



## ***Rocky Enterprise Linux 9.2 Manual Pages on command 'ip-xfrm.8'***

**C:\>man ip-xfrm.8**

IP-XFRM(8)                      Linux                      IP-XFRM(8)

### NAME

ip-xfrm - transform configuration

### SYNOPSIS

ip [ OPTIONS ] xfrm { COMMAND | help }

ip xfrm XFRM-OBJECT { COMMAND | help }

XFRM-OBJECT := state | policy | monitor

ip xfrm state { add | update } ID [ ALGO-LIST ] [ mode MODE ] [ mark MARK [ mask MASK ] ] [ reqid REQID ] [ seq SEQ ] [ replay-window SIZE ] [ replay-seq SEQ ] [ replay-oseq SEQ ] [ replay-seq-hi SEQ ] [ replay-oseq-hi SEQ ] [ flag FLAG-LIST ] [ sel SELECTOR ] [ LIMIT-LIST ] [ encap ENCAP ] [ coa ADDR[/PLEN] ] [ ctx CTX ] [ extra-flag EXTRA-FLAG-LIST ] [ output-mark OUT? PUT-MARK ]

ip xfrm state allocspi ID [ mode MODE ] [ mark MARK [ mask MASK ] ] [ reqid REQID ] [ seq SEQ ] [ min SPI max SPI ]

ip xfrm state { delete | get } ID [ mark MARK [ mask MASK ] ]

ip [ -4 | -6 ] xfrm state deleteall [ ID ] [ mode MODE ] [ reqid REQID ] [ flag  
FLAG-LIST ]

ip [ -4 | -6 ] xfrm state list [ ID ] [ nokeys ] [ mode MODE ] [ reqid REQID ] [ flag  
FLAG-LIST ]

ip xfrm state flush [ proto XFRM-PROTO ]

ip xfrm state count

ID := [ src ADDR ] [ dst ADDR ] [ proto XFRM-PROTO ] [ spi SPI ]

XFRM-PROTO := esp | ah | comp | route2 | hao

ALGO-LIST := [ ALGO-LIST ] ALGO

ALGO := { enc | auth } ALGO-NAME ALGO-KEYMAT |

auth-trunc ALGO-NAME ALGO-KEYMAT ALGO-TRUNC-LEN |

aead ALGO-NAME ALGO-KEYMAT ALGO-ICV-LEN |

comp ALGO-NAME

MODE := transport | tunnel | beet | ro | in\_trigger

FLAG-LIST := [ FLAG-LIST ] FLAG

FLAG := noecn | decap-dscp | nopmtudisc | wildrecv | icmp | af-unspec | align4 |  
esn

SELECTOR := [ src ADDR[/PLEN] ] [ dst ADDR[/PLEN] ] [ dev DEV ]  
[ UPSPEC ]

UPSPEC := proto { PROTO |

{ tcp | udp | sctp | dccp } [ sport PORT ] [ dport PORT ] |

{ icmp | ipv6-icmp | mobility-header } [ type NUMBER ] [ code NUMBER ] |

gre [ key { DOTTED-QUAD | NUMBER } ] }

LIMIT-LIST := [ LIMIT-LIST ] limit LIMIT

LIMIT := { time-soft | time-hard | time-use-soft | time-use-hard } SECONDS |

{ byte-soft | byte-hard } SIZE |

{ packet-soft | packet-hard } COUNT

ENCAP := { espinudp | espinudp-nonike } SPORT DPORT OADDR

EXTRA-FLAG-LIST := [ EXTRA-FLAG-LIST ] EXTRA-FLAG

EXTRA-FLAG := dont-encap-dscp

ip xfrm policy { add | update } SELECTOR dir DIR [ ctx CTX ] [ mark MARK [ mask

MASK ] ] [ index INDEX ] [ ptype PTYPE ] [ action ACTION ] [ priority PRI?

