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Subject: Re: BufferPainter::Clear() optimization  
Posted by Tom1 on Sun, 17 May 2020 18:56:41 GMT  
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Hi Mirek,

Here are my results:

#### CLANG

TIMING HUGE memset : 27.28 ms - 1.36 ms (27.29 ms / 20 ), min: 1.25 ms, max: 1.66 ms,  
nesting: 0 - 20  
TIMING HUGE Fill3 : 35.01 ms - 1.75 ms (35.01 ms / 20 ), min: 1.63 ms, max: 1.99 ms,  
nesting: 0 - 20  
TIMING HUGE Fill : 73.74 ms - 3.69 ms (73.75 ms / 20 ), min: 3.32 ms, max: 7.43 ms,  
nesting: 0 - 20  
TIMING HUGE memsetd : 72.88 ms - 3.64 ms (72.88 ms / 20 ), min: 3.40 ms, max: 4.51 ms,  
nesting: 0 - 20  
TIMING memset : 1.01 s - 1.01 us ( 1.07 s / 1000000 ), min: 1.00 us, max: 28.00 us,  
nesting: 0 - 1000000  
TIMING Fill3 : 505.44 ms - 505.44 ns (565.98 ms / 1000000 ), min: 0.00 ns, max: 29.00 us,  
nesting: 0 - 1000000  
TIMING Fill2 : 497.06 ms - 497.06 ns (557.61 ms / 1000000 ), min: 0.00 ns, max: 28.00 us,  
nesting: 0 - 1000000  
TIMING Fill0 : 772.53 ms - 772.53 ns (833.07 ms / 1000000 ), min: 0.00 ns, max: 63.00 us,  
nesting: 0 - 1000000  
TIMING Fill : 1.67 s - 1.67 us ( 1.73 s / 1000000 ), min: 1.00 us, max: 58.00 us, nesting:  
0 - 1000000  
TIMING memsetd : 495.67 ms - 495.67 ns (556.22 ms / 1000000 ), min: 0.00 ns, max: 28.00  
us, nesting: 0 - 1000000

#### CLANGx64

TIMING HUGE memset : 27.76 ms - 1.39 ms (27.76 ms / 20 ), min: 1.28 ms, max: 1.80 ms,  
nesting: 0 - 20  
TIMING HUGE Fill3 : 36.31 ms - 1.82 ms (36.31 ms / 20 ), min: 1.59 ms, max: 2.27 ms,  
nesting: 0 - 20  
TIMING HUGE Fill : 73.42 ms - 3.67 ms (73.42 ms / 20 ), min: 3.41 ms, max: 4.74 ms,  
nesting: 0 - 20  
TIMING HUGE memsetd : 74.52 ms - 3.73 ms (74.52 ms / 20 ), min: 3.47 ms, max: 4.22 ms,  
nesting: 0 - 20  
TIMING memset : 898.49 ms - 898.49 ns (925.83 ms / 1000000 ), min: 0.00 ns, max: 52.00  
us, nesting: 0 - 1000000  
TIMING Fill3 : 492.59 ms - 492.59 ns (519.92 ms / 1000000 ), min: 0.00 ns, max: 32.00 us,  
nesting: 0 - 1000000  
TIMING Fill2 : 495.82 ms - 495.82 ns (523.15 ms / 1000000 ), min: 0.00 ns, max: 28.00 us,  
nesting: 0 - 1000000  
TIMING Fill0 : 569.61 ms - 569.61 ns (596.95 ms / 1000000 ), min: 0.00 ns, max: 41.00 us,

nesting: 0 - 1000000  
TIMING Fill : 591.56 ms - 591.56 ns (618.90 ms / 1000000 ), min: 0.00 ns, max: 30.00 us,  
nesting: 0 - 1000000  
TIMING memsetd : 549.04 ms - 549.04 ns (576.37 ms / 1000000 ), min: 0.00 ns, max: 65.00  
us, nesting: 0 - 1000000

## MSBT19

TIMING HUGE memset : 26.51 ms - 1.33 ms (26.51 ms / 20 ), min: 1.26 ms, max: 1.49 ms,  
nesting: 0 - 20  
TIMING HUGE Fill3 : 35.42 ms - 1.77 ms (35.42 ms / 20 ), min: 1.58 ms, max: 2.14 ms,  
nesting: 0 - 20  
TIMING HUGE Fill : 25.47 ms - 1.27 ms (25.48 ms / 20 ), min: 1.18 ms, max: 1.59 ms,  
nesting: 0 - 20  
TIMING HUGE memsetd : 25.12 ms - 1.26 ms (25.12 ms / 20 ), min: 1.15 ms, max: 1.59 ms,  
nesting: 0 - 20  
TIMING memset : 978.21 ms - 978.21 ns ( 1.05 s / 1000000 ), min: 1.00 us, max: 29.00 us,  
nesting: 0 - 1000000  
TIMING Fill3 : 1.50 s - 1.50 us ( 1.58 s / 1000000 ), min: 1.00 us, max: 29.00 us, nesting:  
0 - 1000000  
TIMING Fill2 : 1.89 s - 1.89 us ( 1.96 s / 1000000 ), min: 1.00 us, max: 34.00 us, nesting:  
0 - 1000000  
TIMING Fill0 : 2.02 s - 2.02 us ( 2.09 s / 1000000 ), min: 1.00 us, max: 33.00 us, nesting:  
0 - 1000000  
TIMING Fill : 2.06 s - 2.06 us ( 2.14 s / 1000000 ), min: 1.00 us, max: 32.00 us, nesting:  
0 - 1000000  
TIMING memsetd : 1.62 s - 1.62 us ( 1.69 s / 1000000 ), min: 1.00 us, max: 45.00 us,  
nesting: 0 - 1000000

## MSBT19x64

TIMING HUGE memset : 26.96 ms - 1.35 ms (26.96 ms / 20 ), min: 1.27 ms, max: 1.90 ms,  
nesting: 0 - 20  
TIMING HUGE Fill3 : 35.07 ms - 1.75 ms (35.08 ms / 20 ), min: 1.62 ms, max: 2.02 ms,  
nesting: 0 - 20  
TIMING HUGE Fill : 67.09 ms - 3.35 ms (67.09 ms / 20 ), min: 3.17 ms, max: 3.60 ms,  
nesting: 0 - 20  
TIMING HUGE memsetd : 25.64 ms - 1.28 ms (25.64 ms / 20 ), min: 1.19 ms, max: 1.48 ms,  
nesting: 0 - 20  
TIMING memset : 818.75 ms - 818.75 ns (856.11 ms / 1000000 ), min: 0.00 ns, max: 31.00  
us, nesting: 0 - 1000000  
TIMING Fill3 : 1.36 s - 1.36 us ( 1.40 s / 1000000 ), min: 1.00 us, max: 31.00 us, nesting:  
0 - 1000000  
TIMING Fill2 : 1.67 s - 1.67 us ( 1.70 s / 1000000 ), min: 1.00 us, max: 30.00 us, nesting:  
0 - 1000000  
TIMING Fill0 : 1.66 s - 1.66 us ( 1.70 s / 1000000 ), min: 1.00 us, max: 46.00 us, nesting:  
0 - 1000000  
TIMING Fill : 1.68 s - 1.68 us ( 1.72 s / 1000000 ), min: 1.00 us, max: 50.00 us, nesting:

0 - 1000000

TIMING memsetd : 1.50 s - 1.50 us ( 1.54 s / 1000000 ), min: 1.00 us, max: 29.00 us,  
nesting: 0 - 1000000

Fill3 is generally the best, but I experience two issues behind the scenes of this benchmark:

1. On MSBT19 / MSBT19x64 there is a significant penalty for small counts. It results in 5 ns per call, whereas in CLANG it is about 0.8 - 1.0 ns per call.
2. On MSBT19x64 the optimal threshold size is 2M counts on my Core i7. However, interestingly the default threshold value works better with MSBT19 on the same computer.

I will continue to investigate this.

Thanks and best regards,

Tom

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