A. STUDY OF LOCK PERFORMANCE

A.1. Selection of lock sensitive application

Table XIX: For each application, performance gain of the best vs. worst lock and relative standard deviation (**A-48 machine**).

	Gain *one node*	R.Dev. *one node*	Gain *max nodes*	R.Dev. *max nodes*	Gain *opt nodes*	R.Dev. *opt nodes*
barnes	7%	2%	18%	4%	18%	4%
blackscholes	3%	1%	2%	0%	2%	0%
bodytrack	2%	1%	26%	6%	19%	4%
canneal	7%	1%	8%	1%	5%	1%
dedup	**190%**	**35%**	**544%**	**51%**	**200%**	**36%**
ferret	**1%**	**0%**	**481%**	**70%**	**132%**	**30%**
fmm	**21%**	**5%**	**53%**	**13%**	**50%**	**12%**
freqmine	12%	2%	5%	1%	5%	1%
histogram	21%	4%	54%	10%	46%	8%
kmeans	4%	1%	14%	3%	14%	3%
kyotocabinet	**427%**	**26%**	**1491%**	**55%**	**427%**	**26%**
linear_regression	**40%**	**7%**	**243%**	**20%**	**243%**	**23%**
lu_cb	4%	1%	3%	1%	3%	1%
lu_ncb	12%	3%	37%	7%	37%	7%
matrix_multiply	8%	2%	17%	5%	17%	4%
memcached-new	**37%**	**7%**	**621%**	**52%**	**78%**	**19%**
memcached-old	**255%**	**22%**	**1112%**	**47%**	**255%**	**22%**
mysqld	**100%**	**25%**	**54%**	**15%**	**53%**	**15%**
p_raytrace	3%	0%	3%	0%	3%	0%
pca	**13%**	**3%**	**257%**	**32%**	**74%**	**14%**
pca_ll	**3%**	**1%**	**569%**	**39%**	**177%**	**20%**
radiosity	**33%**	**7%**	**685%**	**32%**	**45%**	**8%**
radiosity_ll	**16%**	**3%**	**1524%**	**69%**	**234%**	**29%**
rocksdb	5%	1%	9%	2%	9%	2%
s_raytrace	**6%**	**1%**	**1479%**	**55%**	**340%**	**30%**
s_raytrace_ll	**2%**	**1%**	**1015%**	**58%**	**686%**	**53%**
sqlite	**455%**	**43%**	**939%**	**51%**	**511%**	**45%**
ssl_proxy	**1130%**	**31%**	**2595%**	**67%**	**2116%**	**41%**
streamcluster	**1342%**	**29%**	**2011%**	**48%**	**955%**	**28%**
streamcluster_ll	**18%**	**3%**	**1286%**	**54%**	**44%**	**10%**
string_match	6%	1%	18%	4%	18%	4%
swaptions	1%	0%	6%	1%	6%	1%
upscaledb	**152%**	**24%**	**501%**	**40%**	**214%**	**26%**
vips	**2%**	**0%**	**781%**	**42%**	**18%**	**6%**
volrend	**9%**	**2%**	**127%**	**22%**	**29%**	**7%**
water_nsquared	**11%**	**2%**	**79%**	**11%**	**79%**	**11%**
water_spatial	**18%**	**4%**	**70%**	**12%**	**70%**	**12%**
word_count	7%	2%	35%	8%	24%	6%
x264	3%	1%	4%	1%	4%	1%

Table XX: For each application, performance gain of the best vs. worst lock and relative standard deviation (**I-48 machine in performance mode**).

	Gain *one node*	R.Dev. *one node*	Gain *max nodes*	R.Dev. *max nodes*	Gain *opt nodes*	R.Dev. *opt nodes*
barnes	8%	2%	26%	6%	26%	6%
blackscholes	0%	0%	1%	0%	1%	0%
bodytrack	2%	1%	39%	6%	5%	2%
canneal	1%	0%	1%	0%	1%	0%
dedup	**729%**	**46%**	**2316%**	**83%**	**729%**	**46%**
ferret	**1%**	**0%**	**662%**	**78%**	**81%**	**20%**
fmm	7%	2%	26%	6%	22%	5%
freqmine	2%	0%	1%	0%	1%	0%
histogram	53%	7%	31%	7%	48%	7%
kmeans	2%	0%	11%	2%	11%	2%
kyotocabinet	**462%**	**29%**	**579%**	**37%**	**413%**	**28%**
linear_regression	**18%**	**3%**	**84%**	**16%**	**80%**	**14%**
lu_cb	0%	0%	3%	1%	3%	1%
lu_ncb	9%	2%	12%	3%	12%	3%
matrix_multiply	3%	1%	7%	2%	7%	2%
memcached-new	**139%**	**20%**	**297%**	**25%**	**69%**	**14%**
memcached-old	**85%**	**19%**	**195%**	**38%**	**85%**	**19%**
mysqld	**62%**	**14%**	**57%**	**13%**	**57%**	**14%**
p_raytrace	3%	1%	3%	1%	1%	0%
pca	**278%**	**20%**	**315%**	**30%**	**308%**	**21%**
pca_ll	**90%**	**9%**	**981%**	**47%**	**403%**	**31%**
radiosity	**63%**	**8%**	**174%**	**23%**	**72%**	**9%**
radiosity_ll	**766%**	**31%**	**1979%**	**65%**	**1531%**	**48%**
rocksdb	2%	1%	11%	3%	11%	3%
s_raytrace	**15%**	**2%**	**1256%**	**50%**	**212%**	**31%**
s_raytrace_ll	**3%**	**1%**	**1260%**	**49%**	**345%**	**42%**
sqlite	**618%**	**41%**	**3581%**	**68%**	**618%**	**41%**
ssl_proxy	**1057%**	**40%**	**1594%**	**51%**	**1308%**	**45%**
streamcluster	**43%**	**11%**	**489%**	**70%**	**43%**	**11%**
streamcluster_ll	**66%**	**15%**	**569%**	**77%**	**162%**	**33%**
string_match	1%	0%	6%	2%	6%	2%
swaptions	1%	0%	3%	1%	3%	1%
upscaledb	**277%**	**27%**	**303%**	**33%**	**275%**	**28%**
vips	**1%**	**0%**	**707%**	**52%**	**24%**	**10%**
volrend	**8%**	**3%**	**151%**	**15%**	**42%**	**8%**
water_nsquared	**40%**	**9%**	**129%**	**20%**	**129%**	**20%**
water_spatial	**361%**	**33%**	**917%**	**42%**	**917%**	**42%**
word_count	9%	2%	14%	4%	9%	2%
x264	1%	0%	2%	0%	2%	0%

Table XXI: For each application, performance gain of the best vs. worst lock and relative standard deviation (**I-20 machine in performance mode**).

	Gain *one node*	R.Dev. *one node*	Gain *max nodes*	R.Dev. *max nodes*	Gain *opt nodes*	R.Dev. *opt nodes*
barnes	6%	2%	12%	3%	12%	3%
blackscholes	0%	0%	1%	0%	1%	0%
bodytrack	1%	0%	1%	0%	1%	0%
canneal	2%	0%	4%	1%	4%	1%
dedup	**723%**	**46%**	**1063%**	**61%**	**723%**	**46%**
ferret	**60%**	**15%**	**408%**	**66%**	**137%**	**31%**
fmm	5%	1%	10%	2%	10%	2%
freqmine	3%	1%	4%	1%	4%	1%
histogram	7%	2%	21%	4%	7%	2%
kmeans	3%	1%	2%	1%	2%	1%
kyotocabinet	**256%**	**26%**	**254%**	**28%**	**256%**	**26%**
linear_regression	6%	1%	28%	6%	28%	6%
lu_cb	0%	0%	3%	1%	3%	1%
lu_ncb	10%	2%	6%	2%	6%	2%
matrix_multiply	1%	0%	2%	0%	2%	0%
memcached-new	38%	8%	38%	8%	38%	8%
memcached-old	**316%**	**28%**	**316%**	**28%**	**316%**	**28%**
p_raytrace	3%	1%	4%	1%	3%	1%
pca	**8%**	**2%**	**185%**	**21%**	**24%**	**6%**
pca_ll	**4%**	**1%**	**473%**	**28%**	**89%**	**15%**
radiosity	**25%**	**5%**	**77%**	**13%**	**23%**	**5%**
radiosity_ll	**12%**	**3%**	**802%**	**42%**	**70%**	**19%**
rocksdb	6%	2%	11%	2%	11%	2%
s_raytrace	**2%**	**0%**	**338%**	**25%**	**92%**	**15%**
s_raytrace_ll	**1%**	**0%**	**643%**	**30%**	**77%**	**14%**
sqlite	**394%**	**36%**	**8608%**	**71%**	**394%**	**36%**
streamcluster	**36%**	**8%**	**387%**	**27%**	**36%**	**8%**
streamcluster_ll	**47%**	**9%**	**466%**	**30%**	**113%**	**22%**
string_match	0%	0%	2%	1%	2%	1%
swaptions	0%	0%	1%	0%	1%	0%
upscaledb	**127%**	**24%**	**153%**	**26%**	**148%**	**26%**
vips	**1%**	**0%**	**115%**	**22%**	**94%**	**22%**
volrend	9%	2%	56%	8%	39%	7%
water_nsquared	**24%**	**6%**	**48%**	**10%**	**48%**	**10%**
water_spatial	**170%**	**24%**	**326%**	**31%**	**326%**	**31%**
word_count	2%	0%	4%	1%	2%	0%
x264	2%	0%	3%	1%	3%	1%

Table XXII: For each application, performance gain of the best vs. worst lock and relative standard deviation (**A-64 machine with thread-to-node pinning**).

	Gain *one node*	R.Dev. *one node*	Gain *max nodes*	R.Dev. *max nodes*	Gain *opt nodes*	R.Dev. *opt nodes*
barnes	3%	1%	22%	5%	22%	5%
blackscholes	1%	0%	2%	0%	2%	0%
bodytrack	0%	0%	44%	6%	15%	3%
canneal	2%	0%	4%	1%	3%	1%
dedup	**623%**	**51%**	**1090%**	**51%**	**727%**	**56%**
facesim	**1%**	**0%**	**297%**	**25%**	**21%**	**5%**
ferret	**8%**	**3%**	**386%**	**64%**	**356%**	**63%**
fft	7%	1%	9%	2%	9%	2%
fluidanimate	**60%**	**11%**	**301%**	**39%**	**198%**	**36%**
fmm	5%	1%	12%	3%	12%	3%
freqmine	4%	1%	3%	1%	3%	1%
histogram	5%	1%	20%	5%	16%	4%
kmeans	6%	2%	5%	1%	5%	1%
kyotocabinet	**116%**	**17%**	**2034%**	**54%**	**116%**	**17%**
linear_regression	**3%**	**1%**	**101%**	**17%**	**70%**	**13%**
lu_cb	0%	0%	4%	1%	4%	1%
lu_ncb	6%	1%	5%	1%	5%	1%
matrix_multiply	4%	1%	5%	1%	5%	1%
memcached-new	**35%**	**7%**	**910%**	**47%**	**81%**	**20%**
memcached-old	**128%**	**25%**	**309%**	**49%**	**115%**	**24%**
mysqld	**85%**	**28%**	**66%**	**21%**	**59%**	**16%**
ocean_cp	**4%**	**1%**	**130%**	**20%**	**12%**	**3%**
ocean_ncp	**3%**	**1%**	**110%**	**16%**	**10%**	**3%**
p_raytrace	1%	0%	1%	0%	1%	0%
pca	**2%**	**1%**	**347%**	**32%**	**58%**	**9%**
pca_ll	**7%**	**2%**	**551%**	**41%**	**125%**	**18%**
radiosity	**5%**	**1%**	**114%**	**18%**	**7%**	**2%**
radiosity_ll	**9%**	**2%**	**2260%**	**64%**	**146%**	**22%**
radix	1%	0%	15%	3%	15%	3%
rocksdb	7%	2%	19%	5%	19%	5%
s_raytrace	**8%**	**2%**	**1192%**	**58%**	**222%**	**29%**
s_raytrace_ll	**1%**	**0%**	**1477%**	**59%**	**467%**	**52%**
sqlite	**2830%**	**43%**	**809%**	**86%**	**828%**	**44%**
ssl_proxy	**29%**	**5%**	**1250%**	**56%**	**68%**	**14%**
streamcluster	**21%**	**4%**	**706%**	**50%**	**41%**	**9%**
streamcluster_ll	**32%**	**6%**	**826%**	**52%**	**78%**	**20%**
string_match	7%	2%	8%	2%	8%	2%
swaptions	1%	0%	2%	0%	2%	0%
upscaledb	**143%**	**23%**	**1555%**	**56%**	**191%**	**25%**
vips	**81%**	**21%**	**238%**	**28%**	**294%**	**33%**
volrend	**5%**	**1%**	**106%**	**16%**	**28%**	**6%**
water_nsquared	**7%**	**2%**	**89%**	**15%**	**89%**	**15%**
water_spatial	**95%**	**14%**	**298%**	**26%**	**298%**	**26%**
word_count	2%	0%	5%	1%	4%	1%
x264	0%	0%	1%	0%	1%	0%

Table XXIII: For each application, performance gain of the best vs. worst lock and relative standard deviation (**I-48 machine in energy-saving mode**).

	Gain *one node*	R.Dev. *one node*	Gain *max nodes*	R.Dev. *max nodes*	Gain *opt nodes*	R.Dev. *opt nodes*
barnes	8%	2%	26%	6%	26%	6%
blackscholes	0%	0%	1%	0%	1%	0%
bodytrack	2%	1%	39%	6%	5%	2%
canneal	1%	0%	1%	0%	1%	0%
dedup	**729%**	**46%**	**2316%**	**83%**	**729%**	**46%**
ferret	**1%**	**0%**	**662%**	**78%**	**81%**	**20%**
fmm	7%	2%	26%	6%	22%	5%
freqmine	2%	0%	1%	0%	1%	0%
histogram	53%	7%	31%	7%	48%	7%
kmeans	2%	0%	11%	2%	11%	2%
kyotocabinet	**462%**	**29%**	**579%**	**37%**	**413%**	**28%**
linear_regression	**18%**	**3%**	**84%**	**16%**	**80%**	**14%**
lu_cb	0%	0%	3%	1%	3%	1%
lu_ncb	9%	2%	12%	3%	12%	3%
matrix_multiply	3%	1%	7%	2%	7%	2%
memcached-new	**139%**	**20%**	**297%**	**25%**	**69%**	**14%**
memcached-old	**85%**	**19%**	**195%**	**38%**	**85%**	**19%**
mysqld	**62%**	**14%**	**57%**	**13%**	**57%**	**14%**
p_raytrace	3%	1%	3%	1%	1%	0%
pca	**278%**	**20%**	**315%**	**30%**	**308%**	**21%**
pca_ll	**90%**	**9%**	**981%**	**47%**	**403%**	**31%**
radiosity	**63%**	**8%**	**174%**	**23%**	**72%**	**9%**
radiosity_ll	**766%**	**31%**	**1979%**	**65%**	**1531%**	**48%**
rocksdb	2%	1%	11%	3%	11%	3%
s_raytrace	**15%**	**2%**	**1256%**	**50%**	**212%**	**31%**
s_raytrace_ll	**3%**	**1%**	**1260%**	**49%**	**345%**	**42%**
sqlite	**618%**	**41%**	**3581%**	**68%**	**618%**	**41%**
ssl_proxy	**1057%**	**40%**	**1594%**	**51%**	**1308%**	**45%**
streamcluster	**43%**	**11%**	**489%**	**70%**	**43%**	**11%**
streamcluster_ll	**66%**	**15%**	**569%**	**77%**	**162%**	**33%**
string_match	1%	0%	6%	2%	6%	2%
swaptions	1%	0%	3%	1%	3%	1%
upscaledb	**277%**	**27%**	**303%**	**33%**	**275%**	**28%**
vips	**1%**	**0%**	**707%**	**52%**	**24%**	**10%**
volrend	**8%**	**3%**	**151%**	**15%**	**42%**	**8%**
water_nsquared	**40%**	**9%**	**129%**	**20%**	**129%**	**20%**
water_spatial	**361%**	**33%**	**917%**	**42%**	**917%**	**42%**
word_count	9%	2%	14%	4%	9%	2%
x264	1%	0%	2%	0%	2%	0%

Table XXIV: For each application, performance gain of the best vs. worst lock and relative standard deviation (**I-20 machine in energy-saving mode**).

	Gain *one node*	R.Dev. *one node*	Gain *max nodes*	R.Dev. *max nodes*	Gain *opt nodes*	R.Dev. *opt nodes*
barnes	6%	2%	12%	3%	12%	3%
blackscholes	0%	0%	1%	0%	1%	0%
bodytrack	1%	0%	1%	0%	1%	0%
canneal	2%	0%	4%	1%	4%	1%
dedup	**723%**	**46%**	**1063%**	**61%**	**723%**	**46%**
ferret	**60%**	**15%**	**408%**	**66%**	**137%**	**31%**
fmm	5%	1%	10%	2%	10%	2%
freqmine	3%	1%	4%	1%	4%	1%
histogram	7%	2%	21%	4%	7%	2%
kmeans	3%	1%	2%	1%	2%	1%
kyotocabinet	**256%**	**26%**	**254%**	**28%**	**256%**	**26%**
linear_regression	6%	1%	28%	6%	28%	6%
lu_cb	0%	0%	3%	1%	3%	1%
lu_ncb	10%	2%	6%	2%	6%	2%
matrix_multiply	1%	0%	2%	0%	2%	0%
memcached-new	38%	8%	38%	8%	38%	8%
memcached-old	**316%**	**28%**	**316%**	**28%**	**316%**	**28%**
p_raytrace	3%	1%	4%	1%	3%	1%
pca	**8%**	**2%**	**185%**	**21%**	**24%**	**6%**
pca_ll	**4%**	**1%**	**473%**	**28%**	**89%**	**15%**
radiosity	**25%**	**5%**	**77%**	**13%**	**23%**	**5%**
radiosity_ll	**12%**	**3%**	**802%**	**42%**	**70%**	**19%**
rocksdb	6%	2%	11%	2%	11%	2%
s_raytrace	**2%**	**0%**	**338%**	**25%**	**92%**	**15%**
s_raytrace_ll	**1%**	**0%**	**643%**	**30%**	**77%**	**14%**
sqlite	**394%**	**36%**	**8608%**	**71%**	**394%**	**36%**
streamcluster	**36%**	**8%**	**387%**	**27%**	**36%**	**8%**
streamcluster_ll	**47%**	**9%**	**466%**	**30%**	**113%**	**22%**
string_match	0%	0%	2%	1%	2%	1%
swaptions	0%	0%	1%	0%	1%	0%
upscaledb	**127%**	**24%**	**153%**	**26%**	**148%**	**26%**
vips	**1%**	**0%**	**115%**	**22%**	**94%**	**22%**
volrend	9%	2%	56%	8%	39%	7%
water_nsquared	**24%**	**6%**	**48%**	**10%**	**48%**	**10%**
water_spatial	**170%**	**24%**	**326%**	**31%**	**326%**	**31%**
word_count	2%	0%	4%	1%	2%	0%
x264	2%	0%	3%	1%	3%	1%

A.2. Selection of the number of nodes

Table XXV: For each *(lock-sensitive application, lock)* pair, performance gain (in %) of *opt nodes* over *max nodes*. The background color of a cell indicates the number of nodes for *opt nodes*: 1 2 4 6 8. Dashes correspond to untested cases. (**A-48 machine**).

Applications	ahmcs	alock-ls	backoff	c-bo-mcs-spin	c-bo-mcs_stp	c-ptl-tkt	c-tkt-tkt	clh_spin	clh_stp	clh-ls	hmcs	hticket-ls	malth_spin	malth_stp	mcs_spin	mcs_stp	mcs-ls	mcs-timepub	mutexee	partitioned	pthread	pthreadadapt	spinlock	spinlock-ls	ticket	ticket-ls	ttas	ttas-ls
dedup	-	-	33	80	78	61	45	-	-	-	72	82	67	62	83	84	86	86	45	703	48	45	69	49	721	59	50	-
ferret	150	190		250		154	141	197		186	142	147	201		188		207			203				7	191	146		
fmm																												
kyotocabinet	8	24	51	13	321	18	16	24		24	13	9	27	51	26	10	20	30	222	36	223	213	1k	849	140	80	504	192
linear_regression	13	10		9	181	13	11	14	18	10	10	11	18	44	6	15	24		133	14	13		35	13	15	7	10	13
memcached-new				6	267	-		-	-	-		-	93	132	27	166	5			-	15	87	524	317	101	48	171	151
memcached-old	65	81		15	230	-	79	-	-	-	67	-	28	70	88	27	79	46	25	-	27	50	1k	638	202	142	165	327
mysqld	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
pca	26	32	10	12	176	19	30	31	80	34	12	14	12	42	21	133	24		62	26	54	27	169	89	75	29	101	92
pca_ll	15	39			337	23	33	22	25	32	38	27		144	32	26	23	11	92	20	100	27	291	143	80	17	110	142
radiosity				9	85			9	538			6		36	18	557		13	52	8	56	17	143	52	39	14	49	51
radiosity_ll			6		471			8	269				6	114	10	281	19	7	300	33	261	87	841	373	227	68	342	316
s_raytrace	22	26		27	590	21	23		121	16	26	10	34	126	16	202	30		94	28	70	23	226	120	193	53	161	204
s_raytrace_ll					106				41							44			7				74		12	7	19	40
sqlite	-	-	-	-	261	-	-	-	-	-	-	-	-		-	6	-	2k	153	-	134	82	-	-	-	-	-	-
ssl_proxy	39	49	15	25	973	52	40	85	104	47	42	38	48		78	46	45	52	213	85	247	114	813	328	40	191	412	423
streamcluster	715	674	1k	937	1k	490	546	-	-	-	488	-	2k	7k	1k	12k	2k	1k	850	792	48	59	2k	1k	2k	1k	1k	928
streamcluster_ll	117	116	278	88	392	68	120	-	-	-	98	-	335	2k	389	2k	354	212	145	144	269	384	510	282	360	293	201	172
upscaledb	6	6	7	6				7	11	7	7	8			7	9	7	5		7	58	30	364	172	52	25	67	173
vips	108	80		278	13	193	148	-	-	-	169	-	667		47		44			58					45	5		
volrend	45	52	37	45	91	38	35	38	102	49	32	31	28	137	50	109	49	85	40	102	107	118	72	44	41	47	50	
water_nsquared																												
water_spatial																												

Table XXVI: For each *(lock-sensitive application, lock)* pair, performance gain (in %) of *opt nodes* over *max nodes*. The background color of a cell indicates the number of nodes for *opt nodes*: 1 2 3 4. Dashes correspond to untested cases. (**I-48 machine in performance mode**).

Applications	ahmcs	alock-ls	backoff	c-bo-mcs_spin	c-bo-mcs_stp	c-ptl-tkt	c-tkt-tkt	clh_spin	clh_stp	clh-ls	hmcs	hticket-ls	malth_spin	malth_stp	mcs_spin	mcs_stp	mcs-ls	mcs-timepub	mutexee	partitioned	pthread	pthreadadapt	spinlock	spinlock-ls	ticket	ticket-ls	ttas	ttas-ls
dedup	-	146	62	128	66	3k	3k	240	54	385	96	255	491	78	243	69	471	54	71	3k	84	99	82	64	3k	2k	64	77
ferret	407	355	8	382		390	359	339		350	402	319	365		349		288			322			6	208	130	333	247	7	5
kyotocabinet	8	11	37		136	12	12	16	26	12	7	7	24	17	10	6	10	15	18	19	13	16	115	73	18		18	19
linear_regression					20	11				6		14					34					38	73	5				
memcached-new	24			25	36	-	43	-	-	-	-	-		29	21	135		12	37	-	46	38	115	73	18		18	19
memcached-old	55	20	131	57	58	-	20	-	-	-	63	-	126	118	97	100	132	126	110	-	135	121	97	90	109	122	134	86
mysqld	-	-	-	-		-	-	-	-	-	-	-	-		-		-			-			-	-	-	-	-	-
pca	10	20		10	74	11	16	15	21	14	7	12	15	19	10	278	13	13	13	29	14	18	236	178	41	36	46	45
pca_ll					29				104		7	12	15	19		278	13	13	6	8	7	47	180	284	28	7	77	67
radiosity					38				59							97				9	5	5	97	79	10	7	15	15
radiosity_ll					475	31			46							27	7	6	18	38	5		472	364	38	29	104	105
s_raytrace		6			191			9	380	5		6				335				27	5	12	226	190	35	26	71	86
s_raytrace_ll									207							207							113	106				
sqlite	-	-	-	-	368	-	-	-	-	-	-	-	-	11	-	33	-	4k	34	-	22	17	-	-	-	-	-	-
ssl_proxy	51	45	39	31	421	60	62	35	15	39	49	49	25	16	49	19	48	44	43	76	34	18	335	276	46	40	72	78
streamcluster	306	187	1k	641	1k	422	233	-	-	-	307	-	865	1k	896	1k	750	877	1k	228	1k	1k	1k	847	1k	1k	725	729
streamcluster_ll	39	14	185	120	327	116		-	-	-	49	-	108	149	165	172	134	118	152	6	253	192	168	165	170	162	127	158
upscaledb													8			8			6		6		75	72	7		7	8
vips	152	83		556	21	316	246	-	-	-	261	-	313		94	92				118					62			
volrend		10	89	5	23	8	6	9	9			8		12	14		6		5		11	6	18	15		7	9	9
water_nsquared																												
water_spatial																												

Table XXVII: For each *(lock-sensitive application, lock)* pair, performance gain (in %) of *opt nodes* over *max nodes*. The background color of a cell indicates the number of nodes for *opt nodes*: 1 2. Dashes correspond to untested cases. (**I-20 machine in performance mode**).

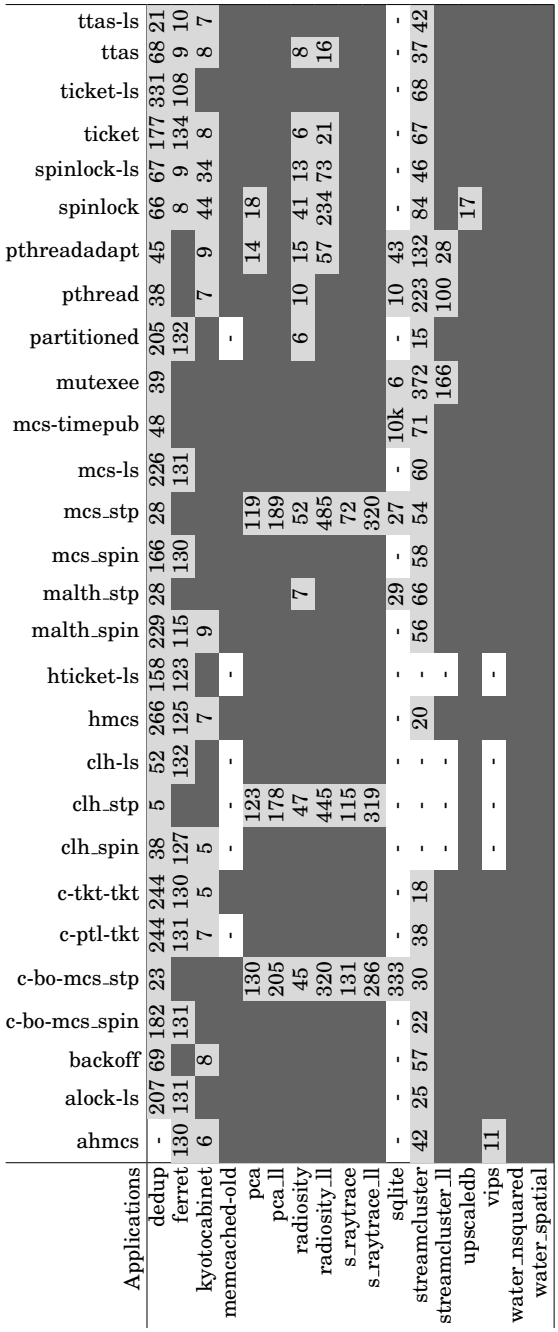


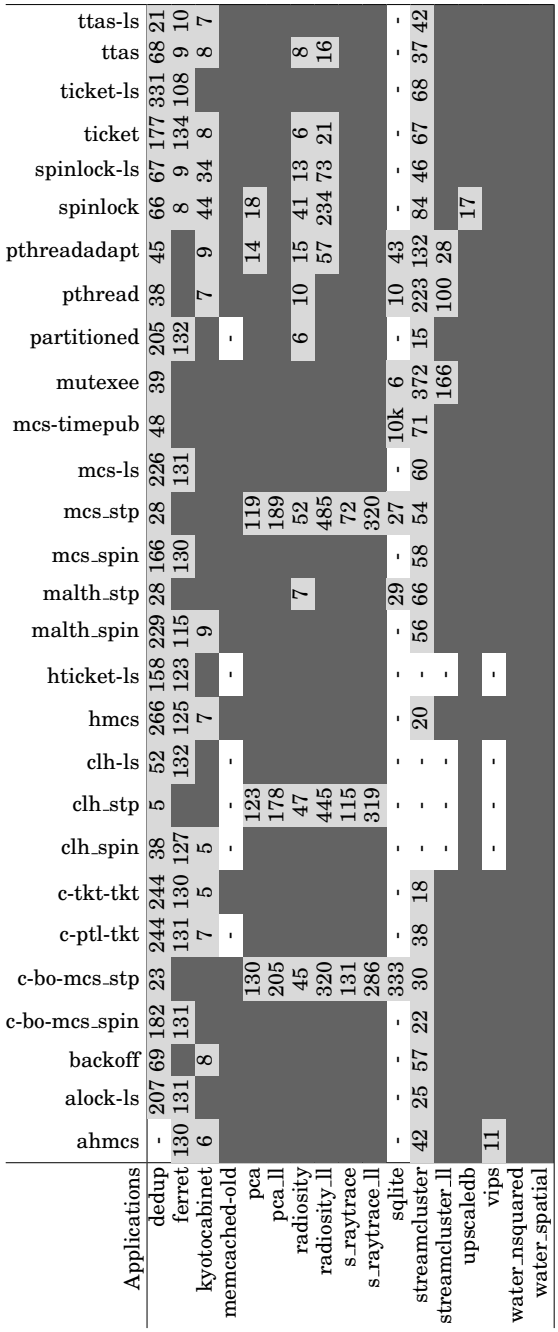
Table XXVIII: For each *(lock-sensitive application, lock)* pair, performance gain (in %) of *opt nodes* over *max nodes*. The background color of a cell indicates the number of nodes for *opt nodes*: 1|2|4|6|8. Dashes correspond to untested cases. (**A-64 machine with thread-to-node pinning**).

Applications	ahmcs	alock-ls	backoff	c-bo-mcs_spin	c-bo-mcs_stp	c-ptl-tkt	c-tkt-tkt	clh_spin	clh_stp	clh-ls	hmcs	hticket-ls	malth_spin	malth_stp	mcs_spin	mcs_stp	mcs-ls	mcs-timepub	mutexee	partitioned	pthread	pthreadadapt	spinlock	spinlock-ls	ticket	ticket-ls	ttas	ttas-ls
dedup	-	173	53	40	48	47	48	165	90	163	15	48	8	49		48		52	83	59	92	90	76	54	65	50	54	138
facesim	18	19	53	48	134	19	18	20	59	20	18	18	14	56	20	60	19	22	42	19	42	58	276	127	45	17	55	61
ferret							6				9	11	9															
fluidanimate	-	41						-	-	-		-		6		6												35
kyotocabinet	23	43	50	5	47	27	23	42	407	40	23	25	37	36	43	501	42	53	222	61	260	200	1k	1k	240	97	669	365
linear_regression									21							24							18		7			9
memcached-new	17	14			78	-	10	-	-	-	14	-	7	21	17	134	29	17	12	-	31	97	588	465	167	90	317	42
memcached-old	344	278	412	77	78	-	110	-	-	-	52	-	620	635	435	480	611	429	372	-	512	561	687	360	656	709	394	467
mysqld	-	-	-	-	26	-	-	-	-	-	-	-	-		-		-	6	7	-			-	-	-	-	-	-
ocean_cp	20	18	52	68	95	18	19	19	61	18	18	25	21	58	17	58	22	32	44	19	38	56	147	97	30	19	51	48
ocean_ncp	15	9	33	22	74	11	14	14	44	9	14	15	13	37	11	42	11	17	24	12	27	36	111	67	23	13	36	35
pca	28	22	20		21	27	27	23	157	23	26	26	24		26	144	20	21	89	27	88	25	282	102	66	6	189	126
pca_ll	23	17			15	24	12	33	118	9	30	21	8		23	114			74	17	64		355	269	57		195	120
radiosity			7		5				65							68			29		25	16	103	47	28	10	48	49
radiosity_ll		6				19	24	6	807	6						750	7	13	243	34	153	83	1k	654	291	80	664	440
s_raytrace					43				302							307			107		81	31	371	162	194	26	412	284
s_raytrace_ll									179							176							150	67	24		127	81
sqlite	-	-	-	-		-	-	-	-	-	-	-	-		-	375	-		185	-	160	86	-	-	-	-	-	-
ssl_proxy	65	66	112	48	165	47	42	78	1k	70	55	55	52	55	73	1k	81	71	349	96	287	199	1k	482	340	167	765	684
streamcluster	1k	968	2k	1k	1k	915	973	-	-	-	863	-	3k	6k	2k	3k	2k	1k	1k	1k	2k	3k	5k	3k	3k	2k	2k	2k
streamcluster_ll	233	178	448	267	370	211	268	-	-	-	198	-	479	2k	285	588	373	246	265	231	423	437	979	891	888	583	641	565
upscaledb						716	360		38							37				401	16	32	353	279	1k	15	125	75
vips	27		20		15	9		-	-	-		-		19	16	20	6	20	23		21	21	18	26		18	24	27
volrend	14	11	29	20	38	7	7	11	21	14	8	9	14	20	13	19	12	15	30	13	28	35	72	58	30	17	35	35
water_nsquared																												
water_spatial																												

Table XXIX: For each *(lock-sensitive application, lock)* pair, performance gain (in %) of *opt nodes* over *max nodes*. The background color of a cell indicates the number of nodes for *opt nodes*: 1 2 3 4. Dashes correspond to untested cases. (**I-48 machine in energy-saving mode**).

Applications	ahmcs	alock-ls	backoff	c-bo-mcs_spin	c-bo-mcs_stp	c-ptl-tkt	c-tkt-tkt	clh_spin	clh_stp	clh-ls	hmcs	hticket-ls	malth_spin	malth_stp	mcs_spin	mcs_stp	mcs-ls	mcs-timepub	mutexee	partitioned	pthread	pthreadadapt	spinlock	spinlock-ls	ticket	ticket-ls	ttas	ttas-ls
dedup	-	146	62	128	66	3k	3k	240	54	385	96	255	491	78	243	69	471	54	71	3k	84	99	82	64	3k	2k	64	77
ferret	407	355	8	382		390	359	339		350	402	319	365		349	288				322				6	130	333	247	7	5
kyotocabinet	8	11	37		136	12	12	16	26	12	7	7	24	17	10	6	10	15	18	19	13	16	208	21	13	31		
linear_regression					20	11				6		14			34		34	12	37	-	46	38	115	73	18		18	19
memcached-new	24			25	36	-	43	-	-	-		-		29	21	135		12	37	-	135	121	97	90	109	122	134	86
memcached-old	55	20	131	57	58	-	20	-	-	-	63	-	126	118	97	100	132	126	110	-			-	-	-	-	-	-
mysqld	-	-	-	-		-	-	-	-	-	-	-	-		-		-	110		-								
pca	10	20		10	74	11	16	15	21	14	7	12	15		10		13	13	13	29	14	18	236	178	41	36	46	45
pca_ll					29				104					19		278			6	8	7	47	180	284	28	7	77	67
radiosity					38				59							97				9	5	5	97	79	10	7	15	15
radiosity_ll					475	31			46							27	7	6	18	38	5		472	364	38	29	104	105
s_raytrace					191			9	380	5		6				335				27	5	12	226	190	35	26	71	86
s_raytrace_ll		6							207							207							113	106				
sqlite	-	-	-	-	368	-	-	-	-	-	-	-	-	11	-	33	-	4k	34	-	22	17	-	-	-	-	-	-
ssl_proxy	51	45	39	31	421	60	62	35	15	39	49	49	25	16	49	19	48	44	43	76	34	18	335	276	46	40	72	78
streamcluster	306	187	1k	641	1k	422	233	-	-	-	307	-	865	1k	896	1k	750	877	1k	228	1k	1k	1k	847	1k	1k	725	729
streamcluster_ll	39	14	185	120	327	116		-	-	-	49	-	108	149	165	172	134	118	152	6	253	192	168	165	170	162	127	158
upscaledb													8			8			6	118	6		75	72	7		7	8
vips	152	83		556	21	316	246	-	-	-	261	-	313		94		92								62			
volrend		10	89	5	23	8	6	9	9			8		12	14		6		5		11	6	18	15		7	9	9
water_nsquared																												
water_spatial																												

Table XXX: For each *(lock-sensitive application, lock)* pair, performance gain (in %) of *opt nodes* over *max nodes*. The background color of a cell indicates the number of nodes for *opt nodes*: 1 2. Dashes correspond to untested cases. (**I-20 machine in energy-saving mode**).



A.3. Are some locks always among the best?

Table XXXI: For each lock, fraction of the lock-sensitive applications for which the lock yields the best performance for three configurations: *one node*, *max nodes* and *opt nodes* (**A-64 machine**).

