NVIDIA DOCA SHA

Sample Guide

MLNX-15-060557 _v1.4 | November 2022

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Chapter 1. Introduction

This document describes SHA samples based on the DOCA SHA library. These samples illustrate how to use the DOCA SHA API to calculate secure hash algorithm on a given message.

For more information about DOCA SHA library, refer to the NVIDIA DOCA SHA Programming Guide.

Chapter 2. Dependencies

The DOCA SHA library requires BlueField-2 firmware version 24.35.1012 or higher.

Chapter 3. Prerequisites

N/A

Chapter 4. Running the Sample

1. Refer to the following documents:
   - NVIDIA DOCA Installation Guide for Linux for details on how to install BlueField-related software.
   - NVIDIA DOCA Troubleshooting Guide for any issue you may encounter with the installation, compilation, or execution of DOCA applications.
2. To build a given sample:
   ```
   cd /opt/mellanox/doca/samples/doca_sha/<sample_name>
   meson build
   ninja -C build
   ```

   Note: The `doca_<sample_name>` will be created under `./build/`.
3. Sample (e.g., `doca_sha_create`) usage:
   ```
   Usage: doca_sha_create [DOCA Flags] [Program Flags]
   DOCA Flags:
     -h, --help                    Print a help synopsis
     -v, --version                 Print program version information
     -l, --log-level               Set the log level for the program <CRITICAL=20,
    ERROR=30, WARNING=40, INFO=50, DEBUG=60>

   Program Flags:
     -p, --pci-addr                PCI device address
     -d, --data                    User data
   ```
   For additional information per sample, use the `-h` option:
   ```
   ./build/doca_<sample_name> -h
   ```

Chapter 5. Samples

5.1. SHA Create

This sample illustrates how to send A SHA job and retrieve the result.

The sample logic includes:

1. Locating a DOCA device.
2. Initializing the required DOCA core structures.
3. Populating DOCA memory map with two relevant buffers; one for the source data and one for the result.
4. Allocating the element in DOCA buffer inventory for each buffer.
5. Initializing a DOCA SHA job object.
6. Submitting the SHA job into work queue.
7. Retrieving the SHA job from the queue once it is done.
8. Printing the job result.
9. Destroying all SHA and DOCA core structures.

References:

- `/opt/mellanox/doca/samples/doca_sha/sha_create/sha_create_sample.c`
- `/opt/mellanox/doca/samples/doca_sha/sha_create/sha_create_main.c`
- `/opt/mellanox/doca/samples/doca_sha/sha_create/meson.build`

5.2. SHA Partial Create

This sample illustrates how to send partial SHA jobs and retrieve the result. Each job source buffer (except the final) will be 64 bytes.

The sample logic includes:

1. Locating a DOCA device.
2. Initializing the required DOCA core structures.
3. Initializing a partial session for all the jobs.

4. Populating DOCA memory map with two relevant buffers; one for the source data and one for the result.
5. Allocating the element in DOCA buffer inventory for the result buffer.
6. Calculating total jobs; user data length divided by 64.
7. For each job:
   a). Allocating the element in DOCA buffer inventory for the relevant part in the source buffer.
   b). Initializing the DOCA SHA job object. If it is the final job, send `DOCA_SHA_JOB_FLAGS_SHA_PARTIAL_FINAL` flag.
   c). Submitting SHA job into work queue.
   d). Retrieving SHA job from the queue once it is done.
8. Printing the final job result.
9. Destroying all SHA and DOCA core structures.

References:

- `/opt/mellanox/doca/samples/doca_sha/sha_partial_create/sha_partial_create_sample.c`
- `/opt/mellanox/doca/samples/doca_sha/sha_partial_create/sha_partial_create_main.c`
- `/opt/mellanox/doca/samples/doca_sha/sha_partial_create/meson.build`

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