

191.fma3d

Datasets profile vs. Reference Dataset

The following are the profiles for the 191.fma3d benchmark. For more details about our profile development and dataset reduction methodology, refer to the paper by AJ KleinOsowski and David J. Lilja, "MinneSPEC: A New SPEC Benchmark Workload for Simulation-Based Computer Architecture Research", Computer Architecture Letters, Volume 1, June 2002. This paper is available in electronic form at <http://www.arctic.umn.edu/~lilja/minnespec/index.html>



[http:// www.arctic.umn.edu](http://www.arctic.umn.edu)

Function level execution profile at optimization level O0

The following table contains function execution profiles and goodness-of-fit chi-squared statistic values for the train, test, large (LgRed), medium (MdRed), and small (SmRed) reduced datasets as compared to the full SPEC reference datasets. This data was gathered with the hiprof profiling utility. *90% Conf = Critical value of the chi-squared statistic at the 90 percent confidence level. Numbers in the Ref, Train, Test, LgRed, MdRed, and SmRed columns are the percent of overall execution time spent in the stated function (in the Function column). Numbers in the Train Chi, Test Chi, LgRed Chi, MdRed Chi, and SmRed Chi are the terms of the chi-squared statistic for the stated function (in the function column).

Function	Ref	Train	Train Chi	Test	Test Chi	LgRed	LgRed Chi	MdRed	MdRed Chi	SmRed	SmRed Chi
khplq_gradient_operator_	19.80	25.10	1.42		19.80		19.80		19.80		19.80
material_41_integration_	13.90	16.20	0.38		13.90		13.90		13.90		13.90
platq_stress_integration_	12.60	12.70	0.00		12.60		12.60		12.60		12.60
solve_	11.70	6.50	2.31	0.00	11.70	3.10	6.32	2.00	8.04	2.20	7.71
khplq_divergence_operator_	9.50	12.30	0.83		9.50		9.50		9.50		9.50
scatter_element_nodal_forces_	7.00	4.10	1.20	0.00	7.00	0.50	6.04	1.20	4.81	0.40	6.22
khplq_stress_divergence_	6.00	7.40	0.33		6.00		6.00		6.00		6.00
platq_internal_forces_	5.00	4.10	0.16		5.00		5.00		5.00		5.00
sqrt	3.70	5.00	0.46	0.00	3.70	0.90	2.12	0.40	2.94	1.20	1.69
material_41_platq_hourglass_forces_	3.70	3.60	0.00		3.70		3.70		3.70		3.70
read_and_build_node_sets_	1.90	2.30	0.08		1.90		1.90		1.90		1.90
subcycling_partition_	1.60	0.00	1.60	0.00	1.60	0.00	1.60	0.00	1.60	0.00	1.60
_OtsStringCompareEqIPadded	1.30	0.20	0.93	0.00	1.30	1.50	0.03	0.90	0.12	1.20	0.01
_OtsStringVerify	0.20	0.00	0.20	4.30	84.05	0.00	0.20	0.00	0.20	0.00	0.20
getirv_	0.20	0.00	0.20	0.00	0.20	0.00	0.20	0.00	0.20	0.00	0.20
_OtsStringIndex	0.10	0.00	0.10	4.30	176.40	0.00	0.10	0.10	0.00	0.00	0.10
rcdrd_	0.10	0.00	0.10	4.30	176.40	0.00	0.10	0.00	0.10	0.00	0.10
_OtsMove	0.10		0.10		0.10	1.00	8.10	0.70	3.60	1.00	8.10
skptnv_	0.10	0.00	0.10	0.00	0.10	0.00	0.10	0.00	0.10	0.00	0.10
cupper_	0.10	0.00	0.10	0.00	0.10	0.00	0.10	0.00	0.10	0.00	0.10
for__desc_ret_item	0.10	0.00	0.10	0.00	0.10	8.50	705.60	8.10	640.00	8.50	705.60
for__interp_fmt	0.10	0.00	0.10	0.00	0.10	10.60	1102.50	10.70	1123.60	10.50	1081.60
impose_displacement_bc_	0.10	0.40	0.90		0.10		0.10		0.10		0.10
_OtsMoveMinimum	0.10	0.00	0.10	0.00	0.10	0.00	0.10	0.00	0.10	0.00	0.10
for_read_int_list	0.10	0.00	0.10	0.00	0.10	0.00	0.10	0.00	0.10	0.00	0.10
Sum	99.30	99.90	12.10	12.90	535.75	26.10	1906.01	24.10	1858.31	25.00	1886.23
	Ref	Train	Train Chi	Test	Test Chi	LgRed	LgRed Chi	MdRed	MdRed Chi	SmRed	SmRed Chi

90% Confidence level (26 entries) = 34.382

191.fma3d

Function level execution profile at optimization level O1

The following table contains function execution profiles and goodness-of-fit chi-squared statistic values for the train, test, large (LgRed), medium (MdRed), and small (SmRed) reduced datasets as compared to the full SPEC reference datasets. This data was gathered with the hiprof profiling utility. *90% Conf = Critical value of the chi-squared statistic at the 90 percent confidence level. Numbers in the Ref, Train, Test, LgRed, MdRed, and SmRed columns are the percent of overall execution time spent in the stated function (in the Function column). Numbers in the Train Chi, Test Chi, LgRed Chi, MdRed Chi, and SmRed Chi are the terms of the chi-squared statistic for the stated function (in the function column).

