MP2 Report - Fall 2014

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The readings which I have received after running different configurations on different protocols i.e MSI, MESI, Dragon has been included in the zip folder with names "output_canneal.04t.debug" and "output_canneal.04t.longTrace".

And here in this Report I would be describing what I have observed from the results which I have received.

For the whole process I have kept Number of Processors = 4 and this remains fixed for the whole process.

(1.) Now for the first set of Calculations,

Fixed Parameters:- (i) associativity = 8

(ii) Block Size = 64B

Variable Parameter:- (i) Cach Size = 256Kb, 512Kb, 1Mb, 2Mb.

We will look at the <u>Total Cache rate</u> of each cache for different Protocols.

Cache Size	N	MSI		1ESI	D	ragon
256Kb	Cach0	7.70%	Cache0	7.70%	Cache0	7.70%
	Cache1	8.25	Cache1	8.25%	Cache1	8.24%
	Cache2	7.8%	Cache2	7.8%	Cache2	7.81%
	Cache3	9.94%	Cache3	9.94%	Cache3	9.94%
512Kb	Cache0	7.70%	Cache0	7.70%	Cache0	7.70%
	Cache1	8.25%	Cache1	8.25%	Cache1	8.25%
	Cache2	7.8%	Cache2	7.8%	Cache2	7.8%
	Cache3	9.94%	Cache3	9.94%	Cache3	9.94%
1Mb	Cache0	7.70%	Cache0	7.70%	Cache0	7.70%
	Cache1	8.25%	Cache1	8.25%	Cache1	8.25%
	Cache2	7.8%	Cache2	7.8%	Cache2	7.8%
	Cache3	9.94%	Cache3	9.94%	Cache3	9.94%
2Mb	Cache0	7.70%	Cache0	7.70%	Cache0	7.70%
	Cache1	8.25%	Cache1	8.25%	Cache1	8.25%
	Cache2	7.8%	Cache2	7.8%	Cache2	7.8%
	Cache3	9.94%	Cache3	9.94%	Cache3	9.94%

From the above observation we can clearly see that increasing the cache size and even changing the protocol does not provide us with any change in the total

miss rate. This is happening because basically it matters the most at which block address the processor wants to either read or write. If a same block address is being written or read many times no matter what is the size of the cache it will generate a lot of misses.

(2.) For my second set of calculations:-

Fixed Parameters:- (i) Cache Size = 1Mb

(ii) Block Size = 64B

Variable Parameter:- (i) Associativity = 4-way, 8-way, 16-way

Here also we will look for <u>Total Cache rate</u> for each cache while running different protocols.

Associativity	N	1SI			MESI		Dragon	
4-way	Cache0	7.70%		Cache0	7.70%		Cache0	7.70%
	Cache1	8.25%		Cache1	8.25%		Cache1	8.25%
	Cache2	7.8%		Cache2	7.8%		Cache2	7.8%
	Cache3	9.94%		Cache3	9.94%		Cache3	9.94%
8-way	Cache0	7.70%		Cache0	7.70%		Cache0	7.70%
,	Cache1	8.25%		Cache1	8.25%		Cache1	8.25%
	Cache2	7.8%		Cache2	7.8%		Cache2	7.8%
	Cache3	9.94%		Cache3	9.94%		Cache3	9.94%
16-way	Cache0	7.70%		Cache0	7.70%		Cache0	7.70%
	Cache1	8.25%		Cache1	8.25%		Cache1	8.25%
	Cache2	7.8%		Cache2	7.8%		Cache2	7.8%
	Cache3	9.94%		Cache3	9.94%		Cache3	9.94%

Here we see that even changing the associativity of the cache does not reflect any change in Total miss rate. The reason is similar to the reason giving in the previous observation.

(3.) Third set of calculations:-

Fixed Parameters:- (i) Cache Sie = 1Mb

(ii) Associativity = 8

Variable Parameter:- (i) Block Size = 64B, 128B, 256B

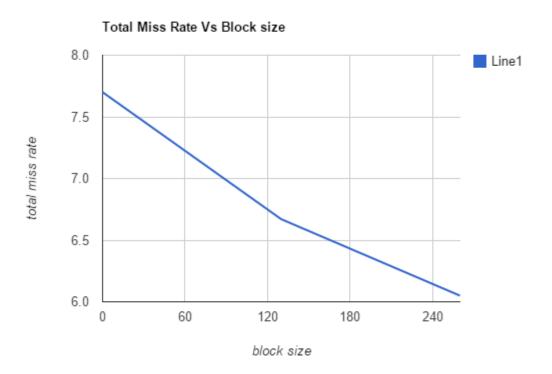
Here also we will look for <u>Total Cache rate</u> for each cache while running different protocols.

Block Size	MSI		MESI			Dragon		
64B	Cache0	7.70%	Cache0	7.70%		Cache0	7.70%	
	Cache1	8.25%	Cache1	8.25%		Cache1	8.25%	
	Cache2	7.8%	Cache2	7.8%		Cache2	7.8%	
	Cache3	9.94%	Cache3	9.94%		Cache3	9.94%	
128B	Cache0	6.67%	Cache0	6.67%		Cache0	6.51%	
	Cache1	7.19%	Cache1	7.19%		Cache1	7.08%	
	Cache2	6.9%	Cache2	6.9%		Cache2	6.75%	
	Cache3	8.8%	Cache3	8.8%		Cache3	8.60%	
256B	Cache0	6.05%	Cache0	6.05%		Cache0	5.90%	
	Cache1	6.65%	Cache1	6.65%		Cache1	6.5%	
	Cache2	6.37%	Cache2	6.37%		Cache2	6.23%	
	Cache3	8.05%	Cache3	8.05%		Cache3	7.86%	

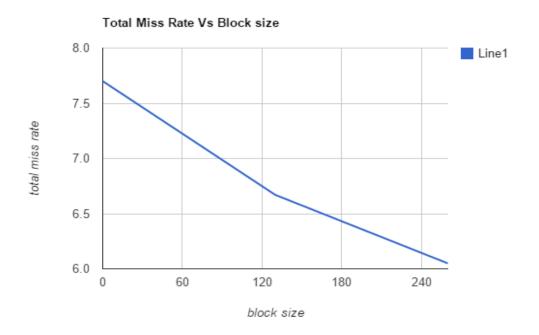
Here we observe that as Block Size is increasing, Cache Misses decrease. The reason behind this is that as the block size increases, there is a good chance for the processor to read and write to other block addresses thereby not invalidating other block address in the other caches and thereby decreasing the miss occurring in that caches.

Now from the above observations we can incur that in order to reduce the miss rate we should increase block size of the cache.

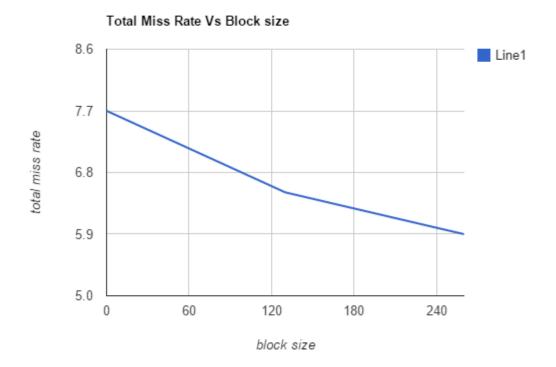
Now let's look at the graph for decreasing miss rate for cach0 for MSI with varying block size values - 64B, 128B, 256B.



