

# SUSE Linux Enterprise Server (SLES) 15 Inbox Driver User Manual

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**SLES 15**

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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

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# Document Revision History

*Table 1: Document Revision History*

Revision	Date	Description
SLES 15	July 18, 2018	Initial version of this document.

# 1 Firmware Burning

1. Identify the adapter card's PSID.

```
# mstflint -d 81:00.0 q
Image type:          FS2
FW Version:          2.36.5000
FW Release Date:     26.1.2016
Rom Info:            type=PXE version=3.4.718 devid=4103
Device ID:           4103
Description:         Node                Port1                Port2
Sys image
GUIDs:               e41d2d0300b3f590 e41d2d0300b3f591 e41d2d0300b3f592
e41d2d0300b3f593
MACs:                e41d2db3f591      e41d2db3f592
VSD:
PSID:                MT_1090111019
```

2. Download the firmware BIN file from the Mellanox website that matches your card's PSID:

[www.mellanox.com](http://www.mellanox.com) → [Support/Education](#) → [Support Downloader](#)

3. Burn the firmware.

```
# mstflint -d <lspci-device-id> -i <image-file> b
```

4. Reboot your machine after the firmware burning is completed.

## 2 Port Type Management

### 2.1 Port Type Management/VPI Cards Configuration



**NOTE:** This tool is supported in the following devices:

- 4<sup>th</sup> generation devices: ConnectX-3, ConnectX-3 Pro (FW 2.31.5000 and above).
- 5<sup>th</sup> generation devices: Connect-IB, ConnectX-4, ConnectX-4 Lx, ConnectX-5.

Device ports can be individually configured to work as InfiniBand or Ethernet ports. By default, device ports are initialized as InfiniBand ports. If you wish to change the port type, use the `mstflint` tool after the driver is loaded.

5. Install `mstflint` tools: Zypper install `mstflint`.

6. Check the PCI address.

```
lspci | grep Mellanox
00:06.0 Infiniband controller: Mellanox Technologies MT27520 Family
[ConnectX-3 Pro]
```

7. Use `mstconfig` to change the link type as desired IB – for InfiniBand, ETH – for Ethernet.

```
mstconfig -d <device pci> s LINK_TYPE_P1/2=<ETH|IB|VPI>
```

Example:

```
mstconfig -d 82:00.1 s LINK_TYPE_P1=ETH
```

8. Reboot your machine.

## 3 Modules Loading and Unloading

Mellanox modules for ConnectX®-3/ConnectX®-3 Pro are:

- mlx4\_en, mlx4\_core, mlx4\_ib

Mellanox modules for Connect-IB/ConnectX®-4/ConnectX®-4 Lx/ConnectX®-5 are:

- mlx5\_core, mlx5\_ib

➤ *To load and unload the modules, use the commands below:*

- Loading the driver: `modprobe <module name>`

```
modprobe mlx5_ib
```

- Unloading the driver: `modprobe -r <module name>`

```
modprobe -r mlx5_ib
```

## 4 Important Packages and Their Installation

### **rdma-core**

rdma-core RDMA core userspace libraries and daemons

### **libibmad: Low layer InfiniBand diagnostic and management programs**

libibmad OpenFabrics Alliance InfiniBand MAD library

### **opensm: InfiniBand Subnet Manager**

opensm-libs Libraries used by OpenSM and included utilities

opensm OpenIB InfiniBand Subnet Manager and management utilities

### **ibutils: OpenIB Mellanox InfiniBand Diagnostic Tools**

ibutils-libs Shared libraries used by ibutils binaries

ibutils OpenIB Mellanox InfiniBand Diagnostic Tools

### **infiniband-diags: OpenFabrics Alliance InfiniBand Diagnostic Tools**

infiniband-diags OpenFabrics Alliance InfiniBand Diagnostic Tools

### **perftest: IB Performance tests**

perftest IB Performance Tests

### **mstflint: Mellanox Firmware Burning and Diagnostics Tools**

mstflint Mellanox firmware burning tool

➤ *To install the packages above run:*

```
# zypper -n install <package-name>
```



