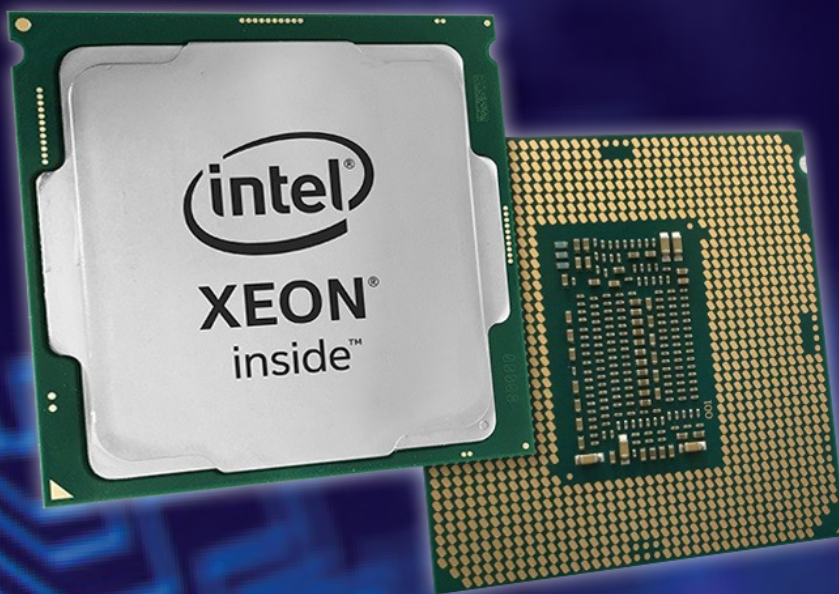


phoenixNAP®
GLOBAL IT SERVICES

Dissecting Intel® Xeon® E-2100 Processor Platform

Features, Benchmarks, and Advantages over
Intel Xeon E3-1200 Series



A White Paper by phoenixNAP
March, 2019

Introducing Intel® Xeon® E-2100

The new **Intel Xeon E-2100** platform (formerly codenamed Coffee Lake) is very well established amongst SMBs, enterprise, and cloud service providers. These entry-level servers have won many businesses over with its solid performance, reliability, and low budget accessibility. Over the years, they have been a great choice for quick horizontal and multi data center scaling without breaking the bank.

As Intel continues to increase focus on data center workloads, it keeps achieving massive success in that space. So far, the most notable progress in the advanced performance sector was made with the switch from E5 (Broadwell) platform to Xeon Scalable (Skylake). After the “industry’s biggest platform announcement of the decade,” the lower-end and entry-level E3 platform Cascade Lake was the next in line for innovation in early/mid 2019. This was another step towards Intel’s vision of building the next generation of data center platforms.

With this data centric mindset, the company has introduced the new generation of Intel Xeon E-2100 entry-level servers in Q3 2018. Set to replace the E3-1200 platform, these servers include numerous advancements over their predecessors. Similar to E3-1200 Xeons, the E-2100 Xeon platform features a wide range of CPU SKU selections, supporting a variety of performance and budgetary requirements.

Choosing the right CPU (E-2186G)

Product Name	Status	Launch Date	# of Cores	Max Turbo Frequency	Processor Base Frequency	Cache	Processor Graphics
Intel® Xeon® E-2186G Processor	Launched	Q3'18	6	4.70 GHz	3.80 GHz	12 MB SmartCache	Intel®UHD Graphics P630
Intel® Xeon® E-2176G Processor	Launched	Q3'18	6	4.70 GHz	3.70 GHz	12 MB SmartCache	Intel®UHD Graphics P630
Intel® Xeon® E-2174G Processor	Launched	Q3'18	4	4.70 GHz	3.80 GHz	8 MB SmartCache	Intel®UHD Graphics P630
Intel® Xeon® E-2146G Processor	Launched	Q3'18	6	4.50 GHz	3.50 GHz	12 MB SmartCache	Intel®UHD Graphics P630
Intel® Xeon® E-2144G Processor	Launched	Q3'18	4	4.50 GHz	3.60 GHz	8 MB SmartCache	Intel®UHD Graphics P630
Intel® Xeon® E-2136G Processor	Launched	Q3'18	6	4.50 GHz	3.30 GHz	12 MB SmartCache	
Intel® Xeon® E-2134G Processor	Launched	Q3'18	4	4.50 GHz	3.50 GHz	8 MB SmartCache	
Intel® Xeon® E-2126G Processor	Launched	Q3'18	6	4.50 GHz	3.30 GHz	12 MB SmartCache	Intel®UHD Graphics P630
Intel® Xeon® E-2124G Processor	Launched	Q3'18	4	4.30 GHz	3.30 GHz	8 MB SmartCache	
Intel® Xeon® E-2124G Processor	Launched	Q3'18	4	4.50 GHz	3.40 GHz	8 MB SmartCache	Intel®UHD Graphics P630

