Computing for a Changing World

SC2009

2009 Chair
Wilfred Pinfold
Portland, OR

Figure 1: Streamlines in the astrophysics dataset seeded outside the proto-neutron star illustrate the nature of the complex magnetic field inside the supernova shock front.

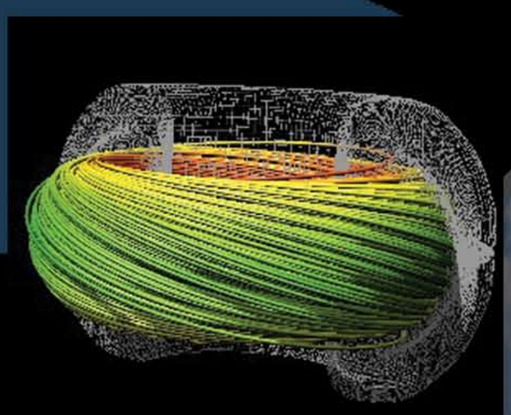

Figure 2: Streamlines show the flow of the magnetic field inside the toroidal plasma chamber.

2009

Notable Systems first mentioned this year in the proceedings:

- Anton - Custom Molecular Dynamics System
- Kraken - Cray XT-5
- Cray XMT
- NEC SX-9

Notable Processors:

- Intel Larrabee
- SiCortex
- Tensilica LX
- Intel Core i7 965

Noteworthy Architecture Topics:

- Code optimizations for multi-core processors
- The Cloud
- Co-tuning for hardware area and power efficiency
- Semantics in file system meta-data

Notable File/IO Systems:

- Lustre
- PVFS
- GPFS
- ADIOS

Notable Languages:

- Cilk

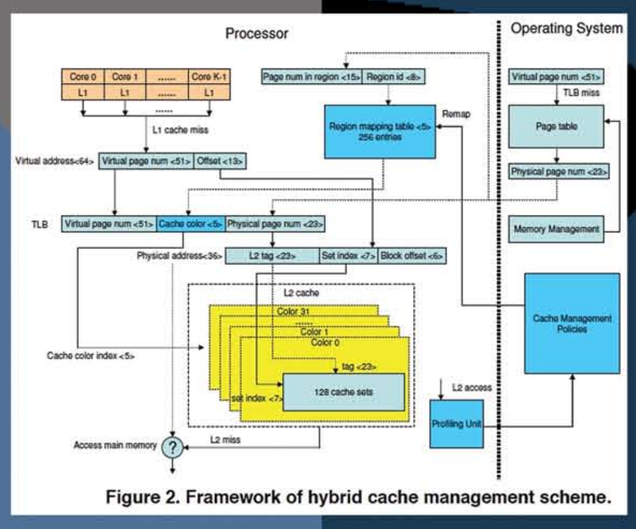

Figure 2. Framework of hybrid cache management scheme.

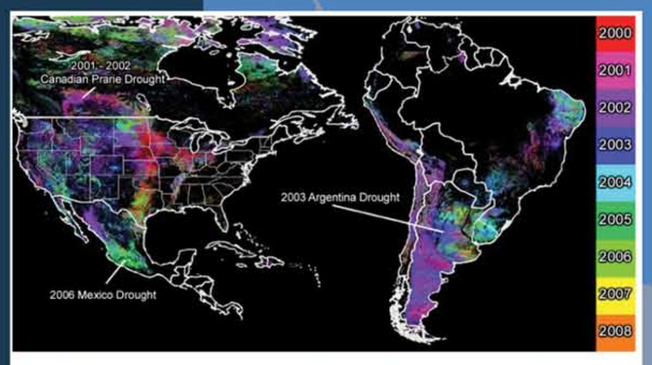

Figure 6: Drought analysis of NDVI < 0.5, NDWI < 0.3, and NDDI between 0.5 and 10.0. These are periods of drought that lasted for at least a month and occurred up to two years for any given region. Several regions are marked where drought has happened, most notably the 2006 Mexico drought. The image was colored based on the year that the longest drought occurred.

Cores	Read	Write	Filter	Distribution	Query	Sort	Analysis	Total Time
1K	85.23	0.68	47.11	22.40	1.01	14.17	0.22	170.82
2K	48.62	0.30	24.49	14.19	0.71	11.31	0.21	99.83
4K	41.27	0.31	11.80	8.78	0.34	9.18	0.10	71.78
8K	48.78	0.32	6.30	5.60	0.16	6.50	0.08	67.74
16K	46.56	0.30	3.45	3.02	0.08	4.20	0.07	57.68

Table 1: Timing results (in seconds) of the drought application.

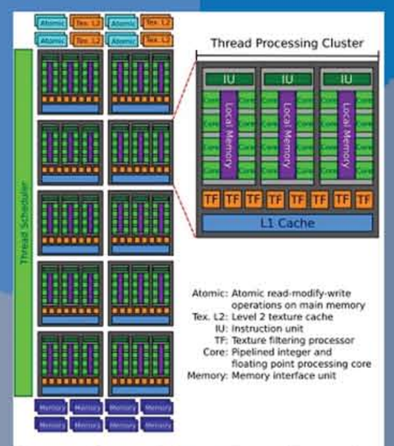

Figure 2: The parallel computing architecture features of the NVIDIA Tesla C1060. The thread scheduler hardware automatically manages thousands of threads executing on 240 cores. Hiding memory latency by oversubscribing the cores produces maximum performance.