Now let's look at the graph for Cach0 for MESI protocol for varying block size - 64B, 128B, 256B.



Now Let's look at the graph for CacheO for Dragon protocol for varying block size - 64B, 128B, 256B.



Now we will look at the Comparison between MSI, MESI and Dragon protocol for all the 11 parameters mentioned in a tabular form.

(Trace file:- canneal.04t.debug)

(1.) First set of Configuration:-

Fixed Parameters:- (i) associativity = 8

(ii) Block Size = 64B

Variable Parameter:- (i) Cache Size = 256Kb, 512Kb, 1Mb, 2Mb.

Cache Size	MSI	MESI	Dragon		
256Kb	Cache0	Cache0	Cache0		
	No. of reads 2339	No. of reads 2339	No. of reads 2339		
	No. of 198	No. of 198	No. of 198		
	readmisses	readmisses	readmisses		
	No. of writes 269	No. of writes 269	No. of writes 269		
	No. of 3	No. of 3	No. of 3		
	writemisses	writemisses	writemisses		
	Miss-rate 7.70%	Miss-rate 7.70%	Miss-rate 7.70%		
	Writebacks 0	Writebacks 0	Writebacks 0		
	C2C 0	C2C 147	C2C 0		
	Memory 215	Memory 54	Memory 201		
	transactions	transactions	transactions		
	Interventions 0	Interventions 43	Interventions 43		
	Invalidations 34	Invalidations 34	Invalidations 0		
	flushes 0	flushes 0	flushes 0		
	Cache1	Cache1	Cache1		
	No. of reads 2341	No. of reads 2341	No. of reads 2341		
	No. of 210	No. of 210	No. of 210		
	readmisses	readmisses	readmisses		
	No. of writes 229	No. of writes 229	No. of writes 229		
	No. of 2	No. of 2	No. of 2		
	writemisses	writemisses	writemisses		
	Miss-rate 8.25%	Miss-rate 8.25%	Miss-rate 8.25%		
	Writebacks 0	Writebacks 0	Writebacks 0		
	C2C 0	C2C 146	C2C 0		
	Memory 232	Memory 66	Memory 212		
	transactions	transactions	transactions		
	Interventions 0	Interventions 41	Interventions 41		
	Invalidations 34	Invalidations 34	Invalidations 0		
	flushes 0	flushes 0	flushes 0		
	Cache2	Cache2	Cache2		
	No. of reads 2396	No. of reads 2396	No. of reads 2396		
	No. of 205	No. of 205	No. of 205		
	readmisses	readmisses	readmisses		
	No. of writes 253	No. of writes 253	No. of writes 253		
	No. of 2	No. of 2	No. of 2		
	writemisses	writemisses	writemisses		
	Miss-rate 7.8%	Miss-rate 7.8%	Miss-rate 7.8%		
	Writebacks 0	Writebacks 0	Writebacks 0		
	C2C 0	C2C 148	C2C 0		
	Memory 226	Memory 59	Memory 207		
	transactions	transactions	transactions		
	Interventions 0	Interventions 38	Interventions 38		
1	Invalidations 35	Invalidations 35	Invalidations 0		

	flushes 0	flushes 0	flushes 0
	Cache3	Cache3	Cache3
	No. of reads 1969	No. of reads 1969	No. of reads 1969
	No. of 216	No. of 216	No. of 216
	readmisses	readmisses	readmisses
	No. of writes 204	No. of writes 204	No. of writes 204
	No. of 0	No. of 0	No. of 0
	writemisses	writemisses	writemisses
	Miss-rate 9.94%	Miss-rate 9.94%	Miss-rate 9.94%
	Writebacks 0	Writebacks 0	Writebacks 0
	C2C 0	C2C 121	C2C 0
	Memory 242	Memory 95	Memory 216
	transactions	transactions	transactions
	Interventions 0	Interventions 68	Interventions 68
	Invalidations 32 flushes 0	Invalidations 32 flushes 0	Invalidations 0
			flushes 0
512Kb	Cache0	Cache0	Cache0
	No. of reads 2339	No. of reads 2339	No. of reads 2339
	No. of 198	No. of 198	No. of 198
	readmisses	readmisses	readmisses
	No. of writes 269	No. of writes 269	No. of writes 269
	No. of 3 writemisses	No. of 3 writemisses	No. of 3 writemisses
	Miss-rate 7.70%	Miss-rate 7.70%	Miss-rate 7.70%
	Writebacks 0	Writebacks 0	Writebacks 0
	C2C 0	C2C 147	C2C 0
	Memory 215	Memory 54	Memory 210
	transactions	transactions	transactions
	Interventions 0	Interventions 43	Interventions 43
	Invalidations 34	Invalidations 34	Invalidations 0
	flushes 0	flushes 0	flushes 0
	Cache1	Cache1	Cache1
	No. of reads 2341	No. of reads 2341	No. of reads 2341
	No. of 210	No. of 210	No. of 210
	readmisses	readmisses	readmisses
	No. of writes 229	No. of writes 229	No. of writes 229
	No. of 2	No. of 2	No. of 2
	writemisses	writemisses	writemisses
	Miss-rate 8.25%	Miss-rate 8.25%	Miss-rate 8.25%
	Writebacks 0	Writebacks 0	Writebacks 0
	C2C 0	C2C 146	C2C 0
	Memory 232	Memory 66	Memory 212
	transactions	transactions	transactions
	Interventions 0	Interventions 41	Interventions 41
	Invalidations 34	Invalidations 34	Invalidations 0
	flushes 0	flushes 0	flushes 0
	Cache2	Cache2	Cache2
	No. of reads 2396	No. of reads 2396	No. of reads 2396
	No. of 205	No. of 205	No. of 205
	readmisses	readmisses	readmisses
	No. of writes 253	No. of writes 253	No. of writes 253
	No. of 2	No. of 2	No. of 2
	writemisses 7.99/	writemisses	writemisses
	Miss-rate 7.8%	Miss-rate 7.81%	Miss-rate 7.8%
	Writebacks 0 C2C 0	Writebacks 0	Writebacks 0 C2C 0
	1		
	Memory 226 transactions	Memory 59 transactions	Memory 207 transactions
	Interventions 0	- 	Interventions 38
	IIIterventions 0	Interventions 38	Interventions 38

