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# **Mellanox DPDK Release Notes**

Rev 2.2\_1.6

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# 1 Overview

These are the release notes for mlx4 and mlx5 DPDK Poll-Mode Driver (PMD) for Mellanox ConnectX®-3/ConnectX®-3 Pro and ConnectX®-4/ConnectX®-4 Lx Ethernet adapters.

## 1.1 System Requirements

**Table 1: System Requirements**

Specification	Value
Network Adapter Cards	Mellanox ConnectX®-3, ConnectX®-3 Pro, ConnectX®-4, ConnectX®-4 Lx network adapter card. (This must be configured to work in ETH mode.)
Firmware	<ul style="list-style-type: none"> <li>• ConnectX4: 12.14.2036</li> <li>• ConnectX-4 Lx: 14.14.2036</li> <li>• ConnectX3/Pro: 2.36.5000</li> </ul>
Linux Driver Stack	MLNX_OFED-3.2-2.0.0.0
ESX 6.0 Driver	2.4.0 <b>Note:</b> ESX 6.0 is supported only in ConnectX-3/ConnectX-3 Pro adapter cards using MLNX_OFED v3.1-1.0.3
Operating Systems and Kernels	All OSs supported by MLNX_OFED
Minimum memory requirements	16 GB RAM
Transport	Ethernet
CPU Arch	x86/PPC (Power8)

## 2 Changes and Major New Features

**Table 2: Changes and Major New Features**



**NOTE:** The changes are from the previous DPDK version on dpdk.org and not between two MLNX\_DPDK versions. DPDK (dpdk.org) Release Notes can be found at: [http://dpdk.org/doc/guides/rel\\_notes/](http://dpdk.org/doc/guides/rel_notes/)

Release	Driver	Changes
Rev 2.2_1.6 from Rev 2.2_1.4	ConnectX-4 PMD, mlx5 ConnectX-3 PMD, mlx4	<ul style="list-style-type: none"> <li>• DPDK bug fixes</li> <li>• Bug fixes</li> </ul>
Rev 2.2_1.4 from DPDK 2.2	ConnectX-4 PMD, mlx5	<ul style="list-style-type: none"> <li>• Added support for flow director filters (RTE_FDIR_MODE_PERFECT and RTE_FDIR_MODE_PERFECT_MAC_VLAN modes)</li> <li>• Single core and max performance optimizations</li> <li>• Added support for RX VLAN stripping</li> <li>• Added support for TX VLAN insertion (supported only with MLNX_OFED-3.2-1.5.0.1 and above)</li> <li>• Added callbacks to support link (up / down) changes</li> <li>• Added support for HW packet padding (supported only with MLNX_OFED-3.2-1.5.0.1 and above)</li> <li>• Added support for scattering FCS (supported only with MLNX_OFED-3.2-1.5.0.1 and above)</li> <li>• Added TX support for secondary processes</li> <li>• Added support for MLNX_OFED 3.2-1.0.1.1 and higher</li> <li>• DPDK fixes (see section <a href="#">Table 7: DPDK v2.2 Bug Fixes</a>)</li> </ul>
	ConnectX-4 PMD, mlx4	<ul style="list-style-type: none"> <li>• Added support for VMware ESX 6.0 U1</li> </ul>
Rev 2.1_1.1 from DPDK 2.1 inbox	ConnectX-4 PMD, mlx5	<ul style="list-style-type: none"> <li>• Added support for ConnectX®-4 and ConnectX®-4 LX NICs</li> <li>• Added support for MLNX_OFED 3.1-1.0.0</li> <li>• DPDK fixes (see section <a href="#">Table 7: DPDK v2.2 Bug Fixes</a>)</li> </ul>
Rev 2.1_1.1 from MLNX DPDK 2.0_2.8.4	ConnectX-3 PMD, mlx4	<ul style="list-style-type: none"> <li>• Removed support for VMware ESX 5.5</li> <li>• Added support for Accelerated verbs – PMD does not include libibverbs and libmlx4</li> </ul>

### 3 mlx4 and mlx5 PMD Drivers Features

Feature	mlx4 PMD	mlx5 PMD
Supported NICs	ConnectX®-3 ConnectX®-3 Pro	ConnectX®-4 ConnectX®-4 Lx
PCI mapping	Function per device	Function per port
KVM SR-IOV	Yes	Yes
ESX 6.0 SR-IOV	Yes	No
Scattering/gathering RX/TX packets	Yes	Yes
Multiple RX (with RSS/RCA) and TX queues	Yes	Yes
IPv4, TCP IPv4, UDP IPv4 RSS	Yes	Yes
IPv6 RSS	Yes	Yes
VXLAN RSS	Yes	According to the outer header
Number of RSS queues	Power of 2	Any
Get and Set RSS key per flow type (rss_hf)	No	Yes
Multiple MAC addresses	Yes	Yes
VLAN filtering	Yes	Yes
Link state information	Yes	Yes
Software counters/statistics	Yes	Yes
Start/stop/close operations	Yes	Yes
Multiple physical ports host adapter	Yes	Yes
Promiscuous mode	Yes	Yes
Multicast Promiscuous	Yes	Yes
Checksums hardware offloading	Yes	Yes
Checksum VXLAN hardware offloading	Yes	No
Flow Director	No	Yes
RX VLAN stripping	No	Yes
TX VLAN insertion	No	Yes

