



# Mellanox ConnectX-4/ConnectX-5 NATIVE ESXi Driver for VMware vSphere 6.5 Release Notes

---

Rev 4.16.12.12

## NOTE:

THIS HARDWARE, SOFTWARE OR TEST SUITE PRODUCT ("PRODUCT(S)") AND ITS RELATED DOCUMENTATION ARE PROVIDED BY MELLANOX TECHNOLOGIES "ASIS" WITH ALL FAULTS OF ANY KIND AND SOLELY FOR THE PURPOSE OF AIDING THE CUSTOMER IN TESTING APPLICATIONS THAT USE THE PRODUCTS IN DESIGNATED SOLUTIONS. THE CUSTOMER'S MANUFACTURING TEST ENVIRONMENT HAS NOT MET THE STANDARDS SET BY MELLANOX TECHNOLOGIES TO FULLY QUALIFY THE PRODUCT(S) AND/OR THE SYSTEM USING IT. THEREFORE, MELLANOX TECHNOLOGIES CANNOT AND DOES NOT GUARANTEE OR WARRANT THAT THE PRODUCTS WILL OPERATE WITH THE HIGHEST QUALITY. ANY EXPRESS OR IMPLIED WARRANTIES, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE AND NONINFRINGEMENT ARE DISCLAIMED. IN NO EVENT SHALL MELLANOX BE LIABLE TO CUSTOMER OR ANY THIRD PARTIES FOR ANY DIRECT, INDIRECT, SPECIAL, EXEMPLARY, OR CONSEQUENTIAL DAMAGES OF ANY KIND (INCLUDING, BUT NOT LIMITED TO, PAYMENT FOR PROCUREMENT OF SUBSTITUTE GOODS OR SERVICES; LOSS OF USE, DATA, OR PROFITS; OR BUSINESS INTERRUPTION) HOWEVER CAUSED AND ON ANY THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT (INCLUDING NEGLIGENCE OR OTHERWISE) ARISING IN ANY WAY FROM THE USE OF THE PRODUCT(S) AND RELATED DOCUMENTATION EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGE.



Mellanox Technologies  
350 Oakmead Parkway Suite 100  
Sunnyvale, CA 94085  
U.S.A.  
[www.mellanox.com](http://www.mellanox.com)  
Tel: (408) 970-3400  
Fax: (408) 970-3403

© Copyright 2017. Mellanox Technologies Ltd. All Rights Reserved.

Mellanox®, Mellanox logo, Accelio®, BridgeX®, CloudX logo, CompustorX®, Connect-IB®, ConnectX®, CoolBox®, CORE-Direct®, EZchip®, EZchip logo, EZappliance®, EZdesign®, EZdriver®, EZsystem®, GPUDirect®, InfiniHost®, InfiniBridge®, InfiniScale®, Kotura®, Kotura logo, Mellanox CloudRack®, Mellanox CloudXMellanox®, Mellanox Federal Systems®, Mellanox HostDirect®, Mellanox Multi-Host®, Mellanox Open Ethernet®, Mellanox OpenCloud®, Mellanox OpenCloud Logo®, Mellanox PeerDirect®, Mellanox ScalableHPC®, Mellanox StorageX®, Mellanox TuneX®, Mellanox Connect Accelerate Outperform logo, Mellanox Virtual Modular Switch®, MetroDX®, MetroX®, MLNX-OS®, NP-1c®, NP-2®, NP-3®, NPS®, Open Ethernet logo, PhyX®, PlatformX®, PSIPHY®, SiPhy®, StoreX®, SwitchX®, Tiler®, Tiler logo, TestX®, TuneX®, The Generation of Open Ethernet logo, UFM®, Unbreakable Link®, Virtual Protocol Interconnect®, Voltaire® and Voltaire logo are registered trademarks of Mellanox Technologies, Ltd.

All other trademarks are property of their respective owners.