Table 1: Intel Xeon E-2100 platform CPU SKUs

Above is an overview of the selection, which is followed by a deeper dive into the new features and comparisons of the new E-2100 and previous E3-1200 series. Intel Xeon E-2100 offers plenty of SKUs to choose from. At phoenixNAP, we have decided to launch this platform with the selection of the highest-end CPU SKU as a replacement of the E3-1200v6 (Kaby Lake) platform. Here is why we have made this choice:

1. CPU CORES AND CLOCK SPEED

E-2186G introduces a 6-core count with Hyper Threading (12 Threads), effectively increasing the core count by 50% compared to the previous maximum of 4 CPU cores (8 threads). In addition to this, its basic clock speed across 6 cores is 3.80 GHz and it is capable of running Max Turbo Speeds of 4.70 GHz.

2. MEMORY

Similar to the E3-1200v6 (Kaby Lake) and E3-1200v5 (Skylake) generations, the E-2186G supports a maximum of 64GB of RAM while the previous E3-1200v3 and v2 generations are capped at 32GB of RAM. However, with an upcoming BIOS update in mid-2019, the E-2186G will be able to support 128GB RAM, effectively doubling and quadrupling RAM capacity of its predecessors. Moreover, E-2186G also supports DDR4-2666 with a max memory bandwidth speeds of 41.6 GB/s, outpacing RAM performance of any previous E3 generations.

3. GRAPHICS ACCELERATION:

With the launch of E3-XXXXv5 (Skylake) platform for selected number of its CPU SKUs, Intel has introduced an integrated graphics processing circuitry. This technology has been improving with each generation and the E-2186G has an Intel UHD Graphics P630 integrated graphics accelerator. With its full 4K support, graphics base 350Mhz / max dynamic 1.20GHz frequencies, ability to support up to 128GB graphics video memory from the RAM pool (after the BIOS update), and full Intel Quick Sync Video support, the E-2186G is a very versatile power house right out of the box in its workload space.

4. SECURITY FEATURES:

Recognizing the extreme importance of security in today's infrastructure deployments, the E-2186G includes the Intel Software Guard Extensions (Intel SGX) and Intel Memory Protection Extensions (Intel MPX). This way it provides applications with hardware-based security features, which can be fully taken advantage of by a software application to further improve security and overall data protection.

5. LOCAL STORAGE:

While the storage options are always somewhat limited to the choices of the motherboards, chassis, and other components, we have decided to build an offering that fully leverages the new generation platform features. With that in mind, our E-2186G system will be capable of supporting up to 4 local drives ranging from high capacity 10TB SATA HDD and medium capacity SSD to 4TB SATA SSDs, 2TB NVMe SSDs and Intel Optane Memory NVMe SSD's DC P4800X. These were selected to provide the highest levels of storage performance for IOPS-hungry applications. While the physical space might limit some choices of drive configurations, we can still offer very flexible builds:

Maximum of 4 drives per server:
2 X HDD, or
4 X SSD, or
2 x NVMe (also Intel Optane Memory) + 1x HDD, or
2 x NVMe (also Intel Optane Memory) + 2x SSD

6. NETWORK OPTIONS:

phoenixNAP launches this platform with 1Gbps and fully enabled 10Gbps public and private networks.

NEW INTEL® XEON® E PROCESSOR
ESSENTIAL PERFORMANCE AND VISUALS FOR YOUR ENTRY WORKSTATION

Intel Xeon Processor box and processor chip.

