

## 164.gzip, Program command line

### Datasets profile vs. Reference Dataset

The following are the profiles for the 164.gzip benchmark, program command line. 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)

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## 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 gprof 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
longest_match	61.94	25.85	21.03	12.66	39.21	62.59	0.01	72.86	1.93	77.29	3.80
deflate	6.08	11.09	4.13	12.48	6.74	5.81	0.01	5.31	0.10	3.87	0.80
internal_mcount	5.29	11.68	7.72	15.42	19.40	5.73	0.04	3.27	0.77	2.64	1.33
inflate_codes	4.19	7.96	3.39	9.06	5.66	3.80	0.04	2.65	0.57	2.15	0.99
fill_window	3.68	5.74	1.15	6.30	1.87	3.56	0.00	4.24	0.09	2.52	0.37
ct_tally	3.62	9.24	8.72	12.06	19.68	4.18	0.09	2.12	0.62	1.60	1.13
updcrc	3.35	4.98	0.79	5.16	0.98	3.56	0.01	3.18	0.01	2.64	0.15
send_bits	3.21	6.43	3.23	7.68	6.22	2.79	0.05	1.24	1.21	1.66	0.75
compress_block	3.15	5.94	2.47	5.40	1.61	3.25	0.00	2.12	0.34	2.03	0.40
deflate_fast	2.24	5.13	3.73	6.78	9.20	1.78	0.09	1.06	0.62	1.29	0.40
memcpy	1.25	1.58	0.09	0.84	0.13	0.77	0.18	1.06	0.03	1.10	0.02
pqdownheap	0.79	1.52	0.67	2.10	2.17	0.85	0.00	0.18	0.47	0.74	0.00
memset	0.26	0.48	0.19	0.30	0.01	0.39	0.07	0.09	0.11	0.12	0.08
_mcount	0.19	0.33	0.10	0.18	0.00	0.15	0.01	0.09	0.05		0.19
spec_init	0.14	0.17	0.01	0.06	0.05	0.00	0.14	0.00	0.14	0.00	0.14
gen_bitlen	0.12	0.21	0.07	0.18	0.03	0.00	0.12	0.00	0.12	0.12	0.00
build_tree	0.09	0.17	0.07	0.18	0.09	0.08	0.00	0.00	0.09	0.00	0.09
huft_build	0.09	0.15	0.04	0.12	0.01	0.15	0.04	0.09	0.00	0.12	0.01
bi_reverse	0.07	0.15	0.09	0.06	0.00	0.08	0.00	0.09	0.01	0.00	0.07
.umul	0.07	0.08	0.00	0.18	0.17	0.08	0.00	0.09	0.01	0.00	0.07
inflate_dynamic	0.03	0.07	0.05	0.00	0.03	0.00	0.03	0.00	0.03	0.00	0.03
send_tree	0.03	0.06	0.03	0.00	0.03	0.08	0.08	0.00	0.03	0.00	0.03
scan_tree	0.03	0.07	0.05	0.00	0.03	0.08	0.08	0.00	0.03	0.00	0.03
gen_codes	0.02	0.04	0.02	0.18	1.28	0.00	0.02	0.00	0.02	0.00	0.02
main	0.02	0.02	0.00	0.00	0.02	0.00	0.02	0.00	0.02	0.00	0.02
_free_unlocked	0.01	0.00	0.01	0.00	0.01	0.00	0.01	0.00	0.01	0.00	0.01
_brk_unlocked	0.01	0.02	0.01	0.18	2.89	0.08	0.49	0.18	2.89	0.06	0.25
init_block	0.01	0.01	0.00	0.00	0.01	0.00	0.01	0.00	0.01	0.00	0.01
Sum	99.98	99.17	57.87	97.56	117.52	99.84	1.66	99.92	10.31	99.95	11.19
	Ref	Train	Train Chi	Test	Test Chi	LgRed	LgRed Chi	MdRed	MdRed Chi	SmRed	SmRed Chi