Function	Ref	Train	Train Chi	Test	Test Chi	LgRed	LgRed Chi	MdRed	MdRed Chi	SmRed	SmRed Chi
khplq_gradient_operator_	16.30	23.80	3.45		16.30		16.30		16.30		16.30
solve_	15.50	7.10	4.55	0.00	15.50	2.00	11.76	3.20	9.76	4.10	8.38
material_41_integration_	11.70	15.40	1.17		11.70		11.70		11.70		11.70
scatter_element_nodal_forces_	8.40	5.00	1.38	0.00	8.40	0.80	6.88	0.50	7.43	0.30	7.81
platq_internal_forces_	7.50	6.30	0.19		7.50		7.50		7.50		7.50
khplq_divergence_operator_	7.40	10.80	1.56		7.40		7.40		7.40		7.40
platq_stress_integration_	6.90	7.60	0.07		6.90		6.90		6.90		6.90
khplq_stress_divergence_	5.00	7.00	0.80		5.00		5.00		5.00		5.00
sqrt	4.90	8.00	1.96	0.00	4.90	0.90	3.27	0.90	3.27	0.50	3.95
read_and_build_node_sets_	3.80	0.00	3.80	0.00	3.80	0.00	3.80	0.00	3.80	0.00	3.80
material_41_subcycling_partition_	3.10	3.00	0.00		3.10		3.10		3.10		3.10
platq_hourglass_forces_	2.70	0.40	1.96	0.00	2.70	0.40	1.96	0.60	1.63	0.50	1.79
__sqrt4	2.40	3.40	0.42		2.40		2.40		2.40		2.40
_OtsStringCompareEqIPadded	1.00	1.40	0.16		1.00		1.00		1.00		1.00
_OtsStringVerify	0.40	0.00	0.40	0.00	0.40	0.00	0.40	0.00	0.40	0.00	0.40
getirv_	0.30		0.30		0.30		0.30		0.30		0.30
_OtsStringIndex	0.20	0.00	0.20	0.00	0.20	0.00	0.20	0.00	0.20	0.00	0.20
_OtsMove	0.20		0.20	4.50	92.45	0.10	0.05	0.00	0.20	0.00	0.20
rcrdrd_	0.20		0.20	4.50	92.45	1.00	3.20	1.00	3.20	1.60	9.80
_OtsStringIndexChar	0.10	0.00	0.10	4.50	193.60	0.00	0.10	0.00	0.10	0.00	0.10
_OtsFill	0.10		0.10		0.10	2.40	52.90	1.90	32.40	1.60	22.50
for_read_seq_fmt_xmit	0.10	0.00	0.10	0.00	0.10	0.00	0.10	0.00	0.10	0.00	0.10
for__get_su	0.10	0.00	0.10	0.00	0.10	0.00	0.10	0.10	0.00	0.00	0.10
for_read_int_lis	0.10	0.00	0.10	0.00	0.10	0.00	0.10	0.00	0.10	0.00	0.10
skptnv_	0.10	0.00	0.10	0.00	0.10	0.00	0.10	0.00	0.10	0.00	0.10
proc_at_0x1202647c4	0.10	0.00	0.10	0.00	0.10	0.10	0.00	0.00	0.10	0.00	0.10
dlfnd_	0.10	0.00	0.10	0.00	0.10	0.00	0.10	0.00	0.10	0.00	0.10
cupper_	0.10	0.00	0.10	0.00	0.10	0.00	0.10	0.00	0.10	0.00	0.10
for__desc_ret_item	0.10	0.00	0.10	9.10	810.00	7.40	532.90	6.30	384.40	6.70	435.60
for_read_seq_fmt	0.10	0.00	0.10	0.00	0.10	0.00	0.10	0.00	0.10	0.00	0.10

_OtsMoveMinimum	0.10	0.00	0.10	0.00	0.10	0.10	0.00	0.00	0.10	0.00	0.10
proc_at_0x1201d64	0.10	0.00	0.10	0.00	0.10	0.00	0.10	0.00	0.10	0.00	0.10
for__interp_fmt	0.10	0.00	0.10	4.50	193.60	13.10	1690.00	12.00	1416.10	12.40	1512.90
Sum	99.40	99.20	24.28	27.10	1480.80	28.30	2369.91	26.50	1925.49	27.70	2070.14
	Ref	Train	Train Chi	Test	Test Chi	LgRed	LgRed Chi	MdRed	MdRed Chi	SmRed	SmRed Chi

90% Confidence level (34 entries) = 43.745

Function level execution profile at optimization level O2

The following table contains function execution profiles and goodness-of-fit chi-squared statistic values for the train, test, large (LgRed), medium (MdRed), and small (SmRed) reduced datasets as compared to the full SPEC reference datasets. This data was gathered with the hiprof profiling utility. *90% Conf = Critical value of the chi-squared statistic at the 90 percent confidence level. Numbers in the Ref, Train, Test, LgRed, MdRed, and SmRed columns are the percent of overall execution time spent in the stated function (in the Function column). Numbers in the Train Chi, Test Chi, LgRed Chi, MdRed Chi, and SmRed Chi are the terms of the chi-squared statistic for the stated function (in the function column).

