

MODELING • ANIMATION • RENDERING

The logo features a central blue sphere with a metallic, reflective surface. This sphere is partially enclosed by a white, metallic-looking ring that has several rectangular cutouts. The entire logo is set against a background of concentric, light gray circles that create a sense of depth and motion.

CINEMA 4D

CINEBENCH 2003

CINEBENCH 2003

Reference

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Contents

CINEBENCH 2003	1
Preface	5
Before you start	6
System Requirements	7
Installation	8
Preparation	9
About graphics accelerators	9
The Test Process	11
Overview	11
1. Info	12
2. Main	12
3. The CPU Benchmark	12
5. The Graphics Benchmark	13
5. The console	13
6. The Image/Database Window	14
The Benchmark Tests in Detail	15
CPU Benchmark	15
Rendering (1 CPU)	15
Rendering (x CPU)	15
Intel Pentium 4 HyperThreading	15
Graphics Benchmark	16
C4D Shading	16
OpenGL SW-L	16
OpenGL HW-L	16
Interpreting The Results	17
Boosting System Performance	18
Sharing And Comparing	19
The CINEBENCH 2003 Database	20
Newer CINEMA 4D Versions	21

Preface

Welcome to CINEBENCH 2003.

This tool is based on CINEMA 4D, the powerful 3D modeling, rendering and animation software from MAXON Computer. This application will benchmark your CPU's performance by running several demanding tests on it. It utilizes not only software-based algorithms for these tests, but also hardware functions such as OpenGL acceleration via your graphics card.

In addition, you can collect and share your results with the help of database functions. And you can export your results and share them with other users, for a database jam-packed with results.

Before you start

Important Note:

Benchmark results of CINEBENCH 2003 should not be related to those of earlier CINEBENCH versions, even if they look similar!

We have completely redefined the benchmarking tests to push even the most modern CPU and graphics card to their limits. When sharing your new results with others, please be sure to mention that you tested using CINEBENCH 2003.

System Requirements

The minimum requirements for using CINE-BENCH 2003 are:

- 35 MB of available hard disk space
- 128 MB (256 MB recommended) of available RAM (will have to be allocated to CINE-BENCH in Mac OS (not OS X))
- 16-bit graphics accelerator with a minimum screen resolution of 1024x768 pixels.
- Windows 98/Me/2000/XP or Mac OS 9.x or higher.

Please note:

The application and its tests are in English only, and will not be localized into other languages.

Installation

Copy the “CINEBENCH 2003” folder from the CD drive to your hard disk. Ensure that you have at least 35 MB of available space on the hard disk.

Never change the directory structure or the names of any of the files and folders in the directory!

No further installation steps are necessary.

Preparation

For the most reliable benchmark scores, please keep the following in mind prior to starting CINEBENCH 2003.

- If the driver for your graphics card has an option for vertical sync, please switch it off. (With vertical sync enabled, the driver may stall for 1/70th of a second per each rendered image before redrawing the screen.)



- Before starting to benchmark your computer, turn off all secondary effects. Close all other programs, including the ones that run in the background. In particular, be sure to close all virus scanners or similar applications that constantly access the hard drive or the Internet—these applications can slow down system performance considerably. Ideally, restart your system.

- After starting the benchmarking, do not disturb the computer. Neither touch the mouse nor the other input devices, such as the keyboard.
- Do not overlay the CINEBENCH 2003 window with other windows, even partially.
- If you are using more than one monitor, the benchmarking results may differ depending on which monitor is used. This usually depends on the settings of your graphics card's driver. We recommend testing both.
- If you are planning to run CINEBENCH 2003 on a laptop, ensure that the power adaptor is connected and that all energy-saving options are disabled.
- If you plan to benchmark HyperThreading, ensure that you are working with Windows XP. This is because results taken in Windows 2000 with HyperThreading will be inaccurate.

About graphics accelerators

Some graphics cards will accelerate graphics performance up to a certain resolution only. In some cases this may be when the monitor's resolution is above a certain size. Or it may be when the size of the CINEBENCH window exceeds a particular resolution.

Other cards (most of them OpenGL accelerators) may not accelerate your graphics at color depths of 24-bits or higher ("True Color" in Windows, "Million of Colors" in Mac OS). In this case, they might automatically switch from hardware acceleration to the slower software-only acceleration.

Do not assume that your OpenGL implementation supports multiple monitors. This will depend on the graphics driver. So if you are using more than one monitor, please ensure that your graphics card supports OpenGL acceleration on multi-monitor systems. If it doesn't, then don't be surprised by the benchmark scores you get.

