Mellanox OFED for FreeBSD for ConnectX-4/ConnectX-4 Lx/ConnectX-5/ConnectX-6
Release Note

Rev 3.5.2
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Mellanox Technologies
350 Oakmead Parkway Suite 100
Sunnyvale, CA 94085
U.S.A.
www.mellanox.com
Tel: (408) 970-3400
Fax: (408) 970-3403

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Release Update History

Table 1 - Release Update History

<table>
<thead>
<tr>
<th>Release</th>
<th>Date</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rev 3.5.2</td>
<td>September 29, 2019</td>
<td>Initial release of this version.</td>
</tr>
</tbody>
</table>
1 Introduction

These are the release notes for Mellanox Technologies' driver for FreeBSD Rev 3.5.2 driver kit for Mellanox ConnectX®-4, ConnectX®-4 Lx, ConnectX®-5, ConnectX®-5 Ex adapter cards supporting the following uplinks to servers:

<table>
<thead>
<tr>
<th>Uplink/HCAs</th>
<th>Driver Name</th>
<th>Uplink Speed</th>
</tr>
</thead>
<tbody>
<tr>
<td>ConnectX®-4</td>
<td>mlx5</td>
<td>• InfiniBand: SDR, QDR, FDR, FDR10, EDR</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Ethernet: 1GigE, 10GigE, 25GigE, 40GigE, 50GigE, 56GigE(^a), and 100GigE</td>
</tr>
<tr>
<td>ConnectX®-4 Lx</td>
<td></td>
<td>• Ethernet: 1GigE, 10GigE, 25GigE, 40GigE, and 50GigE</td>
</tr>
<tr>
<td>ConnectX®-5/ConnectX®-5 Ex</td>
<td></td>
<td>• InfiniBand: SDR, QDR, FDR, FDR10, EDR</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Ethernet: 1GigE, 10GigE, 25GigE, 40GigE, 50GigE, and 100GigE</td>
</tr>
<tr>
<td>ConnectX®-6</td>
<td></td>
<td>• InfiniBand: SDR, EDR, HDR</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Ethernet: 10GigE, 25GigE, 40GigE, 50GigE, 100GigE(^b), and 200GigE (alpha)</td>
</tr>
</tbody>
</table>

\(^a\) 56 GbE is a Mellanox propriety link speed and can be achieved while connecting a Mellanox adapter cards to Mellanox SX10XX switch series or connecting a Mellanox adapter card to another Mellanox adapter card.

\(^b\) ConnectX-6 Ethernet adapter cards currently support Force mode only. Auto-Negotiation mode is not supported.

1.1 Supported Platforms and Operating Systems

The following are the supported OSs in Mellanox OFED for FreeBSD for ConnectX-4/ConnectX-4 Lx/ConnectX-5/ConnectX-6 Rev 3.5.2:

<table>
<thead>
<tr>
<th>Operating System</th>
<th>Platform</th>
</tr>
</thead>
<tbody>
<tr>
<td>FreeBSD 13</td>
<td>AMD64/x86_64</td>
</tr>
</tbody>
</table>

1.2 Supported Adapters Firmware Versions

Mellanox OFED for FreeBSD Rev 3.5.2 supports the following Mellanox network adapter cards:

<table>
<thead>
<tr>
<th>Supported Adapters</th>
<th>Current Firmware Rev.</th>
</tr>
</thead>
<tbody>
<tr>
<td>ConnectX®-4</td>
<td>12.26.1040</td>
</tr>
<tr>
<td>ConnectX®-4 Lx</td>
<td>14.26.1040</td>
</tr>
<tr>
<td>ConnectX®-5/ConnectX-5 Ex</td>
<td>16.26.1040</td>
</tr>
<tr>
<td>ConnectX®-6</td>
<td>20.26.1040</td>
</tr>
</tbody>
</table>
2 Changes and New Features in Rev 3.5.2

