Conditions

Tested on Oliver,Louie,Poseidon Walltimelimit of 6 hours
CFD size with 62,400 mesh points MD size with 23188 particles
5 Restarts on LB
Totally 2500 tau: 25000 iterations on CFD / 500000 iterations on MD

1. Result of total runtime (Values represent average / values in the bracket is standard deviation)

6 tests between conventional teset and 1 BJ+LB / 2 tests done on 1 BJ and 2 under submission
Conventional test showed 2 failures due to timeover of walltimelimit of the faster starting task
(usually CFD: CFD submitted first and MD submission immediately follows)
% Averaged values are considered only on 4 successful cases

	Total runtime	Waiting	Inactive	Execution
Conventional	10977	10154.25	66	756.75 (1.89297)
1 BJ	11514.75	10750.75	0	764 (1.414214)
1 BJ+LB	11413.75			663 (2.828427)

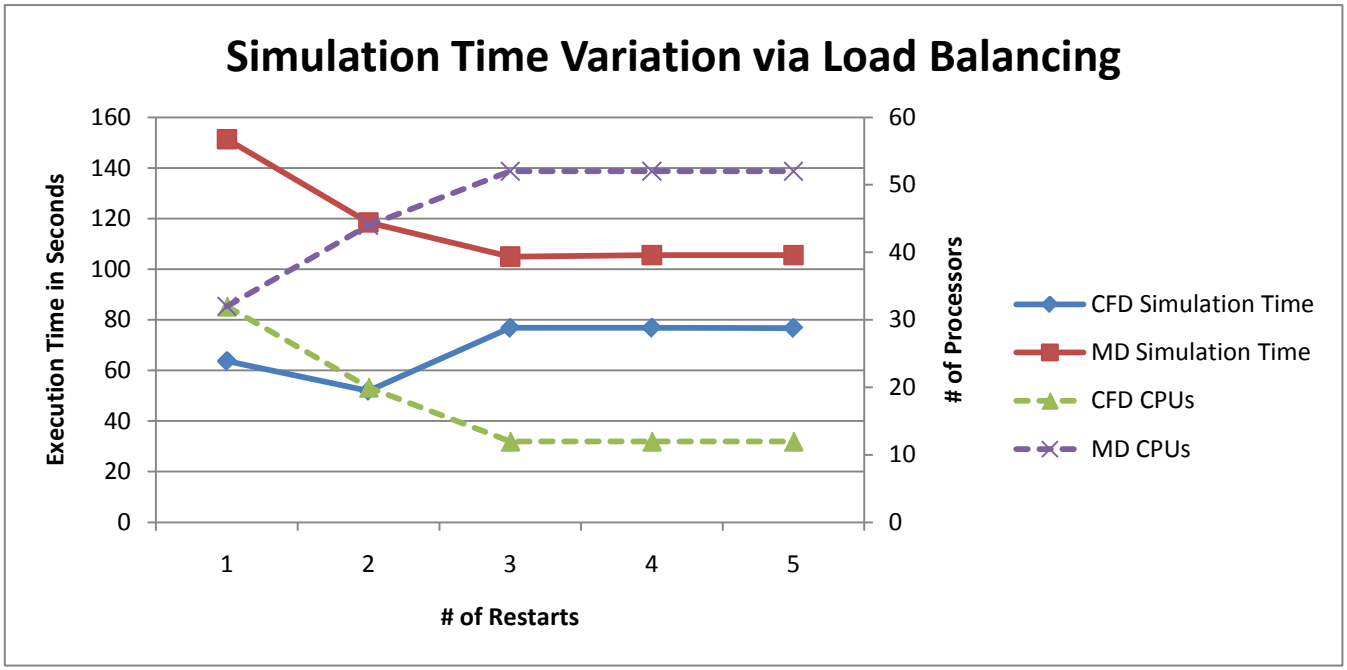
% 1 BJ default case tested only to check the execution time change
% When default BJ is used, total execution time increases by about 1%, because of communication with advert server and job status update

2. Result of execution time change on LB (Values represent average on each restart / values in the bracket is standard deviation)

# of restarts	1	2	3	4	5	Total
CFD CPUs	32	20	12	12	12	
MD CPUs	32	44	52	52	52	
CFD Execution T	63.70333333	51.96166667	76.8	76.85333333	76.77666667	346.095