The Test Process

Overview

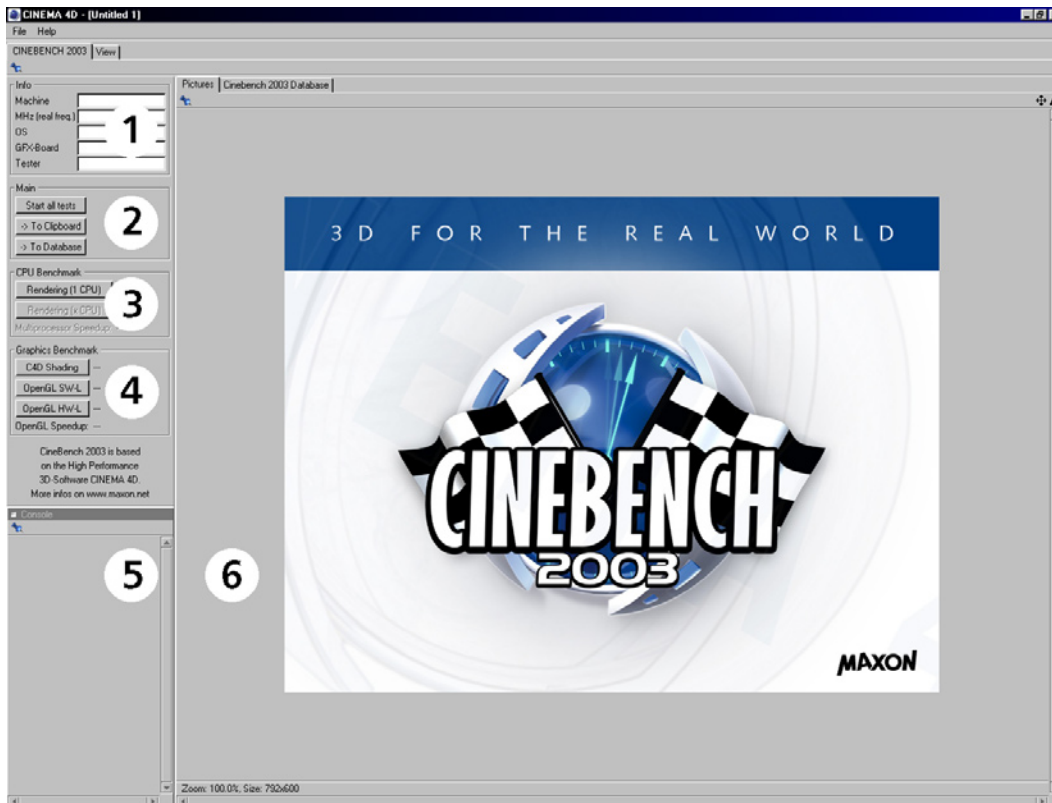
To start benchmarking, double-click the application icon in the "CINEBENCH 2003" directory. A window will open (see below).

To quit CINEBENCH 2003, close the window.

Please note:

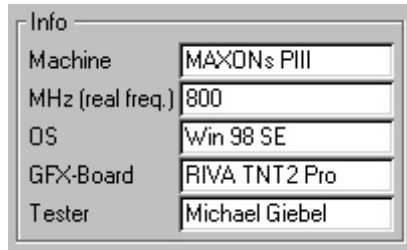
Do not start CINEBENCH 2003 from the CD. Although it is possible to do so, this can lead to exaggerated benchmark results.

Additionally, if you run CINEBENCH 2003 from the CD, you'll be unable to save the results to the integrated database.



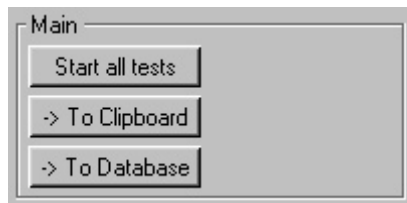
Six key areas are displayed in the CINEBENCH 2003 window:

1. Info



Here you can add specific information about your hardware setup (system, real CPU speed, operating system, graphics card). You can also insert your name to let other users know who you are.

2. Main



This is where you start the full benchmarking test. You can also run various tests individually (see below). If you click the "Start all tests" button, the tests will be run one after the other.

Once testing is complete, the results are displayed in the screen areas (3) and (4).