UP TO 1.45X FASTER
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3D MODELING,
& ANIMATION APPLICATIONS*

UP TO 1.33X
COMPUTE
INTENSIVE
APPLICATIONS*

*vs. 2017 Intel® Xeon® E3-1200 v6 Processor

Comparing E-2186G to previous Xeon E3 platforms

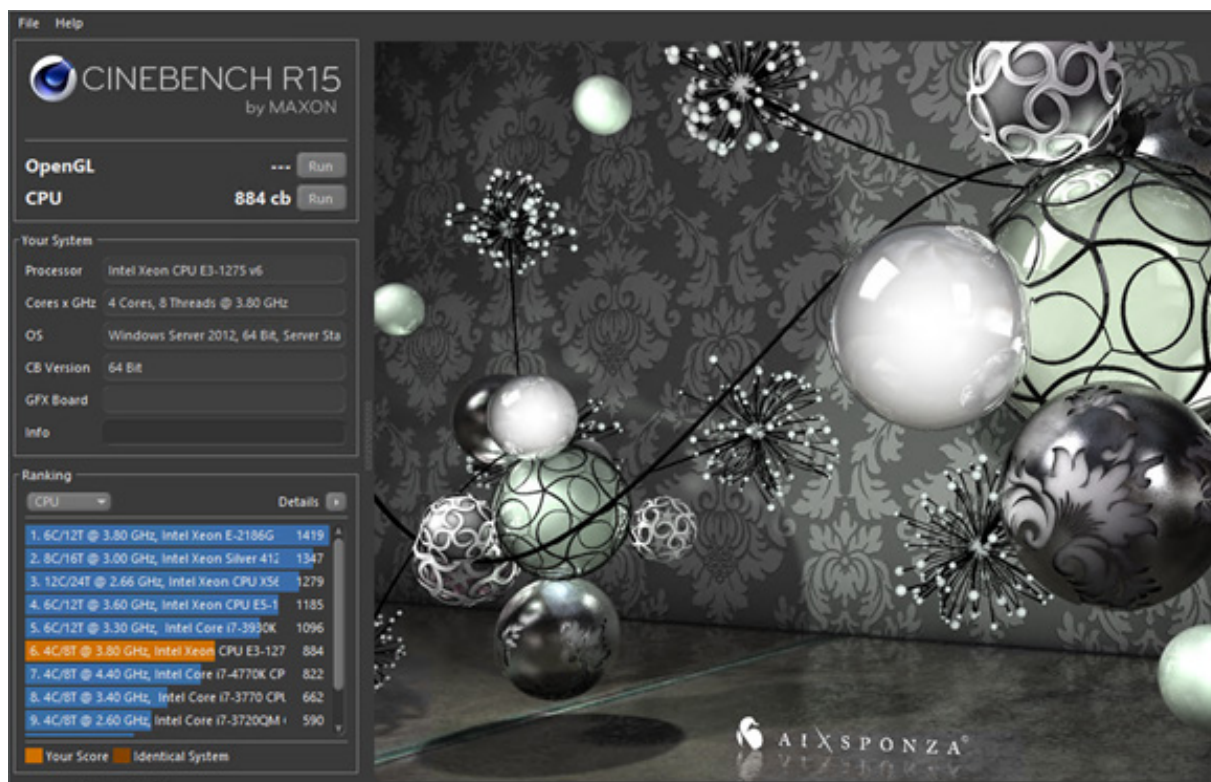
The E-2186G was a logical choice for us given the features presented on the Graphic 1. Below is an overview of features comparing it to the previous Xeon E3 platforms, including some popular processors deployed in the last six years. The comparison purposefully does not include each generation, as E3-1200v2 is inferior to the v3 while E3-1200v5 is second-rate to E3-1200v6 based on selected criteria.

Looking at the differences between the new and old platforms, and specifically comparing E-2186G to E3-1275v6 (or E3-1270v6) and E3-1270v3, we have decided to add E5-1650v4 (Broadwell) to the comparison chart as a previous generation CPU. Although deployed as a single processor system and supporting six cores (12 threads), E5-1650v4 belongs to the Xeon E5 processor family.