Locks	Number of nodes		
	one node	*max nodes*	*opt nodes*
ahmcs	54%	21%	50%
alock-ls	50%	0%	23%
backoff	62%	23%	31%
c-bo-mcs_spin	50%	12%	27%
c-bo-mcs_stp	46%	11%	18%
c-ptl-tkt	62%	17%	42%
c-tkt-tkt	73%	8%	38%
clh_spin	65%	5%	30%
clh_stp	60%	15%	20%
clh-ls	55%	5%	35%
hmcs	50%	15%	42%
hticket-ls	70%	15%	40%
malth_spin	58%	8%	27%
malth_stp	43%	25%	29%
mcs_spin	65%	19%	38%
mcs_stp	61%	18%	21%
mcs-ls	58%	4%	31%
mcs-timepub	57%	29%	36%
mutexee	57%	14%	21%
partitioned	71%	12%	42%
pthread	43%	21%	21%
pthreadadapt	39%	25%	21%
spinlock	73%	23%	23%
spinlock-ls	62%	15%	31%
ticket	69%	15%	35%
ticket-ls	65%	12%	31%
ttas	73%	12%	31%
ttas-ls	54%	0%	15%

Table XXXII: For each lock, fraction of the lock-sensitive applications for which the lock yields the best performance for three configurations: *one node*, *max nodes* and *opt nodes* (**A-48 machine**).

Locks	Number of nodes		
	one node	*max nodes*	*opt nodes*
ahmcs	60%	15%	40%
alock-ls	55%	10%	35%
backoff	71%	33%	33%
c-bo-mcs_spin	57%	24%	19%
c-bo-mcs_stp	52%	9%	9%
c-ptl-tkt	58%	16%	21%
c-tkt-tkt	62%	14%	29%
clh_spin	47%	13%	20%
clh_stp	33%	7%	7%
clh-ls	53%	0%	27%
hmcs	71%	29%	48%
hticket-ls	69%	31%	31%
malth_spin	67%	19%	10%
malth_stp	35%	4%	4%
mcs_spin	67%	14%	43%
mcs_stp	39%	9%	9%
mcs-ls	67%	5%	29%
mcs-timepub	52%	22%	35%
mutexee	61%	22%	30%
partitioned	58%	5%	21%
pthread	43%	17%	17%
pthreadadapt	57%	26%	17%
spinlock	67%	14%	24%
spinlock-ls	67%	10%	29%
ticket	71%	5%	14%
ticket-ls	71%	10%	29%
ttas	67%	10%	24%
ttas-ls	65%	0%	20%

Table XXXIII: For each lock, fraction of the lock-sensitive applications for which the lock yields the best performance for three configurations: *one node*, *max nodes* and *opt nodes* (**I-48 machine in performance mode**).

Locks	Number of nodes		
	one node	*max nodes*	*opt nodes*
ahmcs	47%	26%	37%
alock-ls	55%	15%	10%
backoff	60%	30%	20%
c-bo-mcs_spin	65%	35%	35%
c-bo-mcs_stp	55%	14%	18%
c-ptl-tkt	72%	44%	50%
c-tkt-tkt	70%	40%	50%
clh_spin	47%	7%	7%
clh_stp	20%	7%	7%
clh-ls	27%	0%	0%
hmcs	75%	45%	50%
hticket-ls	73%	33%	33%
malth_spin	55%	10%	15%
malth_stp	41%	18%	18%
mcs_spin	60%	10%	20%
mcs_stp	27%	5%	5%
mcs-ls	55%	15%	15%
mcs-timepub	45%	9%	5%
mutexee	41%	27%	27%
partitioned	56%	17%	11%
pthread	41%	23%	27%
pthreadadapt	41%	14%	23%
spinlock	40%	15%	20%
spinlock-ls	40%	15%	15%
ticket	45%	10%	15%
ticket-ls	55%	10%	15%
ttas	55%	20%	20%
ttas-ls	30%	5%	5%

Table XXXIV: For each lock, fraction of the lock-sensitive applications for which the lock yields the best performance for three configurations: *one node*, *max nodes* and *opt nodes* (**I-20 machine in performance mode**).

Locks	Number of nodes		
	one node	*max nodes*	*opt nodes*
ahmcs	60%	53%	53%
alock-ls	50%	38%	38%
backoff	56%	38%	44%
c-bo-mcs_spin	75%	62%	62%
c-bo-mcs_stp	47%	24%	24%
c-ptl-tkt	67%	60%	60%
c-tkt-tkt	75%	62%	62%
clh_spin	42%	25%	25%
clh_stp	42%	8%	8%
clh-ls	42%	25%	25%
hmcs	69%	62%	62%
hticket-ls	75%	75%	75%
malth_spin	56%	44%	44%
malth_stp	59%	47%	47%
mcs_spin	62%	50%	50%
mcs_stp	59%	24%	24%
mcs-ls	62%	50%	50%
mcs-timepub	53%	53%	53%
mutexee	59%	41%	47%
partitioned	60%	47%	47%
pthread	71%	35%	47%
pthreadadapt	59%	47%	47%
spinlock	75%	44%	50%
spinlock-ls	62%	44%	44%
ticket	56%	38%	38%
ticket-ls	62%	44%	44%
ttas	69%	50%	50%
ttas-ls	50%	31%	31%

Table XXXV: For each lock, fraction of the lock-sensitive applications for which the lock yields the best performance for three configurations: *one node*, *max nodes* and *opt nodes* (**A-64 machine with thread-to-node pinning**).

Locks	Number of nodes		
	one node	*max nodes*	*opt nodes*
ahmcs	50%	32%	41%
alock-ls	62%	21%	25%
backoff	75%	21%	42%
c-bo-mcs_spin	54%	17%	29%
c-bo-mcs_stp	54%	19%	19%
c-ptl-tkt	59%	32%	36%
c-tkt-tkt	54%	29%	38%
clh_spin	67%	28%	44%
clh_stp	56%	6%	11%
clh-ls	67%	11%	28%
hmcs	54%	50%	46%
hticket-ls	78%	39%	44%
malth_spin	54%	33%	38%
malth_stp	58%	38%	38%
mcs_spin	62%	38%	46%
mcs_stp	62%	19%	19%
mcs-ls	54%	29%	33%
mcs-timepub	54%	8%	27%
mutexee	65%	19%	31%
partitioned	73%	23%	36%
pthread	62%	19%	27%
pthreadadapt	65%	19%	27%
spinlock	62%	12%	12%
spinlock-ls	75%	17%	33%
ticket	75%	8%	25%
ticket-ls	79%	25%	38%
ttas	92%	17%	50%
ttas-ls	79%	4%	21%

Table XXXVI: For each lock, fraction of the lock-sensitive applications for which the lock yields the best performance for three configurations: *one node*, *max nodes* and *opt nodes* (**I-48 machine in energy-saving mode**).

Locks	Number of nodes		
	one node	*max nodes*	*opt nodes*
ahmcs	47%	26%	37%
alock-ls	55%	15%	10%
backoff	60%	30%	20%
c-bo-mcs_spin	65%	35%	35%
c-bo-mcs_stp	55%	14%	18%
c-ptl-tkt	72%	44%	50%
c-tkt-tkt	70%	40%	50%
clh_spin	47%	7%	7%
clh_stp	20%	7%	7%
clh-ls	27%	0%	0%
hmcs	75%	45%	50%
hticket-ls	73%	33%	33%
malth_spin	55%	10%	15%
malth_stp	41%	18%	18%
mcs_spin	60%	10%	20%
mcs_stp	27%	5%	5%
mcs-ls	55%	15%	15%
mcs-timepub	45%	9%	5%
mutexee	41%	27%	27%
partitioned	56%	17%	11%
pthread	41%	23%	27%
pthreadadapt	41%	14%	23%
spinlock	40%	15%	20%
spinlock-ls	40%	15%	15%
ticket	45%	10%	15%
ticket-ls	55%	10%	15%
ttas	55%	20%	20%
ttas-ls	30%	5%	5%

Table XXXVII: For each lock, fraction of the lock-sensitive applications for which the lock yields the best performance for three configurations: *one node*, *max nodes* and *opt nodes* (**I-20 machine in energy-saving mode**).

Locks	Number of nodes		
	one node	*max nodes*	*opt nodes*
ahmcs	60%	53%	53%
alock-ls	50%	38%	38%
backoff	56%	38%	44%
c-bo-mcs_spin	75%	62%	62%
c-bo-mcs_stp	47%	24%	24%
c-ptl-tkt	67%	60%	60%
c-tkt-tkt	75%	62%	62%
clh_spin	42%	25%	25%
clh_stp	42%	8%	8%
clh-ls	42%	25%	25%
hmcs	69%	62%	62%
hticket-ls	75%	75%	75%
malth_spin	56%	44%	44%
malth_stp	59%	47%	47%
mcs_spin	62%	50%	50%
mcs_stp	59%	24%	24%
mcs-ls	62%	50%	50%
mcs-timepub	53%	53%	53%
mutexee	59%	41%	47%
partitioned	60%	47%	47%
pthread	71%	35%	47%
pthreadadapt	59%	47%	47%
spinlock	75%	44%	50%
spinlock-ls	62%	44%	44%
ticket	56%	38%	38%
ticket-ls	62%	44%	44%
ttas	69%	50%	50%
ttas-ls	50%	31%	31%

A.4. Is there a clear hierarchy between locks?

A.4.1. At opt nodes

Table XXXVIII: For each pair of locks *(rowA, colB)* at *opt nodes*, scores of lock A vs lock B: percentage of lock-sensitive applications for which lock A performs at least 5% better than B (**A-64 machine**).

	ahmcs	alock-ls	backoff	c-bo-mcs_spin	c-bo-mcs_stp	c-ptl-tkt	c-tkt-tkt	clh_spin	clh_stp	clh-ls	hmcs	hticket-ls	malth_spin	malth_stp	mcs_spin	mcs_stp	mcs-ls	mcs-timepub	mutexee	partitioned	pthread	pthreadadapt	spinlock	spinlock-ls	ticket	ticket-ls	ttas	ttas-ls	average
ahmcs		38	46	42	54	23	33	16	63	21	21	26	29	54	42	54	42	46	58	27	50	58	50	50	42	42	38	42	41
alock-ls	12		42	27	38	4	12	5	60	20	8	10	27	27	12	50	19	27	54	4	42	50	46	42	35	27	31	38	29
backoff	33	35		35	58	25	23	30	70	40	35	30	35	38	27	58	35	23	54	25	46	50	38	35	27	19	23	50	37
c-bo-mcs_spin	29	46	23		42	17	23	30	70	40	35	20	23	35	19	46	27	19	62	21	54	46	35	42	35	35	35	58	36
c-bo-mcs_stp	17	35	15	12		12	15	25	65	35	23	15	12	14	19	43	19	21	36	17	32	32	38	23	23	19	23	38	25
c-ptl-tkt	18	42	46	46	54		17	30	75	40	29	25	25	50	29	67	33	42	54	21	54	50	50	46	42	29	38	62	41
c-tkt-tkt	17	42	42	35	50	12		25	80	35	27	20	38	54	27	65	46	38	58	12	54	54	50	54	42	31	42	65	41
clh_spin	26	40	40	45	45	20	35		55	40	20	30	30	30	20	55	30	35	50	20	50	55	55	60	45	30	45	50	39
clh_stp	32	35	5	15	10	15	20	15		35	25	25	15	10	15	10	20	5	25	10	10	10	20	20	10	15	15	25	17
clh-ls	21	15	40	35	45	20	25	0	55		20	25	30	30	15	55	10	25	55	15	50	55	55	60	40	35	40	50	34
hmcs	12	38	42	35	38	4	23	35	75	40		15	23	38	23	58	35	35	58	21	46	46	46	42	38	35	35	50	37
hticket-ls	16	40	55	40	55	0	10	35	75	30	15		20	45	15	65	25	35	55	20	60	55	55	50	45	30	45	60	39
malth_spin	12	38	19	27	50	12	15	25	65	35	23	15		31	15	46	27	31	50	12	46	46	38	38	31	19	19	46	31
malth_stp	21	38	23	35	39	21	15	30	65	35	31	20	8		15	39	23	25	54	12	54	46	38	35	31	23	23	46	31
mcs_spin	29	54	46	38	65	29	23	40	70	40	42	40	38	46		50	46	31	65	21	54	54	42	54	46	35	42	69	45
mcs_stp	25	35	12	27	29	25	15	30	35	30	31	25	15	14	8		27	14	39	17	29	29	12	12	12	15	12	31	22
mcs-ls	21	27	38	38	50	8	15	15	70	15	23	20	31	27	8	46		12	62	8	50	54	46	46	38	15	35	54	32
mcs-timepub	29	38	27	35	50	17	12	35	70	35	35	20	38	36	8	43	19		61	17	46	50	42	54	42	27	35	62	36
mutexee	17	31	8	19	21	12	12	20	60	30	27	20	8	4	19	36	15	14		12	29	21	31	27	19	12	15	27	21
partitioned	23	38	38	33	62	25	21	35	70	35	33	35	38	42	25	67	38	38	62		46	50	46	54	33	38	38	62	42
pthread	25	38	4	23	29	21	15	30	60	35	35	25	23	18	23	46	31	18	21	12		18	27	19	15	12	19	42	25
pthreadadapt	25	38	8	23	32	29	19	30	55	35	31	25	19	18	23	43	31	18	36	12	36		19	19	15	19	19	42	27
spinlock	25	38	15	38	38	33	23	30	55	35	38	30	38	38	23	42	35	19	50	21	38	38		27	12	27	19	31	32
spinlock-ls	25	35	15	31	31	12	19	20	50	25	35	10	23	23	27	54	23	23	42	17	38	31	35		19	12	8	23	26
ticket	25	31	12	31	38	25	23	30	60	30	35	30	31	31	27	54	31	23	50	12	35	50	23	31		15	8	27	30
ticket-ls	17	35	31	31	54	17	19	25	70	30	27	10	31	42	27	58	27	31	58	12	46	58	46	38	35		27	46	35
ttas	21	31	15	38	35	21	19	20	55	30	31	25	27	35	31	50	27	23	50	17	42	46	35	27	15	15		31	30
ttas-ls	17	23	15	23	23	4	12	5	35	20	12	5	15	23	19	38	15	15	42	4	35	46	27	15	12	8	0		19
average	22	36	27	32	42	17	19	25	63	32	28	22	26	32	21	50	28	25	50	16	43	44	39	38	30	24	27	46	22

Table XXXIX: For each pair of locks *(rowA, colB)* at *opt nodes*, scores of lock A vs lock B: percentage of lock-sensitive applications for which lock A performs at least 5% better than B (**A-48 machine**).

	ahmcs	alock-ls	backoff	c-bo-mcs_spin	c-bo-mcs_stp	c-ptl-tkt	c-tkt-tkt	clh_spin	clh_stp	clh-ls	hmcs	hticket-ls	malth_spin	malth_stp	mcs_spin	mcs_stp	mcs-ls	mcs-timepub	mutexee	partitioned	pthread	pthreadadapt	spinlock	spinlock-ls	ticket	ticket-ls	ttas	ttas-ls	average
ahmcs		20	25	35	60	28	25	33	73	20	5	20	30	70	30	60	20	45	60	28	65	65	50	50	55	20	40	45	40
alock-ls	20		25	30	65	28	30	20	73	20	10	33	30	65	15	60	10	35	65	22	70	70	50	50	50	20	35	35	38
backoff	35	35		52	71	32	33	40	87	40	29	31	48	71	33	67	29	33	52	26	62	62	48	38	52	33	38	50	45
c-bo-mcs_spin	30	30	14		57	11	14	33	87	40	19	19	33	67	38	71	19	48	57	26	71	62	52	43	52	33	38	60	42
c-bo-mcs_stp	25	25	10	10		5	10	33	80	27	10	6	14	43	24	61	10	22	13	11	30	13	29	5	14	10	14	25	21
c-ptl-tkt	28	17	26	32	63		16	33	87	33	11	19	37	68	37	74	26	53	53	32	68	63	58	58	53	32	47	72	44
c-tkt-tkt	20	25	14	29	57	5		27	87	27	14	12	38	76	24	71	24	52	57	16	71	67	57	52	52	24	33	50	40
clh_spin	27	13	33	13	67	13	33		73	27	13	27	33	73	13	67	7	40	53	33	73	73	60	53	53	40	40	60	41
clh_stp	27	13	7	7	0	7	7	13		27	7	7	7	7	7	27	7	0	0	7	0	0	7	0	7	7	7	7	8
clh-ls	20	0	27	20	67	20	27	13	73		13	33	40	73	27	67	13	47	53	27	73	60	60	60	53	27	53	53	41
hmcs	25	35	33	43	67	32	33	47	87	40		19	38	71	33	71	24	57	62	32	71	62	62	48	52	29	38	55	47
hticket-ls	20	27	19	25	62	6	12	33	87	27	12		38	69	38	75	12	50	56	19	69	69	62	56	56	25	50	73	43
malth_spin	20	35	10	19	71	11	14	33	87	40	14	12		62	24	67	19	29	57	11	67	67	43	38	38	24	24	50	36
malth_stp	25	25	5	29	22	16	14	27	60	27	14	19	10		19	48	19	13	13	11	13	9	14	0	14	10	5	20	18
mcs_spin	30	35	33	43	67	42	38	40	93	40	19	44	43	76		62	29	33	62	21	67	67	52	52	52	33	43	50	47
mcs_stp	25	30	5	24	22	26	19	27	33	27	19	19	14	13	14		19	4	13	16	9	13	5	5	19	19	10	15	17
mcs-ls	25	25	24	38	67	21	29	33	87	33	14	25	48	71	24	67		48	62	21	67	67	57	43	52	24	29	50	43
mcs-timepub	30	30	19	43	70	32	33	33	93	33	19	31	43	61	10	61	29		57	21	61	57	52	43	48	33	29	50	41
mutexee	35	35	14	24	48	26	24	40	87	40	24	25	29	65	29	70	29	22		26	39	17	33	19	29	24	24	35	34
partitioned	33	22	11	26	68	16	21	20	87	27	21	25	37	68	21	74	16	32	58		68	63	58	47	47	32	42	61	41
pthread	25	25	10	24	48	16	14	27	93	27	24	25	19	74	19	70	19	17	9	16		4	19	10	19	10	24	30	26
pthreadadapt	25	25	5	24	57	16	14	27	93	27	24	25	19	74	24	74	19	22	30	11	43		29	10	24	14	19	30	30
spinlock	30	40	14	43	57	37	33	33	87	33	29	31	29	71	19	71	29	14	48	26	57	43		14	33	24	14	25	37
spinlock-ls	35	40	10	29	57	21	19	27	87	27	19	12	29	76	29	76	19	24	43	16	48	29	33		29	19	5	20	32
ticket	20	15	5	24	52	11	14	13	87	13	10	12	19	67	14	67	10	19	38	5	57	33	29	5		5	10	10	25
ticket-ls	20	25	10	24	62	16	19	33	87	33	19	12	29	71	29	67	24	38	57	11	67	57	52	43	48		38	45	38
ttas	30	30	5	24	67	26	24	27	87	33	19	19	33	71	29	67	19	24	48	21	52	52	38	14	38	14		25	35
ttas-ls	20	30	5	20	55	11	10	13	73	27	5	7	10	65	10	60	5	15	45	6	55	40	30	15	35	5	10		25
average	26	26	15	28	56	20	22	29	82	30	16	21	29	65	23	66	19	31	45	19	55	48	42	32	40	22	28	41	26

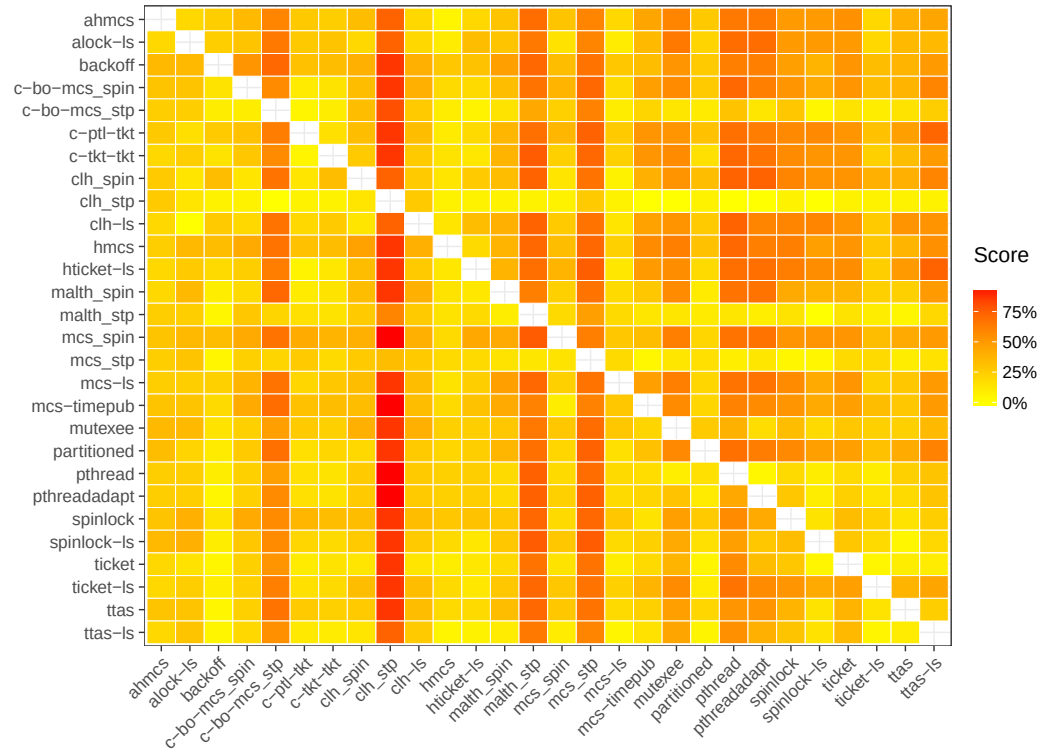


Fig. 8: For each pair of locks *(rowA, colB)* at *opt nodes*, scores of lock A vs lock B: percentage of lock-sensitive applications for which lock A performs at least 5% better than B (**A-48 machine**).

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Table XL: For each pair of locks *(rowA, colB)* at *opt nodes*, scores of lock A vs lock B: percentage of lock-sensitive applications for which lock A performs at least 5% better than B (**I-48 machine in performance mode**).

	ahmcs	alock-ls	backoff	c-bo-mcs_spin	c-bo-mcs_stp	c-ptl-tkt	c-tkt-tkt	clh_spin	clh_stp	clh-ls	hmcs	hticket-ls	malth_spin	malth_stp	mcs_spin	mcs_stp	mcs-ls	mcs-timepub	mutexee	partitioned	pthread	pthreadadapt	spinlock	spinlock-ls	ticket	ticket-ls	ttas	ttas-ls	average
ahmcs		42	53	37	58	18	26	50	79	57	11	36	58	53	53	74	58	53	58	47	58	63	68	63	63	53	58	53	52
alock-ls	32		30	15	50	6	10	60	93	60	10	20	50	50	15	75	25	50	60	50	70	60	65	70	70	50	50	65	47
backoff	32	40		30	60	22	15	47	87	60	35	27	65	55	40	75	45	45	65	39	60	60	50	55	75	65	45	65	50
c-bo-mcs_spin	37	50	55		60	17	15	73	93	73	25	33	60	70	45	80	50	65	70	56	70	70	70	75	75	70	70	85	60
c-bo-mcs_stp	26	30	25	10		6	10	47	87	47	15	7	35	36	25	68	25	41	36	17	41	36	55	50	45	35	40	60	35
c-ptl-tkt	29	72	56	33	72		11	87	93	93	11	40	78	78	61	83	67	78	67	61	67	67	72	72	72	67	72	83	65
c-tkt-tkt	42	55	50	35	75	17		87	93	93	15	40	80	85	60	85	65	80	75	67	75	75	75	75	75	70	65	90	67
clh_spin	21	0	27	13	47	7	0		73	7	0	7	47	40	0	67	13	20	60	33	67	67	60	60	67	53	53	60	36
clh_stp	21	7	13	7	0	7	7	7		7	7	7	7	0	7	27	7	7	0	7	0	0	7	7	7	7	7	7	7
clh-ls	14	0	27	7	47	0	0	7	73		0	7	40	40	0	67	7	13	53	47	60	60	60	60	60	40	40	53	33
hmcs	37	65	55	40	60	22	25	80	93	87		40	65	65	50	70	60	65	70	72	70	70	70	70	70	65	60	85	62
hticket-ls	29	67	40	20	67	7	0	67	93	73	13		47	60	33	73	33	47	67	60	73	67	67	73	73	67	67	87	54
malth_spin	32	25	20	5	45	0	0	47	93	53	15	13		40	10	60	10	20	45	11	50	45	55	55	60	35	50	60	35
malth_stp	32	30	20	15	41	11	10	33	93	40	25	7	10		10	59	15	23	27	17	32	27	55	50	50	25	25	40	30
mcs_spin	32	25	30	20	45	0	0	67	93	60	10	20	50	55		60	30	60	70	44	65	70	55	50	70	65	50	70	47
mcs_stp	21	25	20	15	14	11	10	27	40	27	15	7	25	14	10		20	23	14	11	9	18	15	10	25	20	5	25	18
mcs-ls	26	15	25	15	45	0	0	67	93	67	10	20	40	45	5	60		45	55	39	55	60	55	55	65	55	50	60	42
mcs-timepub	37	30	30	15	41	11	10	33	93	47	15	13	45	45	10	55	20		59	28	55	59	55	50	75	50	35	55	40
mutexee	26	30	15	20	41	17	15	27	93	33	25	20	35	27	20	68	25	23		17	32	27	50	35	55	30	15	35	32
partitioned	24	17	22	17	56	6	0	27	93	33	17	20	50	61	22	89	28	28	56		67	67	67	72	72	50	61	72	44
pthread	26	25	20	20	36	17	10	27	87	33	25	20	35	27	25	73	35	23	9	17		18	45	30	40	20	10	30	29
pthreadadapt	26	30	10	20	41	17	10	33	87	40	25	20	25	18	20	68	25	18	9	17	27		45	40	35	20	15	30	29
spinlock	26	30	10	20	25	17	10	27	73	27	25	20	35	30	25	50	35	20	25	17	20	30		5	30	20	0	20	25
spinlock-ls	26	30	15	20	30	17	10	27	73	27	25	20	35	25	25	65	40	25	25	11	35	35	35		30	20	5	20	28
ticket	16	20	10	10	35	6	0	20	87	20	15	20	15	15	10	65	20	10	20	6	20	20	45	35		0	5	20	21
ticket-ls	26	25	10	15	55	11	5	20	93	27	20	20	25	45	20	65	25	15	30	11	40	35	55	55	55		20	45	32
ttas	26	30	20	20	50	17	15	27	93	27	30	20	35	40	25	85	40	30	35	17	35	50	60	55	50	25		35	37
ttas-ls	26	25	20	10	30	11	10	27	87	33	15	7	25	25	15	60	30	10	35	11	40	40	50	40	45	20	5		28
average	28	31	27	19	45	11	9	42	86	46	17	20	41	42	24	68	32	35	44	31	48	48	54	51	56	41	36	52	28

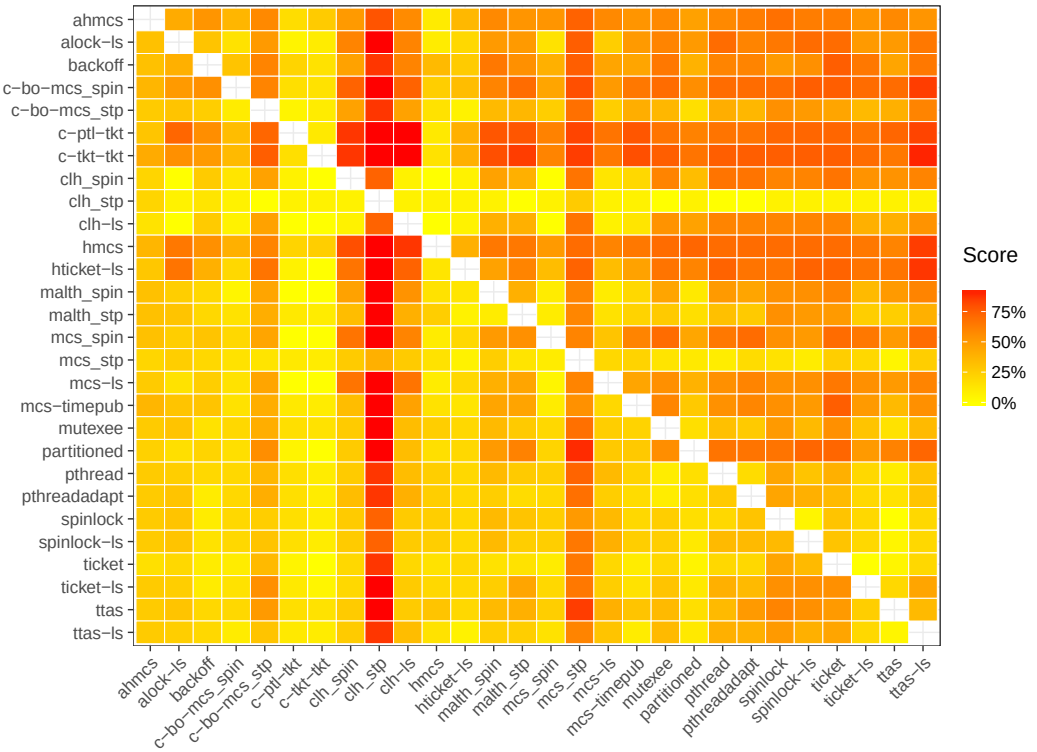


Fig. 9: For each pair of locks *(rowA, colB)* at *opt nodes*, scores of lock A vs lock B: percentage of lock-sensitive applications for which lock A performs at least 5% better than B (**I-48 machine in performance mode**).

Table XLI: For each pair of locks *(rowA, colB)* at *opt nodes*, scores of lock A vs lock B: percentage of lock-sensitive applications for which lock A performs at least 5% better than B (**I-20 machine in performance mode**).

	ahmcs	alock-ls	backoff	c-bo-mcs_spin	c-bo-mcs_stp	c-ptl-tkt	c-tkt-tkt	clh_spin	clh_stp	clh-ls	hmcs	hticket-ls	malth_spin	malth_stp	mcs_spin	mcs_stp	mcs-ls	mcs-timepub	mutexee	partitioned	pthread	pthreadadapt	spinlock	spinlock-ls	ticket	ticket-ls	ttas	ttas-ls	average
ahmcs		20	33	7	67	0	7	27	64	27	7	0	33	47	33	67	33	27	53	29	47	47	40	27	40	33	33	33	33
alock-ls	40		25	19	62	20	19	42	92	42	25	8	31	38	12	62	12	12	50	33	44	44	38	31	19	19	19	25	33
backoff	33	44		19	56	20	12	50	92	50	19	17	25	25	25	56	25	12	31	27	31	31	31	25	38	31	19	38	33
c-bo-mcs_spin	27	50	38		62	20	6	58	92	58	19	8	25	38	25	56	25	25	50	27	44	38	31	25	31	31	25	56	37
c-bo-mcs_stp	33	38	12	12		13	12	42	33	42	19	8	19	6	19	12	19	12	12	13	18	12	12	12	25	25	6	38	19
c-ptl-tkt	29	53	40	13	60		13	67	92	67	13	8	53	47	47	67	33	33	47	27	40	40	47	40	47	33	33	60	43
c-tkt-tkt	33	44	38	19	69	13		58	92	58	12	8	38	44	25	62	38	31	50	27	44	38	38	31	44	31	19	56	39
clh_spin	18	0	25	8	58	8	8		58	8	8	8	25	17	0	58	0	0	42	25	42	33	33	25	8	8	8	8	20
clh_stp	27	8	8	8	0	8	8	8		8	8	8	8	0	8	0	8	8	0	8	0	0	8	8	8	8	8	8	7
clh-ls	27	0	25	8	58	8	8	0	58		8	8	17	17	0	58	0	0	42	17	42	33	33	25	8	8	8	17	20
hmcs	27	44	38	12	62	7	6	58	92	58		0	31	38	19	56	25	25	50	20	44	44	38	31	38	25	31	56	36
hticket-ls	27	58	33	8	67	0	0	58	92	58	8		33	33	25	58	25	33	42	25	42	33	33	33	33	25	25	67	36
malth_spin	27	31	12	6	50	7	0	42	92	42	12	0		25	0	50	0	6	44	20	38	38	31	19	31	31	12	44	26
malth_stp	33	31	19	12	59	13	12	42	92	42	19	8	19		12	53	19	12	47	27	35	41	38	25	31	25	12	38	30
mcs_spin	33	31	38	12	56	13	6	42	92	42	19	8	31	31		50	12	12	50	27	44	38	38	19	31	25	6	44	31
mcs_stp	33	38	19	19	18	13	12	42	42	42	19	8	25	6	12		25	6	12	13	12	12	19	6	25	25	6	31	20
mcs-ls	33	31	31	19	56	13	6	42	92	50	19	8	31	31	0	56		6	44	33	38	44	38	25	38	31	19	50	33
mcs-timepub	33	38	44	19	59	13	19	42	92	50	19	8	25	24	19	59	25		53	27	47	47	44	25	31	31	19	50	36
mutexee	33	38	6	19	47	20	19	42	83	42	19	17	19	6	19	47	19	12		13	18	0	6	6	19	12	6	31	23
partitioned	43	27	27	20	60	20	13	33	92	33	20	17	27	20	13	53	20	13	40		40	33	33	20	13	13	7	40	29
pthread	33	38	12	25	53	27	25	42	75	42	25	17	25	12	25	53	25	18	18	27		12	19	19	38	25	12	38	29
pthreadadapt	33	38	12	19	47	20	19	42	75	42	19	17	19	6	19	47	19	12	24	20	18		12	12	25	25	12	31	25
spinlock	33	31	6	19	50	20	12	42	75	42	19	17	19	12	19	44	19	6	31	13	31	12		0	19	19	0	25	24
spinlock-ls	33	31	25	25	56	20	19	42	92	42	19	17	31	31	31	62	31	12	44	20	44	38	25		25	25	6	25	32
ticket	33	25	12	12	50	20	6	33	92	33	19	17	12	12	6	50	6	6	38	13	38	31	31	12		6	0	31	24
ticket-ls	33	31	19	12	56	20	6	33	92	33	19	17	19	25	6	56	6	12	44	27	38	38	25	19	12		6	50	28
ttas	33	38	31	19	56	20	12	42	92	42	19	17	25	25	25	56	25	12	44	20	44	38	25	12	25	25		38	32
ttas-ls	33	19	19	19	56	13	12	33	92	33	12	8	25	12	19	50	25	6	38	13	38	38	25	12	25	25	6		26
average	32	32	24	15	54	15	11	41	82	42	16	10	26	23	17	52	19	14	38	22	35	31	29	20	27	23	14	38	32

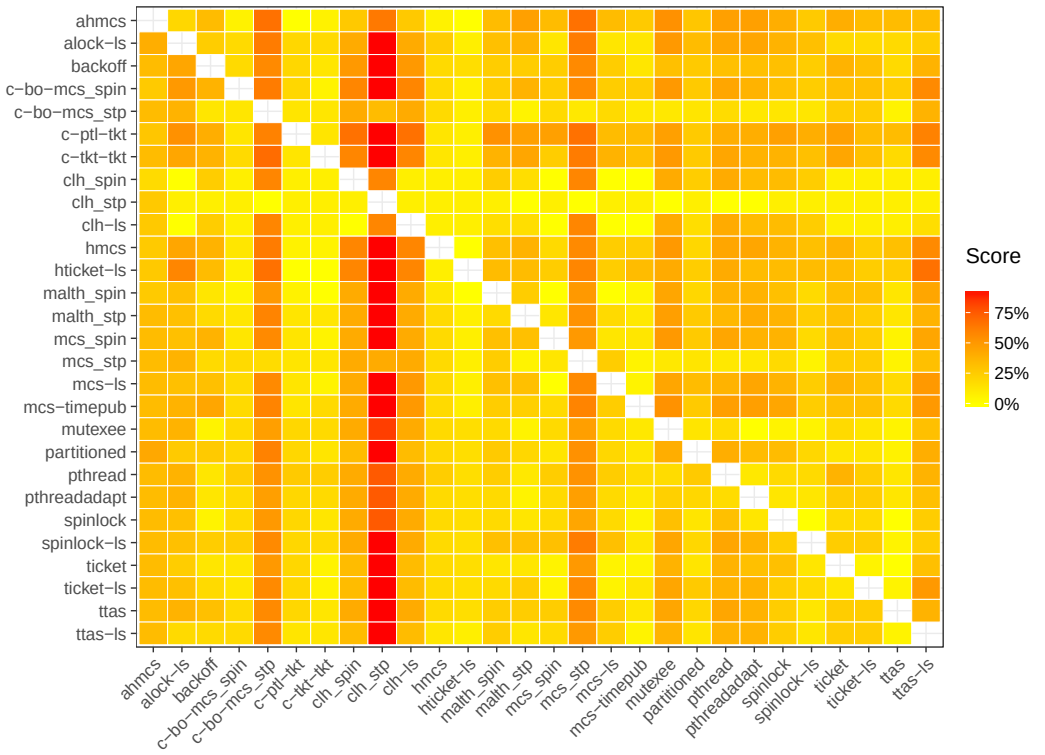


Fig. 10: For each pair of locks *(rowA, colB)* at *opt nodes*, scores of lock A vs lock B: percentage of lock-sensitive applications for which lock A performs at least 5% better than B (**I-20 machine in performance mode**).

