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## ***Rocky Enterprise Linux 9.2 Manual Pages on command 'tc-pedit.8'***

### ***\$ man tc-pedit.8***

Generic packet editor action in tc(8)      Linux      Generic packet editor action in tc(8)

#### **NAME**

pedit - generic packet editor action

#### **SYNOPSIS**

```
tc ... action pedit [ex] munge { RAW_OP | LAYERED_OP | EXTENDED_LAYERED_OP } [ CONTROL ]

RAW_OP := offset OFFSET { u8 | u16 | u32 } [ AT_SPEC ] CMD_SPEC

AT_SPEC := at AT offmask MASK shift SHIFT

LAYERED_OP := { ip IPHDR_FIELD | ip BEYOND_IPHDR_FIELD } CMD_SPEC

EXTENDED_LAYERED_OP := { eth ETHHDR_FIELD | ip IPHDR_FIELD | ip EX_IPHDR_FIELD | ip6
    IP6HDR_FIELD | tcp TCPHDR_FIELD | udp UDPHDR_FIELD } CMD_SPEC

ETHHDR_FIELD := { src | dst | type }

IPHDR_FIELD := { src | dst | tos | dsfield | ihl | protocol | precedence | nofrag | first?
    frag | ce | df }

BEYOND_IPHDR_FIELD := { dport | sport | icmp_type | icmp_code }

EX_IPHDR_FIELD := { ttl }

IP6HDR_FIELD := { src | dst | traffic_class | flow_lbl | payload_len | nexthdr | hoplimit
    }

TCPHDR_FIELD := { sport | dport | flags }

UDPHDR_FIELD := { sport | dport }

CMD_SPEC := { clear | invert | set VAL | add VAL | decrement | preserve } [ retain RVAL ]

CONTROL := { reclassify | pipe | drop | shot | continue | pass | goto chain CHAIN_INDEX }
```

#### **DESCRIPTION**

The pedit action can be used to change arbitrary packet data. The location of data to

change can either be specified by giving an offset and size as in RAW\_OP, or for header values by naming the header and field to edit the size is then chosen automatically based on the header field size.

## OPTIONS

ex Use extended edit. EXTENDED\_LAYERED\_OP and the add/decrement CMD\_SPEC are allowed only in this mode.

offset OFFSET { u32 | u16 | u8 }

Specify the offset at which to change data. OFFSET is a signed integer, its base is automatically chosen (e.g. hex if prefixed by 0x or octal if prefixed by 0).

The second argument specifies the length of data to change, that is four bytes (u32), two bytes (u16) or a single byte (u8).

at AT offmask MASK shift SHIFT

This is an optional part of RAW\_OP which allows to have a variable OFFSET depending on packet data at offset AT, which is binary ANDed with MASK and right-shifted by SHIFT before adding it to OFFSET.

eth ETHHDR\_FIELD

Change an ETH header field. The supported keywords for ETHHDR\_FIELD are:

src

dst Source or destination MAC address in the standard format: XX:XX:XX:XX:XX:XX

type Ether-type in numeric value

ip IPHDR\_FIELD

Change an IPv4 header field. The supported keywords for IPHDR\_FIELD are:

src

dst Source or destination IP address, a four-byte value.

tos

dsfield

precedence

Type Of Service field, an eight-bit value.

ihl Change the IP Header Length field, a four-bit value.

protocol

Next-layer Protocol field, an eight-bit value.

nofrag

firstfrag

ce

df

mf Change IP header flags. Note that the value to pass to the set command is not just a bit value, but the full byte including the flags field. Though only the relevant bits of that value are respected, the rest ignored.

#### ip BEYOND\_IPHDR\_FIELD

Supported only for non-extended layered op. It is passed to the kernel as offsets relative to the beginning of the IP header and assumes the IP header is of minimum size (20 bytes). The supported keywords for BEYOND\_IPHDR\_FIELD are:

dport

sport Destination or source port numbers, a 16-bit value. Indeed, IPv4 headers don't contain this information. Instead, this will set an offset which suits at least TCP and UDP if the IP header is of minimum size (20 bytes). If not, this will do unexpected things.

icmp\_type

icmp\_code

Again, this allows to change data past the actual IP header itself. It assumes an ICMP header is present immediately following the (minimal sized) IP header. If it is not or the latter is bigger than the minimum of 20 bytes, this will do unexpected things. These fields are eight-bit values.