MD Execution T	151.3216667	118.4366667	104.9933333	105.5316667	105.5266667	585.8100001
Total Execution	152.8116667	120.735	108.97	106.9266667	106.745	596.1883334

LB shows that 12:52 is optimal processor distribution between CFD and MD (converges from 3rd start)
Coupled simulation's total runtime is 596.19 sec, which is different from 663 seconds which is counted on BigJob application manager:
66.81 seconds (=663-596.19) can be considered as the time to run LB function, relaunch the subjob, etc.:
BigJob application manager spent about 13 seconds on every restart



3. Result of total runtime in each testcase

Red colored texts on failed simulations

Test1:	Resource(Workload)		Total	Queuewait	Inactive	Runtime
	Oliver	Conv	55628	33260	22368	0
	(488/508)	1BJ				

		1BJ+LB	55681	55023	0	658
Test2:	Oliver	Conv	21843	31	21812	0
	(448/508)	1BJ				
		1BJ+LB	79339	78685	0	654
Test3:	Oliver	Conv	807	47	2	758
	(208/504)	1BJ				763
		1BJ+LB	752	93	0	659
Test4:	Oliver	Conv	10852	10090	4	758
	(484/508)	1BJ				
		1BJ+LB	10638	9975	0	663
Test5:	Louie	Conv	31261	30443	61	757
	(552 / 508)	1BJ				765
		1BJ+LB	32074	31409	0	665
Test6:	Louie	Conv	988	37	197	754
	(448/504)	1BJ				
		1BJ+LB	2191	1526	0	665

4. Execution time variation of each LB test

Averaged over all simulation tasks

Test1:	Runtime variation		1st	2nd	3rd	4th	5th
	Oliver	Total runtime	152.56	121.13	114.34	105.87	107.06
		CFD_Proc	32	20	12	12	12
		MD_Proc	32	44	52	52	52
		CFD_time	63.27	51.65	76.76	77.09	76.69
		MD_time	150.91	118.62	105	104.81	105.98

Test2:	Oliver	Total runtime	152.2	120.18	107.14	107.19	106.06
		CFD_Proc	32	20	12	12	12
		MD_Proc	32	44	52	52	52
		CFD_time	63.27	52.18	76.88	76.71	77.02
		MD_time	150.57	117.6	104.43	104.87	104.84
Test3:	Oliver	Total runtime	152.09	121.93	108.16	106.6	107.24
		CFD_Proc	32	20	12	12	12
		MD_Proc	32	44	52	52	52
		CFD_time	63.95	51.61	76.63	76.64	76.64
		MD_time	150.71	119.21	105.19	105.51	106.14
Test4:	Oliver	Total runtime	155.84	119.89	108.28	106.58	106.88
		CFD_Proc	32	20	12	12	12
		MD_Proc	32	44	52	52	52
		CFD_time	63.82	52.79	76.96	76.86	77.06
		MD_time	154.5	118.41	105.8	105.42	105.8
Test5:	Louie	Total runtime	152.1	121.69	107.64	106.06	106.77
		CFD_Proc	32	20	12	12	12
		MD_Proc	32	44	52	52	52
		CFD_time	64.13	51.9	76.67	76.69	76.51
		MD_time	150.53	118.68	104.59	104.77	105.36
Test6:	Louie	Total runtime	152.08	119.59	108.26	109.26	106.46
		CFD_Proc	32	20	12	12	12
		MD_Proc	32	44	52	52	52
		CFD_time	63.78	51.64	76.9	77.13	76.74
		MD_time	150.71	118.1	104.95	107.81	105.04

Conditions

Tested on Oliver,Louie,Poseidon Walltimelimit of 24 hours
CFD size with 130,000 mesh points MD size with 23188 particles
25 Restarts on LB
Totally 125000 tau: 1250000 iterations on CFD / 25000000 iterations on MD

1. Result of total runtime (Values represent average / values in the bracket is standard deviation)

6 tests between conventional teset and 1 BJ+LB / 4 tests done on 1 BJ
Conventional test showed 1 failure due to timeover of walltimelimit of the faster starting task
(usually CFD: CFD submitted first and MD submission immediately follows)
One BJ+LB case showed internal(system level) disturbance during simulation, resulting in different LB result
% Averaged values are considered only on 4 'both' successful cases

	Total runtime	Waiting	Inactive	Execution
Conventional	176585	109727.75	27281.75	39575 (128.0)
1 BJ	133159	93252.3	0	39906 (206.3)
1 BJ+LB	127038			33785.7 (278.5)

