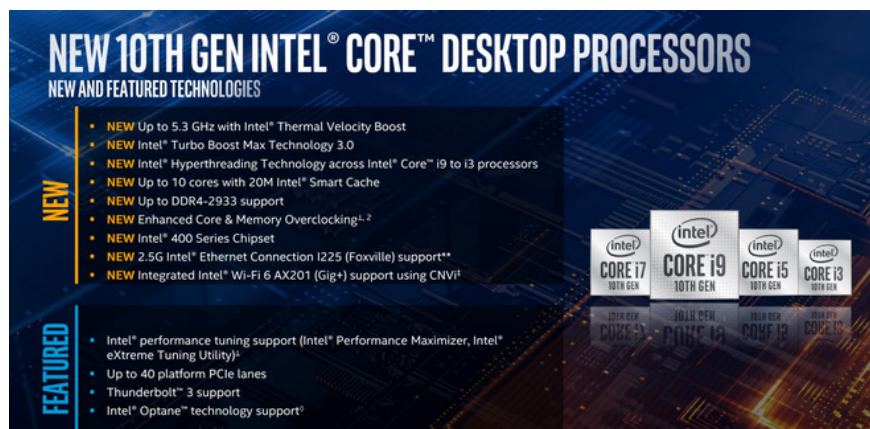


Intel unveiled 10th generation Core i: codenamed Comet Lake-S, still 14nm but has hit the 10 core 20 thread on the popular PC line

The most successful mainstream CPU in Intel's history, Core i has just been released the 10th generation codename Comet Lake-S.

One of the most valuable improvements for users compared to the previous generation is probably Hyperthreading technology, which is disabled on the Coffee Lake refresh line due to security vulnerabilities. Not only that, users can now enable Hyperthreading on each CPU core. Thanks to that, i9-10900K now has a boost frequency of up to 5.3 GHz single core. Apart from the above points, the new generation of Intel CPU is not too outstanding compared to the previous generation, especially when they are still manufactured on the 14nm process. Despite this, Comet Lake-S in general and i9-10900K are still the best gaming CPUs on the market, at least according to Intel's assertion.



This is also the first time Intel has released 32 CPUs simultaneously for the desktop PC market. Especially the series appearance of CPUs with the suffix F (not equipped with integrated graphics core) and T (CPU with a power consumption of only 35W, optimal for small-form compact machine design) factor, which has been a trend of machine build for 2 years).

With the tradition of 2 generations of CPU changing socket once, in the 10th generation, Comet Lake S will use LGA 1200 socket to match the power requirement of 125W or more in CPUs with K suffix (open system) multiplier for overclocking). This is also the weakness of Intel CPUs at the present time when compared to rivals from AMD. One thing is for sure, no Intel mainstream CPU can beat the Ryzen 9 3950X with 16 cores and 32 threads of computing performance. Therefore, in its media publications, Intel mainly emphasizes on single-core performance as well as the ability to play and run applications of Adobe, which is the strong point / multiplier of the CPU of AMD. still cannot reach.

