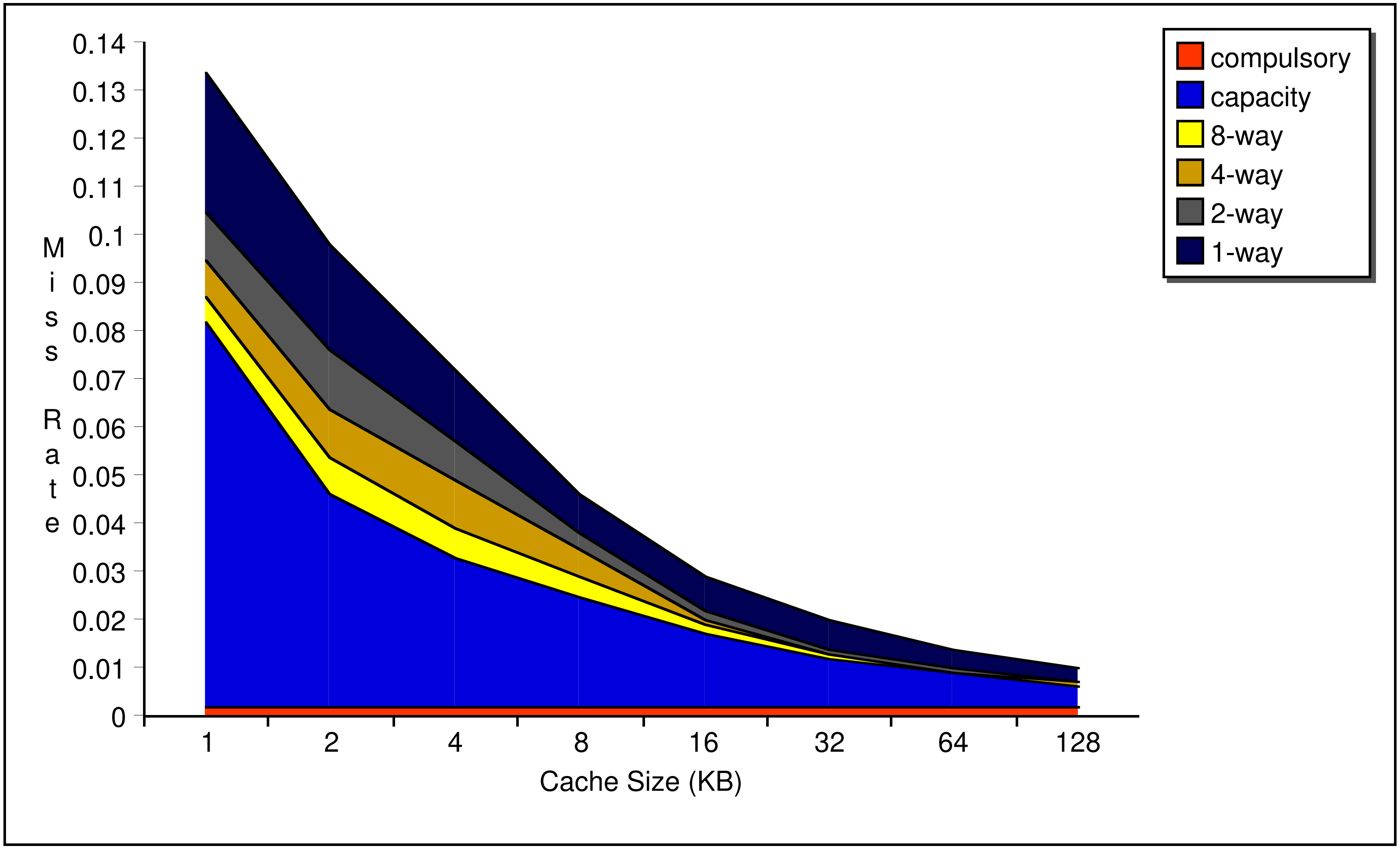
