TWEAKER'S PARADISE

Tweakers rejoice! *GFW* and Koroush Ghazi, founder of TweakGuides.com, are teaming up every month to deliver invaluable PC-performance advice. After tackling the big topics here, head to TweakGuides.com for detailed breakdowns on everything from OS optimization to squeezing out extra frames per second in your favorite games.

REQUIRED READING
TweakGuides Tweaking Companion
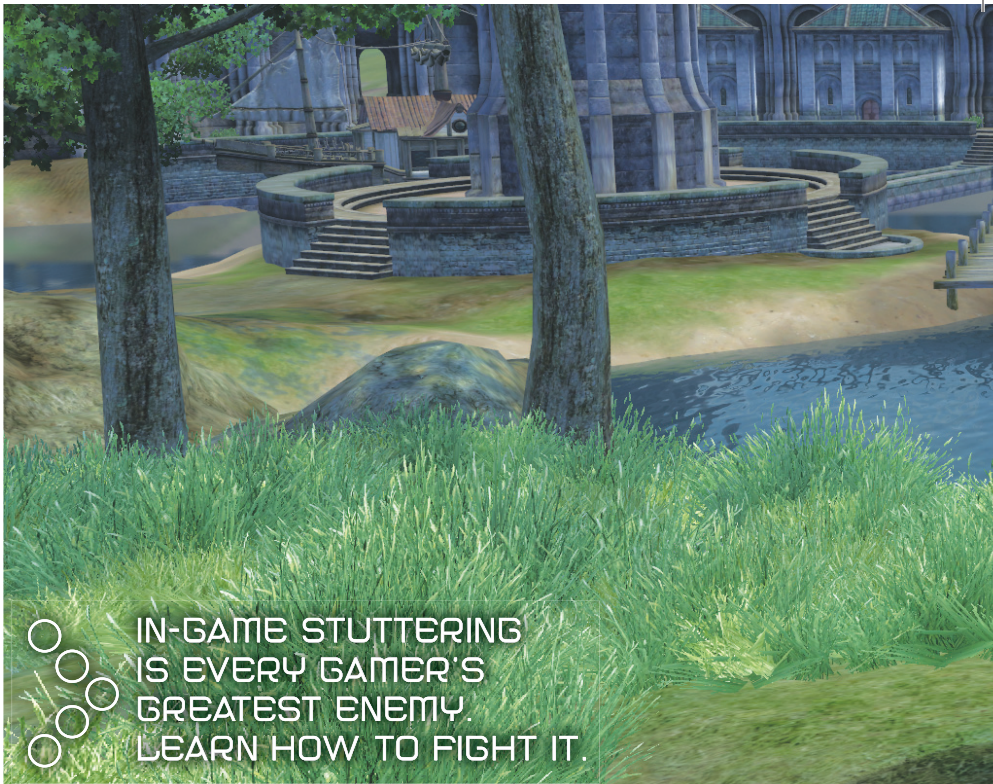www.tweakguides.com/TGTC.html

SOFTWARE TOOLS
System Identification: CPU-Z
www.cpuid.com/cpuz.php
Defrag: Diskeeper
www.diskeeper.com/defrag.asp
Defrag: PerfectDisk
www.raxco.com/products/perfectdisk2k

Koroush Ghazi

Koroush Ghazi is the founder of TweakGuides.com.

HOW-TO

Stuttering. Freezing. Those periodic gameplay hiccups. Whatever you call it, this is every gamer's greatest enemy. Annoyingly, stuttering plagues even the mightiest of high-end systems. No magic bullet can kill it. No special program exists to squash it; no single piece of hardware can exorcise it. But there are some things you can do to at least keep it from overwhelming your gaming.

WHAT CAUSES STUTTERING?

Imagine you're reading a book. Every time you reach the end of a page, you pause while flipping to the next page. Game stuttering works on the same principle: Your PC is pausing to physically access new data in order to let the game progress. You'll probably notice that you get the most stuttering in the first few minutes of gaming—especially when "outdoors" in the game world—and then whenever you enter new areas or trigger new events or sounds. At these times, your hard drive is struggling to keep up with loading all the various pieces

of new information into memory as the game needs it. To confirm this, the next time you get some stuttering, check your hard drive light—you'll see that it's on.

