



NVIDIA DOCA DMA

Sample Guide

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Chapter 1. Introduction

DOCA direct memory access (DMA) library provides an API for copying data between buffers using hardware acceleration, supporting both local and remote memory regions.

The library provides an API for executing DMA operations on DOCA buffers. These buffers can reside in local memory (i.e., within the DPU) or remote memory (i.e., on the host).

Using DOCA DMA you can easily execute complex memory copy operations in an optimized, hardware-accelerated way.

For more information about the DOCA DMA library, refer to [NVIDIA DOCA DMA Programming Guide](#).

Chapter 2. Dependencies

The library requires a minimum DPU firmware version of 24.33.0100 and OFED version of 5.5.

Chapter 3. Prerequisites

N/A

Chapter 4. Samples

4.1. Local Copy

This sample illustrates how to locally copy memory with DMA from one buffer to another on the DPU.

The sample logic includes:

1. Locating DOCA device.
2. Initializing needed DOCA core structures.
3. Populating DOCA memory map with two relevant buffers.
4. Allocating element in DOCA buffer inventory for each buffer.
5. Constructing DOCA DMA object.
6. Submitting DMA job into work queue.
7. Retrieving DMA job from the queue once it is done.
8. Comparing memory on both buffers.
9. Destroying all DMA and DOCA core structures.

Reference:

- ▶ `/opt/mellanox/doca/samples/doca_dma/dma_local_copy/dma_local_copy.c`

4.2. Remote Copy Receiver

This sample illustrates how to copy memory with DMA from the x86 host into the DPU.

The sample logic includes:

1. Locating DOCA device.
2. Initializing needed DOCA core structures.
3. Populating DOCA memory map with destination buffer.
4. Receiving exported data from x86 host (sender), which is needed to create the remote memory map.
5. Creating memory map to the remote buffer.
6. Allocating element in DOCA buffer inventory for each buffer.

7. Constructing DOCA DMA object.
8. Submitting DMA job into work queue.
9. Retrieving DMA job from the queue once it is done.
10. Checking DMA job result.
11. Destroying remote memory map.
12. Sending ack message to sender to notify that DMA was done.
13. Destroying all DMA and DOCA core structures.

Reference:

- ▶ `/opt/mellanox/doca/samples/doca_dma/dma_remote_copy_receiver/
dma_remote_copy_receiver.c`

4.3. Remote Copy Sender

This sample illustrates how to allow memory copy with DMA from the x86 host into the DPU. This sample should be run on the host.

The sample logic includes:

1. Initializing needed DOCA core structures.
2. Populating DOCA memory map with source buffer.
3. Exporting memory map.
4. Sending exported data to the DPU which is needed to create an exported memory map on the DPU side.
5. Destroying all DMA and DOCA core structures.

Reference:

- ▶ `/opt/mellanox/doca/samples/doca_dma/dma_remote_copy_sender/
dma_remote_copy_sender.c`

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