



NVIDIA DOCA

Developer Quick Start Guide

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Chapter 1. Introduction

DOCA brings together a wide range of powerful APIs, libraries, and frameworks for programming and accelerating modern data center infrastructures. Like NVIDIA® CUDA® for GPUs, DOCA is a consistent and essential resource across all existing and future generations of DPU products.

This document is intended for those wishing to develop applications using the DOCA framework.



Note: Not sure which installation type to use? To expand on different DOCA user types and the relevant installation for each, see [NVIDIA BlueField and DOCA User Types](#).

Chapter 2. Install DPU

Install the DPU into your host according to the installation instructions in the [DPU's hardware user guide](#). The steps include installing the DPU into the PCIe slot and properly securing it in the chassis. Make sure your host OS is listed under the "Supported Operating Systems" section in the [NVIDIA DOCA Installation Guide for Linux](#).

Chapter 3. Register to NVIDIA DOCA Developer Zone

As part of the installation process, you must provide your NVIDIA account information. Get your NVIDIA Developer Zone access [here](#).

Chapter 4. Install SDKM

Download [NVIDIA SDK Manager \(SDKM\)](#) and install it on the machine hosting the DPU.

- ▶ For Ubuntu/Debian host, run:

```
host# sudo apt install ./sdkmanager_[version]-[build]_amd64.deb
```

- ▶ For RedHat/CentOS host, run:

```
host# sudo yum install ./sdkmanager_[version]-[build#].x86_64.rpm
```

Chapter 5. Install DOCA Software Package

SDKM installs all required development software on both the host and DPU. The following command installs or upgrades the required software on the DPU and host, flashes the new OS image and firmware, configures a network interface between the host and the DPU (RShim), and more.

Run this command on the host as a non-root user:

- ▶ For BlueField-2:

```
host# sdkmanager --cli install --logintype devzone --product DOCA --version latest --targetos Linux --host --target BLUEFIELD2_DPU_TARGETS --flash all
```

- ▶ For BlueField-3:

```
host# sdkmanager --cli install --logintype devzone --product DOCA --version latest --targetos Linux --host --target BLUEFIELD3_DPU_BMC_100GBE --flash all
```

HOST COMPONENTS	STATUS
▶ DOCA Software Package	[██████████] Ⓞ Installing - 25%
▶ Development Container on Host	[██████████] Ⓞ Install Pending

TARGET COMPONENTS	STATUS
▶ BlueField OS	[██████████] Ⓞ Flash Pending
▶ Firmware and Flashing Tools	[██████████] Ⓞ Pending
▶ Burn Target Firmware	[██████████] Ⓞ Install Pending
▶ DOCA Software Package	[██████████] Ⓞ Install Pending
▶ Development Container on Target	[██████████] Ⓞ Install Pending

During installation, you must perform the following steps:

- ▶ Provide root password to the host machine
- ▶ Set a new password to access the BlueField DPU (default username: `ubuntu`)



Note: DOCA software can also be installed manually using `apt-get` via the standard Linux Debian Package Manager. See the [NVIDIA DOCA Installation Guide for Linux](#) for more.

Chapter 6. Access DPU

After a successful installation, you may log into the DPU's Ubuntu-based OS by running the following command from the host:

```
host# ssh ubuntu@192.168.100.2
```

Use the DPU password you defined during the installation process.

At this stage DOCA is installed on the DPU and the host server.

Chapter 7. Run Reference DOCA Application

DOCA package assets (e.g., references, tools) are located on the DPU and on the host under `/opt/mellanox/doca/`.

The DOCA package includes a set of reference applications to facilitate developer onboarding. Please refer to the [NVIDIA DOCA Applications Overview](#) and [NVIDIA DOCA Programming Guides Overview](#) for more information.

To run the [DOCA File Scan](#) reference application which performs high-speed hardware RegEx acceleration using the RegEx engine:

1. Allocate huge pages and verify that the RegEx engine is active:

```
# sudo echo 2048 > /sys/kernel/mm/hugepages/hugepages-2048kB/nr_hugepages
# systemctl start mlx-regex
```

2. Compile the example RegEx rules file:

```
# rxcpc -f /opt/mellanox/doca/applications/file_scan/bin/regex_rules.txt -p 0.01 -o /tmp/regex_rules
```

3. Run the application using the following command:

```
# /opt/mellanox/doca/applications/file_scan/bin/doca_file_scan -p 03:00.0 -r /tmp/regex_rules.rof2.binary -d /opt/mellanox/doca/applications/file_scan/bin/data_to_scan.txt -l 60
Successful result: "Job 0 complete. Detected 7 match(es)"
```



Note: All parameters are available in the [NVIDIA DOCA File Scan Application Guide](#).

Chapter 8. More Information

To learn more about NVIDIA BlueField DPUs, visit [NVIDIA BlueField DPU Documentation](#).

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