

Core Competency

How many cores do you *really* need?

Like great technology philosopher Sir Mix-A-Lot says, we like big cores and we cannot lie. We want as many cores as legally available. But we recognize that not everyone rolls as hard as we do with a posse of threads. With Intel's first eight-core CPU, consumers can now pick from two cores all the way to eight on the Intel side of the aisle—and then there's Hyper-Threading to confuse you even more. So, how many cores do you need? We'll give you the quick-and-dirty lowdown.

Two cores

Normally, we'd completely skip dual-cores without Hyper-Threading because the parts tend to be the very bottom end of the pool Celerons. Our asterisk is the new Intel Pentium G3258 Anniversary Edition, or "Pentium K," which is a real hoot of a chip. It easily overlocks and is dead cheap. It's not the fastest in content creation by a long shot, but if we were building an ultra-budget gaming rig and needed to steal from the CPU budget for a faster GPU, we'd recommend this one. Otherwise, we see dual-cores as purely ultra-budget parts today.

Two cores with Hyper-Threading

For your parents who need a reliable, solid PC without overclocking (you really don't want to explain how to back down the core voltage in the BIOS to grandma, do you?), the dual-core Core i3 parts fulfill the needs of most people who only do content creation on occasion. Hyper-Threading adds value in multi-threaded and multi-tasking jobs. You can almost think of these chips with Hyper-Threading as three-core CPUs.

Four cores

For anyone who does content creation such as video editing, encoding, or even photo editing with newer applications, a quad-core is usually our recommended part. Newer game consoles are also expected to push minimum specs for newer games to quad-cores or more as well, so for most people who carry an Enthusiast badge, a quad-core part is the place to start.



It's indeed a glorious thing to see a task manager with this many threads, but not everyone needs them.

Four cores with Hyper-Threading

Hyper-Threading got a bad name early on from the Pentium 4 and existing software that actually saw it reduce performance when turned on. Those days are long behind us though, and Hyper-Threading offers a nice performance boost with its virtual cores. How much? A 3.5GHz Core i7 quad-core with Hyper-Threading generally offers the same performance on multi-threaded tasks as a Core i5 running at 4.5GHz. The Hyper-Threading helps with content creation and,

we'd say, if content creation is 30 percent or less of your time, this is the place to be. It's the best fit for 90 percent of enthusiasts.

Six cores with Hyper-Threading

Once you pass the quad-core mark, you are moving pixels professionally in video editing, 3D modeling, or other tasks that necessitate the costs of a six-core chip or more. We still think that for 90 percent of folks, a four-core CPU is plenty, but if losing time rendering a video costs you money (or you're ADD), pay for a six-core or more CPU. How to decide if you need six or eight cores? Read on.

Eight cores with Hyper-Threading

Not everyone needs an eight-core processor. In fact, one way to save cash is to buy the midrange six-core chip. But, if time is money, an eight-core chip will pay for itself. For example, the eight-core Haswell-E is about 45 percent faster than the four-core Core i7-4790K chip. If your render job is three hours, that's more time working on other paying projects. The gap gets smaller between the six-core and the eight-core, so it becomes about how much your time is worth. To give you an idea, the 3.3GHz Core i7-5960X is about 20 percent faster than the Core i7-4960X running at 4GHz.

Intel's Top Guns Compared

The LGA2011-based Core i7-4960X (left) and the LGA2011-v3-based Core i7-5960X (middle) dwarf the Core i7-4790K chip (right). Note the change in the heat spreader between the older 4960X and 5960X, which now has larger "wings" to make it easier to remove the CPU. The breather hole, which allows for curing of the thermal interface material, has also been moved. Finally, while the chips are the same size, they're keyed differently to stop you installing a newer Haswell-E into an older Ivy Bridge-E board.

