Intel® oneAPI VTune™ Profiler 2021.1.1 Gold

Recommendations:

Hotspots: Start with Hotspots analysis to understand the efficiency of your algorithm.

> Use Hotspots analysis to identify the most time consuming functions. Drill down to see the time spent on every line of code.

Microarchitecture Exploration: There is low microarchitecture usage (49.5%) of available hardware resources. of Pipeline Slots

> Run Microarchitecture Exploration analysis to analyze CPU microarchitecture bottlenecks that can affect application performance.

Threading: There is poor utilization of logical CPU cores (16.1%) in your application.

> Use Threading to explore more opportunities to increase parallelism in your application.

Elapsed Time: 3.675s

CPU:

IPC: 1.809

SP GFLOPS: 0.000

DP GFLOPS: 0.070

x87 GFLOPS: 0.005

Average CPU Frequency: 2.442 GHz

GPU:

Time: 1.4% (0.051s) of Elapsed time

> GPU utilization is low. Consider offloading more work to the GPU to increase overall application performance.

IPC Rate: 1.469

Effective Logical Core Utilization: 16.1% (1.284 out of 8)

> The metric value is low, which may signal a poor logical CPU cores utilization. Consider improving physical core utilization as the first step and then look at opportunities to utilize logical cores, which in some cases can improve

processor throughput and overall performance of multi-threaded applications.

Effective Physical Core Utilization: 30.6% (1.224 out of 4)

The metric value is low, which may signal a poor physical CPU cores utilization caused by:
- load imbalance
- threading runtime overhead
- contended synchronization
- thread/process underutilization
- incorrect affinity that utilizes logical cores instead of physical cores

Explore sub-metrics to estimate the efficiency of MPI and OpenMP parallelism or run the Locks and Waits analysis to identify parallel bottlenecks for other parallel runtimes.

Microarchitecture Usage: 49.5% of Pipeline Slots

You code efficiency on this platform is too low.

Possible cause: memory stalls, instruction starvation, branch misprediction or long latency instructions.

Next steps: Run Microarchitecture Exploration analysis to identify the cause of the low microarchitecture usage efficiency.

Retiring:	49.5% of Pipeline Slots
Front-End Bound:	20.6% of Pipeline Slots

Issue: A significant portion of Pipeline Slots is remaining empty due to issues in the Front-End.

Tips: Make sure the code working size is not too large, the code layout does not require too many memory accesses per cycle to get enough instructions for filling four pipeline slots, or check for microcode assists.

Back-End Bound: 16.4% of Pipeline Slots
Memory Bound: 6.3% of Pipeline Slots
Core Bound: 10.0% of Pipeline Slots
Bad Speculation: 13.5% of Pipeline Slots

Memory Bound: 6.3% of Pipeline Slots
L1 Bound: 8.2% of Clockticks
L2 Bound: 0.5% of Clockticks
L3 Bound: 2.0% of Clockticks
DRAM Bound: 2.4% of Clockticks
DRAM Bandwidth Bound: 0.0% of Elapsed Time
Store Bound: 0.9% of Clockticks

Vectorization: 2.1% of Packed FP Operations

> A significant fraction of floating point arithmetic instructions are scalar. Use Intel Advisor to see possible reasons why the code was not vectorized.

Instruction Mix:
SP FLOPs: 0.0% of uOps
Packed: 0.6% from SP FP
128-bit: 0.2% from SP FP
256-bit: 0.4% from SP FP
Scalar: 99.4% from SP FP

> A significant fraction of floating point arithmetic instructions are scalar. Use Intel Advisor to see possible reasons why the code was not vectorized.

DP FLOPs: 1.2% of uOps
Packed: 2.3% from DP FP
128-bit: 2.3% from DP FP
256-bit: 0.0% from DP FP
Scalar: 97.7% from DP FP

> A significant fraction of floating point arithmetic instructions are scalar. Use Intel Advisor to see possible reasons why the code was not vectorized.

x87 FLOPs: 0.1% of uOps

Non-FP: 98.8% of uOps

FP Arith/Mem Rd Instr. Ratio: 0.045

> The metric value is low. This can be a result of unaligned access to data for vector operations. Use Intel Advisor to find possible data access inefficiencies for vector operations.

FP Arith/Mem Wr Instr. Ratio: 0.105

> The metric value is low. This can be a result of unaligned access to data for vector operations. Use Intel Advisor to find possible data access inefficiencies for vector operations.

GPU Active Time: 1.4%

> GPU utilization is low. Consider offloading more work to the GPU to increase overall application performance.

GPU Utilization when Busy: 24.3%

> The percentage of time when the EUs were stalled or idle is high, which has a negative impact on compute-bound applications.

IPC Rate: 1.469
EU State: 24.3%
Active: 24.3%
Stalled: 26.8%

> A significant portion of GPU time is lost due to stalls. For compute-bound code, this could indicate that performance is limited by memory or sampler acesses.

Idle: 48.9%

> A significant portion of GPU time is spent idle. This is usually caused by imbalance or thread scheduling problems.

Occupancy: 34.1% of peak value

> Low value of the occupancy metric may be caused by inefficient work scheduling. Make sure work items are neither too small nor too large.

Collection and Platform Info:

Application Command Line: ./codecs/hm/encoder/TAppEncoderStatic "-c" "./configs/hm/encoder_lowdelay_main.cfg" "-i" "./sequences/CLASS_C/RaceHorses_416x240_30.yuv" "-wdt" "416" "-hgt" "240" "-b" "./bin/hm/encoder_lowdelay_main.cfg/CLASS_C/RaceHorses_416x240_30_QP_22_hm.bin" "-o" "./rec_yuv/hm/encoder_lowdelay_main.cfg/CLASS_C/RaceHorses_416x240_30_QP_22_hm.yuv" "-fr" "30" "-fs" "0" "-f" "2" "-q" "22"

Operating System: 5.4.0-65-generic DISTRIB_ID=Ubuntu DISTRIB_RELEASE=18.04 DISTRIB_CODENAME=bionic DISTRIB_DESCRIPTION="Ubuntu 18.04.5 LTS"

Computer Name: eimon

Result Size: 3.8 MB

Collection start time: 04:45:44 10/02/2021 UTC

Collection stop time: 04:45:48 10/02/2021 UTC

Collector Type: Event-based sampling driver,Event-based counting driver

CPU:

Name: Intel(R) Processor code named Kabylake ULX

Frequency: 1.992 GHz

Logical CPU Count: 8

Max DRAM Single-Package Bandwidth: 11.000 GB/s

Cache Allocation Technology:

Level 2 capability: not detected

Level 3 capability: not detected

GPU:

Name:

Display controller: Intel Corporation Device 22807

Vendor:	Intel Corporation
EU Count:	24
Max EU Thread Count:	7
Max Core Frequency:	1.150 GHz