# Evidence continues to mount about how bad Denuvo is for PC gaming performance

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One of the biggest arguments against anti-piracy checks built into video games (commonly known as “digital rights management,” or DRM) is that they punish paying customers with stuttering, loading times, and other detractive gameplay issues. While leading DRM vendor Denuvo has long claimed that its tools don’t hamper video games, the stats keep piling up to suggest otherwise.

This week, in its third video on the topic, YouTube channel Overlord Gaming confirmed an additional six examples of improvements once Denuvo was patched out of recent games. The differences in performance range from marginal to noticeable. Yet in all cases, Overlord confirms a general trend of Denuvo impact in two key categories: loading times, and sporadic-yet-severe spikes in “frame time.”

The latter issue emerges when a system struggles to render the next frame of animation in a video game, resulting in a pause far greater than the 16.67-millisecond standard found in “60 frames per second” action. Overlord Gaming once again found frame time spikes in the 100-, 200-, and even 400-millisecond ranges in every tested game that had Denuvo enabled. These

rare-but-severe dips subsequently went away in each game's post-Denuvo version.

All six tested games included loading times that were anywhere between 50-80 percent longer with Denuvo enabled. Overlord's tests made sure to reload and retest both pre- and post-Denuvo versions a few times, to see how leaving any information or assets in a system's RAM might affect subsequent reboots, and to confirm that post-Denuvo versions weren't unfairly benefiting from game elements remaining in the testing system.

The games tested in Overlord's Tuesday video, embedded below, include *Dishonored, Dishonored 2: Death of the Outsider, Deus Ex: Human Revolution*, *Bulletstorm: Full Clip Edition, Motoracer 4,* and *Rime*. Most games did not include built-in benchmarks, which can lead to some variance in test results (though loading-time comparisons are the most consistent data point compared in these tests, since these were measured for identical levels and menus in each game).

[embedded content]
Denuvo tests from Overlord Gaming
The last game on that list will likely stand out, because *Rime*'s initial, Denuvo-saddled version already drew an uproar from fans thanks to poor PC performance. Overlord took an opportunity this week to definitively test the game immediately before and after Denuvo had been removed, and to ensure that its test would not include any GPU-limited results. The test confirmed significantly higher frame time spikes and longer loading times with Denuvo enabled. In both categories, performance increased by roughly 50-60 percent once Denuvo was removed.

In the years since Denuvo's emergence as a popular DRM option for PC game publishers, news of a game receiving a "no Denuvo" update has become so common that Ars rarely reports individual cases anymore. Representatives at Denuvo have already stated that their patches are considered successful even if they only

hold off would-be pirates and downloaders during the first week of retail availability. That span of “protected” Denuvo time has since shrunken to “zero days” for some major PC launches. Some other recent games, including *Sonic Mania* and *Assassin’s Creed Odyssey*, have held off PC scene crackers’ attacks for months.

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