Silo/HDF5 Driver Comparison on Dawn

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Dawn User Forum

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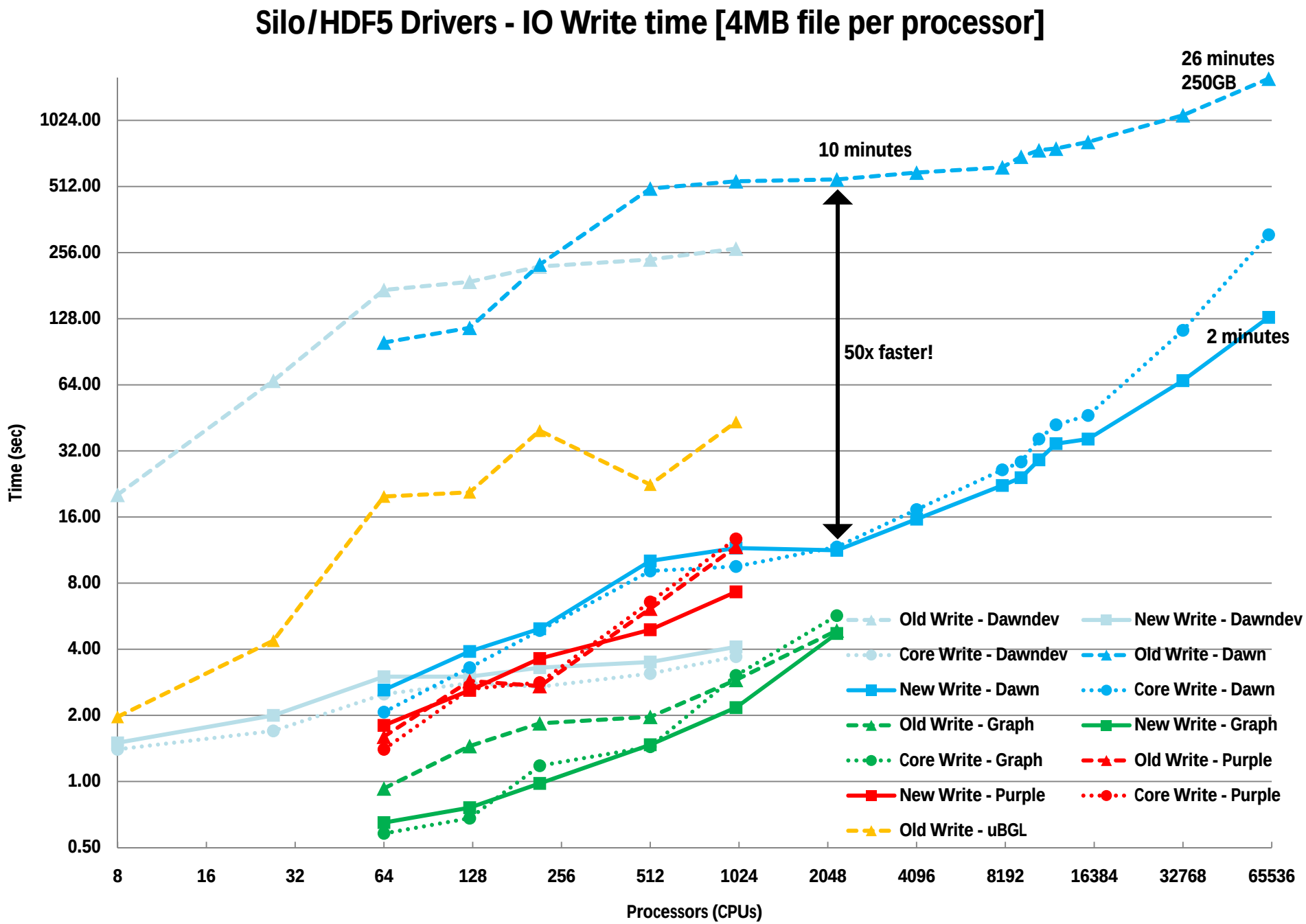
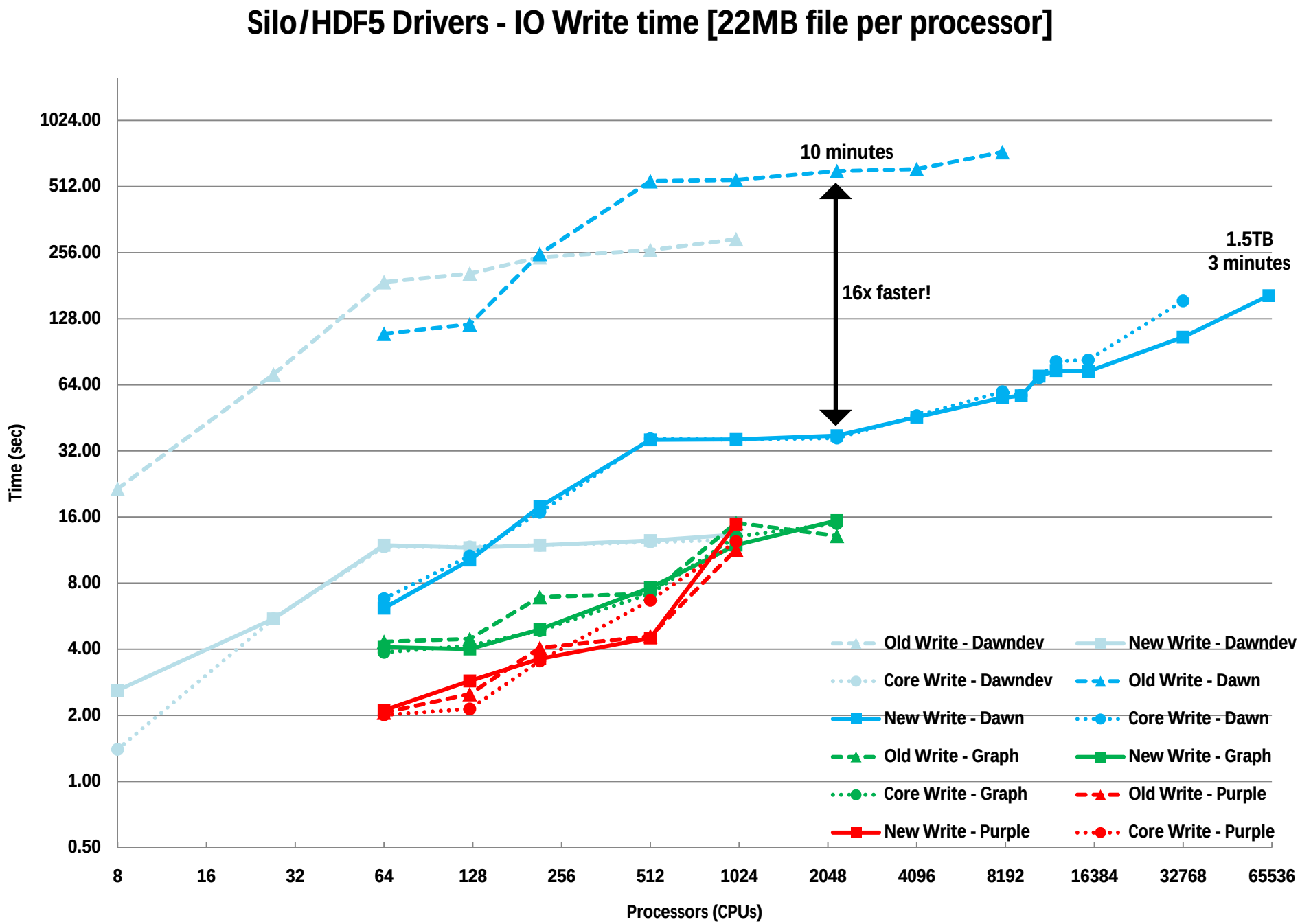
