



NVIDIA DOCA Telemetry Client

Reference Application Guide

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Chapter 1. Introduction

This document describes DOCA telemetry API example. For general information, refer to [NVIDIA DOCA Telemetry Programming Guide](#).

The telemetry application example code shows an initial recommended configuration which covers 2 use cases:

- ▶ Standard DOCA telemetry data
- ▶ DOCA telemetry for NetFlow data

The `telemetry_client.c` contains the basic DOCA application logic, which splits into the two cases as mentioned above:

- ▶ `telemetry_config.c`
- ▶ `telemetry_netflow_config.c`

Both files demonstrate the API usage and are recommended as a basis for any development that uses the DOCA telemetry API.

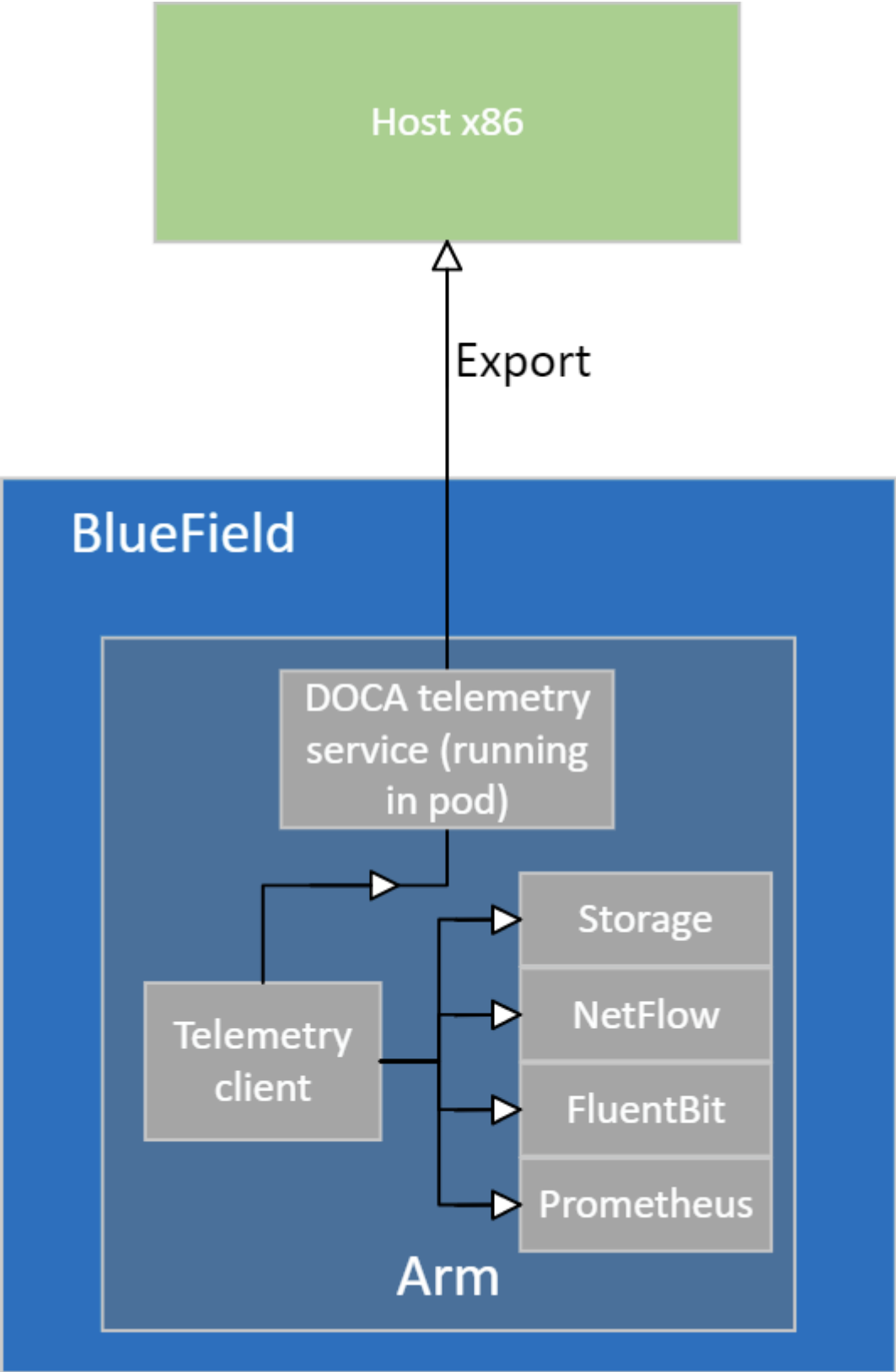
Chapter 2. System Design

The telemetry client runs on the BlueField and writes telemetry data to BlueField's storage. If IPC is enabled, data is sent to the DOCA Telemetry Service (DTS) running on the same BlueField.

