# Windows Support

Table of contents

Network Drivers

Windows support for NVIDIA BlueField networking platform (DPU or SuperNIC) from the host-side is facilitated by the WinOF-2 driver. For more information on WinOF-2 (including installation), please refer to the WinOF-2 Documentation.

RShim Drivers

RShim drivers provide functionalities like resetting the Arm cores, pushing a bootstream image, as well as some networking and console functionalities.

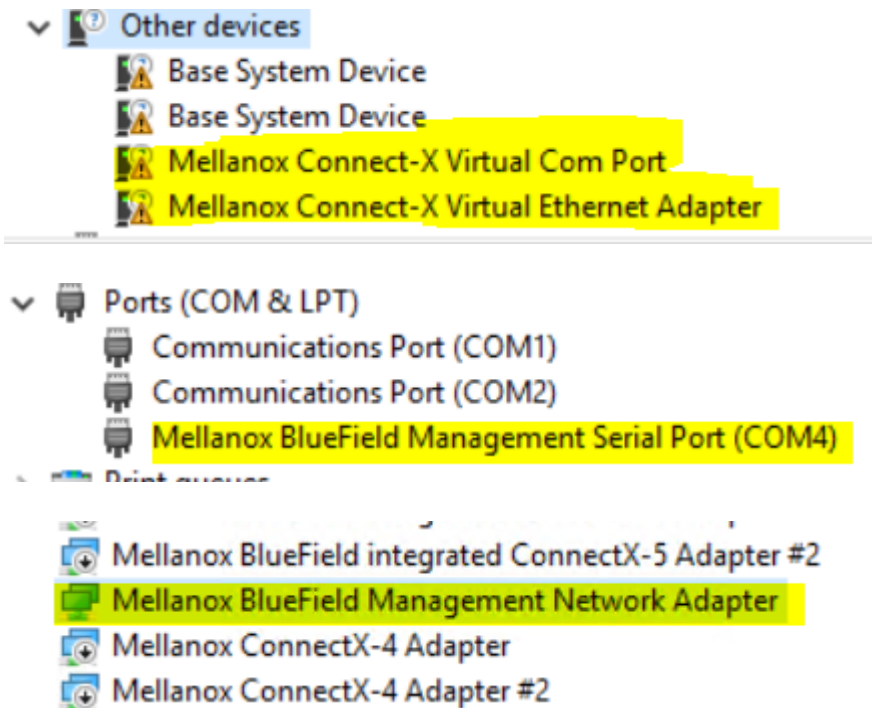# Verifying RShim Drivers Installation

1. Open the Device Manager when no drivers are installed to make sure a new PCIe device is available as below.
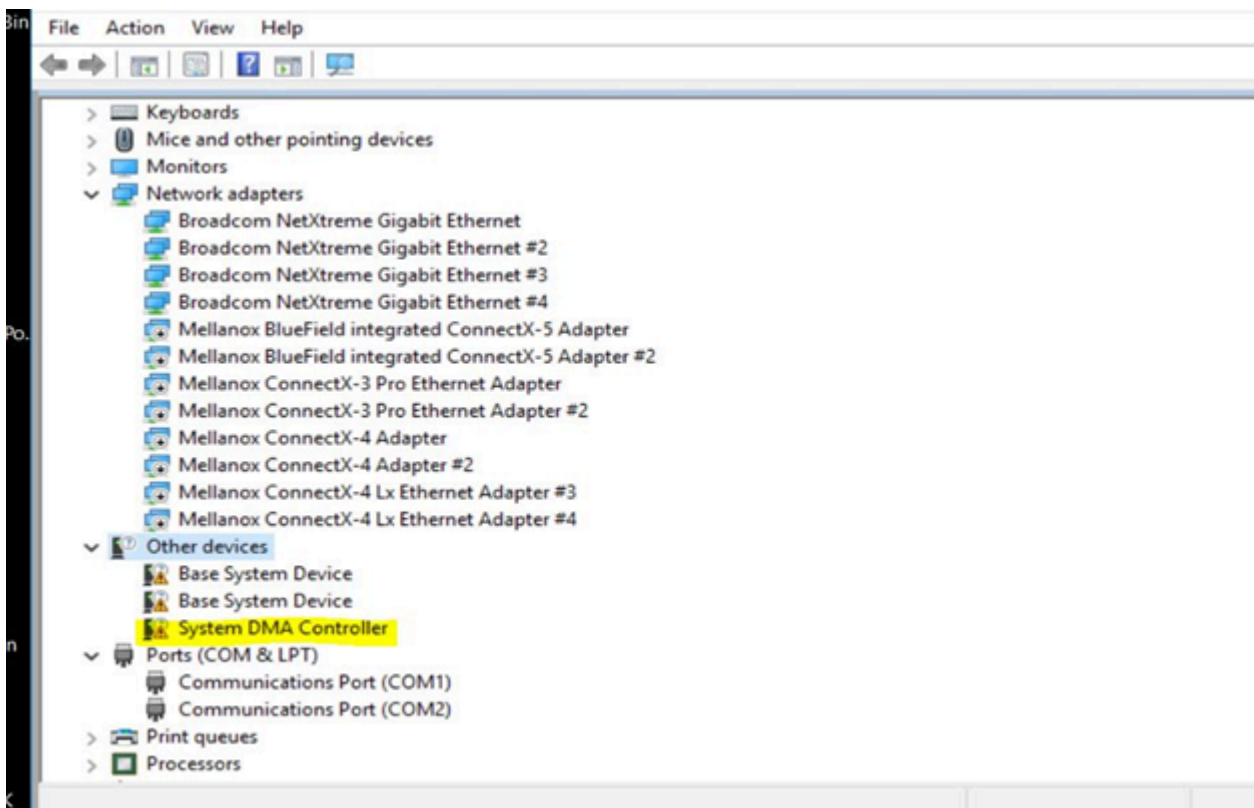
2. Run the installer to install all 3 drivers (MlxRshimBus.sys, MlxRshimCom.sys, and MlxRshimEth.sys).
