User Guide for mmb 0.1

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mmb (modular middlebox) is a vpp plugin that performs various middlebox behaviors.

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`mmb <command>`
SYNTAX : `add|del|list|flush`

This parameter determines the command applied on the policy list.
Allowed values:

- `add` : add a policy to the policy list

- `del` : remove a policy from the policy list

- `list` : list the policies in the policy list.

- `flush` : remove all policies from the policy list

2.1 add/remove policies

`mmb add|del <match> [<match> ...]  <target> [<target> ...]`

- `<match>`
  SYNTAX : `[!] <field> [[<cond>] <value>]`

  This parameter is a constraint that determines the packets on which the policy will operate.

  If a `<match>` is composed of a `<field>` alone, the constraint is that the packet should contain the field. If it is composed of a `<field>` and a `<value>`, the constraint is that the packet should contain the field and it should be set to the specified value. If it is composed of a `<field>`, a `<cond>` and a `<value>`, then the constraint is that the packet should contain the field, and the condition on the value should be true.

  The ! operator applied on one constraint performs the logical NOT of the constraint. Multiple constraints can be inputted for the same rule, the resulting constraint is the logical AND of all inputted constraints.

- `<target>`
  SYNTAX : `mod [...]|strip [...]|drop`

  This parameter determines the action(s) to apply on matched packets.

  - `mod <field> <value>` : modify a field on a packet.
  - `strip [!] <field>` : strip options from a packet.
    If the ! operator is placed after the strip keyword, the following option will be added to the whitelist (the only authorized options), if not it will be added to the blacklist (the forbidden options).
    The special keyword `all` can be used in a `strip` target to strip all options from the matched packet.
  - `drop` : drop a packet

2.1.1 `<cond>`

A condition is applied on a `<value>` from a `<field>` to form a constraint. Note that > and < have to be escaped if typed from a bash shell.
Available conditions: ==, !=, <=, >=, <, >.

2.1.2 `<field>`

Available fields:

- interfaces: `in`, `out`

- protocols[1]: `ip`, `tcp`, `udp`, `icmp`

- IPv4 fields: `ip-ver`, `ip-ihl`, `ip-dscp`, `ip-ecn`, `ip-non-ect`[2], `ip-ect0`[2], `ip-ect1`[2], `ip-ce`[2], `ip-len`, `ip-id`, `ip-flags`, `ip-res`, `ip-df`, `ip-mf`, `ip-frag-offset`, `ip-ttl`, `ip-proto`, `ip-checksum`, `ip-saddr`[3], `ip-daddr`[3].

- ICMPv4 fields: `icmp-type`, `icmp-code`, `icmp-checksum`, `icmp-payload`.

- User Datagram Protocol (UDP) fields: `udp-sport`, `udp-dport`, `udp-len`, `udp-checksum`, `udp-payload`.

- Transmission Control Protocol (TCP) fields: `tcp-sport`, `tcp-dport`, `tcp-seq-num`, `tcp-ack-num`, `tcp-offset`, `tcp-res`, `tcp-cwr`, `tcp-ece`, `tcp-urg`, `tcp-ack`, `tcp-push`, `tcp-res`, `tcp-syn`, `tcp-fin`, `tcp-flags`, `tcp-win`, `tcp-checksum`, `tcp-urg-ptr`, `tcp-payload`.

- TCP options: `tcp-opt-mss`, `tcp-opt-wscale`, `tcp-opt-sackp`, `tcp-opt-sack`, `tcp-opt-timestamp`, `tcp-opt-fast-open`, `tcp-opt-fast-open`.

- Custom TCP options: `tcp-opt [<kind>]`
  Replace `<kind>` with the kind of option in decimal. When employed in a `<match>` without a `<kind>`, checks if the packet contains any option.

2.1.3 `<value>`

The value of a field is in decimal or in hexadecimal if preceeded by `x`.

2.1.4 Examples

```
vpp# mmb add all mod ip-ecn 0
```
ECN bleaching

```
vpp# mmb add ip-proto udp drop
```
Block UDP

---

[1] applicable only to `net-proto` or `ip-proto` fields in a `<match>`
[2] not followed by `<value>`
[3] the following `<value>` can include a subnet mask, the == condition will become subnet matching

```
vpp# mmb add ip-proto != tcp drop
```
Block every IP protocol but TCP

```
vpp# mmb add ip-proto != udp ip-proto != tcp drop
```
Block every IP protocol but TCP and UDP

```
vpp# mmb add ip-proto udp drop
vpp# mmb add ip-proto tcp drop
```
Block TCP and UDP

```
vpp# mmb add tcp-dport 80 mod tcp-dport 443
```
Rewrite TCP port 80 to port 443

```
vpp# mmb add tcp-opt-mss strip tcp-opt-mss
```
Strip MSS option

```
vpp# mmb add tcp-opt-mss > 1500 mod tcp-opt-mss 1460
```
If MSS is larger than 1500, set it to 1460

```
vpp# mmb add tcp-opt strip ! tcp-opt-mss
```
Strip all options but MSS

```
vpp# mmb add tcp-opt strip tcp-opt-mss strip tcp-opt-wscale
```
Strip MSS and WScale

```
vpp# mmb add tcp-opt-timestamp strip all
```
Strip all options if packet contains timestamp option

```
vpp# mmb add tcp-opt strip ! tcp-opt-mss strip ! tcp-opt-wscale
```
Strip all options except mss and wscale if packet contains timestamp option (whitelist)

```
vpp# mmb add tcp-opt strip tcp-opt-mss strip tcp-opt-wscale
```
Strip all mss and wscale if packet contains timestamp option (blacklist)

```
vpp# mmb add tcp-opt ! tcp-opt-mss ! tcp-opt-wscale drop
```
Drop all TCP packets with options different than MSS or WScale.

```
vpp# mmb add ! tcp-opt-mss ! tcp-opt-wscale drop
```
Drop all TCP packets that do not contain MSS nor WScale.

```
vpp# mmb add tcp-opt 22 drop
```
Drop all TCP packets that contain option 22

2.2   stateful polices