Table XLII: For each pair of locks *(rowA, colB)* at *opt nodes*, scores of lock A vs lock B: percentage of lock-sensitive applications for which lock A performs at least 5% better than B (**A-64 machine with thread-to-node pinning**).

	ahmcs	alock-ls	backoff	c-bo-mcs_spin	c-bo-mcs_stp	c-ptl-tkt	c-tkt-tkt	clh_spin	clh_stp	clh-ls	hmcs	hticket-ls	malth_spin	malth_stp	mcs_spin	mcs_stp	mcs-ls	mcs-timepub	mutexee	partitioned	pthread	pthreadadapt	spinlock	spinlock-ls	ticket	ticket-ls	ttas	ttas-ls	average
ahmcs		27	41	41	77	25	45	18	76	29	14	35	41	59	23	68	41	41	59	25	64	59	68	45	36	27	36	45	43
alock-ls	23		38	33	67	23	29	17	89	22	21	11	38	50	12	67	17	33	54	9	62	58	67	46	29	17	33	42	37
backoff	32	38		38	58	27	29	33	78	33	38	22	38	38	33	58	33	33	58	32	62	54	71	42	46	29	21	42	41
c-bo-mcs_spin	18	38	25		62	14	17	33	83	50	17	11	29	29	21	54	25	21	54	32	67	54	67	42	33	25	29	46	37
c-bo-mcs_stp	18	25	0	12		9	8	22	39	22	17	6	17	8	12	23	17	12	23	23	23	27	33	12	17	12	8	25	17
c-ptl-tkt	25	32	41	36	73		14	17	89	28	14	22	36	55	27	73	27	36	59	32	68	59	73	50	45	27	36	59	43
c-tkt-tkt	18	29	38	42	79	18		17	89	28	25	17	38	54	17	71	25	29	54	32	71	58	67	54	46	25	33	62	42
clh_spin	29	22	39	17	72	28	28		72	33	6	17	22	39	0	67	22	33	56	22	61	56	67	56	39	33	33	44	38
clh_stp	18	6	0	6	6	6	6	6		6	6	6	6	0	6	11	6	0	17	6	17	17	33	6	6	6	6	0	8
clh-ls	18	0	28	17	56	11	17	6	72		0	11	22	33	0	61	6	17	56	11	56	56	67	50	33	22	33	44	30
hmcs	27	42	42	42	67	32	29	33	94	44		33	33	46	17	62	33	38	54	32	58	54	67	46	42	29	38	58	44
hticket-ls	18	28	44	17	78	11	22	17	89	33	6		17	39	0	67	11	17	61	22	67	61	72	61	39	28	39	61	38
malth_spin	23	29	29	21	67	14	21	28	83	39	17	17		25	8	54	12	12	50	18	50	46	54	46	33	17	25	54	33
malth_stp	27	42	25	25	58	23	25	39	61	44	29	28	25		25	35	25	31	50	32	46	42	50	38	38	25	25	38	35
mcs_spin	27	42	33	33	71	32	38	22	89	44	25	22	33	50		58	42	38	50	23	58	58	62	42	42	25	33	54	42
mcs_stp	18	29	4	17	31	9	17	22	28	28	21	11	21	8	12		21	19	15	14	23	19	42	17	12	8	4	12	18
mcs-ls	23	29	29	25	71	14	21	22	89	28	21	17	29	33	4	50		12	50	27	58	46	54	46	42	21	29	50	35
mcs-timepub	27	25	21	29	65	9	21	22	83	28	25	17	38	38	21	46	21		50	27	54	50	67	46	42	25	25	46	36
mutexee	23	25	8	21	38	14	17	22	61	22	25	11	25	15	21	42	25	23		14	23	31	50	25	17	12	12	25	24
partitioned	25	32	41	23	64	18	23	17	89	28	18	11	27	41	14	68	27	36	64		64	59	68	45	36	32	27	68	39
pthread	18	25	8	17	38	14	17	22	56	22	29	11	25	15	21	35	25	19	12	18		8	38	21	17	12	12	25	21
pthreadadapt	18	25	8	17	38	14	17	22	61	22	29	11	21	12	17	38	21	23	31	18	35		46	17	21	17	12	25	24
spinlock	18	25	4	17	38	14	12	22	39	22	29	11	17	8	17	25	17	12	17	14	25	4		4	12	12	4	17	17
spinlock-ls	32	38	8	29	50	23	25	22	50	22	29	11	29	21	29	50	29	25	38	18	38	33	50		33	21	4	29	29
ticket	18	25	8	29	54	14	21	22	78	28	25	11	21	33	21	58	21	25	50	14	54	46	67	29		0	8	38	30
ticket-ls	27	38	17	38	71	32	38	33	89	33	42	22	38	46	29	71	38	33	62	23	67	58	71	42	42		25	54	44
ttas	32	42	8	42	67	27	29	28	72	28	29	17	29	42	29	67	33	33	50	18	58	54	67	25	29	21		33	37
ttas-ls	23	25	12	25	50	9	21	22	56	28	17	6	25	17	21	46	25	17	42	9	50	42	58	21	21	17	4		26
average	23	29	22	26	58	18	22	22	72	29	21	16	27	32	17	53	24	25	46	21	51	45	59	36	31	20	22	41	23

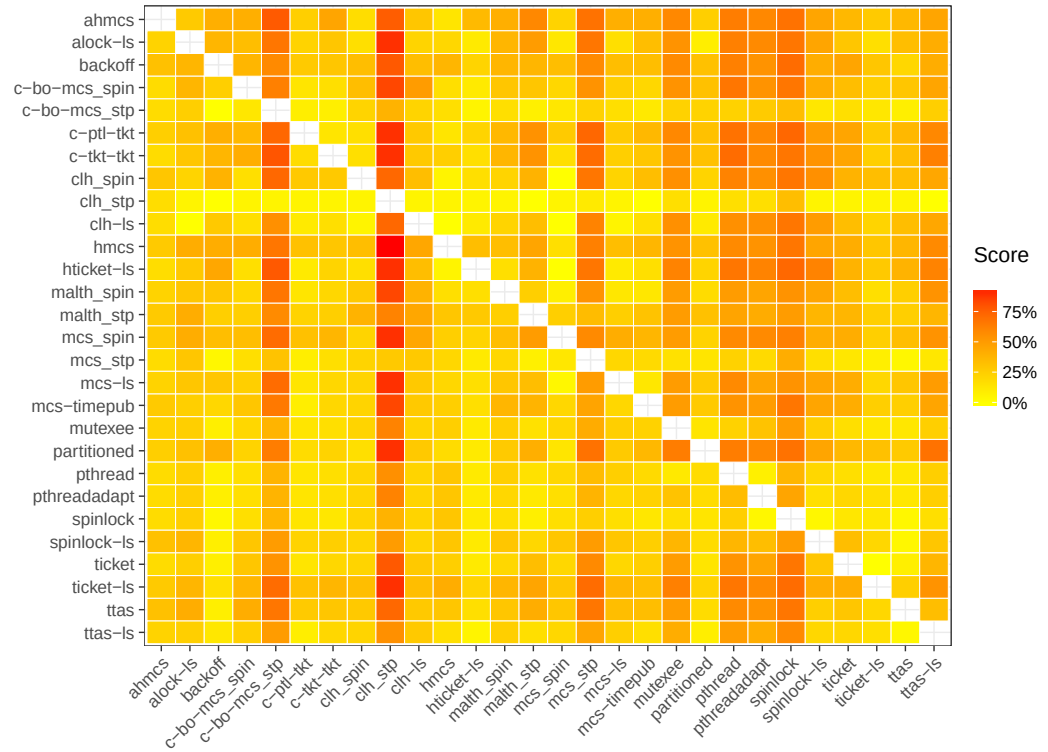


Fig. 11: For each pair of locks *(rowA, colB)* at *opt nodes*, scores of lock A vs lock B: percentage of lock-sensitive applications for which lock A performs at least 5% better than B (**A-64-node machine**).

Table XLIII: For each pair of locks *(rowA, colB)* at *opt nodes*, scores of lock A vs lock B: percentage of lock-sensitive applications for which lock A performs at least 5% better than B (**I-48 machine in energy-saving mode**).

	ahmcs	alock-ls	backoff	c-bo-mcs_spin	c-bo-mcs_stp	c-ptl-tkt	c-tkt-tkt	clh_spin	clh_stp	clh-ls	hmcs	hticket-ls	malth_spin	malth_stp	mcs_spin	mcs_stp	mcs-ls	mcs-timepub	mutexee	partitioned	pthread	pthreadadapt	spinlock	spinlock-ls	ticket	ticket-ls	ttas	ttas-ls	average
ahmcs		42	53	37	58	18	26	50	79	57	11	36	58	53	53	74	58	53	58	47	58	63	68	63	63	53	58	53	52
alock-ls	32		30	15	50	6	10	60	93	60	10	20	50	50	15	75	25	50	60	50	70	60	65	70	70	50	50	65	47
backoff	32	40		30	60	22	15	47	87	60	35	27	65	55	40	75	45	45	65	39	60	60	50	55	75	65	45	65	50
c-bo-mcs_spin	37	50	55		60	17	15	73	93	73	25	33	60	70	45	80	50	65	70	56	70	70	70	75	75	70	70	85	60
c-bo-mcs_stp	26	30	25	10		6	10	47	87	47	15	7	35	36	25	68	25	41	36	17	41	36	55	50	45	35	40	60	35
c-ptl-tkt	29	72	56	33	72		11	87	93	93	11	40	78	78	61	83	67	78	67	61	67	67	72	72	72	67	72	83	65
c-tkt-tkt	42	55	50	35	75	17		87	93	93	15	40	80	85	60	85	65	80	75	67	75	75	75	75	75	70	65	90	67
clh_spin	21	0	27	13	47	7	0		73	7	0	7	47	40	0	67	13	20	60	33	67	67	60	60	67	53	53	60	36
clh_stp	21	7	13	7	0	7	7	7		7	7	7	7	0	7	27	7	7	0	7	0	0	7	7	7	7	7	7	7
clh-ls	14	0	27	7	47	0	0	7	73		0	7	40	40	0	67	7	13	53	47	60	60	60	60	60	40	40	53	33
hmcs	37	65	55	40	60	22	25	80	93	87		40	65	65	50	70	60	65	70	72	70	70	70	70	70	65	60	85	62
hticket-ls	29	67	40	20	67	7	0	67	93	73	13		47	60	33	73	33	47	67	60	73	67	67	73	73	67	67	87	54
malth_spin	32	25	20	5	45	0	0	47	93	53	15	13		40	10	60	10	20	45	11	50	45	55	55	60	35	50	60	35
malth_stp	32	30	20	15	41	11	10	33	93	40	25	7	10		10	59	15	23	27	17	32	27	55	50	50	25	25	40	30
mcs_spin	32	25	30	20	45	0	0	67	93	60	10	20	50	55		60	30	60	70	44	65	70	55	50	70	65	50	70	47
mcs_stp	21	25	20	15	14	11	10	27	40	27	15	7	25	14	10		20	23	14	11	9	18	15	10	25	20	5	25	18
mcs-ls	26	15	25	15	45	0	0	67	93	67	10	20	40	45	5	60		45	55	39	55	60	55	55	65	55	50	60	42
mcs-timepub	37	30	30	15	41	11	10	33	93	47	15	13	45	45	10	55	20		59	28	55	59	55	50	75	50	35	55	40
mutexee	26	30	15	20	41	17	15	27	93	33	25	20	35	27	20	68	25	23		17	32	27	50	35	55	30	15	35	32
partitioned	24	17	22	17	56	6	0	27	93	33	17	20	50	61	22	89	28	28	56		67	67	67	72	72	50	61	72	44
pthread	26	25	20	20	36	17	10	27	87	33	25	20	35	27	25	73	35	23	9	17		18	45	30	40	20	10	30	29
pthreadadapt	26	30	10	20	41	17	10	33	87	40	25	20	25	18	20	68	25	18	9	17	27		45	40	35	20	15	30	29
spinlock	26	30	10	20	25	17	10	27	73	27	25	20	35	30	25	50	35	20	25	17	20	30		5	30	20	0	20	25
spinlock-ls	26	30	15	20	30	17	10	27	73	27	25	20	35	25	25	65	40	25	25	11	35	35	35		30	20	5	20	28
ticket	16	20	10	10	35	6	0	20	87	20	15	20	15	15	10	65	20	10	20	6	20	20	45	35		0	5	20	21
ticket-ls	26	25	10	15	55	11	5	20	93	27	20	20	25	45	20	65	25	15	30	11	40	35	55	55	55		20	45	32
ttas	26	30	20	20	50	17	15	27	93	27	30	20	35	40	25	85	40	30	35	17	35	50	60	55	50	25		35	37
ttas-ls	26	25	20	10	30	11	10	27	87	33	15	7	25	25	15	60	30	10	35	11	40	40	50	40	45	20	5		28
average	28	31	27	19	45	11	9	42	86	46	17	20	41	42	24	68	32	35	44	31	48	48	54	51	56	41	36	52	28

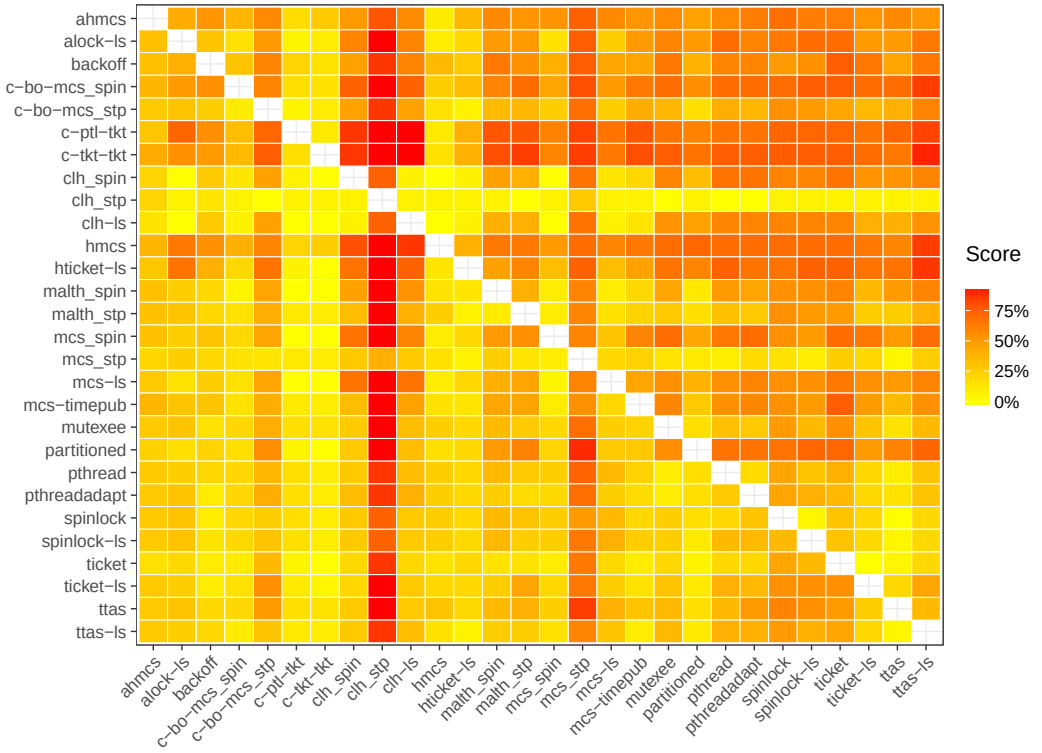


Fig. 12: For each pair of locks *(rowA, colB)* at *opt nodes*, scores of lock A vs lock B: percentage of lock-sensitive applications for which lock A performs at least 5% better than B (**I-48 machine in energy-saving move**).

Table XLIV: For each pair of locks *(rowA, colB)* at *opt nodes*, scores of lock A vs lock B: percentage of lock-sensitive applications for which lock A performs at least 5% better than B (**I-20 machine in energy-saving mode**).

	ahmcs	alock-ls	backoff	c-bo-mcs_spin	c-bo-mcs_stp	c-ptl-tkt	c-tkt-tkt	clh_spin	clh_stp	clh-ls	hmcs	hticket-ls	malth_spin	malth_stp	mcs_spin	mcs_stp	mcs-ls	mcs-timepub	mutexee	partitioned	pthread	pthreadadapt	spinlock	spinlock-ls	ticket	ticket-ls	ttas	ttas-ls	average
ahmcs		20	33	7	67	0	7	27	64	27	7	0	33	47	33	67	33	27	53	29	47	47	40	27	40	33	33	33	33
alock-ls	40		25	19	62	20	19	42	92	42	25	8	31	38	12	62	12	12	50	33	44	44	38	31	19	19	19	25	33
backoff	33	44		19	56	20	12	50	92	50	19	17	25	25	25	56	25	12	31	27	31	31	31	25	38	31	19	38	33
c-bo-mcs_spin	27	50	38		62	20	6	58	92	58	19	8	25	38	25	56	25	25	50	27	44	38	31	25	31	31	25	56	37
c-bo-mcs_stp	33	38	12	12		13	12	42	33	42	19	8	19	6	19	12	19	12	12	13	18	12	12	12	25	25	6	38	19
c-ptl-tkt	29	53	40	13	60		13	67	92	67	13	8	53	47	47	67	33	33	47	27	40	40	47	40	47	33	33	60	43
c-tkt-tkt	33	44	38	19	69	13		58	92	58	12	8	38	44	25	62	38	31	50	27	44	38	38	31	44	31	19	56	39
clh_spin	18	0	25	8	58	8	8		58	8	8	8	25	17	0	58	0	0	42	25	42	33	33	25	8	8	8	8	20
clh_stp	27	8	8	8	0	8	8	8		8	8	8	8	0	8	0	8	8	0	8	0	0	8	8	8	8	8	8	7
clh-ls	27	0	25	8	58	8	8	0	58		8	8	17	17	0	58	0	0	42	17	42	33	33	25	8	8	8	17	20
hmcs	27	44	38	12	62	7	6	58	92	58		0	31	38	19	56	25	25	50	20	44	44	38	31	38	25	31	56	36
hticket-ls	27	58	33	8	67	0	0	58	92	58	8		33	33	25	58	25	33	42	25	42	33	33	33	33	25	25	67	36
malth_spin	27	31	12	6	50	7	0	42	92	42	12	0		25	0	50	0	6	44	20	38	38	31	19	31	31	12	44	26
malth_stp	33	31	19	12	59	13	12	42	92	42	19	8	19		12	53	19	12	47	27	35	41	38	25	31	25	12	38	30
mcs_spin	33	31	38	12	56	13	6	42	92	42	19	8	31	31		50	12	12	50	27	44	38	38	19	31	25	6	44	31
mcs_stp	33	38	19	19	18	13	12	42	42	42	19	8	25	6	12		25	6	12	13	12	12	19	6	25	25	6	31	20
mcs-ls	33	31	31	19	56	13	6	42	92	50	19	8	31	31	0	56		6	44	33	38	44	38	25	38	31	19	50	33
mcs-timepub	33	38	44	19	59	13	19	42	92	50	19	8	25	24	19	59	25		53	27	47	47	44	25	31	31	19	50	36
mutexee	33	38	6	19	47	20	19	42	83	42	19	17	19	6	19	47	19	12		13	18	0	6	6	19	12	6	31	23
partitioned	43	27	27	20	60	20	13	33	92	33	20	17	27	20	13	53	20	13	40		40	33	33	20	13	13	7	40	29
pthread	33	38	12	25	53	27	25	42	75	42	25	17	25	12	25	53	25	18	18	27		12	19	19	38	25	12	38	29
pthreadadapt	33	38	12	19	47	20	19	42	75	42	19	17	19	6	19	47	19	12	24	20	18		12	12	25	25	12	31	25
spinlock	33	31	6	19	50	20	12	42	75	42	19	17	19	12	19	44	19	6	31	13	31	12		0	19	19	0	25	24
spinlock-ls	33	31	25	25	56	20	19	42	92	42	19	17	31	31	31	62	31	12	44	20	44	38	25		25	25	6	25	32
ticket	33	25	12	12	50	20	6	33	92	33	19	17	12	12	6	50	6	6	38	13	38	31	31	12		6	0	31	24
ticket-ls	33	31	19	12	56	20	6	33	92	33	19	17	19	25	6	56	6	12	44	27	38	38	25	19	12		6	50	28
ttas	33	38	31	19	56	20	12	42	92	42	19	17	25	25	25	56	25	12	44	20	44	38	25	12	25	25		38	32
ttas-ls	33	19	19	19	56	13	12	33	92	33	12	8	25	12	19	50	25	6	38	13	38	38	25	12	25	25	6		26
average	32	32	24	15	54	15	11	41	82	42	16	10	26	23	17	52	19	14	38	22	35	31	29	20	27	23	14	38	32

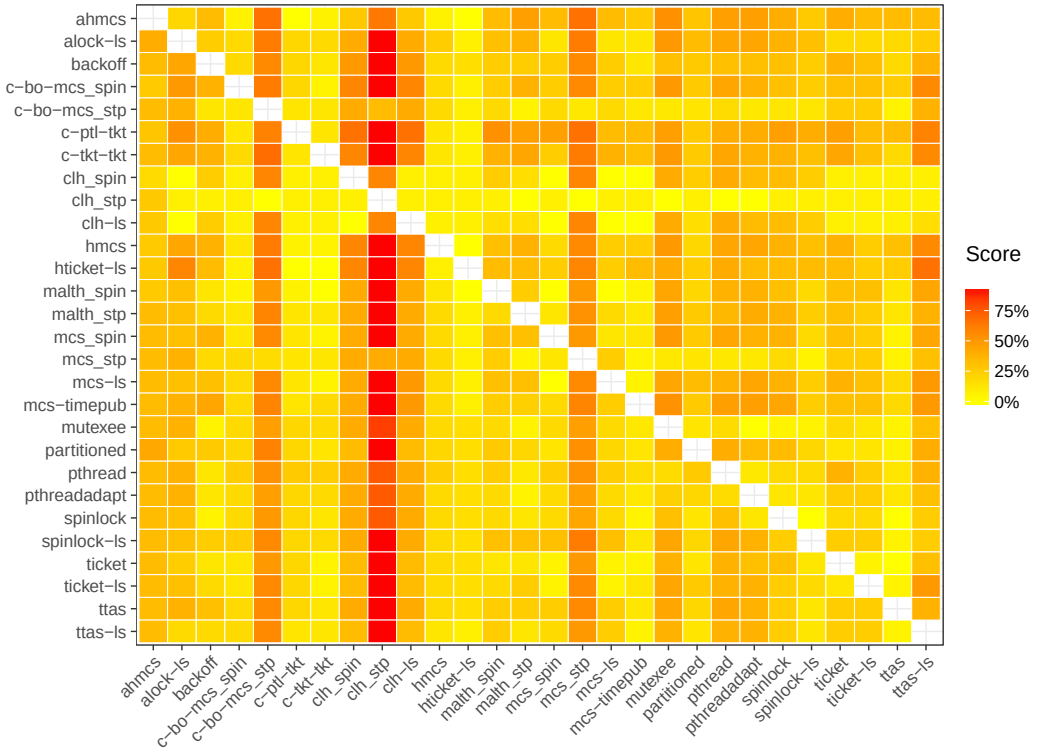


Fig. 13: For each pair of locks *(rowA, colB)* at *opt nodes*, scores of lock A vs lock B: percentage of lock-sensitive applications for which lock A performs at least 5% better than B (**I-20 machine in energy-saving move**).

A.5. At *max nodes*

Table XLV: For each pair of locks *(rowA, colB)* at *max nodes*, scores of lock A vs lock B: percentage of lock-sensitive applications for which lock A performs at least 5% better than B (**A-64 machine**).

	ahmcs	alock-ls	backoff	c-bo-mcs_spin	c-bo-mcs_stp	c-ptl-tkt	c-tkt-tkt	clh_spin	clh_stp	clh-ls	hmcs	hticket-ls	malth_spin	malth_stp	mcs_spin	mcs_stp	mcs-ls	mcs-timepub	mutexee	partitioned	pthread	pthreadadapt	spinlock	spinlock-ls	ticket	ticket-ls	ttas	ttas-ls	average
ahmcs		46	50	33	67	32	29	42	58	42	21	42	50	42	58	67	58	33	46	45	54	46	71	71	67	54	58	67	50
alock-ls	42		38	27	62	8	8	25	55	25	23	0	31	35	31	62	38	19	54	38	54	46	58	58	54	38	50	62	38
backoff	46	54		35	81	33	31	55	70	60	42	40	42	38	46	73	65	27	54	50	46	46	69	58	69	54	50	85	53
c-bo-mcs_spin	42	69	42		69	42	35	70	70	70	42	40	35	42	54	65	58	23	50	46	54	54	65	69	58	62	62	85	54
c-bo-mcs_stp	29	38	12	15		17	19	30	40	35	23	15	19	14	19	39	19	11	11	17	14	14	54	35	27	15	31	46	24
c-ptl-tkt	45	71	42	50	71		29	65	75	65	46	25	38	42	50	75	50	42	54	62	50	42	62	67	67	50	54	83	54
c-tkt-tkt	46	69	50	46	77	21		50	80	55	38	25	46	54	54	77	69	38	62	50	58	50	69	69	69	54	62	85	56
clh_spin	16	40	30	10	55	15	20		50	40	15	15	10	25	15	60	35	25	50	40	45	35	60	70	50	40	55	60	36
clh_stp	37	35	10	15	40	20	20	20		35	20	20	15	5	20	10	20	0	10	15	5	5	60	40	15	20	20	25	21
clh-ls	32	35	30	15	65	15	15	30	60		30	15	10	30	35	60	35	25	50	50	50	45	60	65	55	40	50	65	40
hmcs	38	54	46	35	62	25	31	60	75	55		25	38	35	50	65	42	31	58	50	54	42	65	65	69	46	58	77	50
hticket-ls	47	60	50	25	65	25	40	70	75	55	45		30	30	50	65	55	35	50	60	50	45	65	60	65	45	60	85	52
malth_spin	38	58	27	31	58	29	31	75	80	70	42	35		31	42	65	46	23	50	54	46	42	62	58	65	42	46	77	49
malth_stp	42	54	38	27	68	38	31	70	80	60	46	40	23		38	54	42	21	50	54	57	43	58	69	54	58	54	85	50
mcs_spin	25	50	35	27	65	25	23	30	70	45	38	35	38	42		62	65	27	50	33	46	42	62	62	58	50	58	77	46
mcs_stp	29	38	15	19	43	25	19	40	30	35	27	25	19	14	19		27	7	11	21	14	14	54	31	23	23	19	38	25
mcs-ls	29	46	27	27	65	12	15	45	75	30	31	15	27	38	15	58		8	46	21	42	38	62	50	50	31	46	65	38
mcs-timepub	62	69	46	58	79	46	38	70	85	65	58	55	62	50	50	71	58		68	54	64	61	73	73	73	69	65	92	64
mutexee	42	42	27	46	61	25	27	40	80	50	38	30	35	32	46	75	46	18		33	36	32	69	58	54	31	69	85	45
partitioned	41	50	17	25	79	29	21	40	75	35	46	30	29	25	33	71	46	17	54		46	46	62	67	46	46	50	75	44
pthread	38	46	23	35	64	33	23	45	70	50	42	35	42	25	42	64	50	18	21	33		25	73	62	42	31	62	77	43
pthreadadapt	46	46	19	35	68	38	31	55	75	50	50	35	42	29	50	71	54	18	39	29	39		73	62	54	38	62	88	48
spinlock	25	38	4	31	38	33	19	35	30	40	35	30	31	27	27	31	35	15	15	25	8	8		15	15	23	12	31	25
spinlock-ls	29	42	8	19	46	21	19	30	55	35	35	15	35	19	27	54	38	15	15	25	8	15	73		31	19	31	46	30
ticket	25	35	4	19	62	25	15	30	70	35	31	25	23	27	23	69	42	12	27	17	23	8	65	46		12	42	65	32
ticket-ls	38	58	12	27	77	33	27	55	75	55	50	30	42	31	46	73	50	19	50	38	42	38	69	58	65		62	73	48
ttas	33	46	15	31	54	29	23	40	75	45	38	30	31	27	38	73	38	15	15	33	12	12	65	38	35	15		54	36
ttas-ls	29	31	4	8	42	12	8	10	45	30	12	5	19	15	19	50	27	4	12	17	12	12	65	27	27	12	35		22
average	37	49	27	28	62	26	24	45	66	47	36	27	32	31	37	61	45	20	40	37	38	34	65	56	50	38	49	69	37

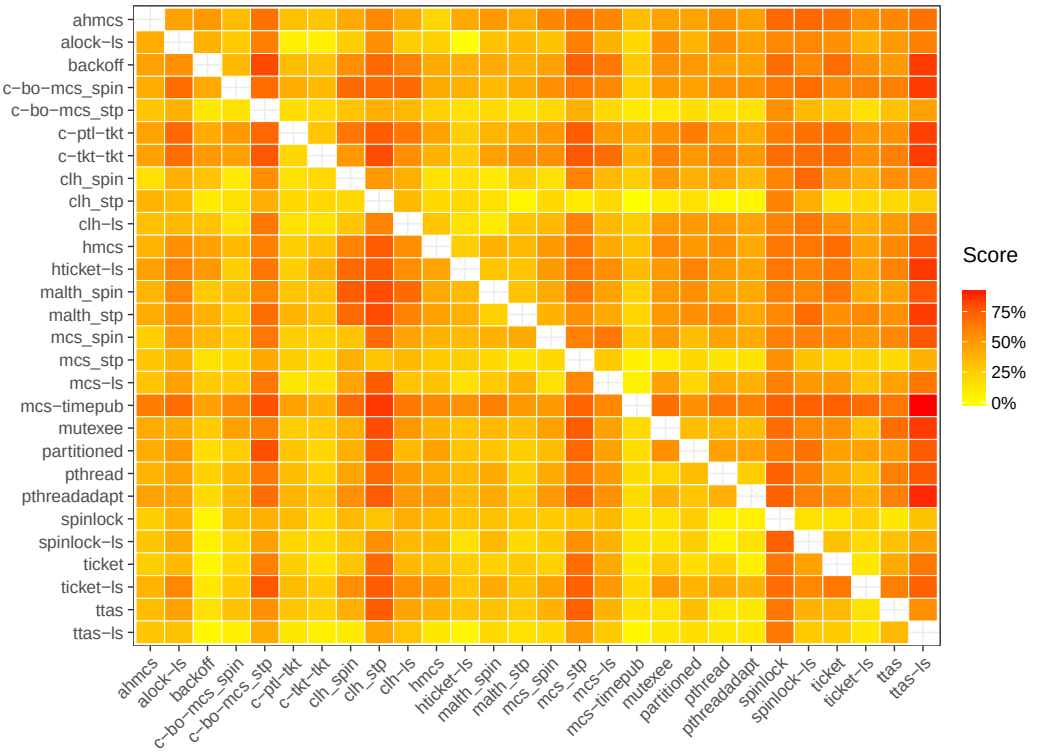


Fig. 14: For each pair of locks *(rowA, colB)* at *max nodes*, scores of lock A vs lock B: percentage of lock-sensitive applications for which lock A performs at least 5% better than B (**A-64 machine**).

Table XLVI: For each pair of locks *(rowA, colB)* at *max nodes*, scores of lock A vs lock B: percentage of lock-sensitive applications for which lock A performs at least 5% better than B (**A-48 machine**).

	ahmcs	alock-ls	backoff	c-bo-mcs_spin	c-bo-mcs_stp	c-ptl-tkt	c-tkt-tkt	clh_spin	clh_stp	clh-ls	hmcs	hticket-ls	malth_spin	malth_stp	mcs_spin	mcs_stp	mcs-ls	mcs-timepub	mutexee	partitioned	pthread	pthreadadapt	spinlock	spinlock-ls	ticket	ticket-ls	ttas	ttas-ls	average
ahmcs		40	35	30	75	28	40	40	73	33	10	33	45	75	60	75	50	45	75	33	75	70	75	75	75	55	75	75	54
alock-ls	25		30	30	75	28	30	27	73	20	10	20	45	75	35	75	35	50	75	33	75	60	75	75	70	55	70	70	50
backoff	55	60		48	81	42	48	53	87	67	43	38	67	81	67	81	62	43	62	58	71	71	81	71	86	71	67	80	64
c-bo-mcs_spin	45	45	19		71	32	38	60	87	47	29	25	57	71	52	81	43	52	67	47	71	67	76	71	76	62	67	80	57
c-bo-mcs_stp	25	25	5	10		11	10	27	53	27	14	6	14	17	24	57	14	22	0	16	4	4	57	19	24	5	5	25	19
c-ptl-tkt	39	44	32	42	74		37	67	87	60	16	25	53	74	47	79	47	53	68	58	68	63	74	68	74	58	68	83	58
c-tkt-tkt	25	40	24	38	76	11		47	87	40	14	12	52	81	48	81	33	48	71	42	71	62	76	71	76	52	71	85	53
clh_spin	27	27	27	13	73	20	27		73	27	20	20	27	73	27	73	20	33	67	47	73	60	73	73	67	47	73	73	47
clh_stp	27	13	7	7	33	7	7	13		27	7	7	7	27	7	33	7	7	0	7	7	0	53	20	7	7	13	13	14
clh-ls	27	13	20	20	73	27	27	13	73		13	20	33	73	20	73	13	33	73	33	73	60	73	73	67	47	67	73	45
hmcs	30	50	38	38	71	37	33	60	87	53		19	48	71	62	81	43	57	71	53	71	67	76	71	76	57	71	85	58
hticket-ls	40	53	19	19	69	31	25	53	87	40	25		31	69	44	81	31	50	69	56	69	62	75	69	75	56	69	87	54
malth_spin	35	35	10	14	71	11	19	53	87	53	19	12		71	43	81	33	38	52	37	57	62	76	62	67	52	62	75	48
malth_stp	25	25	5	24	65	11	10	27	60	27	14	19	10		19	65	19	22	17	16	22	9	48	29	29	14	19	35	25
mcs_spin	35	45	24	33	76	37	38	33	93	40	29	38	43	76		71	29	19	62	47	67	62	71	76	67	52	67	75	52
mcs_stp	25	25	10	19	39	21	14	27	27	27	19	19	14	17	14		19	9	4	21	9	4	33	29	19	19	19	25	20
mcs-ls	25	25	14	24	67	21	19	27	87	33	19	12	43	71	38	81		38	62	32	62	57	76	62	67	43	57	75	46
mcs-timepub	40	50	24	38	78	32	43	53	93	53	38	38	48	70	48	65	52		52	53	65	65	76	76	81	76	62	75	57
mutexee	25	25	19	19	83	16	14	33	80	27	14	12	38	61	33	78	29	30		21	43	30	86	71	52	33	57	60	40
partitioned	28	39	11	26	74	11	16	27	87	33	21	25	32	68	32	74	16	21	63		68	63	74	68	63	53	74	78	46
pthread	25	25	10	24	78	16	14	27	87	27	24	25	33	65	24	83	29	22	9	21		13	86	57	52	14	48	60	37
pthreadadapt	30	35	5	29	74	21	19	27	93	33	29	25	29	78	24	87	24	26	43	21	52		86	62	62	29	71	75	44
spinlock	25	25	10	24	38	26	19	27	40	27	24	25	24	38	19	48	24	10	10	26	10	10		10	24	19	10	20	23
spinlock-ls	25	25	5	14	67	16	14	27	73	27	19	12	29	52	24	62	24	10	5	16	14	14	81		33	14	10	30	27
ticket	25	15	0	10	62	11	10	27	87	13	10	6	14	57	10	76	5	10	24	16	33	24	76	48		5	38	55	28
ticket-ls	25	30	0	14	81	16	19	27	87	40	24	12	33	76	38	81	24	19	48	21	57	48	81	62	81		62	75	44
ttas	25	20	5	14	76	16	14	27	80	27	14	12	29	48	29	76	24	24	10	16	33	14	81	43	33	19		50	32
ttas-ls	25	20	10	15	70	11	10	13	67	27	10	7	20	45	20	65	20	10	15	11	30	20	75	40	25	20	30		27
average	30	32	15	24	69	21	23	35	78	35	20	19	34	62	34	73	28	30	43	32	50	42	73	58	57	38	52	63	30

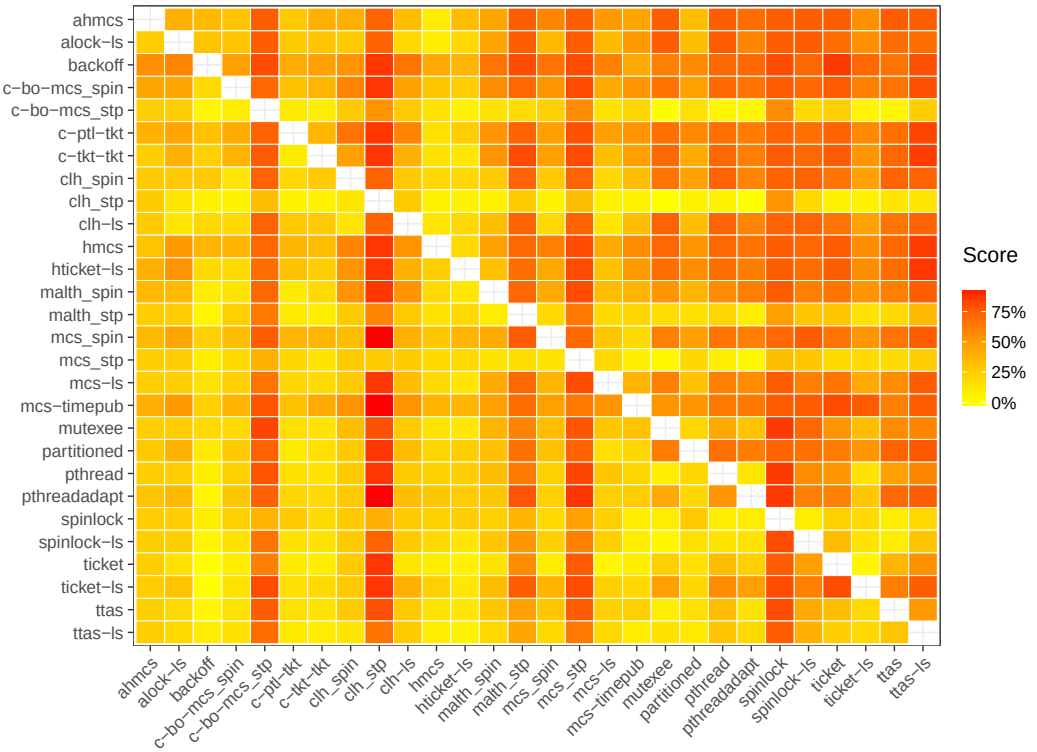


Fig. 15: For each pair of locks *(rowA, colB)* at *max nodes*, scores of lock A vs lock B: percentage of lock-sensitive applications for which lock A performs at least 5% better than B (**A-48 machine**).