90% Confidence level (28 entries) = 36.741

## 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 gprof 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
longest_match	55.92	22.72	19.71	11.03	36.04	57.26	0.03	65.65	1.69	71.78	4.50
internal_mcount	11.84	21.15	7.32	23.68	11.84	10.68	0.11	8.35	1.03	6.51	2.40
deflate	5.49	9.53	2.97	11.44	6.45	6.85	0.34	4.55	0.16	4.07	0.37
inflate_codes	4.21	6.71	1.48	8.30	3.97	3.84	0.03	2.28	0.88	3.39	0.16
ct_tally	3.73	8.78	6.84	12.45	20.39	3.56	0.01	2.66	0.31	1.76	1.04
updcrc	3.47	4.82	0.53	4.05	0.10	2.88	0.10	3.98	0.07	2.99	0.07
memcpy	3.25	4.53	0.50	3.64	0.05	2.88	0.04	3.23	0.00	1.63	0.81
send_bits	2.92	5.76	2.76	6.58	4.59	2.88	0.00	1.71	0.50	2.04	0.27
fill_window	2.90	4.11	0.50	4.05	0.46	3.56	0.15	3.23	0.04	2.31	0.12
deflate_fast	2.03	4.79	3.75	6.38	9.32	1.51	0.13	0.95	0.57	0.95	0.57
compress_block	1.97	2.66	0.24	3.74	1.59	1.51	0.11	1.52	0.10	1.22	0.29
_mcount	0.56	0.87	0.17	0.71	0.04	0.41	0.04	0.76	0.07	0.27	0.15
memset	0.52	0.88	0.25	0.61	0.02	0.27	0.12	0.38	0.04	0.27	0.12
pqdownheap	0.44	0.87	0.42	0.40	0.00	0.68	0.13	0.19	0.14	0.27	0.07
spec_init	0.27	0.34	0.02	0.10	0.11	0.14	0.06	0.00	0.27	0.00	0.27
huft_build	0.07	0.14	0.07	0.10	0.01	0.14	0.07	0.00	0.07	0.00	0.07
_umul	0.07	0.16	0.12	0.30	0.76	0.41	1.65	0.00	0.07	0.14	0.07
build_tree	0.05	0.09	0.03	0.20	0.45	0.00	0.05	0.00	0.05	0.00	0.05
gen_bitlen	0.04	0.11	0.12	0.00	0.04	0.14	0.25	0.00	0.04	0.00	0.04
bi_reverse	0.03	0.11	0.21	0.20	0.96	0.27	1.92	0.00	0.03	0.00	0.03
send_tree	0.03	0.04	0.00	0.00	0.03	0.00	0.03	0.00	0.03	0.00	0.03
main	0.03	0.03	0.00	0.00	0.03	0.00	0.03	0.00	0.03	0.00	0.03
gen_codes	0.02	0.06	0.08	0.00	0.02	0.00	0.02	0.00	0.02	0.00	0.02
inflate_dynamic	0.02	0.03	0.00	0.10	0.32	0.00	0.02	0.19	1.45	0.00	0.02
_free_unlocked	0.02	0.01	0.01	0.00	0.02	0.00	0.02	0.00	0.02	0.00	0.02
scan_tree	0.02	0.03	0.00	0.00	0.02	0.00	0.02	0.00	0.02	0.00	0.02
_brk_unlocked	0.02	0.01	0.01	0.20	1.62		0.02	0.38	6.48	0.27	3.13
_return_zero	0.01	0.01	0.00	0.00	0.01	0.00	0.01	0.00	0.01	0.00	0.01
_malloc_unlocked	0.01	0.00	0.01	0.00	0.01	0.00	0.01	0.00	0.01	0.00	0.01
realloc	0.01	0.00	0.01	0.10	0.81	0.00	0.01	0.00	0.01	0.00	0.01
free	0.01	0.00	0.01	0.00	0.01	0.00	0.01	0.00	0.01	0.00	0.01
init_block	0.01	0.03	0.04	0.00	0.01	0.00	0.01	0.00	0.01	0.00	0.01
_libc_read	0.01	0.01	0.00	0.00	0.01	0.00	0.01	0.00	0.01	0.14	1.69
Sum	100.00	99.39	48.20	98.36	100.09	99.87	5.57	100.01	14.25	100.01	16.46
	Ref	Train	Train Chi	Test	Test Chi	LgRed	LgRed Chi	MdRed	MdRed Chi	SmRed	SmRed Chi