For the most updated list of Mellanox trademarks, visit <http://www.mellanox.com/page/trademarks>

## Table of Contents

<b>Table of Contents</b> .....	<b>3</b>
<b>List Of Tables</b> .....	<b>4</b>
<b>Release Update History</b> .....	<b>5</b>
<b>Chapter 1 Overview</b> .....	<b>6</b>
1.1 Content of MLNX-NATIVE-ESX Driver Package.....	6
1.2 Supported HCAs Firmware Versions.....	6
1.3 Tested Hypervisors in Paravirtualized and SR-IOV Environments .....	7
<b>Chapter 2 Changes and New Features in Rev 4.16.12.12</b> .....	<b>8</b>
<b>Chapter 3 Known Issues</b> .....	<b>9</b>
<b>Chapter 4 Bug Fixes History</b> .....	<b>13</b>
<b>Chapter 5 Change Log History</b> .....	<b>14</b>

## List Of Tables

Table 1:	Release Update History	5
Table 2:	Supported Uplinks to Servers	6
Table 3:	Supported HCAs Firmware Versions	6
Table 4:	Tested Hypervisors in Paravirtualized and SR-IOV Environments	7
Table 5:	Changes and New Features	8
Table 6:	Known Issues	9
Table 7:	Fixed Bugs List	13
Table 8:	Change Log History	14

## Release Update History

*Table 1 - Release Update History*

Release	Date	Description
Rev 4.16.12.12	December 11, 2017	Initial release of this MLNX-NATIVE-ESXi-ConnectX-4/ConnectX-4 Lx/ConnectX-5 driver version

# 1 Overview

These are the release notes of Mellanox ConnectX-4/ConnectX-5 NATIVE ESXi Driver for VMware vSphere 6.5. Mellanox ConnectX-4/ConnectX-5 NATIVE ESXi Driver for VMware vSphere 6.5 supports the following uplinks to servers

**Table 2 - Supported Uplinks to Servers**

Version	OS	Uplink Speed
4.16.12.2	ESXi 6.5	10/25/40/50/100GbE

## 1.1 Content of MLNX-NATIVE-ESX Driver Package

The MLNX-NATIVE-ESX driver package is distributed as an offline bundle (.zip file) and contains:

- **ESXi 6.5:**  
MLNX-NATIVE-ESX-ConnectX-4-5\_4.16.12.2-10EM-650.0.0.4598673.zip - Hypervisor bundle for ESXi 6.5 contains the following kernel modules:
  - nmlx5\_core
  - nmlx5\_rdma

## 1.2 Supported HCAs Firmware Versions

MLNX-NATIVE-ESX Rev 4.16.12.12 supports the following Mellanox Ethernet HCA:

**Table 3 - Supported HCAs Firmware Versions**

HCAs	Recommended Firmware Rev.
ConnectX-4	12.21.1000
ConnectX-4 Lx	14.21.1000
ConnectX-5	16.21.1000
ConnectX-5 Ex	16.21.1000

Please note that older firmware versions were not tested with this release.

For the latest firmware versions, visit:

- [http://www.mellanox.com/page/vmware\\_matrix](http://www.mellanox.com/page/vmware_matrix)
- or
- <http://www.mellanox.com/supportdownloader/>

## 1.3 Tested Hypervisors in Paravirtualized and SR-IOV Environments

*Table 4 - Tested Hypervisors in Paravirtualized and SR-IOV Environments*

Tested Hypervisors	HCAs	Operating System
SR-IOV	ConnectX-4/ConnectX-4 Lx ConnectX-5/ConnectX-5 Ex	Windows Server 2012 R2
		RedHat 6.5
		RedHat 6.6
		RedHat 7.0
		RedHat 7.1
		RedHat 7.2
		SLES 11.3
Paravirtualized	ConnectX-4/ConnectX-4 Lx ConnectX-5/ConnectX-5 Ex	Windows Server 2012 R2
		RedHat 6.5
		RedHat 6.6
		RedHat 7.0
		RedHat 7.1
		RedHat 7.2
		SLES 11.3

## 2 Changes and New Features in Rev 4.16.12.12

**Table 5 - Changes and New Features**

Feature/Change	Description
<b>Packet Capture Utility</b>	<p>Packet Capture utility duplicates all traffic, including RDMA, in its raw Ethernet form (before stripping) to a dedicated "sniffing" QP, and then passes it to an ESX drop capture point. It allows gathering of Ethernet and RoCE bidirectional traffic via pktcap-uw and viewing it using regular Ethernet tools, e.g. Wireshark. To enable/disable packet capture, download the nmlxcli tool from the Mellanox site.</p> <p>For further information, refer to the User Manual section Packet Capture Utility.</p>
<b>SR-IOV max_vfs module parameter Type Modification</b>	<p>Changed the type of the SR-IOV max_vfs module parameter from a single integer value to an array of unsigned integers. For further information, refer to the User Manual.</p>
<b>Bug Fixes</b>	<p>See <a href="#">Section 4, "Bug Fixes History"</a>, on page 13</p>

### 3 Known Issues

The following is a list of general limitations and known issues of the various components of this MLNX-NATIVE-ESX release.

