The Linley Group

MICROPROCESSOR report

Insightful Analysis of Processor Technology

Analysts' Choice Winners for 2015

Recognizing the Best Chips and Technology of the Past Year

By The Linley Group (January 18, 2016)

To recognize the top semiconductor offerings of the year, The Linley Group presents its 2015 Analysts' Choice Awards. These awards span several categories: embedded processors, mobile processors, PC and server processors, processor-IP (intellectual property) cores, and related technology. We have presented them in *Microprocessor Report* for several years. For the second time, we include two categories recognizing devices that are not processors: mobile chips and networking chips. The categories reflect our expanded coverage of these areas in our sister publications *Mobile Chip Report* and *Networking Report.* (For a list of last year's winners, see *MPR 1/19/15,* "Analysts' Choice Winners.")

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 2015. This guideline eliminates "paper" products and allows us to evaluate delivered capabilities, not promises. We also considered only merchant offerings (e.g., chips that sell to system vendors) and not ASIC or in-house designs.

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

Best Processor IP

Designing a modern processor typically requires integrating a variety of licensable IP cores, including CPUs, DSPs, GPUs, and VPUs, and connecting them together using a high-bandwidth network-on-a-chip (NoC) to form a complete high-performance system. Our choice for this year's Best Processor IP award was Ceva's XM4 vision processor (see *MPR 4/27/15,* "Ceva Sharpens Computer Vision," and *MPR 10/26/15,* "Ceva Enables Deep Learning"). We selected it over the ARM Cortex-A72 CPU, Arteris FlexNoC Physical interconnect, and Cadence P5 VPU.

The XM4 is Ceva's fourth-generation VPU, offering four times the compute power of the previous-generation MM3101. We estimate it can deliver more integer performance than any other licensable VPU. The XM4 can run the same convolutional-neural-network (CNN) object-recognition models that computer-vision researchers developed using Nvidia's Cuda parallel-computing platform but at a fraction of the power and cost. Ceva's VPU outperforms Cadence's P5 by virtue of its deeper 14-stage pipeline, wider 4,096 bit VLIW architecture, and 64-bit data-type support, which alleviates saturation issues in CNNs.

Ceva supports its VPU with its deep-neural-network software, which automatically generates compatible CNNs from UC Berkeley's popular Caffe models. This performance and software support made the XM4 our top choice among VPUs and processor IP in general. We expect to see greater uptake of vision-processing IP in advanced automotive systems, mobile devices, and other applications in the next year. ♦