

# How-to: Firmware update for NVIDIA ConnectX-5/6 adapter on VMware ESXi 6.5 and above.

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## Introduction

This post describes the procedure of how to Update Firmware for ConnectX®-5 VPI PCI Express Adapter Cards (InfiniBand, Ethernet, VPI) on VMware ESXi 6.5/6.7 versions.

## References

- [NVIDIA Firmware Tools \(MFT\) Product Page](#)
- [Firmware Downloads](#)
- [Ethernet Cards - Overview](#)
- [InfiniBand Cards - Overview](#)
- [How-to: Install NVIDIA Firmware Tools \(MFT\) on VMware ESXi 6.7/7.0](#)
- [Using ESXi Shell in ESXi 5.x, 6.x and 7.x \(2004746\)](#)

## Hardware and Software Requirements

1. A server platform with an adapter card based on one of the following NVIDIA Technologies' **HCA devices**:

- [ConnectX®-5](#)
- [ConnectX®-6 Dx](#)

2. **Installer Privileges**: The installation requires **administrator privileges** on the target machine.

## NVIDIA Firmware Tools (MFT)

The NVIDIA Firmware Tools (MFT) package is a set of firmware management tools used to:

- Generate a standard or customized NVIDIA firmware image
- Querying for firmware information
- Burn a firmware image

## Updating Firmware for a Single NVIDIA Network Interface Card (NIC)

This part describes the procedure for burning firmware using the NVIDIA Firmware Tools (MFT).



As a sample, we are going to update FW for vmnic0.

1. **Download and Install** the NVIDIA Firmware Tools (**MFT**) by [How-to: Install NVIDIA Firmware Tools \(MFT\) on VMware ESXi 6.7/7.0](#) document.
2. **Log into ESXi vSphere Command-Line Interface** with root permissions.
3. **Get the device location** on the PCI bus.

### ESXi Console

```
# lspci | grep nox | grep vmnic0
0000:39:00.0 Ethernet controller: Mellanox Technologies ConnectX-6 Dx EN
NIC; 100GbE; dual-port QSFP56; PCIe4.0 x16; (MCX623106AC-CDA) [vmnic0]
```

## Related Documents

- [How-to: Install NVIDIA Firmware Tools \(MFT\) on VMware ESXi 6.7 /7.0.](#)
- [RDG: RoCE accelerated Apache Spark 2.2 cluster deployment.](#)
- [RDG: RoCE accelerated vSphere 6.7 cluster deployment for ML and HPC workloads.](#)
- [RDG: VMware NSX-V hardware VTEPs in High-Availability mode on Spectrum switches running Cumulus Linux.](#)
- [How-to: Firmware update for NVIDIA ConnectX-5/6 adapter on VMware ESXi 6.5 and above.](#)
- [How-to: Change port type of NVIDIA ConnectX VPI adapter on VMware ESXi 6.x and above.](#)
- [How-to: NVIDIA ConnectX driver upgrade on VMware ESXi 6.7/7.0 and above.](#)
- [How-to: Configure NVIDIA network device in VMDirectPath I/O passthrough mode on VMware ESXi 6.x.](#)
- [How-to: Configure NVIDIA ConnectX-5/6 adapter in SR-IOV mode on VMware ESXi 6.7/7.0 and above.](#)
- [How-to: Configure RoCEv2 lossless fabric for VMware ESXi 6.5 and above.](#)
- [How-to: Configure NVIDIA GPU device in VMDirectPath I/O passthrough mode on VMware ESXi 6.x server.](#)
- [QSG: TRex in a few steps using Nvidia ConnectX adapters.](#)
- [QSG: Building Docker image with compiled Nvidia Network DPDK PMD.](#)
- [How-to: Configure PVRDMA in VMware vSphere 6.5/6.7.](#)
- [RDG: Kubernetes Cluster Deployment for ML and HPC Workloads with NVIDIA GPU Virtualization and VMware PVRDMA Technologies.](#)

4. Get the **Card type, Part Number, PSID** (firmware identification) and **FW version** using the command.

```

ESXi Console


# /opt/mellanox/bin/mlxfwmanager -d 0000:39:00.0 --query

QQuerying Mellanox devices firmware ...

Device #1:
-----

Device Type:      ConnectX6DX
Part Number:      MCX623106AC-CDA_Ax
Description:      ConnectX-6 Dx EN adapter card; 100GbE; Dual-port
QSFP56; PCIe 4.0 x16; Crypto and Secure Boot
PSID:             MT_0000000436
PCI Device Name:  mt4125_pciconf6
Base GUID:        0c42a103002404ea
Base MAC:         0c42a12404ea
Versions:         Current      Available
FW                22.28.4000     N/A
PXE               3.6.0301      N/A
UEFI              14.23.0017     N/A

Status:          No matching image found
  
```

 Please save the PCI Device Name: mt4125\_pciconf6 for using in step 12. **Burning the firmware image** to the Adapter Card

5. **Download** the correct **firmware image** zip file using the [Firmware Download Table](#) on the firmware Web page of your product's family -- save with a .zip extension.