## 4 Known Issues

### 4.1 General Known Issues

**Table 3: General Known Issues**

Subject	Description	Workaround
InfiniBand	Mellanox PMDs does not support InfiniBand.	N/A
Support for DPDK integrated shared library	Mellanox PMDs does not support DPDK integrated shared library	PMD compiled as shared library can be used
Hardware counters	Hardware counters are not implemented.	N/A
The Primary and Secondary multi process model	The Primary and Secondary multi process model is currently supported in TX only.	Use multithreaded model instead of multi process in case mutli process RX is needed
Performance degradation when SGE_NUM =1	There is performance degradation for small packets when PMD is compiled with SGE_NUM = 4 compared to the performance when SGE_NUM = 1	If scattered packets are not used compile PMD with SGE_NUM = 1
Active - Passive Bonding mode	Bond PMD does not configure the needed MAC address to Bond slaves in case of failover. Active-Passive Bonding mode is available in case of KVM SR-IOV when 2 VMs are configured with the same MAC.	
Bond LAG interface is down	Bond PMD does not notice when Mellanox PMD's ports are up	Run ifconfig down and up on the bond slaves of the Mellanox interfaces

### 4.2 mlx4 PMD Known Issues

**Table 4: mlx4 PMD Known Issues**

Subject	Description	Workaround
Multicast / Broadcast Self-loopback on SR-IOV VF	When a Multicast or Broadcast packet is sent to the SR-IOV VF, it is returned back to the port.	N/A
VXLAN TX checksum hardware offloading	The bad checksum of sent packets is not fixed by the hardware.	Use software checksum calculation
Hardware checksum offloading on ConnectX-3	Hardware checksum offloading is not supported in ConnectX-3	Use ConnectX3-Pro if hardware checksum offloading is needed



Subject	Description	Workaround
Sending abnormal packets	Sending abnormal packets, smaller than 16B and bigger than the configured MTU causes PMD queues to enter an error state.	run dev_stop and dev_start
ESX 6.0 and DMFS A0 mode	DMFS A0 mode is not supported in ESX 6.0 VM	N/A
ESX 6.0 and HW checksum offloading	RX hardware checksum offloads are not supported in ESX 6.0 VM	N/A
ESX 6.0 and “add MAC”	Only one additional MAC can be added in addition to the VF’s MAC in ESX 6.0 VM	N/A
VXLAN hardware checksum offloading	VXLAN hardware checksum offloading is supported only if the used kernel supports it	N/A
L4 checksum report with hardware checksum offloading	When the packet does not include TCP/UDP header and the hardware checksum offloading is enabled, L4 checksum will be reported as bad	N/A
RSS	RSS hash key and options cannot be modified.	N/A
Promiscuous and SR-IOV	Promiscuous mode does not work when SR-IOV is enabled.	N/A
Promiscuous and SR-IOV	In testpmd: Although promiscuous mode fails in SR-IOV, it still shows as enabled This is DPDK implementation bug.	N/A
VLAN filtering	VLAN filtering is supported only with non-optimized steering mode.	See QSG, RX VLAN Filter section
Number of configured RSS queues must be power of 2	Number of configured RSS queues must be power of 2.	Use only power of 2 RSS queues
MLNX OFED 2.4	MLNX_OFED 2.4 and below is not supported	It is recommended to use MLNX_OFED 3.2

### 4.3 mlx5 PMD Known Issue

**Table 4: mlx5 PMD Known Issues**

Subject	Description	Workaround
VMware SR-IOV	SR-IOV is not supported	N/A
VXLAN HW Checksum offloading	VXLAN HW Checksum offloading is not supported	N/A
VXLAN RSS	VXLAN traffic is spread between RSS queues according to the outer header	N/A
Flow director VXLAN filter	Flow director VXLAN filter is not supported	N/A
RSS with non-power of 2 RX queues performance	When the number of RX queues is not power of 2, the RETA table size is automatically configured to 512 to achieve the best flows spreading. Still in	Use power of 2 number of queues if possible