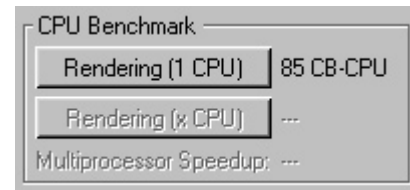
You can copy the results to the Clipboard by pressing the "-> To Clipboard" button.

Next, start your usual text editor and open a new document. Paste the Clipboard's contents into this file. Just fill in any missing data in the top part of the document. You can now share your benchmarking experience with fellow testers.

Alternatively, you can also collect the benchmark results in the integrated database. Simply click on the "-> To Database" button.

After selecting this command and giving the file a name, the display on the right (6) will change to display the database. We'll take a closer look at this comparison tool later on.

3. The CPU Benchmark



As mentioned before, each test can be run on its own. This section enables you to benchmark the render speed of your system's CPU.

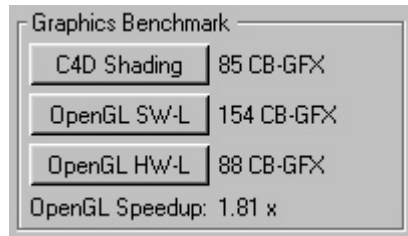
Just select the button "Rendering (1 CPU)" to start the test. This will cause your computer to render a CINEMA 4D scene on a single processor. The results will be displayed next to the button.

If there is more than one CPU installed on your system (multi-processor systems), another button can be selected. To run the MP test, simply click the "Rendering (x CPU)" button. The CINEMA 4D scene will now be rendered using all of the main CPUs that are available to your system. Once again, the results will be displayed next to the button.

Additionally, CINEBENCH 2003 will show you the performance ratio between a single CPU and multiple CPUs. This gives you an accurate way to gauge how much faster your computer can go when all of its CPUs are working flat-out.

Keep in mind that you won't get a 100 percent increase in performance per additional processor—even if the CPUs are the same speed. Among other things, this is because the processors must share RAM. Also, some processing time is taken up because the CPUs need to communicate with each other in order to share out the job.

5. The Graphics Benchmark



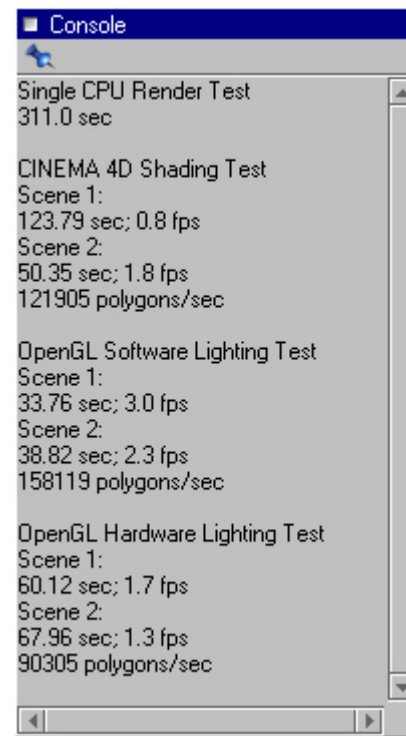
The buttons in this area are for testing the power of your graphics card. Ideal if you want to compare the performance of different graphics cards on your system.

The graphics tests are divided into various shading and lighting tasks. “C4D Shading” benchmarks using CINEMA 4D’s own software shading engine, “OpenGL SW-L” tests the OpenGL acceleration in combination with CINEMA 4D’s software-based lighting, and the “OpenGL HW-L” button will benchmark the graphics card’s OpenGL acceleration, as well as possible hardware lighting acceleration.

The results will be displayed next to the buttons.

The speed increase ratio between the CINEMA 4D software calculations and OpenGL will be displayed as well (“OpenGL Speedup”). Values greater than 1 mean that OpenGL acceleration has taken place. Value less than 1 mean that CINEMA 4D redraws the scene faster than the graphics card’s OpenGL implementation.

5. The console



Here you can see which test is currently running, as well as the subsection tests. It also shows you the duration and the frame rate.

This is also where error messages will appear. Should an error message appear, please read the CINEBENCH 2003 installation instructions once more.

6. The Image/Database Window

This is where the actual raytracing test takes place. The top window tab lets you switch to the database, which should contain the results from previous tests.

The Benchmark Tests in Detail

The application runs several different tests. Each can last several minutes, depending on the performance of your hardware. The shading tests primarily benchmark the speed of your graphics card, while the raytracing tests check the performance of the main processing units (CPU and FPU).

This chapter explains the individual tests in detail.

