

MICROPROCESSOR *report*

Insightful Analysis of Processor Technology

ANALYSTS' CHOICE WINNERS FOR 2020

Recognizing the Best Chips and Technology of the Past Year

By The Linley Group (January 25, 2021)



To recognize the top semiconductor offerings of the year, The Linley Group presents its 2020 Analysts' Choice Awards. These awards span several categories: data-center processors, PC processors, embedded processors, mobile processors, networking chips, processor-IP (intellectual property) cores, and related technology. We've presented these awards in *Microprocessor Report* for many years. (For a list of last year's winners, see [MPR 1/20/20](#), "Analysts' Choice Winners for 2019.")

To choose each winner, The Linley Group's team of technology analysts gathered to discuss the merits of the top offerings that entered production (or, in the case of IP, production RTL) in 2020. This guideline eliminates "paper" products and allows us to evaluate delivered capabilities, not promises. This year, we eliminated the separate AI Accelerator category, since AI is now pervasive in all categories.

Our analyst team is deeply familiar with all the leading products, having written about them over the past year. We selected the winners on the basis of their performance, power, features, and cost in the context of their target applications and competition at the time of their release. May I have the envelope, please?

Best Networking Chip

Despite heavy investment in data-center switching, the networking chips that stood out most in 2020 serve in end points. Two high-profile startups shipped SoCs designed for

smart NICs and storage systems, introducing new architectures for these applications. Seven data-center switch chips reached production in 2020 by our count, but most represented merely evolutionary designs.

It was a close race between the aforementioned startups, with Fungible shipping its powerful F1 data-processing unit (DPU) and Pensando shipping smart NICs using its Capri ASIC. We selected **Pensando's Capri** because it delivers an impressive combination of data-plane programmability, performance, and power efficiency (see [MPR 6/15/20](#), "Pensando, Xilinx Debut Smart NICs"). For example, the company's 2x25GbE smart NIC handles advanced services while consuming only 20W. By contrast, Fungible's F1 primarily targets storage systems, handling up to 400Gbps in a 100W power envelope. Prior SoCs targeting these applications include Broadcom's Stingray and Nvidia's BlueField-2, which lack customer-programmable data planes and rely on standard Arm CPUs for advanced services.

On the switch side, we considered the first Broadcom Tomahawk 4 and the Cisco Silicon One Q200. Now dubbed Tomahawk4-50G, Broadcom's switch chip is first to deliver 25.6Tbps and does so using an unprecedented 512 serdes. The Q200 is the second-generation merchant switch chip from Cisco, and it offers a choice of high-density switching or routing in a single hardware design. The 12.8Tbps Q200 includes copackaged HBM2 for deep buffers and large tables, whereas the Q200L omits that memory to reduce cost and power. The Cisco Silicon One family is also customer programmable using the open-source P4 language. ♦

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