

Company of Heroes DX10 (“d3d10”) FAQ and Benchmarking Guide

Q. Why don't I see muzzle flashes or explosions on my nVidia 8x00?

A. You must be using 158.45 or newer drivers. These can be found following the BETA Drivers link from <http://www.nvidia.com/content/drivers/drivers.asp>

Q. Which of nVidia's CSAA modes are most similar to ATI's?

A. nVidia's 8xQ CSAA mode and ATI's 8x AA mode should be visually equivalent. For more information on CSAA please see nVidia's paper at <http://developer.nvidia.com/object/coverage-sampled-aa.html>

Q. My frame rate is locked at 60fps, how can I unlock it?

A. Use the *-novsync* command line parameter by creating a shortcut to RelicCoH.exe with *-novsync* in the target.

e.g.

"C:\Program Files\THQ\Company of Heroes\RelicCOH.exe" -novsync

Q. Can I do anything to prevent CoH from running out of memory when playing certain maps at very high resolutions and anti-aliasing settings?

A. No, you must lower your display settings. By default Vista 32 gives each application two gigabytes of virtual address space. You can look up how to change this to three gigabytes, use Vista 64, try the *-notriplebuffer* or *-novsync* command line parameters, or try newer display drivers when they are available.

Q. Why does CoH run slower with shader quality set to Direct3D 10 instead of High?

A. CoH is not simple port to the Direct3D 10 API from the Direct3D 9 API, it was planned from the start to add many significant new features and improvements. Just as the additional calculations required by the features enabled in high shader quality mode (Pixel Shader 2.0/3.0) make CoH run slower than in low shader quality (Pixel Shader 1.1) the additional calculations of all new advanced Direct3D 10 features cause each frame to take slightly longer to render. Keep an eye on your favourite graphic card vendor's web site for new driver releases offering improved performance.

Q. Are others experiencing subsequent runs of the game being slower than the previous run and eventually running out of memory in Direct3D 10?

A. Yes, however this is limited to certain drivers. Please keep checking your graphic chip manufacturer's web site for improved drivers. If you are affected by this you can exit and restart CoH to work around this problem.

Q. Why am I having problems with my SLI/Crossfire system?

A. At the time the patch was released there are known driver issues with multi-GPU systems. Check your vendor's website for updates.

Benchmarking Company of Heroes

With Relic's release of the Direct3D 10 patch, many new features were added that push the limit of what current hardware can do and what end users can expect from a game.

As many new features have been added exclusively for Direct3D 10, you will find the CoH Direct3D 10 renderer runs slower than Direct3D 9 due to the additional work load. For this reason we recommend using High shader quality (Direct3D 9) instead of Direct3D 10 shader quality when running on low end hardware that is Direct3D 10 compatible.

As Direct3D 10 is so new and Company of Heroes is the first full commercial game to use this API, using the latest drivers for your video card is absolutely necessary. nVidia users must use the 158.45 or newer drivers. These are currently found by following the BETA drivers link at <http://www.nvidia.com/content/drivers/drivers.asp>

The night missions are the best show cases for image quality in Direct3D 10 due to the additional shadows.

Explanation of the new features:

Soft FX Blending

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<!--[if !supportLineBreakNewLine]-->  
<!--[endif]-->
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In previous generation games, 2D sprites are often used for explosions. Where these intersect the ground or other objects it becomes apparent these are simple 2D cards, not real 3d objects. CoH uses multiple render targets to store the depth information to a 2nd texture before rendering our FX. Using this depth information we can properly blend as the intersection approaches to maintain the 3D illusion.

These are always enabled, unless the video card runs out of memory. When doing comparison benchmarking at high resolutions and anti-aliasing settings it is important to check the warnings.log for texture creation failures due to running out of memory to see if this feature was silently disabled which will result in a small performance gain for cards that run out of memory.

Litter Objects

Previous generation games generally have flat terrain with a few objects such as trees or barrels placed on them for variety. CoH advances this by adding small procedurally generated 'litter' objects. These are added to all existing levels without requiring any work from map artists by adding objects based on the material type of the terrain. With the Direct3D 10 renderer users get to have real 3d models of small plants growing in the fields or real 3d models of rocks on the roads instead of just paintings of rocks on flat terrain.

The number of objects is tied to the model quality slider in the graphics options menu and uses the Draw Instanced API.

Short Grass

In addition to having litter objects areas of the maps where grass is growing will have 3D grass in Direct3D 10. Grass 'shells' are drawn over the terrain using the Draw Instanced API so that soldiers will be able to walk on real grass instead of a flat painting of grass.

This is enabled in the options menu by selecting the Ultra detail terrain setting.

Point light shadows

In Direct3D 10 mode all lights can be shadowed. Whether it is a huge explosion, a street light, or even a match lighting a cigarette, the light has the potential to be shadowed.

This is implemented by rendering the entire scene to all six faces of a cube map for each shadowing light using a combination of the Draw Instanced API and the Geometry shader. As long as shadows are enabled this feature is enabled.

General Improvements

As all the lighting in Direct3D 10 is 100% per pixel, the shadows are more softened, the lighting is more detailed, and there are more shadows the pixel shaders are up to five times longer than they were in Direct3D 9 mode. Many of these instructions can be skipped in typical day missions with only a few point lights, but night missions will tend to have more point lights which will require more work to draw the shadow maps and then more work to render the world scene with more active shadow maps.

In Direct3D 9 only the main sun/moon light was normal mapped; the ambient light and other lights were calculated per vertex. This is most noticeable when the object you're looking at is in a shadow and only ambient light is on it.

-novsync, triple buffering, and perftest

vsync is now enabled by default in both 9 and 10, although the *-novsync* command can be used to disable it. In Direct3D 10 (not d3d9) triple buffering is enabled if the *-novsync* or *-notriplebuffer* command line parameters are not used. Triple buffering will make the in game frame rate more consistent, but will use additional video memory and consume more virtual address space.

To make CoH more friendly to incorporating in benchmark suites we've added the *-perftest* command line parameter (be sure to use *-novsync* with it!) which will save a performance report text file with average/min/max frame rates in the %user%/documents/my games/company of heroes/log files folder.

Running at very high resolutions and anti aliasing settings

Due to the limited address space of Vista 32 if trying to run at very high resolutions and/or anti aliasing settings the driver may consume so much virtual address space the application crashes. Running with *-novsync* for performance testing will disable triple buffering to recover a tiny bit of memory, but the best solution is to run Vista 32 set to give applications three gigabytes of virtual address space or to just run Vista 64 which gives all 32bit applications a full four gigabytes.

Subsequent runs

At the time the patch was released there was a known issue that made subsequent runs slower with certain cards. To work around this and ensure benchmarks are consistent and representative please exit CoH completely before re-running a performance test.

Screen shot comparisons

To save a screenshot as a lossless .tga instead of a small jpeg bring down the console by pressing SHIFT+CTRL+~ and type *app_screenshotext(".tga")*