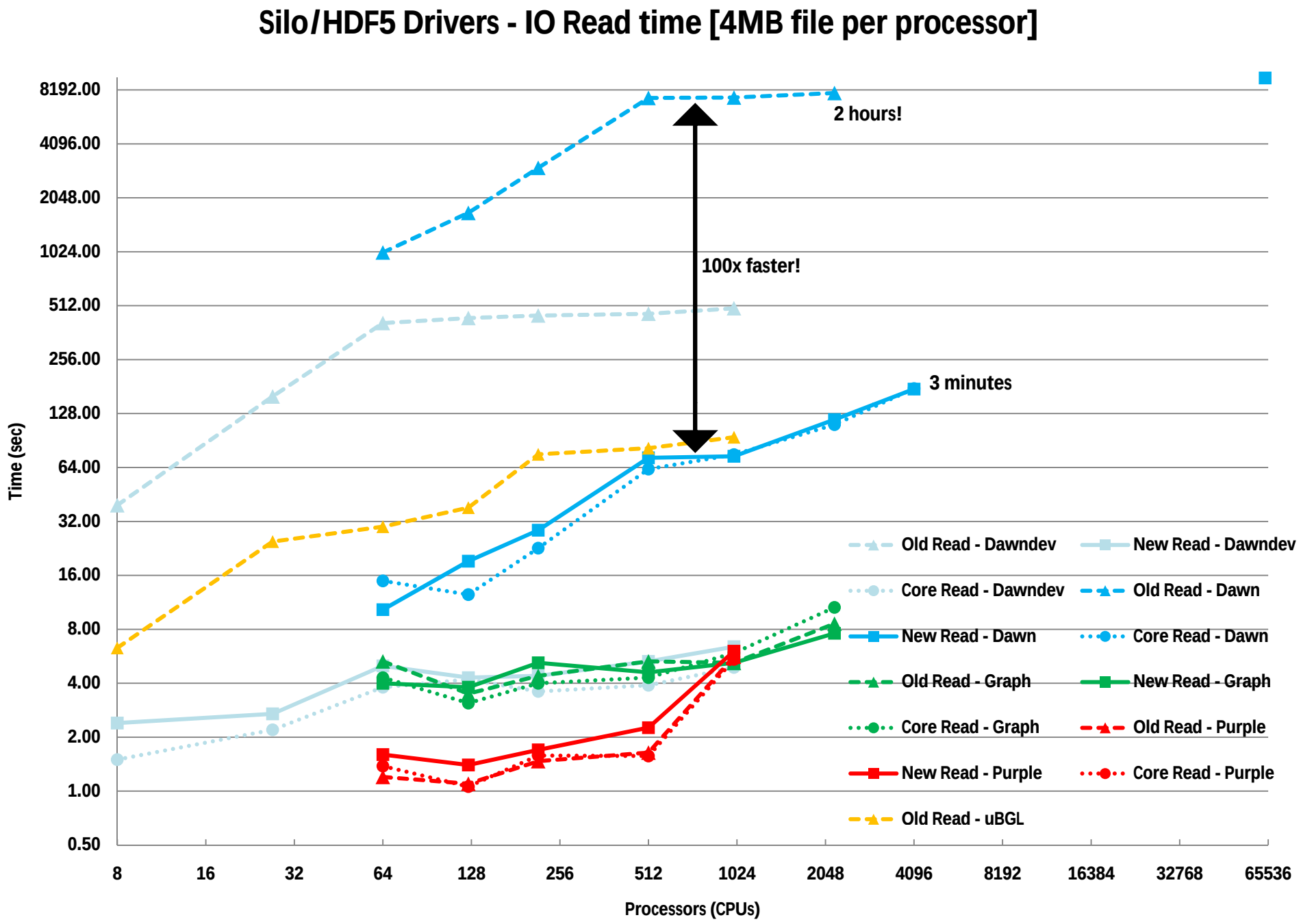
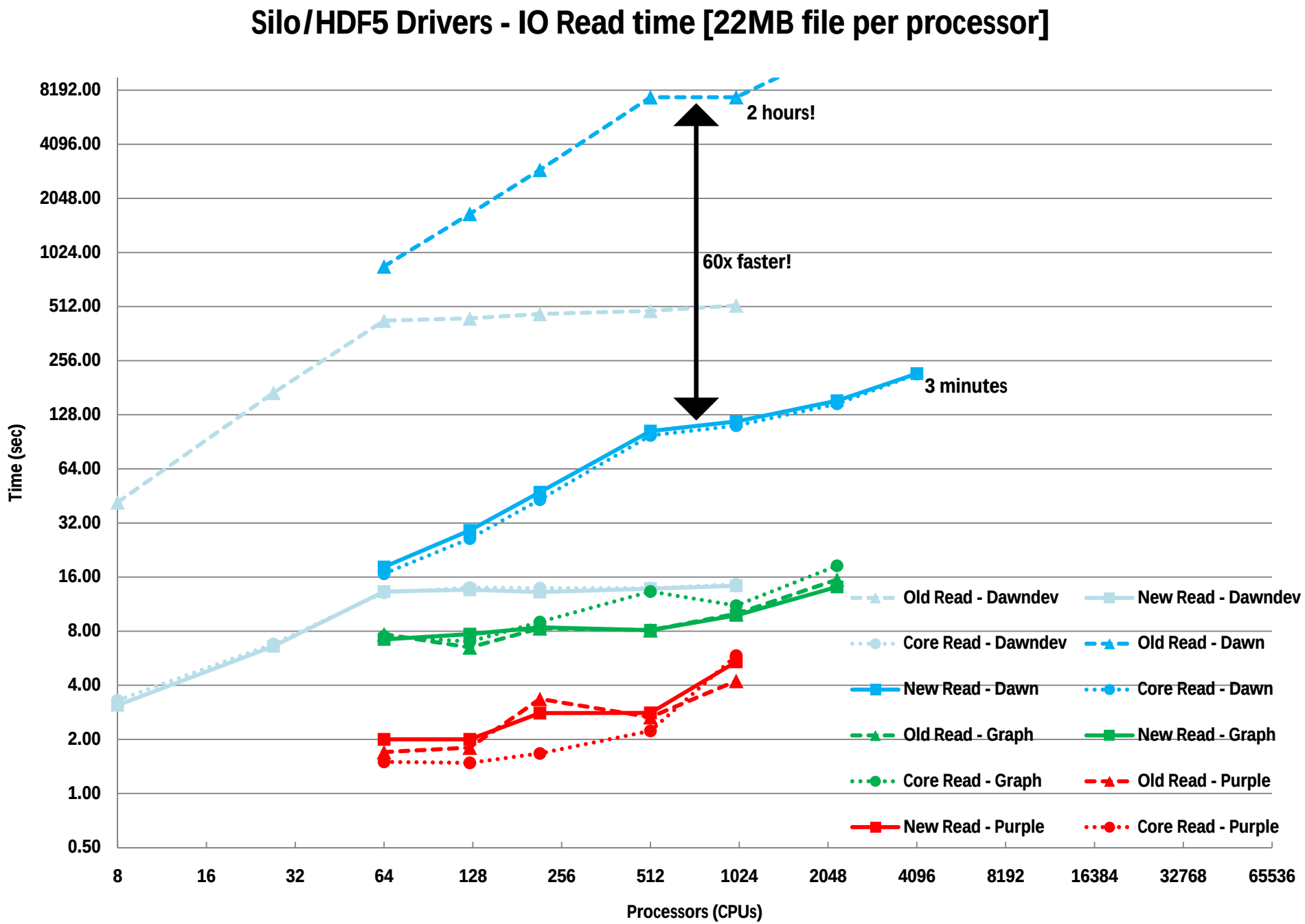