## 5 SR-IOV Configuration

### 5.1 Setting up SR-IOV in ConnectX-3/ConnectX-3 Pro

9. Download mstflint tools: `zypper install mstflint`

10. Check the device's PCI.

```
lspci | grep mellanox
```

11. Check if SR-IOV is enabled in the firmware.

```
mstconfig -d <device pci> q
```

Example:

```
# mstconfig -d 81:00.0 q

Device #1:
-----

Device type:      ConnectX3Pro
PCI device:      81:00.0

Configurations:                                     Current
SRIOV_EN          True(1)
NUM_OF_VFS        0
LINK_TYPE_P1      VPI(3)
LINK_TYPE_P2      VPI(3)
LOG_BAR_SIZE      3
BOOT_PKEY_P1      0
BOOT_PKEY_P2      0
BOOT_OPTION_ROM_EN_P1 True(1)
BOOT_VLAN_EN_P1   False(0)
BOOT_RETRY_CNT_P1 0
LEGACY_BOOT_PROTOCOL_P1 PXE(1)
BOOT_VLAN_P1      1
BOOT_OPTION_ROM_EN_P2 True(1)
BOOT_VLAN_EN_P2   False(0)
BOOT_RETRY_CNT_P2 0
LEGACY_BOOT_PROTOCOL_P2 PXE(1)
BOOT_VLAN_P2      1
IP_VER_P1         IPv4(0)
IP_VER_P2         IPv4(0)...
```

12. Check SRIOV\_EN and NUM\_OF\_VFS configurations.

13. Enable SR-IOV:

```
mstconfig -d <device pci> s SRIOV_EN=<False|True>
```

14. Configure the needed number of VFs

```
mstconfig -d <device pci> s NUM_OF_VFS=<NUM>
```



**NOTE:** This file will be generated only if IOMMU is set in the grub.conf file (by adding "intel\_iommu=on" to /boot/grub/grub.conf file).

15. **[mlx4 devices only]** Edit the file /etc/modprobe.d/mlx4.conf:

```
options mlx4_core num_vfs=[needed num of VFs] port_type_array=[1/2 for IB/ETH],[ 1/2 for IB/ETH]
```

Example:

```
options mlx4_core num_vfs=8 port_type_array=1,1
```

16. **[mlx5 devices only]** Write to the sysfs file the number of needed VFs.

```
echo [num_vfs] > /sys/class/infiniband/mlx5_0/device/sriov_numvfs
```

Example:

```
echo 8 > /sys/class/infiniband/mlx5_0/device/sriov_numvfs
```

17. Reboot the driver.

18. Load the driver and verify that the VFs were created.

```
lspci | grep mellanox
```

Example:

```
dev-r-vrt-214:~ # lspci | grep nox
82:00.0 Ethernet controller: Mellanox Technologies MT27700 Family
[ConnectX-4]
82:00.1 Ethernet controller: Mellanox Technologies MT27700 Family
[ConnectX-4]
82:00.2 Ethernet controller: Mellanox Technologies MT27700 Family
[ConnectX-4 Virtual Function]
82:00.3 Ethernet controller: Mellanox Technologies MT27700 Family
[ConnectX-4 Virtual Function]
82:00.4 Ethernet controller: Mellanox Technologies MT27700 Family
[ConnectX-4 Virtual Function]
82:00.5 Ethernet controller: Mellanox Technologies MT27700 Family
[ConnectX-4 Virtual Function]
```

For further information, refer to section [Setting Up SR-IOV MLNX\\_OFED User Manual](#).

## 6 Default RoCE Mode Setting for RDMA\_CM Application

19. Create a directory for the mlx4/mlx5 device.

```
mkdir -p /sys/kernel/config/rdma_cm/mlx4_0/
```

20. Validate what is the used RoCE mode in the default\_roce\_mode configs file.

```
# cat /sys/kernel/config/rdma_cm/mlx4_0/ports/1/default_roce_mode  
IB/RoCE v1
```

21. Change the default RoCE mode,

- For RoCE v1: IB/RoCE v1
- For RoCE v2: RoCE v2

```
# echo "RoCE v2" >  
/sys/kernel/config/rdma_cm/mlx4_0/ports/1/default_roce_mode  
# cat /sys/kernel/config/rdma_cm/mlx4_0/ports/1/default_roce_mode  
RoCE v2
```

```
# echo "IB/RoCE v1" >  
/sys/kernel/config/rdma_cm/mlx4_0/ports/1/default_roce_mode  
# cat /sys/kernel/config/rdma_cm/mlx4_0/ports/1/default_roce_mode  
IB/RoCE v1
```