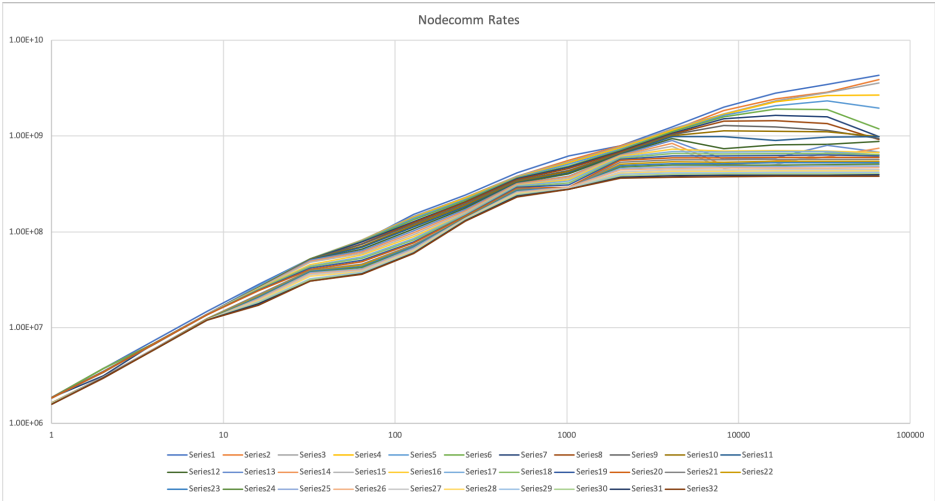


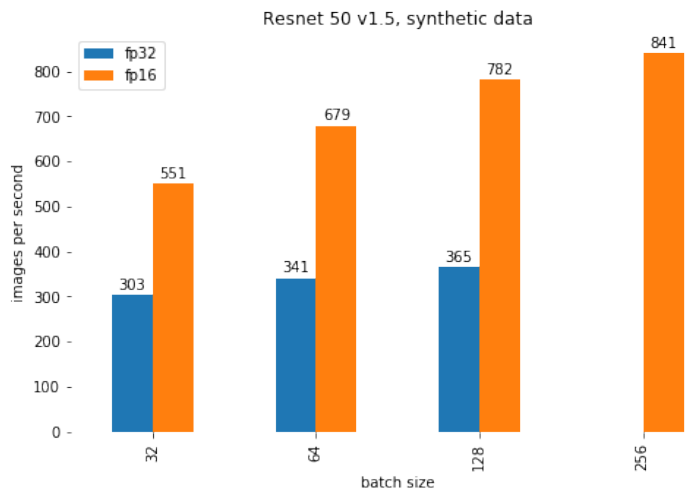
HAL Benchmarks 2019

MPI Benchmarks

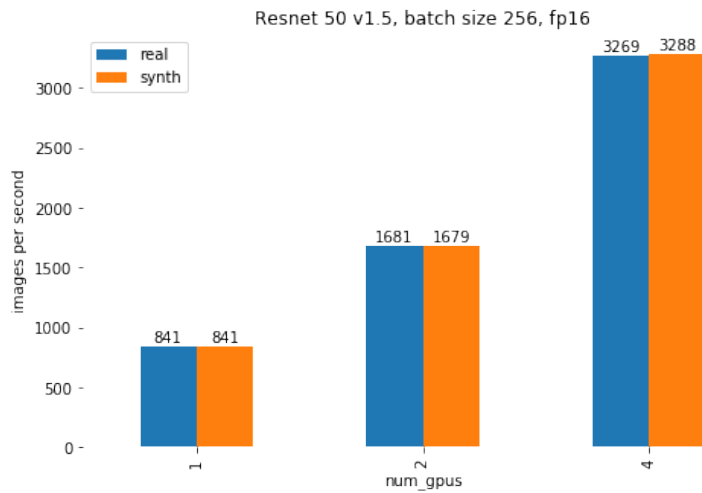
The following uses nodecomm to measure the bandwidth between 2 nodes, with 1-32 processes on each node communicating with its partner on the other node.



TensorFlow Benchmarks



The figure above shows effect of increasing batch size on training rate. Trying to run Resnet 50 v1.5 with batch size 256 using fp32 for calculations results in OOM, which is why that result is omitted.



The figure above shows effect of increasing number of gpus on training rate with fixed batch size for both real (blue) and synthetic (orange) data.

A broader set of results can be seen in the following table, with results accumulated from 5 separate trials:

model	num_gpus	batch_size	use_fp16	use_synth	avg img_per_sec	std dev img_per_sec
resnet50_v1.5	1	32	False	False	300.7115095987747	0.8334252017088293
resnet50_v1.5	1	32	False	True	303.2748894498352	0.518768277442615
resnet50_v1.5	1	32	True	False	552.8543259023911	3.7419280205833876
resnet50_v1.5	1	32	True	True	551.3152982879091	1.9256151492887408
resnet50_v1.5	1	64	False	False	340.3455581202521	0.4352822822221454
resnet50_v1.5	1	64	False	True	341.4178425579963	1.399820974317093
resnet50_v1.5	1	64	True	False	679.092793370331	1.811493519714515
resnet50_v1.5	1	64	True	True	679.4220076333565	0.4846137767752205
resnet50_v1.5	1	128	False	False	365.97794971142156	0.6660901988191761
resnet50_v1.5	1	128	False	True	365.1002182169415	0.290659074503093
resnet50_v1.5	1	128	True	False	780.7795427908641	2.6289190299425735
resnet50_v1.5	1	128	True	True	782.0787833811031	1.4035397167521415
resnet50_v1.5	1	256	True	False	841.0209098895596	0.9327257479352289
resnet50_v1.5	1	256	True	True	841.6281134422322	0.6754027617726148
resnet50_v1.5	2	32	False	False	597.7123015353376	2.5358048324228486
resnet50_v1.5	2	32	False	True	602.1851277710804	1.4932197457537746
resnet50_v1.5	2	32	True	False	1092.0792847503365	5.317212492608127
resnet50_v1.5	2	32	True	True	1101.2976316254073	3.1791943633783832
resnet50_v1.5	2	64	False	False	680.4331810776715	1.1986421991311502
resnet50_v1.5	2	64	False	True	680.168662439279	1.628589727697411
resnet50_v1.5	2	64	True	False	1350.6915781119133	4.771936223937959
resnet50_v1.5	2	64	True	True	1337.9212057737357	4.3318244554829635
resnet50_v1.5	2	128	False	False	722.1292515998915	1.7079082542095976
resnet50_v1.5	2	128	False	True	724.5907650506392	1.3016121917621204
resnet50_v1.5	2	128	True	False	1560.6063143166916	5.574390740438405
resnet50_v1.5	2	128	True	True	1558.8925541664316	3.7645037153069234
resnet50_v1.5	2	256	True	False	1681.9367020855304	2.135490739835972
resnet50_v1.5	2	256	True	True	1679.1043258972677	1.9428881159794065

resnet50_v1.5	4	32	False	False	1137.8151032757787	3.6070602577235196
resnet50_v1.5	4	32	False	True	1147.7653259816507	10.086122200344256
resnet50_v1.5	4	32	True	False	2090.181533002181	27.753203322924346
resnet50_v1.5	4	32	True	True	2118.951749390374	9.671318775529995
resnet50_v1.5	4	64	False	False	1323.4940363814712	2.4288696630804347
resnet50_v1.5	4	64	False	True	1336.5457321023537	2.8028756633168586
resnet50_v1.5	4	64	True	False	2627.208652367316	30.590239282719534
resnet50_v1.5	4	64	True	True	2605.2372571940177	16.77388699379653
resnet50_v1.5	4	128	False	False	1428.9004479146274	5.19872681737769
resnet50_v1.5	4	128	False	True	1431.0649693247092	2.1140696182827456
resnet50_v1.5	4	128	True	False	3038.123973486709	32.14983993002834
resnet50_v1.5	4	128	True	True	3050.6240630834754	13.087954923831944
resnet50_v1.5	4	256	True	False	3269.060930519893	18.13964231626883
resnet50_v1.5	4	256	True	True	3288.0027951477073	10.833033249948164
inception3	1	32	False	False	229.6400062758412	1.011150139067665
inception3	1	32	False	True	231.35776988245647	0.7390853739290063
inception3	1	32	True	False	390.8430427702688	1.5232497382000254
inception3	1	32	True	True	392.77650557982815	0.7988964068960409
inception3	1	64	False	False	254.08237225221546	0.7822494442939251
inception3	1	64	False	True	254.54280397180582	0.9677860725157185
inception3	1	64	True	False	459.27229023783576	1.0561819758930817
inception3	1	64	True	True	465.8370224010511	1.9406403927259364
inception3	1	128	False	False	266.6960069340822	0.6349003776029812
inception3	1	128	False	True	267.3287620209714	0.3378865479524414
inception3	1	128	True	False	522.7059605744032	1.2095275730192268
inception3	1	128	True	True	528.411119339248	1.886616179173554
inception3	1	256	True	False	555.9733275297333	0.793152246051491
inception3	1	256	True	True	555.8605933224619	1.0050188430980673
inception3	2	32	False	False	453.8981275778566	1.4942589199911878
inception3	2	32	False	True	460.07629649023164	2.572961501771087
inception3	2	32	True	False	785.3002107622603	2.808072532884698
inception3	2	32	True	True	794.9652159658681	3.612256492187289
inception3	2	64	False	False	504.9115747109531	0.9842426876013127
inception3	2	64	False	True	505.8260905072816	1.4738932419714106
inception3	2	64	True	False	920.4145181495171	3.1651197427361715
inception3	2	64	True	True	929.0658731171085	5.145909922759968
inception3	2	128	False	False	531.5809808901386	4.152618166592716
inception3	2	128	False	True	531.3011081204222	3.821408673513115
inception3	2	128	True	False	1043.3751588125951	6.360344252646946
inception3	2	128	True	True	1052.1427785292055	0.8095010705701331
inception3	2	256	True	False	1108.9748739263916	9.386603241427991
inception3	2	256	True	True	1113.16626158571	6.4319767570544535
inception3	4	32	False	False	872.3219766840209	4.856647166737354
inception3	4	32	False	True	888.3055054654682	2.5289892419845943
inception3	4	32	True	False	1495.0846768394943	10.965843253024328
inception3	4	32	True	True	1539.5491706395067	9.667722873324415
inception3	4	64	False	False	992.8041857703738	2.4128076229880566

inception3	4	64	False	True	999.2568604412305	2.9532997352535655
inception3	4	64	True	False	1790.7335622916307	12.568524155858082
inception3	4	64	True	True	1813.338802302623	1.7710531654085244
inception3	4	128	False	False	1044.764217747176	6.219768494743513
inception3	4	128	False	True	1041.9846289297782	16.16776883872252
inception3	4	128	True	False	2045.2687789799281	15.112275686406946
inception3	4	128	True	True	2063.858653134279	8.19186760727177
inception3	4	256	True	False	2186.246302564507	32.645185806377874
inception3	4	256	True	True	2194.476607046693	20.772815631509243