Table XLVII: For each pair of locks *(rowA, colB)* at *max nodes*, scores of lock A vs lock B: percentage of lock-sensitive applications for which lock A performs at least 5% better than B (**I-48 machine in performance mode**).

	ahmcs	alock-ls	backoff	c-bo-mcs_spin	c-bo-mcs_stp	c-ptl-tkt	c-tkt-tkt	clh_spin	clh_stp	clh-ls	hmcs	hticket-ls	malth_spin	malth_stp	mcs_spin	mcs_stp	mcs-ls	mcs-timepub	mutexee	partitioned	pthread	pthreadadapt	spinlock	spinlock-ls	ticket	ticket-ls	ttas	ttas-ls	average
ahmcs		42	58	42	74	47	26	57	79	64	11	36	58	58	53	74	58	58	63	47	63	63	79	74	68	58	74	68	57
alock-ls	47		35	40	75	33	25	60	87	53	30	27	55	55	30	70	25	55	60	67	75	65	75	75	75	70	70	75	56
backoff	37	45		35	70	28	25	53	87	60	30	40	55	50	35	70	45	50	55	61	65	65	60	55	80	65	55	70	54
c-bo-mcs_spin	42	50	50		70	28	30	73	93	73	25	47	70	70	55	80	55	50	70	56	70	70	75	75	75	75	70	85	62
c-bo-mcs_stp	21	25	25	15		17	15	27	87	27	20	13	20	14	20	59	20	23	9	17	9	23	60	55	35	25	15	30	27
c-ptl-tkt	24	56	50	39	78		11	80	87	87	6	33	61	67	56	78	56	61	67	50	67	67	72	72	67	67	67	78	59
c-tkt-tkt	53	55	45	45	80	33		73	87	87	35	33	75	70	50	80	50	60	75	61	75	75	75	75	70	70	70	80	64
clh_spin	29	0	27	13	73	20	13		73	13	7	13	40	47	0	67	7	27	60	60	67	67	73	73	73	53	67	73	42
clh_stp	21	13	13	7	7	13	13	13		13	7	7	7	0	7	20	7	7	0	13	0	0	33	7	13	13	7	7	10
clh-ls	21	0	27	7	73	7	0	0	73		7	7	40	47	0	67	7	27	60	53	60	60	73	73	60	47	67	67	38
hmcs	37	70	65	45	70	44	30	87	93	93		47	70	65	70	75	70	65	70	61	75	70	75	75	75	75	70	85	68
hticket-ls	29	73	40	13	73	20	13	67	93	73	7		60	60	40	73	47	33	67	67	67	67	73	73	73	73	67	87	57
malth_spin	26	30	20	10	70	11	10	40	93	47	5	7		50	10	60	15	15	60	44	60	60	70	60	75	55	55	65	42
malth_stp	32	30	20	15	64	22	20	40	87	47	25	27	20		20	59	25	32	36	33	45	45	65	65	65	55	50	60	41
mcs_spin	37	25	35	25	70	22	15	67	93	53	15	33	50	60		65	20	35	70	61	75	75	70	60	70	70	55	70	52
mcs_stp	21	25	20	15	18	17	15	27	47	27	15	13	20	18	15		20	23	14	17	18	18	30	10	30	25	10	25	20
mcs-ls	37	25	35	20	70	17	15	73	93	53	15	20	55	50	15	70		30	65	61	70	70	70	55	65	65	50	60	49
mcs-timepub	37	35	30	20	68	22	20	47	93	53	20	33	50	45	30	64	25		59	56	64	64	70	60	85	65	55	65	49
mutexee	26	25	15	20	68	22	15	27	93	33	25	27	30	23	20	73	30	27		22	32	41	70	65	65	45	45	55	38
partitioned	41	17	22	28	78	33	11	20	87	33	33	20	33	50	22	83	22	22	44		61	50	72	72	78	61	72	78	46
pthread	26	25	15	20	73	22	15	27	87	33	20	27	25	23	20	68	25	23	5	17		23	65	60	55	30	40	55	34
pthreadadapt	26	25	10	20	68	22	15	27	87	33	25	27	25	18	20	68	25	23	23	22	32		65	60	50	35	40	50	35
spinlock	21	25	15	20	20	17	15	27	67	27	20	20	25	20	20	45	25	15	10	17	10	20		0	30	25	0	15	21
spinlock-ls	21	25	20	20	35	17	15	27	87	27	20	20	35	25	35	80	25	15	15	17	20	20	65		30	25	5	20	28
ticket	26	20	5	15	55	11	15	13	87	27	20	13	15	15	10	60	20	5	15	6	25	30	60	60		0	20	35	25
ticket-ls	26	25	10	20	70	22	20	27	87	33	20	20	25	30	20	60	25	15	25	22	30	35	60	60	70		50	65	36
ttas	26	25	15	20	75	17	20	27	93	33	30	20	35	35	30	85	45	30	30	17	40	50	75	75	35	30		40	39
ttas-ls	26	20	15	10	65	22	20	27	87	33	15	13	30	20	20	70	40	10	30	17	30	35	70	65	30	25	5		31
average	30	31	27	22	63	22	17	42	85	46	19	24	40	40	27	67	31	31	43	39	48	49	67	60	59	48	46	58	30

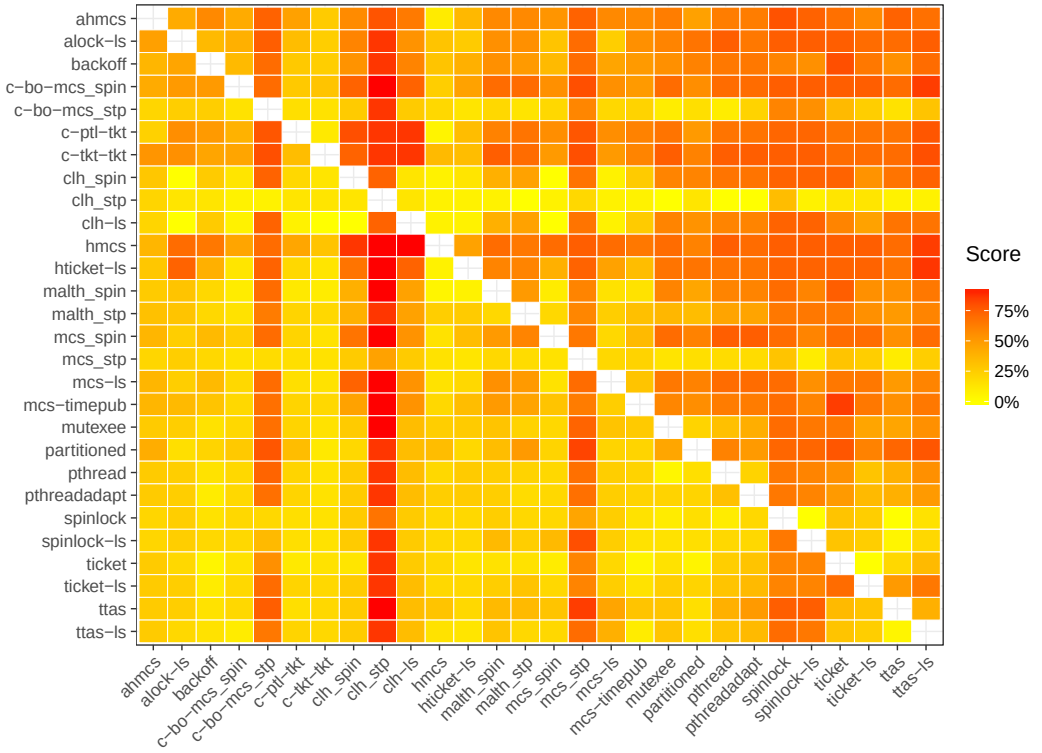


Fig. 16: For each pair of locks *(rowA, colB)* at *max nodes*, scores of lock A vs lock B: percentage of lock-sensitive applications for which lock A performs at least 5% better than B (**I-48 machine in performance mode**).

Table XLVIII: For each pair of locks *(rowA, colB)* at *max nodes*, scores of lock A vs lock B: percentage of lock-sensitive applications for which lock A performs at least 5% better than B (**I-20 machine in performance mode**).

	ahmcs	alock-ls	backoff	c-bo-mcs_spin	c-bo-mcs_stp	c-ptl-tkt	c-tkt-tkt	clh_spin	clh_stp	clh-ls	hmcs	hticket-ls	malth_spin	malth_stp	mcs_spin	mcs_stp	mcs-ls	mcs-timepub	mutexee	partitioned	pthread	pthreadadapt	spinlock	spinlock-ls	ticket	ticket-ls	ttas	ttas-ls	average
ahmcs		20	33	0	73	0	0	27	73	27	7	0	33	47	33	73	33	33	53	21	53	47	47	27	40	33	33	33	33
alock-ls	40		25	19	69	20	19	33	83	33	19	8	31	38	12	69	12	12	50	33	50	50	44	38	25	19	25	31	34
backoff	33	38		19	62	20	19	50	92	50	19	17	25	31	19	62	19	12	38	40	50	50	50	31	50	38	25	44	37
c-bo-mcs_spin	33	50	44		69	27	6	58	92	58	19	8	38	50	31	69	38	31	50	33	56	50	44	38	38	31	38	62	43
c-bo-mcs_stp	27	31	19	19		20	19	33	50	33	19	17	31	12	31	35	31	29	12	20	12	12	19	12	31	31	6	31	24
c-ptl-tkt	29	47	40	7	60		7	67	92	67	13	8	53	47	40	67	33	33	53	33	53	47	47	40	47	40	40	60	43
c-tkt-tkt	40	44	38	19	69	20		58	92	58	19	8	44	50	31	69	38	31	50	33	56	50	44	38	44	38	31	62	43
clh_spin	27	8	25	8	67	8	8		67	17	0	8	25	8	0	67	0	0	42	25	42	33	42	25	17	8	17	17	23
clh_stp	27	17	8	8	25	8	8	17		17	8	8	8	0	8	0	8	8	0	8	0	0	8	8	8	8	8	8	9
clh-ls	18	8	25	8	67	8	8	0	67		0	8	25	17	0	67	0	0	42	17	42	33	42	25	8	8	8	17	21
hmcs	40	38	38	12	69	13	6	50	92	58		0	31	50	25	69	25	31	50	27	56	50	44	38	38	31	38	56	40
hticket-ls	27	58	33	8	67	0	0	58	92	58	8		33	42	17	67	25	25	50	33	50	42	42	33	33	42	33	67	39
malth_spin	27	31	12	6	56	7	0	42	92	42	12	0		31	0	56	0	6	50	27	50	50	44	25	38	31	19	38	29
malth_stp	33	31	12	19	59	20	19	33	92	33	19	17	25		19	59	19	18	47	33	47	53	50	31	38	31	12	38	34
mcs_spin	33	31	38	19	56	13	6	42	92	50	12	8	38	38		56	19	12	50	33	56	50	44	25	38	25	19	44	35
mcs_stp	27	31	19	19	24	20	19	33	42	33	19	17	31	12	19		31	18	12	20	12	12	19	6	31	31	6	25	22
mcs-ls	33	31	31	19	56	13	6	42	92	50	12	8	31	31	0	56		6	56	33	56	50	44	25	38	31	19	44	34
mcs-timepub	33	38	44	19	53	20	19	42	92	50	19	17	31	24	19	53	31		47	40	53	47	50	31	44	38	19	50	38
mutexee	33	31	12	19	65	20	19	42	92	42	19	17	19	12	19	65	19	18		20	18	24	38	25	31	19	25	31	29
partitioned	50	20	27	27	67	27	27	33	92	25	13	17	27	20	20	67	20	13	40		47	47	47	40	20	20	20	40	34
pthread	33	31	12	19	65	20	19	42	92	42	19	17	19	6	19	65	19	18	18	20		24	38	31	25	19	12	25	28
pthreadadapt	27	31	12	19	65	20	19	33	92	33	19	17	19	6	19	65	19	18	29	20	29		31	19	19	19	12	25	27
spinlock	27	31	6	19	56	20	19	33	92	33	19	17	19	12	19	62	19	6	31	20	38	25		0	19	19	0	19	25
spinlock-ls	27	31	25	19	62	20	19	33	92	33	19	17	31	31	31	75	31	19	38	20	38	31	44		31	31	0	19	32
ticket	33	25	12	12	56	20	12	25	92	25	12	17	12	6	6	56	6	0	44	20	44	50	44	25		12	0	25	26
ticket-ls	33	31	19	12	56	13	6	42	92	42	19	8	19	25	6	56	12	0	50	33	50	50	31	25	25		19	50	31
ttas	33	31	31	19	62	20	19	33	92	33	19	17	38	31	31	75	31	19	44	27	44	50	44	25	38	31		31	36
ttas-ls	33	19	19	12	56	13	12	33	92	33	19	8	31	19	25	69	25	12	38	13	44	44	44	19	31	25	6		29
average	32	31	24	15	60	16	13	38	85	40	15	11	28	26	19	61	21	16	40	26	42	40	40	26	31	26	18	37	32

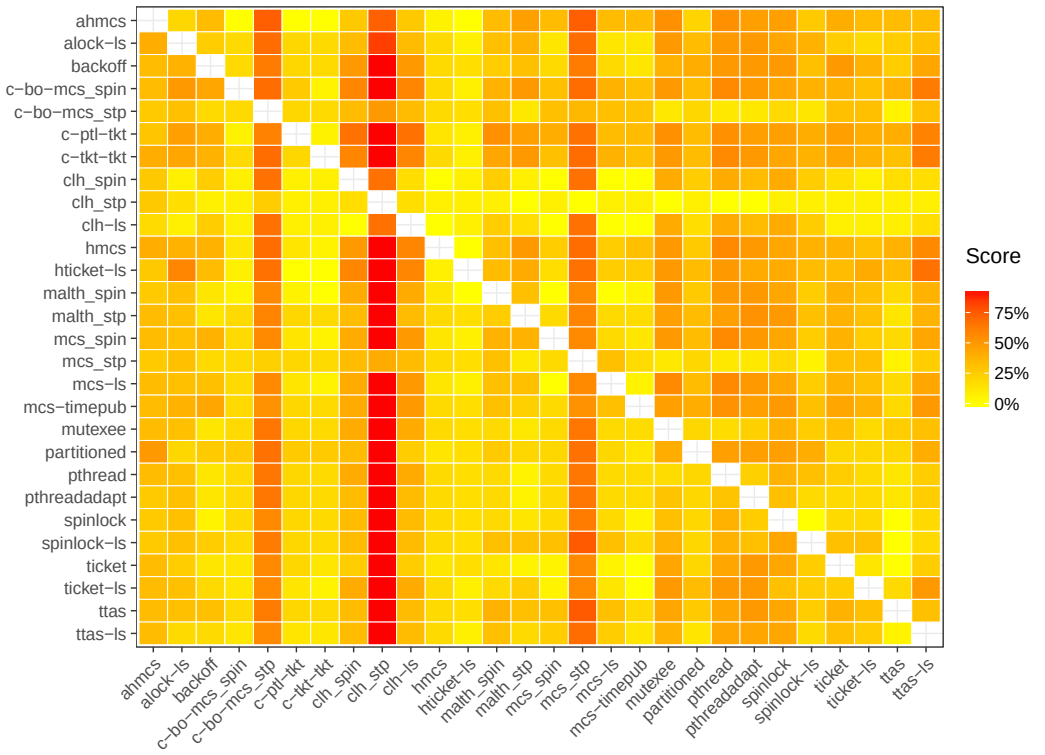


Fig. 17: For each pair of locks *(rowA, colB)* at *max nodes*, scores of lock A vs lock B: percentage of lock-sensitive applications for which lock A performs at least 5% better than B (**I-20 machine in performance mode**).

Table XLIX: For each pair of locks *(rowA, colB)* at *max nodes*, scores of lock A vs lock B: percentage of lock-sensitive applications for which lock A performs at least 5% better than B (**A-64 machine with thread-to-node pinning**).

	ahmcs	alock-ls	backoff	c-bo-mcs_spin	c-bo-mcs_stp	c-ptl-tkt	c-tkt-tkt	clh_spin	clh_stp	clh-ls	hmcs	hticket-ls	malth_spin	malth_stp	mcs_spin	mcs_stp	mcs-ls	mcs-timepub	mutexee	partitioned	pthread	pthreadadapt	spinlock	spinlock-ls	ticket	ticket-ls	ttas	ttas-ls	average
ahmcs		27	64	50	73	30	32	29	82	35	9	35	45	59	32	82	41	50	77	30	82	73	82	77	82	50	77	77	55
alock-ls	41		46	42	62	27	33	22	94	22	17	17	42	50	17	75	25	50	75	32	75	71	75	71	75	50	71	75	50
backoff	32	33		29	58	32	29	28	89	33	33	22	38	42	33	79	42	33	58	45	58	67	79	71	75	46	54	75	49
c-bo-mcs_spin	32	50	58		67	32	33	50	94	61	21	22	46	42	42	71	46	33	62	45	71	75	79	75	71	54	67	88	55
c-bo-mcs_stp	23	29	12	8		14	17	22	72	22	12	6	25	15	21	62	25	15	46	27	46	38	83	67	62	33	58	67	34
c-ptl-tkt	25	32	55	50	77		9	33	89	33	18	17	41	55	23	77	36	55	73	45	73	64	73	68	82	41	68	86	52
c-tkt-tkt	27	29	54	50	75	18		22	89	28	25	17	46	58	25	79	42	50	75	45	75	67	79	75	83	46	71	88	53
clh_spin	24	17	56	33	72	28	28		78	28	11	17	17	44	0	78	22	44	78	33	78	72	78	78	78	50	78	78	48
clh_stp	18	6	6	6	22	11	11	11		11	6	6	6	0	6	0	6	0	6	11	6	6	72	33	11	6	11	6	11
clh-ls	29	6	44	33	67	17	22	11	83		11	22	17	44	6	78	11	39	78	33	78	72	78	78	78	33	78	78	45
hmcs	36	58	67	62	75	36	38	50	94	61		39	42	58	33	75	42	50	75	50	75	67	75	75	79	54	75	88	60
hticket-ls	18	33	67	33	83	11	22	39	94	44	6		22	44	11	78	22	33	78	33	78	67	78	78	83	50	78	94	51
malth_spin	23	38	42	29	58	14	12	39	94	39	21	22		42	12	71	21	33	62	36	62	58	71	67	75	38	62	79	45
malth_stp	27	42	33	21	65	23	21	39	83	44	25	28	21		21	50	29	27	50	41	50	54	67	67	62	50	54	71	43
mcs_spin	27	38	54	38	71	32	29	28	94	44	25	28	33	58		79	46	50	62	32	71	67	75	71	79	54	67	83	53
mcs_stp	18	25	4	12	23	14	12	22	17	22	17	11	12	12	8		17	12	4	18	8	8	71	33	29	12	12	25	18
mcs-ls	27	33	46	38	62	23	21	28	94	33	21	33	33	46	12	71		25	62	45	62	71	75	71	75	42	62	79	48
mcs-timepub	27	29	50	42	65	18	21	28	94	33	17	22	38	38	21	69	25		65	41	69	69	79	71	79	58	71	92	49
mutexee	23	25	21	17	35	18	17	22	89	22	21	11	29	31	29	77	29	23		18	27	31	83	71	46	29	62	75	36
partitioned	35	18	41	32	59	14	14	22	89	22	23	11	18	36	14	73	14	27	73		68	59	73	68	73	41	68	86	43
pthread	18	25	12	17	27	18	17	22	89	22	25	11	29	31	21	73	25	19	15	23		31	83	71	46	21	54	67	34
pthreadadapt	23	25	0	12	35	18	21	28	83	22	29	11	25	23	17	65	21	23	42	23	38		83	71	54	12	46	62	34
spinlock	18	25	0	12	4	18	12	22	28	22	25	11	17	17	17	17	17	12	4	14	0	0		4	17	8	0	21	13
spinlock-ls	23	29	4	17	12	23	17	22	56	22	25	11	21	21	21	42	21	17	8	23	8	8	79		38	8	21	38	23
ticket	18	21	12	8	21	9	8	22	83	22	21	6	17	29	12	58	8	8	33	14	29	21	75	54		0	54	71	27
ticket-ls	27	33	21	29	50	32	29	33	94	33	33	22	38	38	25	79	25	25	62	32	62	67	79	71	88		62	75	47
ttas	23	29	0	25	25	23	21	22	83	22	25	11	29	33	21	71	25	21	8	23	8	29	75	42	33	17		25	29
ttas-ls	23	21	4	12	21	14	12	22	83	22	8	6	21	21	17	67	17	4	4	14	17	25	75	46	29	17	42		25
average	25	29	32	28	51	21	21	27	82	31	20	18	28	37	19	66	26	29	50	31	51	49	77	64	62	34	56	68	25

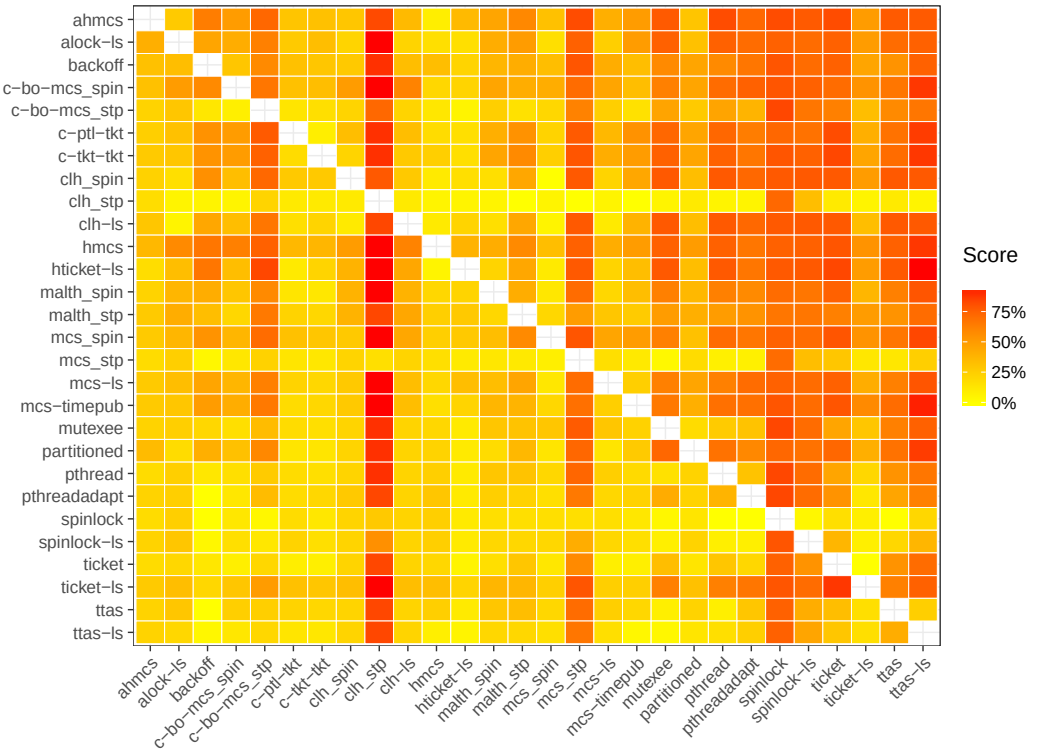


Fig. 18: For each pair of locks *(rowA, colB)* at *max nodes*, scores of lock A vs lock B: percentage of lock-sensitive applications for which lock A performs at least 5% better than B (**A-64-node machine**).

Table L: For each pair of locks *(rowA, colB)* at *max nodes*, scores of lock A vs lock B: percentage of lock-sensitive applications for which lock A performs at least 5% better than B (**I-48 machine in energy-saving mode**).

	ahmcs	alock-ls	backoff	c-bo-mcs_spin	c-bo-mcs_stp	c-ptl-tkt	c-tkt-tkt	clh_spin	clh_stp	clh-ls	hmcs	hticket-ls	malth_spin	malth_stp	mcs_spin	mcs_stp	mcs-ls	mcs-timepub	mutexee	partitioned	pthread	pthreadadapt	spinlock	spinlock-ls	ticket	ticket-ls	ttas	ttas-ls	average
ahmcs		42	58	42	74	47	26	57	79	64	11	36	58	58	53	74	58	58	63	47	63	63	79	74	68	58	74	68	57
alock-ls	47		35	40	75	33	25	60	87	53	30	27	55	55	30	70	25	55	60	67	75	65	75	75	75	70	70	75	56
backoff	37	45		35	70	28	25	53	87	60	30	40	55	50	35	70	45	50	55	61	65	65	60	55	80	65	55	70	54
c-bo-mcs_spin	42	50	50		70	28	30	73	93	73	25	47	70	70	55	80	55	50	70	56	70	70	75	75	75	75	70	85	62
c-bo-mcs_stp	21	25	25	15		17	15	27	87	27	20	13	20	14	20	59	20	23	9	17	9	23	60	55	35	25	15	30	27
c-ptl-tkt	24	56	50	39	78		11	80	87	87	6	33	61	67	56	78	56	61	67	50	67	67	72	72	67	67	67	78	59
c-tkt-tkt	53	55	45	45	80	33		73	87	87	35	33	75	70	50	80	50	60	75	61	75	75	75	75	70	70	70	80	64
clh_spin	29	0	27	13	73	20	13		73	13	7	13	40	47	0	67	7	27	60	60	67	67	73	73	73	53	67	73	42
clh_stp	21	13	13	7	7	13	13	13		13	7	7	7	0	7	20	7	7	0	13	0	0	33	7	13	13	7	7	10
clh-ls	21	0	27	7	73	7	0	0	73		7	7	40	47	0	67	7	27	60	53	60	60	73	73	60	47	67	67	38
hmcs	37	70	65	45	70	44	30	87	93	93		47	70	65	70	75	70	65	70	61	75	70	75	75	75	75	70	85	68
hticket-ls	29	73	40	13	73	20	13	67	93	73	7		60	60	40	73	47	33	67	67	67	67	73	73	73	73	67	87	57
malth_spin	26	30	20	10	70	11	10	40	93	47	5	7		50	10	60	15	15	60	44	60	60	70	60	75	55	55	65	42
malth_stp	32	30	20	15	64	22	20	40	87	47	25	27	20		20	59	25	32	36	33	45	45	65	65	65	55	50	60	41
mcs_spin	37	25	35	25	70	22	15	67	93	53	15	33	50	60		65	20	35	70	61	75	75	70	60	70	70	55	70	52
mcs_stp	21	25	20	15	18	17	15	27	47	27	15	13	20	18	15		20	23	14	17	18	18	30	10	30	25	10	25	20
mcs-ls	37	25	35	20	70	17	15	73	93	53	15	20	55	50	15	70		30	65	61	70	70	70	55	65	65	50	60	49
mcs-timepub	37	35	30	20	68	22	20	47	93	53	20	33	50	45	30	64	25		59	56	64	64	70	60	85	65	55	65	49
mutexee	26	25	15	20	68	22	15	27	93	33	25	27	30	23	20	73	30	27		22	32	41	70	65	65	45	45	55	38
partitioned	41	17	22	28	78	33	11	20	87	33	33	20	33	50	22	83	22	22	44		61	50	72	72	78	61	72	78	46
pthread	26	25	15	20	73	22	15	27	87	33	20	27	25	23	20	68	25	23	5	17		23	65	60	55	30	40	55	34
pthreadadapt	26	25	10	20	68	22	15	27	87	33	25	27	25	18	20	68	25	23	23	22	32		65	60	50	35	40	50	35
spinlock	21	25	15	20	20	17	15	27	67	27	20	20	25	20	20	45	25	15	10	17	10	20		0	30	25	0	15	21
spinlock-ls	21	25	20	20	35	17	15	27	87	27	20	20	35	25	35	80	25	15	15	17	20	20	65		30	25	5	20	28
ticket	26	20	5	15	55	11	15	13	87	27	20	13	15	15	10	60	20	5	15	6	25	30	60	60		0	20	35	25
ticket-ls	26	25	10	20	70	22	20	27	87	33	20	20	25	30	20	60	25	15	25	22	30	35	60	60	70		50	65	36
ttas	26	25	15	20	75	17	20	27	93	33	30	20	35	35	30	85	45	30	30	17	40	50	75	75	35	30		40	39
ttas-ls	26	20	15	10	65	22	20	27	87	33	15	13	30	20	20	70	40	10	30	17	30	35	70	65	30	25	5		31
average	30	31	27	22	63	22	17	42	85	46	19	24	40	40	27	67	31	31	43	39	48	49	67	60	59	48	46	58	30

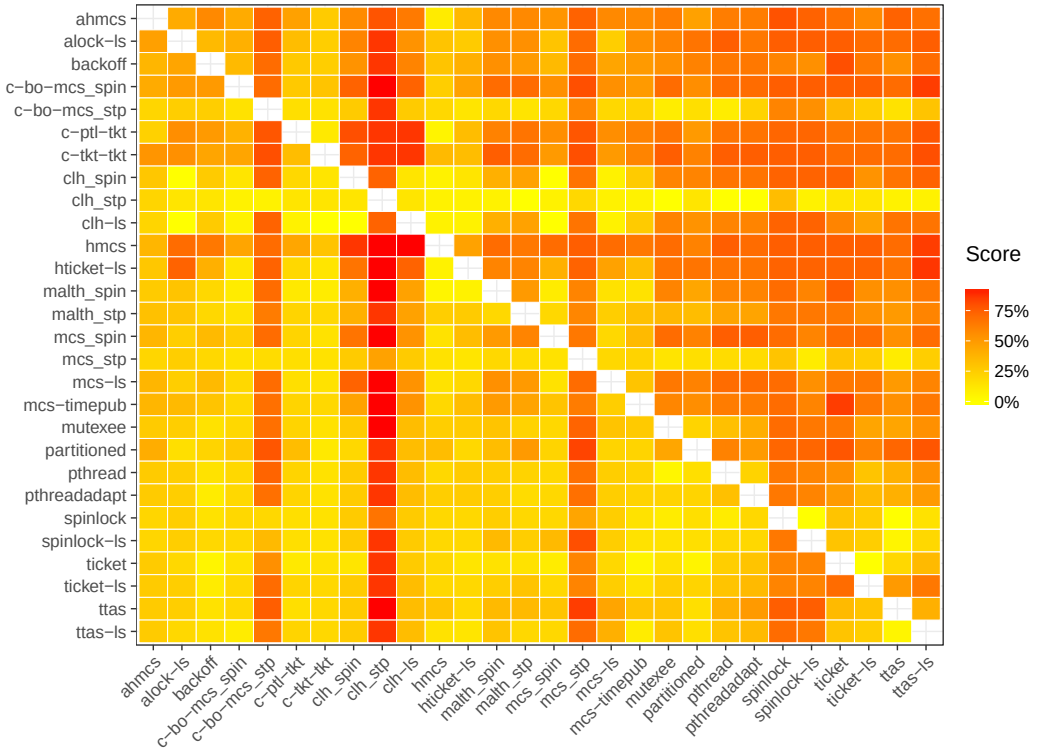


Fig. 19: For each pair of locks *(rowA, colB)* at *max nodes*, scores of lock A vs lock B: percentage of lock-sensitive applications for which lock A performs at least 5% better than B (**I-48 machine in energy-saving move**).

Table LI: For each pair of locks *(rowA, colB)* at *max nodes*, scores of lock A vs lock B: percentage of lock-sensitive applications for which lock A performs at least 5% better than B (**I-20 machine in energy-saving mode**).

	ahmcs	alock-ls	backoff	c-bo-mcs_spin	c-bo-mcs_stp	c-ptl-tkt	c-tkt-tkt	clh_spin	clh_stp	clh-ls	hmcs	hticket-ls	malth_spin	malth_stp	mcs_spin	mcs_stp	mcs-ls	mcs-timepub	mutexee	partitioned	pthread	pthreadadapt	spinlock	spinlock-ls	ticket	ticket-ls	ttas	ttas-ls	average
ahmcs		20	33	0	73	0	0	27	73	27	7	0	33	47	33	73	33	33	53	21	53	47	47	27	40	33	33	33	33
alock-ls	40		25	19	69	20	19	33	83	33	19	8	31	38	12	69	12	12	50	33	50	50	44	38	25	19	25	31	34
backoff	33	38		19	62	20	19	50	92	50	19	17	25	31	19	62	19	12	38	40	50	50	50	31	50	38	25	44	37
c-bo-mcs_spin	33	50	44		69	27	6	58	92	58	19	8	38	50	31	69	38	31	50	33	56	50	44	38	38	31	38	62	43
c-bo-mcs_stp	27	31	19	19		20	19	33	50	33	19	17	31	12	31	35	31	29	12	20	12	12	19	12	31	31	6	31	24
c-ptl-tkt	29	47	40	7	60		7	67	92	67	13	8	53	47	40	67	33	33	53	33	53	47	47	40	47	40	40	60	43
c-tkt-tkt	40	44	38	19	69	20		58	92	58	19	8	44	50	31	69	38	31	50	33	56	50	44	38	44	38	31	62	43
clh_spin	27	8	25	8	67	8	8		67	17	0	8	25	8	0	67	0	0	42	25	42	33	42	25	17	8	17	17	23
clh_stp	27	17	8	8	25	8	8	17		17	8	8	8	0	8	0	8	8	0	8	0	0	8	8	8	8	8	8	9
clh-ls	18	8	25	8	67	8	8	0	67		0	8	25	17	0	67	0	0	42	17	42	33	42	25	8	8	8	17	21
hmcs	40	38	38	12	69	13	6	50	92	58		0	31	50	25	69	25	31	50	27	56	50	44	38	38	31	38	56	40
hticket-ls	27	58	33	8	67	0	0	58	92	58	8		33	42	17	67	25	25	50	33	50	42	42	33	33	42	33	67	39
malth_spin	27	31	12	6	56	7	0	42	92	42	12	0		31	0	56	0	6	50	27	50	50	44	25	38	31	19	38	29
malth_stp	33	31	12	19	59	20	19	33	92	33	19	17	25		19	59	19	18	47	33	47	53	50	31	38	31	12	38	34
mcs_spin	33	31	38	19	56	13	6	42	92	50	12	8	38	38		56	19	12	50	33	56	50	44	25	38	25	19	44	35
mcs_stp	27	31	19	19	24	20	19	33	42	33	19	17	31	12	19		31	18	12	20	12	12	19	6	31	31	6	25	22
mcs-ls	33	31	31	19	56	13	6	42	92	50	12	8	31	31	0	56		6	56	33	56	50	44	25	38	31	19	44	34
mcs-timepub	33	38	44	19	53	20	19	42	92	50	19	17	31	24	19	53	31		47	40	53	47	50	31	44	38	19	50	38
mutexee	33	31	12	19	65	20	19	42	92	42	19	17	19	12	19	65	19	18		20	18	24	38	25	31	19	25	31	29
partitioned	50	20	27	27	67	27	27	33	92	25	13	17	27	20	20	67	20	13	40		47	47	47	40	20	20	20	40	34
pthread	33	31	12	19	65	20	19	42	92	42	19	17	19	6	19	65	19	18	18	20		24	38	31	25	19	12	25	28
pthreadadapt	27	31	12	19	65	20	19	33	92	33	19	17	19	6	19	65	19	18	29	20	29		31	19	19	19	12	25	27
spinlock	27	31	6	19	56	20	19	33	92	33	19	17	19	12	19	62	19	6	31	20	38	25		0	19	19	0	19	25
spinlock-ls	27	31	25	19	62	20	19	33	92	33	19	17	31	31	31	75	31	19	38	20	38	31	44		31	31	0	19	32
ticket	33	25	12	12	56	20	12	25	92	25	12	17	12	6	6	56	6	0	44	20	44	50	44	25		12	0	25	26
ticket-ls	33	31	19	12	56	13	6	42	92	42	19	8	19	25	6	56	12	0	50	33	50	50	31	25	25		19	50	31
ttas	33	31	31	19	62	20	19	33	92	33	19	17	38	31	31	75	31	19	44	27	44	50	44	25	38	31		31	36
ttas-ls	33	19	19	12	56	13	12	33	92	33	19	8	31	19	25	69	25	12	38	13	44	44	44	19	31	25	6		29
average	32	31	24	15	60	16	13	38	85	40	15	11	28	26	19	61	21	16	40	26	42	40	40	26	31	26	18	37	32

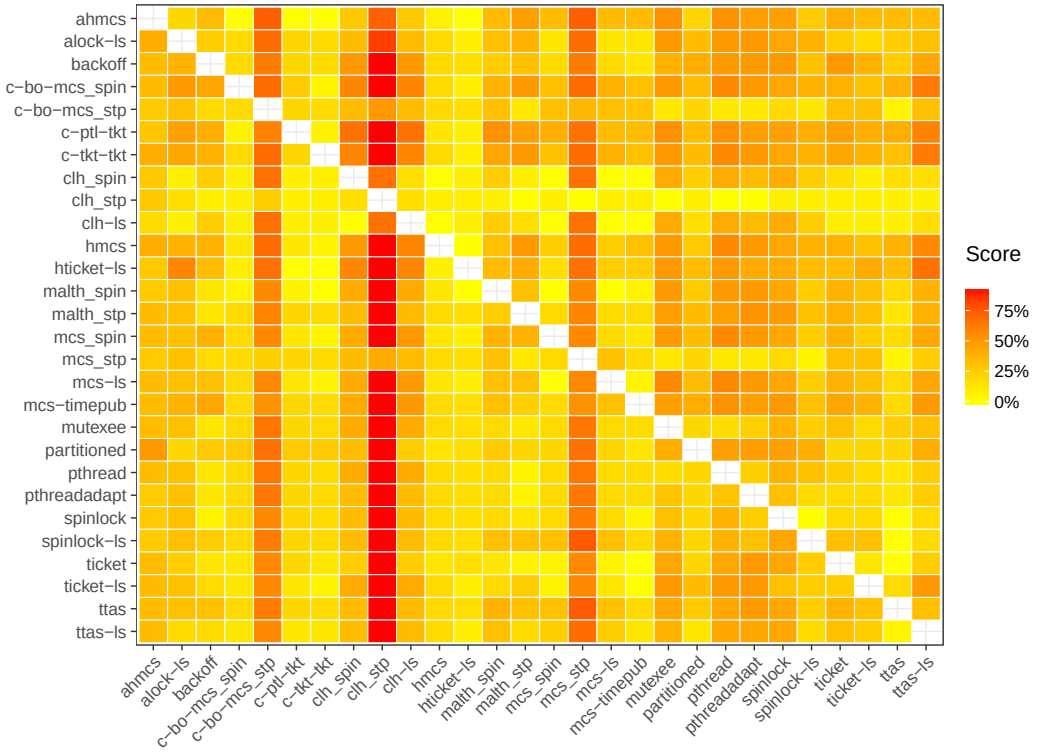


Fig. 20: For each pair of locks *(rowA, colB)* at *max nodes*, scores of lock A vs lock B: percentage of lock-sensitive applications for which lock A performs at least 5% better than B (**I-20 machine in energy-saving move**).

