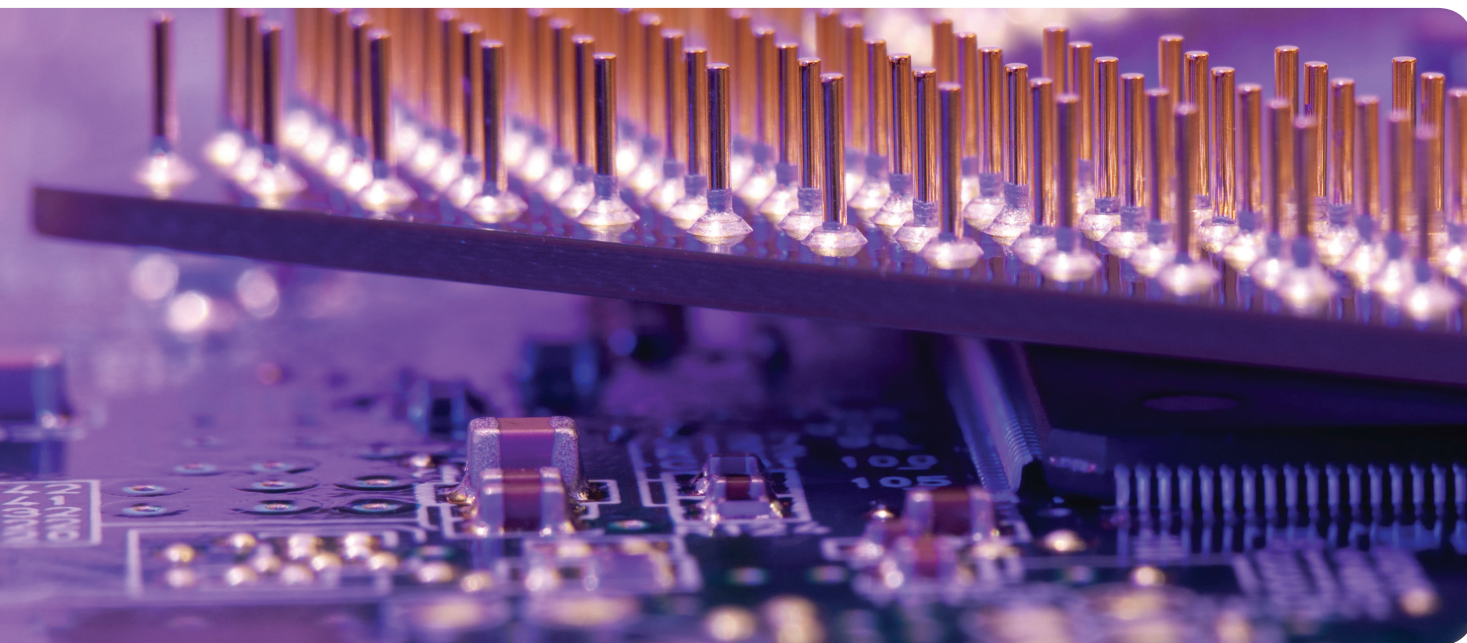


UNLOCKING THE POWER OF THE GPU

New programming language Quasar cuts development timelines for parallel computing algorithms from months to a matter of days



QUASAR AT A GLANCE

WHAT IT DOES

Accelerating image reconstruction and video processing by 10 to 100 times through faster, easier programming of GPU/CPU parallel computing

WHERE IT CAN BE APPLIED

- Medical imaging and data processing
- Scientific software development
- Real-time video processing
- Automotive applications

When used in parallel with the central processing unit (CPU), graphics processing units (GPUs) can improve computation speed by up to 100 times—but this is rarely done because GPUs are notoriously hard to program. The new Quasar language changes that. Created by iMinds researchers at Ghent University, Quasar opens up whole new possibilities for faster GPU programming and processing in medical imaging reconstruction, video processing and more.

THE CHALLENGE

Harness GPU potential efficiently

Developing a program that uses both the CPU and GPU requires programmers to master multiple specialized, platform-specific coding languages, which can take months of dedicated training. Development then takes several more

months. Even then, a program written for one GPU is not always portable to another (or even others made by the same manufacturer)—forcing programmers to rewrite code whenever a new GPU is released. For all these reasons, making use of the GPU's computation resources has not been cost-effective enough for most companies to consider... until now.