[Click Here](#) for help in **identifying your Adapter Card**.

**Adapter Cards**

Note 1: For using mlxup to automatically update the firmware, [click here](#).  
 Note 2: For help in identifying your adapter card, [click here](#).

Product Line	Network Protocol
ConnectX®-6 Lx	Ethernet
<b>ConnectX®-6 Dx</b>	<b>Ethernet</b>
ConnectX®-6	Ethernet
	InfiniBand / VPI
ConnectX®-5	Ethernet
	InfiniBand / VPI

**ConnectX-6 Dx Ethernet Firmware Download Center**

Current Versions | **Archive Versions** | [START OVER](#)

Version (Archive)	OPN	PSID	Download / Documentation
22.30.1004	CDAT	MT_0000000436	<a href="#">ConnectX6Dx-ConnectX6Dx-22_29_2002-MCX623106AC-CDA_Ax-UEFI-14.23.10-Firmware-3.7_234.zip</a>
22.29.2002	CDAT		<b>MD5 SUM:</b> 2d70239062274ee34bc4ee3428ed94
22.29.1016	MCX623106AS-CDAT		<b>SHA512:</b> 85b1440916575eed79efbab67bb0d29c3041d26a1708c9ab029a64530f8
22.28.4000	CDAT		<b>Release Date:</b> 4-Feb-21
22.28.2006	MCX623106AH-CDAT		<b>Documentation:</b> <a href="#">Release Notes</a>
22.28.1002	MCX623106AE-CDAT		
22.27.6008	MCX623106AC-CDAT		
22.27.2008	MCX623105AS-VDAT		
22.27.1016	MCX623105AH-VDAT		

**Note:** PSID (Parameter-Set Identification) is a 16-ascii character string embedded in the firmware image which provides a unique identification for the configuration of the firmware.

6. **Unzip** the binary image (.zip file).

7. Use **SCP** or any other file transfer method to copy to */tmp* the bin file to the required ESXi host.
8. **Log into a ESXi vSphere Command-Line Interface** with root permissions.
9. **Enter Maintenance Mode** the ESXi host.
10. **Verify** that the file are placed in the */tmp* directory.

#### ESXi Console

```
# cd /tmp
# ls
fw-ConnectX6Dx-rel-22_29_2002-MCX623106AC-CDA_Ax-UEFI-14.22.16-FlexBoot-3.6.204.signed.bin
```

11. To **print** the current **status of NVIDIA devices**.

#### ESXi Console

```
/opt/mellanox/bin/mst status
MST devices:
-----
mt4125_pciconf6
mt4123_pciconf1
mt4127_pciconf2
mt4123_pciconf3
mt4125_pciconf4
mt4121_pciconf5
```

12. **Burn the firmware image** to the Adapter Card.

**Enter:**

```
flint -d <device_name> -i <binary image> b
```

**Example:**

To burn the 22.29.2002 version firmware image to an **ConnectX-6DX ( Device Name: mt4125\_pciconf6, Part Number: MCX623106AC-CDA\_Ax, PSID: MT\_0000000436)** enter:

#### ESXi Console

```
# /opt/mellanox/bin/flint -d mt4125_pciconf6 -i /tmp/fw-ConnectX6Dx-rel-22_29_2002-MCX623106AC-CDA_Ax-UEFI-14.22.16-FlexBoot-3.6.204.signed.bin b

Current FW version on flash: 22.28.4000

New FW version: 22.29.2002

Burning FW image without signatures - OK

Restoring signature - OK

-I- To load new FW run mlxfwreset or reboot machine.
```

13. **Reboot** the server.
14. **Log into a ESXi vSphere Command-Line Interface** with root permissions.
15. Query the device. And **verify FW version**.

## ESXi Console

```
./flint -d mt4121_pciconf0 query
Image type:          FS4
FW Version:          22.29.2002
FW Release Date:     27.1.2021
Product Version:     22.29.2002
Rom Info:            type=UEFI version=14.22.16 cpu=AMD64,AARCH64
                    type=PXE version=3.6.204 cpu=AMD64
Description:        UID                GuidNumber
Base GUID:          0c42a103002404ea          4
Base MAC:           0c42a12404ea          4
Image VSD:          N/A
Device VSD:         N/A
PSID:               MT_0000000436
Security Attributes: secure-fw
```

16. [Exit Maintenance Mode](#) the ESXi host.

**Done!**