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]

- **Old Write**
  - Dawndev: ~26 minutes
  - Dawn: ~10 minutes
  - Graph: ~2 minutes
  - Purple: ~2 minutes
  - uBGL: ~2 minutes

- **New Write**
  - Dawndev: ~2 minutes
  - Dawn: ~2 minutes
  - Graph: ~2 minutes
  - Purple: ~2 minutes
  - Dawn DIO: ~2 minutes

**50x faster!**
Silo/HDF5 Drivers - IO Write time [22MB file per processor]

- 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
- New Write - Dawn DIO

16x faster!

10 minutes

1.5TB

3 minutes
Silo/HDF5 Drivers - IO Read time [4MB file per processor]

- **100x faster!**
- **2 hours!**
- **3 minutes**
- **30 seconds**
- **100x faster!**
- **4x faster!**
- **OK!!**
- **SLOW!!**
Silo/HDF5 Drivers - IO Read time [22MB file per processor]

- **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
- **New Read** - Dawn DIO

- **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
- **New Read** - Dawn DIO

- 60x faster!
- 2 hours!
- 3 minutes
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)
Weak Scaling – 3D rad – our old vs. new communication routines on Dawn

Slopes
0.000265 Dawn (BG/P)
0.000016 Dawn - w/new comm
Note: 0 slope is ideal scaling