NVIDIA BLUEFIELD-2 DPU SOFTWARE QUICK START GUIDE

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The following quick start guide details the procedure for installing a brand new NVIDIA® BlueField® DPU and performing the following actions:

- Pinging from the local host to a destination host (e.g. x86 host)
- Accessing the Arm cores through the x86 host using SSH

For information on how upgrade the software on your BlueField DPU, please refer to *NVIDIA BlueField DPU OS Platform Documentation (*https://docs.mellanox.com/category/bluefieldsw*)* > BlueField Software Overview > Upgrading NVIDIA BlueField DPU Software.

Hardware Prerequisites

This quick start guide assumes that a BlueField-2 DPU has already been installed in a server according to the instructions detailed in the DPU's hardware user guide (https://docs.mellanox.com/category/bluefieldsnic).

BlueField DPU Cable Connections

1. Connect the UART cable to a USB socket, and find it in your USB devices.

```
sudo lsusb
Bus 002 Device 003: ID 0403:6001 Future Technology Devices International, Ltd FT232 Serial (UART) IC
```

> It is good practice to connect the other end of the NC-SI cable to a different host than the one on which the BlueField DPU is installed.

2. Install the minicom application.
   - For CentOS:

```
sudo yum install minicom -y
```

   - For Ubuntu/Debian:

```
sudo apt-get install minicom
```

3. Open the minicom application.

```
sudo minicom -s -c on
```

4. Go to "Serial port setup"
5. Enter "F" to change "Hardware Flow control" to NO
6. Enter "A" and change to `/dev/ttyUSB0` and press Enter
7. Press ESC.
8. Type on "Save setup as dfl"
9. Exit minicom by pressing Ctrl + a + z.

```
+-----------------------------------------------------------------------+
| A -    Serial Device      : /dev/ttyUSB0                              |
|                                                                       |
| C -   Callin Program      :                                           |
| D -  Callout Program      :                                           |
| E -    Bps/Par/Bits       : 115200 8N1                                |
| F - Hardware Flow Control : No                                        |
| G - Software Flow Control : No                                        |
|                                                                       |
|    Change which setting?                                              |
+-----------------------------------------------------------------------+
```

Software Prerequisites

Downloading DOCA Runtime Packages

The following table provides links to DOCA Runtime packages depending on the OS running on your system.

OS	Download Link
Ubuntu 20.04	https://developer.nvidia.com/networking/secure/doca-sdk/doca_1.11/doca_111_b19/ubuntu2004/doca-host-repo-ubuntu2004_1.1.1-0.0.1.1.1.024.5.4.2.4.1.3_amd64.deb
Ubuntu 18.04	https://developer.nvidia.com/networking/secure/doca-sdk/doca_1.11/doca_111_b19/ubuntu1804/doca-host-repo-ubuntu1804_1.1.1-0.0.1.1.1.024.5.4.2.4.1.3_amd64.deb
CentOS 8.2	https://developer.nvidia.com/networking/secure/doca-sdk/doca_1.11/doca_111_b19/centos8.2/doca-host-repo-rhel82-1.1.1-0.0.1.1.1.024.5.4.2.4.1.3.x86_64.rpm
CentOS 8.0	https://developer.nvidia.com/networking/secure/doca-sdk/doca_1.11/doca_111_b19/centos8.0/doca-host-repo-rhel80-1.1.1-0.0.1.1.1.024.5.4.2.4.1.3.x86_64.rpm
CentOS 7.6	https://developer.nvidia.com/networking/secure/doca-sdk/doca_1.11/doca_111_b19/centos7.6/doca-host-repo-rhel76-1.1.1-0.0.1.1.1.024.5.4.2.4.1.3.x86_64.rpm

⚠ Only the generic kernel versions are supported for DOCA metapackage installation.

Installing Metapackage Dependencies

Ubuntu	N/A

CentOS	`yum install -y epel-release`
	`yum install -y uriparser-devel`
	`yum install -y meson`
	`yum install -y https://dl.fedoraproject.org/pub/epel/epel-release-latest-7.noarch.rpm`
	`yum-config-manager --add-repo http://mirror.centos.org/centos/7/os/x86_64`
	`yum-config-manager --add-repo http://mirror.centos.org/centos/7/extras/x86_64`
	`yum-config-manager --save --setopt=mirror.centos.org_centos_7_os_x86_64.exclude='pciutils* libnl3*'`
	`rpm --import http://mirror.centos.org/centos/7/os/x86_64/RPM-GPG-KEY-CentOS-7`
	`yum makecache`
	`yum install python3`

CentOS 8.x	`yum install -y epel-release`
	`yum install -y uriparser-devel`
	`yum install -y 'dnf-command(config-manager)'`
	`dnf -y install dnf-plugins-core`
	`dnf config-manager --set-enabled PowerTools`
	`yum install -y meson`