THE BREAKTHROUGH

A simpler way to develop universal, future-proof GPU code

An easy-to-learn, high-level programming language that's hardware-independent, Quasar automates and streamlines GPU algorithm development and programming—making it faster and easier to leverage GPUs for parallel computing. A compiler takes the code written in Quasar's integrat-

ed development environment and automatically translates it for use with specific GPUs. A patent-protected runtime suite then determines the optimal balance of program execution between the GPU and CPU.

The result? Code that can be developed, tested and run more quickly and efficiently—and then seamlessly re-used with different GPUs today and tomorrow.

THE OPPORTUNITY

Faster development, better performance, minimal effort

Quasar is a valuable addition to the programming arsenal of not only scientific software and digital media developers but also those working in the medical imaging sector, where parallel computing can accelerate image reconstruction and video processing by 10 to 100 times thanks to faster computations during program execution.

With Quasar, developers need to learn just one simple programming language to code for all different types of GPUs, greatly reducing the amount of training required. And because it is so easy to use, Quasar dramatically cuts development timelines. In one test, experts using CUDA/C++ took three months to implement an MRI reconstruction algorithm; a developer using Quasar for the very first time achieved the same numerical results at the same computational performance in just three days.

“ While other programming languages support GPUs—indirectly like MATLAB and Mathematica, or directly like CUDA and OpenCL—none offers the user-friendly integrated development environment, faster development and execution times, hardware independence and future-proof code made possible with Quasar.

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Prof. Bart Goossens imec - Ghent University