10TH GEN INTEL® CORE™ DESKTOP PROCESSORS

PROCESSOR NUMBER	BASE CLOCK SPEED (GHZ)	INTEL TURBO BOOST TECHNOLOGY 2.0 MAXIMUM SINGLE CORE TURBO FREQUENCY (GHZ)	INTEL TURBO BOOST MAX TECHNOLOGY 3.0 FREQUENCY (GHZ)	INTEL THERMAL VELOCITY BOOST TECHNOLOGY SINGLE / ALL CORE TURBO FREQUENCY (GHZ)	INTEL ALL CORE TURBO FREQUENCY (GHZ)	CORES/ THREADS	THERMAL DESIGN POWER	UNLOCKED ¹	PLATFORM PCIE 3.0 LANES	MEMORY SUPPORT ¹	PROCESSOR GRAPHICS	INTEL® OPTANE™ MEMORY ¹	RCP PRICING (USD 1K)
i9-10900K	Up to 3.7	Up to 5.1	Up to 5.2	Up to 5.3 / 4.9	Up to 4.8	10/20	125	✓	Up to 40	Two Channels DDR4-2933	Intel® UHD Graphics 630	✓	\$488
i9-10900KF	Up to 3.7	Up to 5.1	Up to 5.2	Up to 5.3 / 4.9	Up to 4.8	10/20	125	✓	Up to 40	Two Channels DDR4-2933	Intel® UHD Graphics 630	✓	\$472
i9-10900	Up to 2.8	Up to 5.0	Up to 5.1	Up to 5.2 / 4.6	Up to 4.5	10/20	65	✓	Up to 40	Two Channels DDR4-2933	Intel® UHD Graphics 630	✓	\$439
i9-10900F	Up to 2.8	Up to 5.0	Up to 5.1	Up to 5.2 / 4.6	Up to 4.5	10/20	65	✓	Up to 40	Two Channels DDR4-2933	Intel® UHD Graphics 630	✓	\$422
i7-10700K	Up to 3.8	Up to 5.0	Up to 5.1	NA	Up to 4.7	8/16	125	✓	Up to 40	Two Channels DDR4-2933	Intel® UHD Graphics 630	✓	\$374
i7-10700KF	Up to 3.8	Up to 5.0	Up to 5.1	NA	Up to 4.7	8/16	125	✓	Up to 40	Two Channels DDR4-2933	Intel® UHD Graphics 630	✓	\$349
i7-10700	Up to 2.9	Up to 4.7	Up to 4.8	NA	Up to 4.6	8/16	65	✓	Up to 40	Two Channels DDR4-2933	Intel® UHD Graphics 630	✓	\$323
i7-10700F	Up to 2.9	Up to 4.7	Up to 4.8	NA	Up to 4.6	8/16	65	✓	Up to 40	Two Channels DDR4-2933	Intel® UHD Graphics 630	✓	\$298

10TH GEN INTEL® CORE™ DESKTOP PROCESSORS

PROCESSOR NUMBER	BASE CLOCK SPEED (GHZ)	INTEL TURBO BOOST TECHNOLOGY 2.0 MAXIMUM SINGLE CORE TURBO FREQUENCY (GHZ)	INTEL TURBO BOOST MAX TECHNOLOGY 3.0 FREQUENCY (GHZ)	INTEL THERMAL VELOCITY BOOST TECHNOLOGY SINGLE / ALL CORE TURBO FREQUENCY (GHZ)	INTEL ALL CORE TURBO FREQUENCY (GHZ)	CORES/ THREADS	THERMAL DESIGN POWER	UNLOCKED ¹	PLATFORM PCIE 3.0 LANES	MEMORY SUPPORT ¹	PROCESSOR GRAPHICS	INTEL® OPTANE™ MEMORY ¹	RCP PRICING (USD 1K)
i5-10600K	Up to 4.1	Up to 4.9	NA	NA	Up to 4.5	6/12	125	✓	Up to 40	Two Channels DDR4-2666	Intel® UHD Graphics 630	✓	\$262
i5-10600KF	Up to 4.1	Up to 4.8	NA	NA	Up to 4.5	6/12	125	✓	Up to 40	Two Channels DDR4-2666	Intel® UHD Graphics 630	✓	\$237
i5-10600	Up to 3.3	Up to 4.8	NA	NA	Up to 4.4	6/12	65	✓	Up to 40	Two Channels DDR4-2666	Intel® UHD Graphics 630	✓	\$213
i5-10500	Up to 3.1	Up to 4.5	NA	NA	Up to 4.2	6/12	65	✓	Up to 40	Two Channels DDR4-2666	Intel® UHD Graphics 630	✓	\$192
i5-10400	Up to 2.9	Up to 4.3	NA	NA	Up to 4.0	6/12	65	✓	Up to 40	Two Channels DDR4-2666	Intel® UHD Graphics 630	✓	\$182
i5-10400F	Up to 2.9	Up to 4.3	NA	NA	Up to 4.0	6/12	65	✓	Up to 40	Two Channels DDR4-2666	Intel® UHD Graphics 630	✓	\$157
i3-10320	Up to 3.8	Up to 4.6	NA	NA	Up to 4.4	4/8	65	✓	Up to 40	Two Channels DDR4-2666	Intel® UHD Graphics 630	✓	\$154
i3-10300	Up to 3.7	Up to 4.4	NA	NA	Up to 4.2	4/8	65	✓	Up to 40	Two Channels DDR4-2666	Intel® UHD Graphics 630	✓	\$143
i3-10100	Up to 3.6	Up to 4.3	NA	NA	Up to 4.1	4/8	65	✓	Up to 40	Two Channels DDR4-2666	Intel® UHD Graphics 630	✓	\$122

