



DOCA LIBRARIES API

Reference Manual

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Chapter 1. Change Log

This chapter lists changes in API that were introduced to the library.

1.3.0

- ▶ Field Groups, GPU Groups, and field watches created with a handle returned from `dcgmConnect()` are now cleaned up upon disconnect. `dcgmConnect_v2()` can be used to get the old behavior of objects persisting after disconnect.
- ▶ `dcgmConnect_v2()` was added as a method for specifying additional connection options when connecting to the host engine.
- ▶ `dcgmUnwatchFields()` was added as a method of unwatching fields that were previously watched with `dcgmWatchFields()`
- ▶ `dcgmActionValidate_v2()` was added to be able to pass more parameters to the DCGM GPU Diagnostic.
- ▶ `dcgmDiagResponse_t` was increased from v2 to v3. See `dcgmDiagResponse_v3` for details

1.2.3

- ▶ No API changes in this version.

1.1.1

- ▶ `dcgmGetAllSupportedDevices()` was added as a method to get DCGM-supported GPU IDs. `dcgmGetAllDevices()` can still be used to get all GPU IDs in the system.

1.0.0

- ▶ Initial Release.

Chapter 2. Modules

Here is a list of all modules:

- ▶ [APSH](#)
- ▶ [Compatibility Management](#)
- ▶ [Deep packet inspection](#)
- ▶ [flow](#)
- ▶ [flow net define](#)
- ▶ [Logging Management](#)
- ▶ [NetFlow](#)
- ▶ [Telemetry Service Library](#)
- ▶ [Version Management](#)

2.1. APSH

DOCA App Shield library let you to monitor operation system that resides on the host. This is done with the DPU DMA capabilities and the regex engine. Please follow the programmer guide for system configurations.

enum `doca_apsh_system_layer`

system supported layer types

Values

DOCA_APSH_LAYER_BARE_METAL

Bare metal system - no abstraction layer

DOCA_APSH_LAYER_VM

Virtual system

DOCA_APSH_LAYER_DOCKER_CONTAINER

Docker process

enum doca_apsh_system_os

system os types

Values

DOCA_APSH_SYSTEM_LINUX

linux

DOCA_APSH_SYSTEM_WINDOWS

windows

```
const __DOCA_EXPERIMENTAL void
* __doca_apsh_attst_info_get (doca_apsh_attestation
*attestation, enum doca_apsh_attestation_attr attr)
```

Shadow function - get attribute value for a attestation.

Parameters

attestation

single attestation handler

attr

Attribute to get the info on the attestation

Returns

return the info requested, need to cast

Description

Do not use this function, recommended to use doca_apsh_attestation_info_get

```
const __DOCA_EXPERIMENTAL void
* __doca_apsh_lib_info_get (doca_apsh_lib *lib, enum
doca_apsh_lib_attr attr)
```

Shadow function - get attribute value for a lib.

Parameters

lib

single lib handler

attr

Attribute to get the info on the lib

Returns

return the info requested, need to cast

Description

Do not use this function, recommended to use `doca_apsh_lib_info_get`

```

const __DOCA_EXPERIMENTAL void
*__doca_apsh_module_info_get (doca_apsh_module
*module, enum doca_apsh_module_attr attr)

```

Shadow function - get attribute value for a module.

Parameters

module

single module handler

attr

Attribute to get the info on the module

Returns

return the info requested, need to cast

Description

Do not use this function, recommended to use `doca_apsh_mod_info_get`

```

const __DOCA_EXPERIMENTAL void
*__doca_apsh_proc_info_get (doca_apsh_process
*process, enum doca_apsh_process_attr attr)

```

Shadow function - get attribute value for a process.

Parameters

process

single process handler

attr

Attribute to get the info on the process

Returns

return the info requested, need to cast

Description

Do not use this function, recommended to use `doca_apsh_proc_info_get`

```
const __DOCA_EXPERIMENTAL void
*__doca_apsh_thread_info_get (doca_apsh_thread
*thread, enum doca_apsh_lib_attr attr)
```

Shadow function - get attribute value for a thread.

Parameters

thread

single thread handler

attr

Attribute to get the info on the thread

Returns

return the info requested, need to cast

Description

Do not use this function, recommended to use `doca_apsh_thread_info_get`

```
const __DOCA_EXPERIMENTAL void
*__doca_apsh_vad_info_get (doca_apsh_vad *vad,
enum doca_apsh_lib_attr attr)
```

Shadow function - get attribute value for a vad.

Parameters

vad

single vad handler

attr

Attribute to get the info on the vad

Returns

return the info requested, need to cast

Description

Do not use this function, recommended to use `doca_apsh_vad_info_get`

```

__DOCA_EXPERIMENTAL void
doca_apsh_attestation_free (doca_apsh_attestation
**attestation)

```

Destroys a attestation context.

Parameters

attestation

Attestation opaque pointer of the process to destroy

```

__DOCA_EXPERIMENTAL int
doca_apsh_attestation_get (doca_apsh_process
*process, const char *exec_hash_map_path,
doca_apsh_attestation attestation)

```

Get current process attestation.

Parameters

process

Process handler

exec_hash_map_path

path to file containing the hash calculations of the executable and dlls/libs of the process note that changing the process code or any libs can effect this. The file can be created by running the doca_exec_hash_build_map tool on the system.

attestation

Attestation opaque pointers of the process

Returns

Size of the array, error code on negative value.

Description

This function is multithreaded compatible with different system context, meaning do not call this function simultaneously with the same system context. The return is snapshot, this is not dynamic, need to free it.

```
__DOCA_EXPERIMENTAL int
doca_apsh_attst_refresh
(doca_apsh_attestationattestation)
```

refresh single attestation handler of a process with new snapshot

Parameters

attestation

single attestation handler to refresh

Returns

Size of the array, error code on negative value.

Description

This function is multithreaded compatible with different system context, Refresh the snapshot of the handler. Recommended to query all wanted information before refreshing.

```
__DOCA_EXPERIMENTAL doca_apsh_ctx
*doca_apsh_create (void)
```

Create a new apsh handler.

Returns

apsh context required for creating system handler, NULL on failure

Description

Allocate memory and init the opaque struct for apsh handler. Before using the system handler use doca_apsh_start

```
__DOCA_EXPERIMENTAL void doca_apsh_destroy
(doca_apsh_ctx *ctx)
```

Free the APSH memory and close connections.

Parameters

ctx

apsh context to destroy

```
__DOCA_EXPERIMENTAL int
doca_apsh_dma_dev_set (doca_apsh_ctx *ctx, const
char *dma_dev_name)
```

Set apsh dma device.

Parameters

ctx

apsh handler

dma_dev_name

device name with the capabilities of dma

Returns

0 on success, error code otherwise.

Description

This is a Mandatory setter

```
__DOCA_EXPERIMENTAL void doca_apsh_libs_free
(doca_apsh_lib **libs)
```

Destroys a libs context.

Parameters

libs

Array of libs opaque pointers of the process to destroy

```
__DOCA_EXPERIMENTAL int doca_apsh_libs_get
(doca_apsh_process *process, doca_apsh_liblibs)
```

Get array of current process loadable libraries.

Parameters

process

Process handler

libs

Array of libs opaque pointers of the process

Returns

Size of the array, error code on negative value.

Description

This function is multithreaded compatible with different system context, meaning do not call this function simultaneously with the same system context. The return array is snapshot, this is not dynamic array, need to free it.

```
__DOCA_EXPERIMENTAL void  
doca_apsh_module_free (doca_apsh_module  
*modules)
```

Destroys a modules array.

Parameters

modules

Array of module opaque pointers of the systems to destroy

```
__DOCA_EXPERIMENTAL int doca_apsh_module_get  
(doca_apsh_system *system,  
doca_apsh_modulemodules)
```

Get array of current modules installed on the system.

Parameters

system

System handler

modules

Array of module opaque pointers of the systems

Returns

Size of the array, error code on negative value.

Description

This function is multithreaded compatible with different system context, meaning do not call this function simultaneously with the same system context. The return array is snapshot, this is not dynamic array, need to free it.

```

__DOCA_EXPERIMENTAL int
doca_apsh_proc_refresh (doca_apsh_process
*process)

```

refresh single process handler with new snapshot

Parameters

process

single process handler to refresh

Returns

0 on success, error code otherwise.

Description

This function is multithreaded compatible with different system context, Refresh the snapshot of the handler. Recommended to query all wanted information before refreshing.

```

__DOCA_EXPERIMENTAL void
doca_apsh_processes_free (doca_apsh_process
**processes)

```

Destroys a process context.

Parameters

processes

Array of process opaque pointers of the systems to destroy

```

__DOCA_EXPERIMENTAL int
doca_apsh_processes_get (doca_apsh_system
*system, doca_apsh_processprocesses)

```

Get array of current processes running on the system.

Parameters

system

System handler

processes

Array of process opaque pointers of the systems

Returns

Size of the array, error code on negative value.

Description

This function is multithreaded compatible with different system context, meaning do not call this function simultaneously with the same system context. The return array is snapshot, this is not dynamic array, need to free it.

```
__DOCA_EXPERIMENTAL int
doca_apsh_regex_dev_set (doca_apsh_ctx *ctx, const
char *regex_dev_name)
```

Set apsh regex device.

Parameters

ctx

apsh handler

regex_dev_name

device name with the capabilities of regex

Returns

0 on success, error code otherwise.

Description

This is a Mandatory setter

```
__DOCA_EXPERIMENTAL int doca_apsh_start
(doca_apsh_ctx *ctx)
```

Start apsh handler.

Parameters

ctx

App Shield handler

Returns

0 on success, error code otherwise.

Description

Start apsh handler and init connection to devices. Need to set apsh params with setter functions before starting the system. Mandatory setters: `os_symbol_map`, `mem_region`, `pcidev`. Other setters can be query automatically but will take time.

```
__DOCA_EXPERIMENTAL int
doca_apsh_sys_mem_region_set (doca_apsh_system
*system, const char *system_mem_region_path)
```

Set system allowed memory regions.