**Table 6 - Known Issues (Sheet 1 of 4)**

Internal Ref.	Description
1191657	<b>Description:</b> The maximum value of RSS must be lower than the number of CPU cores.
	<b>Workaround:</b> N/A
	<b>Keywords:</b> RSS
	<b>Discovered in Version:</b> 4.16.12.12
-	<b>Description:</b> The hardware can offload only up to 256B of headers.
	<b>Workaround:</b> N/A
	<b>Keywords:</b> Hardware offload
	<b>Discovered in Version:</b> 4.16.10.3
781277	<b>Description:</b> The "esxcli network sriovnic vf stats" command is not supported. When running this command on a vmknics, a failure message is displayed.
	<b>Workaround:</b> N/A
	<b>Keywords:</b> esxcli SR-IOV
	<b>Discovered in Version:</b> 4.6.10.3
685558	<b>Description:</b> There is no traffic between PV and SR-IOV VF connected to different ports on the same HCA.
	<b>Workaround:</b> N/A
	<b>Keywords:</b> PV, SR-IOV VF, HCA
858972	<b>Description:</b> Setting the "Allow Guest MTU Change" option in vSphere Client is currently not functional. Although guest MTU changes in SR-IOV are allowed, they do not affect the port's MTU and the guest's MTU remains the same as the PF MTU.
	<b>Workaround:</b> N/A
	<b>Keywords:</b> MTU, SR-IOV
939198	<b>Description:</b> VST mode in SR-IOV in ConnectX-5 is currently not functional.
	<b>Workaround:</b> N/A
	<b>Keywords:</b> VSNetQ RSS, encapsulated trafficT Mode, SR-IOV
-	<b>Description:</b> Geneve options length support is limited to 56B. Received packets with options length bigger than 56B are dropped.
	<b>WA:</b> N/A
	<b>Keywords:</b> Geneve

**Table 6 - Known Issues (Sheet 2 of 4)**

Internal Ref.	Description
910292	<b>Description:</b> Running with ConnectX-4/ConnectX-4 Lx older firmware versions, might result in the following internal firmware errors: <ul style="list-style-type: none"> <li>• Device health compromised</li> <li>• synd 0x1: firmware internal error</li> <li>• extSync 0x94ee</li> </ul>
	<b>Workaround:</b> Upgrade your firmware to the latest version 12.17.2020/14.17.2020
	<b>Keywords:</b> Firmware
1031520	<b>Description:</b> When a guest is assigned an IB PCI passthru device or an IB VF, VMware Tools networking information for the guest may be incorrect. This affects how the guest networking information, such as interfaces and their IPs, is displayed in vCenter.
	<b>Workaround:</b> N/A
	<b>Keywords:</b> VMware Tools networking information
1064844	<b>Description:</b> nmlxcli tool is not supported on ESXi 5.5.
	<b>Workaround:</b> N/A
	<b>Keywords:</b> nmlxcli, ESXi 5.5
1064883	<b>Description:</b> Operations on vmnics which are in passthru mode are not supported.
	<b>Workaround:</b> N/A
	<b>Keywords:</b> vmnics, passthru mode
746100	<b>Description:</b> The 'esxcli mellanox uplink link info -u <vmnic_name>' command reports the 'Auto negotiation' capability always as 'true'.
	<b>Workaround:</b> N/A
	<b>Keywords:</b> 'Auto negotiation' capability
1072640	<b>Description:</b> ESXi v4.16.10.3 cannot updated from v4.16.8.8 (GA) or from the Inbox driver using the "esxcli software vib update" command.
	<b>Workaround:</b> To update it, run the "esxcli software vib install" command.
	<b>Keywords:</b> Driver update
1068621	<b>Description:</b> SMP MADs (ibnetdiscover, sminfo, iblinkinfo, smpdump, ibqueryerr, ibdiagnet and smpquery) are not supported on the VFs.
	<b>Workaround:</b> N/A
	<b>Keywords:</b> SMP MADs
-	<b>Description:</b> Multicast and IPv6 traffic might be unstable over SR-IOV.
	<b>Workaround:</b> N/A
	<b>Keywords:</b> SR-IOV, IPv6, Multicast
656416	<b>Description:</b> Reboot is required after any SR-IOV configuration change.
	<b>Workaround:</b> N/A
	<b>Keywords:</b> SR-IOV