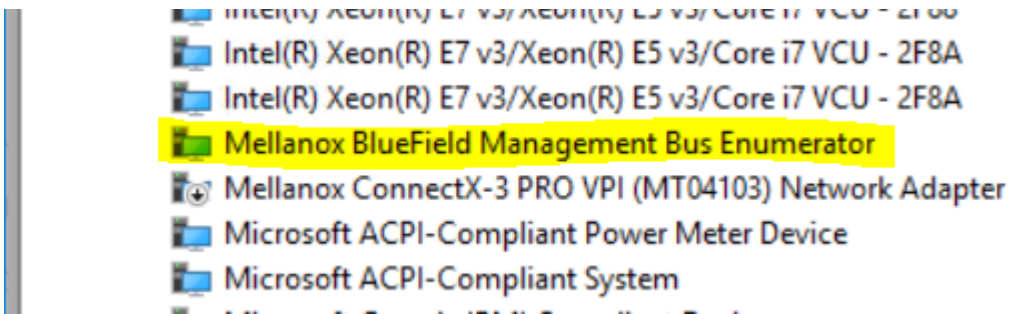
3. Make sure the Bus driver created 2 child devices after the installation (Com port and the Ethernet adapter).

At this time, PuTTY application or any other network utility can be used to communicate with BlueField via Virtual Com Port or Virtual Ethernet Adapter (ssh). The Com Port can be used using the 9600 baud-rate and default settings.

> (i) **Note**
>
> RShim drivers can be connect via PCIe (the drivers we are providing) or via USB (external connection) but not both at the same time. So when the bus driver detects that an external USB is already attached,

it will not create the child virtual devices for data access. Access via PCIe is available once the USB connection is removed.

