

Assignment-3

I have used two Benchmark to generate Trace file.

- Splash2x.radix (default)
- Splash2x.ocean

For Splash2x.radix :

It is tested on two different parameter and their generate Statistics as follow

Parameter: -p4 -r2 (trace file size: 897.3 MB)

Statistics	MSI	MESI	MOESI
# of Cycle	322600383	292041367	1587551232
# of Hits	58247118	58403139	40929048
# of Miss	156502	481	17474572
# of Flush	155581	39	11383
# of Evicts	0	0	11493
# of BusRq	156502	481	1747968
# of Shares	0	335	4789767
# of Ex2Mod	0	16	212
# mm access	312083	328	12681528

From above observation MESI protocol performing better than MSI & MOESI.

MOESI even perform worse in this application.

This observation show that Best protocol among MSI, MESI, MOESI dependent upon application.

Parameter: -p4 -r4 (trace file size: 483.7 MB)

Statistics	MSI	MESI	MOESI
# of Cycle	487547394	318177182	371651642
# of Hits	28147284	28147291	26383261
# of Miss	2138574	2138567	3902597
# of Flush	1308150	1308149	0
# of Evicts	4	4	4
# of BusRq	2138574	2138567	4089465
# of Shares	0	2117118	1939338
# of Ex2Mod	0	3	1
# mm access	3446724	2651969	2159124

Even with different trace for same application it behave same, but MOESI have better performance than for larger file.

For Splash2x.ocean:

It is tested on two different parameter and their generate Statistics as follow

Parameter: -n514 -p4 (trace file size: 1.7 GB)

Statistics	MSI	MESI	MOESI
# of Cycle	407505531	405414243	405479895
# of Hits	77273991	77298529	77297822
# of Miss	204676	180138	180845
# of Flush	4633	8075	8032
# of Evicts	5960	11858	12171

# of BusRq	204676	180138	181179
# of Shares	0	997	974
# of Ex2Mod	0	22829	22850
# mm access	205261	291220	180201

In Ocean benchmark also, MESI is performing better than rest 2-protocol.
We can see MESI have highest # of Hit among rest, this is because it avoid unnecessary invalidation & and save cycle by silently writing data into exclusive mode.
Because of this its BusRq is less than other and tooks lesser cycle than others.

Parameter: -n258 -p4 (trace file size: 365.3)

Statistics	MSI	MESI	MOESI
# of Cycle	103052427	102458747	102449815
# of Hits	19718152	19724342	19724304
# of Miss	41267	35077	35115
# of Flush	2937	3597	3388
# of Evicts	3758	5139	5241
# of BusRq	41267	35077	35188
# of Shares	0	811	715
# of Ex2Mod	0	6189	6185
# mm access	41571	55457	34473

Same property hold true for even small trace file of same application.