NEWS RELEASE

Imagination Announces Highest Performance Automotive GPU IP with FuSa Advancement

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Imagination DXS GPU Extends Lead in Automotive

Highlights:

- 50% higher peak performance than Imagination's previous generation automotive GPU, scaling up to 192GPixel/s, 6 TFLOPS and 24 TOPS
- Up to ten times higher performance for compute workloads
- New innovations in distributed functional safety deliver ASIL-B functional safety with minimal overhead

SAN JOSE, Calif. & BEIJING--(BUSINESS WIRE)-- Imagination Technologies ("Imagination") today unveils **Imagination DXS GPU** , its latest automotive GPU IP for in-vehicle intelligence and interaction. DXS is a scalable and flexible GPU IP designed to process graphics and compute workloads in cockpit, infotainment and advanced driver assistance systems. It introduces new innovations in distributed safety, eliminating the overhead of achieving ASIL-B functional safety on Imagination processors. It has already been licensed for use in the automotive market.

The Imagination DXS GPU supports the graphics and compute requirements of an entire vehicle line-up with single core configurations starting at 0.25 TFLOPS and scaling up to 1.5 TFLOPS - 50% higher peak performance than Imagination's previous generation automotive GPU IP. Imagination's unique multi-core technology allows for two, three and four core configurations, while the low bandwidth bus between cores and support for isolation suits the use of IMG DXS in chiplets. It adopts relevant features introduced into the PowerVR architecture in D-Series, such as Pipelined Data Masters and 2D Dual-Rate Texturing, to boost performance efficiency by 20% over previous generations of automotive GPU IP and ensure that it outperforms competitive cores on real world benchmarks.

“Imagination is a leading provider of GPU IP into automotive,” says Anshel Sag, Principal Analyst at Moor Insights & Strategy. “The demand for pixel processing in cars has grown enormously over the last decade, with digital cockpits, dashboard wide displays and rear entertainment screens offering smartphone-like visual experiences. Imagination’s combination of great performance for 3D graphics, flexible multitasking and a robust approach to safety has seen its popularity explode.”

DXS is optimised for the compute workloads needed for next generation vehicle intelligence, such as computer vision and data processing. By combining the raw performance of DXS with an additional FP16 pipeline and a set of new compute libraries and AI toolkits, users can achieve up to ten times higher performance for compute workloads compared to previous generations.

“The GPU is no longer just used for graphics in cars,” says James Chapman, Chief Product Officer at Imagination. “The long-term nature of designing hardware in the era of the software-defined vehicles is making hardware designers choose flexible and programmable processors that can handle the AI workloads of today as well as adapt to whatever the future brings. Today, our automotive GPUs are as much in demand for their compute abilities as for their rendering.”

The first Imagination processor to feature “Distributed Safety Mechanisms”

All functions that a vehicle performs are graded based on potential risk according to the ISO 26262 Automotive Safety Integrity Level (ASIL). Automotive manufacturers and their suppliers must ensure that components involved in that function meet the necessary standards for fault detection and handling, with ASIL-A having the least stringent requirements and ASIL-D the most comprehensive.

Its new “Distributed Safety Mechanisms” solution means DXS achieves ASIL-B functional safety at a fraction of the Performance, Power or Area (PPA) overhead of the two main existing methods: dual-core lockstep, which increases silicon area by 100%, and workload repetition, which halves processor performance for safety workloads.

Distributed Safety Mechanisms has a near-zero impact on GPU performance and 10% area cost. It does this by taking advantage of the inherent parallelism of today’s processors and the fact that no thread is ever fully utilised. A patented mechanism combines these threads into pairs and injects safety tests in idle moments to identify faults within the timeframe set by the ASIL standard. Further details on the complete Distributed Safety Mechanisms solution can be found on the Imagination website in the whitepaper, “ **Innovations in Distributed Functional Safety** . ”

New Compute Libraries and AI Toolkits

Developed alongside the hardware is a new set of compute libraries (imgBLAS, imgNN, imgFFT) to help software developers achieve up to 80% GPU utilisation. This will also accelerate common compute workloads such as computer vision and pre/post processing perception data for ADAS systems.

The libraries combine with new reference toolkits (oneAPI and TVM) to create a practical software stack based on open standards with which software developers can easily port their compute applications onto Imagination IP based hardware, and from there maximise their performance.

“Software portability and the ability to take advantage of heterogeneous hardware is essential to the future of the automotive industry. The UXL Foundation is looking to provide a clear and easy path for developers to do this through the ongoing open source development of the oneAPI standard,” says Rod Burns, Chair of the UXL Foundation Steering Committee. “Imagination is a long-standing supporter of our ecosystem and the compute software solutions they release today reinforce their commitment to building an optimal developer journey based on open standards.”

“ PerfX Lab Technologies develops heterogeneous computing software stacks and infrastructure solutions for companies looking to accelerate AI,” says Zhang Xianyi, Chief Executive Office at PerfXLab. “We are using Imagination’s compute software solutions to run various AI applications, including our LLM inference engine, PerfXLM, on Imagination GPUs and have so far achieved performance gains of up to 100% compared to the CPU, with minimal time spent porting. ”

Software

Imagination’s automotive GPUs support OpenGL® ES, Vulkan®, OpenGL® and OpenCL™. They run popular automotive operating systems such as QNX and Green Hills Software’s INTEGRITY RTOS, as well as Linux and Android. Hardware-based virtualisation enables Imagination GPUs to run up to eight operating systems simultaneously, with full memory isolation for fully secure GPU multitasking. Imagination partners with CoreAVI, the global leader in architecting and delivering safety critical graphics and compute software drivers and libraries, on the development of a safety critical driver, supporting OpenGL SC and Vulkan SC for Imagination GPUs.

“As vehicles become more autonomous, greater emphasis is placed on their ability to detect and handle faults in an appropriate manner,” says Dan Joncas, Chief Marketing and Sales Officer & Deputy CEO, CoreAVI. “By working with us, Imagination is able to meet the complex requirements of the automotive industry with a complete safety package covering both hardware and software."

For more information on the Imagination DXS GPU **visit the Imagination website** .

About Imagination Technologies

Imagination is a UK-based company that creates silicon and software IP designed to give its customers an edge in competitive global technology markets. Its GPU, CPU, and AI technologies enable outstanding power, performance, and area (PPA), fast time-to-market, and lower total cost of ownership. Products based on Imagination IP are used by billions of people across the globe in their smartphones, cars, homes, and workplaces.

press@imgtec.com

Source: Imagination Technologies