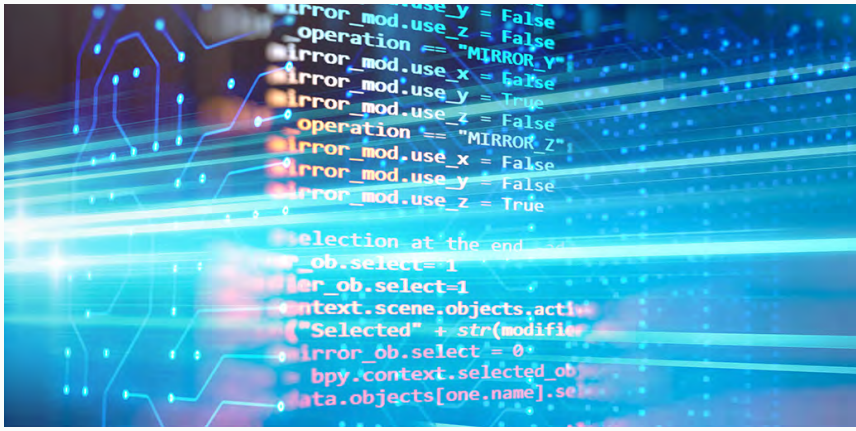
Verasonics®
The leader in Research Ultrasound™

GPU Toolkit & GPU Toolkit with GPU Direct Options

The Verasonics GPU Toolkit options can accelerate Vantage™ System data transfer by:

1) Increasing memory copy speed, which reduces latency and improves frame rate.
2) Providing programming tools and capabilities that reduce overall development time.



These options are packaged as bundles that include an NVIDIA GPU card*, software license(s) and the Verasonics Specialty Host Controller. These options include the following features:

1) User selected memory allocation of the Vantage buffers utilzed in the image reconstruction process. The current default for the system is the CPU, new choices include:
   a. CUDA allocated host memory – enabling up to 2X faster asynchronous memory copies between the host computer and the GPU device
   b. CUDA allocated unified memory – simplifying CUDA programming by utilizing NVIDIA's unified memory architecture

2) An Event Profiling Tool that allows users to see timing information for each operation in the event sequence. This provides users with the information needed to identify bottlenecks in data processing pipelines; this can help focus optimization efforts most efficiently.

3) A 1-step compilation of CUDA source code into .mex files that does not require the MATLAB® Parallel Computing Toolbox.

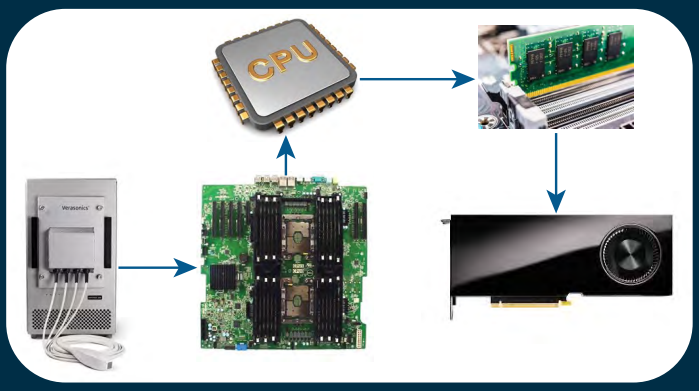
4) Example scripts illustrating implementation of RF or IQ data processing externally with either MATLAB scripts, MATLAB Parallel Computing Toolbox, compiled .mex functions including multi-threading, or CUDA programming.

   These examples can be tested to run synchronously or asynchronously with different memory allocation methods for comparison, including GPU Toolkit with GPU Direct implementations.