Installation Procedure

For Ubuntu

1. Download the appropriate metapackage for your Ubuntu OS from "Downloading DOCA Runtime Packages".

   ```
   wget <doca-runtime-package-link-deb>
   ```

2. Unpack the deb repo. Run:

   ```
   dpkg -i <repo_file>
   ```

3. Perform apt update. Run:

   ```
   apt-get update
   ```

4. Run apt-install for DOCA SDK, DOCA runtime, DOCA tools:

   ```
   sudo apt install doca-runtime
   sudo apt install doca-sdk
   sudo apt install doca-tools
   ```

For CentOS

1. Download the appropriate metapackage for your OS from "Downloading DOCA Runtime Packages".

   ```
   wget <doca-runtime-package-link-rpm>
   ```

2. Run:

   ```
   yum autoremove
   yum makecache
   ```

3. Unpack the deb repo. Run:

   ```
   rpm -Uvh <repo_file>.rpm
   ```

4. Run:

   ```
   yum makecache
   ```

5. Run apt-install for DOCA SDK, DOCA runtime, DOCA tools:

   ```
   sudo yum install doca-runtime
   sudo yum install doca-sdk
   sudo yum install doca-tools
   ```

6. (Optional) If you choose not to install DOCA Runtime, you must install RShim.
   - For Ubuntu/Debian, run:

     ```
     sudo dpkg --force-all -i rshim-<version>.deb
     ```

> ⚠ Download the `.deb` RShim package from the URL provided in the BlueField Drivers for Host downloader under the "Download/Documentation" column.

- For CentOS, run:

```
sudo rpm -Uhv rshim-<version>.rpm
```

> ⚠ Download the `.rpm` RShim package from the URL provided in the BlueField Drivers for Host downloader under the "Download/Documentation" column.

7. Assign a static IP to tmfifo_net0 (RShim host interface).
   - For Ubuntu, edit the file `/etc/netplan/01-netcfg.yaml` by adding the following lines:

```
tmfifo_net0:
  addresses: [192.168.100.1/24]
  dhcp4: false
```

     Example:

```
sudo cat /etc/netplan/01-netcfg.yaml
# This file describes the network interfaces available on your system
# For more information, see netplan(5).
network:
  version: 2
  renderer: networkd
  ethernets:
    eno1:
      dhcp4: yes
    tmfifo_net0:
      addresses: [192.168.100.1/24]
      dhcp4: no
```

   - For Debian:
     i. Create the file `/etc/network/interfaces.d/tmfifo`.
     ii. Set the following lines:

```
auto tmfifo_net0
iface tmfifo_net0 inet static
address 192.168.100.1/24
```

   - For CentOS:
     i. Create the file `/etc/sysconfig/network-scripts/ifcfg-tmfifo_net0`.
     ii. Set the following lines:

```
DEVICE=tmfifo_net0
BOOTPROTO=none
ONBOOT=yes
PREFIX=24
IPADDR=192.168.100.1
NM_CONTROLLED=no
```

8. Power cycle your server.
9. Verify that RShim is active.

```
sudo systemctl status rshim
```

This command is expected to display "active (running)". If RShim service does not launch automatically, run:

```
sudo systemctl enable rshim
sudo systemctl start rshim
```

Troubleshooting

Ping Fail Between Source Uplinks and Destination

If pinging does not work between the source uplink interface and the destination:

- Verify that the links on your interfaces are UP. For example:

```
sudo ethtool <interface-name>
Link detected: yes
```

- Verify that your destination host's network is configured properly and shares the same subnet

If connectivity is still not established, please refer to the full software upgrade procedure detailed under *NVIDIA BlueField DPU OS Platform Documentation (*https://docs.mellanox.com/category/bluefieldsw*)* > BlueField Software Overview > Upgrading NVIDIA BlueField DPU Software.

Ping Fail of BlueField Arm Cores From Local Host

If pinging the BlueField Arm cores from the local host fails, verify that the tmfifo interface is configured properly to 192.168.100.1. Run:

```
sudo ifconfig tmfifo_net0 192.168.100.1 netmask 255.255.255.0
```

Try re-pinging the Arm cores.

If pinging still fails, try recycling the host. If that does not work, try reinstalling RShim:

1. Download the suitable DEB/RPM for RShim (management interface for BlueField from the host) driver.
   For Ubuntu, use this link: https://developer.nvidia.com/networking/secure/doca-sdk/doca_1.11/doca_111_b19/ubuntu1804_ubuntu2004/rshim_2.0.6-1.ga97dc5d_amd64.deb.
   For CentOS, use this link: https://developer.nvidia.com/networking/secure/doca-sdk/doca_1.11/doca_111_b19/centos7.6_centos8.0_centos8.2/rshim-2.0.6-1.ga97dc5d.el7.centos.x86_64.rpm.
2. Run:

Ubuntu/Debian	`sudo dpkg --force-all -i rshim-<version>.deb`
CentOS/RHEL	`sudo rpm -Uhv rshim-<version>.rpm`

If connectivity is still not established, please refer to the full software upgrade procedure detailed under *NVIDIA BlueField DPU OS Platform Documentation (*https://docs.mellanox.com/category/bluefieldsw*)* > BlueField Software Overview > Upgrading NVIDIA BlueField DPU Software.

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