



NVIDIA DOCA RegEx

Sample Guide

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Chapter 1. Introduction

BlueField DPU supports high-speed hardware regular expression (RegEx) acceleration. This allows accelerating different security and networking applications which require RegEx processing.

This document describes RegEx samples based on the DOCA RegEx library. These samples illustrate how to use the DOCA RegEx API to configure, send, and receive data buffers to and from the BlueField RegEx engine. Processing the data to detect matches requires compilation of regular expressions rules file. The compiled file (.ROF2) is loaded to the RegEx engine using DOCA RegEx APIs.

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

Chapter 2. Dependencies

N/A

Chapter 3. Prerequisites

Developing an application that leverages the RegEx engine requires pre-run setup:

1. Allocate hugepages:

```
sudo echo 2048 > /sys/kernel/mm/hugepages/hugepages-2048kB/nr_hugepages
```

2. Make sure the RegEx engine is active:

```
systemctl status mlx-regex
```

If the status is inactive (Active: failed), run:

```
systemctl start mlx-regex
```

To run the application, the RegEx compiled rule file (.rof2.binary) must be supplied with it. To compile the sample rules file, run:

```
cd /opt/mellanox/doca/samples/doca_regex/<sample_name>/  
rxpc -f <rules_file_name>.txt -p 0.01 -o /tmp/sample_regex_rules
```



Note: For more information, refer to [NVIDIA RXP Compiler](#).

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 samples.

2. To build a given sample:

```
cd /opt/mellanox/doca/samples/doca_regex/<sample_name>
meson build
ninja -C build
```



Note: The binary `doca_<sample_name>` will be created under `./build/`.

3. Sample (e.g., `regex_scan`) usage:

```
Usage: doca_regex_scan [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-ADDRESS>  RegEx device PCI address
  -r, --rules <path>            Path to compiled rules file (rof2.binary)
  -d, --data <path>            Path to data file
```

For additional information per sample, use the `-h` option:

```
./build/doca_<sample_name> -h
```

Chapter 5. Samples

5.1. RegEx Scan

This sample illustrates how to scan data to find matches according to regular expression patterns.

The sample logic includes:

1. Accepting RegEx rules file path and data to scan.
2. Configuring DOCA RegEx device (loading compiled rules, mempool allocation, etc.) to enable RegEx engine to receive jobs.
3. Splitting the user data to 6 chunks.
4. Sending the chunks to RegEx engine, each chunk is a RegEx job.
5. HW scanning data and returning a list of matches.
6. Reporting the results.

References:

- ▶ `/opt/mellanox/doca/samples/doca_regex/regex_scan/regex_scan_sample.c`
- ▶ `/opt/mellanox/doca/samples/doca_regex/regex_scan/regex_scan_main.c`
- ▶ `/opt/mellanox/doca/samples/doca_regex/regex_scan/meson.build`
- ▶ `/opt/mellanox/doca/samples/doca_regex/regex_scan/regex_rules.txt`
- ▶ `/opt/mellanox/doca/samples/doca_regex/regex_scan/data_to_scan.txt`

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