% 1 BJ default case tested only to check the execution time change
% When default BJ is used, total execution time increases by about 1%, because of communication with advert server and job status update

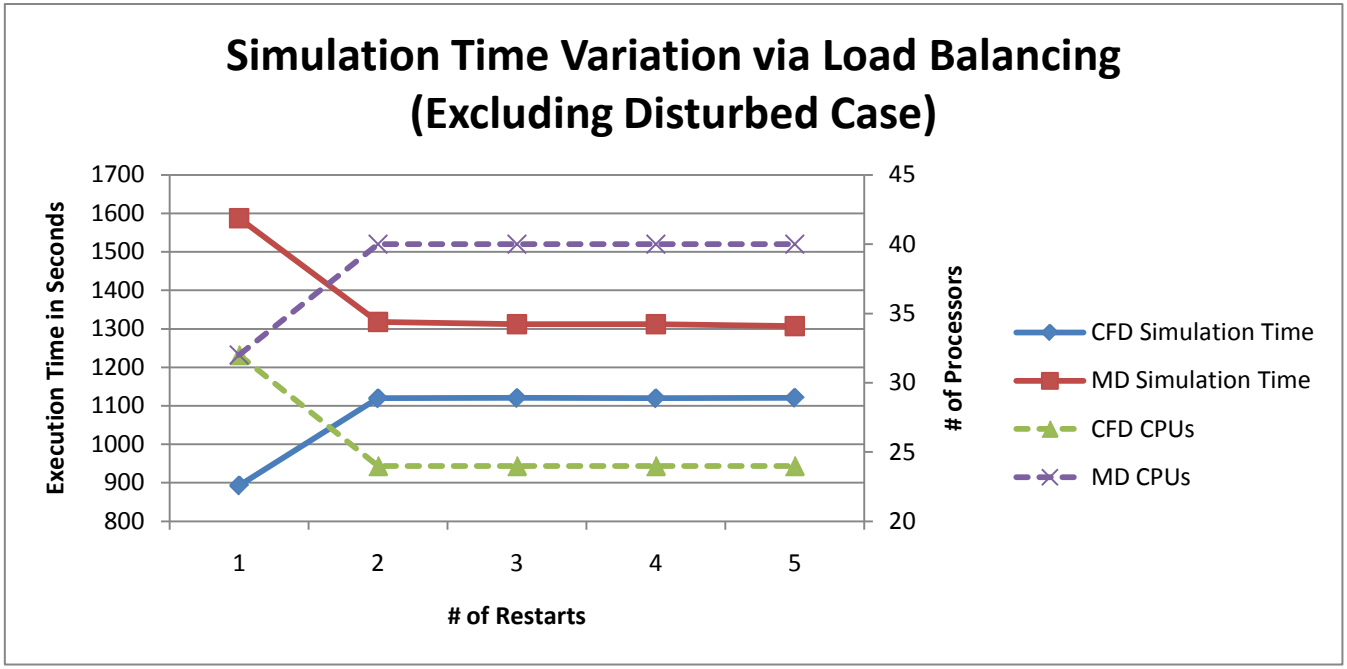
2. Result of execution time change on LB (Values represent average on each restart / values in the bracket is standard deviation)

Data table excluding one disturbance case which converged to a different solution

# of restarts	1	2	3	4	5	…	Total
CFD CPUs	32	24	24	24	24		
MD CPUs	32	40	40	40	40		

CFD Execution T	892.6	1119.6	1120.4	1119.6	1121	...	33379
MD Execution T	1587.6	1318.2	1312.4	1312.4	1307.4	...	27800.2
Total Execution	1605.6	1335.6	1330.6	1329.4	1324	...	32972.4

LB shows that 24:40 is optimal processor distribution between CFD and MD (converges from 2nd start):
In one case, system seems to have internal disturbance resulting in MD simulation's overhead, after then resulting in load balance between CFD ar
> In this case, total execution time increased by 3000 seconds, including the temporary overhead on system side
> After converged, execution time for one restart took about 1380 seconds with this processor distribution, compared to ideal test cases which to
Coupled simulation's total runtime is 33379 sec, which is different from 33786 seconds which is counted on BigJob application manager:
407 seconds (=33786-33379) can be considered as the time to run LB function, relaunch the subjob, etc.:
BigJob application manager spent about 16 seconds on every restart