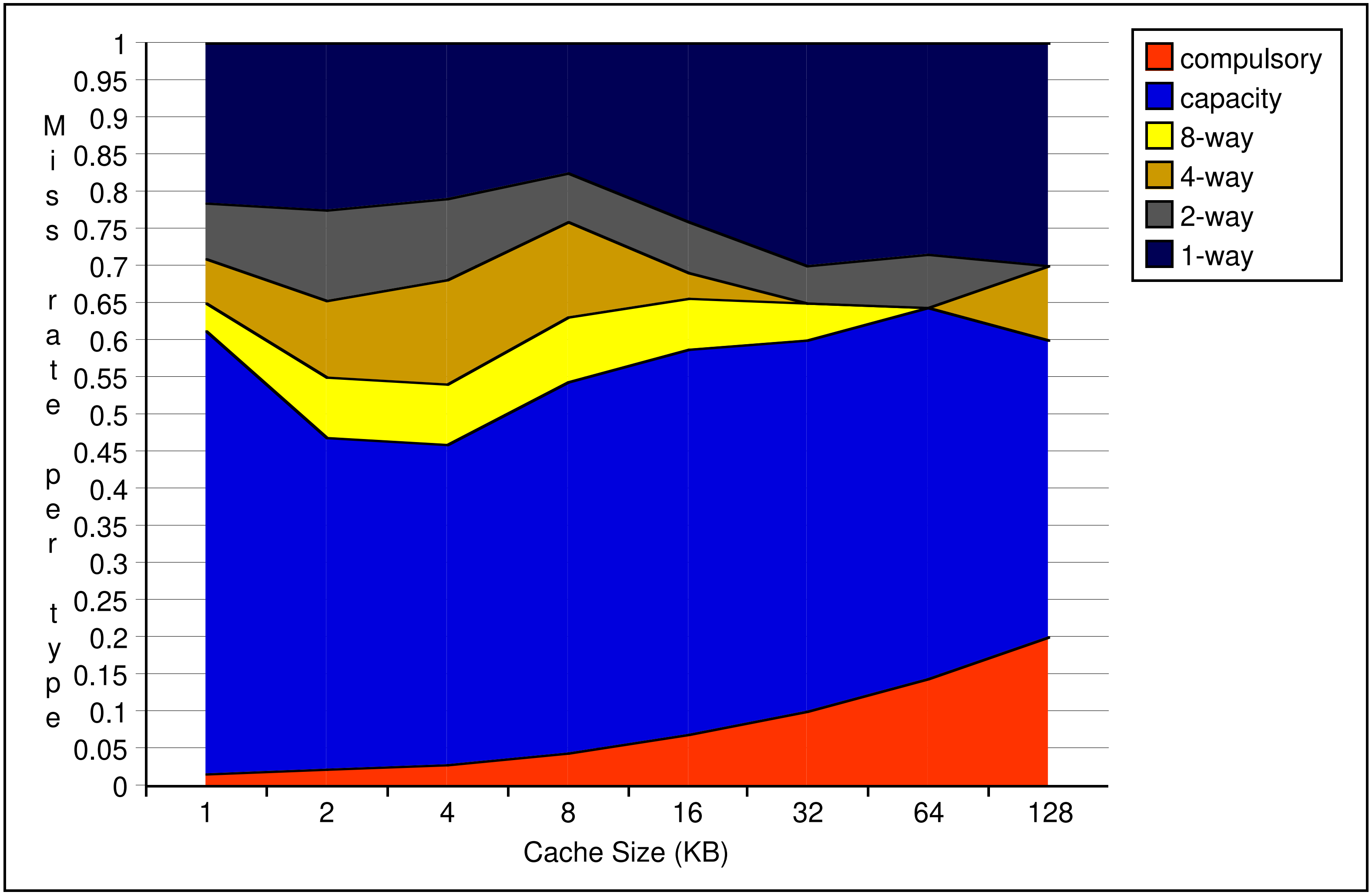