CPU Benchmark

A single scene (“Daylight”—copyright by Carles Piles) is rendered using CINEMA 4D’s famously fast raytracing engine. It contains 35 light sources, an incredible 16 of which use shadow maps and cast soft shadows.

Rendering (1 CPU)

The time it takes to render the scene with a single processor is determined. A CB-CPU value of 100 would be roughly equivalent to a 1GHz Intel Pentium 4 processor.

This gives you an easy way to compare the performance of different CPUs, such as AMD Athlon and Motorola G4.

The scene will be pre-rendered at a very small size to ensure that there is no hard drive activity. All textures are therefore stored in physical memory for the real test.

Rendering (x CPU)

The time it takes to render the scene with multiple processors is determined. The resulting “Multiprocessor Speedup” factor determines how much faster the system is compared with one CPU only.

Real dual-processor systems (as opposed to virtual dual-processors) should give you a performance boost in the region of 1.8 to 1.9.

Why not a factor of 2.0?

Multiple processors still have to access the same RAM. In addition, you lose some CPU-time because the processors need to communicate with each other in order to share out the job. Therefore you’ll always get a factor less than 2.0.

The scene will be pre-rendered at a very small size to ensure that there is no hard drive activity during the tests. As a result, all textures are stored in physical memory in preparation for the real tests.

The Multiprocessor option will only be available if your system has two or more processors, or if HyperThreading (see explanation below) is enabled for your computer. For example, multi-processors are supported under Mac OS 9 or higher and Windows XP Professional. Note that multi-processors are not supported under Windows 98 or Windows XP Home.

Intel Pentium 4 HyperThreading

Intel has introduced HyperThreading in its latest generation of Pentium 4 processors. This brand-new technology is designed to use the system’s resources more efficiently than ever before. The computer pretends to use an additional processor per each real CPU, even if your system has one CPU only. Because CINEBENCH 2003 recognizes multiple CPUs, this will result in the rendering being split up into at least two threads. This can lead to a performance-boost of up to 20%!

Graphics Benchmark

The viewport will display two scenes, one after the other (“Pump Action”—copyright by Phil “Captain3D” McNally and “Citygen”—copyright by Paul Everett).

The first animation uses an original scene from the famous short animation “Pump Action”. This is a real-world example of a professional animation project, containing 37,000 polygons and a massive 1,064 objects. In particular, this sheer number of objects creates a great deal of overhead. And it’s for this reason that the Pump Action isn’t the best scene for testing raw polygon-per-second count. However, this scene is very good at exposing the difference in speed between OpenGL and CINEMA 4D’s own software-based shading (because almost all the objects are texture-mapped at different qualities). So what about testing the polygon-per-second count?

To the rescue comes the second scene, “Citygen”. It contains about 70,000 polygons and this time there are only a couple of objects - ideal for testing the polygon display rate.

C4D Shading

This test uses CINEMA 4D’s own software shading algorithm. The CB result is calibrated to an Intel Pentium 4 processor with 1 GHz. This can be used to determine the performance of the CPU in yet another way.

OpenGL SW-L

This test-runs both scenes with the help of OpenGL. The lighting is handled by the CINEMA 4D’s highly-optimized software algorithms. Shading and transformation is carried out by the graphics card.

Older graphics cards may run these tests faster than the third benchmark “OpenGL HW-L”.

OpenGL HW-L

These tests run entirely with the help of the graphics card’s OpenGL accelerator. CINEMA 4D merely transfers the position of the light sources and geometry. Modern graphics cards will run this test much faster than the software-based algorithms.

Because we are dealing with a real-world benchmark and CINEMA 4D has to transfer the information over to the graphics card, the result cannot be compared to those given by the card’s manufacturer. However, you can consider the result to be a measure of your card’s performance when running a top-class application like CINEMA 4D.

Interpreting The Results

You're probably asking yourself: "What do these values all mean?"

Let's take the simple results first: the tests for single and multiple CPUs. These give a fair impression of just how fast your computer is. The greater these values, the faster your system is (and the quicker you get the results, of course).

The "Rendering (1 CPU)" value multiplied by 10 roughly equals the MHz speed of the CPU. In other words, a 2.8 GHz Pentium 4 may provide 280 CBs. A margin or error in the region of about 10% is acceptable. If you get a result that is much greater, you should check the installation of your system.

Let's have a look at the more complicated tests. In particular, the graphics benchmarks... Keep in mind that the fairest way to test different graphics cards is to benchmark them all on the same computer, so that they are tested under identical conditions.

