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# Full NetFlow export format

## General Settings

Enabling statistics collection and export:

```
netflow=1
```

- 0 or not set - the option is disabled
- 1 - export statistics by protocols (port numbers)
- 2 - export statistics by directions (autonomous system numbers)
- 4 - export statistics for billing
- 8 - export full session statistics



3 = 1 + 2 — simultaneous export of protocol-based and direction-based statistics (the same logic applies to other combinations)  
12 = 8 + 4 — simultaneous export of full NetFlow and billing statistics. In particular, this is used for [RADIUS Accounting](#)

Network interface name through which NetFlow statistics will be sent:

```
netflow_dev=eth2
```

Data export interval (in seconds):

```
netflow_timeout=10
```

Session timeout:

- `netflow_passive_timeout` — inactivity timeout after which, if there is no activity, the session is considered finished and its data is exported
- `netflow_active_timeout` — interval after which information about long sessions is reported (i.e., long sessions are effectively split into fragments of this duration)

To smooth peaks and distribute the load on the collector more evenly, set the tuning parameter

```
netflow_rate_limit=60
```

, where 60 is the maximum NetFlow rate in Mbit/s.



The parameter value should be set based on the following calculation: 6 Mbit/s per each 1G of external link bandwidth.  
Setting an insufficient value will result in data being dropped on the DPI side. Information about this event will be recorded in the log `/var/log/dpi/fastdpi_alert.log`.



A separate collector must be allocated for each type so that data is not mixed!



IPFIX/NetFlow parameters can be changed without restarting fastDPI.

The configuration parameter `ipfix_reserved` allows reserving the required amount of memory to enable/change IPFIX/NetFlow parameters.

If IPFIX/NetFlow parameters are specified in the configuration file, memory reservation for IPFIX/NetFlow is enabled automatically, and parameters as well as new IPFIX/NetFlow exporter types can be changed without restarting fastDPI.

## Full NetFlow

IP address and port number of the **NetFlow collector with full statistics**; a separate collector must be allocated so that data is not mixed with other statistics:

```
netflow_full_collector=192.168.0.1:9996
```

In NetFlow5 format, the full statistics retain the original port numbers, and information about detected protocols is transmitted in the usually unused bytes 46–47. If it is necessary to analyze the protocols in use, you can enable a setting in which protocol information is transmitted in the port number:

```
netflow_full_port_swap=1
```

For compatibility with older collectors, this setting also applies to the IPFIX format, but it is not recommended to use it together with IPFIX, since protocol information in IPFIX is transmitted in a separate dedicated field.

It is also necessary to define the full NetFlow export format:

```
netflow_full_collector_type=2
```

Possible values:

- **0** - export in NetFlow5 format (default)
- **1** - export IPFIX to a UDP collector
- **2** - export IPFIX to a TCP collector



**We recommend using full NetFlow export in IPFIX format over TCP (parameter value 2).**

The NetFlow protocol does not guarantee packet delivery (as it runs over UDP), and if the collector cannot handle the incoming data rate, some packets will simply be lost. Exporting full NetFlow statistics for a 10G link requires the collector to be able to receive data at a rate of at least 60 Mbit/s.

Check the capabilities of your collector before sending NetFlow traffic to it. At the same time, short-term bursts of up to 100 Mbit/s may occur when exporting NetFlow from DPI. Only a few collectors can handle such a data stream without losses, for



The `netflow_tos_format` parameter defines the data format of the TOS field in IPFIX. Possible values:

- **0** - 3 bits are transmitted (default)
- **1** - 6 bits are transmitted (full DSCP)

The `netflow_plc_stat` parameter defines the set of transmitted statistics data for dropped packets according to policing or drop rules. The parameter is a bit mask.

By default, the mask value is **0x07** — statistics are transmitted for dropped data due to session + subscriber + virtual channel policing.

! Affects the formation of the `DROPPED_BYTES` and `DROPPED_PACKETS` counters.

Mask values:

- **0xff** - count any drop
- **0** - do not count
- **1** - count for session policing
- **2** - count for subscriber policing
- **4** - count for virtual channel policing
- **8** - count drops by protocol
- **16** - count in all other cases

The `ipfix_mtu_limit` parameter sets the maximum UDP packet size when sending IPFIX. By default, it is equal to the minimum MTU size of the interfaces used for transmission.

The `tethering_ttl_allowed = 128:64` parameter specifies the list of allowed TTL values for subscriber traffic that are not considered tethering. Values are separated by ':'. Up to 256 values (0-255) are supported.



For receiving, processing, and storing IPFIX data, it is recommended to use the [QoE Store statistics collection software](#) and the [DPIUI2 graphical interface](#).

For collecting data in IPFIX format, any universal IPFIX collector that supports templates, or the [IPFIX Receiver](#) utility, can be used.

## Export Template in IPFIX Format (Netflow v10) for IPv4 Protocol

| Export Template for IPv4 |       |           |      |                    |                                  |                 |
|--------------------------|-------|-----------|------|--------------------|----------------------------------|-----------------|
| No                       | Bytes | Data Type | IANA | Description        | Notes                            | Used in QoEStor |
| 1                        | 8     | int64     | 0    | OCTET_DELTA_COUNT  | Analog in NetFlow v9<br>IN_BYTES | Used            |
| 2                        | 8     | int64     | 0    | PACKET_DELTA_COUNT | Analog in NetFlow v9<br>IN_PKTS  | Used            |