Brandt Guttridge, senior director of desktop and workstation marketing at Intel, explained that Intel's current goal is to improve actual clock, overlocking and performance. We can see the battle in the mainstream CPU market getting hotter day by day. Leading the Comet Lake-S is the Core i9-10900K, which is listed at i9-9900K at \$ 488. However, to choose the best p / p (performance / price) CPU, the Core i5-10600K with 6 cores and 12 threads promises to be the market leader. The problem is that the power of Comet Lake-S comes with a small price. The index of power consumption and TDP generation temperature of Core i Generation 10 reached 125W, about 25% compared to 95W of 9th generation. Meanwhile, AMD Ryzen 9 TDP of 3950X (16 cores) / 32 streams) and 3900X (12 cores / 24 streams) at 105W only.

Comet Lake-S's auto-overclocking-boosting capability is also new. While Turbo Boost Max Technology 3.0 has been available on the Broadwell-E series since 2016, this is the first time this technology has been applied on mainstream CPUs. In particular, this overlocking technology will choose a core is said to be the most powerful to overclock. The improvement after 4 years is that Comet Lake CPUs will choose up to two cores to overclock without increasing the input voltage.

In addition, the i9 CPUs are equipped with Thermal Velocity Boost technology, with the ability to read information from the CPU's temperature sensor to add 200 MHz of clock speed if the system is equipped with a powerful enough heat sink. Not only the processor core, but the UHD 630 graphics cores will also be overclocked from 350 MHz to 1.2 GHz if needed.

10TH GEN INTEL® CORE™ DESKTOP PROCESSORS

PROCESSOR NUMBER	BASE CLOCK SPEED (GHZ)	INTEL® TURBO BOOST TECHNOLOGY 2.0 MAXIMUM SINGLE CORE TURBO FREQUENCY (GHZ)	INTEL® TURBO BOOST MAX TECHNOLOGY 3.0 FREQUENCY (GHZ)	INTEL® THERMAL VELOCITY BOOST TECHNOLOGY SINGLE / ALL CORE TURBO FREQUENCY (GHZ)	INTEL® ALL CORE TURBO FREQUENCY (GHZ)	CORES/ THREADS	THERMAL DESIGN POWER	UNLOCKED ¹	PLATFORM PCI 3.0 LANES	MEMORY SUPPORT ²	PROCESSOR GRAPHICS	INTEL® OPTANE™ MEMORY	RCP PRICING (USD 1K)
Pentium Gold G6600	Up to 4.2	NA	NA	NA	NA	2/4	58		Up to 40	Two Channels DDR4-2666	Intel® UHD Graphics 630	✓	\$86
Pentium Gold G6500	Up to 4.1	NA	NA	NA	NA	2/4	58		Up to 40	Two Channels DDR4-2666	Intel® UHD Graphics 630	✓	\$75
Pentium Gold G6400	Up to 4.0	NA	NA	NA	NA	2/4	58		Up to 40	Two Channels DDR4-2666	Intel® UHD Graphics 610	✓	\$64
Celeron G5920	Up to 3.5	NA	NA	NA	NA	2/2	58		Up to 40	Two Channels DDR4-2666	Intel® UHD Graphics 610	✓	\$52
Celeron G5900	Up to 3.4	NA	NA	NA	NA	2/2	58		Up to 40	Two Channels DDR4-2666	Intel® UHD Graphics 610	✓	\$42

