Intersect360 Research Stat Sheet:
VisiSoft Gives Parallelism a New Look

Intersect360 Research studies have documented an industry-wide movement toward a greater need for parallel programming. In our most recent HPC User Site Survey data, 85% of HPC systems installed or modified since 2017 have more than 8 cores per processor chip. Nearly one-third (32%) have more than 16 cores per chip. *See Figure below.*[1] Each core is essentially a unique processing element. (At the PC or workstation level, each core is often thought of as a separate "processor"; in server lingo, one "processor" consists of multiple cores. The confusion in vocabulary only serves to highlight the parallelism issue.)

This trend hurts most HPC applications in processing efficiency, which translates into cost and energy at scale. In 2008, Intersect360 Research CEO Addison Snell wrote that with increases in multi-core processing, "we're soon going to come to grips with the reality that new tools or programming models are needed in order to keep up the race."[2] Adding in accelerators, used in more than half of HPC systems installed since 2017, only compounds the issue.

In fact, the challenge is so well-recognized that the U.S. Defense Advanced Research Projects Agency (DARPA) has opened solicitations for a two-phase program known as Performant Automation of Parallel Program Assembly (PAPPA), for technologies that may bridge this parallelism gap.[3]

VisiSoft, from Prediction Systems, Inc. (PSI), seeks to unlock access to parallel processing's full potential with a different programming approach. Based on what it calls the "Separation Principle," VisiSoft has distinct languages for data and instructions, but rather than having programmers code each directly, VisiSoft offers a CAD system for mapping data and instructions to processing elements.

This approach is designed to appeal to engineers whose applications tend not to scale well in HPC clusters. PSI's approach is that parallel programming is done more efficiently in standalone machines than in clustered servers. Testing on PSI's "Green Gene Machine"—a parallel PC acting like a technical workstation—indicates parallelism improvements of several orders of magnitude. This technique has the potential to improve computational efficiency for a wide range of HPC applications.

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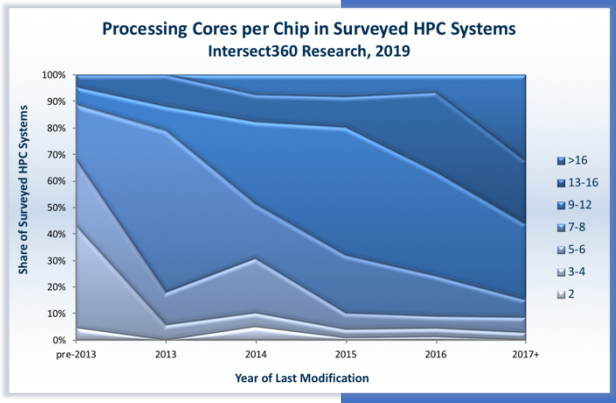

Learn More ...

[1] Intersect360 Research, HPC User Site Census data, 2019.

[2] Addison Snell, Intersect360 Research (then Tabor Research, a division of Tabor Communications), in *HPCwire*, "Anticipating the Fall: Application Performance Has Chased Multicore's Speed Right Over a Cliff," June 5, 2008, https://www.hpcwire.com/2008/06/05/anticipating_the_fall_application_performance_has_chased_multicores_speed_right_over_a_diff/.

[3] Intersect360 Research, This Week in HPC podcast, Episode 279, September 13, 2019, https://soundcloud.com/this-week-in-hpc/episode-279-frontera-debuts-at-tacc-plus-darpa-pappa-and-hello-nanotubes.

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