Parameters

system

system handler

system_mem_region_path

path to json file containing the memory regions of the devices The memory regions are uniq per system, would not change on reboot or between defrent PCI devices of the same system. note that adding/removing device from the host can change the regions. The json can be created by running the `doca_system_mem_region` tool on the system.

Returns

0 on success, error code otherwise.

Description

This is a Mandatory setter

```
__DOCA_EXPERIMENTAL int
doca_apsh_sys_os_symbol_map_set
(doca_apsh_system *system, const char
*system_os_symbol_map_path)
```

Set system os symbol map.

Parameters

system

system handler

system_os_symbol_map_path

the os memory map data, uniq per os build please note that changing linux kernel (adding/removing modules) will change the map should be created by running the doca_system_os_symbol_map tool on the system os

Returns

0 on success, error code otherwise.

Description

This is a Mandatory setter

__DOCA_EXPERIMENTAL int

doca_apsh_sys_os_type_set (doca_apsh_system *system, doca_apsh_system_layer os_type)

Set system os type.

Parameters**system**

system handler

os_type

system os type - windows/linux

Returns

0 on success, error code otherwise.

Description

This is a must setter

__DOCA_EXPERIMENTAL int

doca_apsh_sys_pcidev_set (doca_apsh_system *system, int bdf)

Set system net device.

Parameters**system**

system handler

bdf

pci function name connected to the system to run apsh on ex: "0000:00:01.0" as long format
or "00:01.0" as short format

Returns

0 on success, error code otherwise.

Description

This is a Mandatory setter

```
__DOCA_EXPERIMENTAL int
doca_apsh_sys_system_layer_set
(doca_apsh_system *system,
doca_apsh_system_layer layer_type)
```

Set system layer type.

Parameters**system**

system handler

layer_type

system layer type - bare metal/vm ...

Returns

0 on success, error code otherwise.

Description

This is a optional setter

```
__DOCA_EXPERIMENTAL doca_apsh_system
*doca_apsh_system_create (doca_apsh_ctx *ctx)
```

Create a new system handler.

Parameters**ctx**

apsh handler

Returns

returns system pointer, NULL on failure

Description

Allocate memory and init the opaque struct for system handler. Before using the system handler use `doca_apsh_system_start`

```
__DOCA_EXPERIMENTAL void  
doca_apsh_system_destroy (doca_apsh_system  
*system)
```

Destroy system handler.

Parameters

system

system context to destroy

Description

This will not destroy process/module/libs ...

```
__DOCA_EXPERIMENTAL int  
doca_apsh_system_start (doca_apsh_system  
*system)
```

Start system handler.

Parameters

system

system handler

Returns

0 on success, error code otherwise.

Description

Start system handler and init connection to the system. Need to set system params with setter functions before starting the system. Mandatory setters: `os_symbol_map`, `mem_region`, `pcidev`. Other setters can be query automatically but will take time.

```
__DOCA_EXPERIMENTAL void
doca_apsh_threads_free (doca_apsh_thread
**threads)
```

Destroys a threads context.

Parameters

threads

Array of threads opaque pointers of the process to destroy

```
__DOCA_EXPERIMENTAL int doca_apsh_threads_get
(doca_apsh_process *process,
doca_apsh_threadthreads)
```

Get array of current process threads.

Parameters

process

Process handler

threads

Array of threads opaque pointers of the process

Returns

Size of the array, error code on negative value.

Description

This function is multithreaded compatible with different system context, meaning do not call this function simultaneously with the same system context. The return array is snapshot, this is not dynamic array, need to free it.

```
__DOCA_EXPERIMENTAL void doca_apsh_vads_free
(doca_apsh_vad **vads)
```

Destroys a vads context.

Parameters

vads

Array of vads opaque pointers of the process to destroy

```
__DOCA_EXPERIMENTAL int doca_apsh_vads_get
(doca_apsh_process *process, doca_apsh_vadvads)
```

Get array of current process vads - virtual address descriptor.

Parameters

process

Process handler

vads

Array of vads opaque pointers of the process

Returns

Size of the array, error code on negative value.

Description

This function is multithreaded compatible with different system context, meaning do not call this function simultaneously with the same system context. The return array is snapshot, this is not dynamic array, need to free it.

```
#define doca_apsh_attst_info_get
((attr##_TYPE) __doca_apsh_attst_info_get(attestation,
attr))
```

Get attribute value for a attestation.

Get the requested info from attestation handler. The info is right to the snapshot (at the get function moment) full list (type and descriptions) can be found in doca_apsh_attr.h

```
#define doca_apsh_lib_info_get
((attr##_TYPE) __doca_apsh_lib_info_get(lib, attr))
```

Get attribute value for a lib.

Get the requested info from lib handler. The info is right to the snapshot (at the get function moment) full list (type and descriptions) can be found in doca_apsh_attr.h

```
#define doca_apsh_module_info_get
((attr##_TYPE)__doca_apsh_module_info_get(module,
attr))
```

Get attribute value for a module.

Get the requested info from module handler. The info is right to the snapshot (at the get function moment) full list (type and descriptions) can be found in doca_apsh_attr.h

```
#define doca_apsh_proc_info_get
((attr##_TYPE)__doca_apsh_proc_info_get(process,
attr))
```

Get attribute value for a process.

Get the requested info from process handler. The info is right to the snapshot (at the get function moment) full list (type and descriptions) can be found in doca_apsh_attr.h

```
#define doca_apsh_thread_info_get
((attr##_TYPE)__doca_apsh_thread_info_get(thread,
attr))
```

Get attribute value for a thread.

Get the requested info from thread handler. The info is right to the snapshot (at the get function moment) full list (type and descriptions) can be found in doca_apsh_attr.h

```
#define doca_apsh_vad_info_get
((attr##_TYPE)__doca_apsh_vad_info_get(vad, attr))
```

Get attribute value for a vad.

Get the requested info from vad handler. The info is right to the snapshot (at the get function moment) full list (type and descriptions) can be found in doca_apsh_attr.h

2.2. Compatibility Management

Lib to define compatibility with current version, define experimental Symbols.

To set a Symbol (or specifically a function) as experimental:

```
__DOCA_EXPERIMENTAL int func_declare(int param1, int param2);
```

To remove warnings of experimental compile with "-D DOCA_ALLOW_EXPERIMENTAL_API"

```
#define __DOCA_EXPERIMENTAL
__attribute__((deprecated("Symbol is defined as
experimental"), section(".text.experimental")))
```

To set a Symbol (or specifically a function) as experimental.

2.3. Deep packet inspection

DOCA Deep packet inspection library. For more details please refer to the user guide on DOCA devzone.

struct doca_dpi_config_t

DPI init configuration.

struct doca_dpi_parsing_info

L2-L4 flow information.

struct doca_dpi_result

Dequeue result.

struct doca_dpi_sig_data

Extra signature data.

struct doca_dpi_sig_info

Signature info.

struct doca_dpi_stat_info

DPI statistics.

enum doca_dpi_dequeue_status_t

Status of dequeue operation.

Values

DOCA_DPI_DEQ_NA

No DPI enqueued jobs done, or no packets to dequeue

DOCA_DPI_DEQ_READY

DPI Job and result is valid

enum doca_dpi_enqueue_status_t

Status of enqueue operation.

Values

DOCA_DPI_ENQ_PROCESSING

Packet enqueued for processing

DOCA_DPI_ENQ_PACKET_EMPTY

No payload, packet was not queued

DOCA_DPI_ENQ_BUSY

Packet cannot be enqueued, queue is full

DOCA_DPI_ENQ_INVALID_DB

load_signatures failed, or was never called

DOCA_DPI_ENQ_INTERNAL_ERR

enum doca_dpi_flow_status_t

Status of enqueued entry.

Values

DOCA_DPI_STATUS_LAST_PACKET = 1<<1

Indicates there are no more packets in queue from this flow.

DOCA_DPI_STATUS_DESTROYED = 1<<2

Indicates flow was destroyed while being processed

DOCA_DPI_STATUS_NEW_MATCH = 1<<3

Indicates flow was matched on current dequeue

enum doca_dpi_sig_action_t

Signature action. Some signatures may come with an action.

Values

DOCA_DPI_SIG_ACTION_NA

Action not available for signature

DOCA_DPI_SIG_ACTION_ALERT

Alert

DOCA_DPI_SIG_ACTION_PASS

Signature indicates that the flow is allowed

DOCA_DPI_SIG_ACTION_DROP

Signature indicates that the flow should be dropped

DOCA_DPI_SIG_ACTION_REJECT

Send RST/ICMP unreachable error to the sender of the matching packet

DOCA_DPI_SIG_ACTION_REJECTSRC

Send RST/ICMP unreachable error to the sender of the matching packet

DOCA_DPI_SIG_ACTION_REJECTDST

Send RST/ICMP error packet to receiver of the matching packet

DOCA_DPI_SIG_ACTION_REJECTBOTH

Send RST/ICMP error packets to both sides of the conversation

```
__DOCA_EXPERIMENTAL int doca_dpi_dequeue
(doca_dpi_ctx *ctx, uint16_t dpi_q, doca_dpi_result
*result)
```

Dequeues packets after processing.

Parameters

ctx

The DPI context.

dpi_q

The DPI queue from which to dequeue the flows' packets.

result

Output, matching result.

Returns

doca_dpi_dequeue_status_t if successful, error code otherwise

Description

Only packets enqueued for processing will be returned by this API. Packets will return in the order they were enqueued.

```
__DOCA_EXPERIMENTAL void doca_dpi_destroy
(doca_dpi_ctx *ctx)
```

Free the DPI memory and releases the regex engine.