There are 2 possibilities:

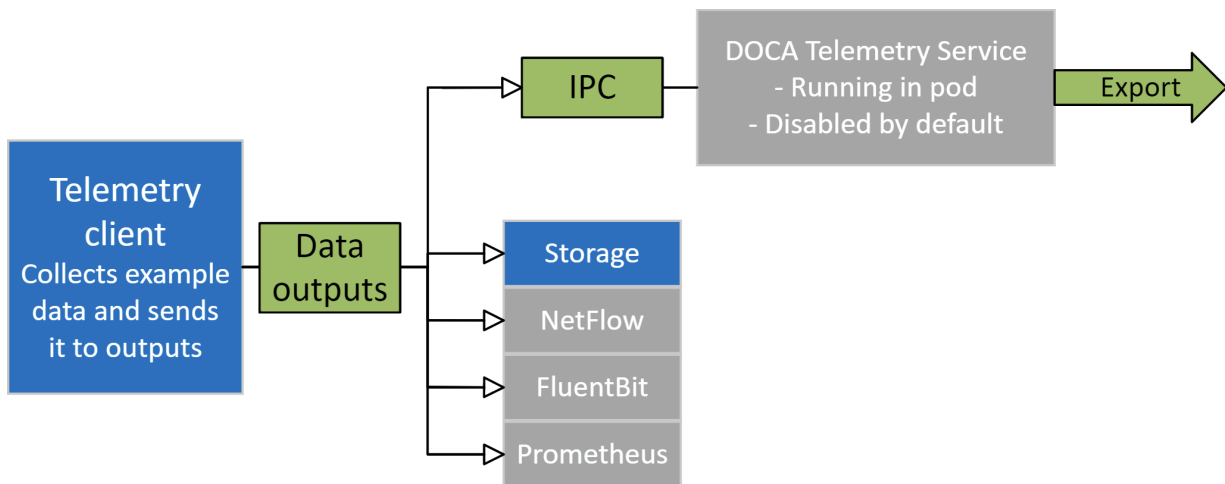
- ▶ Telemetry client runs in a container and shares the same Kubernetes pod with the DTS container, using a single `.yaml` file. The `hostIPC` option is set to `false` and telemetry client `ipc_sockets` folder must be mounted to:
`/opt/mellanox/doca/services/telemetry/ipc_sockets`
- ▶ Telemetry client is executed regardless of the DTA Kubernetes pod, and the pod defines `hostIPC=true`. In this case, the telemetry client `ipc_sockets` folder must be changed to:
`/opt/mellanox/doca/services/telemetry/ipc_sockets`

The first scenario is preferred for production deployment as it is better in terms of security. The second scenario should be used only for debugging and development.



Chapter 3. Application Architecture

The following diagram presents example data flow:



Data from telemetry client can be exported in two ways:

- ▶ Write to disk (default)
- ▶ Using inter-process communication (IPC)

By default, IPC connection to DTS is disabled and the data is written to the disk.

When the data is written to disk, it can be read with the `clx_read` utility (see [Read Example Data](#)). Once the user finds that data is written correctly, IPC transport can be enabled so the data is sent to DTS.

When IPS is used, telemetry client and DTS must be executed on the same node (BlueField-2/ host).

DTS can export the collected data out of the node.

Chapter 4. Configuration Flow

1. Parse application argument.

```
arg_parser_init();
```

- a). Initialize arg parser resources.
- b). Register DOCA general flags.

```
register_telemetry_params();
```
- c). Register telemetry application flags.

```
arg_parser_start();
```
- d). Parse app flags.