3. Result of total runtime in each testcase

Red colored texts on failed simulations

	Resource(Workload)		Total	Queuewait	Inactive	Runtime
Test1:	Louie	Conv	242779	184002	19056	39721
	(948/508)	1BJ	118070	78060	0	40010
		1BJ+LB	183818	149979	0	33839
Test2:	Louie	Conv	222839	152862	30333	39644
	(484/508)	1BJ	67671	28074	0	39597
		1BJ+LB	89629	55475	0	34154
Test3:	Poseidon	Conv	121245	59672	21900	39673
	(524/508)	1BJ				
		1BJ+LB	81380	44413	0	36967
Test4:	Poseidon	Conv	141474	101979	28	39467
	(536/506)	1BJ	72676	32653	0	40023
		1BJ+LB	175183	141660	0	33523
Test5:	Poseidon	Conv	99246	68	59710	39468
	(460/512)	1BJ	49362	9368	0	39994
		1BJ+LB	59522	25895	0	33627
Test6:	Poseidon	Conv	*193548*	*31*	*153902*	
	(400/512)	1BJ				
		1BJ+LB	76436	42446	0	33990

4. Execution time variation of each LB test

Averaged over all simulation tasks

	Runtime variation		1	2	3	4	5	6	7	8
Test1:	Louie	Total runtime	1616	1333	1331	1328	1327	1330	1321	1324
		CFD_Proc	32	24	24	24	24	24	24	24

		MD_Proc	32	40	40	40	40	40	40	40
		CFD_time	894	1121	1120	1120	1121	1122	1121	1119
		MD_time	1598	1315	1313	1309	1310	1313	1305	1309
			1	2	3	4	5	6	7	8
Test2:	Louie	Total runtime	1620	1347	1336	1347	1337	1345	1327	1348
		CFD_Proc	32	24	24	24	24	24	24	24
		MD_Proc	32	40	40	40	40	40	40	40
		CFD_time	896	1120	1120	1119	1122	1121	1120	1122
		MD_time	1602	1330	1319	1331	1320	1330	1311	1333
			1	2	3	4	5	6	7	8
Test3:	Poseidon	Total runtime	1603	1322	1325	2021	2311	1722	1380	1380
		CFD_Proc	32	24	24	24	16	16	20	20
		MD_Proc	32	40	40	40	48	48	44	44
		CFD_time	890	1117	1117	1119	1670	1699	1356	1357
		MD_time	1585	1306	1308	2004	2183	1144	1247	1270
			1	2	3	4	5	6	7	8
Test4:	Poseidon	Total runtime	1592	1330	1327	1317	1313	1312	1316	1310
		CFD_Proc	32	24	24	24	24	24	24	24
		MD_Proc	32	40	40	40	40	40	40	40
		CFD_time	891	1119	1117	1117	1117	1117	1116	1116
		MD_time	1574	1313	1303	1301	1297	1297	1299	1294
			1	2	3	4	5	6	7	8
Test5:	Poseidon	Total runtime	1602	1335	1319	1327	1316	1319	1316	1318
		CFD_Proc	32	24	24	24	24	24	24	24
		MD_Proc	32	40	40	40	40	40	40	40
		CFD_time	890	1117	1123	1121	1124	1123	1124	1125
		MD_time	1584	1317	1303	1308	1299	1303	1300	1301
			1	2	3	4	5	6	7	8
Test6:	Poseidon	Total runtime	1598	1333	1340	1328	1327	1335	1326	1327
		CFD_Proc	32	24	24	24	24	24	24	24
		MD_Proc	32	40	40	40	40	40	40	40
		CFD_time	892	1121	1122	1121	1121	1122	1120	1122
		MD_time	1580	1316	1324	1313	1311	1319	1308	1312

Avg. with Distur	Total runtime	1605.166667	1333.333333	1329.666667	1444.666667	1488.5	1393.833	1331	1334.5
	CFD_time	892.1666667	1119.166667	1119.833333	1119.5	1212.5	1217.333	1159.5	1160.167
	MD_time	1587.166667	1316.166667	1311.666667	1427.666667	1453.333333	1284.333	1295	1303.167
Avg. w/o Distur	Total runtime	1605.6	1335.6	1330.6	1329.4	1324	1328.2	1321.2	1325.4
	CFD_time	892.6	1119.6	1120.4	1119.6	1121	1121	1120.2	1120.8
	MD_time	1587.6	1318.2	1312.4	1312.4	1307.4	1312.4	1304.6	1309.8