	Invalidations	35	Invalidations	35	Invalidations	0
	flushes	0	flushes	0	flushes	0
	Cache3		Cache3		Cache3	
	No. of reads	1969	No. of reads	1969	No. of reads	1969
	No. of	216	No. of	216	No. of	216
	readmisses	210	readmisses	210	readmisses	210
	No. of writes	204	No. of writes	204	No. of writes	204
	No. of	0	No. of	0	No. of Writes	0
	writemisses		writemisses		writemisses	
	Miss-rate	9.94%	Miss-rate	9.94%	Miss-rate	9.94%
	Writebacks	0	Writebacks	0	Writebacks	0
	C2C	0	C2C	121	C2C	0
	Memory	242	Memory	95	Memory	216
	transactions		transactions		transactions	210
	Interventions	0	Interventions	68	Interventions	68
	Invalidations	32	Invalidations	32	Invalidations	0
	flushes	0	flushes	0	flushes	0
10.46	Cache0		Cache0		Cache0	
1Mb	No. of reads	2339	No. of reads	2339	No. of reads	2339
	No. of reads		No. of reads	198	No. of reads	-
	readmisses	198	readmisses	130	readmisses	198
	No. of writes	269	No. of writes	269	No. of writes	269
	No. of	3	No. of	3	No. of writes	3
	writemisses	·	writemisses		writemisses	
	Miss-rate	7.70%	Miss-rate	7.70%	Miss-rate	7.70%
	Writebacks	0	Writebacks	0	Writebacks	0
	C2C	0	C2C	147	C2C	0
	Memory	215	Memory	54	Memory	210
	transactions		transactions		transactions	
	Interventions	0	Interventions	43	Interventions	43
	Invalidations	34	Invalidations	34	Invalidations	0
	flushes	0	flushes	0	flushes	0
	Cache1	•	Cache1	<u> </u>	Cache1	
	No. of reads	2341	No. of reads	2341	No. of reads	2341
	No. of	210	No. of	210	No. of	210
	readmisses		readmisses		readmisses	
	No. of writes	229	No. of writes	229	No. of writes	229
	No. of	2	No. of	2	No. of	2
	writemisses		writemisses		writemisses	
	Miss-rate	8.25%	Miss-rate	8.25%	Miss-rate	8.25%
	Writebacks	0	Writebacks	0	Writebacks	0
	C2C	0	C2C	146	C2C	0
	Memory	232	Memory	66	Memory	212
	transactions		transactions		transactions	
	Interventions	0	Interventions	41	Interventions	41
	Invalidations	34	Invalidations	34	Invalidations	0
	flushes	0	flushes	0	flushes	0
	Cache2		Cache2		Cache2	
	No. of reads	2396	No. of reads	2396	No. of reads	2396
	No. of	205	No. of	205	No. of	205
	readmisses		readmisses		readmisses	
	No. of writes	253	No. of writes	253	No. of writes	253
	No. of	2	No. of	2	No. of	2
	writemisses		writemisses	<u> </u>	writemisses	
	Miss-rate	7.8%	Miss-rate	7.81%	Miss-rate	7.8%
	Writebacks	0	Writebacks	0	Writebacks	0
	C2C	0	C2C	148	C2C	0
i	CZC					
	Memory	226	Memory transactions	59	Memory transactions	207

	Interventions 0		Interventions	38	П	Interventions	38
	Invalidations 35		Invalidations	35		Invalidations	0
	flushes 0		flushes	0		flushes	0
					١H	L.	U
	Cache3		Cache3			Cache3	
	No. of reads 1969		No. of reads	1969		No. of reads	1969
	No. of 216		No. of	216		No. of	216
	readmisses		readmisses			readmisses	204
	No. of writes 204		No. of writes	204		No. of writes	204
	No. of 0		No. of	0		No. of	0
	writemisses	_	writemisses	0.040/		writemisses	0.040/
	Miss-rate 9.94%		Miss-rate	9.94%		Miss-rate	9.94%
	Writebacks 0		Writebacks	0		Writebacks	0
	C2C 0	_	C2C	121		C2C	0
	Memory 242		Memory	95		Memory	216
	transactions	_	transactions	60		transactions	60
	Interventions 0	_	Interventions	68		Interventions	68
	Invalidations 32	_	Invalidations	32		Invalidations	0
	flushes 0	 	flushes	0	#	flushes	0
2Mb	Cache0		Cache0	,		Cache0	
	No. of reads 2339		No. of reads	2339		No. of reads	2339
	No. of 198		No. of	198		No. of	198
	readmisses		readmisses			readmisses	266
	No. of writes 269		No. of writes	269		No. of writes	269
	No. of 3		No. of	3		No. of	3
	writemisses		writemisses	7 700/		writemisses	7.700/
	Miss-rate 7.70%		Miss-rate	7.70%		Miss-rate	7.70%
	Writebacks 0	_	Writebacks	0		Writebacks	0
	C2C 0		C2C	147		C2C	0
	Memory 215 transactions		Memory transactions	54		Memory transactions	210
	Interventions 0		Interventions	43		Interventions	43
	Invalidations 34		Invalidations	34		Invalidations	0
	flushes 0		flushes	0		flushes	0
					 -		U
	Cache1		Cache1	2244		Cache1	22.44
	No. of reads 2341		No. of reads	2341		No. of reads	2341
	No. of 210		No. of	210		No. of	210
	readmisses	_	readmisses	220		readmisses	220
	No. of writes 229	_	No. of writes	229		No. of writes	229
	No. of 2 writemisses		No. of writemisses	2		No. of writemisses	2
	Miss-rate 8.25%		Miss-rate	8.25%		Miss-rate	8.25%
	Writebacks 0		Writebacks	0		Writebacks	0
	C2C 0		C2C	146		C2C	0
	Memory 232		Memory	66		Memory	212
	transactions		transactions			transactions	212
	Interventions 0		Interventions	41		Interventions	41
	Invalidations 34		Invalidations	34		Invalidations	0
	flushes 0		flushes	0		flushes	0
	Cache2		Cache2	<u> </u>	l	Cache2	
	No. of reads 2396	\neg	No. of reads	2396		No. of reads	2396
	No. of 205		No. of	205		No. of	205
	readmisses		readmisses			readmisses	203
	No. of writes 253	-	No. of writes	253		No. of writes	253
	No. of 2	-	No. of	2		No. of	2
	writemisses		writemisses	-		writemisses	_
	Miss-rate 7.8%	-	Miss-rate	7.81%		Miss-rate	7.8%
	Writebacks 0	-	Writebacks	0		Writebacks	0
	C2C 0		C2C	148		C2C	0
	Memory 226	-	Memory	59		Memory	207
	I I Melliory 1 776						

transactions		transactions		transactions	
Interventions	0	Interventions	38	Interventions	38
Invalidations	35	Invalidations	35	Invalidations	0
flushes	0	flushes	0	flushes	0
Cache3		Cache3		Cache3	
No. of reads	1969	No. of reads	1969	No. of reads	1969
No. of	216	No. of	216	No. of	216
readmisses		readmisses		readmisses	
No. of writes	204	No. of writes	204	No. of writes	204
No. of	0	No. of	0	No. of	0
writemisses		writemisses		writemisses	
Miss-rate	9.94%	Miss-rate	9.94%	Miss-rate	9.94%
Writebacks	0	Writebacks	0	Writebacks	0
C2C	0	C2C	121	C2C	0
Memory	242	Memory	95	Memory	216
transactions		transactions		transactions	
Interventions	0	Interventions	68	Interventions	68
Invalidations	32	Invalidations	32	Invalidations	0
flushes	0	flushes	0	flushes	0

From the above results what I observed was that In MESI protocol there were more number of cache to cache transfers as compared to MSI, which is a good improvement as that help reduce processor every time accessing memory for the value. Secondly I found that increasing the cache size didn't provide any improvement over the miss rate as explained before. All other values are almost same for MSI, MESI and Dragon Protocol. Finally one more thing to be taken into account is that there are 0 number of invalidations in case of Dragon Protocol which is a good thing as it would involve less number of bus transactions.