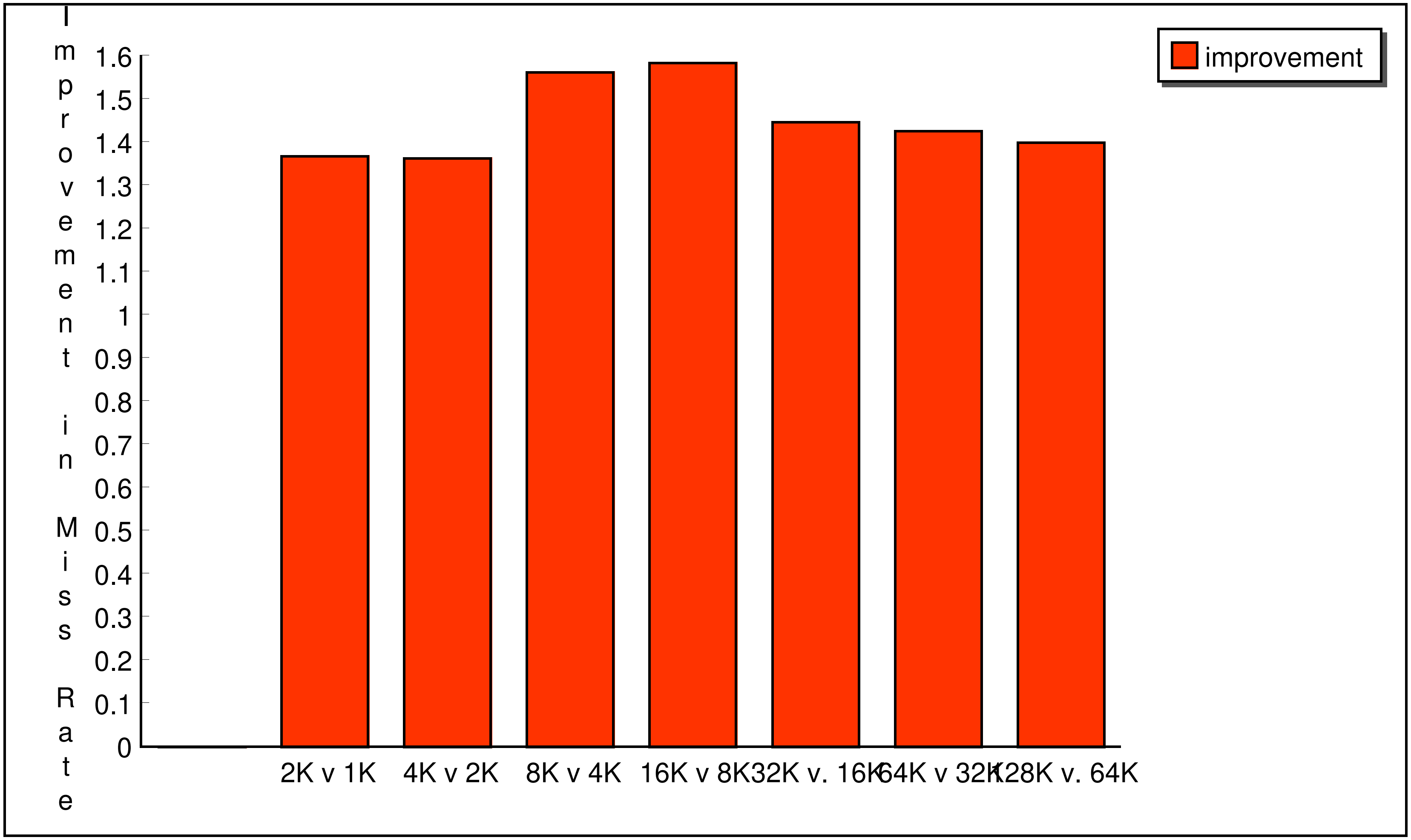