Accessing BlueField From Host

BlueField can be accessed via PuTTY or any other network utility application to communicate via virtual COM or virtual Ethernet adapter. To use COM:

1. Open Putty.

2. Change connection type to Serial.

3. Run the following command in order to know what to set the "Serial line" field to:

```
C:\Users\username\Desktop> reg query HKLM\HARDWARE\DEVICEMAP\SERIALCOMM | findstr MlxRshim
     \MlxRshim\COM3     REG-SZ     COM3
```

In this case use COM3. This name can also be found via Device Manager under "Ports (Com & LPT)".
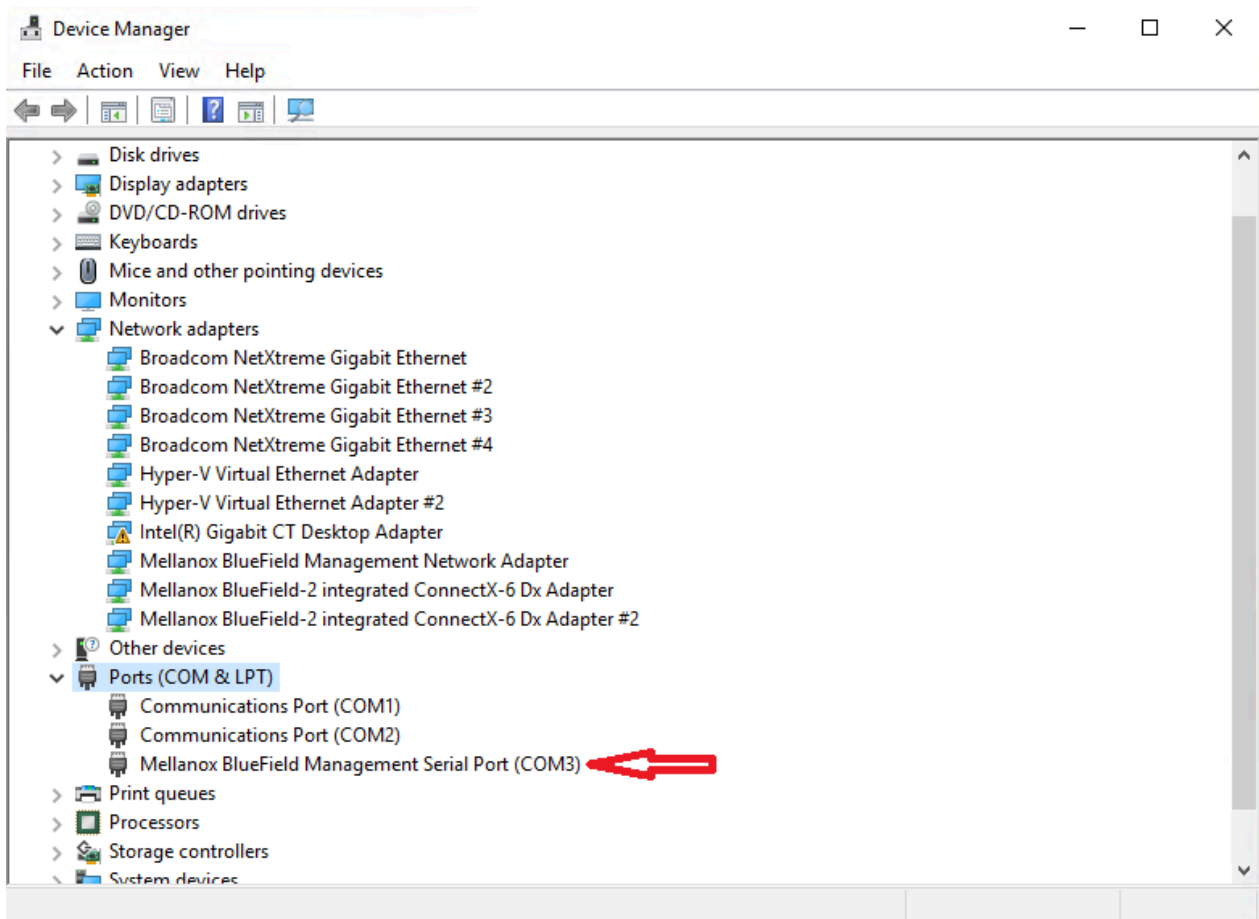
4. Press Open and hit Enter.
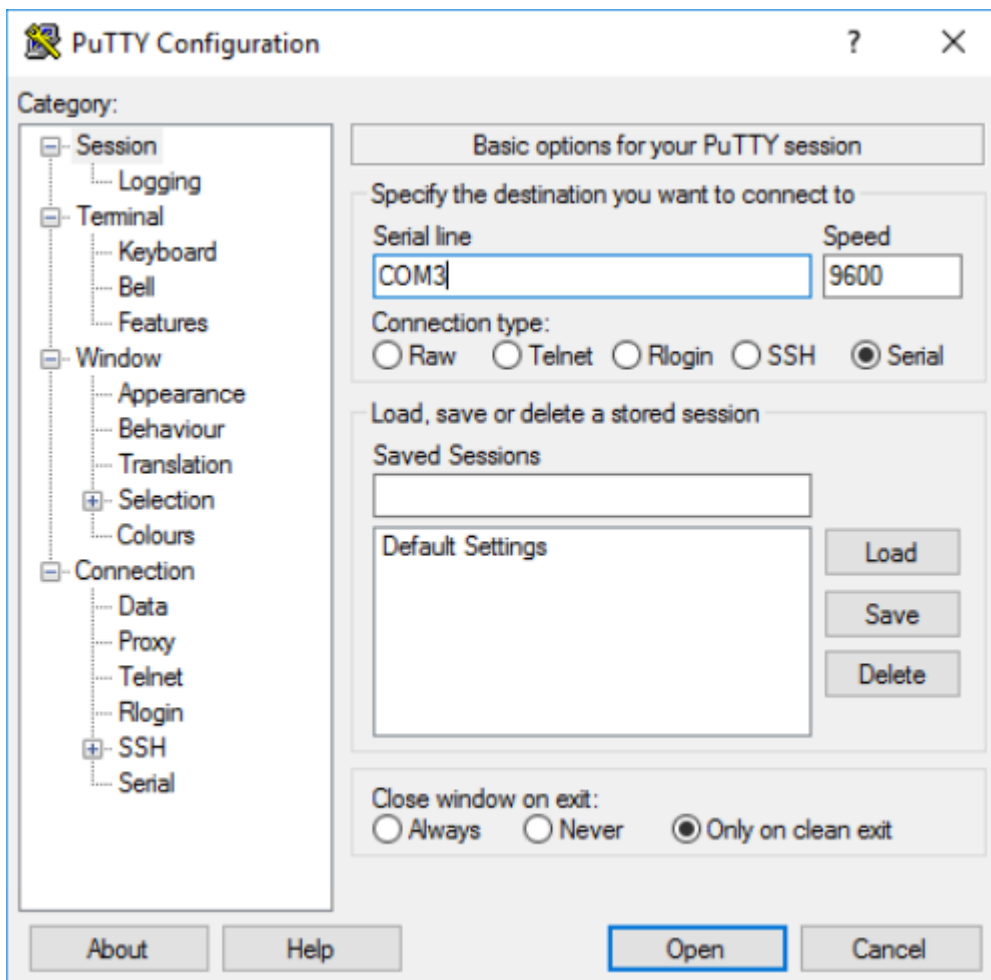
To access via BlueField management network adapter, configure an IP address as shown in the example below and run a ping test to confirm configuration.