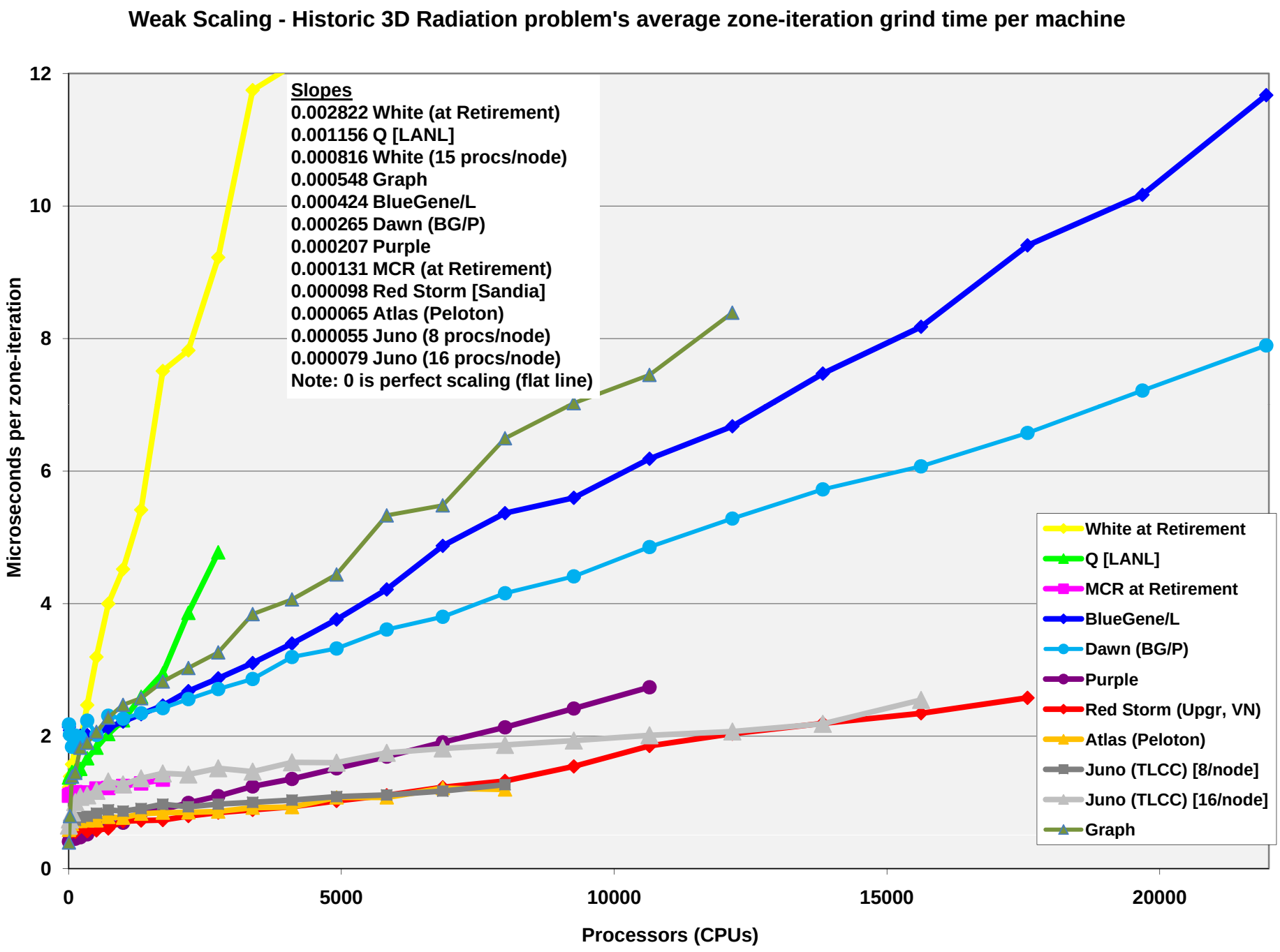
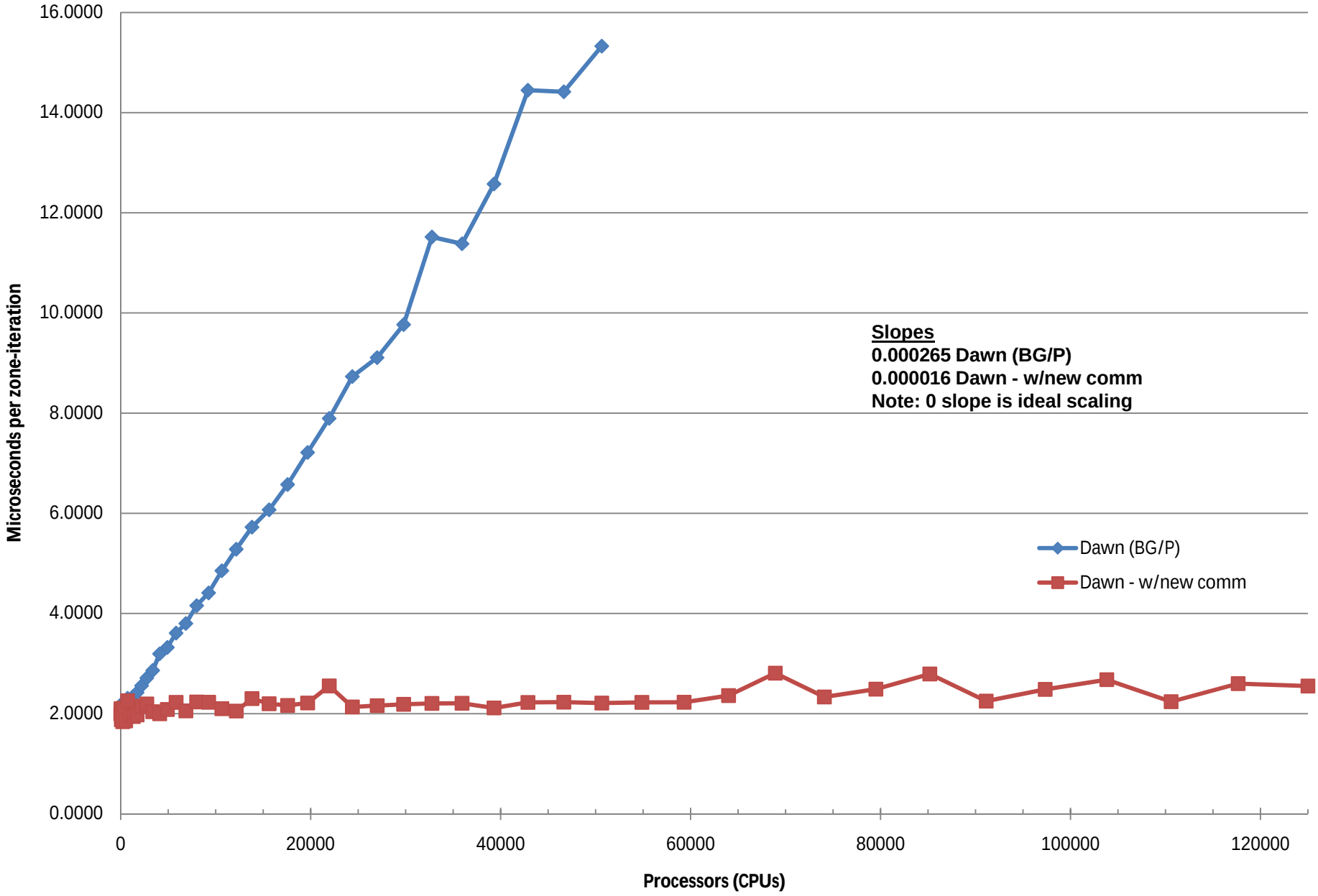

Silo/HDF5 Drivers - IO Write time [4MB file per processor]
26 minutes
250GB
10 minutes
50x faster!