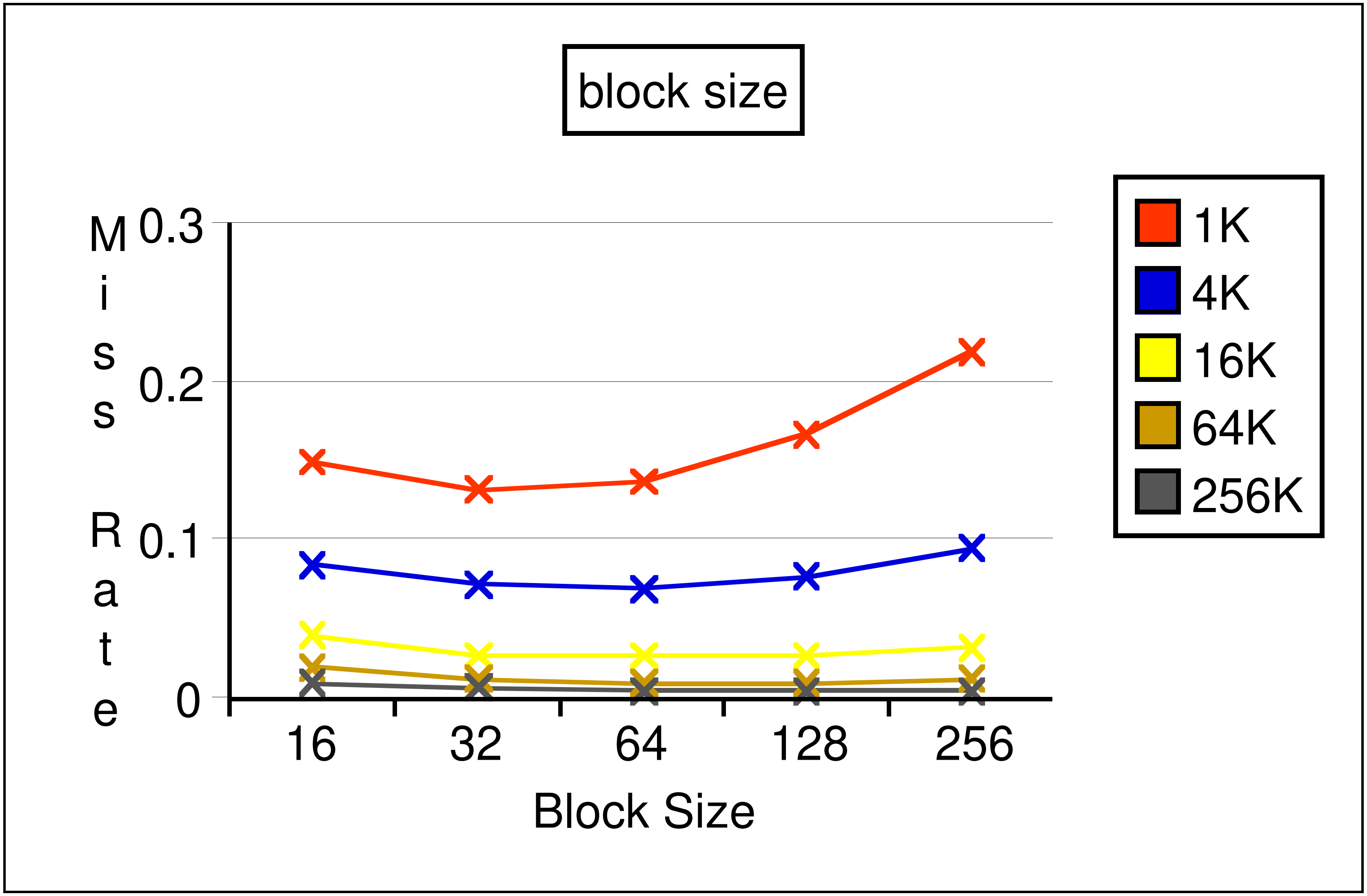