A.6. Are all locks potentially harmful?

Table LII: For each lock-sensitive application, at *max nodes*, performance gain, (in %) obtained by the best lock(s) with respect to each of the other locks. A gray cell highlights a configuration where a given lock hurts the application, i.e., the performance gain is greater than 15%. A line with many gray cells corresponds to an application whose performance is hurt by many locks. A column with many gray cells corresponds to a lock that is outperformed by many other locks. Dashes correspond to untested cases. For example, the table shows that for the dedup application, the best lock (0%, here mutexee) is 609% better than the alock-ls lock. The gray cells highlight configurations where a given lock hurts the application, i.e., the performance gain brought by the best lock with respect to the given lock is greater than 15%. Thus, for each lock in a column, the number of gray cells corresponds to the number of applications for which the lock is defeated by a gap of 15% or more by the best lock(s) for this application. (**A-64 machine**).

Applications	ahmcs	alock-ls	backoff	c-bo-mcs_spin	c-bo-mcs_stp	c-ptl-tkt	c-tkt-tkt	clh_spin	clh_stp	clh-ls	hmcs	hticket-ls	malth_spin	malth_stp	mcs_spin	mcs_stp	mcs-ls	mcs-timepub	mutexee	partitioned	pthread	pthreadadapt	spinlock	spinlock-ls	ticket	ticket-ls	ttas	ttas-ls
dedup	-	609	5	142	141	29	13	588	590	988	150	134	135	133	131	133	127	84	0	16	8	4	4	3	6	4	5	591
facesim	298	694	338	115	85	258	231	687	52	700	219	196	531	40	710	52	771	0	23	685	56	44	572	117	719	337	147	224
ferret	310	270	8	50	0	239	229	312	0	252	274	277	209	0	317	0	349	4	1	314	0	1	10	4	308	93	8	8
fluidanimate	-	284	0	53	71	30	12	-	-	-	65	-	31	87	35	86	44	44	76	9	1	7	21	2	13	10	4	187
fmm	41	37	22	16	27	29	15	39	33	38	35	32	21	18	2	0	32	0	25	20	25	23	2	27	19	28	22	32
kyotocabinet	9	91	29	0	171	24	28	33	484	43	12	19	22	22	28	474	38	52	397	45	409	276	2k	2k	214	89	589	334
linear_regression	17	89	10	34	198	14	17	17	64	56	13	29	8	0	22	58	54	4	16	47	16	2	85	31	33	12	34	38
matrix_multiply	9	78	3	14	5	27	54	9	3	12	608	59	5	3	28	2	168	0	6	44	3	3	5	59	3	59	4	55
memcached-new	0	20	38	70	871	-	10	-	-	-	0	-	35	81	20	582	31	17	53	-	103	193	1k	764	221	80	331	110
memcached-old	117	54	63	0	1	-	14	-	-	-	6	-	289	307	149	192	264	175	108	-	209	225	305	45	216	223	33	74
mysqld	-	-	-	-	53	-	-	-	-	-	-	-	-	0	-	7	-	173	10	-	97	102	-	-	-	-	-	-
ocean_cp	28	17	38	32	47	24	21	41	38	19	31	14	23	27	43	32	30	0	13	31	11	19	129	54	55	7	23	34
ocean_ncp	24	17	23	24	31	8	12	27	25	18	13	3	16	19	33	34	11	8	5	26	28	24	113	34	22	0	11	31
pca	51	57	26	27	346	43	47	49	221	53	51	41	30	0	57	229	39	25	124	31	121	45	266	107	104	26	200	128
pca_ll	64	52	0	8	713	56	58	66	379	31	60	35	14	10	61	369	27	26	165	41	166	51	522	331	116	23	273	193
radiosity	13	12	4	4	38	8	5	9	0	13	7	8	8	12	0	90	9	0	42	0	0	0	1	54	0	19	34	61
radiosity_ll	0	41	43	26	1k	37	47	31	1k	49	0	17	68	67	26	2k	57	60	535	76	569	262	2k	1k	585	200	1k	802
s_raytrace	0	33	65	37	2k	29	39	46	1k	37	16	31	26	64	0	1k	16	13	282	103	230	122	714	252	412	145	661	514
s_raytrace_ll	10	20	42	39	645	11	13	0	2k	5	41	19	37	21	0	2k	10	14	284	56	201	67	1k	744	554	172	1k	916
sqlite	-	-	-	-	405	-	-	-	-	-	-	-	-	0	-	591	-	2k	375	-	336	181	-	-	-	-	-	-
ssl_proxy	0	17	48	5	790	11	26	16	879	27	159	15	16	35	41	900	48	29	319	36	293	153	1k	447	271	89	594	499
streamcluster	49	21	137	43	195	0	15	-	-	-	0	-	219	1k	121	1k	188	13	32	8	95	142	527	129	302	181	215	206
streamcluster_ll	65	20	188	58	277	0	21	-	-	-	15	-	262	1k	144	1k	228	28	44	27	80	120	549	196	321	177	232	189
upscaledb	8	18	30	9	110	16	12	16	281	19	8	14	0	5	17	267	21	34	107	25	215	109	747	496	106	49	226	318
vips	48	38	6	184	21	95	73	-	-	-	84	-	196	0	28	1	28	3	2	33	0	2	3	6	16	10	8	14
volrend	2	27	36	19	72	0	7	26	58	17	0	2	18	63	27	47	22	25	80	25	78	105	162	87	25	15	40	48
water_nsquared	94	48	4	6	10	8	2	35	35	58	14	11	7	6	3	2	9	7	7	4	6	7	0	6	4	6	5	37
water_spatial	97	48	1	9	6	3	3	40	39	63	8	4	8	5	9	9	5	10	3	1	0	0	2	1	1	0	0	40

Table LIII: For each lock-sensitive application, at *opt nodes*, performance gain, (in %) obtained by the best lock(s) with respect to each of the other locks. A gray cell highlights a configuration where a given lock hurts the application, i.e., the performance gain is greater than 15%. A line with many gray cells corresponds to an application whose performance is hurt by many locks. A column with many gray cells corresponds to a lock that is outperformed by many other locks. Dashes correspond to untested cases. (**A-64 machine**).

Applications	ahmcs	alock-ls	backoff	c-bo-mcs_spin	c-bo-mcs_stp	c-ptl-tkt	c-tkt-tkt	clh_spin	clh_stp	clh-ls	hmcs	hticket-ls	malth_spin	malth_stp	mcs_spin	mcs_stp	mcs-ls	mcs-timepub	mutexee	partitioned	pthread	pthreadadapt	spinlock	spinlock-ls	ticket	ticket-ls	ttas	ttas-ls
dedup	-	462	29	255	252	64	45	538	531	819	296	233	197	197	206	203	207	222	0	36	36	28	17	29	22	28	24	544
facesim	2	3	6	4	7	1	0	3	12	3	3	1	2	7	1	6	2	3	4	3	7	13	6	9	5	2	3	7
ferret	88	49	6	32	0	89	100	54	0	51	82	91	84	0	51	0	56	3	0	55	0	0	7	3	54	40	5	6
fluidanimate	-	126	0	46	46	31	13	-	-	-	59	-	24	23	21	22	34	36	69	10	2	8	5	0	0	0	0	76
fmm	41	36	22	16	27	29	15	27	25	38	33	31	21	18	2	0	32	0	25	20	25	23	1	27	19	28	22	32
kyotocabinet	13	37	0	12	9	20	25	29	414	40	19	21	22	31	23	347	35	34	77	22	82	59	65	88	47	26	40	48
linear_regression	2	12	16	9	19	9	15	1	30	7	0	6	4	4	11	29	10	11	18	4	16	4	48	29	22	13	26	24
matrix_multiply	9	78	3	14	5	24	23	9	3	12	83	59	5	3	23	2	168	0	6	24	3	3	5	59	3	59	4	55
memcached-new	0	18	53	69	119	-	12	-	-	-	5	-	29	53	7	48	20	10	66	-	90	55	36	34	36	34	34	35
memcached-old	14	72	2	30	29	-	43	-	-	-	54	-	19	23	21	19	32	43	44	-	50	50	15	5	13	14	0	9
mysqld	-	-	-	-	55	-	-	-	-	-	-	-	-	0	-	8	-	121	8	-	96	96	-	-	-	-	-	-
ocean_cp	7	8	6	11	13	7	9	3	2	1	9	8	8	20	10	19	0	14	18	7	6	14	11	11	8	7	8	10
ocean_ncp	4	2	8	12	2	1	0	4	13	4	1	1	3	4	12	11	4	9	3	3	6	11	13	2	4	2	6	4
pca	4	3	10	11	22	6	8	6	38	3	3	3	6	4	7	39	3	7	11	3	16	7	6	3	4	0	3	2
pca_ll	4	3	12	19	54	3	0	5	160	3	2	0	2	18	0	157	2	2	32	0	43	42	41	20	42	1	2	3
radiosity	9	9	4	4	9	6	5	8	0	10	6	8	6	9	0	13	8	0	10	0	0	0	1	11	0	8	10	10
radiosity_ll	0	25	36	26	79	5	25	19	175	32	0	17	55	67	15	161	32	34	69	26	134	113	131	85	90	38	56	62
s_raytrace	0	6	65	23	87	6	11	5	123	10	5	17	26	53	0	117	14	12	232	10	75	94	120	103	119	30	123	124
s_raytrace_ll	10	20	42	39	185	11	13	0	401	5	41	19	37	21	0	390	10	14	244	56	200	67	394	388	396	172	388	390
sqlite	-	-	-	-	3	-	-	-	-	-	-	-	-	5	-	16	-	0	68	-	80	60	-	-	-	-	-	-
ssl_proxy	3	3	16	16	25	0	2	7	31	5	0	0	27	32	10	23	9	11	38	7	58	27	20	28	19	11	15	18
streamcluster	9	7	6	2	5	6	1	-	-	-	5	-	8	8	0	0	7	3	14	5	10	5	0	4	6	6	5	6
streamcluster_ll	12	12	19	5	12	0	16	-	-	-	11	-	33	27	23	20	26	22	35	10	18	34	26	3	15	19	12	12
upscaledb	0	11	30	4	8	4	3	8	196	12	0	2	1	10	11	194	15	19	117	15	108	58	32	33	27	21	33	30
vips	3	5	2	2	2	3	2	-	-	-	5	-	1	2	2	2	5	2	2	3	0	1	3	1	1	1	2	4
volrend	2	4	10	5	11	2	2	4	8	3	0	1	5	8	3	7	4	4	15	3	17	18	23	14	8	4	10	11
water_nsquared	94	48	4	6	10	8	2	35	35	58	14	11	7	6	3	2	9	7	7	4	6	7	0	6	4	6	5	37
water_spatial	95	48	1	9	6	3	3	40	39	63	8	4	8	5	9	9	5	10	3	1	0	0	2	1	1	0	0	40

Table LIV: For each lock-sensitive application, at *max nodes*, performance gain, (in %) obtained by the best lock(s) with respect to each of the other locks. A gray cell highlights a configuration where a given lock hurts the application, i.e., the performance gain is greater than 15%. A line with many gray cells corresponds to an application whose performance is hurt by many locks. A column with many gray cells corresponds to a lock that is outperformed by many other locks. Dashes correspond to untested cases. (**A-48 machine**).

Applications	ahmcs	alock-ls	backoff	c-bo-mcs-spin	c-bo-mcs-stp	c-ptl-tkt	c-tkt-tkt	clh_spin	clh_stp	clh-ls	hmcs	hticket-ls	malth_spin	malth_stp	mcs_spin	mcs_stp	mcs-ls	mcs-timepub	mutexee	partitioned	pthread	pthreadadapt	spinlock	spinlock-ls	ticket	ticket-ls	ttas	ttas-ls
dedup	-	-	10	226	223	67	32	-	-	-	243	208	75	71	275	269	204	285	0	544	23	18	35	21	511	25	25	-
ferret	453	389	10	391	0	480	455	402	0	383	438	466	472	0	387	2	395	7	0	397	0	0	14	10	395	271	10	10
fmm	50	45	40	41	36	39	39	53	40	48	40	41	39	34	5	0	39	3	36	38	33	33	3	36	41	39	41	40
kyotocabinet	8	33	21	0	470	21	16	31	327	37	12	14	27	191	26	328	30	43	327	42	364	259	1k	1k	176	83	474	234
linear_regression	8	9	0	5	242	9	9	4	59	7	6	4	9	73	8	102	8	17	20	12	20	0	74	26	26	4	25	16
memcached-new	2	0	19	40	550	-	5	-	-	-	1	-	116	302	26	350	5	6	51	-	88	143	620	390	152	49	170	154
memcached-old	65	103	0	24	298	-	79	-	-	-	69	-	34	175	84	343	84	59	121	-	126	87	1k	646	202	137	174	332
mysqld	-	-	-	-	33	-	-	-	-	-	-	-	-	13	-	9	-	54	0	-	1	0	-	-	-	-	-	-
pca	13	20	0	1	199	7	16	19	160	20	9	0	3	104	27	256	16	2	71	14	75	23	213	87	71	14	96	86
pca_ll	15	40	0	8	569	20	30	23	240	31	36	25	4	282	32	242	24	12	117	19	136	48	298	148	83	19	113	146
radiosity	10	10	13	16	108	6	10	14	684	8	11	14	10	64	0	622	10	0	72	12	78	33	138	67	51	25	60	68
radiosity_ll	0	7	33	11	871	18	24	24	1k	25	0	29	62	560	14	1k	30	39	611	66	662	223	2k	689	484	171	604	584
s_raytrace	27	28	8	46	1k	27	34	1	767	19	31	19	62	544	15	1k	36	0	200	32	169	89	388	235	340	101	301	354
s_raytrace_ll	5	0	22	48	771	24	35	7	1k	7	4	44	64	414	12	1k	14	24	213	30	143	76	660	344	392	124	407	435
sqlite	-	-	-	-	92	-	-	-	-	-	-	-	-	11	-	161	-	939	58	-	60	0	-	-	-	-	-	-
ssl_proxy	94	104	0	100	1k	127	117	191	2k	101	101	104	175	2k	193	3k	110	165	160	216	660	330	2k	752	173	317	725	938
streamcluster	47	43	104	106	190	15	29	-	-	-	0	-	214	1k	154	2k	195	129	94	61	153	185	285	167	211	163	111	81
streamcluster_ll	56	64	180	21	214	0	38	-	-	-	10	-	226	1k	256	1k	235	132	97	63	169	287	339	155	251	192	118	96
upscaledb	0	7	21	1	150	5	5	10	222	10	1	1	0	34	12	221	14	16	80	17	172	105	500	255	89	42	120	249
vips	140	112	3	338	33	240	191	-	-	-	214	-	781	6	70	7	66	4	3	82	0	0	3	3	67	23	5	12
volrend	9	16	9	10	76	3	4	10	87	11	0	0	2	126	19	101	13	24	55	10	70	74	91	42	17	9	17	20
water_nsquared	78	42	8	15	14	11	11	29	29	48	13	14	8	9	5	6	16	8	10	6	8	8	0	10	9	12	12	32
water_spatial	69	35	2	4	4	1	0	34	33	45	6	4	9	8	19	21	4	19	2	5	0	1	15	1	3	1	2	28

Table LV: For each lock-sensitive application, at *opt nodes*, performance gain, (in %) obtained by the best lock(s) with respect to each of the other locks. A gray cell highlights a configuration where a given lock hurts the application, i.e., the performance gain is greater than 15%. A line with many gray cells corresponds to an application whose performance is hurt by many locks. A column with many gray cells corresponds to a lock that is outperformed by many other locks. Dashes correspond to untested cases. (**A-48 machine**).

Applications	ahmcs	alock-ls	backoff	c-bo-mcs_spin	c-bo-mcs_stp	c-ptl-tkt	c-tkt-tkt	clh_spin	clh_stp	clh-ls	hmcs	hticket-ls	malth_spin	malth_stp	mcs_spin	mcs_stp	mcs-ls	mcs-timepub	mutexee	partitioned	pthread	pthreadadapt	spinlock	spinlock-ls	ticket	ticket-ls	ttas	ttas-ls
dedup	-	-	19	163	162	49	33	-	-	-	189	144	51	53	196	191	136	199	0	16	20	19	15	17	7	14	20	-
ferret	122	69	6	41	0	130	131	69	0	69	123	129	90	0	69	1	62	4	0	65	0	0	9	3	70	51	5	6
fmm	50	45	40	41	36	39	39	47	40	48	40	41	38	34	5	0	39	3	36	38	33	33	3	36	41	39	41	40
kyotocabinet	25	34	0	10	69	28	24	33	426	38	24	30	25	141	25	385	36	37	65	30	79	43	53	46	43	27	18	42
linear_regression	85	92	93	87	136	87	91	78	161	89	86	81	78	133	100	242	69	127	0	91	105	93	151	117	114	90	120	99
memcached-new	3	0	16	33	78	-	1	-	-	-	2	-	12	74	0	70	0	4	50	-	65	30	16	18	26	1	0	1
memcached-old	2	14	1	10	22	-	2	-	-	-	3	-	6	64	0	254	5	10	80	-	82	26	2	2	1	0	5	2
mysqld	-	-	-	-	33	-	-	-	-	-	-	-	-	13	-	9	-	52	0	-	0	0	-	-	-	-	-	-
pca	2	3	3	2	23	2	1	4	64	2	11	0	5	63	19	74	7	17	20	3	29	9	32	12	11	1	11	10
pca_ll	2	3	1	5	56	0	0	2	177	1	0	0	4	59	2	176	3	2	15	1	20	20	3	4	4	4	3	3
radiosity	30	26	29	25	33	22	27	23	44	27	26	27	25	43	0	29	24	4	33	22	34	34	15	29	28	30	26	31
radiosity_ll	0	4	25	11	70	15	24	14	234	21	0	29	53	208	4	218	9	30	78	25	111	72	72	66	78	61	59	64
s_raytrace	5	2	9	16	130	5	10	1	294	3	4	9	21	186	0	340	5	0	55	4	59	55	50	53	51	32	54	50
s_raytrace_ll	5	0	22	48	323	24	35	7	686	7	4	44	64	414	12	672	14	24	192	30	143	76	336	333	339	110	327	282
sqlite	-	-	-	-	31	-	-	-	-	-	-	-	-	175	-	511	-	0	55	-	68	35	-	-	-	-	-	-
ssl_proxy	69	64	4	92	74	79	86	89	873	64	70	77	124	2k	98	2k	74	109	0	104	163	141	130	139	134	72	93	138
streamcluster	6	8	6	16	20	14	17	-	-	-	0	-	8	8	3	6	1	8	20	6	907	954	7	0	10	6	4	3
streamcluster_ll	29	35	32	15	14	6	12	-	-	-	0	-	34	39	30	28	32	33	44	19	30	43	28	19	36	33	30	29
upscaledb	1	8	21	2	164	7	7	10	208	10	0	0	2	43	11	213	13	17	92	16	84	69	37	38	33	21	40	36
vips	15	18	3	15	17	16	17	-	-	-	17	-	14	6	16	7	15	4	3	15	0	0	3	3	15	17	5	12
volrend	0	2	6	1	23	0	3	6	23	0	1	1	6	27	6	28	1	10	11	5	12	12	17	9	8	3	6	7
water_nsquared	78	42	8	15	14	11	11	29	29	48	13	14	8	9	5	6	16	8	10	6	8	8	0	10	9	12	12	32
water_spatial	69	35	2	4	4	1	0	34	33	45	6	4	9	8	19	21	4	19	2	5	0	1	15	1	3	1	2	28

Table LVI: For each lock-sensitive application, at *max nodes*, performance gain, (in %) obtained by the best lock(s) with respect to each of the other locks. A gray cell highlights a configuration where a given lock hurts the application, i.e., the performance gain is greater than 15%. A line with many gray cells corresponds to an application whose performance is hurt by many locks. A column with many gray cells corresponds to a lock that is outperformed by many other locks. Dashes correspond to untested cases. (**I-48 machine in performance mode**).

Applications	ahmcs	alock-ls	backoff	c-bo-mcs_spin	c-bo-mcs_stp	c-ptl-tkt	c-tkt-tkt	clh_spin	clh_stp	clh-ls	hmcs	hticket-ls	malth_spin	malth_stp	mcs_spin	mcs_stp	mcs-ls	mcs-timepub	mutexee	partitioned	pthread	pthreadadapt	spinlock	spinlock-ls	ticket	ticket-ls	ttas	ttas-ls
dedup	-	716	2	155	67	2k	2k	2k	655	2k	128	252	469	70	227	62	448	80	2	2k	11	20	10	5	2k	1k	0	411
ferret	640	560	16	614	1	609	589	556	1	558	629	660	662	0	552	0	537	11	0	557	1	0	14	14	527	401	14	14
kyotocabinet	14	33	39	0	161	21	18	37	487	34	17	19	58	78	30	423	28	50	121	53	125	91	578	322	66	41	64	72
linear_regression	11	6	6	12	74	21	1	3	83	28	0	21	8	7	4	79	47	11	10	8	12	10	68	53	17	13	18	13
memcached-new	90	24	2	25	87	-	42	-	-	-	64	-	13	45	36	296	41	31	50	-	72	56	126	89	34	0	30	33
memcached-old	14	0	93	26	29	-	8	-	-	-	38	-	186	171	91	93	170	166	150	-	195	189	96	80	183	183	99	94
mysqld	-	-	-	-	0	-	-	-	-	-	-	-	-	6	-	9	-	56	3	-	4	8	-	-	-	-	-	-
pca	8	17	3	0	108	3	10	15	315	14	3	11	6	5	9	286	12	14	29	27	36	29	243	190	51	36	42	48
pca_ll	3	10	52	9	280	0	1	16	925	14	1	1	19	72	9	980	9	23	85	30	103	190	691	550	80	46	146	132
radiosity	18	13	7	2	48	4	3	19	173	22	0	2	8	11	5	147	5	7	17	16	22	17	142	106	28	20	30	38
radiosity_ll	1	65	106	8	779	54	22	92	2k	91	0	25	129	149	58	2k	71	90	211	174	267	159	2k	1k	379	247	436	440
s_raytrace	0	13	9	28	453	0	7	23	1k	24	0	20	42	96	8	1k	11	12	58	66	62	101	787	689	161	101	177	243
s_raytrace_ll	2	14	45	29	151	13	15	31	1k	30	0	35	104	135	11	1k	13	26	63	58	68	74	845	817	176	98	213	245
sqlite	-	-	-	-	196	-	-	-	-	-	-	-	-	0	-	505	-	4k	37	-	35	15	-	-	-	-	-	-
ssl_proxy	7	47	22	0	473	45	26	55	1k	51	6	19	61	109	57	1k	45	62	129	98	134	94	2k	730	189	125	189	181
streamcluster	47	0	486	162	424	81	13	-	-	-	36	-	356	418	298	342	288	274	432	18	386	485	393	274	488	457	225	217
streamcluster_ll	49	0	466	177	433	121	2	-	-	-	52	-	359	467	346	379	319	303	444	13	456	569	424	308	522	502	268	298
upscaledb	3	23	27	0	63	4	4	26	281	26	4	0	26	21	27	303	22	36	138	36	138	106	195	187	58	39	57	58
vips	213	127	2	706	48	410	324	-	-	-	347	-	408	1	139	6	135	2	0	167	2	0	3	3	100	5	0	1
volrend	9	10	150	2	42	1	0	14	26	10	0	1	2	21	10	11	2	3	15	1	25	25	40	30	15	10	17	21
water_nsquared	128	52	0	0	4	2	4	97	89	90	5	2	2	0	3	6	2	6	2	0	1	5	2	3	2	5	0	44
water_spatial	917	320	2	11	9	2	1	614	618	620	13	8	9	9	9	9	9	8	0	1	2	0	0	0	0	1	0	321

Table LVII: For each lock-sensitive application, at *opt nodes*, performance gain, (in %) obtained by the best lock(s) with respect to each of the other locks. A gray cell highlights a configuration where a given lock hurts the application, i.e., the performance gain is greater than 15%. A line with many gray cells corresponds to an application whose performance is hurt by many locks. A column with many gray cells corresponds to a lock that is outperformed by many other locks. Dashes correspond to untested cases. (**I-48 machine in performance mode**).

Applications	ahmcs	alock-ls	backoff	c-bo-mcs_spin	c-bo-mcs_stp	c-ptl-tkt	c-tkt-tkt	clh_spin	clh_stp	clh-ls	hmcs	hticket-ls	malth_spin	malth_stp	mcs_spin	mcs_stp	mcs-ls	mcs-timepub	mutexee	partitioned	pthread	pthreadadapt	spinlock	spinlock-ls	ticket	ticket-ls	ttas	ttas-ls
dedup	-	451	5	86	68	18	5	726	715	728	93	65	60	59	59	59	59	94	0	7	0	0	1	7	5	2	1	381
ferret	46	45	8	48	1	44	50	49	0	46	45	81	63	0	45	0	64	7	0	55	1	0	8	9	45	44	7	8
kyotocabinet	10	25	6	0	14	12	9	22	384	24	13	15	31	58	23	413	20	35	94	33	106	71	128	90	42	30	29	32
linear_regression	10	6	6	11	45	9	1	3	79	21	0	6	8	7	4	79	10	11	10	8	12	10	68	45	17	13	16	13
memcached-new	53	24	2	0	37	-	0	-	-	-	62	-	9	13	12	68	37	17	9	-	18	13	5	9	14	0	10	11
memcached-old	0	13	13	9	11	-	23	-	-	-	15	-	72	70	32	31	59	60	62	-	71	78	35	29	85	74	15	42
mysqld	-	-	-	-	0	-	-	-	-	-	-	-	-	5	-	7	-	56	3	-	4	4	-	-	-	-	-	-
pca	8	7	10	0	31	2	4	10	277	10	6	8	1	11	10	308	9	11	26	8	32	21	12	14	17	10	7	12
pca_ll	3	10	52	9	195	0	1	16	403	14	1	1	18	45	9	186	9	19	75	20	89	97	182	69	40	37	39	39
radiosity	16	9	6	0	7	0	0	17	71	17	0	1	5	9	4	25	4	6	12	7	16	11	22	15	16	12	13	20
radiosity_ll	1	61	102	8	52	18	21	87	1k	88	0	24	129	149	57	2k	59	80	163	99	249	159	263	218	248	169	162	163
s_raytrace	0	7	9	24	90	0	7	13	179	18	0	13	38	88	5	211	6	12	57	31	54	80	172	172	94	60	62	84
s_raytrace_ll	2	14	44	29	151	8	15	31	342	30	0	35	104	135	11	343	13	26	63	58	68	74	343	345	176	98	213	245
sqlite	-	-	-	-	0	-	-	-	-	-	-	-	-	41	-	618	-	35	61	-	74	55	-	-	-	-	-	-
ssl_proxy	0	42	23	6	54	27	9	61	1k	53	0	12	80	153	48	1k	37	58	124	57	144	130	445	209	178	125	135	121
streamcluster	8	3	25	5	6	3	1	-	-	-	0	-	41	38	19	15	36	14	32	7	15	35	19	17	41	42	17	14
streamcluster_ll	21	0	125	43	41	16	15	-	-	-	15	-	151	158	91	99	103	109	145	21	78	160	122	75	161	161	84	75
upscaledb	1	23	27	0	63	2	1	26	264	26	1	0	17	21	26	274	22	36	124	35	124	106	68	67	48	37	46	47
vips	24	24	2	22	22	22	22	-	-	-	24	-	23	1	23	6	22	2	0	22	2	0	3	3	23	5	0	1
volrend	17	7	41	3	23	0	0	12	24	11	1	0	5	15	3	13	2	9	17	7	20	27	26	20	18	9	15	18
water_nsquared	128	52	0	0	4	2	4	97	89	90	5	2	2	0	3	6	2	6	2	0	1	5	2	3	2	5	0	44
water_spatial	917	320	2	11	9	2	1	614	618	620	13	8	9	9	9	9	9	8	0	1	2	0	0	0	0	1	0	321

Table LVIII: For each lock-sensitive application, at *max nodes*, performance gain, (in %) obtained by the best lock(s) with respect to each of the other locks. A gray cell highlights a configuration where a given lock hurts the application, i.e., the performance gain is greater than 15%. A line with many gray cells corresponds to an application whose performance is hurt by many locks. A column with many gray cells corresponds to a lock that is outperformed by many other locks. Dashes correspond to untested cases. (**I-20 machine in performance mode**).

Applications	ahmcs	alock-ls	backoff	c-bo-mcs_spin	c-bo-mcs_stp	c-ptl-tkt	c-tkt-tkt	clh_spin	clh_stp	clh-ls	hmcs	hticket-ls	malth_spin	malth_stp	mcs_spin	mcs_stp	mcs-ls	mcs-timepub	mutexee	partitioned	pthread	pthreadadapt	spinlock	spinlock-ls	ticket	ticket-ls	ttas	ttas-ls
dedup	-	1k	25	261	56	178	165	695	501	758	428	202	316	56	233	54	305	83	1	132	0	1	22	24	110	222	25	307
ferret	363	343	46	369	2	367	366	337	0	342	354	367	407	0	338	0	338	29	0	339	0	0	66	67	340	296	68	69
kyotocabinet	4	12	6	0	251	8	3	14	253	17	10	6	27	19	10	249	10	16	70	21	61	38	112	71	22	12	21	20
memcached-old	2	3	3	2	315	-	2	-	-	-	3	-	1	20	1	254	2	3	81	-	97	36	5	2	0	1	2	4
pca	1	5	10	4	184	0	4	6	167	5	3	3	4	11	5	163	3	2	14	3	15	31	36	5	7	2	3	10
pca_ll	2	3	7	1	473	2	0	0	423	2	1	0	3	3	1	437	1	1	9	0	16	3	1	0	0	0	0	1
radiosity	23	11	5	5	52	1	3	19	77	17	2	1	6	13	3	60	0	4	7	12	11	21	50	22	14	7	14	16
radiosity_ll	2	9	33	0	577	2	0	16	799	22	1	4	29	46	8	802	10	15	56	59	76	156	427	167	89	40	78	59
s_raytrace	0	0	1	2	337	0	0	0	312	1	1	1	1	3	0	224	0	0	2	0	3	3	2	0	1	0	0	0
s_raytrace_ll	2	2	4	3	582	1	1	2	641	2	2	2	2	1	1	643	1	2	3	1	5	1	0	1	1	1	1	1
sqlite	-	-	-	-	321	-	-	-	-	-	-	-	-	0	-	388	-	9k	22	-	27	58	-	-	-	-	-	-
streamcluster	23	0	61	17	33	24	12	-	-	-	9	-	55	55	49	45	61	51	387	6	168	129	85	27	82	80	31	29
streamcluster_ll	20	0	67	17	29	26	9	-	-	-	9	-	59	60	50	50	67	57	466	0	233	158	91	39	80	90	34	36
upscaledb	3	11	21	1	143	0	7	14	152	13	1	3	5	13	10	150	10	14	129	21	125	123	56	35	13	11	12	20
vips	115	62	3	50	0	62	21	-	-	-	85	-	39	0	25	0	29	1	1	80	2	1	3	2	49	52	2	1
water_nsquared	47	17	0	0	1	0	0	32	31	33	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	16
water_spatial	325	110	0	3	3	0	0	219	212	211	4	3	2	3	3	2	3	2	0	0	0	0	0	0	0	1	0	107

Table LIX: For each lock-sensitive application, at *opt nodes*, performance gain, (in %) obtained by the best lock(s) with respect to each of the other locks. A gray cell highlights a configuration where a given lock hurts the application, i.e., the performance gain is greater than 15%. A line with many gray cells corresponds to an application whose performance is hurt by many locks. A column with many gray cells corresponds to a lock that is outperformed by many other locks. Dashes correspond to untested cases. (**I-20 machine in performance mode**).

Applications	ahmcs	alock-ls	backoff	c-bo-mcs_spin	c-bo-mcs_stp	c-ptl-tkt	c-tkt-tkt	clh_spin	clh_stp	clh-ls	hmcs	hticket-ls	malth_spin	malth_stp	mcs_spin	mcs_stp	mcs-ls	mcs-timepub	mutexee	partitioned	pthread	pthreadadapt	spinlock	spinlock-ls	ticket	ticket-ls	ttas	ttas-ls
dedup	-	437	5	82	81	15	9	722	711	703	105	66	80	74	78	71	76	77	3	8	2	0	4	6	8	6	6	378
ferret	101	92	46	103	2	102	103	92	0	91	102	109	136	0	90	0	89	29	0	89	0	0	54	54	87	90	54	53
kyotocabinet	3	13	3	0	249	6	3	14	255	16	8	6	22	21	12	250	10	18	74	21	58	32	53	33	19	12	17	18
memcached-old	2	3	3	2	315	-	2	-	-	-	3	-	1	20	1	254	2	3	81	-	97	36	5	2	0	1	2	4
pca	1	5	10	4	23	0	4	6	19	5	3	3	4	11	5	20	3	2	14	3	15	14	15	5	7	2	3	10
pca_ll	2	3	7	1	87	2	0	0	88	2	1	0	3	3	1	86	1	1	9	0	16	3	1	0	0	0	0	1
radiosity	23	11	5	5	5	1	2	19	20	17	2	1	6	6	3	5	0	4	4	6	2	5	6	7	7	5	5	13
radiosity_ll	2	9	33	0	61	2	0	16	65	22	1	4	29	46	8	54	10	15	56	56	69	63	57	54	56	40	53	53
s_raytrace	0	0	1	2	89	0	0	0	91	1	1	1	1	3	0	88	0	0	2	0	3	3	2	0	1	0	0	0
s_raytrace_ll	2	2	4	3	76	1	1	2	77	2	2	2	2	1	1	77	1	2	3	1	5	1	0	1	1	1	1	1
sqlite	-	-	-	-	25	-	-	-	-	-	-	-	-	0	-	394	-	16	47	-	49	42	-	-	-	-	-	-
streamcluster	8	0	28	19	27	12	18	-	-	-	13	-	24	16	18	17	25	10	28	15	3	23	25	8	36	34	19	13
streamcluster_ll	20	0	67	17	29	26	9	-	-	-	9	-	59	60	50	50	67	57	112	0	67	100	91	39	80	90	34	36
upscaledb	3	11	21	1	143	0	7	14	145	13	1	3	5	13	10	147	10	14	129	21	125	123	34	29	13	11	12	20
vips	93	62	3	50	0	62	21	-	-	-	85	-	39	0	25	0	29	1	1	80	2	1	3	2	49	52	2	1
water_nsquared	47	17	0	0	1	0	0	32	31	33	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	16
water_spatial	325	110	0	3	3	0	0	219	212	211	4	3	2	3	3	2	3	2	0	0	0	0	0	0	0	1	0	107

Table LX: For each lock-sensitive application, at *max nodes*, performance gain, (in %) obtained by the best lock(s) with respect to each of the other locks. A gray cell highlights a configuration where a given lock hurts the application, i.e., the performance gain is greater than 15%. A line with many gray cells corresponds to an application whose performance is hurt by many locks. A column with many gray cells corresponds to a lock that is outperformed by many other locks. Dashes correspond to untested cases. (**A-64 machine with thread-to-node pinning**).