2 minutes
Time (sec)
1024.00
512.00
256.00
128.00
64.00
32.00
16.00
8.00
4.00
2.00
1.00
0.50
8
16
32
64
128
256
512
1024
2048
4096
8192
16384
32768
65536
Processors (CPUs)
Old Write - Dawndev
New Write - Dawndev
Core Write - Dawndev
Old Write - Dawn
New Write - Dawn
Core Write - Dawn
Old Write - Graph
New Write - Graph
Core Write - Graph
Old Write - Purple
New Write - Purple
Core Write - Purple
Old Write - uBGL


Silo/HDF5 Drivers - IO Write time [22MB file per processor]
Time (sec)
1024.00
512.00
256.00
128.00
64.00
32.00
16.00
8.00
4.00
2.00
1.00
0.50
8
16
32
64
128
256
512
1024
2048
4096
8192
16384
32768
65536
Processors (CPUs)
10 minutes
16x faster!
1.5TB
3 minutes
Old Write - Dawndev
New Write - Dawndev
Core Write - Dawndev
Old Write - Dawn
New Write - Dawn
Core Write - Dawn
Old Write - Graph
New Write - Graph
Core Write - Graph
Old Write - Purple
New Write - Purple
Core Write - Purple


Silo/HDF5 Drivers - IO Read time [4MB file per processor]
Time (sec)
8192.00
4096.00
2048.00
1024.00
512.00
256.00
128.00
64.00
32.00
16.00
8.00
4.00
2.00
1.00
0.50
8
16
32
64
128
256
512
1024
2048
4096
8192
16384
32768
65536
Processors (CPUs)
2 hours!
100x faster!
3 minutes
Old Read - Dawndev
New Read - Dawndev
Core Read - Dawndev
Old Read - Dawn
New Read - Dawn
Core Read - Dawn
Old Read - Graph
New Read - Graph
Core Read - Graph
Old Read - Purple
New Read - Purple
Core Read - Purple
Old Read - uBGL


Silo/HDF5 Drivers - IO Read time [22MB file per processor]
Time (sec)
8192.00
4096.00
2048.00
1024.00
512.00
256.00
128.00
64.00
32.00
16.00
8.00
4.00
2.00
1.00
0.50
8
16
32
64
128
256
512
1024
2048
4096
8192
16384
32768
65536
Processors (CPUs)
2 hours!
60x faster!
3 minutes
Old Read - Dawndev
New Read - Dawndev
Core Read - Dawndev
Old Read - Dawn
New Read - Dawn
Core Read - Dawn
Old Read - Graph
New Read - Graph
Core Read - Graph
Old Read - Purple
New Read - Purple
Core Read - Purple


Weak Scaling - Historic 3D Radiation problem's average zone-iteration grind time per machine
Slopes
0.002822 White (at Retirement)
0.001156 Q [LANL]
0.000816 White (15 procs/node)
0.000548 Graph
0.000424 BlueGene/L
0.000265 Dawn (BG/P)
0.000207 Purple
0.000131 MCR (at Retirement)
0.000098 Red Storm [Sandia]
0.000065 Atlas (Peloton)
0.000055 Juno (8 procs/node)
0.000079 Juno (16 procs/node)
Note: 0 is perfect scaling (flat line)
Microseconds per zone-iteration
Processors (CPUs)
0
2
4
6
8
10
12
0
5000
10000
15000
20000
White at Retirement
Q [LANL]
MCR at Retirement
BlueGene/L
Dawn (BG/P)
Purple
Red Storm (Upgr, VN)
Atlas (Peloton)
Juno (TLCC) [8/node]
Juno (TLCC) [16/node]
Graph

Weak Scaling – 3D rad – our old vs. new communication routines on Dawn