RShim Ethernet Driver

The device does not support any type of stateful or stateless offloads. This is indicated to the Operating System accordingly when the driver l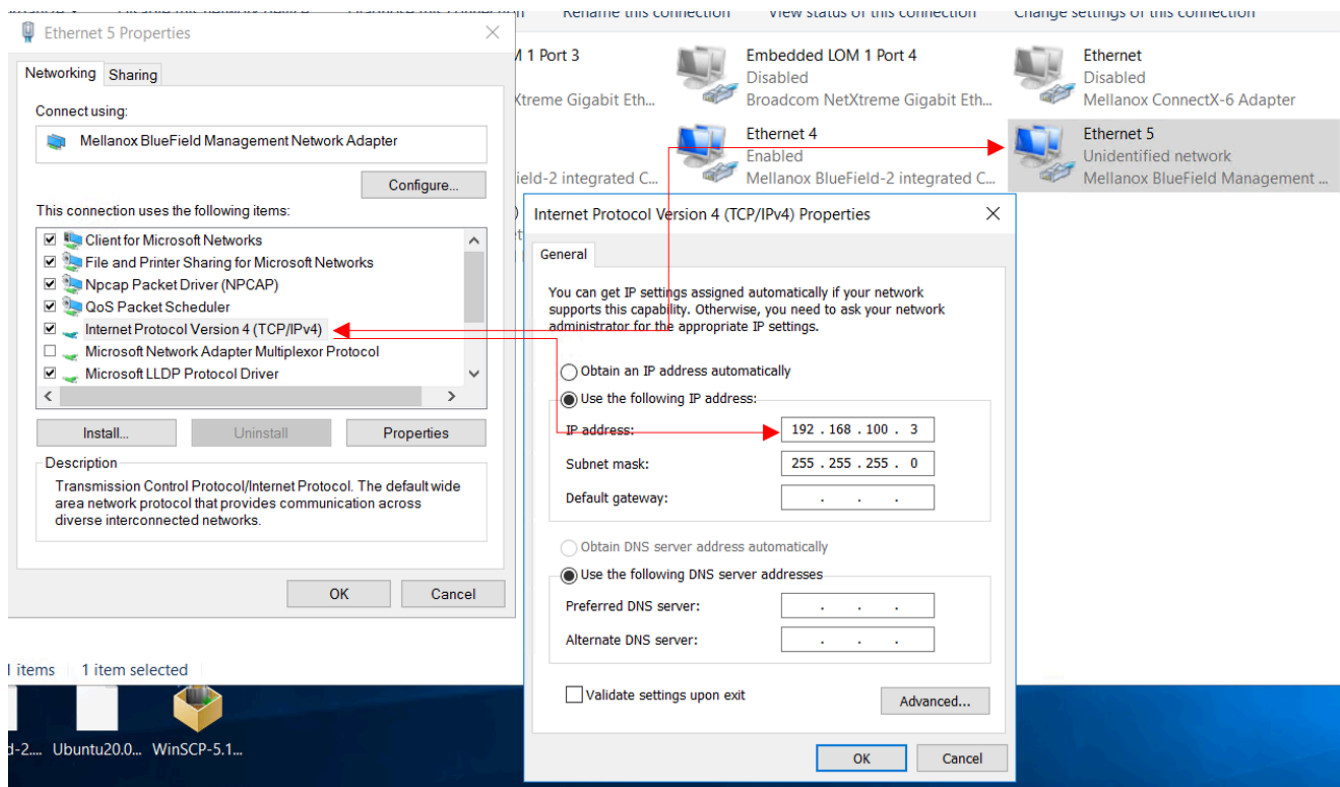oads. The MAC address is a pre-defined MAC address (CA-FE-01-CA-FE-02). The following registry keys can be used to change basic settings such as MAC address.

Registry Name	Description	Valid Values
HKLM\SYSTEM\CurrentControlSet\Control\Class\{4d36e972-e325-11ce-bfc1-08002be10318}\<nn>*JumboPacket	The size, in bytes, of the largest supported Jumbo Packet (an Ethernet frame that is greater than 1514 bytes) that the hardware can support.	1514 (default) - 2048
HKLM\SYSTEM\CurrentControlSet\Control\Class\{4d36e972-e325-11ce-bfc1-08002be10318}\<nn>*NetworkAddress	The network address of the device. The format for a MAC address is: XX-XX-XX-XX-XX-XX.	CA-FE-01-CA-FE-02 (default)
HKLM\SYSTEM\CurrentControlSet\Control\Class\{4d36e972-e325-	The number of receive descriptors used by the miniport adapter.	16 – 64 (Default)

Registry Name	Description	Valid Values
11ce-bfc1-08002be10318}\ <nn>\ReceiveBuffers		

> ### (i) Note
>
> Update the MAC address manually using registry key if there are more than one BlueField in the system.

For instructions on how to find interface index in the registry (nn), please refer to section "Finding the Index Value of the Network Interface" in the WinOF-2 User Manual under Features Overview and Configuration > Configuring the Driver Registry Keys.