ORITY ] [ flag FLAG-LIST ] [ LIMIT-LIST ] [ TMPL-LIST ]

ip xfrm policy { delete | get } { SELECTOR | index INDEX } dir DIR [ ctx CTX ] [

mark MARK [ mask MASK ] ] [ ptype PTYPE ]

ip [ -4 | -6 ] xfrm policy { deleteall | list } [ nosock ] [ SELECTOR ] [ dir DIR ]

[ index INDEX ] [ ptype PTYPE ] [ action ACTION ] [ priority PRIORITY ] [

flag FLAG-LIST]

ip xfrm policy flush [ ptype PTYPE ]

ip xfrm policy count

ip xfrm policy set [ hthresh4 LBITS RBITS ] [ hthresh6 LBITS RBITS ]

SELECTOR := [ src ADDR[/PLEN] ] [ dst ADDR[/PLEN] ] [ dev DEV ] [ UPSPEC ]

UPSPEC := proto { PROTO |

{ tcp | udp | sctp | dccp } [ sport PORT ] [ dport PORT ] |

{ icmp | ipv6-icmp | mobility-header } [ type NUMBER ] [ code NUMBER ] |

gre [ key { DOTTED-QUAD | NUMBER } ] }

DIR := in | out | fwd

PTYPE := main | sub

ACTION := allow | block

FLAG-LIST := [ FLAG-LIST ] FLAG

FLAG := localok | icmp

LIMIT-LIST := [ LIMIT-LIST ] limit LIMIT

LIMIT := { time-soft | time-hard | time-use-soft | time-use-hard } SECONDS |

{ byte-soft | byte-hard } SIZE |

{ packet-soft | packet-hard } COUNT

TMPL-LIST := [ TMPL-LIST ] tmpl TMPL

TMPL := ID [ mode MODE ] [ reqid REQID ] [ level LEVEL ]

ID := [ src ADDR ] [ dst ADDR ] [ proto XFRM-PROTO ] [ spi SPI ]

XFRM-PROTO := esp | ah | comp | route2 | hao

MODE := transport | tunnel | beet | ro | in\_trigger

LEVEL := required | use

ip xfrm monitor [ all-nsid ] [ nokeys ] [ all  
| LISTofXFRM-OBJECTS ]

LISTofXFRM-OBJECTS := [ LISTofXFRM-OBJECTS ] XFRM-OBJECT

XFRM-OBJECT := acquire | expire | SA | policy | aevent | report

## DESCRIPTION

xfrm is an IP framework for transforming packets (such as encrypting their payloads). This framework is used to implement the IPsec protocol suite (with the state object operating on the Security Association Database, and the policy object operating on the Security Policy Database). It is also used for the IP Payload Compression Protocol and features of Mobile IPv6.

ip xfrm state add        add new state into xfrm  
ip xfrm state update    update existing state in xfrm  
ip xfrm state allocspi   allocate an SPI value  
ip xfrm state delete    delete existing state in xfrm  
ip xfrm state get        get existing state in xfrm  
ip xfrm state deleteall delete all existing state in xfrm  
ip xfrm state list       print out the list of existing state in xfrm  
ip xfrm state flush     flush all state in xfrm  
ip xfrm state count     count all existing state in xfrm

ID is specified by a source address, destination address, transform protocol XFRM-PROTO, and/or Security Parameter Index SPI. (For IP Payload Compression, the Compression Parameter Index or CPI is used for SPI.)

## XFRM-PROTO

specifies a transform protocol: IPsec Encapsulating Security Payload (esp),

IPsec Authentication Header (ah), IP Payload Compression (comp), Mobile IPv6 Type 2 Routing Header (route2), or Mobile IPv6 Home Address Option (hao).

## ALGO-LIST

contains one or more algorithms to use. Each algorithm ALGO is specified by:

- ? the algorithm type: encryption (enc), authentication (auth or auth-trunc), authenticated encryption with associated data (aead), or compression (comp)
- ? the algorithm name ALGO-NAME (see below)
- ? (for all except comp) the keying material ALGO-KEYMAT, which may include both a key and a salt or nonce value; refer to the corresponding RFC
- ? (for auth-trunc only) the truncation length ALGO-TRUNC-LEN in bits
- ? (for aead only) the Integrity Check Value length ALGO-ICV-LEN in bits

Encryption algorithms include ecb(cipher\_null), cbc(des), cbc(des3\_ede), cbc(cast5), cbc(blowfish), cbc(aes), cbc(serpent), cbc(camellia), cbc(twofish), and rfc3686(ctr(aes)).

Authentication algorithms include digest\_null, hmac(md5), hmac(sha1), hmac(sha256), hmac(sha384), hmac(sha512), hmac(rmd160), and xcbc(aes).