Parameters

ctx

DPI context to destroy.

```
__DOCA_EXPERIMENTAL int doca_dpi_enqueue
(doca_dpi_flow_ctx *flow_ctx, rte_mbuf *pkt, bool
initiator, uint32_t payload_offset, void *user_data)
```

Enqueue a new DPI job for processing.

Parameters

flow_ctx

The flow context handler.

pkt

The mbuf to be processed.

initiator

Indicates to which direction the packet belongs. 1 - if the packet arrives from client to server. 0 - if the packet arrives from server to client. Typically, the first packet will arrive from the initiator (client).

payload_offset

Indicates where the packet's payload begins.

user_data

Private user data to be returned when the DPI job is dequeued.

Returns

doca_dpi_enqueue_status_t or other error code.

Description

This function is thread-safe per queue. For best performance it should always be called from the same thread/queue on which the flow was created. See Multithreading section of the DPI Programming Guide for more details.

Once a packet is enqueued, user must not change, reuse or free the mbuf while it is being processed. See "Packet Ownership" section of the DPI Programming Guide for more details.

The injected packet has to be stripped of FCS. A packet will not be enqueued if:

- ▶ Payload length = 0

```

__DOCA_EXPERIMENTAL doca_dpi_flow_ctx
*doca_dpi_flow_create (doca_dpi_ctx *ctx, uint16_t
dpi_q, const doca_dpi_parsing_info *parsing_info, int
*error, doca_dpi_result *result)

```

Creates a new flow on a queue.

Parameters

ctx

The DPI context.

dpi_q

The DPI queue on which to create the flows

parsing_info

L3/L4 information.

error

Output, Negative if error occurred.

result

Output, If flow was matched based on the parsing info, result->matched will be true.

Returns

NULL on error.

Description

Must be called before enqueueing any new packet. A flow must not be created on 2 different queues.

```

__DOCA_EXPERIMENTAL void doca_dpi_flow_destroy
(doca_dpi_flow_ctx *flow_ctx)

```

Destroys a flow on a queue.

Parameters

flow_ctx

The flow context to destroy.

Description

Should be called when a flow is terminated or times out

```
__DOCA_EXPERIMENTAL int
doca_dpi_flow_match_get (const doca_dpi_flow_ctx
*flow_ctx, doca_dpi_result *result)
```

Query a flow's match.

Parameters

flow_ctx

The flow context of the flow to be queried.

result

Output, latest match on this flow. Only "matched" and "info" fields in the result parameter are valid.

Returns

0 on success, error code otherwise.

```
__DOCA_EXPERIMENTAL doca_dpi_ctx
*doca_dpi_init (const doca_dpi_config_t *config, int
*error)
```

Initialize the DPI library.

Parameters

config

See [doca_dpi_config_t](#) for details.

error

Output error, negative value indicates an error.

Returns

doca_dpi_ctx - dpi opaque context, NULL on error.

Description

This function must be invoked first before any function in the API. It should be invoked once per process. This call will probe the first regex device it finds (0).

```

__DOCA_EXPERIMENTAL int
doca_dpi_load_signatures (doca_dpi_ctx *ctx, const
char *cdo_file)

```

Loads the cdo file.

Parameters

ctx

The DPI context.

cdo_file

CDO file created by the DPI compiler.

Returns

0 on success, error code otherwise.

Description

The cdo file contains signature information. The cdo file must be loaded before any enqueue call.

Database update: When a new signatures database is available, the user may call this function again. The newly loaded CDO must contain the signatures of the previously loaded CDO or result will be undefined.

```

__DOCA_EXPERIMENTAL int doca_dpi_signature_get
(const doca_dpi_ctx *ctx, uint32_t sig_id,
doca_dpi_sig_data *sig_data)

```

Returns a specific sig info.

Parameters

ctx

The DPI context.

sig_id

The signature ID.

sig_data

Output of the sig metadata.

Returns

0 on success, error code otherwise.

```
__DOCA_EXPERIMENTAL int
doca_dpi_signatures_get (const doca_dpi_ctx *ctx,
doca_dpi_sig_data **sig_data)
```

Returns all signatures.

Parameters

ctx

The DPI context.

sig_data

Output of the sig data.

Returns

Number of signatures on success, error code otherwise.

Description

It is the responsibility of the user to free the array. Because this function copies all the sig info, it is highly recommended to call this function only once after loading the database, and not during packet processing.

```
__DOCA_EXPERIMENTAL void doca_dpi_stat_get
(const doca_dpi_ctx *ctx, bool clear,
doca_dpi_stat_info *stats)
```

Returns DPI statistics.

Parameters

ctx

The DPI context.

clear

Clear the statistics after fetching them.

stats

Output struct containing the statistics.

2.4. flow

DOCA HW offload flow library. For more details please refer to the user guide on DOCA devzone.

struct doca_flow_actions

doca flow actions information

struct doca_flow_aged_query

aged flow query callback context

struct doca_flow_cfg

doca flow global configuration

struct doca_flow_encap_action

doca flow encap data information

struct doca_flow_error

doca flow error message struct

struct doca_flow_fwd

forwarding configuration

struct doca_flow_match

doca flow matcher information

struct doca_flow_monitor

doca monitor action configuration

struct doca_flow_pipe_cfg

pipeline configuration

struct doca_flow_port_cfg

doca flow port configuration

struct doca_flow_query

flow query result

enum doca_flow_error_type

doca flow error type define

Values

DOCA_ERROR_UNKNOWN

Unknown error

DOCA_ERROR_UNSUPPORTED

Operation unsupported

DOCA_ERROR_INVALID_PARAM

Invalid parameter

DOCA_ERROR_PIPE_BUILD_ITEM

Build pipe match items error

DOCA_ERROR_PIPE_MODIFY_ITEM

Modify pipe match items error

DOCA_ERROR_PIPE_BUILD_ACTION

Build pipe actions error

DOCA_ERROR_PIPE_MODIFY_ACTION

Modify pipe actions error

DOCA_ERROR_PIPE_BUILD_FWD

Build pipe fwd error

DOCA_ERROR_FLOW_CREATE

Flow creation error

DOCA_ERROR_OOM

Out of memory

DOCA_ERROR_PORT

Port error

enum doca_flow_fwd_type

forwarding action type

Values

DOCA_FLOW_FWD_NONE = 0

No forward action be set

DOCA_FLOW_FWD_RSS

Forwards packets to rss

DOCA_FLOW_FWD_PORT

Forwards packets to one port

DOCA_FLOW_FWD_PIPE

Forwards packets to another pipe

DOCA_FLOW_FWD_DROP

Drops packets

enum doca_flow_match_flags

doca flow match flags

Values

DOCA_FLOW_MATCH_TCP_FIN

match tcp packets with Fin flag

enum `doca_flow_port_type`

doca flow port type

Values

DOCA_FLOW_PORT_DPDK_BY_ID

dpdk port by mapping id

enum `doca_rss_type`

rss offload types

Values

DOCA_FLOW_RSS_IP = (1<<0)

rss by ip head

DOCA_FLOW_RSS_UDP = (1<<1)

rss by udp head

DOCA_FLOW_RSS_TCP = (1<<2)

rss by tcp head

```

__DOCA_EXPERIMENTAL doca_flow_pipe_entry
*doca_flow_control_pipe_add_entry (uint16_t
pipe_queue, uint8_t priority, doca_flow_pipe
*pipe, const doca_flow_match *match, const
doca_flow_match *match_mask, const
doca_flow_fwd *fwd, doca_flow_error *error)

```

Add one new entry to a control pipe.

Parameters

pipe_queue

Queue identifier.

priority

Priority value.

pipe

Pointer to pipe.

match

Pointer to match, indicate specific packet match information.

match_mask

Pointer to match mask information.

fwd

Pointer to fwd actions.

error

Output error, set [doca_flow_error](#) for details.

Returns

Pipe entry handler on success, NULL otherwise and error is set.

Description

Refer to [doca_flow_pipe_add_entry](#).

```
doca_flow_pipe *doca_flow_create_control_pipe
(doca_flow_port *port, doca_flow_error *error)
```

Create control pipe.

Parameters**port**

Port struct.

error

Output error, set [doca_flow_error](#) for details.

Returns

pipe handler or NULL on failure.

Description

Control pipe is a special type of pipe that can have dynamic matches and forward with priority. Number of entries is limited (<64).

```

__DOCA_EXPERIMENTAL doca_flow_pipe
*doca_flow_create_pipe (const doca_flow_pipe_cfg
*cfg, const doca_flow_fwd *fwd, const doca_flow_fwd
*fwd_miss, doca_flow_error *error)

```

Create one new pipe.

Parameters

cfg

Pipe configuration.

fwd

Fwd configuration for the pipe.

fwd_miss

Fwd_miss configuration for the pipe. NULL for no fwd_miss. When creating a pipe if there is a miss and fwd_miss configured, packet steering should jump to it.

error

Output error, set [doca_flow_error](#) for details.

Returns

Pipe handler on success, NULL otherwise and error is set.

Description

Create new pipeline to match and offload specific packets, the pipe configuration includes the following components:

match: Match one packet by inner or outer fields. match_mask: The mask for the matched items. actions: Includes the modify specific packets fields, Encap and Decap actions. monitor: Includes Count, Age, and Meter actions. fwd: The destination of the matched action, include RSS, Hairpin, Port, and Drop actions.

This API will create the pipe, but would not start the HW offload.

```

__DOCA_EXPERIMENTAL void doca_flow_destroy
(void)

```

Destroy the doca flow.

Description

Release all the resources used by doca flow.

Must be invoked at the end of the application, before it exits.

```
__DOCA_EXPERIMENTAL void  
doca_flow_destroy_pipe (uint16_t port_id,  
doca_flow_pipe *pipe)
```

Destroy one pipe.

Parameters

port_id

Port id of the port.

pipe

Pointer to pipe.