Applications	ahmcs	alock-ls	backoff	c-bo-mcs_spin	c-bo-mcs_stp	c-ptl-tkt	c-tkt-tkt	clh_spin	clh_stp	clh-ls	hmcs	hticket-ls	malth_spin	malth_stp	mcs_spin	mcs_stp	mcs-ls	mcs-timepub	mutexee	partitioned	pthread	pthreadadapt	spinlock	spinlock-ls	ticket	ticket-ls	ttas	ttas-ls
dedup	-	652	14	159	160	37	24	1k	720	1k	78	141	59	59	61	59	71	80	0	215	11	12	13	13	187	13	14	635
facesim	3	5	39	34	131	5	4	6	56	6	4	3	0	47	5	55	4	6	29	5	30	56	297	131	29	2	38	51
ferret	366	310	3	215	0	356	370	326	0	328	385	368	338	0	322	0	277	1	0	320	0	0	7	2	287	173	3	4
fluidanimate	-	301	0	49	53	27	12	-	-	-	198	-	138	158	133	156	146	156	101	69	57	61	71	3	57	3	0	202
kyotocabinet	9	42	26	0	60	24	27	31	493	42	12	18	21	27	27	468	38	52	338	45	400	277	2k	2k	207	72	577	344
linear_regression	6	10	14	5	15	6	6	3	71	11	0	2	3	7	1	68	4	5	38	5	33	16	100	50	33	11	56	53
memcached-new	1	9	33	46	175	-	6	-	-	-	15	-	16	38	0	217	23	10	45	-	94	171	909	701	182	73	435	79
memcached-old	123	61	56	6	2	-	14	-	-	-	0	-	290	300	155	181	284	148	108	-	206	235	308	40	224	234	51	79
mysqld	-	-	-	-	66	-	-	-	-	-	-	-	-	0	-	4	-	60	1	-	1	2	-	-	-	-	-	-
ocean_cp	2	0	34	44	78	0	0	3	52	3	3	5	2	44	0	48	3	13	27	0	25	38	130	76	13	1	29	30
ocean_ncp	4	0	23	12	67	2	2	3	39	2	4	4	3	35	1	37	1	9	23	2	20	28	109	59	11	2	24	28
pca	48	40	38	17	82	47	47	43	285	41	46	46	43	0	46	285	39	40	123	47	132	50	347	138	91	19	234	160
pca_ll	62	48	0	8	155	56	61	67	380	38	64	53	31	4	57	380	24	23	146	52	157	52	551	372	108	19	273	184
radiosity	6	5	8	3	7	1	1	4	71	6	0	1	2	3	1	70	2	3	32	3	32	19	114	49	29	11	49	52
radiosity_ll	0	41	44	25	93	37	47	27	1k	47	0	21	67	65	26	1k	57	64	531	77	521	280	2k	1k	585	188	1k	792
s_raytrace	2	9	53	35	225	16	18	9	1k	17	0	30	30	68	0	1k	14	17	332	31	264	144	778	340	398	104	764	564
s_raytrace_ll	6	3	44	28	38	10	12	0	1k	6	7	19	45	23	0	1k	8	16	304	54	187	66	1k	746	561	187	1k	914
sqlite	-	-	-	-	31	-	-	-	-	-	-	-	-	0	-	676	-	809	367	-	342	179	-	-	-	-	-	-
ssl_proxy	1	11	72	5	143	11	14	13	933	13	0	7	14	32	14	945	26	27	317	28	299	155	1k	407	259	80	600	545
streamcluster	44	19	145	87	119	11	11	-	-	-	0	-	241	706	159	256	195	65	81	30	132	255	523	253	272	181	158	111
streamcluster_ll	32	11	140	69	146	4	18	-	-	-	0	-	230	826	101	247	171	63	85	20	160	204	491	250	309	180	161	159
upscaledb	6	17	29	8	190	808	415	14	285	18	5	12	0	4	17	285	21	34	98	508	112	107	687	463	2k	49	193	128
vips	71	33	8	238	0	136	83	-	-	-	95	-	223	2	39	3	25	5	5	35	4	3	4	10	30	13	8	13
volrend	7	4	31	17	41	0	0	6	24	8	1	2	10	19	6	19	6	11	41	7	37	49	105	66	28	12	34	37
water_nsquared	89	42	0	5	4	1	1	55	55	53	6	3	3	3	3	3	3	8	1	0	0	0	1	0	1	0	0	31
water_spatial	297	42	0	4	3	2	1	217	218	57	6	2	4	4	4	4	4	5	2	1	1	0	1	0	1	0	0	35

Table LXI: For each lock-sensitive application, at *opt nodes*, performance gain, (in %) obtained by the best lock(s) with respect to each of the other locks. A gray cell highlights a configuration where a given lock hurts the application, i.e., the performance gain is greater than 15%. A line with many gray cells corresponds to an application whose performance is hurt by many locks. A column with many gray cells corresponds to a lock that is outperformed by many other locks. Dashes correspond to untested cases. (**A-64 machine with thread-to-node pinning**).

Applications	ahmcs	alock-ls	backoff	c-bo-mcs_spin	c-bo-mcs_stp	c-ptl-tkt	c-tkt-tkt	clh_spin	clh_stp	clh-ls	hmcs	hticket-ls	malth_spin	malth_stp	mcs_spin	mcs_stp	mcs-ls	mcs-timepub	mutexee	partitioned	pthread	pthreadadapt	spinlock	spinlock-ls	ticket	ticket-ls	ttas	ttas-ls
dedup	-	402	36	237	221	70	53	716	689	727	183	198	170	96	181	96	201	118	0	263	6	7	18	34	218	37	36	464
facesim	0	1	3	4	13	1	0	1	12	1	1	0	0	8	1	10	0	0	4	1	4	12	20	16	2	0	2	7
ferret	355	310	3	215	0	349	346	326	0	327	346	322	302	0	322	0	277	1	0	320	0	0	7	2	287	173	3	4
fluidanimate	-	183	0	49	53	27	12	-	-	-	198	-	138	144	133	141	146	156	101	69	57	61	71	3	57	3	0	124
kyotocabinet	6	19	0	13	30	16	23	10	39	21	9	13	5	11	6	12	16	18	62	7	65	49	115	85	7	4	4	13
linear_regression	6	10	14	5	14	6	6	3	42	11	0	2	3	7	1	36	4	5	33	5	33	16	69	45	25	11	49	41
memcached-new	1	12	55	64	81	-	13	-	-	-	18	-	27	33	0	58	11	10	51	-	73	60	71	65	23	6	49	47
memcached-old	64	39	0	96	88	-	77	-	-	-	115	-	77	78	56	58	77	53	44	-	63	65	69	0	40	35	0	3
mysqld	-	-	-	-	37	-	-	-	-	-	-	-	-	4	-	8	-	58	0	-	2	5	-	-	-	-	-	-
ocean_cp	1	1	5	2	9	1	0	2	12	4	4	0	0	8	1	12	1	2	5	0	8	5	11	6	4	1	2	4
ocean_ncp	0	1	3	2	6	2	0	0	7	3	1	0	1	9	1	7	1	3	9	1	5	4	9	5	0	0	0	5
pca	15	15	15	15	50	15	16	15	50	15	16	16	15	0	15	58	15	16	18	15	23	20	17	17	15	13	15	15
pca_ll	32	27	0	8	122	26	43	25	120	26	26	27	21	4	28	124	24	21	42	30	57	52	43	28	32	19	26	29
radiosity	4	2	2	0	3	0	0	3	5	3	0	1	2	2	0	2	1	2	3	1	6	3	6	2	2	1	2	3
radiosity_ll	0	33	44	25	93	14	19	19	70	39	0	21	62	65	22	82	46	45	83	32	145	107	110	69	75	59	68	65
s_raytrace	2	9	53	35	126	16	18	9	221	17	0	25	30	68	0	217	14	17	109	29	101	86	86	68	69	62	69	72
s_raytrace_ll	6	3	44	28	38	10	12	0	464	6	7	19	45	23	0	466	8	16	304	54	187	66	459	407	433	186	437	461
sqlite	-	-	-	-	32	-	-	-	-	-	-	-	-	0	-	66	-	827	67	-	73	53	-	-	-	-	-	-
ssl_proxy	0	8	32	15	49	22	30	3	48	8	4	12	22	39	7	37	13	21	51	6	67	38	41	41	32	9	31	33
streamcluster	16	11	20	21	40	9	3	-	-	-	3	-	26	25	22	21	24	24	33	4	30	29	28	0	15	17	1	13
streamcluster_ll	23	23	36	43	62	3	0	-	-	-	3	-	77	78	61	56	78	46	57	13	53	75	69	9	28	27	9	21
upscaledb	6	17	29	8	190	11	12	14	179	18	5	12	0	4	16	181	21	32	98	21	83	57	73	48	28	29	30	30
vips	57	49	6	294	1	152	108	-	-	-	127	-	276	0	40	0	38	2	0	55	0	0	2	2	51	12	2	4
volrend	0	1	8	4	10	0	0	2	9	2	0	1	3	6	0	7	2	3	15	1	14	18	28	12	5	2	6	8
water_nsquared	89	42	0	5	4	1	1	55	55	53	6	3	3	3	3	3	3	8	1	0	0	0	1	0	1	0	0	31
water_spatial	297	42	0	4	3	2	1	217	218	57	6	2	4	4	4	4	4	5	2	1	1	0	1	0	1	0	0	35

Table LXII: For each lock-sensitive application, at *max nodes*, performance gain, (in %) obtained by the best lock(s) with respect to each of the other locks. A gray cell highlights a configuration where a given lock hurts the application, i.e., the performance gain is greater than 15%. A line with many gray cells corresponds to an application whose performance is hurt by many locks. A column with many gray cells corresponds to a lock that is outperformed by many other locks. Dashes correspond to untested cases. (**I-48 machine in energy-saving mode**).

Applications	dedup	ferret	kyotocabinet	linear_regression	memcached-new	memcached-old	mysqld	pca	pca_ll	radiosity	radiosity_ll	s_raytrace	s_raytrace_ll	sqlite	ssl_proxy	streamcluster	streamcluster_ll	upscaledb	vips	volrend	water_nsquared	water_spatial
ttas-ls	411	14	72	13	33	94	-	48	132	38	440	243	245	-	181	217	298	58	1	21	44	321
ttas	0	14	64	18	30	99	-	42	146	30	436	177	213	-	189	225	268	57	0	17	0	0
ticket-ls	1k	401	41	13	0	183	-	36	46	20	247	101	98	-	125	457	502	39	5	10	5	1
ticket	2k	527	66	17	34	183	-	51	80	28	379	161	176	-	189	488	522	58	100	15	2	0
spinlock-ls	5	14	322	53	89	80	-	190	550	106	1k	689	817	-	730	274	308	187	3	30	3	0
spinlock	10	14	578	68	126	96	-	243	691	142	2k	787	845	-	2k	393	424	195	3	40	2	0
pthreadadapt	20	0	91	10	56	189	8	29	190	17	159	101	74	15	94	485	569	106	0	25	5	0
pthread	11	1	125	12	72	195	4	36	103	22	267	62	68	35	134	386	456	138	2	25	1	2
partitioned	2k	557	53	8	-	-	-	27	30	16	174	66	58	-	98	18	13	36	167	1	0	1
mutexee	2	0	121	10	50	150	3	29	85	17	211	58	63	37	129	432	444	138	0	15	2	0
mcs-timepub	80	11	50	11	31	166	56	14	23	7	90	12	26	4k	62	274	303	36	2	3	6	8
mcs-ls	448	537	28	47	41	170	-	12	9	5	71	11	13	-	45	288	319	22	135	2	2	9
mcs_stp	62	0	423	79	296	93	9	286	980	147	2k	1k	1k	505	1k	342	379	303	6	11	6	9
mcs_spin	227	552	30	4	36	91	-	9	9	5	58	8	11	-	57	298	346	27	139	10	3	9
malth_stp	70	0	78	7	45	171	6	5	72	11	149	96	135	0	109	418	467	21	1	21	0	9
malth_spin	469	662	58	8	13	186	-	6	19	8	129	42	104	-	61	356	359	26	408	2	2	9
hticket-ls	252	660	19	21	-	-	-	11	1	2	25	20	35	-	19	-	-	0	-	1	2	8
hmcs	128	629	17	0	64	38	-	3	1	0	0	0	0	-	6	36	52	4	347	0	5	13
clh-ls	2k	558	34	28	-	-	-	14	14	22	91	24	30	-	51	-	-	26	-	10	90	620
clh_stp	655	1	487	83	-	-	-	315	925	173	2k	1k	1k	-	1k	-	-	281	-	26	89	618
clh_spin	2k	556	37	3	-	-	-	15	16	19	92	23	31	-	55	-	-	26	-	14	97	614
c-tkt-tkt	2k	589	18	1	42	8	-	10	1	3	22	7	15	-	26	13	2	4	324	0	4	1
c-ptl-tkt	2k	609	21	21	-	-	-	3	0	4	54	0	13	-	45	81	121	4	410	1	2	2
c-bo-mcs_stp	67	1	161	74	87	29	0	108	280	48	779	453	151	196	473	424	433	63	48	42	4	9
c-bo-mcs_spin	155	614	0	12	25	26	-	0	9	2	8	28	29	-	0	162	177	0	706	2	0	11
backoff	2	16	39	6	2	93	-	3	52	7	106	9	45	-	22	486	466	27	2	150	0	2
alock-ls	716	560	33	6	24	0	-	17	10	13	65	13	14	-	47	0	0	23	127	10	52	320
ahmcs	-	640	14	11	90	14	-	8	3	18	1	0	2	-	7	47	49	3	213	9	128	917

Table LXIII: For each lock-sensitive application, at *opt nodes*, performance gain, (in %) obtained by the best lock(s) with respect to each of the other locks. A gray cell highlights a configuration where a given lock hurts the application, i.e., the performance gain is greater than 15%. A line with many gray cells corresponds to an application whose performance is hurt by many locks. A column with many gray cells corresponds to a lock that is outperformed by many other locks. Dashes correspond to untested cases. (**I-48 machine in energy-efficiency mode**).

Applications	ahmcs	alock-ls	backoff	c-bo-mcs_spin	c-bo-mcs_stp	c-ptl-tkt	c-tkt-tkt	clh_spin	clh_stp	clh-ls	hmcs	hticket-ls	malth_spin	malth_stp	mcs_spin	mcs_stp	mcs-ls	mcs-timepub	mutexee	partitioned	pthread	pthreadadapt	spinlock	spinlock-ls	ticket	ticket-ls	ttas	ttas-ls
dedup	-	451	5	86	68	18	5	726	715	728	93	65	60	59	59	59	59	94	0	7	0	0	1	7	5	2	1	381
ferret	46	45	8	48	1	44	50	49	0	46	45	81	63	0	45	0	64	7	0	55	1	0	8	9	45	44	7	8
kyotocabinet	10	25	6	0	14	12	9	22	384	24	13	15	31	58	23	413	20	35	94	33	106	71	128	90	42	30	29	32
linear_regression	10	6	6	11	45	9	1	3	79	21	0	6	8	7	4	79	10	11	10	8	12	10	68	45	17	13	16	13
memcached-new	53	24	2	0	37	-	0	-	-	-	62	-	9	13	12	68	37	17	9	-	18	13	5	9	14	0	10	11
memcached-old	0	13	13	9	11	-	23	-	-	-	15	-	72	70	32	31	59	60	62	-	71	78	35	29	85	74	15	42
mysqld	-	-	-	-	0	-	-	-	-	-	-	-	-	5	-	7	-	56	3	-	4	4	-	-	-	-	-	-
pca	8	7	10	0	31	2	4	10	277	10	6	8	1	11	10	308	9	11	26	8	32	21	12	14	17	10	7	12
pca_ll	3	10	52	9	195	0	1	16	403	14	1	1	18	45	9	186	9	19	75	20	89	97	182	69	40	37	39	39
radiosity	16	9	6	0	7	0	0	17	71	17	0	1	5	9	4	25	4	6	12	7	16	11	22	15	16	12	13	20
radiosity_ll	1	61	102	8	52	18	21	87	1k	88	0	24	129	149	57	2k	59	80	163	99	249	159	263	218	248	169	162	163
s_raytrace	0	7	9	24	90	0	7	13	179	18	0	13	38	88	5	211	6	12	57	31	54	80	172	172	94	60	62	84
s_raytrace_ll	2	14	44	29	151	8	15	31	342	30	0	35	104	135	11	343	13	26	63	58	68	74	343	345	176	98	213	245
sqlite	-	-	-	-	0	-	-	-	-	-	-	-	-	41	-	618	-	35	61	-	74	55	-	-	-	-	-	-
ssl_proxy	0	42	23	6	54	27	9	61	1k	53	0	12	80	153	48	1k	37	58	124	57	144	130	445	209	178	125	135	121
streamcluster	8	3	25	5	6	3	1	-	-	-	0	-	41	38	19	15	36	14	32	7	15	35	19	17	41	42	17	14
streamcluster_ll	21	0	125	43	41	16	15	-	-	-	15	-	151	158	91	99	103	109	145	21	78	160	122	75	161	161	84	75
upscaledb	1	23	27	0	63	2	1	26	264	26	1	0	17	21	26	274	22	36	124	35	124	106	68	67	48	37	46	47
vips	24	24	2	22	22	22	22	-	-	-	24	-	23	1	23	6	22	2	0	22	2	0	3	3	23	5	0	1
volrend	17	7	41	3	23	0	0	12	24	11	1	0	5	15	3	13	2	9	17	7	20	27	26	20	18	9	15	18
water_nsquared	128	52	0	0	4	2	4	97	89	90	5	2	2	0	3	6	2	6	2	0	1	5	2	3	2	5	0	44
water_spatial	917	320	2	11	9	2	1	614	618	620	13	8	9	9	9	9	9	8	0	1	2	0	0	0	0	1	0	321

Table LXIV: For each lock-sensitive application, at *max nodes*, performance gain, (in %) obtained by the best lock(s) with respect to each of the other locks. A gray cell highlights a configuration where a given lock hurts the application, i.e., the performance gain is greater than 15%. A line with many gray cells corresponds to an application whose performance is hurt by many locks. A column with many gray cells corresponds to a lock that is outperformed by many other locks. Dashes correspond to untested cases. (**I-20 machine in energy-saving mode**).

Applications	ahmcs	alock-ls	backoff	c-bo-mcs_spin	c-bo-mcs_stp	c-ptl-tkt	c-tkt-tkt	clh_spin	clh_stp	clh-ls	hmcs	hticket-ls	malth_spin	malth_stp	mcs_spin	mcs_stp	mcs-ls	mcs-timepub	mutexee	partitioned	pthread	pthreadadapt	spinlock	spinlock-ls	ticket	ticket-ls	ttas	ttas-ls
dedup	-	1k	25	261	56	178	165	695	501	758	428	202	316	56	233	54	305	83	1	132	0	1	22	24	110	222	25	307
ferret	363	343	46	369	2	367	366	337	0	342	354	367	407	0	338	0	338	29	0	339	0	0	66	67	340	296	68	69
kyotocabinet	4	12	6	0	251	8	3	14	253	17	10	6	27	19	10	249	10	16	70	21	61	38	112	71	22	12	21	20
memcached-old	2	3	3	2	315	-	2	-	-	-	3	-	1	20	1	254	2	3	81	-	97	36	5	2	0	1	2	4
pca	1	5	10	4	184	0	4	6	167	5	3	3	4	11	5	163	3	2	14	3	15	31	36	5	7	2	3	10
pca_ll	2	3	7	1	473	2	0	0	423	2	1	0	3	3	1	437	1	1	9	0	16	3	1	0	0	0	0	1
radiosity	23	11	5	5	52	1	3	19	77	17	2	1	6	13	3	60	0	4	7	12	11	21	50	22	14	7	14	16
radiosity_ll	2	9	33	0	577	2	0	16	799	22	1	4	29	46	8	802	10	15	56	59	76	156	427	167	89	40	78	59
s_raytrace	0	0	1	2	337	0	0	0	312	1	1	1	1	3	0	224	0	0	2	0	3	3	2	0	1	0	0	0
s_raytrace_ll	2	2	4	3	582	1	1	2	641	2	2	2	2	1	1	643	1	2	3	1	5	1	0	1	1	1	1	1
sqlite	-	-	-	-	321	-	-	-	-	-	-	-	-	0	-	388	-	9k	22	-	27	58	-	-	-	-	-	-
streamcluster	23	0	61	17	33	24	12	-	-	-	9	-	55	55	49	45	61	51	387	6	168	129	85	27	82	80	31	29
streamcluster_ll	20	0	67	17	29	26	9	-	-	-	9	-	59	60	50	50	67	57	466	0	233	158	91	39	80	90	34	36
upscaledb	3	11	21	1	143	0	7	14	152	13	1	3	5	13	10	150	10	14	129	21	125	123	56	35	13	11	12	20
vips	115	62	3	50	0	62	21	-	-	-	85	-	39	0	25	0	29	1	1	80	2	1	3	2	49	52	2	1
water_nsquared	47	17	0	0	1	0	0	32	31	33	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	16
water_spatial	325	110	0	3	3	0	0	219	212	211	4	3	2	3	3	2	3	2	0	0	0	0	0	0	0	1	0	107

Table LXV: For each lock-sensitive application, at *opt nodes*, performance gain, (in %) obtained by the best lock(s) with respect to each of the other locks. A gray cell highlights a configuration where a given lock hurts the application, i.e., the performance gain is greater than 15%. A line with many gray cells corresponds to an application whose performance is hurt by many locks. A column with many gray cells corresponds to a lock that is outperformed by many other locks. Dashes correspond to untested cases. (**I-20 machine in energy-efficiency mode**).

Applications	ahmcs	alock-ls	backoff	c-bo-mcs_spin	c-bo-mcs_stp	c-ptl-tkt	c-tkt-tkt	clh_spin	clh_stp	clh-ls	hmcs	hticket-ls	malth_spin	malth_stp	mcs_spin	mcs_stp	mcs-ls	mcs-timepub	mutexee	partitioned	pthread	pthreadadapt	spinlock	spinlock-ls	ticket	ticket-ls	ttas	ttas-ls
dedup	-	437	5	82	81	15	9	722	711	703	105	66	80	74	78	71	76	77	3	8	2	0	4	6	8	6	6	378
ferret	101	92	46	103	2	102	103	92	0	91	102	109	136	0	90	0	89	29	0	89	0	0	54	54	87	90	54	53
kyotocabinet	3	13	3	0	249	6	3	14	255	16	8	6	22	21	12	250	10	18	74	21	58	32	53	33	19	12	17	18
memcached-old	2	3	3	2	315	-	2	-	-	-	3	-	1	20	1	254	2	3	81	-	97	36	5	2	0	1	2	4
pca	1	5	10	4	23	0	4	6	19	5	3	3	4	11	5	20	3	2	14	3	15	14	15	5	7	2	3	10
pca_ll	2	3	7	1	87	2	0	0	88	2	1	0	3	3	1	86	1	1	9	0	16	3	1	0	0	0	0	1
radiosity	23	11	5	5	5	1	2	19	20	17	2	1	6	6	3	5	0	4	4	6	2	5	6	7	7	5	5	13
radiosity_ll	2	9	33	0	61	2	0	16	65	22	1	4	29	46	8	54	10	15	56	56	69	63	57	54	56	40	53	53
s_raytrace	0	0	1	2	89	0	0	0	91	1	1	1	1	3	0	88	0	0	2	0	3	3	2	0	1	0	0	0
s_raytrace_ll	2	2	4	3	76	1	1	2	77	2	2	2	2	1	1	77	1	2	3	1	5	1	0	1	1	1	1	1
sqlite	-	-	-	-	25	-	-	-	-	-	-	-	-	0	-	394	-	16	47	-	49	42	-	-	-	-	-	-
streamcluster	8	0	28	19	27	12	18	-	-	-	13	-	24	16	18	17	25	10	28	15	3	23	25	8	36	34	19	13
streamcluster_ll	20	0	67	17	29	26	9	-	-	-	9	-	59	60	50	50	67	57	112	0	67	100	91	39	80	90	34	36
upscaledb	3	11	21	1	143	0	7	14	145	13	1	3	5	13	10	147	10	14	129	21	125	123	34	29	13	11	12	20
vips	93	62	3	50	0	62	21	-	-	-	85	-	39	0	25	0	29	1	1	80	2	1	3	2	49	52	2	1
water_nsquared	47	17	0	0	1	0	0	32	31	33	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	16
water_spatial	325	110	0	3	3	0	0	219	212	211	4	3	2	3	3	2	3	2	0	0	0	0	0	0	0	1	0	107

A.7. Impact of the number of nodes.

Table LXVI: For each lock-sensitive application, percentage of pairwise changes in the lock performance hierarchy when changing the number of nodes (**A-48 machine**).

	% of pairwise changes between configurations			
Applications	1/2	2/4	4/8	1/2/4/8
dedup	14%	10%	22%	32%
ferret	0%	72%	15%	83%
fmm	23%	23%	18%	36%
kyotocabinet	25%	8%	14%	38%
linear_regression	18%	36%	32%	61%
memcached-new	58%	39%	0%	76%
memcached-old	37%	29%	0%	55%
mysqld	29%	0%	5%	33%
pca	31%	33%	29%	76%
pca_ll	20%	25%	53%	91%
radiosity	31%	45%	15%	76%
radiosity_ll	30%	53%	18%	84%
s_raytrace	21%	43%	33%	94%
s_raytrace_ll	24%	51%	27%	96%
sqlite	5%	14%	52%	67%
ssl_proxy	35%	26%	14%	56%
streamcluster	15%	59%	35%	85%
streamcluster_ll	32%	49%	38%	95%
upscaledb	23%	16%	11%	44%
vips	0%	5%	84%	84%
volrend	19%	21%	39%	77%
water_nsquared	29%	28%	22%	60%
water_spatial	15%	15%	6%	31%

Table LXVII: For each lock-sensitive application, percentage of pairwise changes in the lock performance hierarchy when changing the number of nodes (**I-48 machine in performance mode**).

	% of pairwise changes between configurations			
Applications	1/2	2/3	3/4	1/2/3/4
dedup	13%	28%	22%	48%
ferret	26%	65%	15%	87%
kyotocabinet	12%	7%	4%	19%
linear_regression	34%	38%	39%	78%
memcached-new	47%	29%	0%	56%
memcached-old	14%	15%	0%	25%
mysqld	7%	29%	24%	38%
pca	47%	12%	15%	59%
pca_ll	41%	30%	14%	76%
radiosity	25%	15%	10%	42%
radiosity_ll	23%	10%	7%	31%
s_raytrace	65%	19%	9%	89%
s_raytrace_ll	86%	15%	10%	98%
sqlite	29%	33%	19%	57%
ssl_proxy	14%	4%	6%	20%
streamcluster	24%	22%	23%	44%
streamcluster_ll	20%	19%	25%	43%
upscaledb	7%	8%	6%	15%
vips	0%	0%	76%	76%
volrend	31%	34%	21%	71%
water_nsquared	0%	0%	4%	4%
water_spatial	13%	13%	5%	29%

Table LXVIII: For each lock-sensitive application, percentage of pairwise changes in the lock performance hierarchy when changing the number of nodes (**I-20 machine in performance mode**).

	% of pairwise changes between configurations
Applications	1/2
dedup	27%
ferret	18%
kyotocabinet	9%
memcached-old	0%
pca	52%
pca_ll	37%
radiosity	56%
radiosity_ll	75%
s_raytrace	21%
s_raytrace_ll	21%
sqlite	48%
streamcluster	46%
streamcluster_ll	46%
upscaledb	13%
vips	74%
water_nsquared	0%
water_spatial	0%

Table LXIX: For each lock-sensitive application, percentage of pairwise changes in the lock performance hierarchy when changing the number of nodes (**A-64 machine with thread-to-node pinning**).

	% of pairwise changes between configurations			
Applications	1/2	2/4	4/8	1/2/4/8
dedup	10%	11%	13%	19%
facesim	0%	43%	30%	73%
ferret	23%	13%	15%	41%
fluidanimate	28%	9%	10%	36%
kyotocabinet	30%	16%	10%	47%
linear_regression	27%	50%	25%	80%
memcached-new	52%	23%	0%	68%
memcached-old	36%	20%	0%	51%
mysqld	26%	14%	38%	57%
ocean_cp	0%	30%	46%	76%
ocean_ncp	0%	25%	48%	74%
pca	25%	48%	16%	81%
pca_ll	8%	53%	58%	95%
radiosity	0%	54%	12%	66%
radiosity_ll	53%	52%	14%	96%
s_raytrace	5%	46%	44%	88%
s_raytrace_ll	0%	87%	23%	96%
sqlite	45%	10%	5%	45%
ssl_proxy	62%	15%	13%	74%
streamcluster	62%	24%	23%	84%
streamcluster_ll	56%	23%	26%	81%
upscaledb	47%	20%	20%	58%
vips	13%	6%	15%	26%
volrend	23%	22%	36%	80%
water_nsquared	20%	10%	7%	38%
water_spatial	3%	0%	3%	6%

Table LXX: For each lock-sensitive application, percentage of pairwise changes in the lock performance hierarchy when changing the number of nodes (**I-48 machine in energy-saving mode**).

	% of pairwise changes between configurations			
Applications	1/2	2/3	3/4	1/2/3/4
dedup	13%	28%	22%	48%
ferret	26%	65%	15%	87%
kyotocabinet	12%	7%	4%	19%
linear_regression	34%	38%	39%	78%
memcached-new	47%	29%	0%	56%
memcached-old	14%	15%	0%	25%
mysqld	7%	29%	24%	38%
pca	47%	12%	15%	59%
pca_ll	41%	30%	14%	76%
radiosity	25%	15%	10%	42%
radiosity_ll	23%	10%	7%	31%
s_raytrace	65%	19%	9%	89%
s_raytrace_ll	86%	15%	10%	98%
sqlite	29%	33%	19%	57%
ssl_proxy	14%	4%	6%	20%
streamcluster	24%	22%	23%	44%
streamcluster_ll	20%	19%	25%	43%
upscaledb	7%	8%	6%	15%
vips	0%	0%	76%	76%
volrend	31%	34%	21%	71%
water_nsquared	0%	0%	4%	4%
water_spatial	13%	13%	5%	29%

Table LXXI: For each lock-sensitive application, percentage of pairwise changes in the lock performance hierarchy when changing the number of nodes (**I-20 machine in energy-saving mode**).

	% of pairwise changes between configurations
Applications	1/2
dedup	27%
ferret	18%
kyotocabinet	9%
memcached-old	0%
pca	52%
pca_ll	37%
radiosity	56%
radiosity_ll	75%
s_raytrace	21%
s_raytrace_ll	21%
sqlite	48%
streamcluster	46%
streamcluster_ll	46%
upscaledb	13%
vips	74%
water_nsquared	0%
water_spatial	0%

A.8. Impact of the machine.

Table LXXII: For each pair of machines, at *max nodes* and *opt nodes*, percentage of pairwise changes in the lock performance hierarchy (**all machines**).

	A-64 vs.	A-48 vs.	A-64 vs.	I-48 vs.
# nodes	A-48	I-48	I-48	I-20
Max	25%	26%	28%	33%
Opt	31%	36%	34%	36%

B. STUDY OF LOCK ENERGY EFFICIENCY

B.1. Selection of lock sensitive application

Table LXXIII: For each application, energy-efficiency gain of the best vs. worst lock and relative standard deviation (**I-48 machine in energy-saving mode**).

	Gain *one node*	R.Dev. *one node*	Gain *max nodes*	R.Dev. *max nodes*	Gain *opt nodes*	R.Dev. *opt nodes*
barnes	7%	2%	17%	4%	17%	4%
blackscholes	1%	0%	1%	0%	1%	0%
bodytrack	1%	0%	80%	9%	11%	3%
canneal	1%	0%	2%	0%	2%	0%
dedup	**619%**	**44%**	**2789%**	**68%**	**619%**	**44%**
ferret	**1%**	**0%**	**569%**	**75%**	**28%**	**8%**
fmm	6%	2%	22%	6%	18%	4%
freqmine	2%	0%	1%	0%	1%	0%
histogram	17%	3%	30%	6%	17%	3%
kmeans	2%	0%	7%	2%	4%	1%
kyotocabinet	**293%**	**26%**	**967%**	**37%**	**293%**	**26%**
linear_regression	**8%**	**2%**	**192%**	**22%**	**86%**	**14%**
lu_cb	3%	1%	2%	1%	2%	1%
lu_ncb	7%	2%	4%	1%	4%	1%
matrix_multiply	2%	1%	7%	2%	7%	2%
memcached-new	**107%**	**21%**	**629%**	**27%**	**88%**	**17%**
memcached-old	**69%**	**18%**	**191%**	**37%**	**69%**	**18%**
mysqld	**103%**	**19%**	**87%**	**18%**	**87%**	**18%**
p_raytrace	2%	1%	3%	1%	1%	0%
pca	**204%**	**19%**	**778%**	**35%**	**204%**	**19%**
pca_ll	**16%**	**3%**	**1139%**	**44%**	**52%**	**14%**
radiosity	**36%**	**7%**	**577%**	**31%**	**39%**	**8%**
radiosity_ll	**169%**	**22%**	**4028%**	**62%**	**223%**	**28%**
rocksdb	3%	1%	7%	2%	7%	2%
s_raytrace	**3%**	**1%**	**2308%**	**49%**	**81%**	**20%**
s_raytrace_ll	**2%**	**1%**	**1941%**	**45%**	**189%**	**33%**
sqlite	**359%**	**35%**	**5657%**	**75%**	**395%**	**37%**
ssl_proxy	**793%**	**37%**	**2306%**	**51%**	**804%**	**38%**
streamcluster	**43%**	**11%**	**520%**	**65%**	**43%**	**11%**
streamcluster_ll	**60%**	**15%**	**613%**	**74%**	**98%**	**22%**
string_match	1%	0%	8%	2%	8%	2%
swaptions	1%	0%	2%	0%	2%	0%
upscaledb	**586%**	**30%**	**768%**	**39%**	**586%**	**30%**
vips	**2%**	**0%**	**636%**	**46%**	**9%**	**3%**
volrend	11%	2%	44%	9%	19%	4%
water_nsquared	**31%**	**7%**	**67%**	**13%**	**67%**	**13%**
water_spatial	**303%**	**31%**	**589%**	**38%**	**589%**	**38%**
word_count	4%	1%	5%	1%	4%	1%
x264	1%	0%	1%	0%	1%	0%

Table LXXIV: For each application, energy-efficiency gain of the best vs. worst lock and relative standard deviation (**I-20 machine in energy-saving mode**).

	Gain *one node*	R.Dev. *one node*	Gain *max nodes*	R.Dev. *max nodes*	Gain *opt nodes*	R.Dev. *opt nodes*
barnes	5%	1%	7%	2%	7%	2%
blackscholes	1%	0%	1%	0%	1%	0%
bodytrack	7%	2%	2%	1%	2%	1%
canneal	1%	0%	2%	1%	2%	1%
dedup	**489%**	**41%**	**1171%**	**46%**	**489%**	**41%**
ferret	**40%**	**9%**	**325%**	**61%**	**75%**	**18%**
fmm	5%	1%	8%	2%	8%	2%
freqmine	8%	1%	1%	0%	1%	0%
histogram	8%	2%	30%	6%	8%	2%
kmeans	2%	0%	3%	1%	2%	0%
kyotocabinet	**747%**	**32%**	**1684%**	**34%**	**747%**	**32%**
linear_regression	**10%**	**2%**	**102%**	**13%**	**24%**	**5%**
lu_cb	1%	0%	1%	0%	1%	0%
lu_ncb	7%	2%	8%	1%	8%	1%
matrix_multiply	2%	0%	5%	1%	5%	1%
memcached-new	47%	9%	47%	9%	47%	9%
memcached-old	**204%**	**25%**	**204%**	**25%**	**204%**	**25%**
p_raytrace	4%	1%	3%	1%	2%	1%
pca	**8%**	**2%**	**1314%**	**28%**	**18%**	**5%**
pca_ll	**6%**	**1%**	**1020%**	**29%**	**37%**	**8%**
radiosity	**19%**	**4%**	**406%**	**24%**	**20%**	**5%**
radiosity_ll	**16%**	**3%**	**4327%**	**42%**	**32%**	**8%**
rocksdb	7%	1%	7%	2%	7%	2%
s_raytrace	**4%**	**1%**	**2043%**	**28%**	**47%**	**10%**
s_raytrace_ll	**2%**	**0%**	**2581%**	**29%**	**32%**	**7%**
sqlite	**364%**	**34%**	**5444%**	**78%**	**364%**	**34%**
streamcluster	**25%**	**6%**	**118%**	**20%**	**25%**	**6%**
streamcluster_ll	**23%**	**7%**	**153%**	**24%**	**79%**	**19%**
string_match	1%	0%	3%	1%	3%	1%
swaptions	1%	0%	1%	0%	1%	0%
upscaledb	**661%**	**36%**	**1027%**	**37%**	**661%**	**36%**
vips	**1%**	**0%**	**66%**	**18%**	**49%**	**17%**
volrend	15%	4%	39%	6%	15%	4%
water_nsquared	20%	5%	27%	7%	27%	7%
water_spatial	**207%**	**26%**	**296%**	**30%**	**296%**	**30%**
word_count	3%	1%	9%	2%	3%	1%
x264	3%	1%	2%	1%	2%	1%

Table LXXV: Number of tested applications and number of lock energy efficiency sensitive applications (**all machines**).

	I-48	I-20
# tested applications	38	36
# lock-sensitive applications	20	17
ratio	53%	47%

B.2. Selection of the number of nodes

Table LXXVI: For each *(lock-sensitive application, lock)* pair, energy-efficiency gain (in %) of *opt nodes* over *max nodes*. The background color of a cell indicates the number of nodes for *opt nodes*: 1|2|3|4. Dashes correspond to untested cases. (**I-48 machine in energy-saving mode**).