| Export Template for IPv4 |       |             |       |                                 |   |             |
|--------------------------|-------|-------------|-------|---------------------------------|---|-------------|
| №                        | Bytes | Data Type   | IANA  | Description                     | Notes   | Used in QoS |
| 4                        | 1     | int8        | 0     | PROTOCOL_IDENTIFIER             | Analog in NetFlow v9 PROTOCOL   | Used        |
| 5                        | 1     | int8        | 0     | IP_CLASS_OF_SERVICE             | Analog in NetFlow v9 TOS  | Used        |
| 7                        | 2     | int16       | 0     | SOURCE_TRANSPORT_PORT           | Analog in NetFlow v9 L4_SRC_PORT  | Used        |
| 8                        | 4     | int32       | 0     | SOURCE_IPV4_ADDRESS             | Analog in NetFlow v9 IPV4_SRC_ADDR  | Used        |
| 11                       | 2     | int16       | 0     | DESTINATION_TRANSPORT_PORT      | Analog in NetFlow v9 L4_DST_PORT  | Used        |
| 12                       | 4     | int32       | 0     | DESTINATION_IPV4_ADDRESS        | Analog in NetFlow v9 IPV4_DST_ADDR  | Used        |
| 16                       | 4     | int32       | 0     | BGP_SOURCE_AS_NUMBER            | Analog in NetFlow v9 SRC_AS   | Used        |
| 17                       | 4     | int32       | 0     | BGP_DESTINATION_AS_NUMBER       | Analog in NetFlow v9 DST_AS   | Used        |
| 152                      | 8     | int64       | 0     | FLOW_START_MILLISECOND          |   | Used        |
| 153                      | 8     | int64       | 0     | FLOW_END_MILLISECOND            |   | Used        |
| 10                       | 2     | int16       | 0     | INPUT_SNMP                      | Analog in NetFlow v9 IngressInterface   | Used        |
| 14                       | 2     | int16       | 0     | OUTPUT_SNMP                     | Analog in NetFlow v9 EgressInterface  | Used        |
| 60                       | 1     | int8        | 0     | IP_VERSION                      | Analog in NetFlow v9 IP_PROTOCOL_VERSION  | Used        |
| 2000                     | 8     | int64       | 43823 | SESSION_ID                      |   | Used        |
| 2001                     | -     | string      | 43823 | HTTP_HOST or CN_HTTPS           |   | Used        |
| 2002                     | 2     | int16       | 43823 | DPI_PROTOCOL                    |   | Used        |
| 2003                     | -     | string      | 43823 | LOGIN                           | Analog in Radius User-Name  | Used        |
| 225                      | 4     | int32       | 0     | POST_NAT_SOURCE_IPV4_ADDRESS    |   | Used        |
| 227                      | 2     | int16       | 0     | POST_NAPT_SOURCE_TRANSPORT_PORT |   | Used        |
| 2010                     | 2     | int16       | 43823 | FRGMT_DELTA_PACKS               | Delta of fragmented packets.  | Used        |
| 2011                     | 2     | int16       | 43823 | REPEAT_DELTA_PACK               | Delta of retransmissions.   | Used        |
| 2012                     | 4     | int32       | 43823 | PACKET_DELIVER_TIME             | Delay (RTT/2) in ms (RTT=round-trip time).  | Used        |
| 2016                     | 2     | int16       | 43823 | BRIDGE_CHANNEL_NUM              | Channel number (vchannel) or bridge. If vchannels are configured in DPI, the channel number will be transmitted, otherwise the bridge number. | Used        |
| 6                        | 2     | int16       | 0     | TCP_FLAGS                       | TCP control bits  | Used        |
| 58                       | 2     | int16       | 0     | SRC_VLAN                        | VLAN ID   | Used        |
| 59                       | 2     | int16       | 0     | DST_VLAN                        | Post VLAN ID  | Used        |
| 56                       | 6     | mac_address | 0     | SRC_MAC                         | Source MAC address  | Used        |

| Export Template for IPv4 |       |             |       |                 |  |             |
|--------------------------|-------|-------------|-------|-----------------|--|-------------|
| No                       | Bytes | Data Type   | IANA  | Description     | Notes  | Used in QoS |
| 57                       | 6     | mac_address | 0     | DST_MAC         | Destination MAC address  | Used        |
| 2017                     | -     | raw         | 43823 | MPLS Labels     |  | Used        |
| 132                      | 8     | int64       | 0     | DROPPED_BYTES   | Delta count of dropped octets.<br><i>For example: data is dumped at minute T1 and T2. The delta will show the difference in the number of octets between minute T1 and T2.</i>   | Used        |
| 133                      | 8     | int64       | 0     | DROPPED_PACKETS | Delta count of dropped packets.<br><i>For example: data is dumped at minute T1 and T2. The delta will show the difference in the number of packets between minute T1 and T2.</i> | Used        |
| 2019                     | 1     | int8        | 43823 | originalTOS     | Original TOS value from IP header  | Used        |
| 192                      | 1     | int8        | 0     | IP_TTL          | TTL packets  |             |
| 2020                     | 2     | int16       | 43823 | RATING_GROUP    | Rating group number  |             |

## Export Template in IPFIX Format (Netflow v10) for IPv6 Protocol

The template is similar to IPv4 except that the following fields are absent: **SOURCE\_IPV4\_ADDRESS**, **DESTINATION\_IPV4\_ADDRESSES**, **POST\_NAT\_SOURCE\_IPV4\_ADDRESS**, **POST\_NAT\_SOURCE\_TRANSPORT\_PORT**, - and the following are present:

| Export Template for IPv6 |       |           |      |                          |                                    |
|--------------------------|-------|-----------|------|--------------------------|------------------------------------|
| No                       | Bytes | Data Type | IANA | Description              | Notes                              |
| 27                       | 16    | int128    | 0    | SOURCE_IPV6_ADDRESS      | Analog in NetFlow v9 IPV6_SRC_ADDR |
| 28                       | 16    | int128    | 0    | DESTINATION_IPV6_ADDRESS | Analog in NetFlow v9 IPV6_DST_ADDR |