90% Confidence level (33 entries) = 42.585

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## 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 gprof 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
longest_match	57.81	23.99	19.79	11.05	37.82	57.28	0.00	67.90	1.76	72.74	3.86
internal_mcount	10.44	20.96	10.60	25.51	21.75	11.61	0.13	5.06	2.77	5.98	1.91
deflate	5.49	9.15	2.44	10.93	5.39	6.04	0.06	5.84	0.02	3.76	0.55
inflate_codes	4.13	6.97	1.95	6.38	1.23	4.02	0.00	2.14	0.96	1.67	1.47
ct_tally	3.69	9.16	8.11	12.53	21.18	4.18	0.07	0.78	2.29	1.53	1.26
fill_window	3.61	5.48	0.97	5.92	1.48	3.87	0.02	4.67	0.31	2.64	0.26
send_bits	3.23	6.19	2.71	7.06	4.54	2.32	0.26	1.75	0.68	1.95	0.51
updcrc	2.94	3.92	0.33	4.10	0.46	1.86	0.40	4.28	0.61	2.92	0.00
memcpy	2.44	3.19	0.23	2.96	0.11	2.32	0.01	3.11	0.18	2.92	0.09
compress_block	1.97	2.75	0.31	2.73	0.29	2.17	0.02	1.95	0.00	1.25	0.26
deflate_fast	1.96	4.05	2.23	5.01	4.75	1.86	0.01	1.17	0.32	0.97	0.50
_mcount	0.55	0.83	0.14	0.57	0.00	0.77	0.09		0.55	0.42	0.03
memset	0.54	0.94	0.30	0.68	0.04	0.46	0.01	0.19	0.23	0.56	0.00
pqdownheap	0.38	0.59	0.12	0.91	0.74	0.31	0.01	0.00	0.38	0.14	0.15
spec_init	0.28	0.39	0.04	0.23	0.01	0.00	0.28	0.00	0.28	0.14	0.07
huft_build	0.12	0.17	0.02	0.00	0.12	0.00	0.12	0.00	0.12	0.00	0.12
.umul	0.09	0.18	0.09	0.23	0.22	0.15	0.04	0.00	0.09	0.00	0.09
bi_reverse	0.06	0.07	0.00	0.23	0.48	0.15	0.14	0.00	0.06	0.14	0.11
build_tree	0.05	0.08	0.02	0.23	0.65	0.00	0.05	0.39	2.31	0.00	0.05
gen_bitlen	0.05	0.12	0.10	0.23	0.65	0.00	0.05	0.19	0.39	0.00	0.05
inflate_dynamic	0.03	0.04	0.00	0.11	0.21	0.00	0.03	0.19	0.85	0.00	0.03
main	0.02	0.03	0.00	0.00	0.02	0.00	0.02	0.00	0.02	0.00	0.02
send_tree	0.02	0.08	0.18	0.23	2.21	0.00	0.02	0.00	0.02	0.00	0.02
_free_unlocked	0.01	0.00	0.01	0.00	0.01	0.00	0.01	0.00	0.01	0.00	0.01
_brk_unlocked	0.01		0.01	0.23	4.84	0.31	9.00	0.19	3.24	0.14	1.69
gen_codes	0.01	0.02	0.01	0.11	1.00	0.00	0.01	0.00	0.01	0.00	0.01
scan_tree	0.01	0.01	0.00	0.00	0.01	0.00	0.01	0.00	0.01	0.00	0.01
cleanfree	0.01	0.00	0.01	0.00	0.01	0.00	0.01	0.00	0.01	0.00	0.01
_smallloc	0.01	0.00	0.01	0.00	0.01	0.00	0.01	0.00	0.01	0.00	0.01
_libc_read	0.01	0.01	0.00	0.00	0.01	0.00	0.01	0.00	0.01	0.00	0.01
realloc	0.01	0.00	0.01	0.00	0.01	0.00	0.01	0.00	0.01	0.00	0.01
init_block	0.01	0.00	0.01	0.00	0.01	0.00	0.01	0.00	0.01	0.00	0.01
Sum	99.99	99.37	50.75	98.17	110.25	99.68	10.90	99.80	18.54	99.87	13.17
	Ref	Train	Train Chi	Test	Test Chi	LgRed	LgRed Chi	MdRed	MdRed Chi	SmRed	SmRed Chi