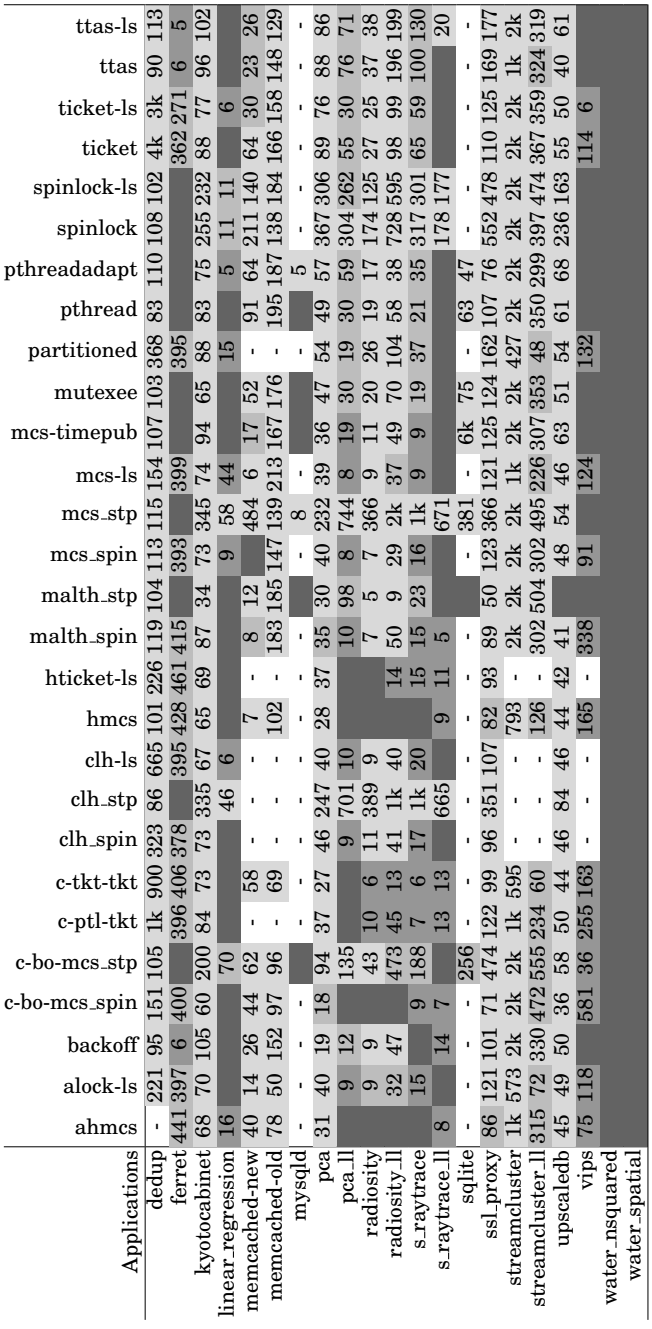
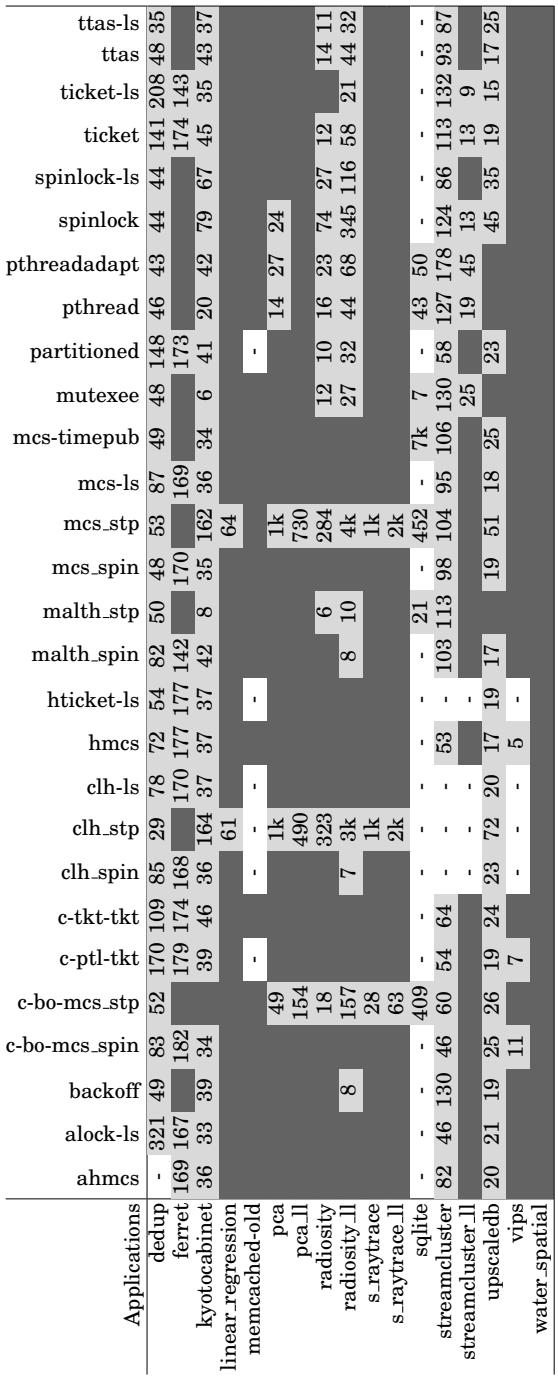


Table LXXVII: For each *(lock-sensitive application, lock)* pair, energy-efficiency gain (in %) of *opt nodes* over *max nodes*. The background color of a cell indicates the number of nodes for *opt nodes*: 1 2. Dashes correspond to untested cases. (**I-20 machine in energy-saving mode**).



B.3. Are some locks always among the best?

Table LXXVIII: For each lock, fraction of the lock-sensitive applications for which the lock yields the best energy-efficiency for three configurations: *one node*, *max nodes* and *opt nodes* (**I-48 machine in energy-saving mode**).

Locks	Number of nodes		
	one node	*max nodes*	*opt nodes*
ahmcs	56%	17%	50%
alock-ls	53%	16%	32%
backoff	68%	21%	37%
c-bo-mcs_spin	68%	37%	53%
c-bo-mcs_stp	57%	14%	24%
c-ptl-tkt	76%	24%	59%
c-tkt-tkt	79%	21%	53%
clh_spin	43%	7%	14%
clh_stp	29%	7%	7%
clh-ls	43%	0%	21%
hmcs	74%	37%	58%
hticket-ls	71%	21%	43%
malth_spin	53%	11%	16%
malth_stp	43%	33%	24%
mcs_spin	58%	11%	37%
mcs_stp	33%	19%	19%
mcs-ls	58%	11%	37%
mcs-timepub	43%	10%	24%
mutexee	38%	19%	24%
partitioned	65%	24%	29%
pthread	38%	24%	24%
pthreadadapt	43%	19%	29%
spinlock	42%	16%	21%
spinlock-ls	53%	16%	32%
ticket	53%	11%	21%
ticket-ls	53%	11%	21%
ttas	53%	21%	26%
ttas-ls	37%	5%	11%

Table LXXIX: For each lock, fraction of the lock-sensitive applications for which the lock yields the best energy-efficiency for three configurations: *one node*, *max nodes* and *opt nodes* (**I-20 machine in energy-saving mode**).

Locks	Number of nodes		
	one node	*max nodes*	*opt nodes*
ahmcs	60%	40%	53%
alock-ls	50%	44%	38%
backoff	69%	44%	50%
c-bo-mcs_spin	75%	50%	62%
c-bo-mcs_stp	53%	18%	24%
c-ptl-tkt	73%	53%	67%
c-tkt-tkt	81%	56%	69%
clh_spin	50%	33%	33%
clh_stp	33%	8%	8%
clh-ls	50%	33%	33%
hmcs	69%	50%	56%
hticket-ls	83%	58%	75%
malth_spin	56%	38%	38%
malth_stp	53%	53%	47%
mcs_spin	62%	44%	44%
mcs_stp	53%	18%	18%
mcs-ls	56%	44%	44%
mcs-timepub	59%	47%	53%
mutexee	59%	47%	47%
partitioned	80%	47%	60%
pthread	59%	24%	24%
pthreadadapt	59%	47%	53%
spinlock	62%	38%	38%
spinlock-ls	69%	44%	50%
ticket	69%	31%	38%
ticket-ls	69%	44%	56%
ttas	81%	44%	56%
ttas-ls	56%	31%	31%

B.4. Is there a clear hierarchy between locks?

Table LXXX: For each pair of locks *(rowA, colB)* at *opt nodes*, scores of lock A vs lock B: percentage of lock-sensitive applications for which lock A is more energy-efficient by at least 5% than B (**I-48 machine in energy-saving mode**).

	ahmcs	alock-ls	backoff	c-bo-mcs_spin	c-bo-mcs_stp	c-ptl-tkt	c-tkt-tkt	clh_spin	clh_stp	clh-ls	hmcs	hticket-ls	malth_spin	malth_stp	mcs_spin	mcs_stp	mcs-ls	mcs-timepub	mutexee	partitioned	pthread	pthreadadapt	spinlock	spinlock-ls	ticket	ticket-ls	ttas	ttas-ls	average
ahmcs		33	44	17	61	25	28	46	77	38	22	23	61	61	50	72	50	50	67	50	67	61	67	61	67	61	61	61	51
alock-ls	28		37	11	42	12	5	57	93	57	11	7	47	47	21	68	21	47	63	41	63	58	63	58	68	47	47	58	44
backoff	33	42		26	58	29	16	50	93	50	32	29	63	58	32	68	42	47	47	41	63	58	58	42	63	63	47	68	49
c-bo-mcs_spin	28	47	42		53	24	11	64	93	64	21	21	63	63	42	74	42	58	74	41	68	63	63	58	58	58	63	79	53
c-bo-mcs_stp	28	37	26	5		6	5	43	86	50	21	7	47	43	37	67	32	43	43	18	48	43	53	47	47	42	53	68	39
c-ptl-tkt	19	53	53	18	59		6	79	93	71	12	29	65	71	47	76	41	59	71	47	71	65	65	65	65	65	65	82	56
c-tkt-tkt	28	53	47	16	63	18		71	93	71	26	14	74	68	47	79	53	58	74	53	68	63	63	58	68	63	68	84	57
clh_spin	15	0	14	7	43	7	0		71	0	0	0	43	43	0	71	0	21	57	21	57	57	64	57	50	36	43	50	31
clh_stp	23	7	7	7	0	7	7	7		7	7	7	7	0	7	7	7	7	0	7	0	0	7	7	7	7	7	7	6
clh-ls	15	0	14	7	43	7	0	7	71		0	0	36	43	0	71	0	29	57	14	57	57	64	57	57	29	36	36	30
hmcs	17	47	53	21	47	18	16	79	93	71		29	63	58	42	68	42	53	68	41	63	63	68	58	68	63	58	79	54
hticket-ls	23	57	29	14	57	7	0	57	93	57	7		57	71	29	71	21	43	71	57	71	64	64	64	71	64	64	86	51
malth_spin	22	21	11	5	32	0	0	29	93	29	11	0		21	5	58	5	26	37	6	42	37	53	47	53	21	21	53	27
malth_stp	28	32	16	11	33	12	11	29	93	29	21	7	16		16	62	16	29	29	12	29	38	53	53	37	21	21	37	29
mcs_spin	17	21	37	16	42	6	0	57	93	50	11	14	47	53		53	16	53	68	41	58	63	53	47	63	53	47	58	42
mcs_stp	17	21	16	11	5	6	5	29	29	29	16	7	21	14	11		26	24	14	6	5	14	11	5	21	21	5	21	15
mcs-ls	17	16	21	11	42	6	0	57	93	57	11	7	47	47	5	53		42	53	35	53	53	53	47	74	47	42	63	39
mcs-timepub	22	21	16	11	33	6	5	36	93	36	16	7	32	33	11	52	16		48	24	48	52	53	47	53	42	26	47	33
mutexee	33	32	5	21	33	18	11	29	93	29	26	21	42	33	21	67	26	33		12	29	29	47	37	53	32	16	37	32
partitioned	19	18	29	6	47	18	0	29	93	29	18	7	41	47	18	76	18	24	59		59	65	65	65	59	35	41	65	39
pthread	28	32	16	16	29	18	11	29	93	29	26	14	37	24	21	67	32	33	14	12		19	53	26	42	26	21	32	30
pthreadadapt	28	32	11	16	29	18	11	29	86	29	26	14	32	19	21	62	21	29	14	12	19		42	37	47	21	16	32	28
spinlock	22	26	11	16	26	12	5	29	71	29	21	14	37	21	16	47	32	26	26	6	16	26		0	21	21	5	21	22
spinlock-ls	22	32	21	26	37	12	11	29	79	29	32	21	37	32	21	63	32	26	32	12	32	37	53		26	26	16	26	30
ticket	17	21	11	11	37	6	5	21	93	21	16	7	11	16	11	63	11	11	26	0	26	21	47	32		5	5	32	22
ticket-ls	22	21	11	5	37	12	0	21	93	21	16	7	16	21	11	63	11	32	26	0	42	37	47	47	42		16	37	26
ttas	28	32	16	21	42	18	11	29	93	29	26	21	37	32	26	74	37	42	32	12	37	47	58	42	53	26		37	35
ttas-ls	28	21	16	11	32	12	11	29	86	29	16	7	26	26	16	58	32	21	32	12	37	47	47	37	53	26	0		28
average	23	29	23	13	39	12	7	40	86	38	17	13	41	39	22	63	25	36	45	23	45	46	53	45	51	38	34	50	23

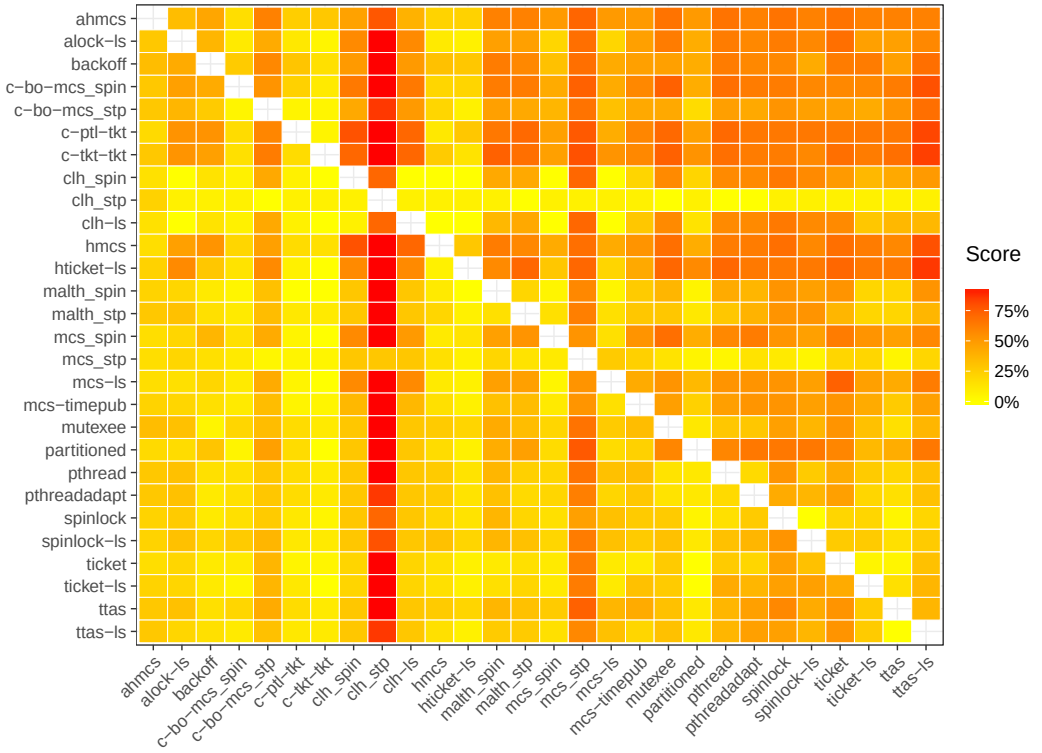


Fig. 21: For each pair of locks *(rowA, colB)* at *opt nodes*, scores of lock A vs lock B: percentage of lock-sensitive applications for which lock A is more energy-efficient at least 5% better than B (**I-48 machine in energy-saving move**).

Table LXXXI: For each pair of locks *(rowA, colB)* at *opt nodes*, scores of lock A vs lock B: percentage of lock-sensitive applications for which lock A is more energy-efficient by at least 5% than B (**I-20 machine in energy-saving mode**).

	ahmcs	alock-ls	backoff	c-bo-mcs_spin	c-bo-mcs_stp	c-ptl-tkt	c-tkt-tkt	clh_spin	clh_stp	clh-ls	hmcs	hticket-ls	malth_spin	malth_stp	mcs_spin	mcs_stp	mcs-ls	mcs-timepub	mutexee	partitioned	pthread	pthreadadapt	spinlock	spinlock-ls	ticket	ticket-ls	ttas	ttas-ls	average
ahmcs		27	33	13	67	14	7	27	73	27	13	0	40	27	20	67	33	33	53	29	47	47	53	27	33	33	20	33	33
alock-ls	20		31	12	69	13	6	25	92	33	12	0	31	19	6	56	6	12	50	13	44	44	50	19	25	12	12	19	27
backoff	33	38		31	56	27	19	50	83	42	31	17	31	19	31	50	31	19	31	20	38	25	25	19	31	25	12	25	32
c-bo-mcs_spin	20	38	31		62	13	6	58	92	50	19	8	31	31	31	62	25	25	44	20	50	44	50	38	44	25	25	50	37
c-bo-mcs_stp	27	25	12	12		20	12	33	58	33	19	8	19	12	19	29	19	12	24	13	18	18	19	12	25	19	12	25	21
c-ptl-tkt	14	40	40	7	67		0	50	92	58	7	8	47	40	27	73	33	33	40	20	53	33	47	40	40	27	33	53	38
c-tkt-tkt	20	38	31	12	75	13		58	92	50	12	8	44	38	25	69	25	31	50	20	56	44	50	44	44	31	25	50	39
clh_spin	9	0	25	0	58	0	0		67	0	0	0	17	0	0	58	0	8	42	8	42	33	33	17	8	0	8	17	17
clh_stp	18	8	8	8	0	8	8	8		8	8	8	8	0	8	8	8	8	0	8	0	0	8	8	8	8	8	8	7
clh-ls	9	0	25	0	58	0	0	0	67		0	0	8	0	0	58	0	0	42	8	42	33	33	17	8	0	8	17	16
hmcs	20	31	31	6	62	13	0	58	92	50		0	31	31	19	62	19	25	44	20	50	44	50	38	44	31	25	50	35
hticket-ls	18	50	33	8	75	0	0	50	92	50	8		33	25	17	67	17	33	42	25	42	33	42	25	33	25	25	58	34
malth_spin	20	25	19	6	50	13	6	25	92	25	19	0		6	6	50	6	6	50	7	38	44	38	12	12	12	0	25	23
malth_stp	27	31	19	12	47	20	12	42	92	42	19	8	19		19	53	19	18	35	27	29	29	31	19	31	31	19	25	29
mcs_spin	13	31	31	6	56	13	6	33	92	33	19	0	25	25		56	0	25	50	20	38	44	50	25	25	25	12	44	30
mcs_stp	27	25	12	12	6	20	12	33	33	33	19	8	19	6	12		12	12	24	13	12	18	19	6	25	25	6	19	17
mcs-ls	13	25	31	6	56	13	6	33	92	42	19	0	19	25	0	56		19	50	20	38	44	50	25	31	25	12	44	29
mcs-timepub	27	31	31	12	47	20	12	33	92	33	25	8	12	12	12	53	12		53	13	41	47	50	12	25	25	6	31	29
mutexee	27	31	6	19	47	20	12	33	75	33	19	17	19	12	19	47	19	12		13	12	0	12	6	12	12	6	25	21
partitioned	29	27	33	20	67	13	13	25	92	25	20	8	27	27	20	67	20	20	47		47	40	40	27	20	13	7	40	31
pthread	27	25	12	25	59	27	12	33	75	33	19	17	31	12	25	53	31	18	18	13		12	25	6	25	25	6	19	25
pthreadadapt	27	31	6	19	53	20	12	33	75	33	19	17	19	12	19	53	19	12	12	13	18		19	6	12	12	6	25	22
spinlock	27	25	6	19	50	13	12	33	83	33	19	17	19	12	19	50	19	6	38	13	38	19		0	12	12	0	12	22
spinlock-ls	27	31	25	25	62	27	12	33	92	33	25	17	31	19	25	62	25	12	44	13	38	31	31		25	25	0	12	30
ticket	13	19	19	12	56	13	6	25	92	25	19	8	12	12	6	56	6	12	31	7	38	19	25	12		0	0	12	21
ticket-ls	13	25	19	12	56	7	6	25	92	25	19	8	12	19	6	56	6	12	44	13	44	31	38	25	12		6	31	25
ttas	27	31	25	25	62	27	12	33	92	33	25	17	31	19	25	69	31	19	50	13	50	44	44	6	25	25		25	33
ttas-ls	27	19	19	12	50	20	12	33	83	33	19	8	19	12	19	50	19	6	44	13	31	38	31	6	31	25	0		25
average	21	27	23	13	55	15	8	34	83	34	17	8	24	17	16	55	17	17	39	16	37	32	36	18	25	20	11	29	21

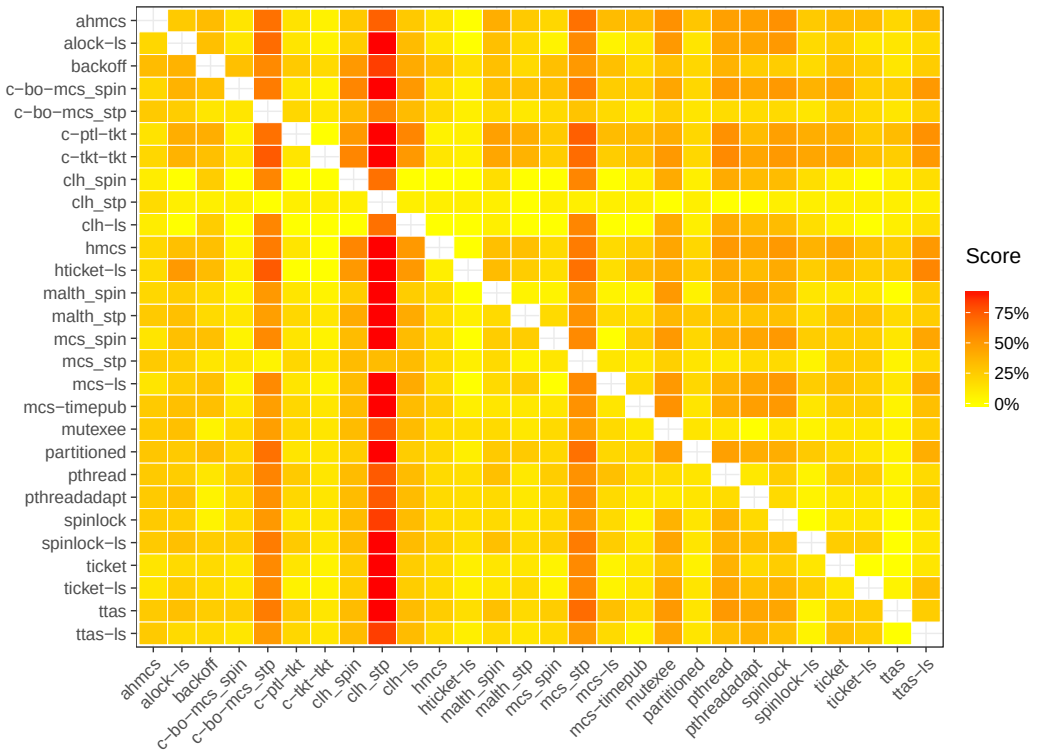


Fig. 22: For each pair of locks *(rowA, colB)* at *opt nodes*, scores of lock A vs lock B: percentage of lock-sensitive applications for which lock A is more energy-efficient at least 5% better than B (**I-20 machine in energy-saving move**).

Table LXXXII: For each pair of locks *(rowA, colB)* at *max nodes*, scores of lock A vs lock B: percentage of lock-sensitive applications for which lock A is more energy-efficient by at least 5% than B (**I-48 machine in energy-saving mode**).

	ahmcs	alock-ls	backoff	c-bo-mcs_spin	c-bo-mcs_stp	c-ptl-tkt	c-tkt-tkt	clh_spin	clh_stp	clh-ls	hmcs	hticket-ls	malth_spin	malth_stp	mcs_spin	mcs_stp	mcs-ls	mcs-timepub	mutexee	partitioned	pthread	pthreadadapt	spinlock	spinlock-ls	ticket	ticket-ls	ttas	ttas-ls	average
ahmcs		50	56	39	72	38	22	69	77	69	11	38	61	44	67	78	67	61	67	69	67	67	78	78	72	67	67	67	60
alock-ls	44		32	32	74	24	26	57	86	57	32	14	58	47	26	74	21	53	74	65	74	74	74	74	74	68	63	68	54
backoff	33	42		26	79	24	21	57	93	57	26	21	58	47	37	74	37	42	74	71	63	68	74	68	89	79	53	74	55
c-bo-mcs_spin	50	47	58		68	47	32	71	93	79	32	50	68	63	42	74	47	63	68	65	74	74	74	74	74	74	53	79	63
c-bo-mcs_stp	28	26	11	16		18	16	29	93	29	21	14	21	24	16	76	21	19	14	18	19	14	63	74	37	32	16	37	30
c-ptl-tkt	31	47	35	29	71		6	79	86	79	6	21	59	53	41	71	35	65	71	59	71	71	71	71	76	76	71	82	57
c-tkt-tkt	44	58	53	26	74	53		86	93	93	26	29	74	53	58	74	58	68	68	59	74	74	74	74	74	74	68	79	64
clh_spin	31	0	21	7	71	7	7		71	14	7	14	43	36	7	71	7	43	57	57	71	57	71	71	79	64	57	71	41
clh_stp	23	14	7	7	0	14	7	14		14	7	7	7	0	7	7	7	7	0	7	0	0	7	7	14	14	7	7	8
clh-ls	23	0	21	0	71	7	0	0	71		7	14	43	29	0	71	7	36	64	71	64	57	71	71	64	57	57	64	39
hmcs	44	63	63	37	63	65	32	86	93	93		57	68	53	68	74	68	68	63	65	74	68	74	74	74	74	68	84	67
hticket-ls	31	64	36	0	71	36	7	71	93	79	0		57	50	43	71	50	50	71	71	71	71	71	71	79	79	71	93	58
malth_spin	22	26	11	16	53	6	11	43	93	50	11	7		26	16	68	21	42	47	53	58	58	58	68	74	58	47	74	41
malth_stp	33	47	26	26	62	35	26	57	93	57	26	29	32		32	62	37	48	38	59	43	43	63	63	63	53	53	68	47
mcs_spin	28	26	26	21	74	18	21	64	93	50	21	21	53	42		68	32	53	68	71	68	68	68	68	74	63	42	68	51
mcs_stp	22	26	5	16	10	18	16	29	29	29	16	14	16	14	11		21	24	5	18	5	5	5	5	21	21	5	21	16
mcs-ls	22	21	26	26	68	18	16	57	93	50	16	29	53	37	21	68		42	58	59	68	63	68	63	63	58	53	74	48
mcs-timepub	28	26	21	21	67	18	16	43	93	43	16	21	42	29	11	62	26		57	59	57	62	68	68	63	63	37	58	43
mutexee	33	26	5	21	67	18	16	29	93	29	26	21	26	33	16	76	21	29		24	29	14	63	68	63	53	42	58	37
partitioned	31	24	18	18	71	29	24	21	93	21	29	7	29	29	12	71	18	24	47		47	47	71	71	65	53	53	76	41
pthread	28	26	21	16	57	18	16	29	93	29	21	14	32	29	16	76	21	24	14	24		19	79	79	58	37	37	47	35
pthreadadapt	33	26	11	16	62	18	16	29	93	29	21	14	32	19	16	76	21	24	29	35	33		74	74	58	58	37	53	37
spinlock	22	26	0	21	21	18	16	29	93	29	21	14	26	21	16	74	21	16	5	18	5	5		11	32	32	0	16	22
spinlock-ls	22	26	5	21	21	18	16	29	93	29	21	21	26	26	21	74	21	16	5	18	5	5	53		26	21	0	16	24
ticket	22	11	0	5	47	12	11	14	86	21	21	7	11	16	0	58	16	5	16	12	26	26	58	58		0	11	47	23
ticket-ls	28	26	0	16	58	12	16	21	86	29	21	7	16	16	16	63	26	21	21	29	26	26	58	58	74		42	58	32
ttas	33	26	11	21	74	18	21	29	93	29	26	21	37	26	16	74	26	32	37	29	32	42	74	74	53	37		32	38
ttas-ls	28	16	11	11	63	18	16	29	93	29	16	7	26	21	11	68	21	11	32	18	32	37	68	68	37	32	0		30
average	30	30	22	19	59	23	17	43	87	45	19	20	40	33	24	69	29	36	43	44	47	45	64	63	60	52	41	58	30

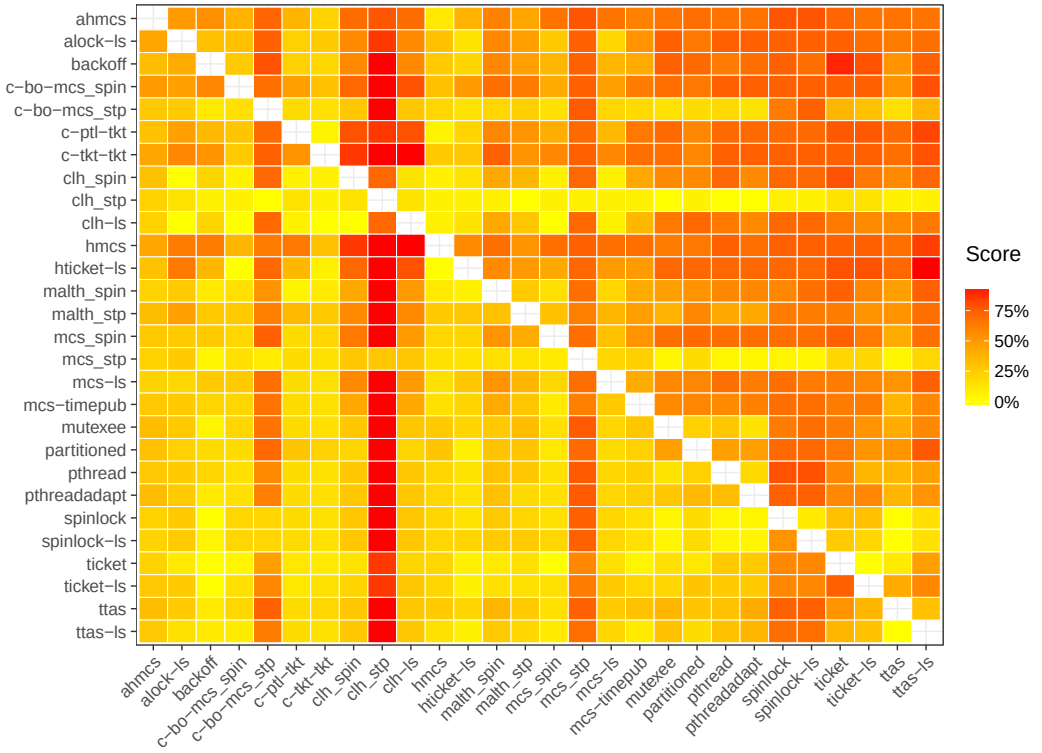


Fig. 23: For each pair of locks *(rowA, colB)* at *max nodes*, scores of lock A vs lock B: percentage of lock-sensitive applications for which lock A is more energy-efficient at least 5% better than B (**I-48 machine in energy-saving move**).

Table LXXXIII: For each pair of locks *(rowA, colB)* at *max nodes*, scores of lock A vs lock B: percentage of lock-sensitive applications for which lock A is more energy-efficient by at least 5% than B (**I-20 machine in energy-saving mode**).

	ahmcs	alock-ls	backoff	c-bo-mcs_spin	c-bo-mcs_stp	c-ptl-tkt	c-tkt-tkt	clh_spin	clh_stp	clh-ls	hmcs	hticket-ls	malth_spin	malth_stp	mcs_spin	mcs_stp	mcs-ls	mcs-timepub	mutexee	partitioned	pthread	pthreadadapt	spinlock	spinlock-ls	ticket	ticket-ls	ttas	ttas-ls	average
ahmcs		27	40	7	67	7	13	27	82	27	20	0	27	27	27	80	33	33	53	29	53	53	60	33	33	27	20	40	35
alock-ls	27		38	25	75	20	12	25	83	33	25	0	31	25	12	75	12	25	50	27	56	50	56	38	31	19	31	44	35
backoff	33	38		25	69	20	25	50	92	42	25	17	31	12	31	69	31	19	44	40	50	50	56	38	56	44	25	38	40
c-bo-mcs_spin	27	38	50		75	20	12	58	92	50	12	17	31	38	38	75	31	31	50	27	62	50	56	50	50	38	38	56	43
c-bo-mcs_stp	27	25	19	19		20	12	25	92	25	19	8	31	12	25	71	31	24	12	20	12	12	31	25	25	31	19	31	26
c-ptl-tkt	14	33	47	0	60		13	50	92	58	0	0	47	33	20	73	27	33	53	27	60	47	53	47	47	40	47	60	40
c-tkt-tkt	27	25	44	12	75	27		50	92	33	19	0	38	38	19	75	25	31	56	33	69	50	56	56	56	31	31	50	41
clh_spin	9	8	25	0	75	0	0		75	0	0	0	17	8	0	75	0	8	42	17	42	42	50	33	17	8	17	25	22
clh_stp	18	17	8	8	0	8	8	17		17	8	8	8	0	8	17	8	8	0	8	0	0	8	8	8	8	8	8	8
clh-ls	9	8	33	8	67	0	0	0	75		0	0	17	8	0	75	0	8	42	25	42	42	50	33	17	8	17	25	23
hmcs	27	31	44	6	75	13	19	50	92	50		0	44	38	25	75	25	31	50	27	62	50	50	50	50	44	38	56	42
hticket-ls	18	50	42	8	75	8	8	50	92	50	8		50	25	8	75	25	33	50	42	50	42	50	33	50	33	33	58	40
malth_spin	20	19	25	6	62	13	6	33	92	25	19	0		6	6	62	6	6	56	27	44	50	56	25	38	31	12	38	29
malth_stp	40	38	31	31	71	33	25	50	92	50	31	25	31		25	65	31	29	41	40	47	53	56	31	56	50	31	44	43
mcs_spin	13	31	44	12	62	13	6	33	92	42	19	0	44	31		62	6	38	56	40	56	50	56	31	38	38	19	44	36
mcs_stp	20	25	19	19	6	20	12	25	25	25	19	8	25	6	12		19	12	18	20	18	12	19	6	31	31	6	19	18
mcs-ls	13	25	38	6	62	13	6	33	92	42	19	0	31	38	0	62		19	56	33	56	50	56	31	38	25	19	44	34
mcs-timepub	27	31	38	19	59	20	12	42	92	33	25	8	38	24	12	59	19		53	40	53	47	62	31	44	38	25	38	37
mutexee	20	25	6	19	71	20	19	25	92	25	19	17	19	12	19	65	19	18		20	29	41	38	25	25	19	6	25	27
partitioned	21	13	33	33	73	27	13	17	92	17	20	0	20	20	13	73	20	13	40		53	47	53	47	33	20	20	47	33
pthread	20	25	6	19	65	20	19	25	92	25	19	17	19	6	19	65	19	18	12	20		29	50	19	31	31	6	19	26
pthreadadapt	20	25	6	19	65	20	19	25	92	25	19	17	19	6	19	71	19	18	12	20	18		31	19	19	19	6	19	25
spinlock	20	25	6	19	50	20	19	25	92	25	19	17	19	12	19	69	19	6	31	20	25	25		0	19	19	0	12	23
spinlock-ls	20	25	25	19	62	20	19	25	92	25	25	17	31	25	31	81	31	19	38	20	44	31	56		31	31	0	12	32
ticket	7	19	19	12	56	13	6	17	92	17	19	0	12	6	0	62	6	12	44	13	38	44	50	31		6	0	19	23
ticket-ls	20	25	19	12	62	13	12	42	92	33	19	8	12	12	6	62	6	12	50	40	50	50	44	38	38		25	38	31
ttas	20	25	31	19	62	20	19	25	92	25	25	17	31	25	31	81	31	25	44	27	56	50	56	25	44	31		25	36
ttas-ls	20	19	25	12	56	13	12	25	92	25	19	8	31	19	25	75	25	12	50	20	50	44	56	25	38	25	12		31
average	21	26	28	15	61	16	13	32	87	31	17	8	28	19	17	69	19	20	41	27	44	41	49	31	36	28	19	35	21

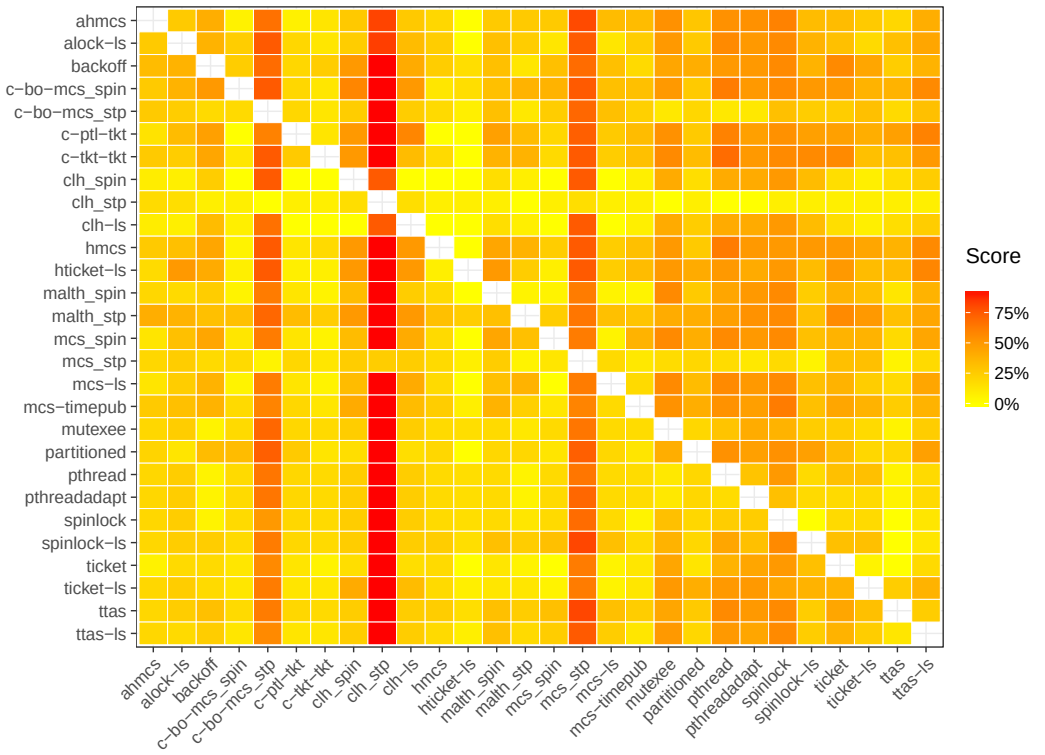


Fig. 24: For each pair of locks *(rowA, colB)* at *max nodes*, scores of lock A vs lock B: percentage of lock-sensitive applications for which lock A is more energy-efficient at least 5% better than B (**I-20 machine in energy-saving move**).

