



Chapter 3.2: Matrix Transpose Naive Kernel Analysis

ROCm Tutorial | AMD 2020

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Chapter 3.2: Matrix Transpose Naive Kernel Analysis

In this tutorial, we will analyze the matrix transpose naive implementation using the rocProf profiler tool from ROCm

Preparation

1. First in the tutorial repository go to the directory

```
cd 02_Matrix_Transpose
```

2. The application code is in matrix_transpose_naive.cpp

Compiling and Executing

1. Compile the program

```
hipcc matrix_transpose_naive.cpp -o matrix_transpose_naive
```

2. Execute the program without profiler

```
./matrix_transpose_naive
```

3. Note that we are not printing any output from the matrices as the matrices are large. But you can add print code if desired

Profiling

1. Now we will analyze the application through the profiler
2. First let us collect the kernel execution time using the performance measurement mode. Run the following command:

```
rocprof --stats ./matrix_transpose_naive
```

You will get the output in a file results.csv. Note down the kernel duration(ns)

3. For this application we have provided the metrics file for collecting the HW performance counters in “metrics_matrix_transpose_naive_kernel.txt”
4. On a closer look the only thing different in this file from the metrics file of the copy kernel is the kernel name which is set to transpose_kernel
5. Now we will run the application in performance counter mode using our defined metric file:

```
rocprof -i metrics_matrix_transpose_naive_kernel.txt -o metrics_matrix_transpose_naive.csv  
./matrix_transpose_naive
```

This will output the results of the HW performance counters in metrics_matrix_transpose_naive.csv.

6. Keep a record of the results obtained for this kernel. For our case, we obtained the results below. Your results might be different depending on the GPU you are on:

```
Kernel time(ns):15135463  
TCC_EA_RDREQ_sum: 524289  
TCC_EA_WRREQ_sum: 1686190
```