Function	Ref	Train	Train Chi	Test	Test Chi	LgRed	LgRed Chi	MdRed	MdRed Chi	SmRed	SmRed Chi
solve_	20.60	10.10	5.35	7.70	8.08	1.00	18.65	1.50	17.71	2.10	16.61
sqrt	10.50	18.60	6.25	0.00	10.50	0.70	9.15	0.60	9.33	0.80	8.96
material_41_integr											
ation_	9.40	14.10	2.35		9.40		9.40		9.40		9.40
platq_internal_for											
ces_	9.30	7.50	0.35		9.30		9.30		9.30		9.30
scatter_element_n											
odal_forces_	9.00	4.10	2.67	0.00	9.00	1.90	5.60	1.70	5.92	1.60	6.08
khplq_gradient_op											
erator_	8.20	12.80	2.58		8.20		8.20		8.20		8.20
platq_stress_integr											
ation_	7.60	9.80	0.64		7.60		7.60		7.60		7.60
khplq_divergence_											
operator_	5.20	8.40	1.97		5.20		5.20		5.20		5.20
khplq_stress_diver											
gence_	3.30	5.30	1.21		3.30		3.30		3.30		3.30
read_and_build_no											
de_sets_	2.70	0.00	2.70	0.00	2.70	0.00	2.70	0.00	2.70	0.00	2.70
subcycling_partiti											
on_	2.30	0.30	1.74	0.00	2.30	1.30	0.43	1.10	0.63	1.30	0.43
material_41_											
__sqrt4	2.30	3.00	0.21		2.30		2.30		2.30		2.30
platq_hourglass_fo											
rces_	1.80	3.00	0.80		1.80		1.80		1.80		1.80
_OtsStringCompar											
eEqIPadded	0.60	2.00	0.02		1.80		1.80		1.80		1.80
_OtsStringVerify	0.60	0.00	0.60	0.00	0.60	0.00	0.60	0.20	0.27	0.00	0.60
_OtsStringIndex	0.50		0.50	7.70	103.68	0.10	0.32		0.50		0.50
_OtsMove	0.40	0.00	0.40	0.00	0.40	0.10	0.23	0.00	0.40	0.00	0.40
getirv_	0.30		0.30		0.30	0.80	0.83	0.80	0.83	0.50	0.13
rcrdrd_	0.30	0.00	0.30	0.00	0.30	0.00	0.30	0.00	0.30	0.00	0.30
for__get_su	0.20	0.00	0.20	0.00	0.20	0.00	0.20	0.00	0.20	0.00	0.20
_OtsStringIndexC											
har	0.20		0.20		0.20		0.20		0.20		0.20
skptnv_	0.10	0.00	0.10	0.00	0.10	0.00	0.10	0.00	0.10	0.00	0.10
for_read_seq_fmt_											
xmit	0.10	0.00	0.10	0.00	0.10	0.00	0.10	0.00	0.10	0.00	0.10
for_read_int_lis											
proc_at_0x1201b0	0.10	0.00	0.10	0.00	0.10	0.00	0.10	0.00	0.10	0.00	0.10
d34	0.10		0.10		0.10	2.40	52.90	1.50	19.60	1.90	32.40
_OtsFill	0.10	0.00	0.10	0.00	0.10	0.00	0.10	0.00	0.10	0.00	0.10
proc_at_0x12023e	0.10	0.00	0.10	0.00	0.10	0.00	0.10	0.00	0.10	0.00	0.10
d3c	0.10	0.00	0.10	0.00	0.10	0.00	0.10	0.00	0.10	0.00	0.10
dlfnd_	0.10	0.00	0.10	0.00	0.10	0.00	0.10	0.00	0.10	0.00	0.10
for__desc_ret_ite											
m	0.10	0.00	0.10	0.00	0.10	6.30	384.40	5.40	280.90	4.80	220.90

_OtsMoveMinimum	0.10	0.00	0.10	0.00	0.10	0.10	0.00	0.10	0.00	0.00	0.10
for_read_seq_fmt	0.10	0.00	0.10	0.00	0.10	0.00	0.10	0.00	0.10	0.00	0.10
for__interp_fmt	0.10	0.00	0.10	0.00	0.10	11.70	1345.60	14.00	1932.10	12.40	1512.90
free	0.10	0.00	0.10	0.00	0.10	0.00	0.10	0.00	0.10	0.00	0.10
for__acquire_lun	0.10	0.00	0.10	0.00	0.10	0.60	2.50	0.70	3.60	0.80	4.90
cupper_	0.10	0.00	0.10	0.00	0.10	0.00	0.10	0.00	0.10	0.00	0.10
infnd_	0.10	0.00	0.10	0.00	0.10	0.00	0.10	0.00	0.10	0.00	0.10
cvtas_a_to_t	0.10	0.00	0.10	0.00	0.10	0.00	0.10	0.00	0.10	0.00	0.10
proc_at_0x1201b5634	0.10	0.00	0.10	0.00	0.10	0.30	0.40	0.50	1.60	0.80	4.90
for_read_int_lis_xmit	0.10	0.00	0.10	0.00	0.10	0.00	0.10	0.00	0.10	0.00	0.10
refnd_	0.10	0.00	0.10	0.00	0.10	0.00	0.10	0.00	0.10	0.00	0.10
for_f90_verify	0.10	0.00	0.10	0.00	0.10	0.00	0.10	0.00	0.10	0.00	0.10
_OtsDivide64	0.10		0.10		0.10		0.10		0.10		0.10
for__cvt_value	0.10	0.00	0.10	0.00	0.10	0.10	0.00	0.00	0.10	0.00	0.10
__read	0.10	0.00	0.10	0.00	0.10	0.00	0.10	0.00	0.10	0.00	0.10
malloc	0.10	0.00	0.10	0.00	0.10	0.00	0.10	0.00	0.10	0.00	0.10
impose_displacement_bc_	0.10	0.50	1.60		0.10		0.10		0.10		0.10
Sum	99.20	99.50	35.54	15.40	189.86	27.40	1875.91	28.10	2327.79	27.00	1864.23
	Ref	Train	Train	Test	Test	LgRed	LgRed	MdRed	MdRed	SmRed	SmRed
			Chi		Chi		Chi		Chi		Chi

90% Confidence level (47 entries) = 58.641

Function level execution profile at optimization level O3

The following table contains function execution profiles and goodness-of-fit chi-squared statistic values for the train, test, large (LgRed), medium (MdRed), and small (SmRed) reduced datasets as compared to the full SPEC reference datasets. This data was gathered with the hiprof profiling utility. *90% Conf = Critical value of the chi-squared statistic at the 90 percent confidence level. Numbers in the Ref, Train, Test, LgRed, MdRed, and SmRed columns are the percent of overall execution time spent in the stated function (in the Function column). Numbers in the Train Chi, Test Chi, LgRed Chi, MdRed Chi, and SmRed Chi are the terms of the chi-squared statistic for the stated function (in the function column).