90% Confidence level (32 entries) = 41.422

### 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 gprof 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
longest_match	56.99	22.63	20.72	14.61	31.52	60.56	0.22	67.43	1.91	71.86	3.88
internal_mcount	10.84	22.92	13.46	25.11	18.79	11.41	0.03	4.02	4.29	5.24	2.89
deflate	5.30	8.78	2.28	10.39	4.89	6.90	0.48	4.60	0.09	4.55	0.11
inflate_codes	4.08	6.87	1.91	6.82	1.84	4.23	0.01	2.49	0.62	1.93	1.13
ct_tally	3.71	8.47	6.11	10.28	11.63	1.83	0.95	2.49	0.40	1.52	1.29
fill_window	3.63	5.12	0.61	5.41	0.87	3.38	0.02	3.26	0.04	2.76	0.21
memcpy	3.39	4.08	0.14	3.35	0.00	3.10	0.02	4.79	0.58	3.86	0.07
send_bits	3.24	5.92	2.22	6.28	2.85	2.25	0.30	2.11	0.39	2.62	0.12
compress_block	2.01	3.08	0.57	2.60	0.17	1.97	0.00	2.30	0.04	1.38	0.20
deflate_fast	1.73	4.10	3.25	4.87	5.70	1.13	0.21	1.72	0.00	0.69	0.63
updcrc	1.44	1.99	0.21	1.95	0.18	1.13	0.07	1.72	0.05	1.38	0.00
flush_window	1.27	1.86	0.27	2.49	1.17	0.56	0.40	1.53	0.05	0.97	0.07
_mcount	0.53	0.87	0.22	1.19	0.82	0.56	0.00	0.57	0.00	0.28	0.12
memset	0.53	0.87	0.22	0.43	0.02	0.00	0.53	0.19	0.22	0.28	0.12
pqdownheap	0.44	0.62	0.07	1.08	0.93	0.42	0.00	0.19	0.14	0.14	0.20
spec_init	0.25	0.38	0.07	0.11	0.08	0.00	0.25	0.00	0.25	0.00	0.25
huft_build	0.13	0.19	0.03	0.00	0.13	0.00	0.13	0.00	0.13	0.14	0.00
.umul	0.10	0.18	0.06	0.32	0.48	0.14	0.02	0.00	0.10	0.00	0.10
build_tree	0.09	0.07	0.00	0.00	0.09	0.00	0.09	0.19	0.11	0.00	0.09
bi_reverse	0.06	0.08	0.01	0.11	0.04	0.14	0.11	0.00	0.06	0.00	0.06
gen_bitlen	0.04	0.12	0.16	0.22	0.81	0.00	0.04	0.00	0.04	0.00	0.04
_brk_unlocked	0.03	0.01	0.01	0.22	1.20	0.14	0.40	0.19	0.85	0.28	2.08
send_tree	0.03	0.04	0.00	0.11	0.21	0.00	0.03	0.00	0.03	0.00	0.03
inflate_dynamic	0.02	0.05	0.05	0.00	0.02	0.00	0.02	0.00	0.02	0.00	0.02
_free_unlocked	0.02	0.01	0.01	0.00	0.02	0.00	0.02	0.00	0.02	0.00	0.02
main	0.02	0.03	0.00	0.00	0.02	0.00	0.02	0.00	0.02	0.00	0.02
__open	0.01	0.01	0.00	0.11	1.00	0.14	1.69	0.19	3.24	0.00	0.01
_malloc_unlocked	0.01	0.01	0.00	0.00	0.01	0.00	0.01	0.00	0.01	0.00	0.01
_smalloc	0.01	0.00	0.01	0.00	0.01	0.00	0.01	0.00	0.01	0.00	0.01
realloc	0.01	0.00	0.01	0.00	0.01	0.00	0.01	0.00	0.01	0.00	0.01
free	0.01	0.00	0.01	0.00	0.01	0.00	0.01	0.00	0.01	0.00	0.01
spec_write	0.01	0.01	0.00	0.00	0.01	0.00	0.01	0.00	0.01	0.00	0.01
scan_tree	0.01	0.03	0.04	0.00	0.01	0.00	0.01	0.00	0.01	0.00	0.01
flush_block	0.01	0.01	0.00	0.00	0.01	0.00	0.01	0.00	0.01	0.00	0.01
Sum	100.00	99.41	52.73	98.06	85.57	99.99	6.13	99.98	13.78	99.88	13.83
	Ref	Train	Train Chi	Test	Test Chi	LgRed	LgRed Chi	MdRed	MdRed Chi	SmRed	SmRed Chi