Authenticated encryption with associated data (AEAD) algorithms include rfc4106(gcm(aes)), rfc4309(ccm(aes)), and rfc4543(gcm(aes)).

Compression algorithms include deflate, lzs, and lzjh.

load Compression modes are transport, tunnel, and (for IPsec ESP only) Bound End-to-End Tunnel (beet). Mobile IPv6 modes are route optimization (ro) and inbound trigger (in\_trigger).

#### FLAG-LIST

contains one or more of the following optional flags: noecn, decap-dscp, nopmtudisc, wildrecv, icmp, af-unspec, align4, or esn.

#### SELECTOR

selects the traffic that will be controlled by the policy, based on the source address, the destination address, the network device, and/or UPSPEC.

UPSPEC selects traffic by protocol. For the tcp, udp, sctp, or dccp protocols, the source and destination port can optionally be specified. For the icmp, ipv6-icmp, or mobility-header protocols, the type and code numbers can optionally be specified. For the gre protocol, the key can optionally be specified as a dotted-quad or number. Other protocols can be selected by name or number PROTO.

#### LIMIT-LIST

sets limits in seconds, bytes, or numbers of packets.

ENCAP encapsulates packets with protocol espinudp or espinudp-nonike, using source port SPORT, destination port DPORT, and original address OADDR.

MARK used to match xfrm policies and states

#### OUTPUT-MARK

used to set the output mark to influence the routing of the packets emitted by the state

ip xfrm policy add      add a new policy

ip xfrm policy update      update an existing policy

ip xfrm policy delete    delete an existing policy  
ip xfrm policy get      get an existing policy  
ip xfrm policy deleteall delete all existing xfrm policies  
ip xfrm policy list     print out the list of xfrm policies  
ip xfrm policy flush    flush policies

nosock filter (remove) all socket policies from the output.

## SELECTOR

selects the traffic that will be controlled by the policy, based on the source address, the destination address, the network device, and/or UPSPEC.

UPSPEC selects traffic by protocol. For the tcp, udp, sctp, or dccp protocols, the source and destination port can optionally be specified. For the icmp, ipv6-icmp, or mobility-header protocols, the type and code numbers can optionally be specified. For the gre protocol, the key can optionally be specified as a dotted-quad or number. Other protocols can be selected by name or number PROTO.

DIR selects the policy direction as in, out, or fwd.

CTX sets the security context.

PTYPE can be main (default) or sub.

ACTION can be allow (default) or block.

## PRIORITY

is a number that defaults to zero.

## FLAG-LIST

contains one or both of the following optional flags: local or icmp.

## LIMIT-LIST

sets limits in seconds, bytes, or numbers of packets.

## TMPL-LIST

is a template list specified using ID, MODE, REQID, and/or LEVEL.

ID is specified by a source address, destination address, transform protocol XFRM-PROTO, and/or Security Parameter Index SPI. (For IP Payload Compression, the Compression Parameter Index or CPI is used for SPI.)

## XFRM-PROTO

specifies a transform protocol: IPsec Encapsulating Security Payload (esp), IPsec Authentication Header (ah), IP Payload Compression (comp), Mobile IPv6 Type 2 Routing Header (route2), or Mobile IPv6 Home Address Option (hao).

MODE specifies a mode of operation for the transform protocol. IPsec and IP Payload Compression modes are transport, tunnel, and (for IPsec ESP only) Bound End-to-End Tunnel (beet). Mobile IPv6 modes are route optimization (ro) and inbound trigger (in\_trigger).

LEVEL can be required (default) or use.

`ip xfrm policy count` count existing policies

Use one or more `-s` options to display more details, including policy hash table information.

`ip xfrm policy set` configure the policy hash table

Security policies whose address prefix lengths are greater than or equal policy hash table thresholds are hashed. Others are stored in the `policy_inexact` chained list.

LBITS specifies the minimum local address prefix length of policies that are stored in the Security Policy Database hash table.

RBITS specifies the minimum remote address prefix length of policies that are stored in the Security Policy Database hash table.

ip xfrm monitor state monitoring for xfrm objects

The xfrm objects to monitor can be optionally specified.

If the all-nsid option is set, the program listens to all network namespaces that have a nsid assigned into the network namespace where the program is running. A prefix is displayed to show the network namespace where the message originates. Example:

```
[nsid 1]Flushed state proto 0
```

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