(2.) Second set of Configuration:-

Fixed Parameters:- (i) Cache Size = 1Mb

(ii) Block Size = 64B

Variable Parameter:- (i) Associativity = 4-way, 8-way, 16-way

Associativity	MSI	MESI	Dragon
4-way	Cache0	Cache0	Cache0
,	No. of reads 2339	No. of reads 2339	No. of reads 2339
	No. of 198	No. of 198	No. of 198
	readmisses	readmisses	readmisses
	No. of writes 269	No. of writes 269	No. of writes 269
	No. of 3	No. of 3	No. of 3
	writemisses	writemisses	writemisses
	Miss-rate 7.70%	Miss-rate 7.70%	Miss-rate 7.70%
	Writebacks 0	Writebacks 0	Writebacks 0
	C2C 0	C2C 147	C2C 0
	Memory 215	Memory 54	Memory 201
	transactions	transactions	transactions
	Interventions 0	Interventions 43	Interventions 43
	Invalidations 34	Invalidations 34	Invalidations 0
	flushes 0	flushes 0	flushes 0
	Cache1	Cache1	Cache1
	No. of reads 2341	No. of reads 2341	No. of reads 2341
	No. of 210	No. of 210	No. of 210
	readmisses	readmisses	readmisses
	No. of writes 229	No. of writes 229	No. of writes 229
	No. of 2	No. of 2	No. of 2
	writemisses	writemisses	writemisses
	Miss-rate 8.25%	Miss-rate 8.25%	Miss-rate 8.25%
	Writebacks 0	Writebacks 0	Writebacks 0
	C2C 0	C2C 146	C2C 0
	Memory 232	Memory 66	Memory 212
	transactions	transactions	transactions
	Interventions 0	Interventions 41	Interventions 41
	Invalidations 34	Invalidations 34	Invalidations 0
	flushes 0	flushes 0	flushes 0
	Cache2	Cache2	Cache2
	No. of reads 2396	No. of reads 2396	No. of reads 2396
	No. of 205	No. of 205	No. of 205
	readmisses	readmisses	readmisses
	No. of writes 253	No. of writes 253	No. of writes 253
	No. of 2	No. of 2	No. of 2
	writemisses	writemisses	writemisses
	Miss-rate 7.8%	Miss-rate 7.8%	Miss-rate 7.8%
	Writebacks 0	Writebacks 0	Writebacks 0
	C2C 0	C2C 148	C2C 0
	Memory 226	Memory 59	Memory 207
	transactions	transactions	transactions
	Interventions 0	Interventions 38	Interventions 38
	Invalidations 35	Invalidations 35	Invalidations 0
	flushes 0	flushes 0	flushes 0
	Cache3	Cache3	Cache3
	No. of reads 1969	No. of reads 1969	No. of reads 1969
	No. of 216	No. of 216	No. of 216
	readmisses	readmisses	readmisses
	No. of writes 204	No. of writes 204	No. of writes 204
	No. of 0	No. of 0	No. of 0

Miss-rate 9.94% Writebacks 0 CZC 0 Memory 242 transactions Interventions 0 Invalidations 32 flushes 0 CZc 121 Memory 95 transactions Interventions 0 Invalidations 32 flushes 0 CZc 0 Memory 216 transactions Interventions 0 Miss-rate 0 CZc 0 Memory 0 Miss-rate 0 CZc 0 Memory 0 Miss-rate 0 CZc 0 Memory 0 Memory 0 Memory 0 Memory 0 Miss-rate 0 CZc 0 Memory 0 Miss-rate		writemisses		ГΓ	writemisses		П	writemisses	
Writebacks 0 C2C			0.04%			0.04%			0.04%
C2C									
Memory transactions Interventions O O O O O O O O O									
transactions Interventions 0 Invalidations 32 Tilushes 0 Tilushes									
Interventions O			242			95		•	216
Invalidations 32 Invalidations 34 Invalid		transactions			transactions			transactions	
Roughes CacheO		Interventions			Interventions			Interventions	
Cache No. of reads 2339 No. of reads 2339 No. of reads 198 readmisses No. of writes 269		Invalidations	32		Invalidations	32		Invalidations	0
No. of reads 2339 No. of reads 2339 No. of reads 2339 No. of writes 269 No. of 3 writemisses Miss-rate 7.70% Writebacks 0 C2C 0 Memory 215 transactions Interventions 0 Invalidations 34 flushes 0 Cache 1 No. of writes 229 No. of writes 230 No. of 2 Writebacks 0 C2C 146 Memory 260 Transactions Interventions 0 Transactions Transactions Transactions T		flushes	0		flushes	0		flushes	0
No. of reads 2339 No. of reads 2339 No. of reads 2339 No. of writes 269 No. of 3 writemisses Miss-rate 7.70% Writebacks 0 C2C 0 Memory 215 transactions Interventions 0 Invalidations 34 flushes 0 Cache 1 No. of writes 229 No. of writes 230 No. of 2 Writebacks 0 C2C 146 Memory 260 Transactions Interventions 0 Transactions Transactions Transactions T	8-way	Cache0			Cache0			Cache0	
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transactions Interventions 0 Interventions 38 Interventions 38 Interventions 38 Interventions 38 Invalidations 35 Invalidations 0 Invalidations 0 flushes 0 flushes 0 Cache3 Cache3 No. of reads No. of reads 1969 No. of reads							
Interventions 0				1 1			
Invalidations 35 Invalidations 35 flushes 0 Cache3 No. of reads 1969 No. of 216 No. of 216 No. of 216 Invalidations 0 flushes 0 Cache3 No. of reads 1969 No. of 216 No. of 21			0		38		38
flushes 0 Cache3 No. of reads 1969 No. of 216 flushes 0 flushes 0 Cache3 No. of reads 1969 No. of 216 No. of 216 flushes 0 Cache3 No. of reads 1969 No. of 216							
Cache3 No. of reads 1969 No. of reads 1969 No. of reads 1969 No. of 216 No. of 216 No. of 216							
No. of reads 1969 No. of 216			- 	-	- 		
No. of 216 No. of 216 No. of 216			1000				1000
readmisses readmisses readmisses			216		216		216
		readmisses		readmisses		readmisses	

No. of writes	204	No. of writes	204	No. of writes	204
No. of	0	No. of	0	No. of	0
writemisses		writemisses		writemisses	
Miss-rate	9.94%	Miss-rate	9.94%	Miss-rate	9.94%
Writebacks	0	Writebacks	0	Writebacks	0
C2C	0	C2C	121	C2C	0
Memory	242	Memory	95	Memory	216
transactions		transactions		transactions	
Interventions	0	Interventions	68	Interventions	68
Invalidations	32	Invalidations	32	Invalidations	0
flushes	0	flushes	0	flushes	0

From the above results I found that by increasing the cache associativity we didn't find much improvement as the miss rate is same as it was for lower associativity. I found similar inference as the previous configuration that cache to cache transfer is greater in case of MESI than MSI and number of invalidations is 0 in case of Dragon.

