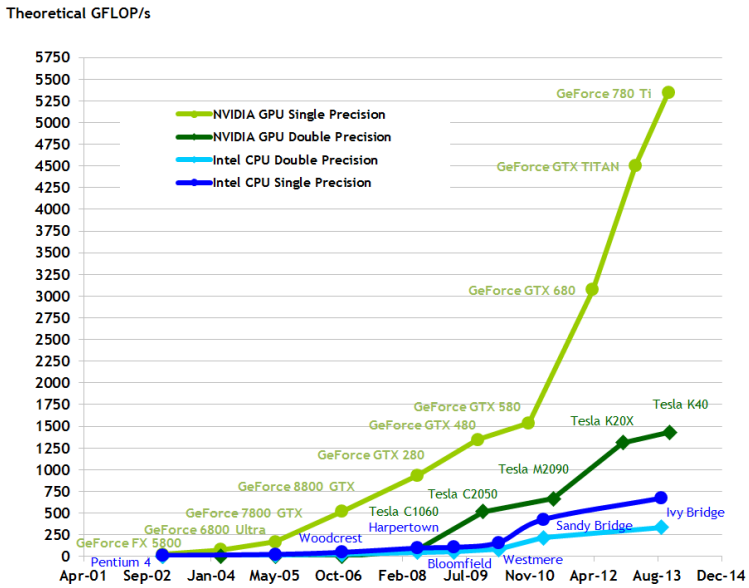
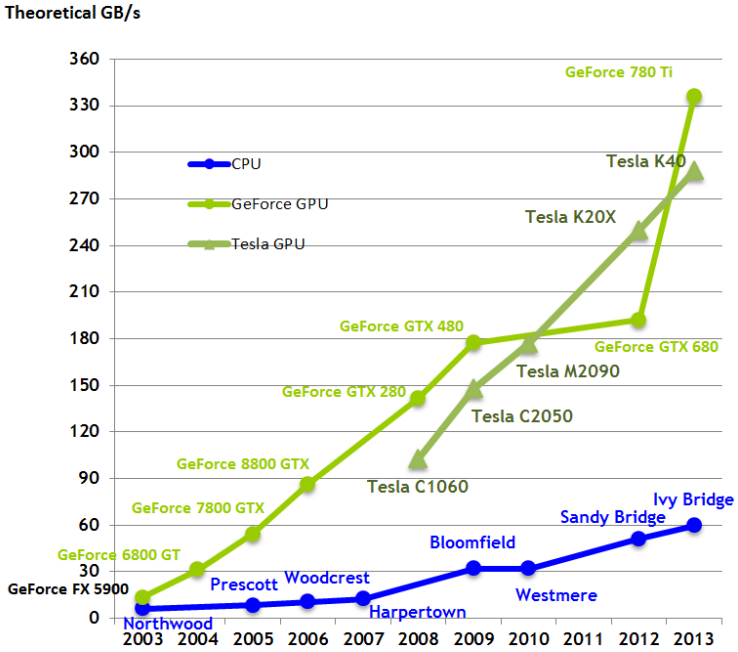
Chapter 4

GPU Computing and Accelerators: Part I

Why use accelerators?



(a) Floating point operations



(b) Memory bandwidth

FigureThroughput comparison of Multicore CPUs and CUDA enabled GPUs (taken from CUDA C Programming Guide)