Function	Ref	Train	Train Chi	Test	Test Chi	LgRed	LgRed Chi	MdRed	MdRed Chi	SmRed	SmRed Chi
solve_	22.00	11.00	5.50	0.00	22.00	2.40	17.46	1.80	18.55	2.30	17.64
platq_stress_integr	9.30	12.50	1.10		9.30		9.30		9.30		9.30
platq_internal_forces_	9.10	7.50	0.28		9.10		9.10		9.10		9.10
scatter_element_nodal_forces_	9.10	3.70	3.20	0.00	9.10	0.90	7.39	1.00	7.21	0.50	8.13
khplq_gradient_operator_	7.60	12.10	2.66		7.60		7.60		7.60		7.60
material_41_integr	6.30	10.30	2.54		6.30		6.30		6.30		6.30
sqrt	6.30	13.30	7.78	0.00	6.30	1.40	3.81	0.80	4.80	0.20	5.91
__sqrt4	5.70	9.50	2.53		5.70		5.70		5.70		5.70
khplq_divergence_operator_	5.00	8.20	2.05		5.00		5.00		5.00		5.00
khplq_stress_divergence_	3.60	5.70	1.23		3.60		3.60		3.60		3.60
read_and_build_node_sets_	3.10	0.00	3.10	0.00	3.10	0.00	3.10	0.00	3.10	0.00	3.10
subcycling_partition_	2.70	0.30	2.13	0.00	2.70	1.10	0.95	1.80	0.30	1.80	0.30
material_41_	2.50	3.70	0.58		2.50		2.50		2.50		2.50
platq_hourglass_forces_	0.90	0.90	0.00		0.90		0.90		0.90		0.90
_OtsStringCompareEqIPadded	0.70	0.00	0.70	5.90	38.63	0.00	0.70	0.10	0.51	0.00	0.70
_OtsStringVerify	0.60		0.60		0.60		0.60		0.60		0.60
_OtsStringIndex	0.50	0.00	0.50	0.00	0.50	0.00	0.50	0.00	0.50	0.50	0.00
getirv_	0.30	0.00	0.30	0.00	0.30	0.00	0.30	0.00	0.30	0.00	0.30
_OtsMove	0.30		0.30		0.30	0.70	0.53	0.60	0.30	1.20	2.70
rcrdrd_	0.30	0.00	0.30	0.00	0.30	0.00	0.30	0.00	0.30	0.00	0.30
for__get_su	0.20	0.00	0.20	0.00	0.20	0.00	0.20	0.00	0.20	0.00	0.20
_OtsFill	0.20		0.20		0.20	2.90	36.45	2.20	20.00	3.90	68.45
for_read_seq_fmt_xmit	0.20	0.00	0.20	0.00	0.20	0.00	0.20	0.00	0.20	0.20	0.00
_OtsStringIndexChar	0.20		0.20		0.20		0.20		0.20		0.20
skptnv_	0.20	0.00	0.20	0.00	0.20	0.00	0.20	0.00	0.20	0.00	0.20
for_read_int_list	0.20	0.00	0.20	0.00	0.20	0.00	0.20	0.00	0.20	0.00	0.20
proc_at_0x1201e4e34	0.10	0.00	0.10	0.00	0.10	0.00	0.10	0.00	0.10	0.00	0.10
dlfnd_	0.10	0.00	0.10	0.00	0.10	0.00	0.10	0.00	0.10	0.00	0.10
proc_at_0x120272e3c	0.10	0.00	0.10	0.00	0.10	0.00	0.10	0.00	0.10	0.00	0.10
for__desc_ret_item	0.10	0.00	0.10	0.00	0.10	5.00	240.10	5.40	280.90	6.50	409.60