(3.) Third set of Configuration:-

Fixed Parameters:- (i) Cache Size = 1Mb

(ii) Associativity = 8

Variable Parameter:- (i) Block Size = 64B, 128B, 256B

Block size	MSI	MESI	Dragon			
64B	Cache0	Cache0	Cache0			
0.15	No. of reads 2339	No. of reads 2339	No. of reads 2339			
	No. of 198	No. of 198	No. of 198			
	readmisses	readmisses	readmisses			
	No. of writes 269	No. of writes 269	No. of writes 269			
	No. of 3	No. of 3	No. of 3			
	writemisses	writemisses	writemisses			
	Miss-rate 7.70%	Miss-rate 7.70%	Miss-rate 7.70%			
	Writebacks 0	Writebacks 0	Writebacks 0			
	C2C 0		C2C 0			
	Memory 215	Memory 54	Memory 201			
	transactions	transactions	transactions			
	Interventions 0	Interventions 43	Interventions 43			
	Invalidations 34	Invalidations 34	Invalidations 0			
	flushes 0	flushes 0	flushes 0			
	Cache1	Cache1	Cache1			
	No. of reads 2341	No. of reads 2341	No. of reads 2341			
	No. of 210	No. of 210	No. of 210			
	readmisses	readmisses	readmisses			
	No. of writes 229	No. of writes 229	No. of writes 229			
	No. of 2	No. of 2	No. of 2			
	writemisses	writemisses	writemisses			
	Miss-rate 8.25%	Miss-rate 8.25%	Miss-rate 8.25%			
	Writebacks 0	Writebacks 0	Writebacks 0			
	C2C 0	C2C 146	C2C 0			
	Memory 232	Memory 66	Memory 212			
	transactions	transactions	transactions			
	Interventions 0	Interventions 41	Interventions 41			
	Invalidations 34	Invalidations 34	Invalidations 0			
	flushes 0	flushes 0	flushes 0			
	Cache2	Cache2	Cache2			
	No. of reads 2396	No. of reads 2396	No. of reads 2396			
	No. of 205	No. of 205	No. of 205			
	readmisses	readmisses	readmisses			
	No. of writes 253	No. of writes 253	No. of writes 253			
	No. of 2	No. of 2	No. of 2			
	writemisses	writemisses	writemisses			
	Miss-rate 7.8%	Miss-rate 7.8%	Miss-rate 7.8%			
	Writebacks 0	Writebacks 0	Writebacks 0			
	C2C 0	C2C 148	C2C 0			
	Memory 226	Memory 59	Memory 207			
	transactions	transactions	transactions			
	Interventions 0	Interventions 38	Interventions 38			
	Invalidations 35	Invalidations 35	Invalidations 0			
	flushes 0	flushes 0	flushes 0			
	Cache3	Cache3	Cache3			
	No. of reads 1969	No. of reads 1969	No. of reads 1969			
	No. of 216	No. of 216	No. of 216			
	readmisses	readmisses	readmisses			

	No. of writes	204		No. of writes	204		No. of writes	204
	No. of	0		No. of	0		No. of	0
	writemisses			writemisses			writemisses	
	Miss-rate	9.94%		Miss-rate	9.94%		Miss-rate	9.94%
	Writebacks	0		Writebacks	0		Writebacks	0
	C2C	0		C2C	121		C2C	0
	Memory	242		Memory	95		Memory	216
	transactions			transactions			transactions	
	Interventions	0		Interventions	68		Interventions	68
	Invalidations	32		Invalidations	32		Invalidations	0
	flushes	0		flushes	0		flushes	0
128B	Cache0		Ħ	Cache0		Ħ	Cache0	
1200	No. of reads	2339		No. of reads	2339		No. of reads	2339
	No. of	171		No. of	171		No. of	167
	readmisses	1/1		readmisses			readmisses	107
	No. of writes	269		No. of writes	269		No. of writes	269
	No. of	3		No. of	3		No. of	3
	writemisses			writemisses			writemisses	
	Miss-rate	6.67%		Miss-rate	6.67%		Miss-rate	6.51%
	Writebacks	1		Writebacks	0.0770		Writebacks	0.5170
	C2C	0		C2C	129		C2C	0
	Memory	189		Memory	46		Memory	170
	transactions			transactions			transactions	
	Interventions	1		Interventions	38		Interventions	37
	Invalidations	34		Invalidations	34		Invalidations	0
	flushes	1		flushes	0		flushes	0
	Cache1	<u> </u>		Cache1		lŀ	Cache1	
	No. of reads	2341		No. of reads	2341		No. of reads	2341
	No. of	184		No. of	184		No. of	181
	readmisses	104		readmisses	184		readmisses	101
	No. of writes	229		No. of writes	229		No. of writes	229
	No. of	1		No. of	1		No. of	1
	writemisses	•		writemisses			writemisses	-
	Miss-rate	7.19%		Miss-rate	7.19%		Miss-rate	7.08%
	Writebacks	2		Writebacks	0		Writebacks	0
	C2C	0		C2C	126		C2C	0
	Memory	206		Memory	61		Memory	182
	transactions			transactions			transactions	102
	Interventions	2		Interventions	39		Interventions	37
	Invalidations	35		Invalidations	35		Invalidations	0
	flushes	2		flushes	2		flushes	0
	Cache2			Cache2	•		Cache2	
	No. of reads	2396		No. of reads	2396		No. of reads	2396
	No. of	181		No. of	181		No. of	177
	readmisses	101		readmisses			readmisses	1,,
	No. of writes	253		No. of writes	253		No. of writes	253
	No. of	2		No. of	2		No. of	2
	writemisses	-		writemisses	-		writemisses	-
	Miss-rate	6.90%		Miss-rate	6.90%		Miss-rate	6.75%
	Writebacks	1		Writebacks	0		Writebacks	0
	C2C	0		C2C	129		C2C	0
	Memory	202		Memory	55		Memory	179
	transactions			transactions			transactions	
	Interventions	1		Interventions	35		Interventions	34
	Invalidations	36		Invalidations	36		Invalidations	0
	flushes	1		flushes	1		flushes	0
	Cache3			Cache3			Cache3	
	No. of reads	1969		No. of reads	1969		No. of reads	1969
	No. of	191		No. of	1909		No. of	187
		101		140.01	101	LL	INO. UI	107