Chapter 5. Running Application on BlueField

1. Please refer to the [DOCA Installation Guide](#) for details on how to install BlueField related software.
2. The telemetry client binary is located under `/opt/mellanox/doca/examples/telemetry_client/bin/doca_telemetry_client`.
3. To re-build the application:

a). Run:

```
cd /opt/mellanox/doca/examples/telemetry_client/src
meson /tmp/build
ninja -C /tmp/build
```

`doca_telemetry_client` is created under `/tmp/build`.

b). The build process depends on the `PKG_CONFIG_PATH` environment variable to locate the DPDK libraries. If the variable was accidentally corrupted and the build fails, run the following command:

► For Ubuntu:

```
export PKG_CONFIG_PATH=$PKG_CONFIG_PATH:/opt/mellanox/dpdk/lib/aarch64-linux-gnu/pkgconfig
```

► For CentOS:

```
export PKG_CONFIG_PATH=$PKG_CONFIG_PATH:/opt/mellanox/dpdk/lib64/pkgconfig
```

4. To run the application:

```
Usage: doca_telemetry_client [DOCA Flags] [Program Flags]
DOCA Flags:
  -h, --help                Print a help synopsis
  -l, --log-level           Set the log level for the program <CRITICAL=0,
  DEBUG=4>
Program Flags:
  -t, --telemetry          Run DOCA telemetry example
  -n, --netflow            Run DOCA telemetry netflow example
```

For example, running with telemetry config:

```
/opt/mellanox/doca/examples/telemetry_client/bin/doca_telemetry_client -t
```

For example, running with NetFlow config:

```
/opt/mellanox/doca/examples/telemetry_client/bin/doca_telemetry_client -n
```

For additional information on available flags for DPDK, use `-h` before the `--` separator:

```
/opt/mellanox/doca/examples/telemetry_client/bin/doca_telemetry_client -h
```


For additional information on the app, use `-h` after the `--` separator:

```
/opt/mellanox/doca/examples/telemetry_client/bin/doca_telemetry_client -- -h
```

Chapter 6. Arg Parser DOCA Flags

| Flag Type | Short Flag | Long Flag/JSON Key | Description |
|---------------|------------|--------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| General Flags | l | log-level | Sets the log level for the application: <ul style="list-style-type: none">▶ CRITICAL=0▶ ERROR=1▶ WARNING=2▶ INFO=3▶ DEBUG=4 |
| | h | help | Print a help synopsis |
| Program Flags | t | telemetry | Run DOCA telemetry example |
| | n | netflow | Run DOCA telemetry NetFlow example |

Chapter 7. Read Example Data

In the example, data output to the file is enabled by default and is written to a predefined path which is set to `./telemetry_examle_data`. The binary files are written according to the following folder structure:

```
{year}/{date}/{source_id}/{tag}_{timestamp}.bin
```

New binary files appear when the program starts or when binary file age/size restriction is reached.

```
$ ls -R telemetry_example_data
telemetry_example_data
├── 2021
│   ├── 1007
│   │   └── source_1
│   │       └── source_1_tag_1633596291715225.bin
├── schema
│   ├── schema_ec9d36e6844048461d96c859e176cf32.json
│   └── schema_f5ce72803e5583d747e1e45d0fa1241b.json
```



Note: The file structure shown is printed using `tree`.

For the development stage, it is recommended to read data with the `clx_read` utility, which reads a binary file and dumps the data to `stdout`.

```
# usage: /opt/mellanox/collectx/bin/clx_read -s /path/to/schema/folder /path/to/binary/file
$ /opt/mellanox/collectx/bin/clx_read -s telemetry_example_data/schema
telemetry_example_data/2021/1007/ source_1_tag_1633596291715225.bin
{
  "timestamp": 1634815738799728,
  "event_number": 0,
  "iter_num": 0,
  "string_number": 0,
  "example_string": "example_str_1"
}
{
  "timestamp": 1634815738799768,
  "event_number": 1,
  "iter_num": 0,
  "string_number": 1,
  "example_string": "example_str_2"
}
...
```

Once the user decides the data is in the correct format (i.e., all the fields are filled with the expected data), the IPC transport may be enabled.



Note: When working on the BlueField, it is recommended to disable writing data to binary files on the disk due to existing storage restrictions of the DPU.

Chapter 8. References

- ▶ `/opt/mellanox/doca/examples/telemetry_client/telemetry_client.c`
- ▶ `/opt/mellanox/doca/examples/telemetry_client/telemetry_config.c`
- ▶ `/opt/mellanox/doca/examples/telemetry_client/telemetry_netflow_config.c`

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