Ethtool

Ethtool is a standard Linux utility for controlling network drivers and hardware, particularly for wired Ethernet devices. It can be used to:

- Get identification and diagnostic information
- Get extended device statistics
- Control speed, duplex, auto-negotiation and flow control for Ethernet devices
- Control checksum offload and other hardware offload features
- Control DMA ring sizes and interrupt moderation
- Flash device firmware using a .mfa2 image

Ethtool Supported Options

Options	Description
ethtool --set-priv-flags eth<x> <priv flag> <on/off>	Enables/disables driver feature matching the given private flag.
ethtool --show-priv-flags eth<x>	Shows driver private flags and their states (ON/OFF).
ethtool -a eth<x>	Queries the pause frame settings.
ethtool -A eth<x> [rx on|off] [tx on|off]	Sets the pause frame settings.
ethtool -c eth<x>	Queries interrupt coalescing settings.
ethtool -C eth<x> [pkt-rate-low N] [pkt-rate-high N] [rx-usecs-low N] [rx-usecs-high N]	Sets the values for packet rate limits and for moderation time high and low values.
ethtool -C eth<x> [rx-usecs N] [rx-frames N]	Sets the interrupt coalescing setting. rx-frames will be enforced immediately, rx-usecs will be enforced only when adaptive moderation is disabled. **Note**: usec settings correspond to the time to wait after the *last* packet is sent/received before triggering an interrupt.
ethtool -C eth<x> adaptive-rx on|off	Enables/disables adaptive interrupt moderation.

Options	Description
	By default, the driver uses adaptive interrupt moderation for the receive path, which adjusts the moderation time to the traffic pattern.
ethtool -C eth<x> adaptive-tx on|off	**Note**: Supported by mlx5e for ConnectX-4 and above adapter cards. Enables/disables adaptive interrupt moderation. By default, the driver uses adaptive interrupt moderation for the transmit path, which adjusts the moderation parameters (time/frames) to the traffic pattern.
ethtool -g eth<x>	Queries the ring size values.
ethtool -G eth<x> [rx <N>] [tx <N>]	Modifies the ring size.
ethtool -i eth<x>	Checks driver and device information. For example: driver: mlx5_core version: 5.1-0.4.0 firmware-version: 4.6.4046 (MT_QEMU000000) expansion-rom-version: bus-info: 0000:07:00.0 supports-statistics: yes supports-test: yes supports-eeprom-access: no supports-register-dump: no supports-priv-flags: yes
ethtool -k eth<x>	Queries the stateless offload status.
ethtool -K eth<x> [rx on|off] [tx on|off] [sg on|off] [tso on|off] [lro on|off] [gro on|off] [gso on|off] [rxvlan on|off] [txvlan on|off] [ntuple on/off] [rxhash on/off] [rx-all on/off] [rx-fcs on/off]	Sets the stateless offload status. TCP Segmentation Offload (TSO), Generic Segmentation Offload (GSO): increase outbound throughput by reducing CPU overhead. It works by queuing up large buffers and letting the network interface card split them into separate packets. Large Receive Offload (LRO): increases inbound throughput of high-bandwidth network connections by reducing CPU overhead. It works by aggregating multiple incoming packets from a single stream into a larger buffer before they are passed

Options	Description
	higher up the networking stack, thus reducing the number of packets that have to be processed. LRO is available in kernel versions < 3.1 for untagged traffic. Hardware VLAN insertion Offload (txvlan): When enabled, the sent VLAN tag will be inserted into the packet by the hardware. **Note**: LRO will be done whenever possible. Otherwise GRO will be done. Generic Receive Offload (GRO) is available throughout all kernels. Hardware VLAN Striping Offload (rxvlan): When enabled received VLAN traffic will be stripped from the VLAN tag by the hardware. RX FCS (rx-fcs): Keeps FCS field in the received packets.Sets the stateless offload status. RX FCS validation (rx-all): Ignores FCS validation on the received packets.
ethtool -l eth<x>	Shows the number of channels.
ethtool -L eth<x> [rx <N>] [tx <N>]	Sets the number of channels. **Notes**: • This also resets the RSS table to its default distribution, which is uniform across the cores on the NUMA (non-uniform memory access) node that is closer to the NIC. • For ConnectX®-4 cards, use ethtool -L eth<x> combined <N> to set both RX and TX channels.
ethtool -m|--dump-module-eeprom eth<x> [raw on|off] [hex on|off] [offset N] [length N]	Queries/decodes the cable module eeprom information.
ethtool -p|--identify DEVNAME	Enables visual identification of the port by LED blinking [TIME-IN-SECONDS].
ethtool -p|--identify eth<x> <LED duration>	Allows users to identify interface's physical port by turning the ports LED on for a number of seconds. **Note**: The limit for the LED duration is 65535 seconds.
ethtool -S eth<x>	Obtains additional device statistics.
ethtool -s eth<x> advertise <N> autoneg on	Changes the advertised link modes to requested link modes <N>