No. of writes 204 No. of O writemisses Miss-rate 8.78% Writebacks 1 C2C D Memory 217 transactions Interventions 1 Invalidations 33 flushes 1 C2C D Memory 15 transactions Interventions 1 Invalidations 33 Miss-rate 6.05% Writebacks C2C D Memory 15 transactions Interventions 1 Invalidations 33 Miss-rate 6.05% Writebacks C2C D Memory 173 transactions Interventions 1 Invalidations 34 Invalidations 35 Invalidations 35 Invalidations 36 Inva		readmisses		readmisses			readmisses	
No. of writeriases No. of			-	 	204			204
writemisses Miss-rate 8.78% Writebacks 1 CZC 0 Memory 173 transactions Interventions 3 moviledations 34 movintemisses Miss-rate 6.05% Writebacks 0 CZC 0 Memory 173 transactions Interventions 1 moviledations 34 movintemisses Miss-rate 6.65% Writebacks 0 CZC 0 Memory 173 transactions Interventions 1 moviledations 34 movintemisses Miss-rate 6.65% Writebacks 0 CZC 0 Memory 173 transactions Interventions 1 writemisses Miss-rate 6.65% Writebacks 0 CZC 0 Memory 173 transactions Interventions 1 writemisses Miss-rate 6.65% Writebacks 0 CZC 0 Memory 173 transactions Interventions 1 writemisses Miss-rate 6.65% Writebacks 0 CZC 0 Memory 173 transactions Interventions 2 invalidations 34 flushes 1 CZchel No. of reads 2341 No. of 170 readmisses No. of writes 229 No.			-					
Miss-rate 8.78% Writebacks 1 C2C								
Writebacks 1 C2C 0 Memory 217 transactions Interventions 1 Invalidations 33 Invalidations 33 Invalidations 33 Invalidations 33 Invalidations 34 Invalidations 35 Invalidations 36 Invalidations			-		0 700/			9 60%
C2C				1				
Memory transactions Interventions 1 Invalidations 33 Invalidations 1 Invalidations 33 Invalidations 1 Invalidations 3					_			
transactions Interventions 1 Invalidations 33 flushes 1 Cache0								
Interventions 1		11 '		11 '	81		•	18/
Invalidations 33 Invalidations 33 Invalidations 33 Invalidations 34 Invalidations 34 Invalidations 35 Invalidations 36 Invalid								
Flushes 1			_					
Cache0			_					
No. of reads 2339 No. of reads 2339 No. of readmisses No. of writes 269 No. of 3 writemisses Miss-rate 6.05% Writebacks 0 C2C 0 Memory 173 transactions Interventions 1 Interventions 34 Invalidations 35 Invalidations 36 Invalidati		flushes 1	Ш	flushes	1	Щ	flushes	0
No. of reads 2339 No. of reads 2339 No. of readmisses No. of writes 269 No. of 3 writemisses Miss-rate 6.05% Writebacks 0 C2C 0 Memory 173 transactions Interventions 1 Interventions 34 Invalidations 35 Invalidations 36 Invalidati	256B	Cache0		Cache0			Cache0	
readmisses No. of writes 269 No. of 3 writemisses Miss-rate 6.05% Writebacks 1 C2C 0 Memory 173 transactions Interventions 1 Invalidations 34 flushes 1 Cache1 No. of writes 229 No. of 167 readmisses No. of writes 230 No. of 2 writemisses No. of writes		No. of reads 2339		No. of reads	2339		No. of reads	2339
No. of writes 269 No. of writes 269 No. of writernisses Miss-rate 6.05% Writebacks 1 CZC 0 Memory 173 transactions Interventions 1 Invalidations 34 flushes 1 Cache 1 No. of reads 2341 No. of 170 readmisses Miss-rate 6.05% Writebacks 0 CZC 0 Memory 154 transactions Interventions 34 flushes 1 Cache 1 No. of 170 readmisses No. of writes 229 No. of 170 readmisses Miss-rate 6.65% Writebacks 2 CZC 0 No. of 170 readmisses Miss-rate 6.65% Writebacks 2 CZC 0 Memory 154 transactions Interventions 34 flushes 1 No. of 170 readmisses No. of writes 229 No. of 1 writemisses Miss-rate 6.65% Writebacks 0 CZC 116 Memory 170 transactions Interventions 2 Invalidations 35 flushes 0 CZC 116 Memory 157 transactions Interventions 35 flushes 0 CZC 116 Memory 157 transactions Interventions 35 flushes 0 CZC Cache CZC Ca		No. of 155		No. of	155		No. of	151
No. of writemisses Miss-rate 6.05% Writebacks 1 C2C 0 Memory 173 transactions Interventions 1 Invalidations 34 flushes 1 Cache 1 Writebacks 0 C2C 118 Memory 41 transactions Interventions 34 Invalidations 34 flushes 1 Cache 1 No. of reads 2341 No. of reads 2341 No. of writes 229 No. of writes 229 No. of 1 writemisses Miss-rate 6.65% Writebacks 2 C2C 0 Memory 154 transactions Interventions 33 Invalidations 35 flushes 1 No. of reads 2341 No. of 170 readmisses No. of writes 229 No. of 167 readmisses No. of writes 2396 No. of 167 readmisses No. of writes 253 No. of 2 writemisses Miss-rate 6.37% Writebacks 1 C2C 0 Memory 57 transactions Interventions 34 Invalidations 35 flushes 2 Cache No. of reads 2396 No. of 167 readmisses No. of writes 253 No. of 2 writemisses Miss-rate 6.37% Writebacks 0 C2C 119 Memory 187 transactions Interventions 34 Invalidations 36 flushes 1 Cache 34 Memory 165 Transactions Invalidations 36 flushes 1 Cache		readmisses		readmisses			readmisses	
No. of writemisses Miss-rate 6.05% Writebacks 1 C2C 0 Memory 173 transactions Interventions 1 Invalidations 34 flushes 1 Cache 1 Writebacks 0 C2C 118 Memory 41 transactions Interventions 34 Invalidations 34 flushes 1 Cache 1 No. of reads 2341 No. of reads 2341 No. of writes 229 No. of writes 229 No. of 1 writemisses Miss-rate 6.65% Writebacks 2 C2C 0 Memory 154 transactions Interventions 33 Invalidations 35 flushes 1 No. of reads 2341 No. of 170 readmisses No. of writes 229 No. of 167 readmisses No. of writes 2396 No. of 167 readmisses No. of writes 253 No. of 2 writemisses Miss-rate 6.37% Writebacks 1 C2C 0 Memory 57 transactions Interventions 34 Invalidations 35 flushes 2 Cache No. of reads 2396 No. of 167 readmisses No. of writes 253 No. of 2 writemisses Miss-rate 6.37% Writebacks 0 C2C 119 Memory 187 transactions Interventions 34 Invalidations 36 flushes 1 Cache 34 Memory 165 Transactions Invalidations 36 flushes 1 Cache		No. of writes 269		No. of writes	269		No. of writes	269
writemisses Miss-rate 6.05% Writebacks 1 C2C 0 Memory 173 transactions Interventions 1 Invalidations 34 Invalidations 36 I								
Miss-rate 6.05% Writebacks 1 C2C 0 C2C 118 Memory 173 transactions Interventions 1 Interventions 34 Invalidations 34 Invalidations 34 Invalidations 34 Invalidations 34 Interventions 34 Invalidations 34 Interventions 35 Invalidations 36 Invalidations 35 Invalidations 35 Interventions 36 Invalidations 35 Interventions 36 Invalidations 36 Invalidatio								-
Writebacks 1 C2C		I 	$\exists \Box$	1	6.05%			5.90%