In the "carpet" market, Intel also released up to eight models of low-cost CPU under \$ 100 with a TDP of only 58W. This is also the segment where Intel will continue to dominate with five Pentium Gold CPUs equipped with Hyperthreading technology. Only three Celeron CPUs do not have hyperthreading technology.

10TH GEN INTEL® CORE™ DESKTOP PROCESSORS

PROCESSOR NUMBER	BASE CLOCK SPEED (GHZ)	INTEL® TURBO BOOST TECHNOLOGY 2.0 MAXIMUM SINGLE CORE TURBO FREQUENCY (GHZ)	INTEL® TURBO BOOST MAX TECHNOLOGY 3.0 FREQUENCY (GHZ)	INTEL® THERMAL VELOCITY BOOST TECHNOLOGY SINGLE / ALL CORE TURBO FREQUENCY (GHZ)	INTEL® ALL CORE TURBO FREQUENCY (GHZ)	CORES/ THREADS	THERMAL DESIGN POWER	UNLOCKED ¹	PLATFORM PCI 3.0 LANES	MEMORY SUPPORT ²	PROCESSOR GRAPHICS	INTEL® OPTANE™ MEMORY	RCP PRICING (USD 1K)
i9-10900T	Up to 3.9	Up to 4.5	Up to 4.6	NA	Up to 3.7	10/20	35		Up to 40	Two Channels DDR4-2933	Intel® UHD Graphics 630	✓	\$439
i7-10700T	Up to 2.0	Up to 4.4	Up to 4.5	NA	Up to 3.7	8/16	35		Up to 40	Two Channels DDR4-2933	Intel® UHD Graphics 630	✓	\$325
i5-10600T	Up to 2.4	Up to 4.0	NA	NA	Up to 3.7	6/12	35		Up to 40	Two Channels DDR4-2666	Intel® UHD Graphics 630	✓	\$213
i5-10500T	Up to 2.3	Up to 3.8	NA	NA	Up to 3.5	6/12	35		Up to 40	Two Channels DDR4-2666	Intel® UHD Graphics 630	✓	\$192
i5-10400T	Up to 2.0	Up to 3.6	NA	NA	Up to 3.2	6/12	35		Up to 40	Two Channels DDR4-2666	Intel® UHD Graphics 630	✓	\$182
i3-10300T	Up to 3.0	Up to 3.9	NA	NA	Up to 3.6	4/8	35		Up to 40	Two Channels DDR4-2666	Intel® UHD Graphics 630	✓	\$143
i3-10100T	Up to 3.0	Up to 3.8	NA	NA	Up to 3.5	4/8	35		Up to 40	Two Channels DDR4-2666	Intel® UHD Graphics 630	✓	\$122
Pentium Gold G6900T	Up to 3.5	NA	NA	NA	NA	2/4	35		Up to 40	Two Channels DDR4-2666	Intel® UHD Graphics 630	✓	\$75
Pentium Gold G6400T	Up to 3.4	NA	NA	NA	NA	2/4	35		Up to 40	Two Channels DDR4-2666	Intel® UHD Graphics 610	✓	\$64
Celeron G5900T	Up to 3.2	NA	NA	NA	NA	2/2	35		Up to 40	Two Channels DDR4-2666	Intel® UHD Graphics 610	✓	\$42

