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Accelerating the Development of Hardware Accelerators

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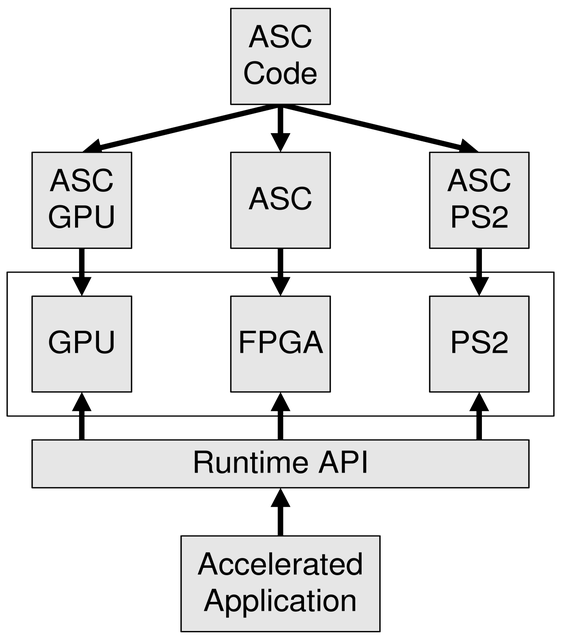
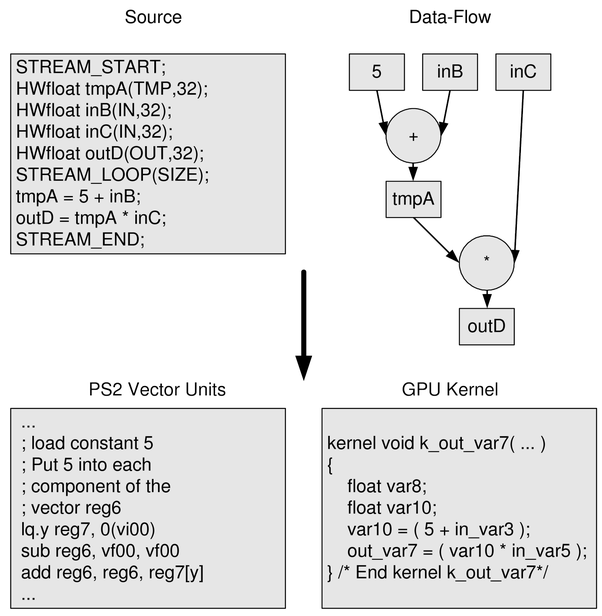
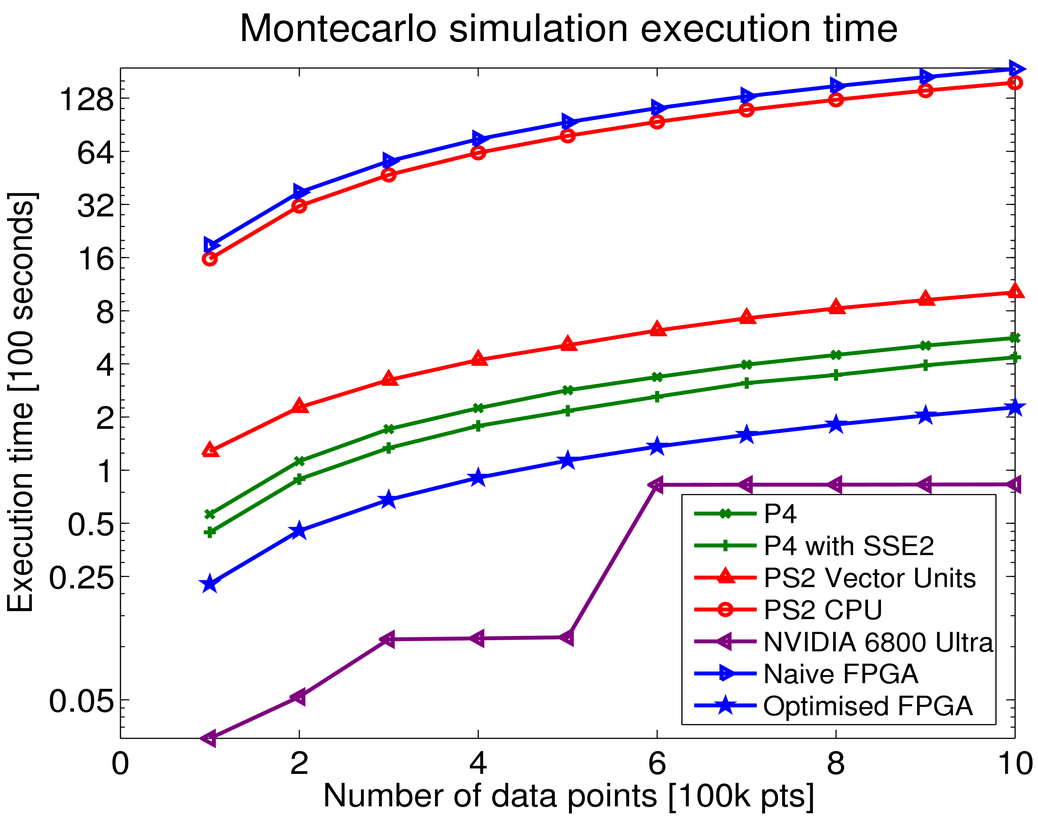
ABSTRACT

