BAT as
TEMP=C:\WINDOWS\TEMP or some other directory

cache:
Memory used as a temporary store for information from slower memory or disk.
Motherboards may have fast cache memory to improve access time to main memory.
Software like SmartDrive allows memory to be used to improve disk performance. Some disk
drives have integral cache to improve their performance, and disk controller cards are
available which include CPUs and memory to boost the speed of attached disk drives.
Caching is a generally good idea,
see under Disk tuning in this help file

SMARTDRV.SYS:
SmartDrive is a disk caching program supplied with Windows. It is added to your CONFIG.SYS file (or AUTOEXEC.BAT for Win 3.1) automatically by the Windows install program.

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This Program was developed using Borland C++ 3.0 and the Borland ObjectWindows Library.

Thanks to everyone who made suggestions for improvements and reported bugs with WindSock 1,1 (I got most of them), all the people on the BCPPWIN forum (from Borland and otherwise) for helping me out when I got in trouble, and Rick Insane Diego for **always** being there (He is rumoured to only exist in CyberSpace). Finally, anyone who is old enough to remember the 7K version of Realtime Startrek (developed after the University of Pittsburgh dropped the student 'core' limit from 10K to stop them playing games) will know what I mean when I thank the Military-Industrial complex for making this program possible (and free).

Chris Hewitt, Sydney, 7 June 1992

 Known Bugs and Incompatibilities

Norton Desktop for Windows 1.0

There is a problem with message handling between BC++ 3.0 programs and NDW 1.0. This is not a problem with NDW 2.0. The symptom is a UAE when using the Hist button.

On 486/50s and doubled (DX2) 25s and 33s, the performance figures 'blow' the indicator bar

Oh, the trials and tribulations of the conspicuous consumer...The LED figures go up to 999, so you can still tell how well your system is performing. If I made the scale bigger, those poor people still running 286/12s would be off the map in the other direction.