Table 3 - Changes and New Features in Rev 3.5.2

<table>
<thead>
<tr>
<th>Category</th>
<th>Description</th>
</tr>
</thead>
</table>
| SR-IOV over ESXi                        | Added support for SR-IOV Guest over ESXi. 
**NOTE:** Certain earlier versions of VMware prevented proper function of MS/MSI-X emulation on FreeBSD Guests. Since these versions are not accurately accounted for, MSI is blacklisted by default, preventing mlx5(4) driver from loading properly. 
If MS/MSI-X emulation does not function properly on your current hypervisor, you may set the loader tunables `hw.pci.enable_msi` and `hw.pci.enable_msix` to 1, and `hw.pci.honor_msi_blacklist` to 0. |
| Forward Error Correction (FEC) Configuration | Added support for FEC configuration via the FreeBSD driver.                                                                                                                                               |
| IRQ Labeling                            | IRQ IDs are now labeled according to their Mellanox device functionality.                                                                                                                                    |
| Priority Flow Control (PFC) Hardware Buffer Configuration | [Beta] Added support for configuring HW buffers for priority flow control (PFC).                                                                                                                            |
| Port Module Events                      | Added counters for various port module events.                                                                                                                                                             |
| ConnectX-6 Firmware Dump                | Expanded firmware dump support for ConnectX-6 adapter cards.                                                                                                                                               |

For additional information on the new features, please refer to the User Manual.
3 Known Issues

The following is a list of general limitations and known issues of the various components of this Mellanox OFED for FreeBSD release.

Table 4 - Known Issues

<table>
<thead>
<tr>
<th>Internal Ref.</th>
<th>Issue</th>
</tr>
</thead>
</table>
| -             | **Description:** When reloading the module during heavy traffic, FreeBSD driver may become unstable.  
**Workaround:** N/A  
**Keywords:** Reload, stress, heavy traffic  
**Discovered in Release:** 3.5.2 |
| 1320335       | **Description:** When Witness is enabled, the following message may appear in logs: “lock order reversal in mlx5_en_rx and in_pcb/tcp_input”.  
**Workaround:** N/A  
**Keywords:** Witness, LOR  
**Discovered in Release:** 3.5.0 |
| 1578093       | **Description:** ibstat tool shows the wrong value of “rate” after unplugging the cable from the HCA.  
**Workaround:** N/A  
**Keywords:** ibstate, rate  
**Discovered in Release:** 3.5.0 |
| 1439351       | **Description:** Link local GIDs are dysfunctional when IPv6 address is configured for the first time.  
**Workaround:** Set the net device state to “up”. For example: `# ifconfig mce0 up`  
**Keywords:** RoCE, IPv6  
**Discovered in Release:** 3.4.2 |
| 1435021       | **Description:** All Rx priority pause counters values increase when Rx global pause is enabled.  
**Workaround:** Ignore Rx priority pause counters when Rx global pause is enabled.  
**Keywords:** Rx pause counters, priority  
**Discovered in Release:** 3.4.2 |
| 1434034       | **Description:** RDMA-CM applications do not work when PCP is configured on one side of the connection.  
**Workaround:** Make sure PCP is configured on both sides of the connection.  
**Keywords:** RDMA-CM, PCP  
**Discovered in Release:** 3.4.2 |
### Table 4 - Known Issues

<table>
<thead>
<tr>
<th>Internal Ref.</th>
<th>Issue</th>
</tr>
</thead>
</table>
| 1428828      | **Description:** Extended join multicast API is not supported.  
**Workaround:** N/A  
**Keywords:** RDMA, Multicast  
**Discovered in Release:** 3.4.2 |
| 1313461      | **Description:** When Packet Pacing is enabled in firmware, only one traffic class will be supported by the firmware.  
**Workaround:** Disable Packet Pacing in the firmware configuration. For example:  
```bash  
# cat /tmp/disable_pp.txt  
MLNX_RAW_TLV_FILE  
0x00000004 0x0000010c 0x00000000 0x00000000  
# mlxconfig -d pci0:4:0:0 -f /tmp/disable_pp.txt set_raw  
```

