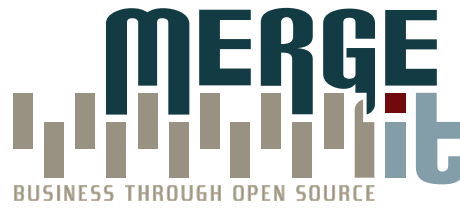


Introduktion



GPU Programming Carsten Eie Frigaard

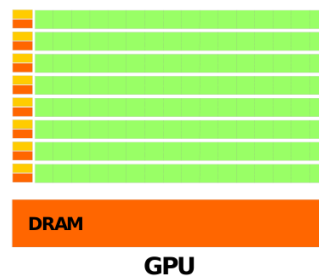
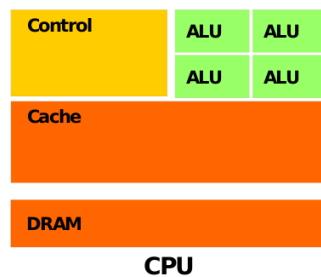
GP-GPU

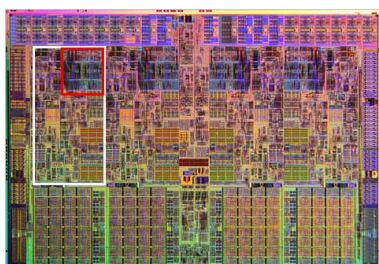


- General Purpose-Graphical Processing Unit

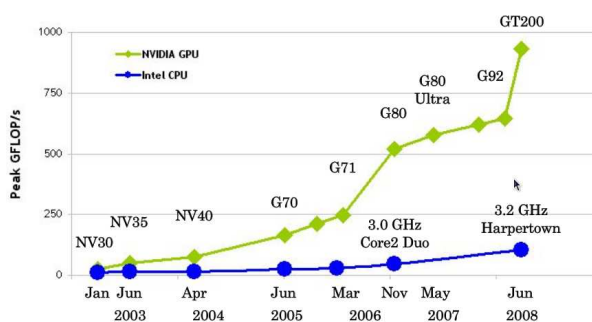


CPU vs GPU - hardware





CPU vs GPU - ydelse



Flydetsoperationer per sekund for CPU'er og GPU'er.

GPU programmering



Kom igang...

- CUDA-kompatibelt nVidia kort
- standard distrib (ubuntu, mandriva, suse, et.al.)
- nVidia CUDA driver for X
- CUDA C compiler, toolkit/SDK, libs, debugger, profiler

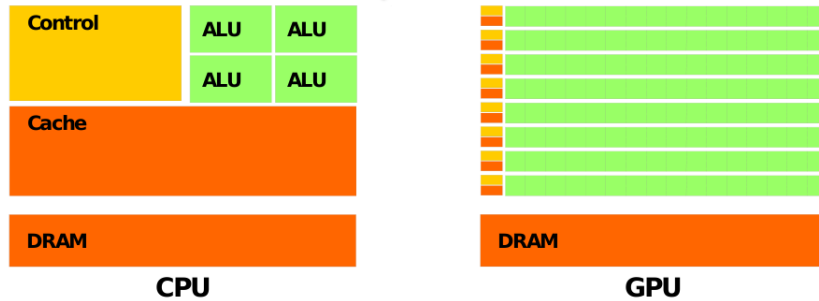
GPU programmering



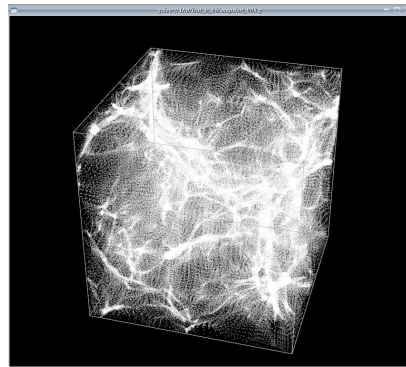
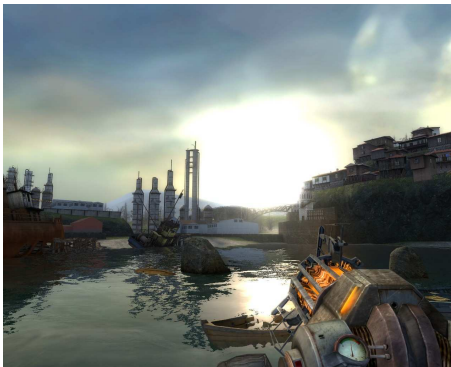
Programér...

- tungt, regne-intensivt problem

- bland f.eks. GCC kode med GPU kode
- fler-niveau hukommelse: register, local, shared, global...
- manuel 'cache' styring



Fra spil til high performace computing



CPU vs GPU



	Intel Core 2 Extreme (QX9650)	nVidia GeForce GTX 260
processor klok	3 GHz	1.3 GHz
effekt forbrug	130-150 W	182 W
kerner	4	216
cache	2 × 6 Mb	30 × 16 Kb
tråde eksekveret per klok	4	216
hardware tråde i 'sving'	4/8	30720
top ydelse	96 GFLOP/s	805 GFLOP/s
hukommelses båndbredde	12.8 GB/s	112 GB/s
pris	>\$1000	ca. \$150

Cluster-computing i 'verdensklasse'



TOP500
SUPERCOMPUTER SITES

TOP500 List - June 2009 (401-500)

R_{max} and R_{peak} values are in TFlops. For more details about other fields, check the TOP500 description.

Power data in KW for entire system

[previous](#)

Rank	Site	Computer/Year Vendor	Cores	R _{max}	R _{peak}	Power
401	Semiconductor Company (C) United States	BladeCenter HS21 Cluster, Xeon dual core 2.66 GHz, GigEthernet / 2009 IBM	5304	18.60	56.58	426.30
402	Geoscience (P) United States	BladeCenter HS21 Cluster, Xeon dual core, 3.0 GHz, GigEthernet / 2009 IBM	3900	18.60	46.80	363.88

Dvs. ca. 23 nVidia GX260 kort,
~5000 kerner, ~4 kW, ~50000,- DKK