For example, if you compare an ATi Radeon 9700 running an AMD Athlon 2600+ with an nVidia GeForce 4 Ti installed in an Intel Pentium 4 with 3 GHz, the results may merely show an increase or decrease in speed, but they will never provide you with comparable results.

The graphics performance will also show you which shading mode will give you the best performance in CINEMA 4D. If the "OpenGL HW-L" test offers the best results, we recommend enabling OpenGL in the preferences (on the Viewport tab). In this case, you should also enable the OpenGL Lighting option on the OpenGL tab of the preferences).

Once again, keep the following in mind:

For comparable results, test each graphics cards under the same conditions, in other words, on the same system. Another important fact to remember is that Windows rarely lets you remove the hardware drivers fully.

Some drivers, or their registry entries, may cause unexpected behavior, even if they are no longer in use. They can even destabilize the entire system. Professional testing sites may install a clean operating system on the computer after every test; this beings with formatting the hard drive.

Don't chuckle to yourself if you are a Mac user. The same can happen under Mac OS, although the old drivers will be a little easier to find.

Boosting System Performance

Right. So you're one of those lucky people who doesn't worry about which piece of hardware kit is slightly faster than the other. You just go right out, buy a computer and stick with it. In which case you must be asking yourself why you should even bother to benchmark your computer.

Well for one, there are others out there who do care about benchmarks. By sharing your benchmarks with them, you'll be helping fellow testers and thus you'll generally make the world a better place. In the next chapter, we'll explore exactly how you go about sharing your benchmarks.

And once you've done your bit to help others, you might like to fine-tune your own computer. Or, of course, wave the white flag. (Remember—there's always a faster, better computer!)

Whatever you do, keep our advice in mind and ask yourself which benchmarks are comparable and which aren't.

CINEBENCH 2003 can also be useful if your computer seems to have slowed down for no apparent reason. CINEBENCH 2003 can help you find out exactly where the problem lies.

To this end, eliminate the possible problems one-by-one and run CINEBENCH 2003 each time to check if things are running fast again. Once things are back to normal, you'll know there was a problem with the last thing you eliminated.

This will also allow you to find the best environment settings for your graphics card's hardware acceleration. Run the benchmarks several times and each time decrease the num-

ber of tasks your system performs. Modern drivers offer a great number of settings for the normal display, as well as OpenGL.

Driver versions in particular can make a noticeable difference. Ensure that you're using the latest drivers offered by the graphics card's manufacturer. They should be available from its website.

Sharing And Comparing

When sharing your results with others, please use the template provided with CINEBENCH 2003. Once the tests have finished, copy the results to the Clipboard. Simply select the button “-> to Clipboard”.

Open a new, empty document in your usual text editor (such as “SimpleText” under Mac OS, or “Notepad” under Windows).

Paste the Clipboard’s contents into this document. This can usually be done by selecting “Edit > Paste” from the text editor’s menu.

Please complete the missing entries in this document. Otherwise, your collected results will be only half as useful as they might be.

Now you can compare your computer with other computers by sharing your results via the Internet or email.

Please note:

We recommend that you include the version number of your graphics card’s driver somewhere in this document. Sometimes the overall performance, or even the system’s stability, might be improved by new drivers. Please do not pass on your benchmark scores if you are using unreleased (i.e. beta) drivers!

You can even compare CINEBENCH 2003 results within the application, including those sent to you by other users. We have implemented a database function especially for this purpose.

```

Michael Giebel_cb2003.txt - Editor
Datei Bearbeiten Suchen ?
Cinebench 2003
*****
Tester      : Michael Giebel
Processor   : MAXONS PIII
MHz         : 800
Number of CPUs : 1
Operating System : Win 98 SE

Graphics Card : RIVA TNT2 Pro
Resolution    : <fill this out>
Color Depth   : <fill this out>

*****
Rendering (Single CPU): 85 CB-CPU
Rendering (Multiple CPU): --- CB-CPU

Shading (CINEMA 4D)      : 85 CB-GFX
Shading (OpenGL Software Lighting) : 154 CB-GFX
Shading (OpenGL Hardware Lighting) : 88 CB-GFX

OpenGL Speedup: 1.81
*****

```

```

Michael Giebel_cb2003.txt - Editor
Datei Bearbeiten Suchen ?
Cinebench 2003
*****
Tester      : Michael Giebel
Processor   : MAXONS PIII
MHz         : 800
Number of CPUs : 1
Operating System : Win 98 SE

Graphics Card : RIVA TNT2 Pro
Resolution    : 1280 x 1024
Color Depth   : 32 bpp

*****
Rendering (Single CPU): 85 CB-CPU
Rendering (Multiple CPU): --- CB-CPU

Shading (CINEMA 4D)      : 85 CB-GFX
Shading (OpenGL Software Lighting) : 154 CB-GFX
Shading (OpenGL Hardware Lighting) : 88 CB-GFX

OpenGL Speedup: 1.81
*****

```

The CINEBENCH 2003 Database

This function lets you save and compare benchmark results. Once the testing is complete, you can easily input the results into the database. To do this, select the button “-> To Database”. In the dialog that appears, enter a suitable name for your results and click “OK”.