B.5. Are all locks potentially harmful?

Table LXXXIV: For each lock-sensitive application, at *max nodes*, energy efficiency gain, (in %) obtained by the best lock(s) with respect to each of the other locks. A gray cell highlights a configuration where a given lock hurts the application, i.e., the energy efficiency gain is greater than 15%. A line with many gray cells corresponds to an application whose energy efficiency is hurt by many locks. A column with many gray cells corresponds to a lock that has lower energy-efficiency than many other locks. Dashes correspond to untested cases. (**I-48 machine in energy-saving mode**).

Applications	ahmcs	alock-ls	backoff	c-bo-mcs_spin	c-bo-mcs_stp	c-ptl-tkt	c-tkt-tkt	clh_spin	clh_stp	clh-ls	hmcs	hticket-ls	malth_spin	malth_stp	mcs_spin	mcs_stp	mcs-ls	mcs-timepub	mutexee	partitioned	pthread	pthreadadapt	spinlock	spinlock-ls	ticket	ticket-ls	ttas	ttas-ls
dedup	-	733	5	120	87	666	452	2k	603	3k	103	161	81	74	77	75	109	95	8	156	0	11	12	9	2k	2k	1	389
ferret	539	486	13	501	0	531	499	465	0	485	521	569	557	0	480	0	490	10	0	482	0	0	12	11	479	339	11	12
kyotocabinet	14	36	33	0	119	32	17	33	967	33	18	17	52	14	35	952	33	68	98	56	114	86	363	285	66	43	58	64
linear_regression	15	2	0	3	116	2	1	4	171	10	3	0	3	11	10	192	49	14	7	23	10	9	64	50	15	15	8	10
memcached-new	73	39	8	32	63	-	46	-	-	-	64	-	22	0	33	629	43	39	49	-	73	57	183	98	33	23	39	40
memcached-old	6	0	87	30	27	-	10	-	-	-	38	-	170	169	92	88	173	151	161	-	190	186	88	78	163	159	85	85
mysqld	-	-	-	-	0	-	-	-	-	-	-	-	-	25	-	46	-	87	28	-	28	30	-	-	-	-	-	-
pca	11	18	14	0	97	16	7	24	777	19	7	17	12	11	17	741	16	18	43	30	53	42	312	248	66	51	58	58
pca_ll	2	9	42	4	254	0	1	14	1k	13	1	1	17	123	8	1k	8	23	68	28	79	124	487	349	70	39	90	84
radiosity	15	17	14	3	50	9	6	27	576	24	0	6	13	16	9	542	12	16	31	31	37	28	233	162	46	36	52	59
radiosity_ll	0	58	94	7	527	48	20	80	4k	80	0	24	117	75	53	4k	64	94	181	158	237	144	2k	1k	327	223	387	379
s_raytrace	5	17	11	23	387	6	8	25	2k	28	0	21	43	100	16	2k	10	15	57	63	60	91	638	607	146	97	157	221
s_raytrace_ll	1	8	35	18	54	9	15	23	2k	22	0	33	78	70	7	2k	8	24	46	42	48	53	634	627	139	73	138	215
sqlite	-	-	-	-	147	-	-	-	-	-	-	-	-	0	-	2k	-	6k	87	-	94	61	-	-	-	-	-	-
ssl_proxy	8	51	22	0	336	44	24	54	2k	54	5	24	62	66	60	2k	49	78	127	101	134	90	1k	692	183	130	185	180
streamcluster	146	20	325	245	348	143	25	-	-	-	63	-	340	520	251	403	224	274	351	0	288	300	357	398	417	385	245	244
streamcluster_ll	167	4	349	284	388	141	10	-	-	-	66	-	373	613	277	465	249	281	394	0	309	334	390	417	461	437	273	277
upscaledb	19	43	48	13	127	24	18	45	767	44	19	18	34	0	47	766	42	73	158	57	163	170	371	246	59	48	48	83
vips	89	136	0	636	48	283	184	-	-	-	188	-	373	1	107	4	142	3	0	153	0	0	3	3	131	14	0	1
water_nsquared	66	24	2	1	1	1	1	45	44	46	1	2	1	1	1	0	1	4	0	0	1	1	0	0	2	0	0	23
water_spatial	588	209	0	5	5	1	2	400	399	396	7	5	5	5	4	4	4	6	0	1	0	0	0	0	1	0	0	204

Table LXXXV: For each lock-sensitive application, at *opt nodes*, energy efficiency gain, (in %) obtained by the best lock(s) with respect to each of the other locks. A gray cell highlights a configuration where a given lock hurts the application, i.e., the energy efficiency gain is greater than 15%. A line with many gray cells corresponds to an application whose energy efficiency is hurt by many locks. A column with many gray cells corresponds to a lock that has lower energy-efficiency than many other locks. Dashes correspond to untested cases. (**I-48 machine in energy-efficiency mode**).

Applications	ahmcs	alock-ls	backoff	c-bo-mcs_spin	c-bo-mcs_stp	c-ptl-tkt	c-tkt-tkt	clh_spin	clh_stp	clh-ls	hmcs	hticket-ls	malth_spin	malth_stp	mcs_spin	mcs_stp	mcs-ls	mcs-timepub	mutexee	partitioned	pthread	pthreadadapt	spinlock	spinlock-ls	ticket	ticket-ls	ttas	ttas-ls
dedup	-	386	1	64	71	12	3	618	609	607	89	50	55	59	56	53	54	77	0	2	2	0	1	1	2	4	0	331
ferret	18	17	6	20	0	27	18	18	0	18	17	19	27	0	17	0	18	6	0	17	0	0	7	7	25	18	5	6
kyotocabinet	8	27	4	0	17	15	9	22	292	27	15	11	30	36	24	277	22	39	92	33	87	70	109	85	41	29	29	30
linear_regression	0	3	0	1	27	1	1	3	86	4	2	0	4	7	2	85	4	14	8	7	7	4	48	35	15	8	7	9
memcached-new	52	49	4	12	22	-	13	-	-	-	87	-	38	9	62	52	65	46	20	-	10	17	11	1	0	15	38	36
memcached-old	0	11	25	11	9	-	10	-	-	-	15	-	60	58	30	32	46	58	58	-	65	67	33	5	66	68	25	36
mysqld	-	-	-	-	0	-	-	-	-	-	-	-	-	23	-	35	-	87	24	-	23	23	-	-	-	-	-	-
pca	1	1	15	1	21	2	1	1	203	2	0	2	0	2	1	204	0	4	16	1	22	8	5	2	5	2	1	2
pca_ll	1	1	27	5	51	0	0	5	48	3	0	0	7	13	1	47	1	4	30	8	38	42	46	24	10	8	8	8
radiosity	15	8	5	0	5	0	0	15	39	15	0	1	6	10	2	38	3	4	10	3	15	10	22	16	15	10	11	15
radiosity_ll	0	21	33	5	10	3	7	29	223	29	0	10	46	61	20	155	21	31	66	27	114	78	125	85	117	63	66	61
s_raytrace	2	2	6	14	69	0	2	8	81	7	0	6	25	63	0	77	1	6	32	19	33	42	77	76	50	25	29	39
s_raytrace_ll	2	18	29	21	69	5	11	34	186	34	0	30	85	86	14	189	18	36	60	55	62	67	188	187	161	90	159	186
sqlite	-	-	-	-	0	-	-	-	-	-	-	-	-	43	-	395	-	37	53	-	71	58	-	-	-	-	-	-
ssl_proxy	0	18	5	1	31	12	9	36	803	29	0	11	48	91	24	794	17	37	76	33	96	87	322	137	134	77	83	75
streamcluster	5	0	22	1	4	1	0	-	-	-	1	-	30	34	12	15	33	28	21	5	12	32	21	14	42	39	20	17
streamcluster_ll	6	0	72	10	22	19	13	-	-	-	21	-	93	94	54	56	76	54	79	11	49	79	62	48	97	92	45	48
upscaledb	0	17	20	1	75	1	0	20	473	21	0	1	15	21	21	586	18	29	108	24	99	95	70	60	25	20	28	38
vips	8	8	0	8	9	7	7	-	-	-	8	-	7	1	8	4	8	3	0	9	0	0	3	3	8	8	0	1
water_nsquared	66	24	2	1	1	1	1	45	44	46	1	2	1	1	1	0	1	4	0	0	1	1	0	0	2	0	0	23
water_spatial	588	209	0	5	5	1	2	400	399	396	7	5	5	5	4	4	4	6	0	1	0	0	0	0	1	0	0	204

Table LXXXVI: For each lock-sensitive application, at *max nodes*, energy efficiency gain, (in %) obtained by the best lock(s) with respect to each of the other locks. A gray cell highlights a configuration where a given lock hurts the application, i.e., the energy efficiency gain is greater than 15%. A line with many gray cells corresponds to an application whose energy efficiency is hurt by many locks. A column with many gray cells corresponds to a lock that has lower energy-efficiency than many other locks. Dashes correspond to untested cases. (**I-20 machine in energy-saving mode**).

Applications	dedup	ferret	kyotocabinet	linear_regression	memcached-old	pca	pca_ll	radiosity	radiosity_ll	s_raytrace	s_raytrace_ll	sqlite	streamcluster	streamcluster_ll	upscaledb	vips	water_spatial
ttas-ls	252	17	27	3	7	11	1	22	54	1	2	-	29	41	45	1	101
ttas	2	18	39	2	5	5	1	19	69	0	1	-	28	36	31	1	0
ticket-ls	118	254	25	4	3	2	0	8	41	0	2	-	75	95	25	32	0
ticket	66	295	46	5	4	8	0	19	88	0	2	-	67	93	32	31	0
spinlock-ls	1	18	77	5	10	7	0	33	154	0	1	-	27	43	56	1	0
spinlock	2	18	118	12	22	37	0	86	438	1	0	-	78	95	73	2	0
pthreadadapt	0	0	47	3	47	41	3	28	114	4	1	43	118	152	192	0	0
pthread	0	0	76	6	131	25	14	22	89	6	5	41	53	72	183	0	0
partitioned	78	292	38	3	-	2	1	15	57	1	2	-	1	5	38	43	0
mutexee	1	0	64	3	134	17	7	16	63	3	5	0	83	118	176	0	0
mcs-timepub	62	11	29	3	9	4	2	4	18	1	3	5k	46	58	40	1	2
mcs-ls	89	293	19	3	7	2	2	4	11	1	2	-	39	58	29	35	2
mcs_stp	55	0	2k	101	92	1k	1k	306	4k	2k	3k	2k	43	54	1k	0	2
mcs_spin	52	294	19	5	4	3	2	2	7	1	2	-	39	53	30	36	2
malth_stp	51	0	0	2	30	8	3	12	34	4	2	24	47	70	0	0	2
malth_spin	85	324	36	4	6	4	2	10	29	2	3	-	46	64	26	22	2
hticket-ls	53	300	13	2	-	2	1	1	6	1	2	-	-	-	20	-	2
hmcs	99	302	17	0	16	0	2	1	2	1	2	-	5	12	18	56	3
clh-ls	617	291	27	4	-	5	1	21	23	1	2	-	-	-	30	-	197
clh_stp	415	0	2k	100	-	1k	709	406	4k	2k	3k	-	-	-	1k	-	197
clh_spin	636	296	22	6	-	3	1	18	26	2	2	-	-	-	34	-	198
c-tkt-tkt	50	307	24	0	4	0	1	1	3	0	2	-	12	11	26	48	0
c-ptl-tkt	101	303	14	2	-	0	0	0	3	0	3	-	18	28	19	58	0
c-bo-mcs_stp	59	0	274	13	204	75	246	24	212	84	114	312	16	27	399	0	2
c-bo-mcs_spin	92	313	6	0	7	2	2	1	0	3	4	-	6	11	22	65	3
backoff	3	22	12	0	0	16	8	8	31	1	4	-	58	71	46	2	0
alock-ls	1k	292	19	2	7	3	2	11	13	1	2	-	0	0	30	47	104
ahmcs	-	305	11	3	5	3	1	18	4	1	2	-	22	33	21	34	296

Table LXXXVII: For each lock-sensitive application, at *opt nodes*, energy efficiency gain, (in %) obtained by the best lock(s) with respect to each of the other locks. A gray cell highlights a configuration where a given lock hurts the application, i.e., the energy efficiency gain is greater than 15%. A line with many gray cells corresponds to an application whose energy efficiency is hurt by many locks. A column with many gray cells corresponds to a lock that has lower energy-efficiency than many other locks. Dashes correspond to untested cases. (**I-20 machine in energy-efficiency mode**).

Applications	dedup	ferret	kyotocabinet	linear_regression	memcached-old	pca	pca_ll	radiosity	radiosity_ll	s_raytrace	s_raytrace_ll	sqlite	streamcluster	streamcluster_ll	upscaledb	vips	water_spatial
ttas-ls	282	17	17	3	7	11	1	10	17	1	2	-	8	41	19	1	101
ttas	1	18	22	2	5	5	1	4	17	0	1	-	4	36	14	1	0
ticket-ls	3	45	16	4	3	2	0	4	17	0	2	-	18	78	10	32	0
ticket	0	44	26	5	4	8	0	6	19	0	2	-	23	71	13	31	0
spinlock-ls	2	18	33	5	10	7	0	5	17	0	1	-	8	43	18	1	0
spinlock	3	18	53	12	22	11	0	6	20	1	0	-	24	72	22	2	0
pthreadadapt	2	0	29	3	47	11	3	4	27	4	1	21	23	74	195	0	0
pthread	0	0	84	6	131	10	14	5	31	6	5	26	6	44	189	0	0
partitioned	4	44	23	3	-	2	1	4	19	1	2	-	0	5	14	43	0
mutexee	0	0	93	3	134	12	7	3	28	3	5	19	24	74	182	0	0
mcs-timepub	59	11	21	3	9	4	2	4	18	1	3	0	11	58	14	1	2
mcs-ls	48	46	10	3	7	2	2	4	11	1	2	-	11	58	11	35	2
mcs_stp	48	0	745	23	92	14	34	5	18	43	31	363	10	54	660	0	2
mcs_spin	50	46	10	5	4	3	2	2	7	1	2	-	9	53	12	36	2
malth_stp	47	0	16	2	30	8	3	6	22	4	2	30	8	64	2	0	2
malth_spin	48	75	21	4	6	4	2	5	19	2	3	-	13	64	10	22	2
hticket-ls	45	44	3	2	-	2	1	1	6	1	2	-	-	-	3	-	2
hmcs	69	45	7	0	16	0	2	1	2	1	2	-	8	12	3	48	3
clh-ls	488	44	16	4	-	5	1	16	19	1	2	-	-	-	10	-	197
clh_stp	481	0	747	24	-	16	37	19	29	47	32	-	-	-	567	-	197
clh_spin	480	48	13	6	-	3	1	16	18	2	2	-	-	-	11	-	198
c-tkt-tkt	4	48	6	0	4	0	1	1	3	0	2	-	7	11	3	48	0
c-ptl-tkt	8	44	4	2	-	0	0	0	3	0	3	-	20	28	3	48	0
c-bo-mcs_stp	53	0	370	13	204	17	36	5	21	44	31	3	13	27	305	0	2
c-bo-mcs_spin	53	46	0	0	7	2	2	1	0	3	4	-	14	11	0	48	3
backoff	1	22	1	0	0	16	8	6	21	1	4	-	8	70	25	2	0
alock-ls	340	46	13	2	7	3	2	10	13	1	2	-	7	0	10	47	104
ahmcs	-	50	3	3	5	3	1	18	4	1	2	-	5	33	3	34	296

B.6. Impact of the number of nodes.

Table LXXXVIII: For each lock-sensitive application, percentage of pairwise changes in the lock energy-efficiency hierarchy when changing the number of nodes (**I-48 machine in energy-saving mode**).

	% of pairwise changes between configurations			
Applications	1/2	2/3	3/4	1/2/3/4
dedup	7%	21%	19%	41%
ferret	19%	66%	8%	84%
kyotocabinet	16%	5%	5%	22%
linear_regression	26%	24%	38%	72%
memcached-new	59%	29%	0%	70%
memcached-old	14%	14%	0%	23%
mysqld	5%	0%	0%	5%
pca	49%	13%	13%	62%
pca_ll	47%	31%	15%	85%
radiosity	24%	14%	10%	43%
radiosity_ll	25%	7%	10%	33%
s_raytrace	69%	19%	12%	95%
s_raytrace_ll	84%	17%	10%	97%
sqlite	19%	33%	19%	57%
ssl_proxy	15%	6%	6%	21%
streamcluster	22%	22%	28%	48%
streamcluster_ll	20%	21%	25%	42%
upscaledb	12%	7%	3%	17%
vips	0%	0%	78%	78%
water_nsquared	0%	0%	0%	0%
water_spatial	3%	4%	8%	12%

Table LXXXIX: For each lock-sensitive application, percentage of pairwise changes in the lock energy-efficiency hierarchy when changing the number of nodes (**I-20 machine in energy-saving mode**).

	% of pairwise changes between configurations
Applications	1/2
dedup	29%
ferret	17%
kyotocabinet	15%
linear_regression	17%
memcached-old	0%
pca	55%
pca_ll	32%
radiosity	63%
radiosity_ll	69%
s_raytrace	22%
s_raytrace_ll	21%
sqlite	62%
streamcluster	50%
streamcluster_ll	39%
upscaledb	17%
vips	70%
water_spatial	0%

B.7. Impact of the machine.

Table XC: Considering energy efficiency and performance, at *max nodes* and *opt nodes*, percentage of pairwise changes in the lock performance hierarchy.

# nodes	I-48 energy efficiency vs. performance	I-20 energy efficiency vs. performance
Max	12%	10%
Opt	14%	12%

C. POLY

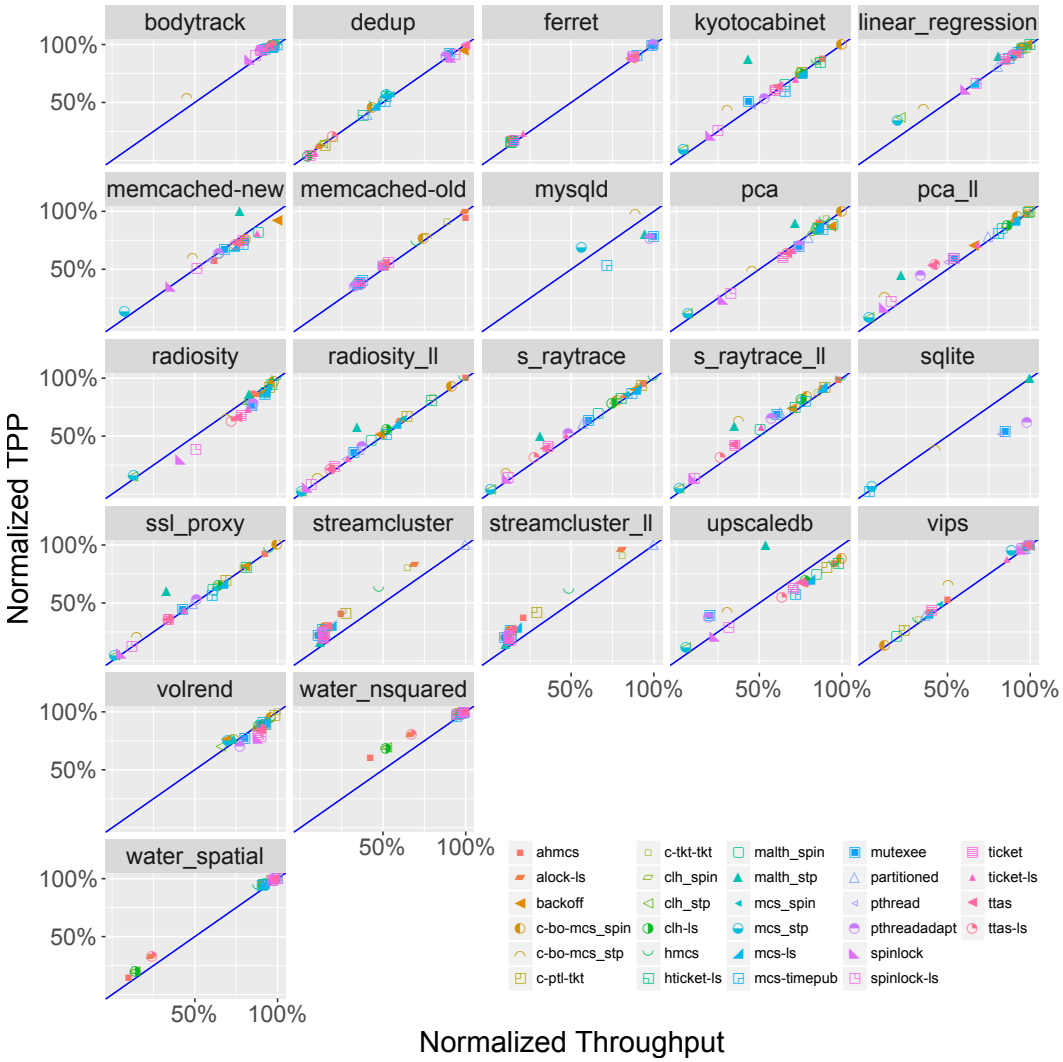


Fig. 25: Correlation of throughput with energy efficiency (TPP) on various lock-sensitive applications at *max nodes* for the different lock algorithms (**I-48 machine**).

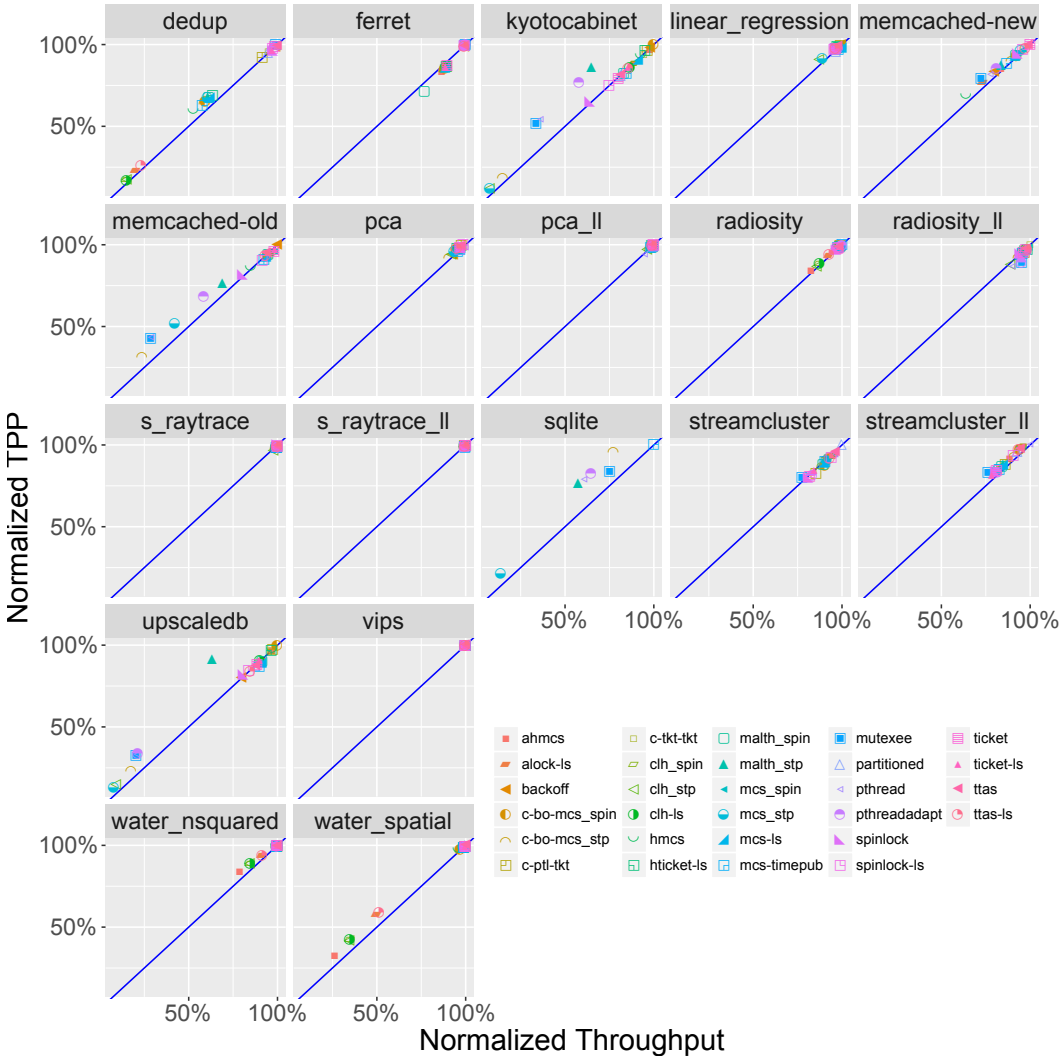


Fig. 26: Correlation of performance (throughput) with energy efficiency (TPP) on various lock-sensitive applications at *one node* for the different lock algorithms (**I-20 machine**).

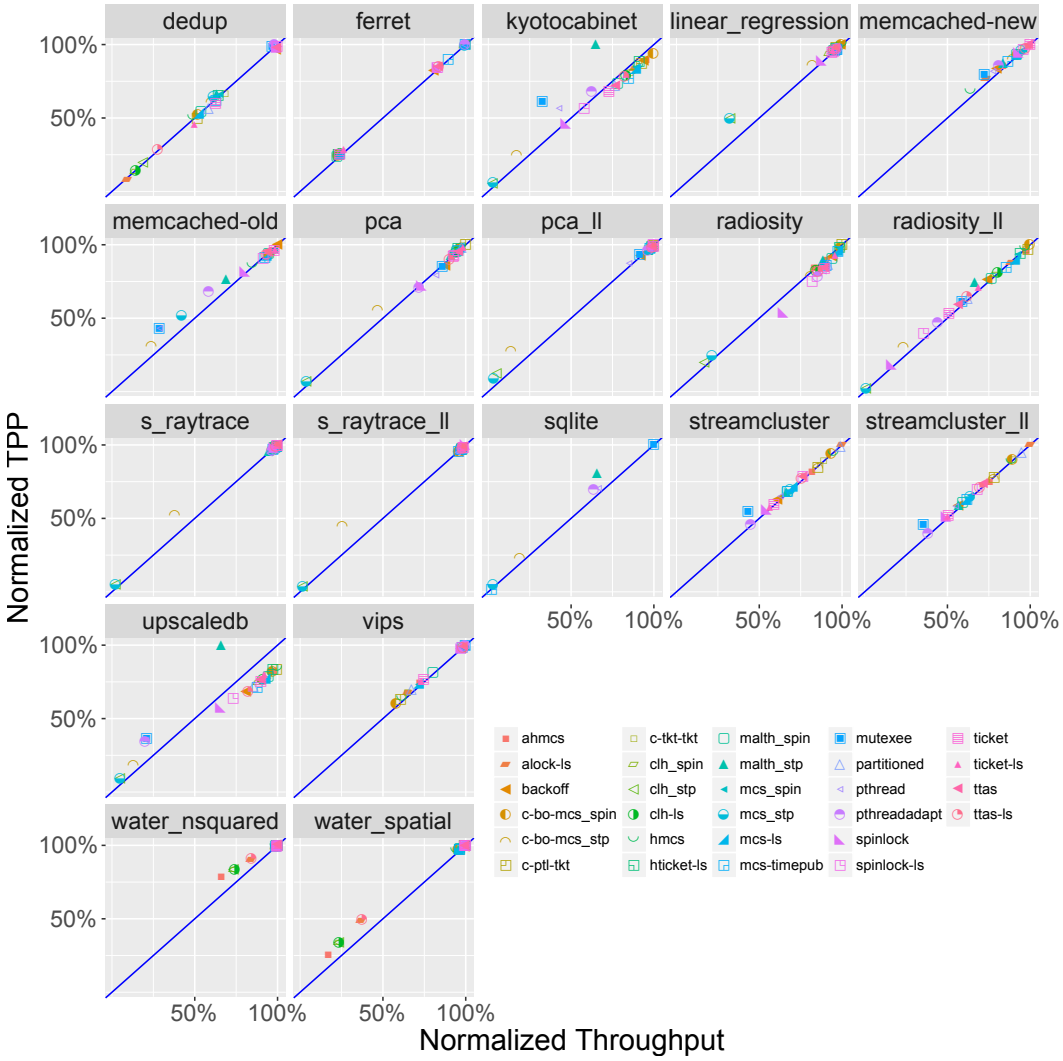


Fig. 27: Correlation of performance (throughput) with energy efficiency (TPP) on various lock-sensitive applications at *max nodes* for the different lock algorithms (**I-20 machine**).

D. STUDY OF LOCK TAIL LATENCY

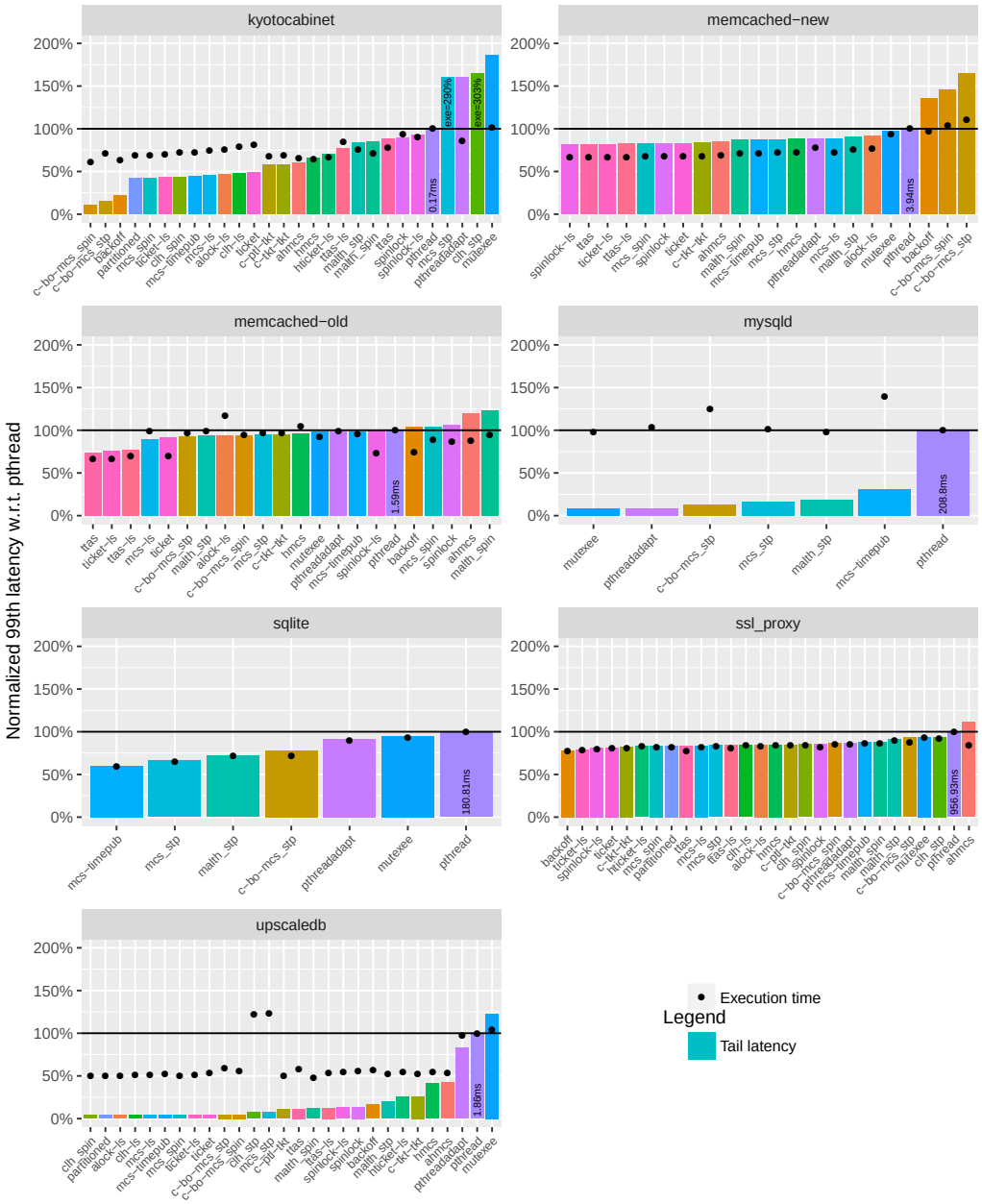


Fig. 28: For each server application, the bars represent the normalized 99th tail latency (w.r.t. Pthread) and the dots the execution time (lower is better) normalized (w.r.t. Pthread) of each lock algorithm (**A-64 at *one node***).

Fig. 29: For each server application, the bars represent the normalized 99th tail latency (w.r.t. Pthread) and the dots the execution time (lower is better) normalized (w.r.t. Pthread) of each lock algorithm (**A-64 at *max nodes***).

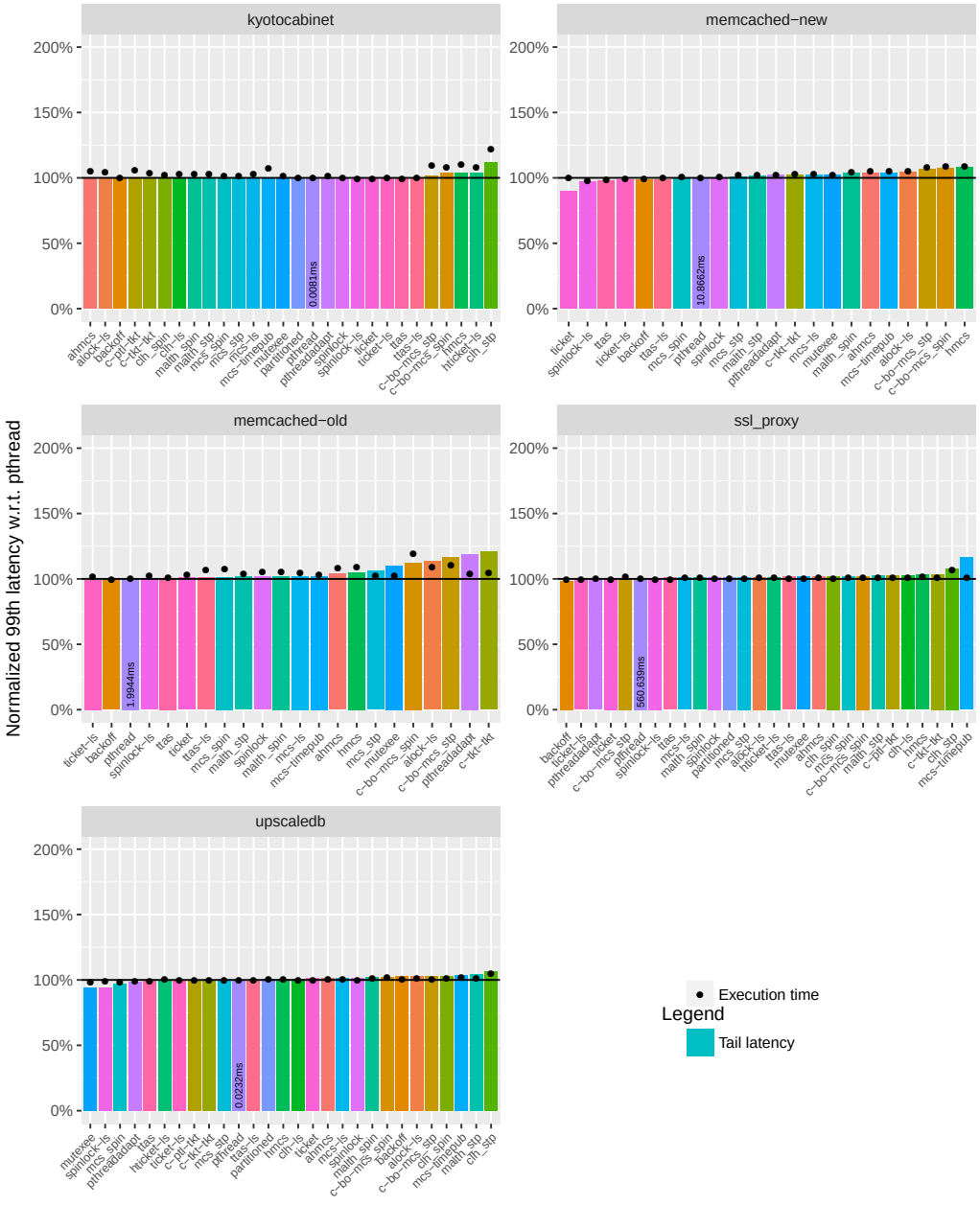


Fig. 30: For each server application, the bars represent the normalized 99th tail latency (w.r.t. Pthread) and the dots the execution time (lower is better) normalized (w.r.t. Pthread) of each lock algorithm (**A-64 *single threaded***).