compulsory
capacity
8-way
4-way
2-way
1-way
Miss Rate
0.14
0.13
0.12
0.11
0.1
0.09
0.08
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0
1
2
4
8
16
32
64
128
Cache Size (KB)



Miss rate per type
1
0.95
0.9
0.85
0.8
0.75
0.7
0.65
0.6
0.55
0.5
0.45
0.4
0.35
0.3
0.25
0.2
0.15
0.1
0.05
0
1
2
4
8
16
32
64
128
Cache Size (KB)
compulsory
capacity
8-way
4-way
2-way
1-way


Improvement in Miss Rate
1.6
1.5
1.4
1.3
1.2
1.1
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
2K v 1K
4K v 2K
8K v 4K
16K v 8K
32K v. 16K
64K v 32K
128K v. 64K
improvement



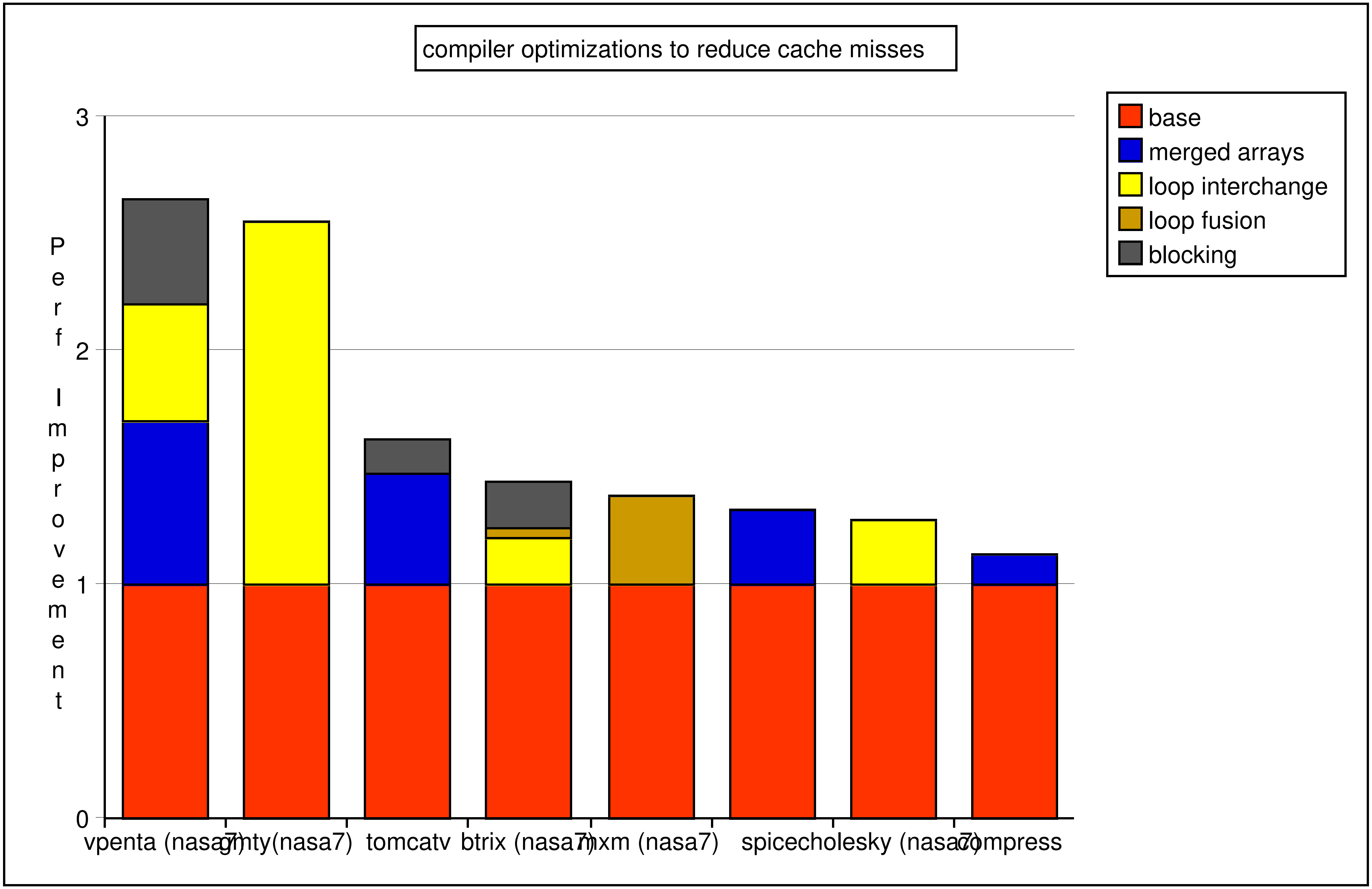
block size
Miss Rate
0.3
0.2
0.1
0
16
32
64
128
256
Block Size
1K
4K
16K
64K
256K

Example: Avg Memory Access Time v. Miss Rate

Assume CCT = 1.10 for 2-way, 1.12 for 4-way, 1.14 for 8-way, v. CCT direct maped

Cache Size(KB)	1-way	2-way	4-way	8-way
1	2.33	2.14	2.07	2.01
2	1.98	1.86	1.76	1.68
4	1.72	1.67	1.61	1.53
8	1.46	*1.48*	*1.47*	1.43
16	*1.29*	*1.32*	*1.32*	*1.32*
32	*1.20*	*1.24*	*1.25*	*1.27*
64	*1.14*	*1.20*	*1.21*	*1.23*
128	*1.10*	*1.17*	*1.18*	*1.20*

Light Blue = AMAT not improved by more associativity


compiler optimizations to reduce cache misses
base
merged arrays
loop interchange
loop fusion
blocking
Perf Improvement
0
1
2
3
vpenta (nasa7)
gmty(nasa7)
tomcatv
btrix (nasa7)
mxm (nasa7)
spice
cholesky (nasa7)
compress