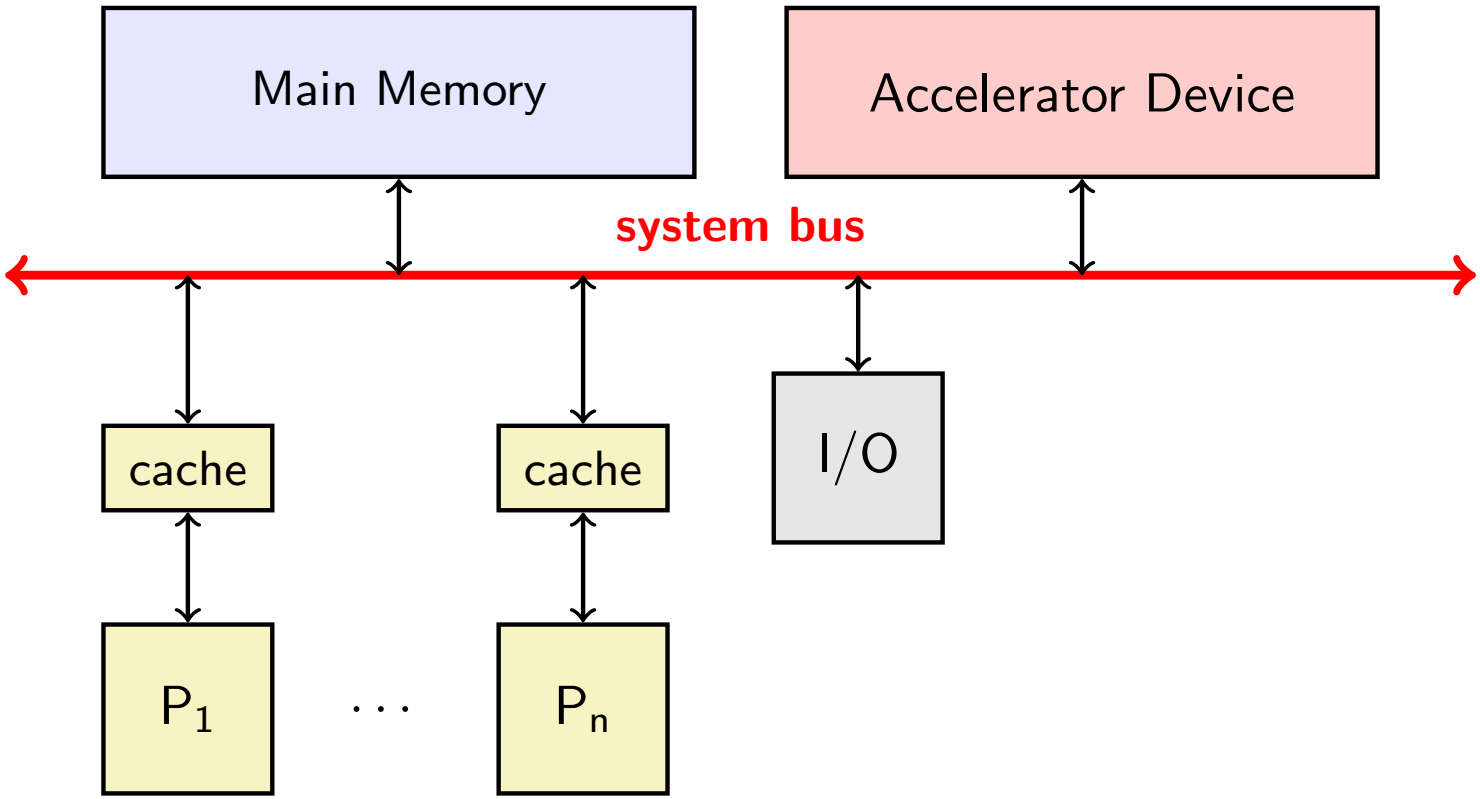
Why use accelerators?

Architecture	GFLOPS	GFLOPS/Watt	Utilization
Core i7-960	96	1.14	**95%**
NVIDIA® GTX280	410	2.6	66%
Cell	200	5.0	88%
NVIDIA® GTX480	**940**	5.4	70%
TI C66x DSP	74	**7.4**	57%

Table Power efficieny comparison of Multicore CPUs and accelerator chips (taken from Conference Poster by F. Igual and M. Ali)