proc_at_0x1201e9734	0.10	0.00	0.10	0.00	0.10	0.60	2.50	0.80	4.90	0.20	0.10
for__acquire_lun	0.10	0.00	0.10	0.00	0.10	0.60	2.50	0.20	0.10	0.70	3.60
_OtsMoveMinimum	0.10	0.00	0.10	0.00	0.10	0.00	0.10	0.00	0.10	0.00	0.10
for__interp_fmt	0.10	0.00	0.10	0.00	0.10	9.90	960.40	12.60	1562.50	10.90	1166.40
for_read_seq_fmt	0.10	0.00	0.10	0.00	0.10	0.00	0.10	0.00	0.10	0.00	0.10
for_read_int_lis_xmit	0.10	0.00	0.10	0.00	0.10	0.00	0.10	0.00	0.10	0.00	0.10
for__get_vm	0.10	0.00	0.10	0.00	0.10	0.00	0.10	0.00	0.10	0.00	0.10
for_f90_verify	0.10	0.00	0.10	0.00	0.10	0.00	0.10	0.00	0.10	0.00	0.10
cupper_	0.10	0.00	0.10	0.00	0.10	0.00	0.10	0.00	0.10	0.00	0.10
infnd_	0.10	0.00	0.10	0.00	0.10	0.00	0.10	0.00	0.10	0.00	0.10
cvtas_a_to_t	0.10	0.00	0.10	0.00	0.10	0.00	0.10	0.00	0.10	0.00	0.10
impose_displacement_bc_	0.10	0.60	2.50		0.10		0.10		0.10		0.10
__read	0.10	0.00	0.10	0.00	0.10	0.00	0.10	0.00	0.10	0.00	0.10
free	0.10	0.00	0.10	0.00	0.10	0.00	0.10	0.00	0.10	0.00	0.10
malloc	0.10	0.00	0.10	0.00	0.10	0.00	0.10	0.10	0.00	0.00	0.10
for__cvt_value	0.10	0.00	0.10	0.00	0.10	0.00	0.10	0.00	0.10	0.00	0.10
_OtsStringSearch	0.10		0.10		0.10		0.10		0.10		0.10
for__free_vm	0.10	0.00	0.10	0.00	0.10	0.00	0.10	0.00	0.10	0.00	0.10
read_input_records_	0.10	0.00	0.10	0.00	0.10	0.00	0.10	0.00	0.10	0.00	0.10
refnd_	0.10	0.00	0.10	0.00	0.10	0.00	0.10	0.00	0.10	0.00	0.10
Sum	99.50	99.30	43.38	5.90	137.43	25.50	1330.59	27.40	1957.77	28.90	1740.62
	Ref	Train	Train Chi	Test	Test Chi	LgRed	LgRed Chi	MdRed	MdRed Chi	SmRed	SmRed Chi

90% Confidence level (50 entries) = 62.038

Function level execution profile at optimization level O4

The following table contains function execution profiles and goodness-of-fit chi-squared statistic values for the train, test, large (LgRed), medium (MdRed), and small (SmRed) reduced datasets as compared to the full SPEC reference datasets. This data was gathered with the hiprof profiling utility. *90% Conf = Critical value of the chi-squared statistic at the 90 percent confidence level. Numbers in the Ref, Train, Test, LgRed, MdRed, and SmRed columns are the percent of overall execution time spent in the stated function (in the Function column). Numbers in the Train Chi, Test Chi, LgRed Chi, MdRed Chi, and SmRed Chi are the terms of the chi-squared statistic for the stated function (in the function column).

Function	Ref	Train	Train Chi	Test	Test Chi	LgRed	LgRed Chi	MdRed	MdRed Chi	SmRed	SmRed Chi
solve_	22.20	11.20	5.45	0.00	22.20	2.10	18.20	2.00	18.38	2.60	17.30
platq_internal_forces_	9.40	8.50	0.09		9.40		9.40		9.40		9.40
scatter_element_nodal_forces_	9.20	3.90	3.05	0.00	9.20	0.90	7.49	1.40	6.61	1.00	7.31
platq_stress_integration_	8.50	11.20	0.86		8.50		8.50		8.50		8.50
khplq_gradient_operator_	7.50	11.80	2.47		7.50		7.50		7.50		7.50
sqrt	7.20	15.10	8.67	0.00	7.20	1.00	5.34	1.00	5.34	0.50	6.23
material_41_integration_	6.50	10.50	2.46		6.50		6.50		6.50		6.50
khplq_divergence_operator_	5.30	8.60	2.05		5.30		5.30		5.30		5.30
__sqrt4	4.20	6.90	1.74		4.20		4.20		4.20		4.20
khplq_stress_divergence_	3.70	5.90	1.31		3.70		3.70		3.70		3.70
read_and_build_node_sets_	3.10	0.00	3.10	0.00	3.10	0.00	3.10	0.00	3.10	0.00	3.10
subcycling_partition_	2.70	0.30	2.13	0.00	2.70	2.10	0.13	1.50	0.53	1.00	1.07
material_41_platq_hourglass_forces_	2.50	3.50	0.40		2.50		2.50		2.50		2.50
__OtsStringCompareEqIPadded	1.10	1.00	0.01		1.10		1.10		1.10		1.10
__OtsStringVerify	0.70	0.00	0.70	11.10	154.51	0.00	0.70	0.00	0.70	0.70	0.00
__OtsStringIndex	0.60		0.60		0.60		0.60		0.60		0.60
getirv_	0.50	0.00	0.50	0.00	0.50	0.00	0.50	0.00	0.50	0.00	0.50
__OtsMove	0.30	0.00	0.30	0.00	0.30	0.00	0.30	0.00	0.30	0.00	0.30
rcrdrd_	0.30		0.30	11.10	388.80	0.90	1.20	1.00	1.63	1.20	2.70
for__get_su	0.30	0.00	0.30	0.00	0.30	0.00	0.30	0.00	0.30	0.00	0.30
__OtsStringIndexChar	0.20	0.00	0.20	0.00	0.20	0.00	0.20	0.00	0.20	0.00	0.20
for_read_seq_fmt_xmit	0.20		0.20	5.60	145.80	0.00	0.20	0.00	0.20	0.00	0.20
__OtsFill	0.20	0.00	0.20		0.20	1.80	12.80	2.00	16.20	1.40	7.20
dlfnd_	0.20		0.20	0.00	0.20	0.00	0.20	0.00	0.20	0.00	0.20
for_read_int_list	0.20	0.00	0.20	0.00	0.20	0.00	0.20	0.00	0.20	0.00	0.20
skptnv_	0.20	0.00	0.20	0.00	0.20	0.10	0.05	0.00	0.20	0.00	0.20
proc_at_0x120200be4	0.20	0.00	0.20	0.00	0.20	0.00	0.20	0.00	0.20	0.00	0.20
proc_at_0x12028ebec	0.20	0.00	0.20	0.00	0.20	0.10	0.05	0.00	0.20	0.20	0.00
for__interp_fmt	0.10	0.00	0.10	0.00	0.10	11.40	1276.90	12.10	1440.00	12.70	1587.60
for__desc_ret_item	0.10	0.00	0.10	0.00	0.10	8.50	705.60	7.00	476.10	8.40	688.90