#### ip EX\_IPHDR\_FIELD

Supported only when ex is used. The supported keywords for EX\_IPHDR\_FIELD are:

ttl

#### ip6 IP6HDR\_FIELD

The supported keywords for IP6HDR\_FIELD are:

src

dst

traffic\_class

flow\_lbl

payload\_len

nexthdr

hoplimit

#### tcp TCPHDR\_FIELD

The supported keywords for TCPHDR\_FIELD are:

sport

dport Source or destination TCP port number, a 16-bit value.

flags

udp UDPHDR\_FIELD

The supported keywords for UDPHDR\_FIELD are:

sport

dport Source or destination TCP port number, a 16-bit value.

clear Clear the addressed data (i.e., set it to zero).

invert Swap every bit in the addressed data.

set VAL

Set the addressed data to a specific value. The size of VAL is defined by either one of the u32, u16 or u8 keywords in RAW\_OP, or the size of the addressed header field in LAYERED\_OP.

add VAL

Add the addressed data by a specific value. The size of VAL is defined by the size of the addressed header field in EXTENDED\_LAYERED\_OP. This operation is supported only for extended layered op.

decrement

Decrease the addressed data by one. This operation is supported only for ip ttl and ip6 hoplimit.

preserve

Keep the addressed data as is.

retain RVAL

This optional extra part of CMD\_SPEC allows to exclude bits from being changed. Supported only for 32 bits fields or smaller.

CONTROL

The following keywords allow to control how the tree of qdisc, classes, filters and actions is further traversed after this action.

reclassify

Restart with the first filter in the current list.

pipe Continue with the next action attached to the same filter.

drop

shot Drop the packet.

continue

Continue classification with the next filter in line.

pass Finish classification process and return to calling qdisc for further packet processing. This is the default.

## EXAMPLES

Being able to edit packet data, one could do all kinds of things, such as e.g. implementing port redirection. Certainly not the most useful application, but as an example it should do:

First, qdiscs need to be set up to attach filters to. For the receive path, a simple ingress qdisc will do, for transmit path a classful qdisc (HTB in this case) is necessary:

```
tc qdisc replace dev eth0 root handle 1: htb
```

```
tc qdisc add dev eth0 ingress handle ffff:
```

Finally, a filter with pedit action can be added for each direction. In this case, u32 is used matching on the port number to redirect from, while pedit then does the actual rewriting:

```
tc filter add dev eth0 parent 1: u32 \
```

```
match ip dport 23 0xffff \
```

```
action pedit pedit munge ip dport set 22
```

```
tc filter add dev eth0 parent ffff: u32 \
```

```
match ip sport 22 0xffff \
```

```
action pedit pedit munge ip sport set 23
```

```
tc filter add dev eth0 parent ffff: u32 \
```

```
match ip sport 22 0xffff \
```

```
action pedit ex munge ip dst set 192.168.1.199
```

```
tc filter add dev eth0 parent ffff: u32 \
```

```
match ip sport 22 0xffff \
```

```
action pedit ex munge ip6 dst set fe80::dadb:8aff:fec7:320e
```

```
tc filter add dev eth0 parent ffff: u32 \
```

```
match ip sport 22 0xffff \
```

```
action pedit ex munge eth dst set 11:22:33:44:55:66
```

```
tc filter add dev eth0 parent ffff: u32 \
```

```
match ip dport 23 0xffff \
```

```
action pedit ex munge tcp dport set 22
```

To rewrite just part of a field, use the retain directive. E.g. to overwrite the DSCP part of a dsfield with \$DSCP, without touching ECN:

```
tc filter add dev eth0 ingress flower ... \
```

```
    action pedit ex munge ip dsfield set $((DSCP << 2)) retain 0xfc
```

And vice versa, to set ECN to e.g. 1 without impacting DSCP:

```
tc filter add dev eth0 ingress flower ... \
```

```
    action pedit ex munge ip dsfield set 1 retain 0x3
```

SEE ALSO

tc(8), tc-htb(8), tc-u32(8)

iproute2

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