The database will appear in the foreground. But you can access it via the window tab anyhow.

CINEBENCH 2003's database is empty to begin with. After the first test, you may find that the only results displayed are your own ones. If you modify your graphics card's driver settings, restart CINEBENCH 2003 and copy the results to the database again.

In this case, ensure that you're using a different filename. Otherwise, you'll overwrite previous results.

You can sort the columns by each test value. Simply click on the header of the column that you want to sort by. The values are color-coded for organizational purposes.

The gradients go from red (very fast) to blue (very slow). The best value in each category will be highlighted in yellow.

How do you integrate the results of others in this database?

Sharing your results with fellow users was explained in the previous chapter. But what do you do when you have received one of these results? Simple—just move the file into the “cb-results” folder of the CINEBENCH 2003 directory. Now you can access those test results in the database and compare them with your own.

Description	Cpus	MHz	OS	GfxBoard	CB	CB	CPU Ratio	GFX	OGL	OGL	SL	HL	Tester	Filename
					1 CPU	X CPU		C4D	SL	HL	Ratio	Ratio		
Fundevogel FV29	2	300	HGranger 2.0.03	Savlatge 1200 NSA	333	333	1.19	333	333	1800	1.19	6.36	Thomas Kunert	Thomas Kunert_cb2003.txt
Joinda J13	2	2539	DDursley ...	Lacrimosa 500 CIA	244	296	1.21	261	1005	1451	3.85	5.56	Philip Losch	Philip_Losch_cb2003.txt
Mother Holle MH23	1	2200	RWesley 2001	Leid Zeppelin 170 BKA	219	219	---	226	328	---	4.11	---	Christian Losch	Christian_Losch_cb2003.txt
Snow-White SM3	2	1650	PMcGonnagall Pro SP 0.75	Matillon 2 PVC	202	---	---	207	753	1181	3.78	5.71	Bjorn Mast	Bjorn_Mast_cb2003.txt
Rapunzel R1	1	1466	PDumbledore 2.00.1	In Extremo 800 KGB	182	182	---	179	689	956	3.85	5.34	Tilo Kuehn	Tilo_Kuehn_cb2003.txt
Grethel G19	2	1200	HPotter 2001	Deep Purple 300 RKD	121	223	1.84	142	380	836	2.68	5.89	Joern Gollob	Joern_Gollob_cb2003.txt
Cinderella C7	2	800	VDursley 16.	Omega 75000 LSD	76	140	1.84	90	227	80	2.52	0.89	Richard Kurz	Richard_Kurz_cb2003.txt
Rinkrank RR17	1	800	Nimbus 2000	ZZ TOP Pro	85	85	---	85	154	88	1.81	1.04	Michael Giebel	Michael_Giebel_cb2003.txt
Rumpelstiltskin RSK11	1	800	PDursley 16.	Themon 2000 FBI	88	88	---	88	395	665	4.03	7.56	Reinhard Hintzenstem	Reinhard_Hintzenstem_cb2003.txt

Newer CINEMA 4D Versions

At MAXON, we are continually developing our flagship software, CINEMA 4D (the software on which CINEBENCH is based). So it's a fair bet that before long there will be a new version of CINEMA 4D with exciting new features. So where does that leave you? On the one hand, you have CINEBENCH 2003, on the other, the very latest version of CINEMA 4D...

The answer is simply: Please only benchmark using the version of CINEMA 4D that comes with CINEBENCH.

After all, we will continue to develop CINEBENCH as well.

But perhaps the most important thing to keep in mind is this: Never compare benchmarks made in one version of CINEBENCH with benchmarks made in a different version of CINEBENCH. This sound advice applies to all benchmarking software, and for good reason. Tests that were relevant even just a few years ago are no longer a good measure of what constitutes a fast computer today.

For now, we hope you'll enjoy pushing your computer to the limit with CINEBENCH 2003. Happy testing!

Your MAXON Team