Description

Destroy the pipe, and the pipe entries that match this pipe.

```
__DOCA_EXPERIMENTAL void  
doca_flow_destroy_port (uint16_t port_id)
```

Destroy a doca port.

Parameters

port_id

Port id of the port.

Description

Destroy the doca port, free all resources of the port.

```
__DOCA_EXPERIMENTAL void doca_flow_dump_pipe  
(uint16_t port_id, FILE *f)
```

Dump pipe of one port.

Parameters

port_id

Port id of the port.

f

The output file of the pipe information.

Description

Dump all pipes and all entries information belong to this port.

```
__DOCA_EXPERIMENTAL void doca_flow_flush_pipe  
(uint16_t port_id)
```

Flush pipes of one port.

Parameters

port_id

Port id of the port.

Description

Destroy all pipes and all pipe entries belonging to the port.

```
__DOCA_EXPERIMENTAL int doca_flow_handle_aging  
(uint16_t queue, uint64_t quota,  
doca_flow_aged_query *entries, int len)
```

Handle aging of flows in queue.

Parameters

queue

Queue identifier.

quota

Max time quota in micro seconds for this function to handle aging.

entries

User input entries array for the aged flows.

len

User input length of entries array.

Returns

> 0 the number of aged flows filled in entries array. 0 no aged entries in current call. -1 full cycle done.

Description

Go over all flows and release aged flows from being tracked. The entries array will be filled with aged flows.

Since the number of flows can be very large, it can take a significant amount of time to go over all flows so this function is limited by time quota, which means it might return without handling all flows which requires the user to call it again. Once a full cycle is done this function will return -1.

```
__DOCA_EXPERIMENTAL int doca_flow_init (const
doca_flow_cfg *cfg, doca_flow_error *error)
```

Initialize the doca flow.

Parameters

cfg

Port configuration, see [doca_flow_cfg](#) for details.

error

Output error, set [doca_flow_error](#) for details.

Returns

0 on success, a negative errno value otherwise and error is set.

Description

This is the global initialization function for doca flow. It initializes all resources used by doca flow.

Must be invoked first before any other function in this API. this is a one time call, used for doca flow initialization and global configurations.

```
__DOCA_EXPERIMENTAL doca_flow_pipe_entry
*doca_flow_pipe_add_entry (uint16_t pipe_queue,
doca_flow_pipe *pipe, const doca_flow_match
*match, const doca_flow_actions *actions, const
doca_flow_monitor *monitor, const doca_flow_fwd
*fwd, doca_flow_error *error)
```

Add one new entry to a pipe.

Parameters

pipe_queue

Queue identifier.

pipe

Pointer to pipe.

match

Pointer to match, indicate specific packet match information.

actions

Pointer to modify actions, indicate specific modify information.

monitor

Pointer to monitor actions.

fwd

Pointer to fwd actions.

error

Output error, set [doca_flow_error](#) for details.

Returns

Pipe entry handler on success, NULL otherwise and error is set.

Description

When a packet matches a single pipe, will start HW offload. The pipe only defines which fields to match. When offloading, we need detailed information from packets, or we need to set some specific actions that the pipe did not define. The parameters include:

match: The packet detail fields according to the pipe definition. actions: The real actions according to the pipe definition. monitor: Defines the monitor actions if the pipe did not define it. fwd: Define the forward action if the pipe did not define it.

This API will do the actual HW offload, with the information from the fields of the input packets.

```
__DOCA_EXPERIMENTAL int
doca_flow_pipe_rm_entry (uint16_t pipe_queue,
doca_flow_pipe_entry *entry)
```

Free one pipe entry.

Parameters**pipe_queue**

Queue identifier.

entry

The pipe entry to be removed.

Returns

0 on success, negative on failure.

Description

This API will free the pipe entry and cancel HW offload. The Application receives the entry pointer upon creation and if can call this function when there is no more need for this offload. For example, if the entry aged, use this API to free it.

```
__DOCA_EXPERIMENTAL uint8_t
*doca_flow_port_priv_data (doca_flow_port *port)
```

Get pointer of user private data.

Parameters

port

Port struct.

Returns

Private data head pointer.

Description

User can manage specific data structure in port structure. The size of the data structure is given on port configuration. See [doca_flow_cfg](#) for more details.

```
__DOCA_EXPERIMENTAL doca_flow_port
*doca_flow_port_start (const doca_flow_port_cfg
*cfg, doca_flow_error *error)
```

Start a doca port.

Parameters

cfg

Port configuration, see [doca_flow_cfg](#) for details.

error

Output error, set [doca_flow_error](#) for details.

Returns

Port handler on success, NULL otherwise and error is set.

Description

Start a port with the given configuration. Will create one port in the doca flow layer, allocate all resources used by this port, and create the default offload flows including jump and default RSS for traffic.

```
__DOCA_EXPERIMENTAL int doca_flow_port_stop
(doca_flow_port *port)
```

Stop a doca port.

Parameters

port

Port struct.

Returns

0 on success, negative on failure.

Description

Stop the port, disable the traffic.

```
__DOCA_EXPERIMENTAL int doca_flow_query
(doca_flow_pipe_entry *entry, doca_flow_query
*query_stats)
```

Extract information about specific entry.

Parameters

entry

The pipe entry to query.

query_stats

Data retrieved by the query.

Returns

0 on success, negative on failure.

Description

Query the packet statistics about specific pipe entry

2.5. flow net define

DOCA HW offload flow net structure define. For more details please refer to the user guide on DOCA devzone.

struct doca_flow_ip_addr

doca flow ip address

struct doca_flow_tun

doca flow tunnel information

enum doca_flow_ip_type

doca flow ip address type

Values

DOCA_FLOW_ADDR_NONE = 0

ip address is not set

DOCA_FLOW_IP4_ADDR = 4

ip address is ipv4

DOCA_FLOW_IP6_ADDR = 6

ip address is ipv6

enum doca_flow_tun_type

doca flow tunnel type

Values

DOCA_FLOW_TUN_NONE = 0

tunnel is not set

DOCA_FLOW_TUN_VXLAN

tunnel is vxlan type

DOCA_FLOW_TUN_GTPU

tunnel is gtpu type

DOCA_FLOW_TUN_GRE

tunnel is gre type

typedef uint16_t doca_be16_t

16-bit big-endian value.

```
typedef uint32_t doca_be32_t
```

32-bit big-endian value.

```
typedef uint64_t doca_be64_t
```

64-bit big-endian value.

```
#define DOCA_ETHER_ADDR_LEN (6)
```

length of ether add length.

```
#define DOCA_GTPU_PORT (2152)
```

gtpu upd port id.

```
#define DOCA_PROTO_GRE (47)
```

Cisco GRE tunnels (rfc 1701,1702).

```
#define DOCA_PROTO_TCP (6)
```

Transmission Control Protocol.

```
#define DOCA_PROTO_UDP (17)
```

User Datagram Protocol.

```
#define DOCA_VXLAN_DEFAULT_PORT (4789)
```

default vxlan port id.

2.6. Logging Management

Define functions for internal and external logging management

To add DOCA internal logging compile with "-D DOCA_LOGGING_ALLOW_DLOG"

```
enum DOCA_LOG_LEVEL
```

log levels

Values

DOCA_LOG_LEVEL_CRIT

Critical log level

DOCA_LOG_LEVEL_ERROR

Error log level

DOCA_LOG_LEVEL_WARNING

Warning log level

DOCA_LOG_LEVEL_INFO

Info log level

DOCA_LOG_LEVEL_DEBUG

Debug log level

typedef (*log_flush_callback) (char* buffer)

logging backend flush() handler

doca_log (uint32_t level, uint32_t source, const char *format, ...)

Generates a log message.

Parameters

level

Log level enum DOCA_LOG_LEVEL.

source

The log source identifier defined by doca_log_source_register.

format

printf(3) arguments, format and variables.

Description

The log will be shown in the doca_log_stream_redirect (see default). This should not be used, please prefer using DOCA_LOG...

doca_log_backend_level_set (doca_logger_backend *logger, uint32_t level)

Set the log level of a specific logger backend.

Parameters

logger

Logger backend to update.

level

Log level enum DOCA_LOG_LEVEL

Description

Dynamically change the log level of the given logger backend, any log under this level will be shown.

doca_logger_backend

***doca_log_create_buffer_backend (char *buffer, size_t capacity, log_flush_callback handler)**

Create a logging backend with a char buffer stream.

Parameters**buffer**

The char buffer (char *) for the logger's stream.

capacity

Maximal amount of chars that could be written to the stream.

handler

Handler to be called when the log record should be flushed from the stream.

Returns

struct doca_logger_backend * on success, NULL otherwise.

Description

Creates a new logging backend that will be added on top of the default logger. The logger will write each log record at the beginning of this buffer.

doca_logger_backend *doca_log_create_fd_backend (int fd)

Create a logging backend with an fd stream.

Parameters**fd**

The file descriptor (int) for the logger's backend.

Returns

struct doca_logger_backend * on success, NULL otherwise.

Description

Creates a new logging backend that will be added on top of the default logger.

`doca_logger_backend *doca_log_create_file_backend (FILE *fptr)`

Create a logging backend with a FILE* stream.

Parameters

fptr

The FILE * for the logger's stream.

Returns

struct doca_logger_backend * on success, NULL otherwise.

Description

Creates a new logging backend that will be added on top of the default logger.

`uint32_t doca_log_global_level_get (void)`

Get the log level of the default logger backend.

Returns

Log level enum DOCA_LOG_LEVEL

Description

Dynamically query for the log level of the default logger backend, any log under this level will be shown.

`doca_log_global_level_set (uint32_t level)`

Set the log level of the default logger backend.

Parameters

level

Log level enum DOCA_LOG_LEVEL.

Description

Dynamically change the log level of the default logger backend, any log under this level will be shown.

`doca_log_source_register (const char *source_name)`

Register a log source.

