Microprocessor or CPU is at the heart of everything of your computer or sever. Microprocessor have so many important features. Those features shown as which processor is best for our daily life or our system. First of all, discuss about some core specification of the microprocessor.

**Clock Speed:** A processor’s clock speed refers to the number of cycles that are performed every second. The higher the clock speed, the more tasks the processor can complete, and the faster your computer will generally run.  For example, a 4.2GHz processor can perform 4.2 billion in one second.

**Max Turbo Frequency:**   A Maximum Turbo Frequency, which defines the absolute limit the CPU will reach. Every processor has Base Frequency or clock speed but when processor need to operate above their typical frequencies for a temporary performance boost when needed. For example, the AMD Ryzen 5 3600 has a base clock of 3.6GHz but has a Max Boost Clock of up to 4.2GHz.

**Overclocking:** Overclocking is the act of increasing the base clock speed that your processor runs at. To do this, it’ll need to ensure that both CPU and motherboard support overclocking. AMD Ryzen processors support overclocking but Intel Core processor models that end with a ‘K’ or ‘X’ can usually be overclocked.

**Core:**  A core is essentially a microprocessor within the CPU. The more cores a processor has, the faster it can handle multiple processes, which is important for multitasking or for heavy workloads that can take advantage of multiple cores. Today’s most of the processor feature multiple cores.

**Threads and Multi-Threading:** While the core count represents the number of physical cores in a CPU, the number of threads represents the number of virtual cores a processor can simulate. So, for example, an Intel i5-10400 processor has 6 physical cores and 12 threads. More cores and threads equal better efficiency and multitasking as the processor is better able to divide its processing power among different tasks.

**cache:**  
Cache is really quick on-board CPU memory, much faster than RAM, that your processor uses to store data that is about to be processed and/or is used often. The more cache you have, the more data your processor can store for ultra-quick access and the more performance you’ll get out of your processor. While each core has its own L1 cache, the L2 cache can be exclusive or shared, with the L3 cache shared by each of the cores.

**Memory Support:** DDR5, which stands for ‘Double Data Rate’ is the latest variant of random-access memory, which all modern CPUs support. The RAM of your computer stores the data that your CPU needs to run your applications. Also, memory speed support one of the most important fact. Now most of the processor support DDR4 different speed RAM. For example, AMD RYZEN processor most of the support DDR4 3200MHz speed RAM. Its processor data transfer rate 3200 million cycles per second.

So many imports features remaining those are also important for microprocessor.

Now we are discussed about Intel core i9-12900k, AMD RYZEN 7 3800X, AMD EPYC 7763 microprocessor.

At first, show some features and compression in the table those processors,

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| --- | --- | --- | --- | --- | --- | --- |
| **Processor**  **Name** | **Cores** | **Threads** | **Base Clock Speed** | **Max. Boost**  **Clock Speed** | **Memory**  **Type and Speed** | **Cache** |
| Intel core i9-12900k | 16 | 24 | 3.71GHz | 5.2GHz | DDR5/DDR4  4800MHz/3200MGz | 30MB |
| AMD RYZEN 7 3800X | 8 | 16 | 3.8GHz | 4.7GHz | DDR4 3200MGz | 32MB |
| AMD EPYC 7763 | 64 | 128 | 2.45GHz | 3.5GHz | DDR4 3200MGz | 256MB |

Table 1: Features compression

First of all, Intel core i9-12900k is the latest processor in the right now from Intel. i9-12900k is Desktop Processors. It is a multicore and multithreads pressor. This processor has 16 Cores and 24 threads which is best of gamming and multitasking work. Base clock speed is 3.71GHz this is really good for our work and if we need more seed for our work, it provides 5.2GHz speed. It supports new memory DDR5 type and memory speed is 4800MHz. It also supports DDR4 3200MHz memory. Intel core i9-12900k have 30MB cache memory.

Another one, AMD RYZEN 7 3800X is AMD flagship processor. This is a Desktop Processors. It also multicore and multithreads pressor and it have 8 core and 16 threads. It’s base clock speed 3.8GHz and Max clock speed 4.7 GHz. It 3200MHz DDR4 RAM. It has L2 4MB and L3 32MB cache memory.

Last one, AMD EPYC 7763 is server-based processor. It uses in the data center or other company network system. Server based processor are so much powerful processor than desktop processor. It has 64 core and 128 threads. Its Max. boost clock speed is 3.5GHz and it support DDR4 3200MHz RAM. I have 256MB L3 cache memory.

The 3 processors I have discussed above, their mainly two types of processors. Intel core i9-12900k and AMD RYZEN 7 3800X both are desktop-based processor. We used them for our work and gamming or others works. In the other hand, AMD EPYC 7763 is server-based processor and it used system sever, datacenter or heavy machine.

Intel core i9-12900k and AMD RYZEN 7 3800X compare between them Intel core i9-12900k give much better performance than AMD RYZEN 7 3800X.Because Intel core i9-12900k have 16 core and 24 Threads other side AMD RYZEN 7 3800X only 8 Core and 16 Threads. Intel core i9-12900k also support DDR5 and DDR4 RAM support, where AMD RYZEN 7 3800X only support DDR4 RAM and Intel core i9-12900k Boost clock speed 5.2GHz but AMD RYZEN 7 3800X only 4.7GHz. Compare both processor features I chose Intel core i9-12900k processor and it is best processor.

But I am not comparing AMD EPYC 7763 with the other 2 processors because AMD EPYC 7763 use it different sector and others two use in different sector.