

## What's new?

Friday, June 19, 2020 8:45 AM

A **record** tool, which will record data copied between host and device by calling cudaMemcpy.

data copied from host to device is treated as input.  
data copied from device to host is treated as output.

Kernel arguments will also be recorded (user defined type is not supported yet).

All data are saved to a folder named `kernel_log`

Note: a single call of cudaMemcpy with data that greater than 2GB is not supported.

A **replay** tool, which will substitute the input of kernel based on the data recorded by record tool.

To verify the correctness, output will be compared to the one recorded in record phase.

Each programs in DRACC and Rodinia is executed 20 times, the result is include this report.

## 20 times run on DRACC

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```
yinengy@efeslab-gpu-rr:~/CUDA-Record-and-Replay$ ./utils.sh rr DRACC001
Output doesn't match in 2 th run
Output doesn't match in 5 th run
Output doesn't match in 12 th run
Output doesn't match in 16 th run
Output doesn't match in 17 th run
Output doesn't match in 19 th run
Finish
```

```
yinengy@efeslab-gpu-rr:~/CUDA-Record-and-Replay$ ./utils.sh rr DRACC002
Finish
yinengy@efeslab-gpu-rr:~/CUDA-Record-and-Replay$ ./utils.sh rr DRACC003
Finish
yinengy@efeslab-gpu-rr:~/CUDA-Record-and-Replay$ ./utils.sh rr DRACC004
Finish
```

```
yinengy@efeslab-gpu-rr:~/CUDA-Record-and-Replay$ ./utils.sh rr DRACC005
Finish
yinengy@efeslab-gpu-rr:~/CUDA-Record-and-Replay$ ./utils.sh rr DRACC006
Finish
yinengy@efeslab-gpu-rr:~/CUDA-Record-and-Replay$ ./utils.sh rr DRACC027
Finish
yinengy@efeslab-gpu-rr:~/CUDA-Record-and-Replay$ ./utils.sh rr DRACC027_injected
Output doesn't match in 5 th run
Output doesn't match in 7 th run
Finish
```

```
yinengy@efeslab-gpu-rr:~/CUDA-Record-and-Replay$ ./utils.sh rr DRACC028
Output doesn't match in 1 th run
Output doesn't match in 2 th run
Output doesn't match in 3 th run
Output doesn't match in 4 th run
Output doesn't match in 5 th run
Output doesn't match in 6 th run
Output doesn't match in 7 th run
Output doesn't match in 8 th run
Output doesn't match in 10 th run
Output doesn't match in 11 th run
Output doesn't match in 12 th run
Output doesn't match in 13 th run
Output doesn't match in 14 th run
Output doesn't match in 15 th run
Output doesn't match in 16 th run
Output doesn't match in 17 th run
Output doesn't match in 18 th run
Output doesn't match in 19 th run
Output doesn't match in 20 th run
Finish
```

Atomic store, no data race  
but there is a race condition by the non-atomic loads

## DRACC029

```
real    1m4.332s
user    0m2.035s
sys     0m3.099s
yinengy@efeslab-gpu-rr:~/CUDA-Record-and-Replay$ time ./test-apps/DRACC029/run
Memory Access Issue visible: false

real    0m3.303s
user    0m1.276s
sys     0m1.863s
```

21x record overhead, second input has a size of 2.5GB, failed to replay

## 20 times run on Rodinia

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b+tree

```
yinengy@efeslab-gpu-rr:~/CUDA-Record-and-Replay/test-apps/rodinia/cuda/b+tree$ ./run
Finish
```

bfs

```
yinengy@efeslab-gpu-rr:~/CUDA-Record-and-Replay/test-apps/rodinia/cuda/bfs$ ./run
Finish
```

dwt2d

```
yinengy@efeslab-gpu-rr:~/CUDA-Record-and-Replay/test-apps/rodinia/cuda/dwt2d$ ./run.sh
Finish
```

gaussian

```
yinengy@efeslab-gpu-rr:~/CUDA-Record-and-Replay/test-apps/rodinia/cuda/gaussian$ ./run
Finish
```

heartwall

```
yinengy@efeslab-gpu-rr:~/CUDA-Record-and-Replay/test-apps/rodinia/cuda/heartwall$ ./run
1th output doesn't match!
2th output doesn't match!
3th output doesn't match!
4th output doesn't match!
Output doesn't match in 1 th run
Output doesn't match in 2 th run
Output doesn't match in 3 th run
Output doesn't match in 4 th run
Output doesn't match in 5 th run
Output doesn't match in 6 th run
Output doesn't match in 7 th run
Output doesn't match in 8 th run
Output doesn't match in 9 th run
Output doesn't match in 10 th run
Output doesn't match in 11 th run
Output doesn't match in 12 th run
```

it use cudaMemcpyToSymbol and constant memory, which is not supported at this time

hybridsort