**Keywords:** Firmware, Packet Pacing  
**Discovered in Release:** 3.4.2 |
| 1227471      | **Description:** When loading and unloading linuxkpi module, the following error message will appear in the dmesg, indicating that a memory leak has occurred:  
"Warning: memory type linux leaked memory on destroy (2 allocations, 64 bytes leaked). Warning: memory type linuxcurrent leaked memory on destroy (7 allocations, 896 bytes leaked)."  
**Workaround:** N/A  
**Keywords:** linuxkpi  
**Discovered in Release:** 3.4.1 |

**Description:** The following error message may be printed to dmesg when using static configuration via rc.conf:  
"loopback_route: deletion failed"  
This is a kernel-related issue.  
**Workaround:** N/A  
**Keywords:** Static Configuration |

**Description:** Choosing a wrong interface media type will cause a “no carrier” status and the physical port will not be active.  
**Workaround:** N/A  
**Keywords:** Media Type |

**Description:** There is no TCP traffic when configuring MTU in the range of 72-100 bytes in ConnectX®-4 Lx.  
**Workaround:** N/A  
**Keywords:** MTU |
## Bug Fixes

The table below lists the bugs fixed in this release.

### Table 5 - Bug Fixes

<table>
<thead>
<tr>
<th>Internal Ref.</th>
<th>Issue</th>
</tr>
</thead>
</table>
| 1243940       | **Description:** Fixed the issue where RDMA applications (user space and Kernel space) might hang when restarting the driver during traffic.  
**Keywords:** RDMA, driver restart  
**Discovered in Release:** 3.4.1  
**Fixed in Release:** 3.5.1 |
| 1402958       | **Description:** Fixed the issue where interfaces were not loaded after firmware software reset while RDMA traffic was running in the background.  
**Keywords:** Self healing, RDMA  
**Discovered in Release:** 3.4.2  
**Fixed in Release:** 3.5.1 |
| 1581628       | **Description:** Fixed the issue were driver unload used to hang while RDMA user space application was running.  
**Keywords:** RDMA, driver unload  
**Discovered in Release:** 3.5.0  
**Fixed in Release:** 3.5.1 |
| 1554671       | **Description:** Fixed the issue where mlx5ib unload used to fail while OpenSM was running in the background.  
**Keywords:** mlx5ib, OpenSM, RDMA  
**Discovered in Release:** 3.5.0  
**Fixed in Release:** 3.5.1 |
| 1498467       | **Description:** Added support for 10G-ER and 10G-LR modules recognition.  
**Keywords:** SFP module  
**Discovered in Release:** 3.4.2  
**Fixed in Release:** 3.5.0 |
| 1175757       | **Description:** Added support for running RDMA CM with IPoIB.  
**Keywords:** RDMA CM, IPoIB  
**Discovered in Release:** 3.4.1  
**Fixed in Release:** 3.5.0 |
## Bug Fixes

<table>
<thead>
<tr>
<th>Internal Ref.</th>
<th>Issue</th>
</tr>
</thead>
</table>
| 1337448/1485155/1470374 | **Description:** Fixed the issue of when rebooting a virtual machine (VM), the following log message may appear: `warning: event(0) on port 0`
*Keywords:* Virtualization, RDMA
*Discovered in Release:* 3.4.2
*Fixed in Release:* 3.5.0 |
| 1297834 | **Description:** Fixed the issue of when running over VLAN, RDMA loopback traffic used to fail.
*Keywords:* RDMA, loopback, VLAN
*Discovered in Release:* 3.4.1
*Fixed in Release:* 3.4.2 |
| 1258718 | **Description:** Fixed the issue of when working in RoCE mode using ConnectX-4 HCAs only, a bandwidth performance degradation used to occur when sending/receiving a message of any size larger than 16K.
*Keywords:* RoCE, performance, ConnectX-4
*Discovered in Release:* 3.4.1
*Fixed in Release:* 3.4.2 |
| 1273118/1399014 | **Description:** Added support for RDMA multicast traffic.
*Keywords:* RDMA, multicast
*Discovered in Release:* 3.4.1
*Fixed in Release:* 3.4.2 |
| 765775 | **Description:** Suppressed EEPROM error message/s that used to be received when SFP cages were empty.
*Keywords:* EEPROM, SFP
*Discovered in Release:* 3.0.0
*Fixed in Release:* 3.3.0 |
| 854565 | **Description:** Allowed setting software MTU size below the value of 1500.
*Keywords:* MTU
*Discovered in Release:* 3.0.0
*Fixed in Release:* 3.3.0 |
# Change Log History