90% Confidence level (34 entries) = 43.745

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### **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).

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Inst Type	Ref	Train	Train Chi	Test	Test Chi	LgRed	LgRed Chi	MdRed	MdRed Chi	SmRed	SmRed Chi
load	22.80	23.54	0.02	24.00	0.06	22.78	0.00	22.32	0.01	22.71	0.00
store	7.47	9.00	0.31	9.89	0.78	7.43	0.00	6.95	0.04	6.80	0.06
unconditional branch	5.76	5.88	0.00	6.08	0.02	5.76	0.00	5.74	0.00	5.83	0.00
conditional branch	8.90	8.19	0.06	7.89	0.11	8.90	0.00	9.17	0.01	9.38	0.03
int computation	55.07	53.39	0.05	52.14	0.16	55.13	0.00	55.81	0.01	55.29	0.00
fp computation	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
trap	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Sum	100.00	100.00	0.45	100.00	1.14	100.00	0.00	99.99	0.06	100.01	0.09
	Ref	Train	Train Chi	Test	Test Chi	LgRed	LgRed Chi	MdRed	MdRed Chi	SmRed	SmRed Chi

90% Confidence level (7 entries) = 10.645

164.zip, Program command line

### **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).

164.gzip

O1 Program

Inst Type	Ref	Train	Train Chi	Test	Test Chi	LgRed	LgRed Chi	MdRed	MdRed Chi	SmRed	SmRed Chi
load	19.70	21.72	0.21	22.43	0.38	19.55	0.00	19.24	0.01	19.21	0.01
store	4.31	7.58	2.48	8.91	4.91	4.16	0.01	3.19	0.29	2.60	0.68
unconditional branch	1.60	3.59	2.48	4.51	5.29	1.51	0.01	0.91	0.30	0.83	0.37
conditional branch	19.42	15.10	0.96	13.52	1.79	19.54	0.00	21.21	0.16	22.02	0.35
int computation	54.98	52.01	0.16	50.63	0.34	55.24	0.00	55.46	0.00	55.34	0.00
fp computation	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
trap	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Sum	100.01	100.00	6.28	100.00	12.72	100.00	0.01	100.01	0.77	100.00	1.41
	Ref	Train	Train Chi	Test	Test Chi	LgRed	LgRed Chi	MdRed	MdRed Chi	SmRed	SmRed Chi

90% Confidence level (7 entries) = 10.645

164.gzip, Program command line

### **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).

164.gzip

O2 Program

Inst Type	Ref	Train	Train Chi	Test	Test Chi	LgRed	LgRed Chi	MdRed	MdRed Chi	SmRed	SmRed Chi
load	19.80	21.82	0.21	22.47	0.36	19.64	0.00	19.39	0.01	19.30	0.01
store	4.52	8.01	2.69	9.41	5.29	4.36	0.01	3.31	0.32	2.70	0.73
unconditional branch	1.62	3.65	2.54	4.59	5.45	1.53	0.01	0.92	0.30	0.84	0.38
conditional branch	19.67	15.37	0.94	13.77	1.77	19.79	0.00	21.47	0.16	22.22	0.33
int computation	54.39	51.16	0.19	49.75	0.40	54.68	0.00	54.91	0.00	54.94	0.01
fp computation	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
trap	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Sum	100.00	100.01	6.58	99.99	13.26	100.00	0.01	100.00	0.80	100.00	1.46
	Ref	Train	Train Chi	Test	Test Chi	LgRed	LgRed Chi	MdRed	MdRed Chi	SmRed	SmRed Chi

