oneccl scaling analysis of all reduce SYCL - GPU

Experiment run date : March 30, 2024 post sunspot upgrade

job script

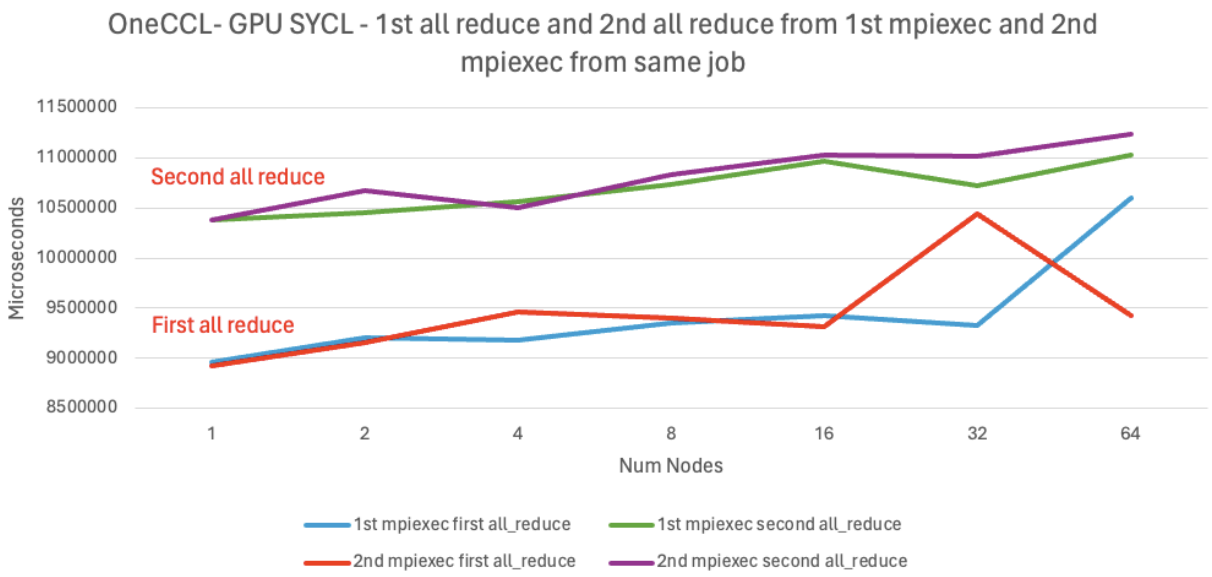
```
+ mpiexec --env FI_CXI_DEFAULT_CQ_SIZE=1048576 --env FI_CXI_RX_MATCH_MODE=software --env MPIR_
CVAR_CH4_MT_MODEL=lockless --env FI_CXI_OVFLOW_BUF_SIZE=8388608 --env FI_CXI_CQ_FILL_PERCENT=2
0
                    --np 12 -ppn 12 --cpu-bind list:1-2:9-10:17-18:25-26:33-34:41-42:52-53:60-
61:68-69:76-77:84-85:92-93
                    /lus/gila/projects/CSC250STDM10_CNDA/kaushik/oneCCL/build/_install/example
s/benchmark/benchmark
                         --max_elem_count 512 --coll allreduce -j off -i 1 -w 0 --backend sycl
--sycl_dev_type gpu
```