Parameters

source_name

The string identifying the log source. Should be in an heirarchic form (i.e. DPI::Parser).

Returns

The log source identifier. Negative for err.

Description

Will return the ID associated with the log source. Log source name will be shown in the logs.

`doca_log_stream_redirect (FILE *stream)`

Redirect the logger to a different stream.

Parameters

stream

Pointer to the stream.

Returns

0 on success, error code otherwise.

Description

Dynamically change the logger stream of the default logger backend. The default stream is stderr.

`#define DOCA_DLOG`

Generates a development log message.

The `DOCA_DLOG()` is the main log function for development purposes logging. To show the logs, define `DOCA_LOGGING_ALLOW_DLOG` in the compilation variables. This will not effect performance if compiled without `DOCA_LOGGING_ALLOW_DLOG`, as it will be removed by

the compiler. Consider using the specific level DOCA_LOG for better code readability (i.e. DOCA_DLOG_ERR)

#define DOCA_DLOG_CRIT DOCA_DLOG(CRIT, format)

Generates a CRITICAL development log message.

Will generate critical log for development purposes. To show the logs define DOCA_LOGGING_ALLOW_DLOG in the compilation variables. This will not effect performance if compiled without DOCA_LOGGING_ALLOW_DLOG, as it will be removed by the compiler.

#define DOCA_DLOG_DBG DOCA_DLOG(DEBUG, format)

Generates a DEBUG development log message.

Will generate debug log for development purposes. To show the logs define DOCA_LOGGING_ALLOW_DLOG in the compilation variables. This will not effect performance if compiled without DOCA_LOGGING_ALLOW_DLOG, as it will be removed by the compiler.

#define DOCA_DLOG_ERR DOCA_DLOG(ERROR, format)

Generates an ERROR development log message.

Will generate error log for development purposes. To show the logs define DOCA_LOGGING_ALLOW_DLOG in the compilation variables. This will not effect performance if compiled without DOCA_LOGGING_ALLOW_DLOG, as it will be removed by the compiler.

#define DOCA_DLOG_INFO DOCA_DLOG(INFO, format)

Generates an INFO development log message.

Will generate info log for development purposes. To show the logs define DOCA_LOGGING_ALLOW_DLOG in the compilation variables. This will not effect performance if compiled without DOCA_LOGGING_ALLOW_DLOG, as it will be removed by the compiler.


```
#define DOCA_DLOG_WARN DOCA_DLOG(WARNING, format)
```

Generates a WARNING development log message.

Will generate warning log for development purposes. To show the logs define DOCA_LOGGING_ALLOW_DLOG in the compilation variables. This will not effect performance if compiled without DOCA_LOGGING_ALLOW_DLOG, as it will be removed by the compiler.

```
#define DOCA_LOG  
doca_log(DOCA_LOG_LEVEL_##level, log_id, format)  
\
```

Generates a log message.

The [DOCA_LOG\(\)](#) is the main log function for logging. This call affects the performance. Consider using DOCA_DLOG for the option to remove it on the final compilation. Consider using the specific level DOCA_LOG for better code readability (i.e. DOCA_LOG_ERR)

```
#define DOCA_LOG_CRIT DOCA_LOG(CRIT, format)
```

Generates a CRITICAL log message.

Will generate critical log. This call affects the performance. Consider using DOCA_DLOG for the option to remove it on the final compilation.

```
#define DOCA_LOG_DBG DOCA_LOG(DEBUG, format)
```

Generates a DEBUG log message.

Will generate debug log. This call affects the performance. Consider using DOCA_DLOG for the option to remove it on the final compilation.

```
#define DOCA_LOG_ERR DOCA_LOG(ERROR, format)
```

Generates an ERROR log message.

Will generate error log. This call affects the performance. Consider using DOCA_DLOG for the option to remove it on the final compilation.

```
#define DOCA_LOG_INFO DOCA_LOG(INFO, format)
```

Generates an INFO log message.

Will generate info log. This call affects the performance. Consider using DOCA_DLOG for the option to remove it on the final compilation.

```
#define DOCA_LOG_REGISTER static int log_id;
\ static void __attribute__((constructor(65535),
used)) __##__LINE__(void) \ { \ log_id =
doca_log_source_register(#SOURCE); \ }
```

Registers log source on program start.

Should be used to register the log source. For example

```
DOCA_LOG_REGISTER(dpi)
```

```
void foo { DOCA_LOG_INFO("Message"); }
```

```
#define DOCA_LOG_WARN DOCA_LOG(WARNING,
format)
```

Generates a WARNING log message.

Will generate warning log. This call affects the performance. Consider using DOCA_DLOG for the option to remove it on the final compilation.

2.7. NetFlow

DOCA lib for exporting a netflow packet to a netflow collector.

This lib simplifies and centralizes the formatting and exporting of netflow packets. Netflow is a protocol for exporting information about the device network flows to a netflow collector that will aggregate and analyze the data. After creating the conf file and invoking the init function, the lib's send function can be called with netflow struct to send a netflow packet with the format to the collector of choice, as specified in the conf file. The lib uses the netflow protocol specified by cisco.

See also:

https://netflow.caligare.com/netflow_v9.htm

Conf File structure:

```
doca_netflow.conf
```

```
[doca_netflow_conf]
```

```
target = <hostname = name/ipv4/ipv6>:<port = integer>
```

```
source_id = <ID = integer>
```

```
version = <version = 9>
```

```
doca_netflow_default.conf
```

```
[doca_netflow_conf]
```

```
target = 127.0.0.1:2055
```

```
source_id = 10
```

```
version = 9
```

Limitations:

The lib supports the netflow V9 format. The lib is not thread safe.

struct doca_netflow_default_record

Flow record, represent a flow at specific moment, usually after a flow ends or after some timeout. Each one is a data record that will appear in the collector. This template is based on V5 fields with additional V9 fields.

struct doca_netflow_flowset_field

One field in netflow template, please look at `doca_netflow_types` for type macros.

struct doca_netflow_template

```
Template for the records. struct record_example { uint32_t
src_addr_V4; uint32_t dst_addr_V4; } struct doca_netflow_flowset_field
fields[] = { { .type = DOCA_NETFLOW_IPV4_SRC_ADDR, .length =
DOCA_NETFLOW_IPV4_SRC_ADDR_DEFAULT_LENGTH}, { .type =
DOCA_NETFLOW_IPV4_DST_ADDR, .length =
DOCA_NETFLOW_IPV4_DST_ADDR_DEFAULT_LENGTH} }; struct doca_netflow_template
template = { .field_count = 2; .fields = fields; };
```

struct doca_netflow_default_record ::packed

Flow record, represent a flow at specific moment, usually after a flow ends or after some timeout. Each one is a data record that will appear in the collector. This template is based on V5 fields with additional V9 fields.



Note:

all fields are in network byte order.

```
__DOCA_EXPERIMENTAL void
doca_netflow_exporter_destroy (void)
```

Free the exporter memory and close the connection.

```
__DOCA_EXPERIMENTAL int
doca_netflow_exporter_init (const char
*netflow_conf_file)
```

Init exporter memory, set configs and open connection.

Parameters

netflow_conf_file

Doca netflow configuration file pointer including a section marked as [doca_netflow_conf], if a NULL pointer is given will use the default path, as defined by DOCA_NETFLOW_CONF_DEFAULT_PATH. This function can be called again only after doca_netflow_exporter_destroy was called.

Returns

0 on success, error code otherwise.

```
__DOCA_EXPERIMENTAL int
doca_netflow_exporter_send (const
doca_netflow_template *netflow_template, const void
**records, size_t length, int *error)
```

Sending netflow records. Need to init first.

Parameters

netflow_template

Template pointer for how the records are structured. for more info refer to [doca_netflow_template](#).

records

Array of pointers to the flows structs to send, must be packed. strings must be a direct array in the struct not a pointer.

length

Records array size.

error

If return value is -1 populate this field with the error.

Returns

Number of records sent, -1 on error.

Description



Note:

- ▶ if the return value is positive but not equal to length then just some of the records were sent. The send function should run again with the remaining records. Please refer to the example.
- ▶ When sending more than 30 records the lib splits the records to multiple packets because a single packet can only send up to 30 records (Netflow protocol limit)

doca_netflow_template

*doca_netflow_template_default_get (void)

Return a default doca_netflow_template for use in send function, if using default template use doca_netflow_default_record struct for records.

Returns

pointer containing the default template

```
#define DOCA_NETFLOW_CONF_DEFAULT_PATH "/etc/doca_netflow.conf"
```

default conf path to look for

2.8. Telemetry Service Library

DOCA lib for exporting events to the telemetry service.

struct doca_telemetry_buffer_attr_t

DOCA schema buffer attribute. Applied to all DOCA sources.

struct doca_telemetry_field_info_t

DOCA schema field.

struct doca_telemetry_file_write_attr_t

DOCA schema file write attribute. Applied to all DOCA sources.

struct doca_telemetry_ipc_attr_t

DOCA schema file write attribute. Applied to all DOCA sources.

struct doca_telemetry_ipc_timeout_attr_t

DOCA schema IPC attribute. Applied to all DOCA sources.

struct doca_telemetry_opaque_events_attr_t

DOCA schema opaque events attribute. Applied to all DOCA sources.

struct doca_telemetry_source_name_attr_t

DOCA telemetry source attributes: id and tag.

enum telemetry_status

DOCA telemetry status.

Values

DOCA_TELEMETRY_OK = 0

ok status

DOCA_TELEMETRY_ERROR = 1

general error

DOCA_TELEMETRY_ALLOC_ERROR

memory allocation error

DOCA_TELEMETRY_CLX_CONTEXT_INIT_ERROR

context init error

DOCA_TELEMETRY_CLX_CONTEXT_CLONE_ERROR

context clone error

DOCA_TELEMETRY_SOURCE_ATTR_NOT_SET

attribute not set error

DOCA_TELEMETRY_INTERNAL_BUFFER_ERROR

buffer internal error

DOCA_TELEMETRY_BAD_STATE_ERROR

general bad state error

DOCA_TELEMETRY_BAD_PARAM_ERROR

general bad parameter error

typedef uint8_t doca_guid_t

DOCA GUID type.

typedef uint64_t doca_telemetry_timestamp_t

DOCA schema type index type.

typedef uint8_t doca_telemetry_type_index_t

DOCA schema field type index.