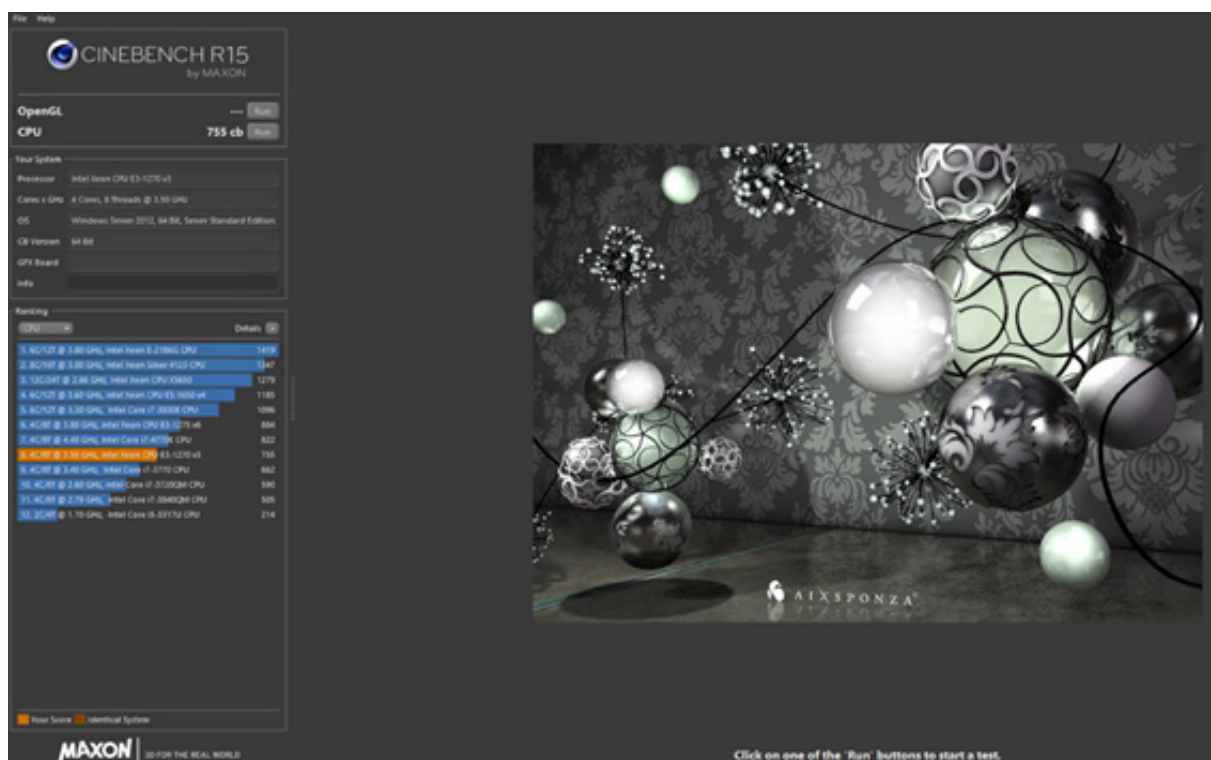
Launch Date	Q3 2018	Q1 2017	Q2 2016	Q2 2013
Intel CPU	E-2186G	E3-1275v6	E5-1650v4	E3-1270v3
Max Core / Thread Count	6 cores 12 threads	4 cores 8 threads	6 cores 12 threads	4 cores 8 threads
Base Clock Speed	3.80 GHz	3.80 GHz	3.60 GHz	3.50 GHz
Max Turbo	4.70 GHz	4.20 GHz	4.00 GHz	3.90 GHz
Max Memory Size	64 GB (128GB later in 2019 with BIOS update)	64GB	1.54 TB	32GB
Memory Type	DDR4-2666	DDR4-2400	DDR4-2400	DDR3-1600
TDP	95W	73W	140W	80W
Graphics Accelerator	Intel UHD Graphics P630	Intel HD Graphics P630	-	-
Graphics Base Frequency	350MHz	350MHz	-	-
Graphics Max Dynamics Frequency	1.20 GHz	1.15 GHz	-	-
Graphics Video Max memory	64 GB (128GB later in 2019 with BIOS update)	64 GB	-	-
Intel Quick Sync Video	YES	YES	NO	NO

