

Quick Take

The Last Major Tipping Point in HPC Computing with the Emergence of X86: Igniting High Growth

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This Quick Take looks at how fast a technology change can impact the overall HPC market, by looking at x86 processor adoption and how quickly x86 processors replaced all other processor types, once it became strong on HPC applications. In the period 2002 to 2005, x86-based HPC systems both took over the market and ignited major growth in system sizes, as shown by the number of processors installed.

Hyperion Research has been following the sales of processors in the High Performance Computing space for more than 30 years, and frequently looks back to see how trends evolve over time, looking for tipping points, the point at which a technology has a major impact on the market.

Before 2002, there was no dominating processor in HPC systems, although various types of RISC processors were doing well, and the total number of processors sold in HPC per year was under 100,000. After 2002, x86 vaulted to the top spot and took over the market. Within a year, the number of processors sold jumped from the hundreds of thousands to millions sold each year. They exceeded 2 million a year by 2005.

SITUATION OVERVIEW

In the early 1990's, the average price of a Cray vector supercomputer was around \$2 million per processor in the system, e.g., a C90 16 CPU system cost \$30 to \$35 million. At that point, Cray was only selling about 300 CPUs a year, a figure dwarfed by the number sold today. Later in that decade, Cray began selling the T90, a system that maxed out at 32 CPUs and cost around \$35 million, bringing the average system price per processor down to just over \$1 million. The market saw a slight increase in processor sales per year from the previous years, but still nothing like the scale of today's market.

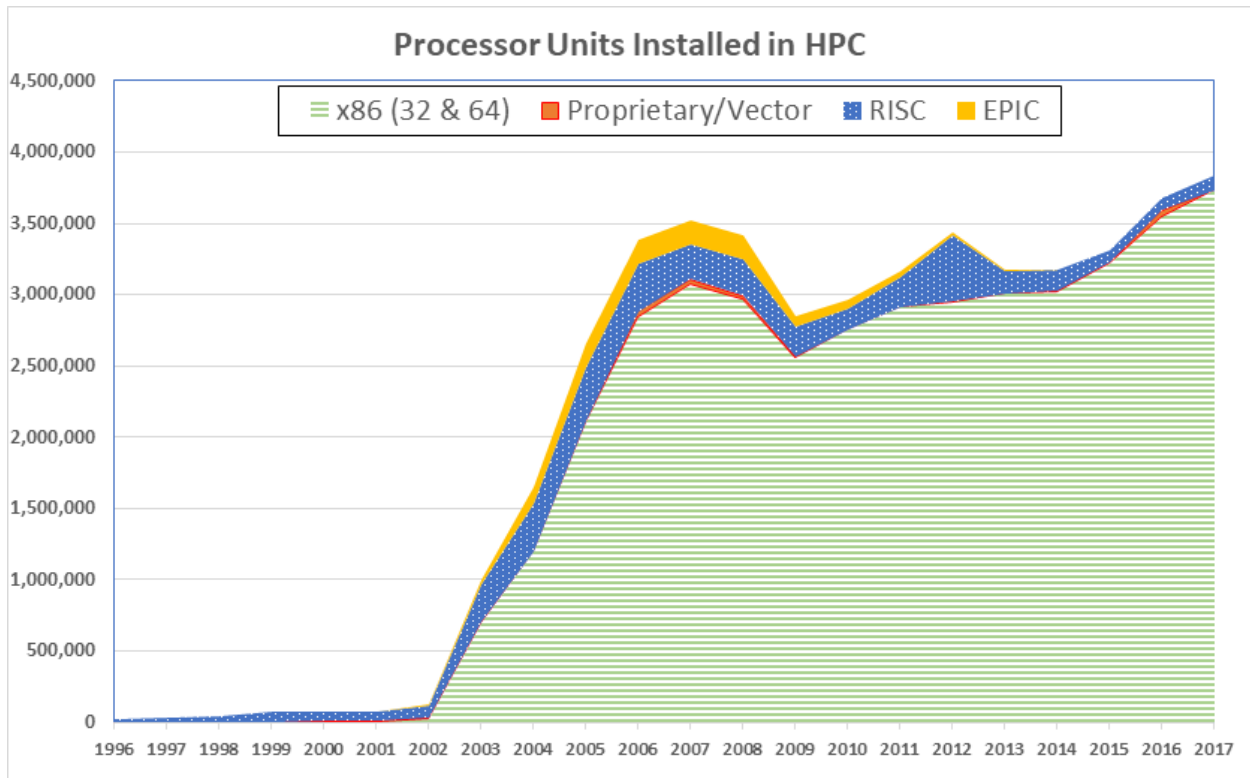
In the late 1990's and into the early 2000's, RISC processors were able to bring the average system price of a processor down significantly to the tens of thousands of dollars, and the sales skyrocketed from just a few hundred CPUs a year to well into the tens of thousands of processors a year. This is where the first jump was made, and the market shifted forever.

In 2001-2002, x86 clusters came onto the scene in a big way, with an average system price of \$2000 to \$2500 per processor. All of the sudden, the market surged, and within two years, there were one million CPU sales in a single year (2004). By the next year, that number doubled to two million CPU

sales. Flashing forward, in 2017 there were over 3.8 million processors sold in the HPC server market. This trend can be seen in more detail in Figure 1 below.

FIGURE 1

Processor Units Installed in HPC from 1996 to 2017



Source: Hyperion Research, 2018

FUTURE OUTLOOK

What will be the next major tipping point in the HPC market?

- Public clouds?
- A new type of processor?
- A new approach to handling massive data?
- A new programming paradigm e.g. for machine or deep learning?

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Hyperion Research provides data-driven research, analysis and recommendations for technologies, applications, and markets in high performance computing and emerging technology areas to help organizations worldwide make effective decisions and seize growth opportunities. Research includes market sizing and forecasting, share tracking, segmentation, technology and related trend analysis, and both user & vendor analysis for multi-user technical server technology used for HPC and HPDA (high performance data analysis). We provide thought leadership and practical guidance for users, vendors and other members of the HPC community by focusing on key market and technology trends across government, industry, commerce, and academia.

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