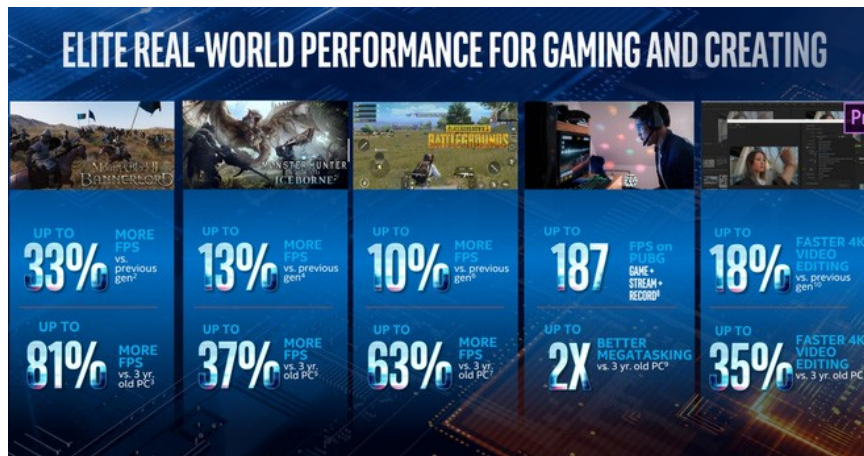
Finally, it is impossible not to mention the CPU with the suffix T of the energy-saving CPU series, serving the next generation Intel NUC as well as small SFF devices. Despite having a TDP of only 35W, Comet Lake-S's T-series CPUs include such giants as the i9-10900T and i7-10700T.

GAME TITLES

Testing done by Intel as of April 17th, 2020:

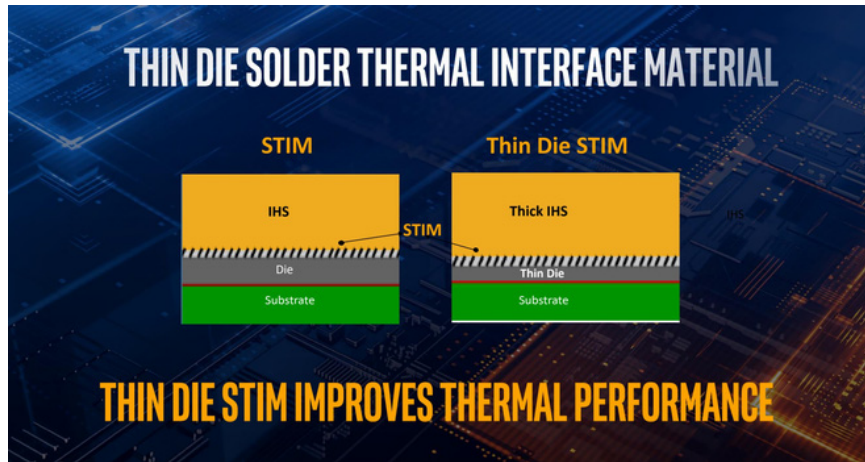
GAME TITLE	VERSION
Asheya of the Singularity: Escalation - Crazy Settings - DX12 - CPU Focused Test - Average Framerate	v2.92.73675
Assassin's Creed Odyssey - Benchmark - DX11 - 1080p High Avg FPS	v1.5.3
Borderlands 3 - Benchmark - DX11 - 1080p High Avg FPS	v1.0.7.EL_214933
Civ 6 Expansion DX12 - Gathering Storm - AI - Avg Turn Time - 1080p High Settings (secs)	1.0.0.341(443561)
Counterstrike Global Offensive - DX11 - 1080p High Avg FPS	v13746
DOTA2 - DX11 - 1080p High Avg FPS	v7.25
F1 2019 Benchmark - DX11 - 1080p High Avg FPS	v1.22
Far Cry New Dawn DX12 1080p High Avg FPS	v1.0.5
Final Fantasy XV - Benchmark - 1080p High Avg FPS	v1.0
Grand Theft Auto V - Benchmark - DX11 1080p High Avg FPS	v1868
Hitman 2 DX12 1080p High Avg FPS	v2.72.0
League of Legends - 1080p High Avg FPS	v10.7
Metro Exodus - Benchmark - DX12 1080p High Avg FPS	v01.0.35
Middle Earth Shadow of War - Benchmark - DX11 - 1080p High Avg FPS	v1.21
Red Dead Redemption 2 - Vulkan - 1080p High Avg FPS	v1.0.1232.48
Rocket League Benchmark - DX11 - 1080p High Avg FPS	v1.75
Rise of the Tomb Raider - Benchmark - DX12 - 1080p High Avg FPS	v1.0 build 820.0_64
Shadow of the Tomb Raider DX12 1080p High Avg FPS	v1.0 build 296.0_64
Strange Brigade Vulkan - 1080p High Avg FPS	v1.47.22.14 Vulkan
Tom Clancy's Rainbow Six Siege - GPU DX11 1080p High Avg FPS	Y551.1
Tom Clancy's The Division 2 - Benchmark - DX12 - 1080p High Avg FPS	v2913517
Total War: Warhammer 2 - Laboratory DX11 1080p High Avg FPS	v1.8.3
War Thunder Tank Battle(CPU) - Benchmark - DX11 - 1080p High Avg FPS	v1.971.47
World Of Warcraft 64 Bit DX11 - 1080p High Avg FPS	v. 8.3.0.33941
World War Z Vulkan - 1080p High Avg FPS	v1.59

