

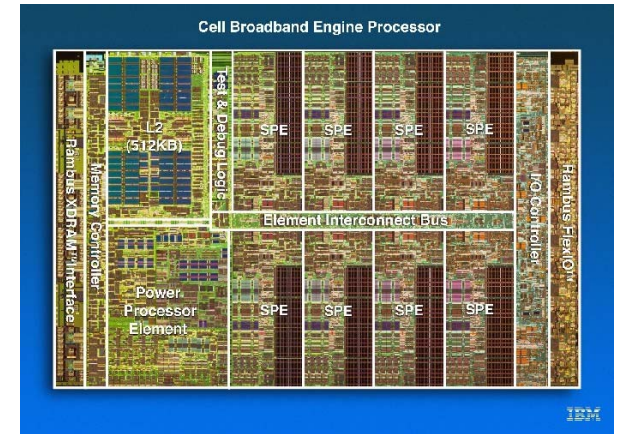
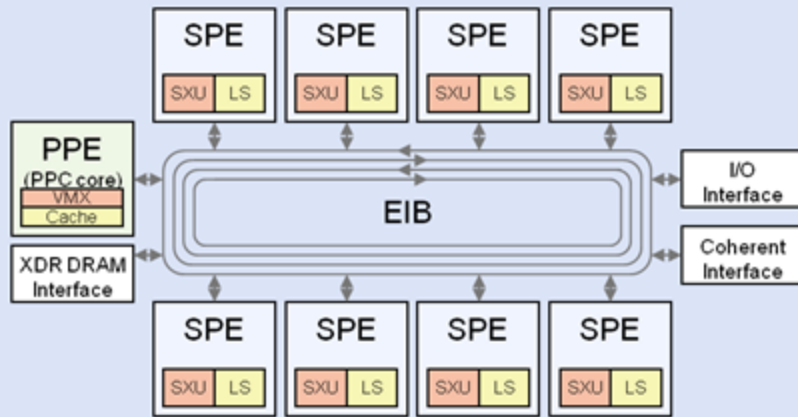
Application Implementation on the Cell B.E Processor: Techniques Employed

John Freeman, Diane Brassaw, Rich Besler, Brian Few,
Shelby Davis, Ben Buley

Black River Systems Company Inc.
162 Genesee St. Utica, NY 13501

IBM Cell BE Processor

BLACK RIVER
SYSTEMS COMPANY



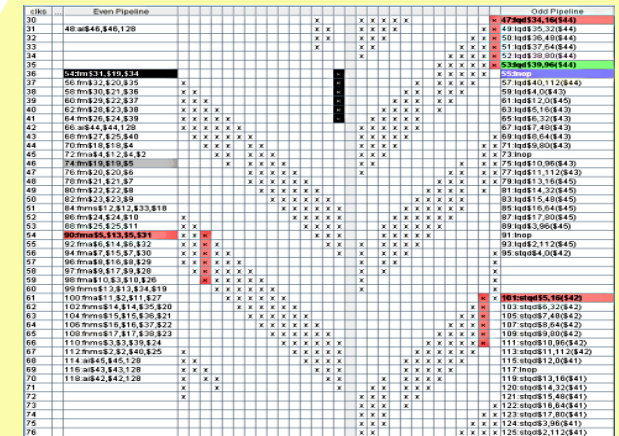
- **Cell BE processor boasts nine processors on a single die**
 - 1 Power® processor
 - 8 vector processors
- **Computational Performance**
 - 205 GFLOPS @ 3.2 GHz
 - 410 GOPS @ 3.2 GHz
- **A high-speed data ring connects everything**
 - 205 GB/s maximum sustained bandwidth
- **High performance chip interfaces**
 - 25.6 GB/s XDR main memory bandwidth

Excellent Single Precision Floating Point Performance

Experience, Performance, Tools & Techniques

BLACK RIVER
SYSTEMS COMPANY

- Share Impressions and Experience From the Past ~2 Years
 - Development Tools and SDKs
 - Parallelization Techniques
 - Approaches for Loop Unrolling
 - Use of C++ templates
 - SPE Assembly Programming
 - SPE Memory Management
 - Performance Metrics and Tools



Inst	Even Pipeline	Odd Pipeline
30		
31	40:aa646,846,120	
32		
33		
34		
35		
36		
37	54:mn11,5,0,8,20	
38	56:mn10,6,21,8,30	
39	60:mn20,6,22,8,37	
40	62:mn20,6,21,8,30	
41	64:mn20,6,24,8,30	
42	66:aa44,844,120	
43	68:mn27,6,25,840	
44	70:mn16,6,16,84	
45	72:mn44,6,12,84,82	
46	74:mn16,6,16,84	
47	76:mn20,6,20,86	
48	78:mn21,6,21,87	
49	80:mn22,6,22,88	
50	82:mn23,6,22,89	
51	84:mn48,7,8,12,835,810	
52	86:mn24,6,24,810	
53	88:mn25,6,25,811	
54	90:mn45,6,13,85,831	
55	92:mn46,6,14,86,832	
56	94:mn47,6,15,87,830	
57	96:mn48,6,16,88,820	
58	98:mn49,6,17,89,820	
59	100:mn50,6,18,90,820	
60	102:mn51,6,19,91,819	
61	104:mn52,6,20,92,811,827	
62	106:mn53,6,21,93,820	
63	108:mn54,6,22,94,821	
64	110:mn55,6,23,95,822	
65	112:mn56,6,24,96,823	
66	114:mn57,6,25,97,824	
67	116:mn58,6,26,98,825	
68	118:aa45,845,120	
69	120:aa46,846,120	
70	122:aa47,847,120	
71		
72		
73		
74		
75		
76		

IBM's ASMVIs Tool

What Worked, What Didn't and What Level of Performance was Achieved