C2C Memory 173 transactions Interventions 1 Invalidations 34 Invalidations 35 Invalidations 36 Invalidations 36 Invalidations 35 Invalidations 36 Invalidations 35 Interventions 36 Invalidations			$\exists $					
Memory transactions Interventions 1 Invalidations 34 Invalidations 36 Invalidations 36 Invalidations 35 Invalidations 36 Invalid			$\exists $					
transactions Interventions 1 Invalidations 34 Interventions 34 Interventions 34 Invalidations 35 Invalidations 34 Invalidations 35 Invalidations 35 Invalidations 35 Invalidations 35 Invalidations 36 Invalidations			$\dashv \sqcap$					
Interventions 1 Invalidations 34 Invalidations 35 Invalidations 36 Invalidation		11 '		/			- I	157
Invalidations 34 flushes 1			-		21			22
Flushes 1 Cache1 No. of reads 2341 No. of reads 2341 No. of readmisses No. of writes 229 No. of 170 readmisses No. of writes 229 No. of 1 writemisses Miss-rate 6.65% Writebacks 2 C2C 0 Memory 192 transactions Interventions 2 Invalidations 35 Flushes 0 Cache2 No. of writes 2396 No. of writes 2396 No. of writes 253								
Cache1			-					
No. of reads 2341 No. of 170 readmisses No. of writes 229 No. of 1 writemisses No. of writes 229 No. of 1 writemisses Miss-rate 6.65% Writebacks 2 C2C 0 Memory 192 transactions Interventions 2 Invalidations 35 flushes 0 Cache2 No. of writes 2396 No. of 2 writemisses Miss-rate 6.37% Writebacks 0 C2C 0 Memory 168 transactions Interventions 35 flushes 2 Cache2 No. of reads 2396 No. of 167 readmisses No. of writes 253 No. of 2 writemisses Miss-rate 6.37% Writebacks 1 C2C 0 Memory 169 transactions Interventions 36 Invalidations 1 Invalidations 36 flushes 1 Cache3 Cac			41		1		1	0
No. of readmisses No. of writes 229 No. of 1 writemisses Miss-rate 6.65% Writebacks 2 C2C 0 C2C 116 Memory 192 transactions Interventions 2 Invalidations 35 flushes 0 Cache2 No. of writes 2396 No. of writes 253 No. of 2 writemisses Miss-rate 6.37% Writebacks 0 Cache2 No. of writes 253 No. of 2 writemisses Miss-rate 6.37% Writebacks 0 Cache3 Miss-rate 6.25% Writebacks 0 Cache3 Cac			_,	I			Cache1	, ,
readmisses		No. of reads 2341	_	No. of reads	2341		No. of reads	2341
No. of writes 229 No. of 1 writemisses Miss-rate 6.65% Writebacks 2 C2C 0 Memory 192 transactions Interventions 2 Invalidations 35 flushes 0 Cache2 No. of writes 2396 No. of 167 readmisses Miss-rate 6.37% Writebacks 1 C2C 0 Memory 187 transactions Interventions 1 Invalidations 36 flushes 1 Cache3 Cache4		No. of 170		No. of	170		No. of	167
No. of writemisses Miss-rate 6.65% Writebacks 2 C2C 0 Memory 192 transactions Interventions 2 Invalidations 35 flushes 0 Cache2 No. of reads 2396 No. of 167 readmisses No. of writes 253 No. of writes 253 No. of writes 6.37% Writebacks 0 C2C 116 Memory 168 transactions Interventions 36 Invalidations 35 flushes 2 Cache2 No. of reads 2396 No. of writes 253 No. of writes		readmisses		readmisses			readmisses	
writemisses Miss-rate 6.65% Miss-rate 6.65% Writebacks 2 C2C 0 Memory 192 transactions 1nvalidations Interventions 2 Invalidations 35 flushes 0 Cache2 No. of reads No. of reads 2396 No. of writes 253		No. of writes 229		No. of writes	229		No. of writes	229
Miss-rate 6.65% Writebacks 2 C2C 0 Memory 192 transactions Interventions 2 Invalidations 35 flushes 0 Cache 2 No. of reads 2396 No. of 167 readmisses Miss-rate 6.37% Writebacks 1 C2C 0 Memory 168 transactions Interventions 36 Invalidations 35 flushes 2 Cache 2 No. of reads 2396 No. of 167 readmisses No. of writes 253 No. of 2 writemisses Miss-rate 6.37% Writebacks 1 C2C 0 Memory 168 transactions Interventions 34 Invalidations 0 flushes 0 Cache 2 No. of reads 2396 No. of 167 readmisses No. of writes 253 No. of 2 writemisses No. of writes 253 No. of 2 writemisses Miss-rate 6.37% Writebacks 0 C2C 119 Memory 51 transactions Interventions 32 Invalidations 0 flushes 0 Cache 3		No. of 1		No. of	1		No. of	1
Writebacks 2 C2C 0 Memory 192 transactions Interventions 2 Invalidations 35 flushes 0 Cache 2 No. of reads 2396 No. of readmisses No. of writes 253 No. of 2 writemisses Miss-rate 6.37% Writebacks 1 C2C 0 Memory 168 transactions Interventions 34 Invalidations 35 flushes 2 Cache 2 No. of reads 2396 No. of 167 readmisses No. of writes 253 No. of 2 writemisses Miss-rate 6.37% Writebacks 1 C2C 0 Memory 187 transactions Interventions 34 Invalidations 36 flushes 1 Cache 3 Cache 3 Writebacks 0 C2C 0 Memory 168 transactions Interventions 34 Invalidations 36 Invalidations 36 flushes 1 Cache 3 Ca		writemisses		writemisses			writemisses	
Writebacks 2 C2C 0 Memory 192 transactions Interventions 2 Invalidations 35 flushes 0 Cache 2 No. of reads 2396 No. of readmisses No. of writes 253 No. of 2 writemisses Miss-rate 6.37% Writebacks 1 C2C 0 Memory 168 transactions Interventions 36 Invalidations 35 flushes 2 Cache 2 No. of readmisses No. of writes 253 No. of 2 writemisses Miss-rate 6.37% Writebacks 1 C2C 0 Memory 187 transactions Interventions 34 Invalidations 0 flushes 0 Cache 2 No. of readmisses No. of 167 readmisses No. of writes 253 No. of 163 readmisses No. of 2 writemisses Miss-rate 6.37% Writebacks 0 C2C 119 Memory 168 transactions University 168 transactions 100 University 168		Miss-rate 6.65%		Miss-rate	6.65%		Miss-rate	6.53%
C2C								
Memory transactions192 transactionsMemory transactions57 transactionsMemory transactions168 transactionsInterventions2 InvalidationsInterventions36 InvalidationsInterventions34 InvalidationsCache2No. of reads2396 No. of reads2396 No. of readsNo. of reads2396 No. of readsNo. of reads2396 No. of readsNo. of reads2396 No. of readsNo. of reads2396 No. of writesNo. of writes253 WritebacksNo. of writes253 Writebacks </td <td></td> <td>C2C 0</td> <td></td> <td></td> <td>116</td> <td></td> <td></td> <td>0</td>		C2C 0			116			0
transactions Interventions 2 Invalidations 35 flushes 0 Cache2 No. of reads 2396 No. of readmisses No. of writes 253 No. of 2 writemisses Miss-rate 6.37% Writebacks 1 C2C 0 Memory 187 transactions Interventions 36 Invalidations 35 flushes 2 Cache2 No. of reads 2396 No. of 167 readmisses No. of 2 writemisses Miss-rate 6.37% Writebacks 1 C2C 0 Memory 187 transactions Interventions 1 Invalidations 36 flushes 1 Cache3 Interventions 36 Invalidations 35 flushes 2 Cache2 No. of reads 2396 No. of 167 readmisses No. of writes 253 No. of 2 writemisses Miss-rate 6.37% Writebacks 0 C2C 119 Memory 51 transactions Interventions 33 Invalidations 36 flushes 1 Cache3								168