Table 2: *How Intel Xeon E-2100 Compares to Previous Xeon E3 Platforms*

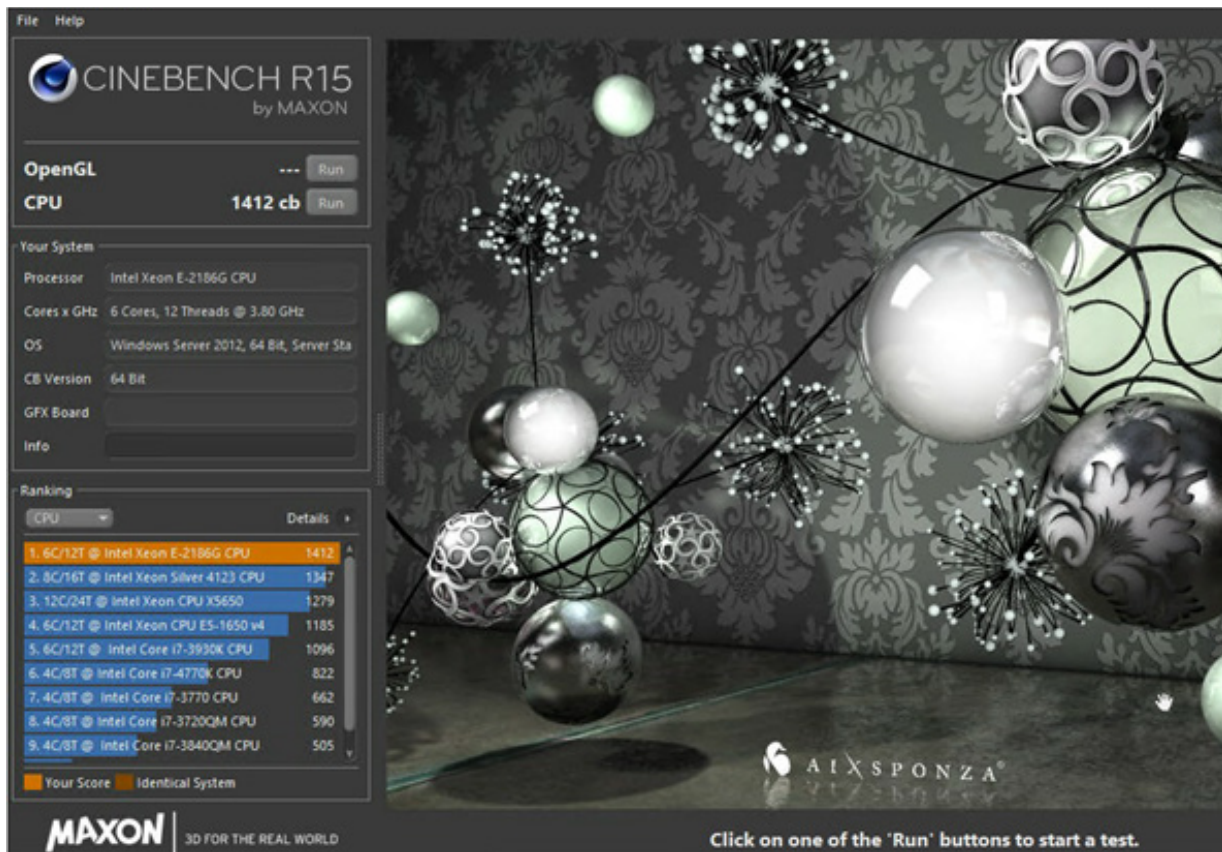
To further show the performance differences outside of raw hardware specifications, we ran some benchmark tests with CINEBENCH and PassMark software. They helped us clearly document the performance edge of E-2186G over CPUs from the E3 platforms and even the E5-1650v4 from the Broadwell generation.