Memory Hierarchy with Accelerators

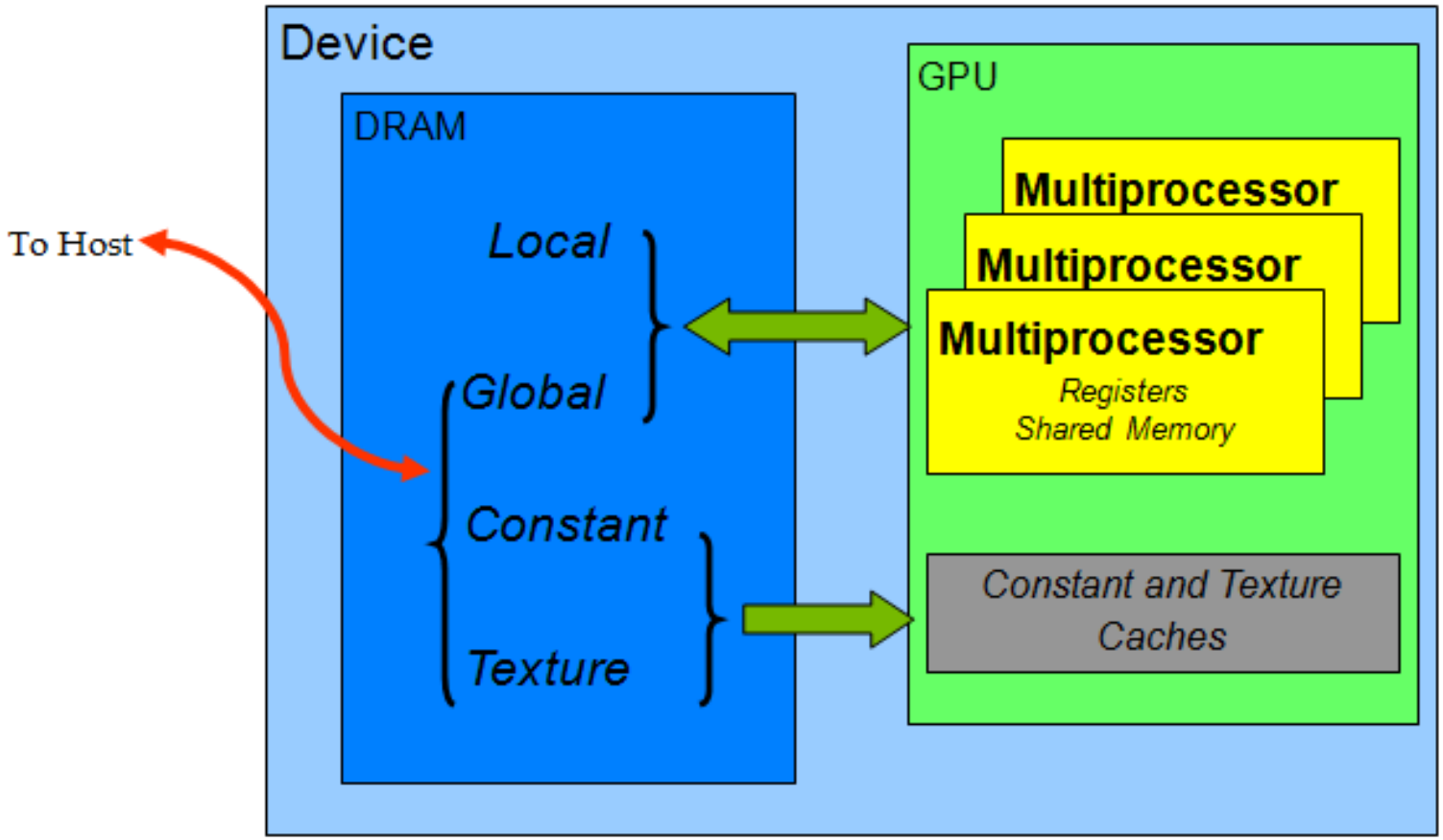
Common Features



FigureSchematic of a general parallel system

Memory Hierarchy with Accelerators

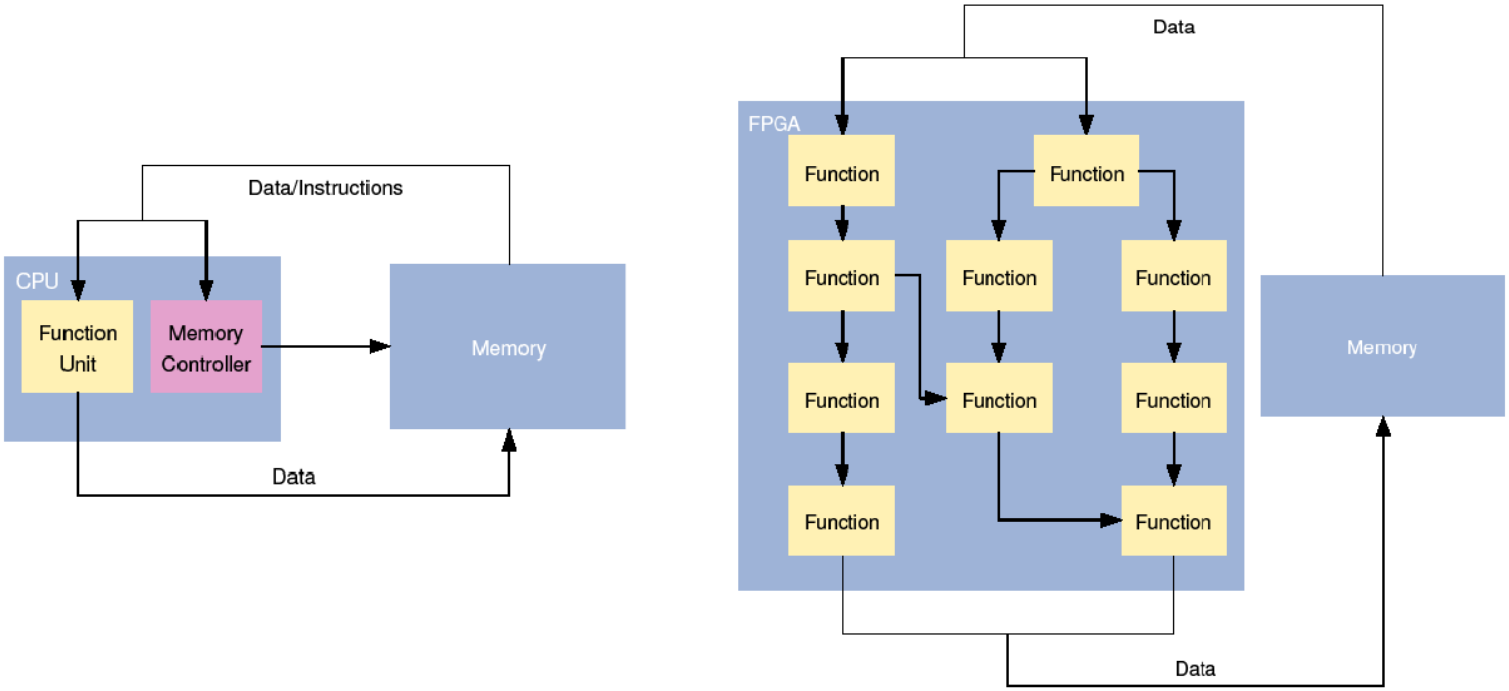
Graphics Processing Units (GPUs)



FigureMemory configuration of a CUDA Device (taken from CUDA C Programming Guide)

Memory Hierarchy with Accelerators

Field Programmable Gate Arrays (FPGAs)



FigureComparison of CPUs and FPGA execution models.