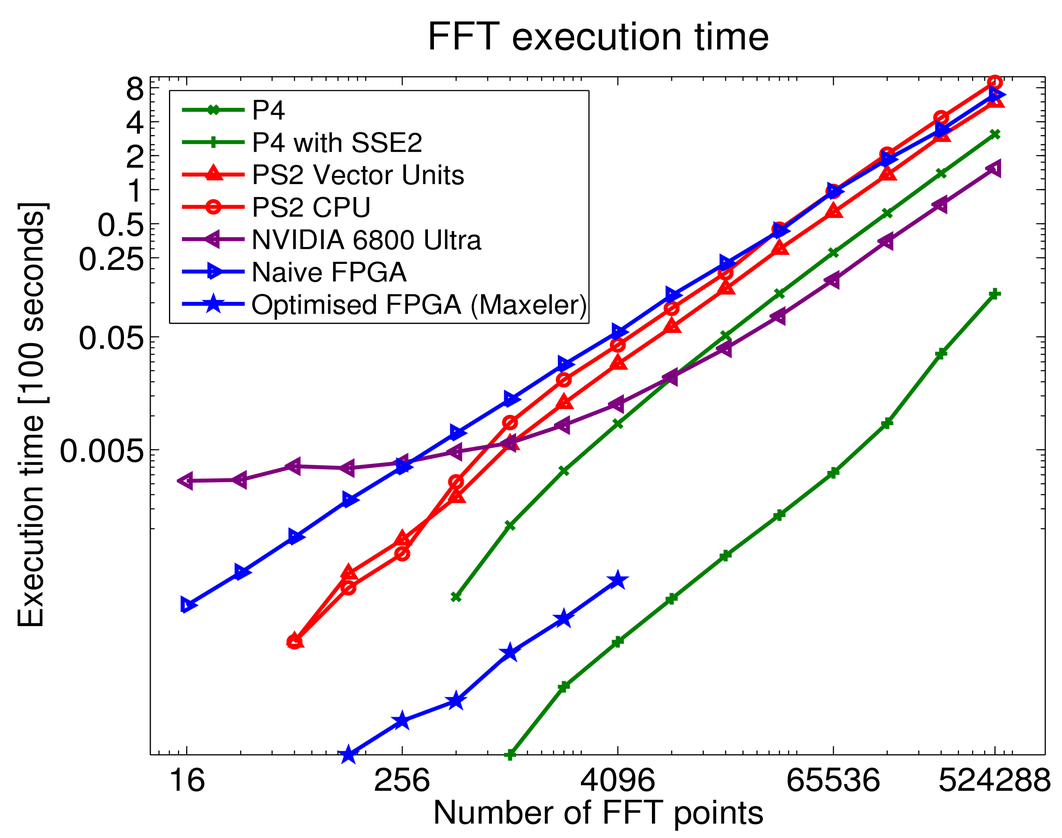
ASC, A Stream Compiler, is designed to enable rapid development of hardware accelerators while still producing results that match hand-crafted equivalents. Stream architectures are constructed using a C++ based, object-oriented approach. A single ASC description can target FPGAs and also other accelerator platforms, such as GPUs and Sony Playstation 2 vector units. Maxeler technologies is currently using ASC to development a range of FFT accelerators for high performance computing.