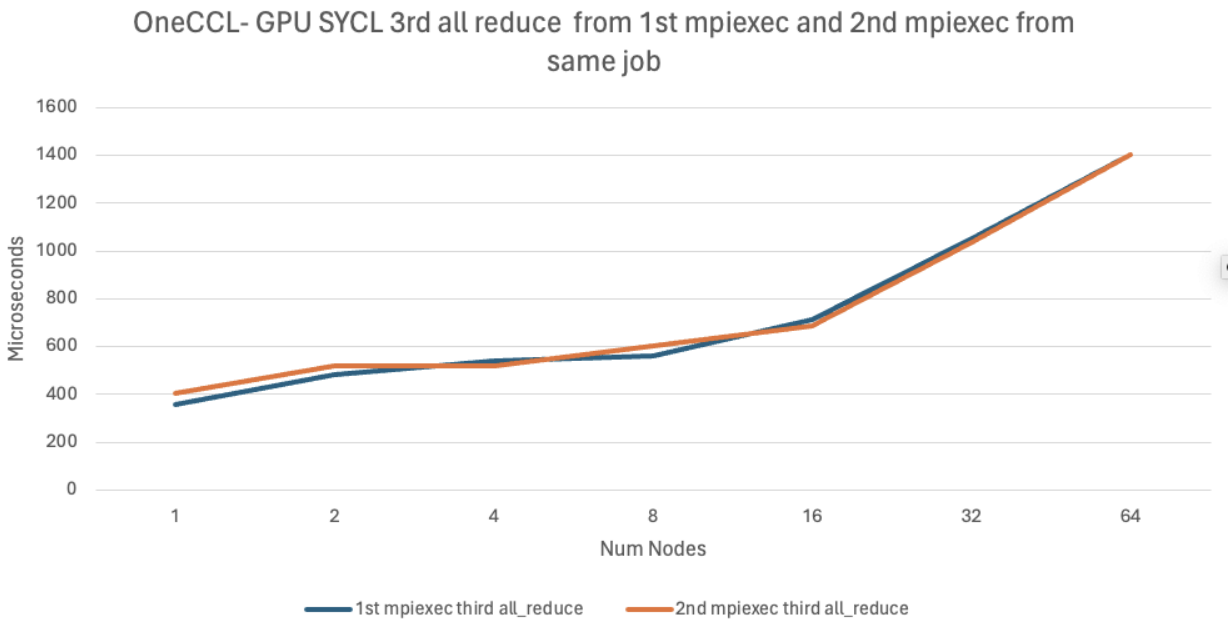
Summary

1. We do not see the 175x between 1st mpiexec 1st all reduce and the 2nd mpiexect 1st all reduce in the same job script post sunspot upgrade.
2. Now it is very close to each other and there is no difference. There is no advantage of caching from 1st mpiexec and 2nd mpiexec.
3. With oneccl sycl gpu, the 2nd all reduce is higher than the first all reduce roughly 1.15x (consistent across scale) .
4. With oneccl sycl gpu, the 3rd all reduce is 29000x to 8000x (on scaling) faster than the 2nd all reduce.

Results

iter4/gpu/pbs-script	o8987483	NUM_OF_NODES	1	TOTAL_NUM_RANKS	12	RANKS_PER_NODE	12
iter4/gpu/pbs-script	o8987484	NUM_OF_NODES	2	TOTAL_NUM_RANKS	24	RANKS_PER_NODE	12
iter4/gpu/pbs-script	o8987485	NUM_OF_NODES	4	TOTAL_NUM_RANKS	48	RANKS_PER_NODE	12
iter4/gpu/pbs-script	o8987486	NUM_OF_NODES	8	TOTAL_NUM_RANKS	96	RANKS_PER_NODE	12
iter4/gpu/pbs-script	o8987487	NUM_OF_NODES	16	TOTAL_NUM_RANKS	192	RANKS_PER_NODE	12
iter4/gpu/pbs-script	o8987488	NUM_OF_NODES	32	TOTAL_NUM_RANKS	384	RANKS_PER_NODE	12
iter4/gpu/pbs-script	o8987489	NUM_OF_NODES	64	TOTAL_NUM_RANKS	768	RANKS_PER_NODE	12


OneCCL- GPU SYCL - 1st all reduce and 2nd all reduce from 1st mpiexec and 2nd mpiexec from same job
11500000
11000000
10500000
10000000
9500000
9000000
8500000
Microseconds
Second all reduce
First all reduce
1
2
4
8
16
32
64
Num Nodes
1st mpiexec first all_reduce
1st mpiexec second all_reduce
2nd mpiexec first all_reduce
2nd mpiexec second all_reduce


OneCCL- GPU SYCL 3rd all reduce from 1st mpiexec and 2nd mpiexec from same job
1600
1400
1200
1000
800
600
400
200
0
Microseconds
1
2
4
8
16
32
64
Num Nodes
1st mpiexec third all_reduce
2nd mpiexec third all_reduce