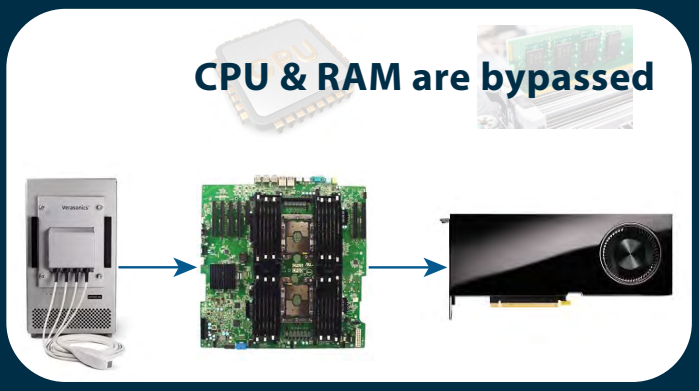
5) Verasonics understands that many researchers have already invested time and money in their own GPU hardware. A GPU diagnostic tool, available on the Vantage 4.7.6 release and after, can be used by existing Vantage users to determine if their GPU card(s) are compatible with Verasonics' GPU option features.[1]

Beyond Image Reconstruction and GPU Toolkit

For Vantage users who are performing their own reconstructions on the GPU, please consider GPU Toolkit with GPU Direct [2]. This option allows researchers to move data directly from the Vantage System to the graphics card.



Standard process flow

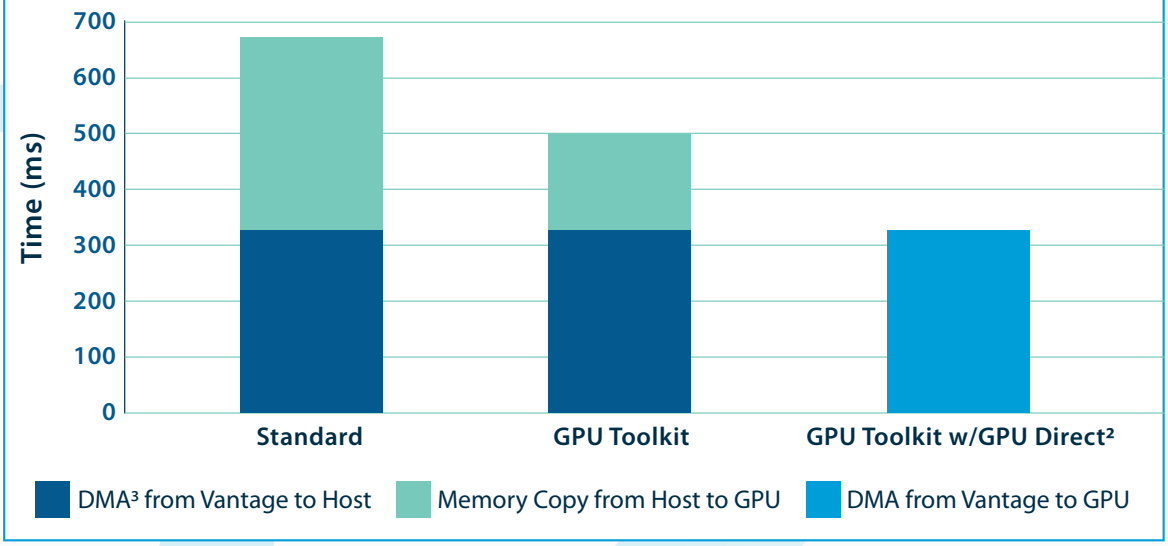


Process flow with GPU Direct

For researchers who have already implemented RF Data processing algorithms on the GPU or are planning to do so, GPU Toolkit with GPU Direct technology writes the RF data directly to the GPU memory, bypassing the host controller CPU and RAM. This reduces the overall latency by removing an extra memory copy operation. For processing algorithms such as 3D reconstruction and super-resolution imaging, this optimization reduces the overall processing time.

Please note that GPU Toolkit with GPU Direct technology is only relevant to writing RF Data directly to the GPU.

Accelerating CPU<->GPU memory copy times - 2GB RF Data Example



** NVIDIA RTX A6000 Graphics Card. Verasonics reserves the right to change products or specifications without notice.*

1 NOTE: Support for Verasonics customers will be offered to GPU Toolkit/GPU Toolkit with GPU Direct Package customers. Verasonics cannot guarantee functionality with GPU cards we have not tested by the organization and will not offer support to GPU Toolkit/GPU Toolkit with GPU Direct License only customers.

2 GPU Toolkit with GPU Direct will work on LINUX systems only.

3 DMA - Direct Memory Access

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