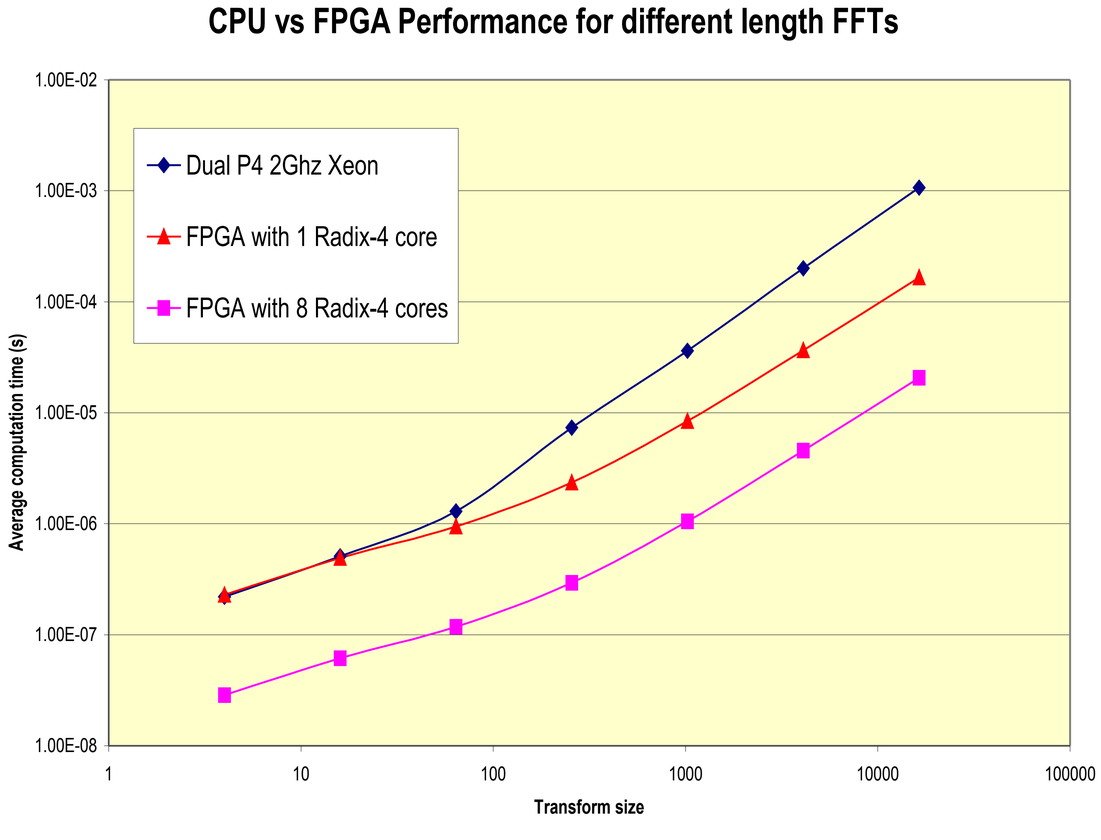
- **Program heterogeneous architectures**
  - Single input description
  - Compiler automatically produces architecture specific implementation and runtime interface
- **Compare performance**
  - Architectures vary in performance on a task
  - Select the optimum architecture to use for further optimisation
- **Provide base on which to optimise**
  - Architecture specific optimisations captured as abstract C++ objects
  - Extend source description for additional performance

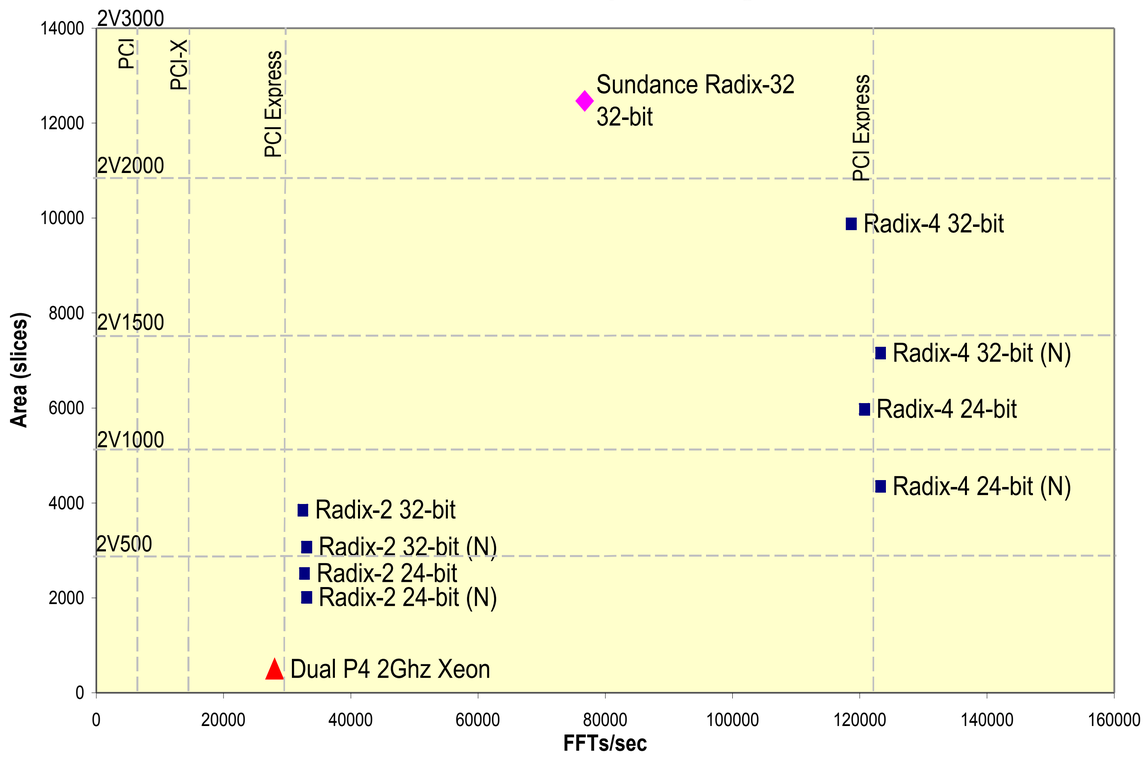












[1] O. Mencer *ASC, a stream compiler for computing with FPGAs,* IEEE Transactions on CAD, 2006

[2] I. Buck et al. *Brook for GPUs: Stream computing on graphics hardware.* Proc. SIGGRAPH, ACM 2004.