Piecewise Holistic Autotuning of Compiler and Runtime Parameters Reports

TABLE I
TEST ARCHITECTURES OF THE PAPER.

	Ivy Bridge	Sandy Bridge
CPU	i7-3770	E5
Frequency (GHz)	3.4	2.7
Sockets	1	2
Cores per socket	4	8
Threads per core	2	2
L1 cache (KB)	32	32
L2 cache (KB)	256	256
L3 cache (MB)	8	20
Ram (GB)	16	64

TABLE II
CODELET EXPLORATION OF OPENMP THREADS AFFINITIES ON SANDY BRIDGE

Benchmarks	Regions	Invocations	Accuracy	Acceleration	Coverage
BT	xsolve	201	92.33	4.96	35.4
	ysolve	201	96.7	4.54	28
	zsolve	201	97.07	3.99	29.7
	rhs	201	95.68	18.71	5.7
CG	conjgrad@405	400	72.71	1.46	71.1
	conjgrad@551	16	95.48	0.8	24.6
FT	cffts1	8	95.54	1.7	21.2
	cffts2	8	94.25	1.68	23.8
	cffts3	8	96.5	1.18	22.9
	evolve	6	82.06	0.94	14
	indexmap	2	79.76	5.59	18.1
IS	main	1	95.2	0.35	71.4
	rank	11	93.77	2.86	27.6
SP	xsolve	401	96.24	20.03	28.3
	ysolve	401	97.11	20.25	27.7
	zsolve	401	98.98	18.95	38.1
	rhs	402	98.37	28.12	5.6
LU	ssor	250	99.51	12.45	81
	rhs	251	96.79	12.73	18.7
EP	main	1	99.31	0.25	99.7
MG	resid	42	93.78	0.52	52.7
	psinv	40	94.32	0.57	16.2
	interp	35	87.06	0.53	8.9
	zero3	39	78.27	0.5	7.4

The **accuracy** of the codelet prediction is based on the relative difference between the original and the replay execution time. The **acceleration** is the exploration time saved when studying a codelet instead of the whole application. **Invocations** display the number of times a region is called inside the application. Only regions covering more than 5% of the application execution time are selected.

TABLE III
CODELET EXPLORATION OF COMPILER PASSES ON IVY BRIDGE

Benchmarks	Regions	Invocations	Accuracy	Acceleration	Coverage
BT	xsolve	201	98.65	102.17	25.2
	ysolve	201	98.44	99.54	27.3
	zsolve	201	98.13	98.55	27.1
CG	conjgrad@491	16	99.07	3.02	88
	conjgrad@607	16	94.44	7.65	9.6
FT	appft	1	94.2	4.48	5
	fft3d@152	8	98.18	3.84	27.6
	fft3d@137	8	99.37	4.91	26.8
	fft3d@112	8	97.85	4.2	30.6
	evolve	6	98.94	5.84	7.8
IS	rank	11	91.64	3.91	21.6
	createseq	1	97.94	0.38	60.0
	fullverify	1	97.92	1.24	15.2
SP	xsolve	401	99.71	161.67	11.2
	ysolve	401	99.02	149.29	16.3
	zsolve	401	99.32	152.25	17.4
	rhs@273	402	98.36	154.97	10.8
	rhs@64	402	96.02	159.07	8.5
	rhs@166	402	95.6	159.81	8.9
LU	buts	15500	93.23	8.75	18.2
	jacu	15500	94.02	37.07	14.4
	blts	15500	94.91	8.75	17.8
	jacld	15500	93.45	8.67	15.2
	rhs@166	251	95.22	164.73	8.0
	rhs@64	251	94.97	162.35	8.2
	rhs@273	251	97.26	170.11	6.3
EP	main	1	82.8	0.24	98.4
MG	interp	35	97.37	1.55	8.0
	rprj3	35	96	0.3	6.0
	resid	42	96.5	0.29	48.3
	psinv	18	97.09	0.47	22.0

The **accuracy** of the codelet prediction is based on the relative difference between the original and the replay execution time. The **acceleration** is the exploration time saved when studying a codelet instead of the whole application. **Invocations** display the number of times a region is called inside the application. Only regions covering more than 5% of the application execution time are selected.