

## HPC User Site Census: Processors

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### EXECUTIVE SUMMARY

The Processors report is part of Intersect360 Research's Site Census series and provides an examination of the processor use in systems found at a sample of HPC user sites. We surveyed a broad range of users about their current computer system installations, storage systems, networks, middleware, and applications software supporting these computer installations. Our goal in this analysis is to examine the processor suppliers, products, and configurations used in high-performance computing systems.

Key findings of the site census surveys include the following:

- By all measures, the x86 architecture is predominant in the HPC community. Nearly three-quarters of systems in our total site survey reported processors from AMD or Intel. The data reflects this same x86 dominance when examining processors by node count and by core count. Intel and AMD are the only two vendors with double-digit shares.
- Intel remains the market share leader and is widening its margin over its smaller x86 competitor, AMD. Nearly 80% of new systems are built with Intel processors, the chip maker's largest share since we first starting collecting data in 2006.
- The number of cores per processor is rising. When studied by year of acquisition, the average number of cores per processor has more than tripled between 2006 and 2013. Four-core processors claim the greatest share, but more than half of processors in HPC systems now have greater than four cores.
- Average memory per core is on the rise. Over the last seven years, average memory per processor has increased ten-fold and average memory per core has doubled. This has significant implications on system architectures, application design, spending habits as core counts continue to rise.
- The use of special-purpose processors, or accelerators, is increasingly common in HPC. Nvidia is most often named as the accelerator supplier in our most recent survey, but with Intel's entrance to the market in 2012, Nvidia will have its first serious challenge. Adoption for new deployments is nearing the halfway mark.
- Two-socket compute nodes remain the most common in distributed memory systems, although four-socket systems are gaining market share. The cluster architecture remains the most prevalent, with smaller contributions from blade and SMP systems.

## COMPANIES MENTIONED IN THIS REPORT

Companies mentioned in this report include:

- AcclerEyes
- AMD
- Calxeda
- Cray
- DRC
- GiDEL
- IBM
- Intel
- MIPS
- Nvidia
- Qlogic
- SGI

## TECHNOLOGIES COVERED IN THIS REPORT

- HPC system elements
  - Systems, clusters
    - HPC clusters
    - SMPs
    - MPP systems
  - Server technologies
    - Blades
  - Memory configurations
- Processor elements
  - System processors
    - X86 processors
    - RISC processors
    - Other processors
  - Accelerators and co-processors
    - GPU computing
    - FPGAs
    - Other accelerators or co-processors
  - Hybrid (accelerated) system processors (e.g., Intel MIC, AMD Fusion)
- Storage elements
  - Storage systems
- Interconnect elements