__DOCA_EXPERIMENTAL int**doca_telemetry_check_ipc_status (void *doca_source)**

Return status of IPC transport.

Parameters**doca_source**

Input doca source.

Returns

1 if IPC is disabled from config. 0 (DOCA_TELEMETRY_OK) if IPC is connected. negative telemetry_status if IPC is not connected. This status occurs after data send_receive

__DOCA_EXPERIMENTAL int**doca_telemetry_schema_add_type (void *doca_schema, const char *new_type_name, doca_telemetry_field_info_t *fields, int num_fields, doca_telemetry_type_index_t *type_index)**

Add user-defined fields to create new type in DOCA schema.

Parameters**doca_schema**

Schema to create type in.

new_type_name

Name for new type.

fields

User-defined fields.

num_fields

Number of user defined fields.

type_index

Type index for the created type is written to this variable.

Returns

0 on success, a negative telemetry_status on error

```
__DOCA_EXPERIMENTAL int
doca_telemetry_schema_buffer_attr_set (void
*doca_schema, doca_telemetry_buffer_attr_t
*buffer_attr)
```

Set buffer attributes to DOCA schema.

Parameters**doca_schema**

Input schema.

buffer_attr

Attribute to set.

Returns

0 on success, a negative telemetry_status on error

```
__DOCA_EXPERIMENTAL void
doca_telemetry_schema_destroy (void
*doca_schema)
```

Destructor for DOCA schema.

Parameters**doca_schema**

Schema to destroy.


```

__DOCA_EXPERIMENTAL void
doca_telemetry_schema_file_write_attr_set (void
*doca_schema, doca_telemetry_file_write_attr_t
*file_attr)

```

Set file write attributes to DOCA schema.

Parameters

doca_schema

Input schema.

file_attr

Attribute to set.

```

__DOCA_EXPERIMENTAL void
*doca_telemetry_schema_init (const char
*schema_name)

```

Initialize DOCA schema to prepare it for setting attributes and adding types. DOCA schema is used to initialize DOCA sources that will collect the data according to the same schema.

Parameters

schema_name

Name of the schema.

Returns

Pointer to DOCA schema, NULL on error.

```

__DOCA_EXPERIMENTAL void
doca_telemetry_schema_ipc_attr_set (void
*doca_schema, doca_telemetry_ipc_attr_t *ipc_attr)

```

Set IPC transport attributes to DOCA schema.

Parameters

doca_schema

Input schema.

ipc_attr

Attribute to set.

```

__DOCA_EXPERIMENTAL void
doca_telemetry_schema_ipc_timeouts_attr_set (void
*doca_schema, doca_telemetry_ipc_timeout_attr_t
*ipc_timeout_attr)

```

Set ipc timeout attributes to DOCA schema.

Parameters

doca_schema

Input schema.

ipc_timeout_attr

Attribute to set.

```

__DOCA_EXPERIMENTAL void
doca_telemetry_schema_opaque_events_attr_set
(void *doca_schema,
doca_telemetry_opaque_events_attr_t
*opaque_events_attr)

```

Set Opaque events attributes to DOCA schema.

Parameters

doca_schema

Input schema.

opaque_events_attr

Attribute to set.

```

__DOCA_EXPERIMENTAL int
doca_telemetry_schema_start (void *doca_schema)

```

Finalizes schema setup to start creating Doca Sources from the schema.

Parameters

doca_schema

Input schema to start.

Returns

0 on success, a negative telemetry_status on error

Description

Do NOT add new types after this function was called.

```
__DOCA_EXPERIMENTAL void
*doca_telemetry_source_create (void *doca_schema)
```

Creates a single DOCA source from schema.

Parameters

doca_schema

Schema from which source will be created.

Returns

pointer to DOCA source, or NULL on error.

Description

To create a DOCA source, first call [doca_telemetry_schema_start\(\)](#) to prepare the DOCA schema.

```
__DOCA_EXPERIMENTAL void
doca_telemetry_source_destroy (void *doca_source)
```

Destructor for DOCA source.

Parameters

doca_source

Source to destroy.

```
__DOCA_EXPERIMENTAL void
doca_telemetry_source_flush (void *doca_source)
```

Immediately flush the data of the DOCA source.

Parameters

doca_source

DOCA source to flush.

```

__DOCA_EXPERIMENTAL void
doca_telemetry_source_name_attr_set (void
*doca_source, doca_telemetry_source_name_attr_t
*source_attr)

```

Set source attributes to DOCA.

Parameters

doca_source

Source to update.

source_attr

Source attribute to set.

Description

source_tag is set on schema basis while source_id is set on source basis.

```

__DOCA_EXPERIMENTAL int
doca_telemetry_source_opaque_report (void
*doca_source, const doca_guid_t app_id, uint64_t
user_defined1, uint64_t user_defined2, const void
*data, uint32_t data_size)

```

Report opaque event data via DOCA source.

Parameters

doca_source

Source to report.

app_id

User defined application ID.

user_defined1

User defined parameter 1.

user_defined2

User defined parameter 2.

data

Data buffer.

data_size

Size of the data in the data buffer.

Returns

0 on success, a negative telemetry_status on error.

Description

Data is flushed from internal buffer when the buffer is full. Flushing the data immediately can be done by invoking [doca_telemetry_source_flush\(\)](#).

```
__DOCA_EXPERIMENTAL uint32_t
doca_telemetry_source_opaque_report_max_data_size
(void *doca_source)
```

Get max data size for opaque report.

Parameters

doca_source

Source to report.

Returns

Maximal data size

```
__DOCA_EXPERIMENTAL int
doca_telemetry_source_report (void *doca_source,
doca_telemetry_type_index_t index, void *data, int
count)
```

Report events data of the same type via DOCA source.

Parameters

doca_source

Source to report.

index

Type index in the DOCA schema.

data

Data buffer.

count

Number of events written to the data buffer.

Returns

0 on success, a negative telemetry_status on error

Description

Data is flushed from internal buffer when the buffer is full. Flushing the data immediately can be done by invoking `doca_telemetry_source_flush()`.

```
__DOCA_EXPERIMENTAL int
doca_telemetry_source_start (void *doca_source)
```

Applies source attribute and starts DOCA source.

Parameters

doca_source

DOCA source to start.

Returns

0 on success, a negative `telemetry_status` on error

Description

Call this function to start reporting.

```
doca_telemetry_timestamp_t
doca_telemetry_timestamp_get (void)
```

Get timestamp in the proper format.

Returns

Timestamp value.

```
#define DOCA_GUID_SIZE 16
```

DOCA GUID size.

```
#define DOCA_TELEMETRY_FIELD_TYPE_BOOL
"bool"
```

`DOCA_TELEMETRY_FIELD_TYPE_{}` are data types that are used to create `doca_telemetry_field_info_t`;

DOCA telemtry bool type

```
#define DOCA_TELEMETRY_FIELD_TYPE_CHAR  
"char"
```

DOCA telemetry char type.

```
#define DOCA_TELEMETRY_FIELD_TYPE_DOUBLE  
"double"
```

DOCA telemetry double type.

```
#define DOCA_TELEMETRY_FIELD_TYPE_FLOAT  
"float"
```

DOCA telemetry float type.

```
#define DOCA_TELEMETRY_FIELD_TYPE_IN "int"
```

DOCA telemetry in type.

```
#define DOCA_TELEMETRY_FIELD_TYPE_INT16  
"int16_t"
```

DOCA telemetry int16 type.

```
#define DOCA_TELEMETRY_FIELD_TYPE_INT32  
"int32_t"
```

DOCA telemetry int32 type.

```
#define DOCA_TELEMETRY_FIELD_TYPE_INT64  
"int64_t"
```

DOCA telemetry int64 type.

```
#define DOCA_TELEMETRY_FIELD_TYPE_INT8  
"int8_t"
```

DOCA telemetry int8 type.

```
#define DOCA_TELEMETRY_FIELD_TYPE_LONG  
"long"
```

DOCA telemetry long type.

```
#define DOCA_TELEMETRY_FIELD_TYPE_LONGLONG  
"long long"
```

DOCA telemetry longlong type.

```
#define DOCA_TELEMETRY_FIELD_TYPE_SHORT  
"short"
```

DOCA telemetry short type.

```
#define  
DOCA_TELEMETRY_FIELD_TYPE_TIMESTAMP  
DOCA_TELEMETRY_FIELD_TYPE_UINT64
```

DOCA telemetry timestamp type.

```
#define DOCA_TELEMETRY_FIELD_TYPE_UCHAR  
"unsigned char"
```

DOCA telemetry uchar type.

```
#define DOCA_TELEMETRY_FIELD_TYPE_UINT  
"unsigned int"
```

DOCA telemetry uint type.

```
#define DOCA_TELEMETRY_FIELD_TYPE_UINT16  
"uint16_t"
```

DOCA telemetry uint16 type.

```
#define DOCA_TELEMETRY_FIELD_TYPE_UINT32  
"uint32_t"
```

DOCA telemetry uint32 type.

```
#define DOCA_TELEMETRY_FIELD_TYPE_UINT64  
"uint64_t"
```

DOCA telemetry uint64 type.


```
#define DOCA_TELEMETRY_FIELD_TYPE_UINT8
"uint8_t"
```

DOCA telemetry uint8 type.

```
#define DOCA_TELEMETRY_FIELD_TYPE_ULONG
"unsigned long"
```

DOCA telemetry ulong type.

```
#define
DOCA_TELEMETRY_FIELD_TYPE_ULONGLONG "long
long"
```

DOCA telemetry ulonglong type.

```
#define DOCA_TELEMETRY_FIELD_TYPE_USHORT
"unsigned short"
```

DOCA telemetry ushort type.

```
#define NUM_OF_DOCA_FIELDS (sizeof(type)/
sizeof(doca_telemetry_field_info_t))
```

NUM_OF_DOCA_FIELDS is macro for fast counting number of fields in user-defined fields array.