**Table 6 - Known Issues (Sheet 3 of 4)**

Internal Ref.	Description
653679	<b>Description:</b> Firmware VF configuration must be N+1 (while N is the required VF number). For example: If your configuration requires 10 VFs, the firmware must be set to support 16 VFs (ESXi Limitation).
	<b>Workaround:</b> N/A
	<b>Keywords:</b> VFs
778371	<b>Description:</b> Wake-on-LAN does not notify when invalid parameters are provided.
	<b>Workaround:</b> N/A
	<b>Keywords:</b> WoL
778572	<b>Description:</b> Nested ESXi might not function properly.
	<b>Workaround:</b> N/A
	<b>Keywords:</b> Nested ESXi
765008	<b>Description:</b> Device RSS fails to hash traffic to sufficient RX rings with Broadcast traffic.
	<b>Workaround:</b> N/A
	<b>Keywords:</b> RSS, RX rings
852883	<b>Description:</b> In stress condition ‘Watchdog’ may appear, leading to uplink going up and down.
	<b>Workaround:</b> N/A
	<b>Keywords:</b> uplink, watchdog
775668	<b>Description:</b> VMs can get Call Trace upon MTU change during heavy traffic.
	<b>Workaround:</b> N/A
	<b>Keywords:</b> VM, MTU, heavy traffic
776274	<b>Description:</b> Reloading the driver when the SR-IOV VFs are ON, will result in Purple Screen of Death (PSOD).
	<b>Workaround:</b> N/A
	<b>Keywords:</b> Driver reload
784293	<b>Description:</b> VGT traffic over VXLAN interfaces is currently not supported.
	<b>Workaround:</b> N/A
	<b>Keywords:</b> VGT traffic, VXLAN
862168	<b>Description:</b> VMs with SR-IOV cannot be powered on when running low on available vectors.
	<b>Workaround:</b> N/A
	<b>Keywords:</b> VM, SR-IOV

**Table 6 - Known Issues (Sheet 4 of 4)**

Internal Ref.	Description
777205	<p><b>Description:</b> Occasionally, untagged traffic can pass between VMs with SR-IOV enabled when portgroup is configured for VLAN trunk range.</p> <p><b>Workaround:</b> N/A</p> <p><b>Keywords:</b> VM, SR-IOV, VLAN trunk</p>

## 4 Bug Fixes History

Table 7 lists the bugs fixed in this release.

**Table 7 - Fixed Bugs List**

Internal Ref.	Description
958154	<b>Description:</b> NetQ RSS for encapsulated traffic is currently not supported. Encapsulated traffic (VXLAN/Geneve) directed to NetQ RSS queue will not be distributed through all queues' channels, thus will not utilize the RSS feature.
	<b>Note:</b> It is highly recommended to avoid requesting RSS for encapsulated interfaces, i.e. refrain from defining the following in the VM configuration file: <code>&lt;iface_name&gt;.pnicFeatures=4</code>
	<b>Keywords:</b> NetQ RSS, encapsulated traffic
	<b>Discovered in Release:</b> 4.16.8.8
	<b>Fixed in Release:</b> 4.16.12.12
698142/637104	<b>Description:</b> Traffic loss of large packets might occur after MTU change.
	<b>Keywords:</b> MTU, Traffic loss
	<b>Discovered in Release:</b> 4.16.7.8
	<b>Fixed in Release:</b> 4.16.10.3
846359	<b>Description:</b> Fixed an issue which caused the adapter card to get stuck in Down state after setting the ring size to 8192.
	<b>Keywords:</b> Ring size
	<b>Discovered in Release:</b> 4.16.7.8
	<b>Fixed in Release:</b> 4.16.8.8