90% Confidence level (7 entries) = 10.645

164.gzip, Program command line



### **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).

164.gzip

O3 Program

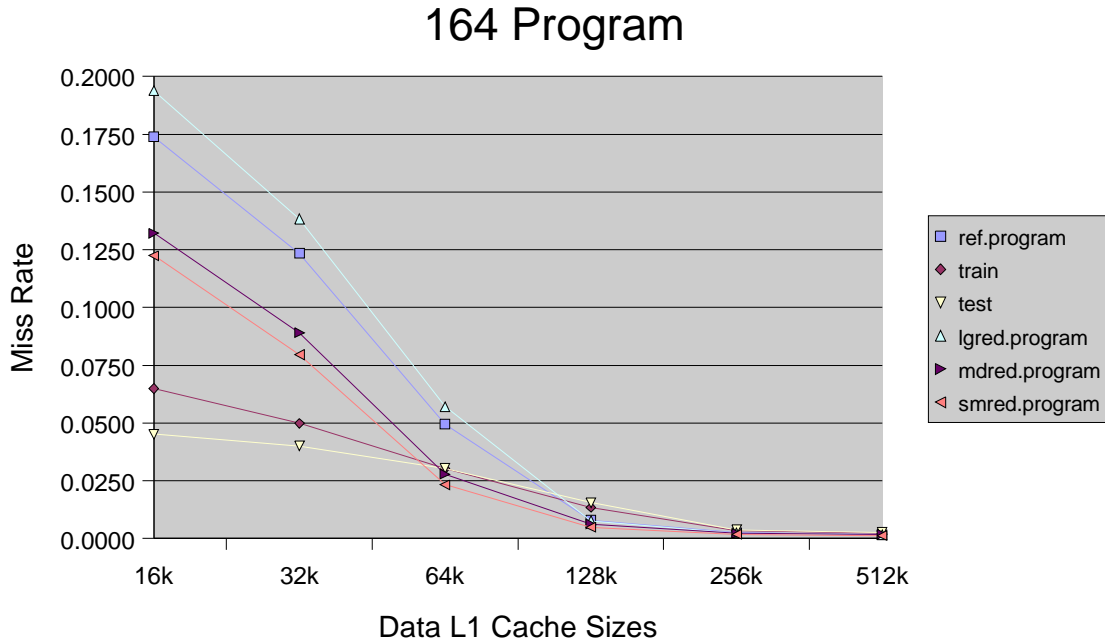
Inst Type	Ref	Train	Train Chi	Test	Test Chi	LgRed	LgRed Chi	MdRed	MdRed Chi	SmRed	SmRed Chi
load	19.80	21.82	0.21	22.47	0.36	19.64	0.00	19.39	0.01	19.30	0.01
store	4.52	8.01	2.69	9.41	5.29	4.36	0.01	3.31	0.32	2.70	0.73
unconditional branch	1.62	3.65	2.54	4.59	5.45	1.53	0.01	0.92	0.30	0.84	0.38
conditional branch	19.67	15.37	0.94	13.77	1.77	19.79	0.00	21.47	0.16	22.22	0.33
int computation	54.39	51.16	0.19	49.76	0.39	54.68	0.00	54.91	0.00	54.94	0.01
fp computation	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
trap	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Sum	100.00	100.01	6.58	100.00	13.26	100.00	0.01	100.00	0.80	100.00	1.46
	Ref	Train	Train Chi	Test	Test Chi	LgRed	LgRed Chi	MdRed	MdRed Chi	SmRed	SmRed Chi

90% Confidence level (7 entries) = 10.645

164.gzip, Program command line

## 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.



164.zip, Program command line

### ***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)	256124	81851	4558	4353	4240	6169
Simulation Time (in hours)	1581.0	505.2	28.1	26.9	26.2	38.1