```
yinengy@efeslab-gpu-rr:~/CUDA-Record-and-Replay/test-apps/rodinia/cuda/hybridsort$ ./run
Finish
```

myocyte  
(mode 1)

```
yinengy@efeslab-gpu-rr:~/CUDA-Record-and-Replay/test-apps/rodinia/cuda/myocyte$ ./run
Finish
```

(mode 0), where cudaMemcpy is called by kernel

```
^C yinengy@efeslab-gpu-rr:~/CUDA-Record-and-Replay/test-apps/rodinia/cuda/myocyte$ ./run
175th output doesn't match!
253th output doesn't match!
7345th output doesn't match!
Output doesn't match in 1 th run
Output doesn't match in 2 th run
Output doesn't match in 3 th run
Output doesn't match in 4 th run
Output doesn't match in 5 th run
Output doesn't match in 6 th run
Output doesn't match in 7 th run
Output doesn't match in 8 th run
Output doesn't match in 9 th run
Output doesn't match in 10 th run
Output doesn't match in 11 th run
Output doesn't match in 12 th run
Output doesn't match in 13 th run
Output doesn't match in 14 th run
Output doesn't match in 15 th run
Output doesn't match in 16 th run
Output doesn't match in 17 th run
Output doesn't match in 18 th run
Output doesn't match in 19 th run
Output doesn't match in 20 th run
Finish
```

particlefilter\_naive

```
yinengy@efeslab-gpu-rr:~/CUDA-Record-and-Replay/test-apps/rodinia/cuda/particlefilter$ ./run
Finish
```

particlefilter\_float

```
yinengy@efeslab-gpu-rr:~/CUDA-Record-and-Replay/test-apps/rodinia/cuda/particlefilter$ ./run
Finish
```

hotspot

```
yinengy@efeslab-gpu-rr:~/CUDA-Record-and-Replay/test-apps/rodinia/cuda/hotspot$ ./run
1th output doesn't match!
Output doesn't match in 1 th run
Output doesn't match in 2 th run
Output doesn't match in 3 th run
Output doesn't match in 4 th run
Output doesn't match in 5 th run
Output doesn't match in 6 th run
Output doesn't match in 7 th run
Output doesn't match in 8 th run
Output doesn't match in 9 th run
Output doesn't match in 10 th run
Output doesn't match in 11 th run
Output doesn't match in 12 th run
Output doesn't match in 13 th run
Output doesn't match in 14 th run
Output doesn't match in 15 th run
Output doesn't match in 16 th run
Output doesn't match in 17 th run
Output doesn't match in 18 th run
Output doesn't match in 19 th run
Output doesn't match in 20 th run
Finish
```

huffman

```
yinengy@efeslab-gpu-rr:~/CUDA-Record-and-Replay/test-apps/rodinia/cuda/huffman$ ./run
Finish
```

kmeans

```
yinengy@efeslab-gpu-rr:~/CUDA-Record-and-Replay/test-apps/rodinia/cuda/kmeans$ ./run
Finish
```

lavaMD

```
yinengy@efeslab-gpu-rr:~/CUDA-Record-and-Replay/test-apps/rodinia/cuda/lavaMD$ ./run
Finish
```

lud

segment fault

pathfinder

```
yinengy@efeslab-gpu-rr:~/CUDA-Record-and-Replay/test-apps/rodinia/cuda/pathfinder$ ./run
Finish
```

streamcluster

where the kernel take an input with a user defined type (Point), which is not supported.  
Also, the input is large, so recording is slow.

```
yinengy@efeslab-gpu-rr:~/CUDA-Record-and-Replay/test-apps/rodinia/cuda/streamcluster$ ./run
read 65536 points
finish local search
read 65536 points
finish local search
read 65536 points
finish local search
Output doesn't match in 1 th run
read 65536 points
finish local search
Output doesn't match in 2 th run
read 65536 points
```

nn

```
yinengy@efeslab-gpu-rr:~/CUDA-Record-and-Replay/test-apps/rodinia/cuda/nn$ ./run
Finish
```

nw

```
yinengy@efeslab-gpu-rr:~/CUDA-Record-and-Replay/test-apps/rodinia/cuda/nw$ ./run
Finish
```