Subject	Description	Workaround
	some cases traffic spreading between the queues can be non-equal	
TX CRC calculation	New CRC will always be calculated and added to the sent packet	Strip the CRC header before sending the packet
RX VLAN Stripping has unexpected behavior	DPDK has a flag per port to indicate the VLAN stripping state (On/Off), that updated when using <code>rte_eth_dev_set_vlan_offload()</code> API.  This flag is not updated when calling the <code>rte_eth_dev_set_vlan_strip_on_queue()</code> API (VLAN stripping per queue), and can cause some confusion when mixing between those two APIs.	Use only one API to configure RX stripping
Flow Director: Ports & VLAN masks format	Flow Director Port and VLAN mask have to be in little endian format	
Flow Control settings on VM	Flow control setting are not allowed on VM	Set Flow Control setting on the Hypervisor
Allmulticast on KVM VM	Allmulticast on VM is not supported	
Adding MAC on KVM VM	Adding MAC on the VM in addition to the DPDK API that should be used ( <code>rte_eth_dev_mac_addr_add</code> ) requires running the following:  <code>bridge fdb add dev &lt;interface name&gt; &lt;MAC ADDRESS&gt;</code>	
MTU configuration on KVM VM	To configure MTU on VM, in addition to the usual configuration (see User Manual ) requires the MTU on the hypervisor to be the same as on the VM	
TX VLAN insertion on Power8	TX VLAN insertion is currently not functional on Power8	
TX VLAN insertion on KVM VM	TX VLAN insertion is currently not functional on KVM VM	
KVM VM on ConnectX-4 Lx VF	On KVM VM that uses ConnectX-4 Lx VF, the SRC MAC of the sent packet has to be the VF's MAC	
testpmd application and CRC stripping	By default, testpmd configures CRC to be scattered by the HW, but it does not strip the CRC header. ConnectX-4 adds CRC header for every packet that is sent. In case of IO forwarding on a loopback setup, the forwarded packet increases each send by 4B.	Use <code>-crc-strip</code> option to enable HW CRC stripping

## 5 Bug Fixes

**Table 5: ConnectX-4 PMD Bug Fixes**

Subject	Description	Found in	Fixed in
Jumbo frames	Fixed an issue that resulted in the following error when working with MTU > 2048 and the PMD is compiled with SGE_NUM=4: mlx5: got completion with error:	MLNX_DPDK 2.2_1.4	MLNX_DPDK 2.2_1.6
Flow Director: zero values	Avoid packet duplication with overlapping Flow Director rules. For example the case where Flow Director mask is zero and the value is not	MLNX_DPDK 2.2_1.4	MLNX_DPDK 2.2_1.6
HW capabilities check	Fixed an error which occurred when the software configured FCS stripping or HW padding which were not supported by the firmware.	MLNX_DPDK 2.2_1.4	MLNX_DPDK 2.2_1.6
L4 checksum of L3 packet	Fixed a faulty L4 checksum which was reported when the packet is L3	MLNX_DPDK 2.1_1	MLNX_DPDK 2.2_1
L3 and L4 checksum of L2 packet	Fixed a faulty L3 and L4 checksums which were reported as bad in case packet is L2	MLNX_DPDK 2.1_1	MLNX_DPDK 2.2_1
Parallel builds compilation	Fixed an issue that showed some features as not supported although they were when DPDK was compiled with -j option	MLNX_DPDK 2.1_1	MLNX_DPDK 2.2_1
IPv6 resolution protocol	Fixed an issue causing IPv6 resolution protocol to not work in case all-multicast options were not configured	MLNX_DPDK 2.1_1	MLNX_DPDK 2.2_1

**Table 6: ConnectX-3 PMD Bug Fixes**

Subject	Description	Found in	Fixed in
Multicast Promiscuous mode and SR-IOV	Fixed Virtual Machines (VM) with enabled Multicast Promiscuous mode do not receive the multicast traffic that other VMs on the same hypervisor are registered to.	MLNX_OFED 2.4	MLNX_OFED 3.0 and above
QP setup failure	Fixed QP setup failure on Debian 3.16.7-ckt7-1	DPDK 2.1 inbox	2.1_1.1
Memory corruption when fork() is used in the application	Fixed an unpredicted behavior due to “cow” mechanism when an application used fork() or system call that were not related to the networking.	DPDK 2.0 inbox	2.0_2.8.4
1Gb/s port's link reported as 10Gb/s	Fixed a wrong speed reporting when a 10Gb/s port was set as 1Gb/s (10Gb/s instead of 1Gb/s)	DPDK 2.0 inbox	2.0_2.8.4
Multiple RX VLAN filters	Fixed a multiple RX VLAN filters issue preventing multiple RX VLAN filters to function properly although all were configured. In this case, only the first one functioned properly.	DPDK 2.0 inbox	2.0_2.8.4

**Table 7: DPDK v2.2 Bug Fixes and Changes**

Subject	Description	Found in	Fixed in
ConnectX-4 100G/b port link speed	Added support for 100 Gb/s link rate	DPDK 2.2	MLNX_DPDK 2.2_1.6
Compilation on Power8	Fixed compilation failure with <code>-pedantic</code> on Power8	DPDK 2.2 inbox	MLNX_DPDK 2.2_1.4
Add support for 512 entries in RETA table		DPDK 2.2 inbox	MLNX_DPDK 2.2_1.4