In terms of performance, despite being technologically lagging behind with 14nm transistors (5 times improved), the overall performance of Intel Comet Lake-S CPUs is still formidable, on par with the 3rd Generation Ryzen CPUs with 7nm transistors and AMD price range. Anyway, Intel's transistor density is still superior to the opponent, for example, Intel's 14nm process is still more dense than TSMC's 10nm (AMD's chip processing company). At this point, when Intel introduces the 10nm CPU, its performance will definitely surpass to bring Intel once again to the top position. Going back to the present day, the Core i9-10900K will help Intel to firmly build the throne in the game when surpassing Ryzen 9 3950X in 25 games.

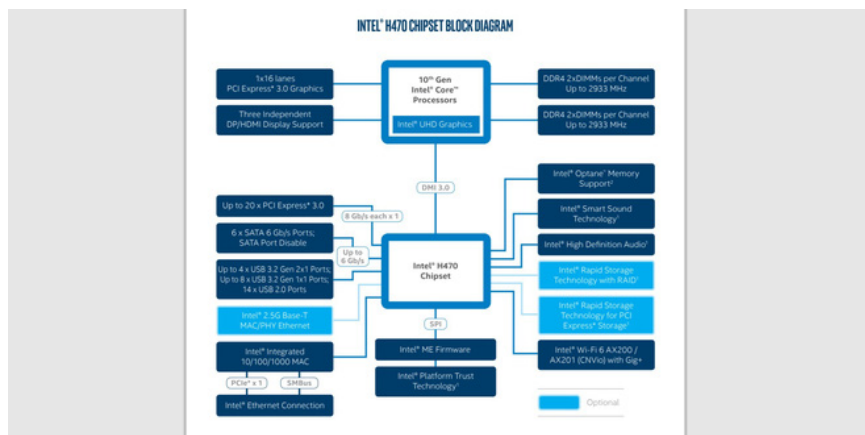
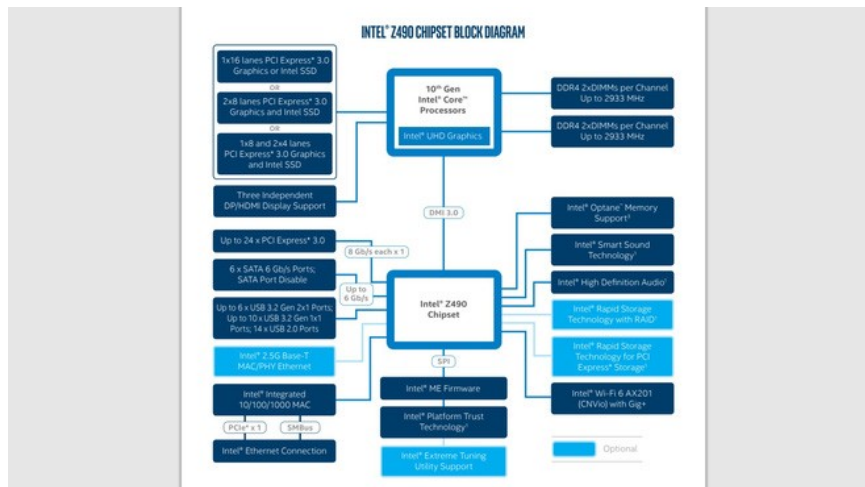