2.9. Version Management

Define functions to get the DOCA version, and compare against it.

```
const char *doca_version (void)
```

Function returning version string.

Returns

version string, using the format major.minor.patch

```
#define DOCA_CURRENT_VERSION_NUM
DOCA_VERSION_NUM(DOCA_VER_MAJOR,
DOCA_VER_MINOR, DOCA_VER_PATCH)
```

Macro of current version number for comparisons.

```
#define DOCA_VER_MAJOR 1
```

Major version number 0-255.

```
#define DOCA_VER_MINOR 2
```

Minor version number 0-255.

```
#define DOCA_VER_PATCH 6
```

Patch version number 0-999.

```
#define DOCA_VERSION_EQ_CURRENT
(DOCA_VERSION_NUM(major, minor, patch) ==
DOCA_CURRENT_VERSION_NUM)
```

Return 1 if the version specified is equal to current.

```
#define DOCA_VERSION_LTE_CURRENT
(DOCA_VERSION_NUM(major, minor, patch) <=
DOCA_CURRENT_VERSION_NUM)
```

Return 1 if the version specified is less then or equal to current.

```
#define DOCA_VERSION_NUM ((size_t)((major) << 24 |
(minor) << 16 | (patch)))
```

Macro of version number for comparisons.

Chapter 3. Data Structures

Here are the data structures with brief descriptions:

doca_dpi_config_t

DPI init configuration

doca_dpi_parsing_info

L2-L4 flow information

doca_dpi_result

Dequeue result

doca_dpi_sig_data

Extra signature data

doca_dpi_sig_info

Signature info

doca_dpi_stat_info

DPI statistics

doca_flow_actions

Doca flow actions information

doca_flow_aged_query

Aged flow query callback context

doca_flow_cfg

Doca flow global configuration

doca_flow_encap_action

Doca flow encap data information

doca_flow_error

Doca flow error message struct

doca_flow_fwd

Forwarding configuration

doca_flow_ip_addr

Doca flow ip address

doca_flow_match

Doca flow matcher information

doca_flow_monitor

Doca monitor action configuration

doca_flow_pipe_cfg

Pipeline configuration

doca_flow_port_cfg

Doca flow port configuration

doca_flow_query

Flow query result

doca_flow_tun

Doca flow tunnel information

doca_netflow_default_record

Flow record, represent a flow at specific moment, usually after a flow ends or after some timeout. Each one is a data record that will appear in the collector. This template is based on V5 fields with additional V9 fields

doca_netflow_flowset_field

One field in netflow template, please look at doca_netflow_types for type macros

doca_netflow_template

```
Template for the records. struct record_example { uint32_t
src_addr_V4; uint32_t dst_addr_V4; } struct doca_netflow_flowset_field
fields[] = { { .type = DOCA_NETFLOW_IPV4_SRC_ADDR, .length
= DOCA_NETFLOW_IPV4_SRC_ADDR_DEFAULT_LENGTH},
{ .type = DOCA_NETFLOW_IPV4_DST_ADDR, .length =
DOCA_NETFLOW_IPV4_DST_ADDR_DEFAULT_LENGTH} }; struct doca_netflow_template
template = { .field_count = 2; .fields = fields; };
```

doca_telemetry_buffer_attr_t

DOCA schema buffer attribute. Applied to all DOCA sources

doca_telemetry_field_info_t

DOCA schema field

doca_telemetry_file_write_attr_t

DOCA schema file write attribute. Applied to all DOCA sources

doca_telemetry_ipc_attr_t

DOCA schema file write attribute. Applied to all DOCA sources

doca_telemetry_ipc_timeout_attr_t

DOCA schema IPC attribute. Applied to all DOCA sources

doca_telemetry_opaque_events_attr_t

DOCA schema opaque events attribute. Applied to all DOCA sources

doca_telemetry_source_name_attr_t

DOCA telemetry source attributes: id and tag

3.1. **doca_dpi_config_t** Struct Reference

DPI init configuration.

uint32_t doca_dpi_config_t::max_packets_per_queue

Number of packets concurrently processed by the DPI engine.

`uint32_t doca_dpi_config_t::max_sig_match_len`

The minimum required overlap between two packets for regex match

`uint16_t doca_dpi_config_t::nb_queues`

Number of DPI queues

3.2. `doca_dpi_parsing_info` Struct Reference

L2-L4 flow information.

`doca_dpi_parsing_info::@0`

`doca_dpi_parsing_info::dst_ip`

IP destination address

`__be16 doca_dpi_parsing_info::ethertype`

Ethertype of the packet in network byte order

`in_addr doca_dpi_parsing_info::ipv4`

Ipv4 destination address in network byte order

Ipv4 source address in network byte order

`in6_addr doca_dpi_parsing_info::ipv6`

Ipv6 destination address in network byte order

Ipv6 source address in network byte order

`in_port_t doca_dpi_parsing_info::l4_dport`

Layer 4 destination port in network byte order

`uint8_t doca_dpi_parsing_info::l4_protocol`

Layer 4 protocol

`in_port_t doca_dpi_parsing_info::l4_sport`

Layer 4 source port in network byte order

`doca_dpi_parsing_info::@1`

`doca_dpi_parsing_info::src_ip`

IP source address

3.3. `doca_dpi_result` Struct Reference

Dequeue result.

`struct doca_dpi_sig_info doca_dpi_result::info`

Signature information

`bool doca_dpi_result::matched`

Indicates flow was matched

`rte_mbuf *doca_dpi_result::pkt`

Pkt provided on enqueue

`int doca_dpi_result::status_flags`

`doca_dpi_flow_status` flags

`void *doca_dpi_result::user_data`

User data provided on enqueue

3.4. `doca_dpi_sig_data` Struct Reference

Extra signature data.

`char doca_dpi_sig_data::name`

Signature name

`uint32_t doca_dpi_sig_data::sig_id`

Signature ID as provided in the signature

3.5. `doca_dpi_sig_info` Struct Reference

Signature info.

`int doca_dpi_sig_info::action`

The action as provided in the signature

`uint32_t doca_dpi_sig_info::sig_id`

Signature ID as provided in the signature

3.6. `doca_dpi_stat_info` Struct Reference

DPI statistics.

`uint32_t doca_dpi_stat_info::nb_http_parser_based`

Total number of http signature matches

`uint32_t doca_dpi_stat_info::nb_matches`

Total number of signature matches

`uint32_t doca_dpi_stat_info::nb_other_l4`

Total number of other l4 signature matches

`uint32_t doca_dpi_stat_info::nb_other_l7`

Total number of other l7 signature matches

`uint32_t doca_dpi_stat_info::nb_scanned_pkts`

Total number of scanned packets

`uint32_t doca_dpi_stat_info::nb_ssl_parser_based`

Total number of ssl signature matches

`uint32_t doca_dpi_stat_info::nb_tcp_based`

Total number of tcp signature matches

`uint32_t doca_dpi_stat_info::nb_udp_based`

Total number of udp signature matches

3.7. `doca_flow_actions` Struct Reference

`doca_flow_actions` information

`bool doca_flow_actions::dec_ttl`

decrease TTL value

`bool doca_flow_actions::decap`

when true, will do decap

`struct doca_flow_encap_action`
`doca_flow_actions::encap`

encap data information

`bool doca_flow_actions::has_encap`

when true, will do encap

`struct doca_flow_ip_addr`
`doca_flow_actions::mod_dst_ip`

modify destination ip address

`uint8_t doca_flow_actions::mod_dst_mac`

modify destination mac address

`doca_be16_t doca_flow_actions::mod_dst_port`

modify layer 4 destination port

`struct doca_flow_ip_addr`
`doca_flow_actions::mod_src_ip`

modify source ip address

`uint8_t doca_flow_actions::mod_src_mac`

modify source mac address

`doca_be16_t doca_flow_actions::mod_src_port`

modify layer 4 source port

3.8. `doca_flow_aged_query` Struct Reference

aged flow query callback context

`uint64_t doca_flow_aged_query::user_data`

The user input context, otherwisch the `doca_flow_pipe_entry` pointer

3.9. `doca_flow_cfg` Struct Reference

doca flow global configuration

`bool doca_flow_cfg::aging`

when true, aging is handled by doca

`bool doca_flow_cfg::is_hairpin`

when true, the fwd will be hairpin queue

`uint16_t doca_flow_cfg::queues`

queue id for each offload thread

```
uint32_t doca_flow_cfg::total_sessions
```

total flows count

3.10. doca_flow_encap_action Struct Reference

doca flow encap data information

```
struct doca_flow_ip_addr  
doca_flow_encap_action::dst_ip
```

destination ip address

```
uint8_t doca_flow_encap_action::dst_mac
```

destination mac address

```
struct doca_flow_ip_addr  
doca_flow_encap_action::src_ip
```

