# AMD improves real-world boost and idle on Ryzen 3000

Enlarge / Too much boost is just enough.
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Tuesday, AMD announced firmware updates for its new Ryzen 3000 desktop CPU line to improve both its highest boost clock speed and its willingness to "idle" at lower, more power-efficient speeds when the processor's full power is not required. The improvements are in the most recent beta reference firmware and are expected to filter down to OEM motherboard manufacturers and become available in about three weeks from now—subject, of course, to testing and implementation schedules of the OEMs.

The announcement also teases a new SDK launch targeted for September 30, which offers APIs for use in monitoring utilities.

## Boosted boost

Last week, a survey of more than 3,000 Ryzen 3000 CPU owners showed that fewer than half of those CPUs were capable of hitting the maximum boost clock rate advertised. This really isn't the end of the world—a Ryzen 9 3900X that peaks at 4.5GHz instead of 4.6GHz is only missing out on 2% of its total possible boost clock rate, and even that 2% clock rate

does not generally translate to 2% slower application performance. In other words, you're going to need artificial tests to discover the problem—you absolutely would not just suddenly realize, "hey, this isn't as fast as it ought to be!" in the middle of a gaming or content creation session.

There's also more going on with a boost clock maximum rate than just the CPU itself. The maximum clock rate achieved will depend heavily on the CPU cooling system, how expertly the cooler has been installed (eg, neither too much nor too little thermal paste), and even the operating system version, among other factors. With all of that said, more MHz is more MHz, and AMD's internal testing shows that the new updates should add about 25-50MHz to the maximum boost clock speed seen on a given system.

## Calmer idle

AMD's new reference firmware adds an activity filter that lets the CPU's own boost algorithm ignore "intermittent OS and background application noise" that might otherwise ramp the CPU up into its boost clock. Certain bursty but overall lightweight tasks, such as video playback, application launch, and monitoring utilities, make regular requests for a higher boost rate, even though their overall activity level is low. The activity filter smooths things out for these lightweight tasks, keeping the CPU out of boost mode without harming overall or perceptible performance.

AMD believes this will result in lower core voltage to cores managing such tasks (around 1.2V) but reassures us that this is not a simple cap, and workloads that really *do* need boost clock and voltage will still hit them as needed.

## Monitoring SDK

AMD's new monitoring SDK aims to make it easier to ask

questions like “what’s my CPU temperature?” and expect consistent, reliable results.

In addition to operating temperature, the 30+ API calls being made available in the initial SDK release include Peak and Average Core Voltages, current and power limits for motherboard voltage regulator and CPU socket, peak CPU speed seen recently, effective frequency (i.e., after adjusting for idle periods: a 4GHz core active 50% of the time would have a 2GHz effective frequency), as well as many arbitrary individual voltage and clock levels.

- You can configure up to four comprehensive profiles in Ryzen Master, aggregating tweaks to CPU, GPU, and RAM frequencies and timings.
- This is the onboard Vega GPU configuration screen in Ryzen Master. PhD sold separately.
- Ryzen Master also offers real-time monitoring functionality, heavy on the pretty colors and blinkenlights.

Although the SDK itself isn’t publicly available yet, you can witness some of its API calls in use right now with AMD’s Ryzen Master application for Windows, which offers a graphical interface for monitoring and tweaking a bewildering array of CPU and onboard GPU metrics and settings.

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