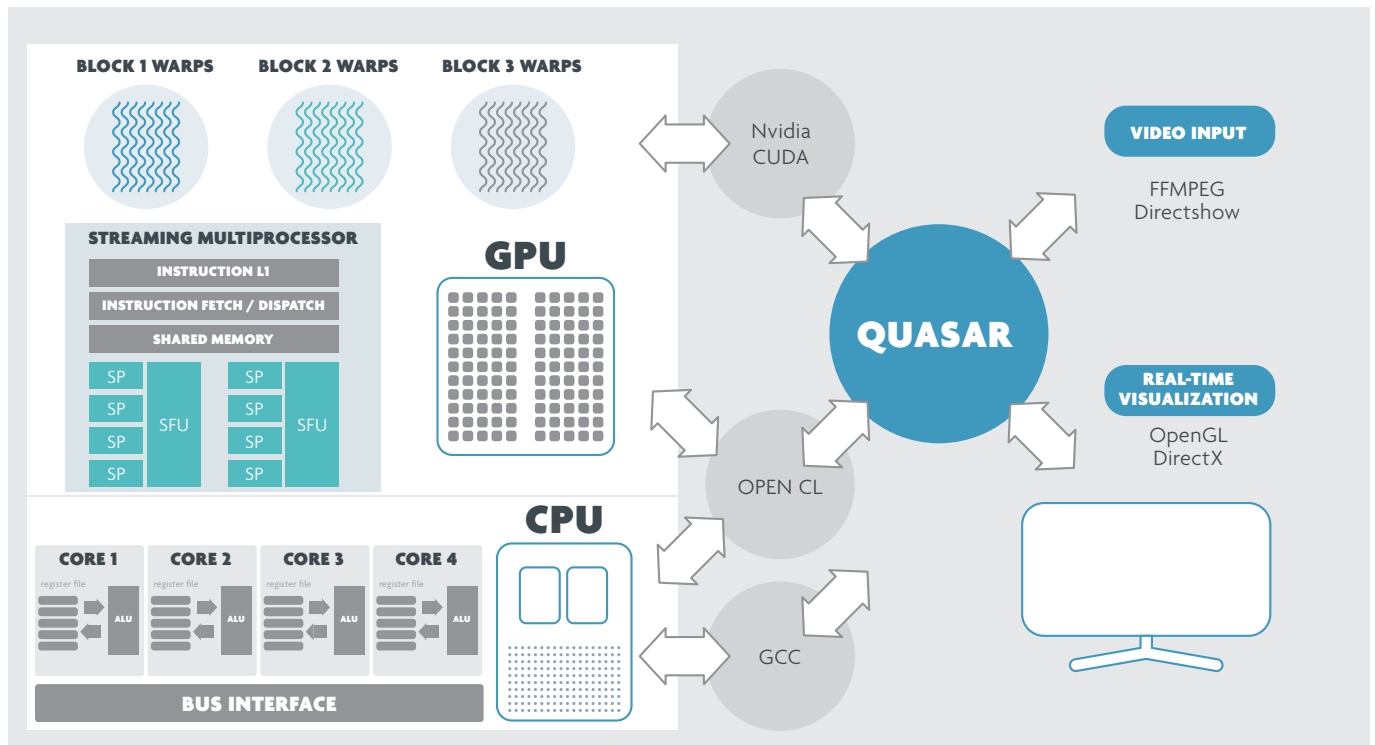
HOW QUASAR WORKS

Quasar features an integrated development environment called Redshift that is easy to learn, use and master. Quasar optimizes Redshift's high-level code through two separate, inter-related components:

- **The compiler**, which translates the initial hardware-independent code so it can be used with GPU models of your choosing. With a modular approach that makes it easy to optimize for new GPUs as they are released, Quasar helps maintain algorithm performance and functionality over the long term—without having to rewrite the original code.
- **The runtime suite**, which looks at current load and other factors to determine which parts of code should run off the CPU and GPU for optimal program execution. The runtime suite also automatically handles many tasks programmers typically need to do manually, including scheduling, load balancing, and memory transfer and management.

“ In one test, experts using CUDA/C++ took three months to implement an MRI reconstruction algorithm; a developer using Quasar for the very first time achieved the same numerical results at the same computational performance in just three days.

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These tools enable rapid prototyping, making it possible to test several different combinations of algorithms and parameters within minutes. The results can then be deployed right away without having to be exported to another programming language.

While automation is at the heart of Quasar, it also provides options for programmers who prefer a more hands-on approach. Users can, for example, add extra code to tell the compiler how to transfer memory blocks, or even generate C++ or CUDA code to be further modified and integrated into existing code bases.

PUT QUASAR TO WORK FOR YOU

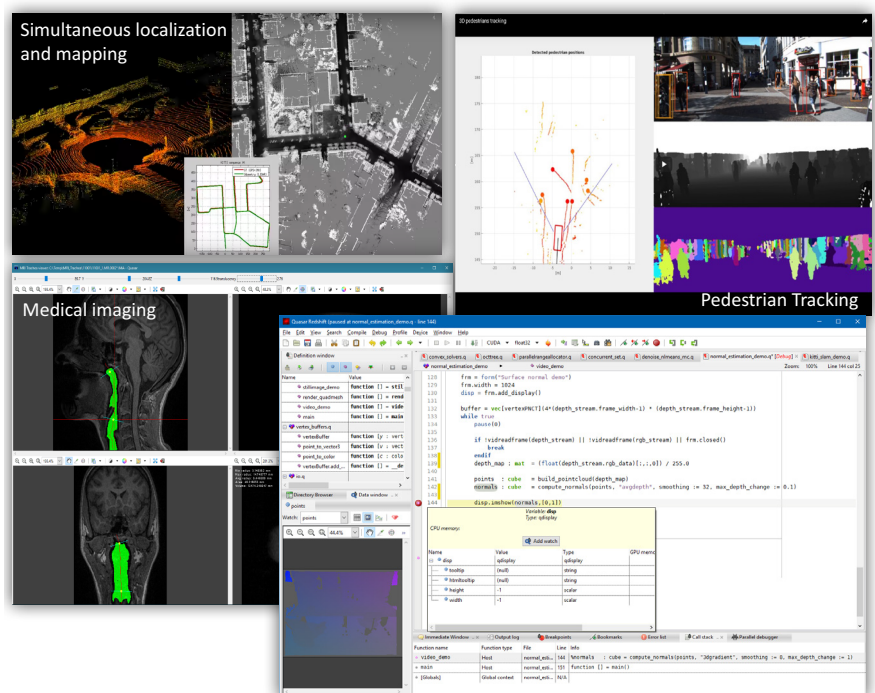
To learn more about Quasar — or to request a trial version — please contact Gepura:



E info@gepura.io

W www.gepura.io

See demos at gepura.io/demos





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