

2019 Intel AI Summit
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Executive Summary

Hosting its 2019 Intel AI Summit, the company announced new chips to expand its portfolio of offerings in AI, challenging Nvidia and other up-and-coming startups. Dr. Naveen Rao, Corporate Vice President and General Manager of Intel's Artificial Intelligence Products Group claimed its AI business this year is already \$3.5 billion, up from \$1 billion in 2017.

Announcements and Analyses

The new chips were born out of Intel's acquisition of the two machine learning companies—Movidius, Ltd. and Nervana Systems—in 2016. The chips, Nervana NNP-T 1000 Neural Network Processor (Figure 1) optimized for training, Nervana NNP-I Neural Network Processor (Figure 2) optimized for inference, and Movidius Myriad Vision Processing Unit (VPU), are aimed at Nvidia's GPUs.



Figure 1. Nervana NNP-T 1000 Neural Network Processor for Training



Figure 2. Nervana NNP-I 1000 Neural Network Processor for Inference

Intel claims there is no single **Approach**, **Budget**, **Chip**, or **System**, and data readiness, expertise, and use case determine the AI solution. AI infuses everything; hence, Intel's breadth of offerings from the datacenter to the edge (Figure 3).¹

Nervana NNP-T 1000, whose manufacturing has been outsourced to Taiwan's TSMC, has 27 billion transistors with 24 cores on a 16-nanometer chip architecture. The Nervana NNP-I 1000 is based on Intel's 10-nanometer chip architecture, has two cores, and 12 *inference engines* to run AI software.

¹ All figures courtesy of Intel.

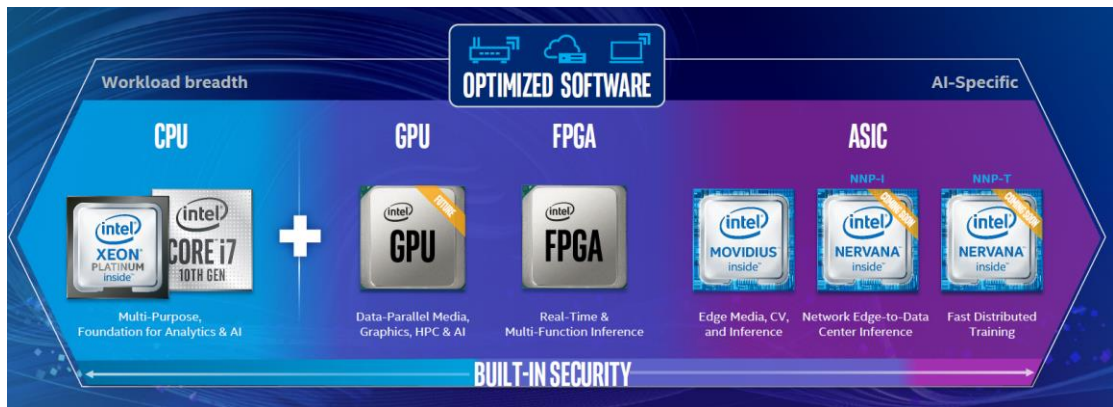


Figure 3. Intel's Portfolio of Chips

Intel's new version of Movidius Myriad VPU is code-named Keem Bay. Intel loves to name its new products after Irish towns, villages, bays...after all, the Intel Ireland campus at Leixlip is Intel's largest manufacturing plant outside of the United States. Keem Bay is designed to power AI image and video processing systems inside low-power devices, such as a drone that relies on machine learning to maneuver around obstacles.

As shown in Figure 4, Intel claims Keem Bay delivers over ten times the inference performance of its previous-generation chip, performing at the same time six times more power-efficient than its competitors such as Nvidia's TX2 chip.

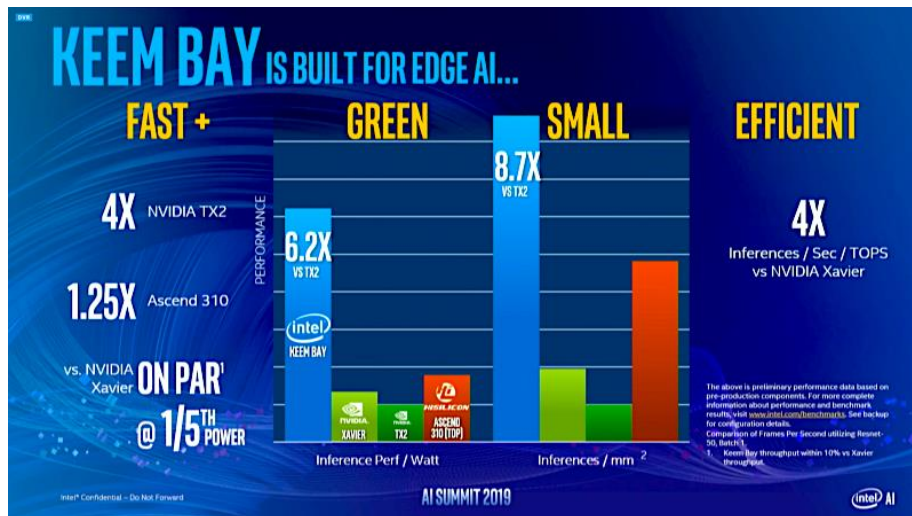


Figure 4. Comparison of Intel and Nvidia Chips

Additional Observations

- Data will grow tenfold in the next five years.
- Seventy-five percent of AI hardware will be at the edge, generating 75% of the data.
- Intel has 2,700 Beta users of Intel DevCloud.
- Using Intel's Nervana NNP-I Facebook's Translate app performs 15 billion translations daily.
- Microsoft's Bing search engine uses Intel's FPGA.

Conclusions

Historically, Intel has been a leader in whatever IT segment it pursues, albeit it has had hiccups in the past in memory, number of cores, clock speed, but in most cases, it not only has caught up, but also has leapt over its competitors. We believe Intel has realized the expected explosive growth of AI in the next decade is inevitable that it can't afford to ignore, and has made significant investments in this area.

We will be reporting in the coming months on Intel's success in fending off its competitors—Nvidia and startups such as the Graphic Streaming Processor (GSP) from [BlaiZe](#) (formerly Thinci), Intelligence Processing Unit (IPU) from [Graphcore](#), [Gyr Falcon Technology](#), [SambaNova Systems](#), and [Vorago Technologies](#).