

# Vertical Sync

Vertical Sync is a technique or technology that synchronizes the frame rate of a monitor to the rendered frame rate of the graphics card.

## General Principle

The idea is to see to it that a frame is not changed by the graphics card during the display of it on the screen side (preventing [screen tearing](#)). This is very often an option in your game's settings, that can be turned on or off. It's usually named V-Sync or Vsync. This is in essence a means of limiting your frame rate to the rate your monitor can actually handle (therefore not changing the displayed situation while the frame is being updated on the screen).

### Pros

E.g. your graphics card may very well be able to render a game with 100 [fps](#) or more, but when your screen has a maximum of 60 fps, it will never show more frames than that anyways. The only thing that might happen, is the change of the currently displayed frame while the update on the screen is happening. Activating Vsync may also help reducing the load on your [GPU](#) hence also reducing energy consumption and maybe even requiring less loudly running fans.

### Cons

On the other hand there are players that claim that this diminishes the response of the game (especially in [shooters](#)). Which may actually be true, if the game actually also only scans or processes the inputs with the same frame rate. Then there is a very short moment between pressing a key or mouse button and the input taking effect. This reduced response performance may be noticeable.

## Variations

There are differences in *how* exactly Vsync is achieved. Usually it is simply done by the game or graphics card driver, that stops rendering the next image until the time has passed between two frames to actually render the next one, hence reducing the load on the GPU. This also only sends data at the frame rate set by the graphics driver/game to the monitor. But which frame rate is taken as a base may very well depend on the hardware, too.

Some monitors do have a technique build-in that manages the frame rate on their own, meaning they adapt *their own frame rate* to the rate of frames received dynamically (which is at the graphics card side is simply the best the set up can handle, aka the max. fps). This is obviously still limited to the maximum frame rate of the panel anyways. But when the maximum frame rate of the monitor is well above the maximum frame rate your graphics card can render (for that game), then there is nothing wrong with using it. It has to be supported by the graphics card and its driver, as well as the monitor. In essence the hardware manages the syncing. There are different proprietary variations of

this technology but also standard solutions. Screens with this feature are in general a bit more expensive than models without it.

Other solutions do it software-wise, meaning *the graphics card* sends its desired frame rate to the screen and the screen simply reacts to that information by adapting its frame rate. This rate again is changed dynamically, not statically, as classical Vsync would be doing it.

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