source ip address

```
uint8_t doca_flow_encap_action::src_mac
```

source mac address

```
struct doca_flow_tun doca_flow_encap_action::tun
```

tunnel info

3.11. doca_flow_error Struct Reference

doca flow error message struct

```
const char *doca_flow_error::message
```

Human-readable error message

enum `doca_flow_error_type` `doca_flow_error::type`

Cause field and error types

3.12. `doca_flow_fwd` Struct Reference

forwarding configuration

`doca_flow_pipe` *`doca_flow_fwd::next_pipe`

next pipe pointer

int `doca_flow_fwd::num_of_queues`

number of queues

uint16_t `doca_flow_fwd::port_id`

destination port id

uint32_t `doca_flow_fwd::rss_flags`

rss offload types

uint32_t `doca_flow_fwd::rss_mark`

markid of each queues

uint16_t *`doca_flow_fwd::rss_queues`

rss queues array

enum `doca_flow_fwd_type` `doca_flow_fwd::type`

indicate the forwarding type

3.13. `doca_flow_ip_addr` Struct Reference

doca flow ip address

`doca_be32_t doca_flow_ip_addr::ipv4_addr`

ipv4 address if type is ipv4

`doca_be32_t doca_flow_ip_addr::ipv6_addr`

ipv6 address if type is ipv6

`uint8_t doca_flow_ip_addr::type`

ip address type

3.14. `doca_flow_match` Struct Reference

doca flow matcher information

`uint32_t doca_flow_match::flags`

match items which are no value

`struct doca_flow_ip_addr doca_flow_match::in_dst_ip`

inner destination ip address if tunnel is used

`doca_be16_t doca_flow_match::in_dst_port`

inner layer 4 destination port if tunnel is used

`doca_be16_t doca_flow_match::in_eth_type`

inner Ethernet layer type

`uint8_t doca_flow_match::in_l4_type`

inner layer 4 protocol type if tunnel is used

`struct doca_flow_ip_addr doca_flow_match::in_src_ip`

inner source ip address if tunnel is used

`doca_be16_t doca_flow_match::in_src_port`

inner layer 4 source port if tunnel is used

```
struct doca_flow_ip_addr  
doca_flow_match::out_dst_ip
```

outer destination ip address

```
uint8_t doca_flow_match::out_dst_mac
```

outer destination mac address

```
doca_be16_t doca_flow_match::out_dst_port
```

outer layer 4 destination port

```
doca_be16_t doca_flow_match::out_eth_type
```

outer Ethernet layer type

```
uint8_t doca_flow_match::out_l4_type
```

outer layer 4 protocol type

```
struct doca_flow_ip_addr  
doca_flow_match::out_src_ip
```

outer source ip address

```
uint8_t doca_flow_match::out_src_mac
```

outer source mac address

```
doca_be16_t doca_flow_match::out_src_port
```

outer layer 4 source port

```
struct doca_flow_tun doca_flow_match::tun
```

tunnel info

```
doca_be16_t doca_flow_match::vlan_id
```

outer vlan id

3.15. `doca_flow_monitor` Struct Reference

`doca_flow_monitor` action configuration

`uint32_t doca_flow_monitor::aging`

aging time in seconds.

`uint64_t doca_flow_monitor::cir`

Committed Information Rate (bytes/second).

`uint8_t doca_flow_monitor::flags`

indicate which actions be included

`uint32_t doca_flow_monitor::id`

meter id

`uint64_t doca_flow_monitor::user_data`

aging user data input.

3.16. `doca_flow_pipe_cfg` Struct Reference

`doca_flow_pipe_cfg` pipeline configuration

`doca_flow_actions *doca_flow_pipe_cfg::actions`

actions for the pipeline

`bool doca_flow_pipe_cfg::is_root`

pipeline is root or not

`doca_flow_match *doca_flow_pipe_cfg::match`

matcher for the pipeline

`doca_flow_match *doca_flow_pipe_cfg::match_mask`

match mask for the pipeline

`doca_flow_monitor *doca_flow_pipe_cfg::monitor`

monitor for the pipeline

`const char *doca_flow_pipe_cfg::name`

name for the pipeline

`doca_flow_port *doca_flow_pipe_cfg::port`

port for the pipeline

3.17. `doca_flow_port_cfg` Struct Reference

doca flow port configuration

`const char *doca_flow_port_cfg::devargs`

specific per port type cfg

`uint16_t doca_flow_port_cfg::port_id`

dpdk port id

`uint16_t doca_flow_port_cfg::priv_data_size`

user private data

`enum doca_flow_port_type doca_flow_port_cfg::type`

mapping type of port

3.18. `doca_flow_query` Struct Reference

flow query result

`uint64_t doca_flow_query::total_bytes`

total bytes hit this flow

`uint64_t doca_flow_query::total_pkts`

total packets hit this flow

3.19. `doca_flow_tun` Struct Reference

doca flow tunnel information

`doca_be32_t doca_flow_tun::gre_key`

gre key

`doca_be32_t doca_flow_tun::gtp_teid`

gtp teid

`enum doca_flow_tun_type doca_flow_tun::type`

tunnel type

`doca_be32_t doca_flow_tun::vxlan_tun_id`

vxlan vni(24) + reserved (8).

3.20. `doca_netflow_default_record` Struct Reference

Flow record, represent a flow at specific moment, usually after a flow ends or after some timeout. Each one is a data record that will appear in the collector. This template is based on V5 fields with additional V9 fields.



Note:

all fields are in network byte order.

`char doca_netflow_default_record::application_name`

Name associated with a classification

`__be32 doca_netflow_default_record::d_octets`

Octets sent in Duration.

`__be32 doca_netflow_default_record::d_pkts`

Packets sent in Duration

`__be32 doca_netflow_default_record::dst_addr_v4`

Destination IPV4 Address

`in6_addr doca_netflow_default_record::dst_addr_v6`

Destination IPV6 Address

`__be16 doca_netflow_default_record::dst_as`

originating AS of destination address

`uint8_t doca_netflow_default_record::dst_mask`

destination address prefix mask bits

`__be16 doca_netflow_default_record::dst_port`

TCP/UDP destination port number or equivalent

`__be32 doca_netflow_default_record::first`

SysUptime at start of flow

`__be64 doca_netflow_default_record::flow_id`

This identifies a transaction within a connection

`__be16 doca_netflow_default_record::input`

Input interface index

`__be32 doca_netflow_default_record::last`

and of last packet of flow

`__be32 doca_netflow_default_record::next_hop_v4`

Next hop router's IPV4 Address

`in6_addr doca_netflow_default_record::next_hop_v6`

Next hop router's IPV6 Address

`__be16 doca_netflow_default_record::output`

Output interface index

`uint8_t doca_netflow_default_record::protocol`

IP protocol type (for example, TCP = 6;UDP = 17)

`__be32 doca_netflow_default_record::src_addr_v4`

Source IPV4 Address

`in6_addr doca_netflow_default_record::src_addr_v6`

Source IPV6 Address

`__be16 doca_netflow_default_record::src_as`

originating AS of source address

`uint8_t doca_netflow_default_record::src_mask`

source address prefix mask bits

`__be16 doca_netflow_default_record::src_port`

TCP/UDP source port number or equivalent

`uint8_t doca_netflow_default_record::tcp_flags`

Cumulative OR of tcp flags

uint8_t doca_netflow_default_record::tos

IP Type-of-Service

3.21. doca_netflow_flowset_field Struct Reference

One field in netflow template, please look at doca_netflow_types for type macros.

int doca_netflow_flowset_field::length

field len in bytes (see link) - will be converted to uint16

int doca_netflow_flowset_field::type

field number id (see link) - will be converted to uint16

3.22. doca_netflow_template Struct Reference

```
Template for the records. struct record_example { uint32_t
src_addr_V4; uint32_t dst_addr_V4; } struct doca_netflow_flowset_field
fields[] = { { .type = DOCA_NETFLOW_IPV4_SRC_ADDR, .length =
DOCA_NETFLOW_IPV4_SRC_ADDR_DEFAULT_LENGTH }, { .type =
DOCA_NETFLOW_IPV4_DST_ADDR, .length =
DOCA_NETFLOW_IPV4_DST_ADDR_DEFAULT_LENGTH } }; struct doca_netflow_template
template = { .field_count = 2; .fields = fields; };
```

**Note:**

all fields are in network byte order.

int doca_netflow_template::field_count

number of fields in 'fields' array - will be converted to uint16

doca_netflow_flowset_field

*doca_netflow_template::fields

array of field info

3.23. `doca_telemetry_buffer_attr_t` Struct Reference

DOCA schema buffer attribute. Applied to all DOCA sources.

Use to set internal `buffer_size`. All DOCA sources will have buffers of the same size. The buffer is flushed once it is full, or upon invocation of `doca_telemetry_source_flush()`. The buffer size is set to 60,000 by default. `data_root` is the data folder for storing the data and `data_schema_{hash}.json` files.

`uint64_t doca_telemetry_buffer_attr_t::buffer_size`

Size of the internal buffer.

`char *doca_telemetry_buffer_attr_t::data_root`

Path for where the data and schema will be stored.

3.24. `doca_telemetry_field_info_t` Struct Reference

DOCA schema field.

`uint16_t doca_telemetry_field_info_t::array_length`

Array length for this field type. Set to: 1 to register single value or >1 to register array of values.

`const char *doca_telemetry_field_info_t::description`

Field description

`const char *doca_telemetry_field_info_t::field_name`

Name of field

`const char *doca_telemetry_field_info_t::type_name`

Name of type that is already in schema (including built-in types).

3.25. `doca_telemetry_file_write_attr_t` Struct Reference

DOCA schema file write attribute. Applied to all DOCA sources.

Use to enable/disable file write onto storage under `data_root`. File write is disabled by default.

`bool`

`doca_telemetry_file_write_attr_t::file_write_enabled`

User defined switch for enabling/disabling local file write. Disabled by the default.

`doca_telemetry_timestamp_t`

`doca_telemetry_file_write_attr_t::max_file_age`

Maximum file age. Once current file is older than this threshold a new file will be created.

`size_t`

`doca_telemetry_file_write_attr_t::max_file_size`

Maximum size of binary data file. Once this size is reached, a new binary file will be created.

3.26. `doca_telemetry_ipc_attr_t` Struct Reference

DOCA schema file write attribute. Applied to all DOCA sources.

Use to enable/disable ipc transport. Enabled by default. