

nvprof results running with 10240 particles, 512x512 resolution							
No shared memory							
Type	Time(%)	Time	Calls	Avg	Min	Max	Name
	%	s		ms	ms	ms	
GPU activities	86.998476	6.829268	349	19.568103	18.122103	33.579794	d_colorBitmapFromParticles(unsigned char*, int, int, particles_t, int)
GPU activities	12.722820	0.998725	349	2.861676	2.390614	4.030778	d_steerParticles(particles_t, int, float, int, int)
GPU activities	0.278443	0.021857	349	0.062628	0.060578	0.120418	[CUDA memcpy DtoH]
GPU activities	0.000261	0.000020	6	0.003413	0.003391	0.003488	[CUDA memcpy HtoD]
API calls	98.493003	7.925436	355	22.325172	0.012136	36.942092	cudaMemcpy
API calls	1.393008	0.112091	7	16.013029	0.001389	112.079517	cudaMalloc
API calls	0.107350	0.008638	698	0.012375	0.003408	0.090371	cudaLaunchKernel
API calls	0.003219	0.000259	101	0.002564	0.000101	0.112920	cuDeviceGetAttribute
API calls	0.001918	0.000154	698	0.000221	0.000102	0.019106	cudaGetLastError
API calls	0.001042	0.000084	1	0.083821	0.083821	0.083821	cuDeviceGetName
API calls	0.000311	0.000025	6	0.004168	0.001381	0.012650	cudaFree
API calls	0.000109	0.000009	1	0.008810	0.008810	0.008810	cuDeviceGetPCIBusId
API calls	0.000023	0.000002	3	0.000616	0.000178	0.001185	cuDeviceGetCount
API calls	0.000010	0.000001	2	0.000403	0.000190	0.000617	cuDeviceGet
API calls	0.000004	0.000000	1	0.000334	0.000334	0.000334	cuDeviceTotalMem
API calls	0.000003	0.000000	1	0.000231	0.000231	0.000231	cuDeviceGetUuid
Shared memory							
Type	Time(%)	Time	Calls	Avg	Min	Max	Name
	%	s		ms	ms	ms	
GPU activities	86.986683	6.982749	355	19.669714	18.387074	34.433551	dshm_colorBitmapFromParticles(unsigned char*, int, int, particles_t, int)
GPU activities	12.732783	1.022108	355	2.879178	2.420728	4.138974	dshm_steerParticles(particles_t, int, float, int, int)
GPU activities	0.280280	0.022499	355	0.063377	0.060610	0.120387	[CUDA memcpy DtoH]
GPU activities	0.000254	0.000020	6	0.003392	0.003360	0.003424	[CUDA memcpy HtoD]
API calls	98.476363	8.114756	361	22.478547	0.011995	38.861625	cudaMemcpy
API calls	1.422776	0.117241	7	16.748732	0.001277	117.229908	cudaMalloc
API calls	0.094465	0.007784	710	0.010963	0.003334	0.075088	cudaLaunchKernel
API calls	0.003346	0.000276	101	0.002730	0.000129	0.114830	cuDeviceGetAttribute
API calls	0.001584	0.000131	710	0.000183	0.000100	0.004078	cudaGetLastError
API calls	0.001029	0.000085	1	0.084762	0.084762	0.084762	cuDeviceGetName
API calls	0.000293	0.000024	6	0.004025	0.001436	0.011971	cudaFree
API calls	0.000107	0.000009	1	0.008835	0.008835	0.008835	cuDeviceGetPCIBusId
API calls	0.000020	0.000002	3	0.000556	0.000176	0.001270	cuDeviceGetCount
API calls	0.000009	0.000001	2	0.000364	0.000126	0.000603	cuDeviceGet

API calls	0.000004	0.000000	1	0.000365	0.000365	0.000365	cuDeviceTotalMem	
API calls	0.000003	0.000000	1	0.000265	0.000265	0.000265	cuDeviceGetUuid	

count		fps			
particles	pixels	gpu	shm	cpu	
100	512*512	372.6	320.1		
1024	512*512	200.8	241.6		
5120	512*512	84.7	82.2		
10240	512*512	43.3	43.1		
20480	512*512	19.1			
40960	512*512	9.4			
81920	512*512	3.7			
100	128*128	530.5	681.7	20.4	
200	128*128	584.5	531.3	10.3	
Note: shm works only up to 10240 particles. CPU is extremely slow with 512*512 resolution.					

CUDA Device Query (Runtime API) version (CUDART static linking)	
Device 0: "NVIDIA GeForce RTX 2060"	
CUDA Driver Version / Runtime Version	11.5 / 11.5
CUDA Capability Major/Minor version number:	7.5
Total amount of global memory:	5935 MBytes (6222839808 bytes)
(030) Multiprocessors, (064) CUDA Cores/MP:	1920 CUDA Cores
GPU Max Clock rate:	1335 MHz (1.34 GHz)
Memory Clock rate:	7001 Mhz
Memory Bus Width:	192-bit
L2 Cache Size:	3145728 bytes
Maximum Texture Dimension Size (x,y,z)	1D=(131072), 2D=(131072, 65536), 3D=(16384, 16384, 16384)
Maximum Layered 1D Texture Size, (num) layers	1D=(32768), 2048 layers
Maximum Layered 2D Texture Size, (num) layers	2D=(32768, 32768), 2048 layers
Total amount of constant memory:	65536 bytes
Total amount of shared memory per block:	49152 bytes
Total shared memory per multiprocessor:	65536 bytes
Total number of registers available per block:	65536
Warp size:	32
Maximum number of threads per multiprocessor:	1024
Maximum number of threads per block:	1024
Max dimension size of a thread block (x,y,z):	(1024, 1024, 64)
Max dimension size of a grid size (x,y,z):	(2147483647, 65535, 65535)
Maximum memory pitch:	2147483647 bytes
Texture alignment:	512 bytes
Concurrent copy and kernel execution:	Yes with 3 copy engine(s)
Run time limit on kernels:	Yes
Integrated GPU sharing Host Memory:	No
Support host page-locked memory mapping:	Yes
Alignment requirement for Surfaces:	Yes

Device has ECC support:	Disabled
Device supports Unified Addressing (UVA):	Yes
Device supports Managed Memory:	Yes
Device supports Compute Preemption:	Yes
Supports Cooperative Kernel Launch:	Yes
Supports MultiDevice Co-op Kernel Launch:	Yes
Device PCI Domain ID / Bus ID / location ID:	0 / 1 / 0
Compute Mode:	< Default (multiple host threads can use ::cudaSetDevice() with device simultaneously) >

CPU	
Architecture:	x86_64
CPU op-mode(s):	32-bit, 64-bit
Byte Order:	Little Endian
Address sizes:	39 bits physical, 48 bits virtual
CPU(s):	12
On-line CPU(s) list:	0-11
Thread(s) per core:	2
Core(s) per socket:	6
Socket(s):	1
NUMA node(s):	1
Vendor ID:	GenuineIntel
CPU family:	6
Model:	158
Model name:	Intel(R) Core(TM) i7-8750H CPU @ 2.20GHz
Stepping:	10
CPU MHz:	2200.000
CPU max MHz:	4100
CPU min MHz:	800
BogoMIPS:	4399.99
Virtualization:	VT-x
L1d cache:	192 KiB
L1i cache:	192 KiB
L2 cache:	1,5 MiB
L3 cache:	9 MiB