Interventions 2 Invalidations 35 Invalidations 36 Invalida		1		1 1			1	
Invalidations 35 flushes 0 Cache2 No. of reads 2396 No. of readmisses No. of writes 253 No. of 2 writemisses Miss-rate 6.37% Writebacks 1 C2C 0 Memory 187 transactions Interventions 1 Invalidations 36 flushes 1 Cache3 Cache3 Invalidations 36 flushes 1 Cache3 Cache3 Invalidations 0 flushes 0 Cache2 No. of reads 2396 No. of readmisses No. of readmisses No. of writes 253 No. of writes			7		36			34
Flushes 0 Cache2 Flushes 2 Cache2 No. of reads 2396 No. of 167 readmisses No. of writes 253 No. of 2 writemisses Miss-rate 6.37% Writebacks 1 C2C 0 Memory 187 transactions Interventions 1 Invalidations 36 flushes 1 Cache3 Cache3 Cache3 Cache3 Cache3 Cache3 Flushes 0 Cache2 No. of reads 2396 No. of reads 2396 No. of writes 253 No. of write								
Cache2 No. of reads 2396 No. of reads 2396 No. of readmisses 167 No. of writes 253 No. of writemisses No. of writemisses Miss-rate 6.37% Writebacks 1 C2C 0 Memory 187 transactions Interventions Interventions 1 Invalidations 36 flushes 1 Cache3 Cache3			-					
No. of reads 2396 No. of 167 readmisses No. of writes 253 No. of 2 writemisses Miss-rate 6.37% Writebacks 1 C2C 0 Memory 187 transactions Interventions 1 Invalidations 36 flushes 1 Cache3 No. of reads 2396 No. of 163 readmisses No. of writes 253 No. of writemisses No. of writes 253 No. of writemisses No. of 2 writemisses Miss-rate 6.37% Writebacks 0 C2C 119 Memory 51 transactions Interventions 33 Invalidations 36 flushes 1 Cache3			-41					
No. of readmisses		I	٦H	I	2225			
readmisses No. of writes 253 No. of 2 writemisses Miss-rate 6.37% Writebacks 1 C2C 0 Memory 187 transactions Interventions 1 Invalidations 36 flushes 1 Cache3 readmisses No. of writes 253 No. of 2 writemisses Miss-rate 6.37% Writebacks 0 C2C 119 Memory 51 transactions Interventions 33 Invalidations 36 flushes 1 readmisses No. of writes 253 No. of writes 253 No. of writes 253 No. of Writebacks No. of writes 253 No. of Writebacks No. of writes 253 No. of Writebacks No. of Wr			411					
No. of writes253No. of writes253No. of writes253No. of2writemissesNo. of2Miss-rate6.37%Writebacks1Writebacks0C2CMemory187Writebacks0C2C119Memory165Interventions1Invalidations36Invalidations36Invalidations36flushes1Cache3Cache3Cache3					167			163
No. of writemisses Miss-rate 6.37% Writebacks 1 C2C 0 Memory 187 transactions Interventions 1 Invalidations 36 flushes 1 Cache3 No. of 2 writemisses Miss-rate 6.37% Writebacks 0 C2C 119 Memory 51 transactions Interventions 33 Invalidations 36 flushes 1 No. of writemisses Miss-rate 6.22% Writebacks 0 C2C 0 Memory 51 transactions Interventions 33 Invalidations 36 flushes 1 Cache3			411	-				
writemisseswritemisseswritemissesMiss-rate6.37%Writebacks1C2C0Memory187transactionsInterventionsInterventions1Invalidations36flushes1Cache3Cache3 writemisses Miss-rate Miss-rate Miss-rate Miss-rate Miss-rate Moiss-rate Miss-rate Memory transactions Interventions 33 Invalidations Invalidations 0 flushes 0 Cache3 Cache3			$\exists \Box$					
Miss-rate 6.37% Writebacks 1 C2C 0 Memory 187 transactions 1 Interventions 1 Invalidations 36 flushes 1 Cache3 Miss-rate 6.37% Writebacks 0 C2C 119 Memory 51 transactions Interventions 33 Invalidations 36 flushes 1 Miss-rate 6.22% Writebacks 0 C2C 0 Memory 165 transactions Interventions 32 Invalidations 36 flushes 1 Cache3 Cache3					2			2
Writebacks1Writebacks0Writebacks0C2C0Memory187Memory51Memory165transactionsInterventions1Interventions33Interventions32Invalidations36Invalidations36Invalidations0flushes1Cache3Cache3			$\exists \Box$					<u> </u>
C2C 0 Memory 187 transactions 1 Interventions 1 Invalidations 36 flushes 1 Cache3 Cache3 C2C 0 Memory 165 Interventions 32 Invalidations 36 flushes 1 Cache3			_		6.37%			6.22%
Memory transactions187 transactionsMemory transactions165 transactionsInterventions 1 Invalidations 36 flushes 1Interventions 33 Invalidations 36 flushes 1Invalidations 36 flushes 1Invalidations 36 flushes 0Cache3Cache3Cache3		Writebacks 1	_					0
transactions transactions transactions Interventions 1 Interventions 33 Invalidations 36 flushes 1 Cache3 Cache3 transactions transactions Interventions 32 Invalidations 0 flushes 0 Cache3 Cache3		C2C 0	_	C2C	119		C2C	0
Interventions1Interventions33Interventions32Invalidations36Invalidations36Invalidations0flushes1flushes1Cache3Cache3		Memory 187		Memory	51		Memory	165
Interventions1Interventions33Interventions32Invalidations36Invalidations36Invalidations0flushes1flushes1Cache3Cache3		transactions		transactions			transactions	
Invalidations36Invalidations36Invalidations0flushes1flushes1flushes0Cache3Cache3Cache3			7		33			32
flushes 1 flushes 1 flushes 0 Cache3 Cache3			$\exists \sqcup$					
Cache3 Cache3 Cache3			$\exists \Box$	-				
		-						
			-		1000			1000
		No. of reads 1969	Ш	No. of reads	1969		No. of reads	1969

No. of	175	No. of	175	No. of	171
readmisses		readmisses		readmisses	
No. of writes	204	No. of writes	204	No. of writes	204
No. of writemisses	0	No. of writemisses	0	No. of writemisses	0
Miss-rate	8.05%	Miss-rate	8.05%	Miss-rate	7.86%
Writebacks	1	Writebacks	0	Writebacks	0
C2C	0	C2C	103	C2C	0
Memory	201	Memory	73	Memory	171
transactions		transactions		transactions	
Interventions	1	Interventions	49	Interventions	48
Invalidations	33	Invalidations	33	Invalidations	0
flushes	1	flushes	1	flushes	0

From the above results I could clearly say that if one wants to decrease the miss rate you will have to increase Cache Block size. The reason is simple as more bytes are put into a cache block upon increasing the cache block size. Another thing that I observed was that as Cache block size increased, number of invalidations also increased in MSI and MESI. The reason is very simple as we bring more bytes into a cache block which may be shared by other processors which thereby increases the number of invalidations during a write.