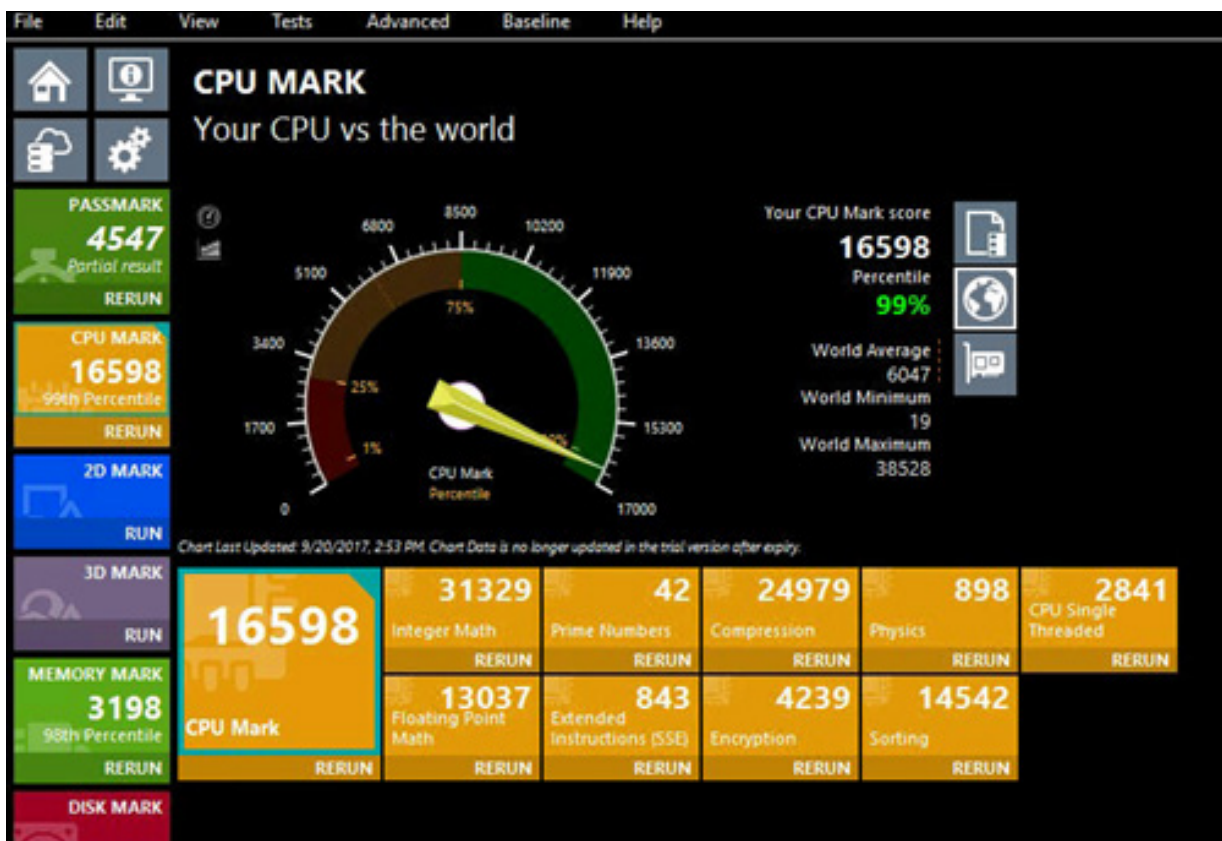
Graph 1: E-2186G vs E3-1275v6



Graph 2: E-2186G vs E3-1270v3



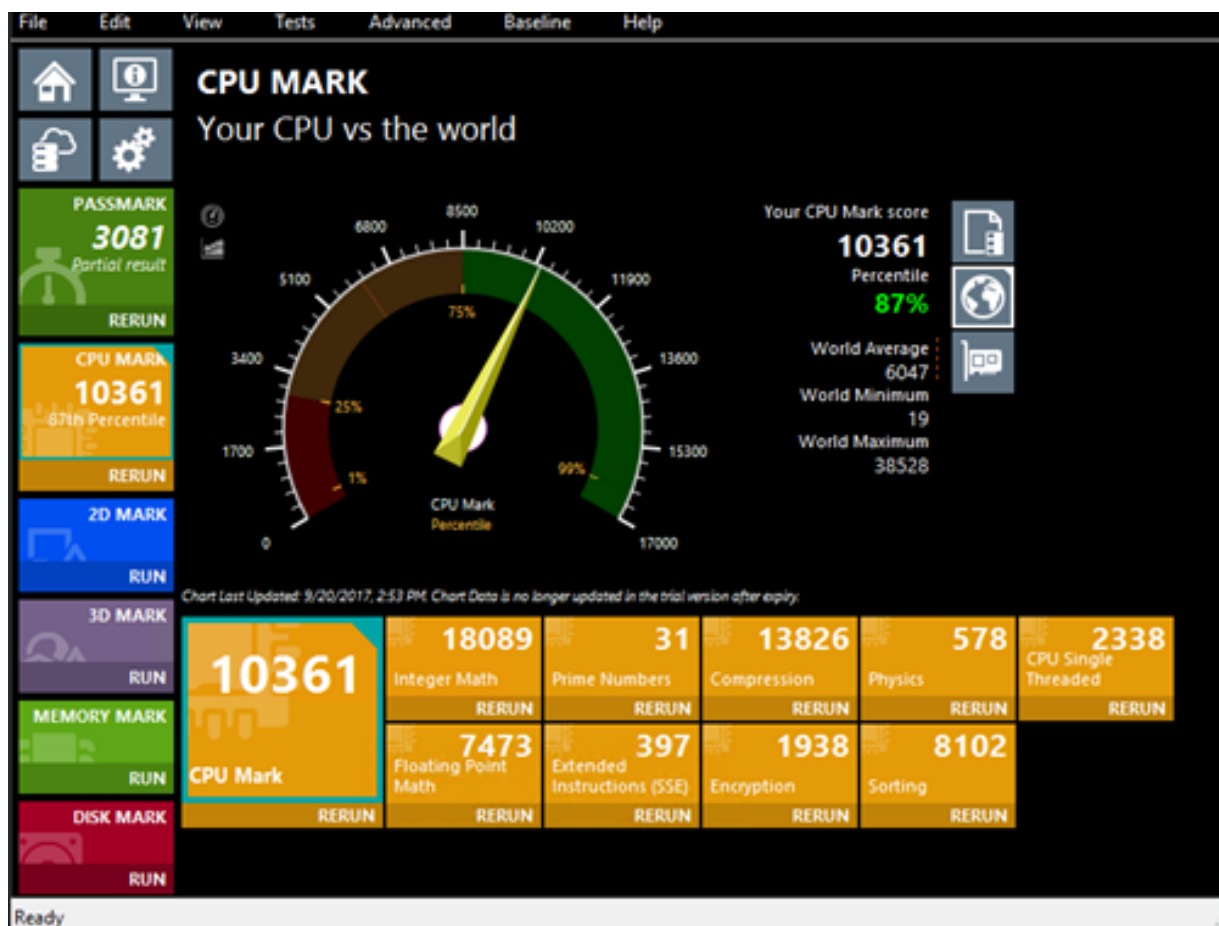
Graph 3: E-2186G vs E5-1650v4



Graph 4: PassMark E-2186G



Graph 5: PassMark E3-1275v6



Graph 6: PassMark E3-1270v3

Conclusion:

As illustrated by hardware specifications and some basic benchmarks results, E-2186G offers significant improvements over all Intel Xeon E3 platforms of previous generations. The most significant ones include hardware-based advancements in security and data protection, doubled/quadrupled RAM capacity, and support for the fastest local storage NVMe options (including Intel Optane NVMe SSDs). Paired with 50% CPU core increase and a high CPU clock speeds, E-2186G packs a punch.

Small businesses, enterprises, and cloud service providers can all benefit from the new platform features and its enhanced performance and security. Supporting many different workloads and sensitive data applications, E-2186G greatly befits applications relaying heavily on transcoding hardware support, gaming, storage and backup, virtualization, and different kinds of business productivity solutions.

Currently, the new Xeon E-2100 platform with our selection of E-2186G CPU is available via our dedicated server platform, as well as our hardware-as-a-service lease and ownership options.

For additional details, visit phoenixnap.com or contact us at **1.877.588.5918**.

phoenixNAP Dedicated Servers	phoenixNAP Hardware-as-a-Service:
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