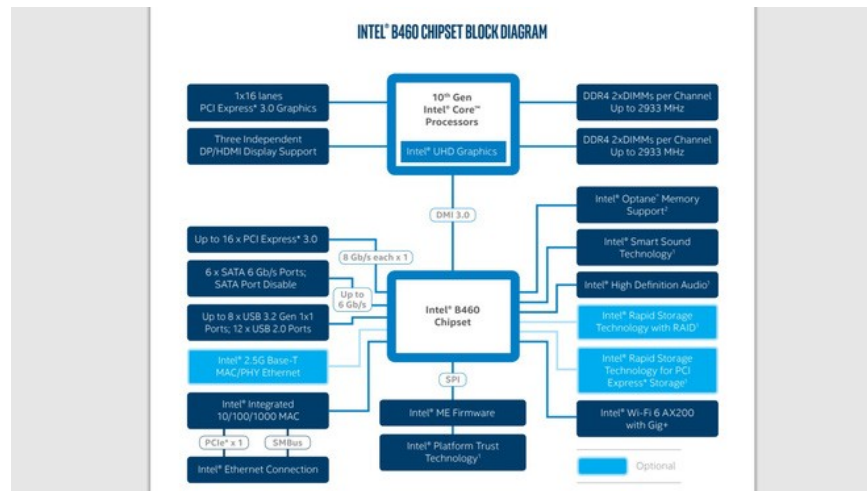
Intel still holds its own view that actual performance is important, not benchmarks. Even Intel also brought the i9-9900K and i7-7700K itself to compare. When paired with the Nvidia RTX 2080 Ti, Comet Lake-S's flagship CPU brings performance improvements of up to 81%.

Intel's reason (or excuse) for overclocking itself on certain CPU cores is based on their research: 95% of systems with Steam installed use at most 6 CPU cores. Therefore, the clock on 6 CPU cores will be the most important factor to improve performance. In parallel, the ability to turn off Hyperthreading on CPU cores is not used to optimize the temperature. This technology may soon be learned by AMD to solve the temperature problem on their high-end CPUs.



Also because of trying to cram more CPU cores, temperature is the most headache of Intel issues on the new generation of CPU. To solve this problem, the blue team had to improve both the chip base design and the thermal pad. Now, the CPU silicon base will be thinner while the IHS thermal pad will thicken to lead more heat.





Along with the 10th generation Core i are four new 400 series chipsets, still based on the old naming: Z490, H470, B460 and H410. The most disappointing thing about this chipset generation is probably still only supporting PCI Express 3.0 protocol while the motherboards on the other side of the line have been equipped with PCI Express 4.0 since the end of last year. On the other hand, the four newer chipsets are not very different from their predecessors, except for the extra support for Wi-Fi 6.

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All in all, the 10th-generation Intel Core i can still be considered an improvement of about 25% over the previous generation, according to its long-standing tradition. Not to mention this time, Intel also launched a completely new product packaging, different from previous generations. However, Comet Lake-S is not really a worthwhile upgrade, especially when you own a desktop equipped with Coffee Lake. It is also worth noting that AMD's credit is extremely large when users now only need to spend 300 USD to have the i7-10700K 8 cores 16 threads, double the figure of three years ago of i7-7700K in when the same price range. The actual performance of this CPU series will soon be assessed by us in the near future.

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