GENERAL DYNAMICS
Advanced Information Systems

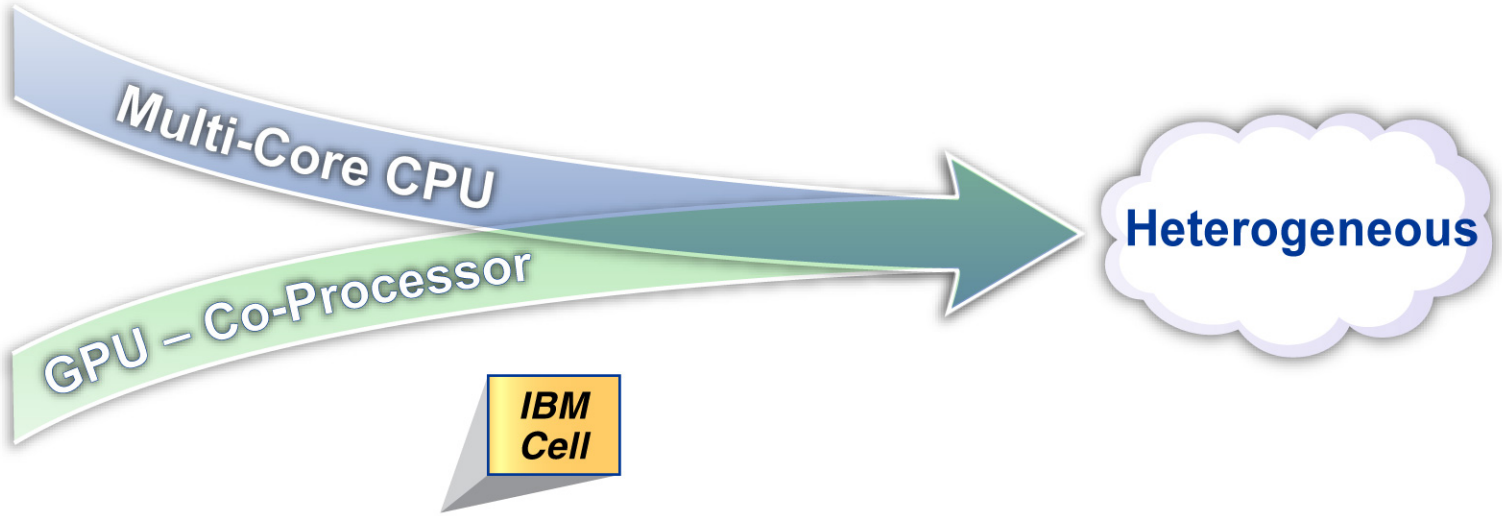
Implementation of Parallel Processing Techniques on Graphical Processing Units

Poster C.4

Brad Baker, Wayne Haney, Dr. Charles Choi

Industry Direction

- High performance COTS computing is moving to multi-core and heterogeneous silicon



MULTI-CORE CPU	CURRENT	FUTURE
▪ Multi-core CPU with smaller individual cores ▪ GPU co-processor	▪ Multi-core CPU with 1-3 GPU co-processors ▪ Heterogeneous multi-core (IBM Cell)	▪ Smaller, heterogeneous cores on same silicon

Math Benchmark and Signal Processing String Results

Fundamental Math Benchmarks		
Software Platform (GPU)	1k SGEMM Gflops	1k 1d Complex FFT
Peakstream (AMD r520)	80.13	8.7
CUDA (Nvidia g80)	**95**	**43.4**
RapidMind (Nvidia g80)	24	7.5
RapidMind (AMD r520)	26	4.9
Intel Core 2 Quad QX6700	12	14.2
AMD Opteron 265HE	8.8	4.8

Nvidia Cuda Platform
- Utilizes most powerful GPU on market
- Most extensive pre-built math library

Application Results	
Architecture	Execution Time
VSIPL++ PNB Algorithm on Intel Core 2 Quad QX6700 CPU	735.78 msec
CUDA Batch Style PNB Algorithm on Nvidia g80 GPU	367.23 msec

Approx. 50% Performance Gain Using CUDA's FFT

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