## 5 Change Log History

Table 8 - Change Log History (Sheet 1 of 2)

Feature/Change	Description
<b>Rev. 4.16.10.3</b>	
<b>InfiniBand SR-IOV</b>	Enables the creation of InfiniBand virtual functions, allowing the guests to operate over an InfiniBand fabric.
<b>ESXi CLI</b>	Added ESXi CLI support for ESXi 6.5
<b>Rev. 4.16.7.8</b>	
<b>Adapter Cards</b>	Added support for ConnectX-5/ConnectX-5 Ex adapter cards. <b>Note:</b> ConnectX-5/ConnectX-5 Ex cards are currently at beta level.
<b>Rev. 4.16.7.8</b>	
<b>Geneve Stateless Offload</b>	Geneve network protocol is encapsulated into IP frame (L2 tunneling). Encapsulation is suggested as a means to alter the normal IP routing for datagrams, by delivering them to an intermediate destination that would otherwise not be selected based on the (network part of the) IP Destination Address field in the original IP header.
<b>Remote Direct Memory Access (RDMA)</b>	Remote Direct Memory Access (RDMA) is the remote memory management capability that allows server-to-server data movement directly between application memory without any CPU involvement. <b>Note:</b> It is recommended to use RoCE with PFC enabled in driver and network switches. For how to enable PFC in the driver see section <i>Priority Flow Control (PFC)</i> in the User Manual.
<b>Set Link Speed</b>	Enables you to set the link speed to a specific link speed supported by ESXi. For further information, see the User Manual section “ <i>Set Link Speed</i> ”.
<b>Priority Flow Control (PFC)</b>	Applies pause functionality to specific classes of traffic on the Ethernet link. For further information, see the User Manual section “ <i>Priority Flow Control (PFC)</i> ”.
<b>NetQ RSS</b>	Allows the user to configure multiple hardware queues backing up the single RX queue. NetQ RSS improves vMotion performance and multiple streams of IPv4/IPv6 TCP/UDP/IPSEC bandwidth over single interface between the Virtual Machines. For further information, see the User Manual section “ <i>NetQ RSS</i> ”.
<b>Default Queue RSS (DRSS)</b>	Allows the user to configure multiple hardware queues backing up the default RX queue. DRSS improves performance for large scale multicast traffic between hypervisors and Virtual Machines interfaces. For further information, see the User Manual section “ <i>Default Queue Receive Side Scaling (DRSS)</i> ”.
<b>SR-IOV</b>	Single Root IO Virtualization (SR-IOV) is a technology that allows a physical PCIe device to present itself multiple times through the PCIe bus. Support for up to 8 ConnectX-4 ports and up to 16 VFs. For further information, refer to the User Manual
<b>RX/TX Ring Resize</b>	Allows the network administrator to set new RX\TX ring buffer size.

**Table 8 - Change Log History (Sheet 2 of 2)**

Feature/Change	Description
<b>VXLAN Hardware Stateless Offloads for ConnectX®-4</b>	VXLAN hardware offload enables the traditional offloads to be performed on the encapsulated traffic.
<b>NetDump</b>	Enables a host to transmit diagnostic information via the network to a remote netdump service, which stores it on disk. Network-based core-dump collection can be configured in addition to or instead of disk-based coredump collection.
<b>NetQueue</b>	NetQueue is a performance technology in VMware ESXi that significantly improves performance in Ethernet virtualized environments.
<b>Wake-on-LAN</b>	Allows a network administrator to remotely power on a system or to wake it up from sleep mode
<b>Hardware Offload</b>	<ul style="list-style-type: none"> <li>• Large Send Offload (TCP Segmentation Offload)</li> <li>• RSS (Device RSS)</li> </ul>
<b>Hardware Capabilities</b>	<ul style="list-style-type: none"> <li>• Multiple Tx/Rx rings</li> <li>• Fixed Pass-Through</li> <li>• Single/Dual port</li> <li>• MSI-X</li> </ul>
<b>Ethernet Network</b>	<ul style="list-style-type: none"> <li>• TX/RX checksum</li> <li>• Auto moderation and Coalescing</li> <li>• VLAN stripping offload</li> </ul>