<table>
<tr><th>Options</th><th>Description</th></tr>
<tr><td></td><td>To check the link modes' hex values, run <code><man ethtool></code> and to check the supported link modes, run <code>ethtool eth<x></code>
For advertising new link modes, make sure to configure the entire bitmap as follows:

<table>
<tr><td>200GAUI-4 / 200GBASE-CR4/KR4</td><td>0x7c000000000000000</td></tr>
<tr><td>100GAUI-2 / 100GBASE-CR2 / KR2</td><td>0x3E00000000000000</td></tr>
<tr><td>CAUI-4 / 100GBASE-CR4 / KR4</td><td>0xF000000000</td></tr>
<tr><td>50GAUI-1 / LAUI-1/ 50GBASE-CR / KR</td><td>0x1F0000000000000</td></tr>
<tr><td>50GAUI-2 / LAUI-2/ 50GBASE-CR2/KR2</td><td>0x10C00000000</td></tr>
<tr><td>XLAUI-4/XLPPI-4 // 40G</td><td>0x7800000</td></tr>
<tr><td>25GAUI-1/ 25GBASE-CR / KR</td><td>0x380000000</td></tr>
<tr><td>XFI / XAUI-1 // 10G</td><td>0x7C0000181000</td></tr>
<tr><td>5GBASE-R</td><td>0x1000000000000</td></tr>
<tr><td>2.5GBASE-X / 2.5GMII</td><td>0x820000000000</td></tr>
<tr><td>1000BASE-X / SGMII</td><td>0x20000020020</td></tr>
</table>

Notes:

Both previous and new link modes configurations are supported, however, they must be run separately.
Any link mode configuration on Kernels below v5.1 and ConnectX-6 HCAs will result in the advertisement of the full capabilities.
<code><autoneg on></code> only sends a hint to the driver that the user wants to modify advertised link modes and not speed.
</td></tr>
<tr><td>ethtool -s eth<x> msglvl [N]</td><td>Changes the current driver message level.</td></tr>
<tr><td>ethtool -s eth<x> speed <SPEED> autoneg off</td><td>Changes the link speed to requested <SPEED>. To check the supported speeds, run <code>ethtool eth<x></code>.
Note: does not set autoneg OFF, it only hints the driver to set a specific speed.</td></tr>
</table>

Options	Description
ethtool -t eth<x>	Performs a self-diagnostics test.
ethtool -T eth<x>	Shows time stamping capabilities
ethtool -x eth<x>	Retrieves the receive flow hash indirection table.
ethtool -X eth<x> equal a b c...	Sets the receive flow hash indirection table. **Note**: The RSS table configuration is reset whenever the number of channels is modified (using ethtool -L command).
ethtool --show-fec eth<x>	Queries current Forward Error Correction (FEC) encoding in case FEC is supported. **Note**: An output of "baser" implies Firecode encoding.
ethtool --set-fec eth<x> encoding auto|off|rs|baser	Configures Forward Error Correction (FEC). **Note**: 'baser' encoding applies to the Firecode encoding, and 'auto' regards the HCA's default.
ethtool -f|--flash <devname> FILE [N]	Flash firmware image on the device using the specified .mfa2 file (FILE). By default, the command flashes all the regions on the device unless a region number (N) is specified.

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