for_read_seq_fmt	0.10	0.00	0.10	0.00	0.10	0.00	0.10	0.00	0.10	0.00	0.10
_OtsMoveMinimum	0.10	0.00	0.10	0.00	0.10	0.00	0.10	0.00	0.10	0.00	0.10
for_acquire_lun	0.10	0.00	0.10	0.00	0.10	1.00	8.10	0.80	4.90	0.70	3.60
for_cvt_value	0.10	0.00	0.10	0.00	0.10	0.00	0.10	0.00	0.10	0.00	0.10
cupper_	0.10	0.00	0.10	0.00	0.10	0.00	0.10	0.00	0.10	0.00	0.10
cvtas_a_to_t	0.10	0.00	0.10	0.00	0.10	0.00	0.10	0.00	0.10	0.00	0.10
for_read_int_lis_xmit	0.10	0.00	0.10	0.00	0.10	0.00	0.10	0.00	0.10	0.00	0.10
infnd_	0.10	0.00	0.10	0.00	0.10	0.00	0.10	0.00	0.10	0.00	0.10
impose_displacement_bc_	0.10	0.60	2.50		0.10		0.10		0.10		0.10
for_f90_verify	0.10	0.00	0.10	0.00	0.10	0.00	0.10	0.00	0.10	0.00	0.10
free	0.10	0.00	0.10	0.00	0.10	0.00	0.10	0.00	0.10	0.00	0.10
proc_at_0x1202054e4	0.10	0.00	0.10	0.00	0.10	0.60	2.50	0.80	4.90	0.50	1.60
__read	0.10	0.00	0.10	0.00	0.10	0.00	0.10	0.10	0.00	0.00	0.10
refnd_	0.10	0.00	0.10	0.00	0.10	0.00	0.10	0.00	0.10	0.00	0.10
_OtsStringSearch	0.10		0.10		0.10		0.10		0.10		0.10
for_get_vm	0.10	0.00	0.10	0.00	0.10	0.00	0.10	0.00	0.10	0.00	0.10
malloc	0.10	0.00	0.10	0.00	0.10	0.00	0.10	0.00	0.10	0.00	0.10
Sum	99.50	99.00	42.58	27.80	787.41	30.50	2095.26	29.70	2031.80	30.90	2379.92
	Ref	Train	Train	Test	Test	LgRed	LgRed	MdRed	MdRed	SmRed	SmRed
			Chi		Chi		Chi		Chi		Chi

90% Confidence level (48 entries) = 59.774

Instruction Mix profile at optimization level o0

The following table contains instruction mix breakdown and goodness-of-fit chi-squared statistic values for the train, test, large (LgRed), medium (MdRed), and small (SmRed) reduced datasets, as compared to the full SPEC dataset. This data was gathered with the sim-profile simulator for the SimpleScalar suite. *90% Conf = Critical value of the chi-squared statistic at the 90 percent confidence level. Numbers in the Ref, Train, Test, LgRed, MdRed, and SmRed columns are the percent of overall instructions of the stated instruction type (in the Inst Type column). Numbers in the Train Chi, Test Chi, LgRed Chi, MdRed Chi, and SmRed Chi columns are the terms of the chi-squared statistic for the stated instruction type (in the Inst Type column).

191.fma3d

O0 Program

Inst Type	Ref	Train	Train Chi	Test	Test Chi	Lgred	Lgred Chi	Mdred	Mdred Chi	Smred	Smred Chi
load	54.84	55.47	0.01	29.48	11.73	31.48	9.95	31.49	9.94	31.51	9.93
store	6.62	6.61	0.00	9.75	1.48	11.72	3.93	11.72	3.93	11.71	3.91
unconditional											
branch	0.50	0.45	0.00	3.26	15.24	2.97	12.20	2.97	12.20	2.97	12.20
conditional branch	1.78	1.52	0.04	10.83	46.01	9.00	29.29	9.01	29.37	9.05	29.69
int computation	26.90	25.76	0.05	45.89	13.41	43.62	10.39	43.60	10.37	43.54	10.29
fp computation	9.33	10.15	0.07	0.43	8.49	1.00	7.44	1.00	7.44	0.99	7.46
trap	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.01	0.00
Sum	99.97	99.96	0.17	99.65	96.35	99.79	73.20	99.79	73.24	99.78	73.48
	Ref	Train	Train Chi	Test	Test Chi	Lgred	Lgred Chi	Mdred	Mdred Chi	Smred	Smred Chi

90% Confidence level (7 entries) = 10.645

191.fma3d

Instruction Mix profile at optimization level o1

The following table contains instruction mix breakdown and goodness-of-fit chi-squared statistic values for the train, test, large (LgRed), medium (MdRed), and small (SmRed) reduced datasets, as compared to the full SPEC dataset. This data was gathered with the sim-profile simulator for the SimpleScalar suite. *90% Conf = Critical value of the chi-squared statistic at the 90 percent confidence level. Numbers in the Ref, Train, Test, LgRed, MdRed, and SmRed columns are the percent of overall instructions of the stated instruction type (in the Inst Type column). Numbers in the Train Chi, Test Chi, LgRed Chi, MdRed Chi, and SmRed Chi columns are the terms of the chi-squared statistic for the stated instruction type (in the Inst Type column).