MlxRshimBus Driver

This driver does all the read/write work to the hardware registers. User space application can send down IOCTL's to restart the system on chip or to push a new BlueField boot stream image.

RshimCmd Tool

RshimCmd is a command line tool that enables the user to:

- Restart BlueField.

- Push a boot stream file (.bfb). A BFB file is a generated BlueField boot stream file that contains Linux operating system image that runs on BlueField. BFB files can be downloaded from the NVIDIA DOCA SDK webpage.

Usage	RshimCmd -RestartSmartNic <Option> -BusNum <BusNum>
Example	RshimCmd -EnumDevices RshimCmd -PushImage c:\bin\MlnxBootImage.bfb -BusNum 11

	RshimCmd -RestartSmartNic 1 -BusNum 11
Detailed Usage	RshimCmd -h

> ⓘ **Note**
>
> The BFB image can be either CentOS or Ubuntu. Ubuntu credentials
> are: ubuntu/ubuntu and for Centos credentials are: root/centos, IP
> address of RShim Ethernet component (called tmfifo_net0) on the
> BlueField side is 192.168.100.2/30 by default. Please set IP address on
> the Windows side accordingly to be able to communicate via SSH.

BlueField UEFI System Boot Customizations during Installation

Bluefield's UEFI system boot options and more can be customized during the BFB
Installation through the use of configuration parameters in the bf.cfg file. For further
information on the bf.cfg file, refer to the [BlueField Documentation](#).

To include the bf.cfg file into the BFB installation, append the file to BFB file as described
below:

1. Copy the BFB file to a local folder. For example:

   ```
   Copy <path>\DOCA_1.4.0_BSP_3.9.2_Ubuntu_20.04-5.20220707.bfb c:\bf\MlnxBootImage.bfb
   ```

2. Append the bf.cfg file into the BFB file.

   ```
   Cd c:\bf
   ```

```
Copy /b MlnxBootImage.bfb + bf.cfg MlnxBootImage_with_bf_cfg.bfb
```

3. Download the BFB image.

```
RshimCmd -PushImage c:\bf\MlnxBootImage_with_bf_cfg.bfb -BusNum 11
```

As the bf.cfg is intended for Linux OSes, it should be created according to Linux rules. For example, the lines of this text file should end in LF and not in CR/LF as accepted in Windows.

All the syntax should be as the accepted by the OS expects. For example, there should be no spaces in the middle of "set" statements: NET_RSHIM_MAC=00:1a:ca:ff:ff:05.

EventLogs and Driver Logging

All driver logging is part of the Mellanox-WinOF2-Kernel trace session that comes with the network drivers installation. The default location to the trace is at %SystemRoot%\system32\LogFiles\Mlnx\Mellanox-WinOF2-System.etl.

The following are the Event logs RShim drivers generate:

MlxRShimBus Driver

Event ID	Severity	Message
2	Informational	RShim Bus driver loaded successfully
3	Informational	Device successfully stopped
4	Error	The SmartNIC seems to be stuck as the boot FIFO data is not being drained.
5	Error	Driver startup failed due to failure in creation of the child device.
6	Error	SmartNIC is in a bad state. Please restart SmartNIC and reload bus drivers. Please refer to user manual on how to restart SmartNIC.

Even t ID	Severit y	Message
7	Warnin g	SmartNIC is in LiveFish mode
8	Warnin g	Failed creating child virtual devices as a backend USB device is attached and accessing RShim FIFO. Please refer to user manual for more details.

MlxRShim Serial Driver

Event ID	Severity	Message
2	Informational	RShim serial driver loaded successfully
3	Informational	device successfully stopped

MlxRShim Ethernet Driver

Event ID	Severity	Message
2	Error	MAC address read from registry is not supported. Please set valid unicast address.
3	Informatio nal	Device is successfully stopped
4	Warning	Value read from registry is invalid. Therefore use the default value.
5	Error	SmartNIC seems stuck as transmit packets are not being drained.
6	Informatio nal	RShim Ethernet driver loaded successfully