

The Heterogeneous System Architecture: It's beyond the GPU

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Abstract. The use of GPUs in computation intensive tasks has an ever increasing impact across all platforms - including embedded - sometimes even used to create new forms of currency (Bitcoin, Litecoin, ...). And the exponential improvements in Performance per Watt gains are still ongoing unabated. At the same time, due to their “design heritage” as primarily 3D accelerators, GPUs have several properties that make it a SW challenge to unlock their full benefit in many real-world application scenarios, be it due to limiting API's (proprietary or limited functionality) or properties that require an advanced understanding of the platform architecture and managing the memory and other system resources, beyond the reach of the “average programmer”. The Heterogeneous System Architecture is established by the HSA Foundation to address many of the current shortcomings at a system architecture and programming model level while providing a great foundation for already established SW models, and in addition to the GPU allow extending the architecture to other specialty processors like DSPs, FPGAs and others to interoperate within the SW framework, a main task for the next level of work in the HSA Foundation. The HSA Foundation, a not-for-profit consortium of SOC and SOC IP vendors, OEMs, academia, OSVs and ISVs defining a consistent heterogeneous platform architecture to make it dramatically easier to program heterogeneous parallel devices like GPUs and other accelerators. The presentation gives the audience a high-level understanding of the goals of HSA, the HSA system architecture properties and its use models by system software, tools and applications.

Biography

Mr. Paul Blinzer works on wide variety of Platform System Software architecture projects and specifically on the Heterogeneous System Architecture (HSA) System Software at Advanced Micro Devices, Inc. (AMD) as a Fellow in the System Software group. Living in the Seattle/WA area, during his career he has worked in various roles on system level driver development, system SW development, graphics architecture, graphics & compute acceleration since the early '90s. Paul is the chairperson of the “System Architecture Workgroup” of the HSA Foundation. He has a degree in Electrical Engineering (Dipl.-Ing) from TU Braunschweig, Germany. He is also a long-standing ACM & SIGGRAPH member.