191.fma3d

O1 Program

Inst Type	Ref	Train	Train Chi	Test	Test Chi	Lgred	Lgred Chi	Mdred	Mdred Chi	Smred	Smred Chi
load	30.85	31.31	0.01	23.35	1.82	23.86	1.58	23.87	1.58	23.91	1.56
store	11.46	11.58	0.00	10.60	0.06	13.47	0.35	13.47	0.35	13.46	0.35
unconditional branch	0.85	0.77	0.01	3.60	8.90	3.45	7.95	3.45	7.95	3.46	8.01
conditional branch	3.22	2.77	0.06	11.92	23.51	10.50	16.46	10.50	16.46	10.55	16.69
int computation	37.07	35.41	0.07	49.67	4.28	47.31	2.83	47.30	2.82	47.23	2.78
fp computation	16.48	18.10	0.16	0.47	15.55	1.16	14.24	1.16	14.24	1.15	14.26
trap	0.00	0.00	0.00	0.02	0.00	0.01	0.00	0.01	0.00	0.01	0.00
Sum	99.93	99.94	0.31	99.63	54.13	99.76	43.42	99.76	43.41	99.77	43.66
	Ref	Train	Train Chi	Test	Test Chi	Lgred	Lgred Chi	Mdred	Mdred Chi	Smred	Smred Chi

90% Confidence level (7 entries) = 10.645

191.fma3d

Instruction Mix profile at optimization level o2

The following table contains instruction mix breakdown and goodness-of-fit chi-squared statistic values for the train, test, large (LgRed), medium (MdRed), and small (SmRed) reduced datasets, as compared to the full SPEC dataset. This data was gathered with the sim-profile simulator for the SimpleScalar suite. *90% Conf = Critical value of the chi-squared statistic at the 90 percent confidence level. Numbers in the Ref, Train, Test, LgRed, MdRed, and SmRed columns are the percent of overall instructions of the stated instruction type (in the Inst Type column). Numbers in the Train Chi, Test Chi, LgRed Chi, MdRed Chi, and SmRed Chi columns are the terms of the chi-squared statistic for the stated instruction type (in the Inst Type column).

191.fma3d

O2 Program

Inst Type	Ref	Train	Train Chi	Test	Test Chi	Lgred	Lgred Chi	Mdred	Mdred Chi	Smred	Smred Chi
load	26.60	26.96	0.00	23.37	0.39	24.50	0.17	24.51	0.16	24.54	0.16
store	12.43	12.44	0.00	10.48	0.31	13.38	0.07	13.38	0.07	13.36	0.07
unconditional											
branch	1.18	1.09	0.01	3.58	4.88	3.47	4.44	3.47	4.44	3.48	4.48
conditional branch	4.44	3.81	0.09	12.11	13.25	10.51	8.30	10.52	8.33	10.57	8.46
int computation	29.80	27.67	0.15	49.60	13.16	46.72	9.61	46.70	9.58	46.64	9.52
fp computation	25.46	27.97	0.25	0.50	24.47	1.18	23.15	1.18	23.15	1.17	23.17
trap	0.00	0.00	0.00	0.02	0.00	0.01	0.00	0.01	0.00	0.01	0.00
Sum	99.91	99.94	0.50	99.66	56.45	99.77	45.74	99.77	45.75	99.77	45.87
	Ref	Train	Train Chi	Test	Test Chi	Lgred	Lgred Chi	Mdred	Mdred Chi	Smred	Smred Chi

90% Confidence level (7 entries) = 10.645

191.fma3d

Instruction Mix profile at optimization level o3

The following table contains instruction mix breakdown and goodness-of-fit chi-squared statistic values for the train, test, large (LgRed), medium (MdRed), and small (SmRed) reduced datasets, as compared to the full SPEC dataset. This data was gathered with the sim-profile simulator for the SimpleScalar suite. *90% Conf = Critical value of the chi-squared statistic at the 90 percent confidence level. Numbers in the Ref, Train, Test, LgRed, MdRed, and SmRed columns are the percent of overall instructions of the stated instruction type (in the Inst Type column). Numbers in the Train Chi, Test Chi, LgRed Chi, MdRed Chi, and SmRed Chi columns are the terms of the chi-squared statistic for the stated instruction type (in the Inst Type column).

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O3 Program

Inst Type	Ref	Train	Train Chi	Test	Test Chi	Lgred	Lgred Chi	Mdred	Mdred Chi	Smred	Smred Chi
load	28.88	29.13	0.00	23.36	1.06	24.45	0.68	24.46	0.68	24.49	0.67
store	13.71	13.78	0.00	10.48	0.76	13.36	0.01	13.36	0.01	13.35	0.01
unconditional branch	1.15	1.04	0.01	3.57	5.09	3.46	4.64	3.46	4.64	3.47	4.68
conditional branch	3.41	2.78	0.12	12.12	22.25	10.56	14.99	10.57	15.03	10.61	15.20
int computation	26.14	23.86	0.20	49.60	21.05	46.75	16.25	46.74	16.23	46.67	16.12
fp computation	26.63	29.32	0.27	0.49	25.66	1.17	24.34	1.17	24.34	1.17	24.34
trap	0.00	0.00	0.00	0.02	0.00	0.01	0.00	0.01	0.00	0.01	0.00
Sum	99.92	99.91	0.60	99.64	75.87	99.76	60.91	99.77	60.93	99.77	61.02
	Ref	Train	Train Chi	Test	Test Chi	Lgred	Lgred Chi	Mdred	Mdred Chi	Smred	Smred Chi

90% Confidence level (7 entries) = 10.645

191.fma3d

Instruction Mix profile at optimization level o4

The following table contains instruction mix breakdown and goodness-of-fit chi-squared statistic values for the train, test, large (LgRed), medium (MdRed), and small (SmRed) reduced datasets, as compared to the full SPEC dataset. This data was gathered with the sim-profile simulator for the SimpleScalar suite. *90% Conf = Critical value of the chi-squared statistic at the 90 percent confidence level. Numbers in the Ref, Train, Test, LgRed, MdRed, and SmRed columns are the percent of overall instructions of the stated instruction type (in the Inst Type column). Numbers in the Train Chi, Test Chi, LgRed Chi, MdRed Chi, and SmRed Chi columns are the terms of the chi-squared statistic for the stated instruction type (in the Inst Type column).