## Table 6 - Change Log History

<table>
<thead>
<tr>
<th>Release</th>
<th>Category</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.5.1</td>
<td>Firmware Upgrade Using mlx5tool</td>
<td>Added the ability to burn firmware of MFA2 format using mlx5tool and Kernel module.</td>
</tr>
<tr>
<td></td>
<td>Dynamic Interrupt Moderation (DIM)</td>
<td>Added the ability to adaptively configure interrupt moderation based on network traffic.</td>
</tr>
<tr>
<td>3.5.0</td>
<td>Relaxed Ordering</td>
<td>Added support for configuring PCIe packet write ordering via sysctl.</td>
</tr>
<tr>
<td></td>
<td>Enhanced Transmission Selection (ETS)</td>
<td>Added support for setting the bandwidth limit as a ratio rather than in bits per second. The ratio must be an integer number between 1 and 100, inclusive. This feature also enables setting a minimal BW guarantee on traffic classes (TCs).</td>
</tr>
</tbody>
</table>
|         | Ethernet Counters | Added support for the following new counters:  
• tx_jumbo_packets  
• rxstat0.bytes  
• txstat0te0.bytes |
| 3.4.2   | RoCE Packet Sniffing | Added support for RoCE packets sniffing using tcpdump tool. |
|         | VLAN 0 Priority Tagging | Added support for 802.1Q Ethernet frames to be transmitted with VLAN ID set to zero in RoCE mode. |
|         | Differentiated Service Code Point (DSCP) | Added support for classifying and managing network traffic and providing quality of service (QoS) on IP and RoCE networks. |
|         | Trust State | Added support for prioritizing sent/received packets based on packet fields. |
|         | Reset Flow | Added support for a reset mechanism to recover from fatal failures. Upon such failures, a firmware dump for all relevant registers will be triggered, followed by a firmware and driver reset. |
|         | RDMA Multicast Support | Added support for sending and receiving RDMA multicast packets. |
| 3.4.1   | Explicit Congestion Notification (ECN) | Added support for ECN, which enables end-to-end congestion notifications between two end-points when a congestion occurs. |
|         | Rate Limiting | Added support for users to rate limit a specific Traffic Class. |
|         | Priority Flow Control (PFC) | Added the ability to apply pause functionality to specific classes of traffic on the Ethernet link.  
**Note:** Currently, only layer 2 PFC (PCP) is supported. |
|         | Rx Hardware Time-Stamping | Added support for adding high-quality hardware time-stamping on incoming packets. |
|         | Firmware Dump | Added the ability to dump hardware registered data upon demand. |
| 3.3.0   | Packet Pacing | Also known as “rate limit”, this feature is now supported at a GA level.  
**Note:** This feature is supported in firmware v12.17.1016 and above. |
### Table 6 - Change Log History

<table>
<thead>
<tr>
<th>Release</th>
<th>Category</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.0.0</td>
<td>Hardware LRO</td>
<td>Added support for Large Receive Offload (LRO) in the hardware. It increases inbound throughput of high-bandwidth network connections by reducing CPU overhead. Hardware LRO is only supported in ConnectX®-4.</td>
</tr>
<tr>
<td></td>
<td>Completion Based Moderation</td>
<td>Added the option to reset the timer for generating interrupts upon completion generation.</td>
</tr>
<tr>
<td></td>
<td>EEPROM Cable Reading</td>
<td>Added support for EEPROM cable reading via ifconfig and sysctl. EEPROM is only supported in ConnectX®-4.</td>
</tr>
<tr>
<td></td>
<td>Interface Name</td>
<td>Changed the interface name from mlx5en&lt;X&gt; to mce&lt;X&gt;.</td>
</tr>
</tbody>
</table>