

## CPU Process Size

Another technical difference between CPUs is the “process size”. When Intel develops a new processor family they assign it a code name like Nehalem or Sandy Bridge or Ivy Bridge; and sometimes change the *process* size by making it smaller. To be technically correct the process size refers to the distance between memory cells inside, so a smaller process size is typically better because the circuits will all be closer together which means the processor will use less power. This in itself doesn’t make the processor any faster, it might, but it does mean the processor will run cooler and use less power. You won’t get a choice in the process size, but it is something you’ll see advertised.

## Form Factor

Another difference between CPUs is the CPU form factor. Each CPU has pins or legs which are used to connect it to the motherboard. Some of the pins are used to transmit power into the CPU, but most are used to transmit or not transmit bursts of electricity that represent 0s and 1s. The 0s and 1s are used to represent the data and instructions being passed into and out of the CPU.

The number and arrangement of pins makes up the CPU form factor. The original CPUs used a form factor called a DIP which stands for Dual Inline Package because they had pins running down two sides of the CPU. They then changed to sockets, which had pins in a square array. The form factor changes periodically, when the CPU vendors add more pins. The extra pins are typically used to transfer more data and instructions on each cycle, they don’t need a lot of pins to send in power to the CPU. The first sockets were numbered Socket 1, Socket 2, etc., up to Socket 7, each iteration added more pins.

Hopefully it’s obvious that the CPU form factor has to match the socket on the motherboard. In other words, a CPU with an LGA1156 form factor can only be mounted on a motherboard with an LGA1156 socket. It can’t be mounted on a motherboard with any other socket because the pins won’t match and you won’t be able to physically install it without using a hammer and some super glue. Hopefully you know I’m just kidding about using a hammer to install a CPU. There’s no way to mount a CPU on a motherboard unless the CPU matches the socket/form factor type of the CPU connector on the motherboard.

And just in case you ever go on Geek Jeopardy, for a few years back in the early 2000’s, CPUs were mounted using a slot instead of a socket. Physically the slot looked a lot like the slots for mounting I/O cards, and the CPU’s were mounted on cards which were then pressed into the slots. The change from sockets to slots came about as an attempt to make it possible to upgrade the CPU without also changing the motherboard. At the time any time a new CPU was introduced it also typically added more pins which changed the form factor. This happened every 6-12 months, which meant if you had a computer that was over a year old you wouldn’t be able to simply swap out the older CPU for a new faster one because the new one almost certainly used a different form factor.

This inability to upgrade proved upsetting to many computer owners, so the CPU and motherboard vendors tried a different track. Instead of mounting the CPU directly to the motherboard, they came up with a system where the CPU was mounted to a card, and the card

was then mounted to the motherboard. The engineers that came up with this system said that this would make it possible to change the CPU socket on the card, which would make it possible to upgrade the CPU without also changing out the motherboard. But they obviously didn't think this all the way through, as the next time the CPU was changed to add more pins, it required more pins on the card, which required a new slot on the motherboard. In other words, the change from mounting CPUs directly to the motherboard with a socket to mounting the CPU to card which was mounted in a slot didn't help at all. Slotted CPUs were only around for a few years before the motherboard manufacturers went back to using CPU sockets.

This is still the situation we're in today. It can be difficult to upgrade the CPU in some computers, even if the computer is only a year old. If Intel releases a new generation of CPUs and change the form factor you won't be able to upgrade the CPU without replacing the entire motherboard. Luckily the changes to the CPU form factor have slowed down and don't happen as frequently as they used to.

[http://en.wikipedia.org/wiki/CPU\\_socket](http://en.wikipedia.org/wiki/CPU_socket)