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O4 Program

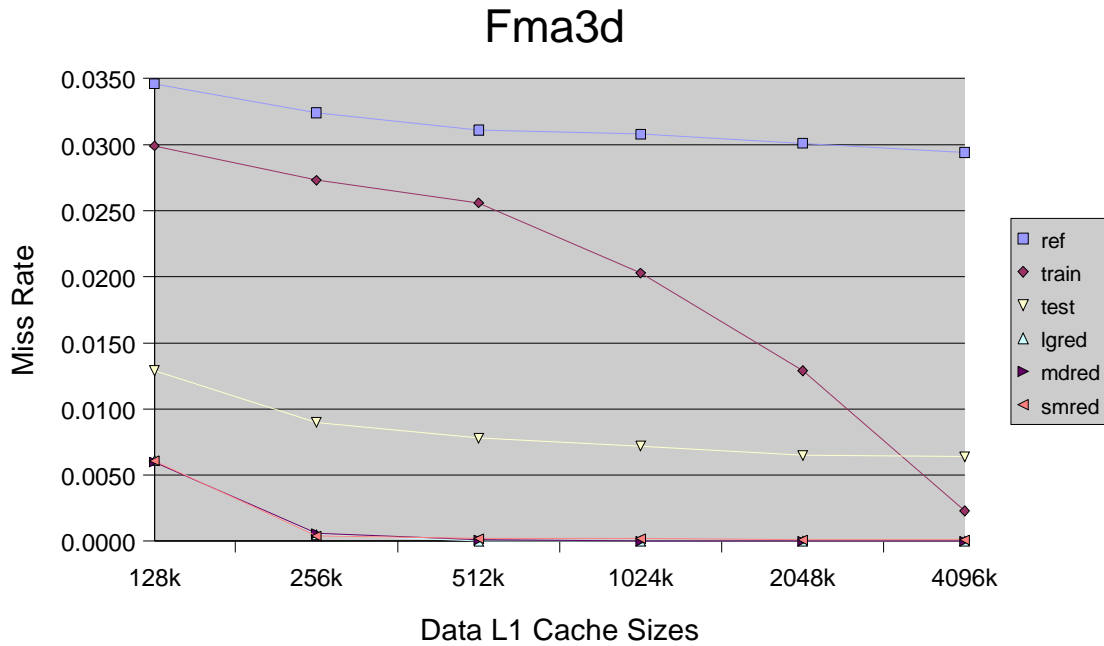
Inst Type	Ref	Train	Train Chi	Test	Test Chi	Lgred	Lgred Chi	Mdred	Mdred Chi	Smred	Smred Chi
load	28.88	29.13	0.00	23.36	1.06	24.45	0.68	24.46	0.68	24.49	0.67
store	13.71	13.78	0.00	10.48	0.76	13.36	0.01	13.36	0.01	13.35	0.01
unconditional branch	1.15	1.04	0.01	3.57	5.09	3.46	4.64	3.46	4.64	3.47	4.68
conditional branch	3.41	2.78	0.12	12.12	22.25	10.56	14.99	10.57	15.03	10.61	15.20
int computation	26.14	23.86	0.20	49.60	21.05	46.75	16.25	46.74	16.23	46.67	16.12
fp computation	26.63	29.32	0.27	0.49	25.66	1.17	24.34	1.17	24.34	1.17	24.34
trap	0.00	0.00	0.00	0.02	0.00	0.01	0.00	0.01	0.00	0.01	0.00
Sum	99.92	99.91	0.60	99.64	75.87	99.76	60.91	99.77	60.93	99.77	61.02
	Ref	Train	Train Chi	Test	Test Chi	Lgred	Lgred Chi	Mdred	Mdred Chi	Smred	Smred Chi

90% Confidence level (7 entries) = 10.645

191.fma3d

Cache profile

The following chart shows level 1 data cache miss rates for the Ref, Train, Test, LgRed, MdRed, and SmRed datasets. This data was gathered with the sim-cache simulator from the SimpleScalar suite. Miss rate is stated as the ratio of level 1 misses to total level 1 accesses.



Instruction Counts for all Datasets

The following table shows the instruction counts and estimated simulation time for the reference (Ref), train, test, large (LgRed), medium(MdRed), and small (SmRed) reduced datasets. Instruction counts are from the simulated benchmark, compiled at optimization level O0 and run with each input dataset. Estimated simulation times are calculated using a 45,000 instructions per second factor. This factor was determined by observing the simulation rate of a simulator similar to sim-outorder, run on a machine similar to the SPEC 2000 reference machine (a 333 Mhz Sparc).

	<u>Ref</u>	<u>Train</u>	<u>Test</u>	<u>LgRed</u>	<u>MdRed</u>	<u>SmRed</u>
Instruction Count (in millions)	1072962	988693	4	775	543	156
Simulation Time (in hours)	6623.2	6103.0	0.03	4.8	3.3	1.0