

BEST PROCESSORS FOR WORKING AND GAMING

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In this paper there is some information how to choose the best processor for your computer. The main characteristics of different processors are described, as well as some facts about overclocking and built-in graphics are presented.

War between two huge companies Intel and AMD has lasted for long years. Their processors are installed in 99% of personal computers around the world. Today it is very difficult to choose a good processor for your personal computer or laptop. Intel processors have some different variants that are called Intel Core. There are four main series: Intel Core i3, Intel Core i5, Intel Core i7, Intel Core i9 [1]. AMD

processors are divided into two series: AMD Ryzen and AMD Athlon [2]. Different processors have different amounts of cores and threads. Cores are small crystals in processor that provide its work.

Nowadays all modern processors support such technology as hyper-threading. Hyper-threading is a process by which a CPU (Central Processing Unit) divides up its physical cores into virtual cores. These virtual cores are also called threads. Programs use these threads as usual physical cores. Such threads are very effective for processors that need to make a lot of different small calculations. For example, games usually require powerful physical cores, as they do not need to calculate small expressions. However, programs for editing photos or videos require a bigger amount of cores or threads to work more effectively.

Now there will be given some information how to choose the best option for yourself. It depends on some facts that we are going to speak about. The first important thing is the fact that the systems based on processors from different companies are designed for different tasks. That is why while choosing a processor you need to answer the question: which one is more suitable for your goals and budgets. In this paper, it is spoken about processors of different price segments.

Before choosing CPU, we have to speak about built-in graphics processor. Built-in graphics processor is a graphics processor (GPU) integrated in CPU. Integrated graphics allow users to build a computer without separate video adapter cards, which reduces the cost and power consumption of the system [2]. This solution is typically used in lower-priced laptops and desktops, as well as in business computers that do not require a high level of graphics performance. But nowadays AMD's integrated GPUs are much faster than Intel's ones. Therefore, while building computer without video adapter you have to look for AMD's processors.

Speaking about cheap processors, both cheap AMD and Intel processors usually have 4 cores and 8 threads. Still there are some differences. The first one is the fact, that AMD core is a little bit more powerful, but this advantage can only be seen in special programs like AutoCAD, Photoshop etc. For other activities, it is better to look for the Intel's CPUs. As their processors are very good choice for gaming, so they offer an opportunity to get higher FPS (frames per second) in games. However, it does not mean that playing on AMD processors is much worse, you will lose just about 3-5% of the total amount of fps comparing to Intel's.

Then it comes to processors of average price segment. Such processors usually have 6 cores and 12 threads. The situation compared to the first one is pretty similar, but here it is important to mention some other factors. The first one is a motherboard. Overclocking is the practice of increasing the clock rate of a computer. Commonly, operating voltage is also increased to maintain component operational stability at accelerated speeds. Semiconductor devices operated at higher frequencies and voltages increase power consumption and heat. It is possible to overclock both processor and RAM using quite cheap motherboards for AMD processors. Intel processors require quite expensive motherboards to get such opportunity as overclocking. However, overclocking is a quite specific moment, but raising RAM's frequencies gives much more computing power because of the microarchitecture. So, it means that it is better to buy AMD processor, because of the overclocking opportunity, but getting better results using stock computer is easier on Intel's processors.

And now we have to speak about high-budget processors. Actually, there are a lot of different variants. Best option for gaming is Intel core i9 series. It gives a high frame rate in games and also it is good for working. Such processors usually have about 8 – 10 cores and 16 – 20 threads. But if you are interested in professional activities, then it will be better to buy AMD processor. They have a lot of different options with huge number of cores. So, AMD Ryzen 9 series usually have about 12 – 16 cores and 24 – 32 threads. But there are some real beasts called Ryzen Threadripper that have 32 – 64 cores and 64 – 124 threads [2]. Such processors will be the best option for working or even building your own server to store data and work with it. In addition, it is important to say that threadrippers are pretty bad for gaming, because games are usually optimized for working with 4 - 10 physical cores. That is why you will not get higher performance in games using such CPU's.

So, in conclusion it is possible to say that all depends on your personal aims. If you need a computer for gaming then it will be better to buy Intel's processor, but if you need it for work then it will be better to buy AMD processor. Nowadays many professionals recommend AMD's CPUs, because they are much more universal and they will not lead to huge fps loss in games. Games require more powerful GPU for them, but not a processor, so you will not feel these 3 – 5% fps loss caused by your processor. Today there are some very good offers from Intel and AMD. The best option is AMD Ryzen 5 5600x, this processor is very good for gaming and it has enough calculating power for working, also you can buy Intel core i5 12400, but it will be a little bit slower in professional programs [1]. If you are not limited with budget, then you have to look for AMD Ryzen 9 5900x or Intel core i9 12900k. However, this AMD processor has bigger amount of cores, but quite often you do not need such speeds.

References:

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