NVIDIA DOCA DPA Statistics Tool

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Introduction

DOCA `dpa-statistics` is a CLI tool which allows users to monitor and obtain statistics on thread execution per running DPA process and thread. The tool is used to expose information about the running DPA processes and threads and to collect statistics on DPA thread performance.

The tool presents performance information for running DPA threads, including the number of cycles and instructions executed in a time period. The tool enables initiating and stopping collection of statistics and displaying the data collected per thread.

Info

The process ID output of the `dpa-ps` tool may be used as the input parameter for the `dpa-statistics` tool.

Info

This tool is supported for NVIDIA® BlueField®-3 only.

Collecting Performance Statistics Data

The command `collect` works on four mutually exclusive modes:

- Enable mode – start collecting performance data
- Disable mode – stop collecting performance data
- Timeout mode – start collecting, wait with a timeout, stop collect and print info. User could break the wait with Ctrl-C command and then the timeout will be canceled and tool will disable statistics collection and prints the info with the actual time of the collect operation.

- Infinite mode – no special flags. Same as timeout mode but with infinite timeout. The tool awaits the Ctrl-C command to stop.

The following table lists the `collect` command's flags and arguments:

Short Option	Long Option	Description
`-h`	`--help`	Help information
`-d`	`--device`	Device interface name (MST/RDMA)
`-p`	`--process-id`	Hexadecimal process ID for filtering **Info** This flag indicates a specific command for the command to operate on. Otherwise, statistics are collected from all processes.
`-i`	`--suppress-header-info`	Suppress print header info
`-n`	`--enable`	Enable collect info
`-o`	`--disable`	Disable collect info
`-t`	`--timeout`	Enable collect, wait with timeout, disable collect and print info **Info** Timeout value is in milliseconds. Examples for inputting timeout value: • 45 – 45 milliseconds

Short Option	Long Option	Description
		• 45.55 – 45 milliseconds and 550,000 nanoseconds • .0005 – 500 nanoseconds • 45m55n – 45 milliseconds and 55 nanoseconds • 66n – 66 nanoseconds
`-r`	`--reset`	Reset counters before operation starting collect operation

Presenting Statistics List

Presenting performance statistics is applicable after initiating data collection.

The following table lists the `show` command's flags and arguments:

Short Option	Long Option	Description
`-h`	`--help`	Help information
`-d`	`--device`	Device interface name (MST/RDMA)
`-p`	`--process-id`	Hexadecimal process ID for filtering
`-i`	`--suppress-header-info`	Suppress print header info

Output example:

```
$ sudo ./dpa-statistics show -d mlx5_0 -p 1
ProcessID    Process Name
    ThreadID    Cycles              Instruction         Time
Executions          Thread Name
1            PROCESS_1
    3           266268              18193               164
41                  EH_1_0_0
    4           411571              32727               252
47                  EH_1_1_1
```

Where:

- `ProcessID` – The `dpa_process_object_id` to which the thread belongs
- `Process Name` – The `dpa_process_name` to which the thread belongs
- `ThreadID` – DPA thread object ID
- `Cycles` – Total EU cycles the thread used
- `Instruction` – Total number of instructions the thread executed
- `Time` – Total time in ticks the thread was active
- `Executions` – Total number of thread invocations
- `Thread Name` – The `dpa_thread_name`

Examples

- Example of `collect` in infinite mode for process 0 with suppress header info:

```
$ sudo ./dpa-statistics collect -d mlx5_0 -p 0 -i
...^C
Data collected for 4606 milliseconds 0 nanoseconds
0           PROCESS_0
    5           223964             13754              140
31         EH_0_5_5
    6           190130             13754              114
31         EH_0_6_6
```

- Example of `collect` in timeout mode with a timeout of 1 second and half a millisecond.

```
$ sudo ./dpa-statistics collect -d mlx5_0 -t 1000.500
```

```
Data collected for 1000 milliseconds 500000 nanoseconds
ProcessID    Process Name
    ThreadID    Cycles              Instruction         Time
Executions          Thread Name
0            PROCESS_0
    5           223964              13754               140
31                  EH_0_5_5
    6           190130              13754               114
31                  EH_0_6_6
1            PROCESS_1
    3           266268              18193               164
41                  EH_1_3_3
    4           411571              32727               252
47                  EH_1_4_4
2            PROCESS_2
3            PROCESS_3
    0           223205              13754               137
31                  EH_3_0_0
    1           189896              13754               113
31                  EH_3_1_1
    2           191796              13754               117
31                  EH_3_2_2
4            PROCESS_4
```

- Example of enabling statistics collection with reset of counters.

```
$ sudo ./dpa-statistics collect -d mlx5_0 -n -r
```

- Example of disabling statistics collection.

```
$ sudo ./dpa-statistics collect -d mlx5_0 -o
```

Known Limitations

- Reading large statistics counter blocks takes a long time
- The `dpa-ps` and `dpa-statistics` tools cannot be run at the same time on the same device

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