So why doesn't the game just load up everything beforehand? Modern games are far too large to load entirely into your RAM, so only part of the game loads to start with, and then smaller chunks get swapped back and forth between your RAM and your hard drive as needed. Now that we know what causes it, let's get rid of it.

STUTTERING FIXES: SOFTWARE TWEAKS

Defragment: By arranging all the pieces of data on your hard drive into a logical order, defragmentation makes drive access quicker. Be sure to defrag after every game, patch, or driver installation. The built-in Windows Disk Defragmenter is fine—but for better results, try retail programs like PerfectDisk and Diskeeper (see "Tweaker's Paradise," above).

Remove Background Programs: At start-up, your PC automatically loads a range of programs, which then sit in its RAM. Most are necessary, but quite a few aren't. Always close all open programs before launching a game, and remove all unnecessary start-up programs, services, and drivers. This is tricky, so read the Startup Programs and Services chapters of the TweakGuides Tweaking Companion for details (see "Tweaker's Paradise").

● Turn down the textures.

Reduce Settings: Turn down a few graphics options, particularly texture quality–related settings. The lower the settings, the less data needs to be loaded as you wander the game world.

Optimize Virtual Memory: Windows uses a portion of your hard drive called the pagefile for juggling around data that it may need again but can't keep in RAM. Check the Memory Optimization chapter of the TGTC for details on how to optimize the pagefile. Don't disable your pagefile, as you can't force Windows to load a program into RAM. You'll also get no benefit from putting the pagefile on a separate partition of the same drive.

The steps above will noticeably reduce stuttering, but you can't get blood from a stone. At some point, though, you'll still need to face the inevitable—it's time to upgrade.

IN-GAME STUTTERING IS EVERY GAMER'S GREATEST ENEMY. LEARN HOW TO FIGHT IT.

TECH TU

This month: Understanding and combating in-game stuttering

STUTTERING FIXES: HARDWARE OPTIONS

More RAM: Recent games require at least 2GB of RAM for smooth sailing. Fortunately, RAM is a cheap and easy upgrade—but remember to get the same type of RAM that you already have. Not certain which RAM you need? Download the helpful freeware program CPU-Z. It'll tell you everything you need to know about your PC. One last RAM note: Anything over 4GB is wasted on 32-bit Windows.

Faster Hard Drive: Because of its moving parts, the hard drive is the slowest PC component. Even the fastest drive can't match the transfer speed of RAM. However, a fast drive will reduce stuttering. When shopping for drives, look for the following:

- Access time is crucial. Find a drive with a random access time of 12 milliseconds or less.
- Rotational speed should be at least 7,200 rpm. Get 10,000 rpm if you can afford it.
- Get a drive with a 16MB cache or buffer size.

Western Digital's Raptor series delivers high-performance, gamer-friendly hard drives that can greatly reduce stuttering. But they don't come cheap.

Multiple Hard Drives: Multiple drives allow your system to read from one hard disk while writing to the other or to simultaneously read from both. When using multiple drives, place your pagefile on the drive that *doesn't* contain your games.

● **Raptor: It's fast, but it will leave a dent in your wallet.**

More Video RAM: A lack of video RAM on your graphics card can sometimes cause stuttering. The higher your in-game resolution, texture quality, and antialiasing or anisotropic filtering settings, the more likely you are to max out the VRAM, resulting in pauses or freezes whenever your PC swaps out old data to make room for the new. Look at your hard drive light—if it's not on when you experience stuttering, you're running out of VRAM. Lower your settings or buy a graphics card with 512MB VRAM or higher.

STUTTERING BEGONE?

The steps above remove the vast majority of stuttering, but I'll level with you: Some stuttering, however mild, is inevitable in complex games, especially in the first few minutes of gameplay. This will only change when storage technology improves in the future. ● **Koroush Ghazi**

NE-UP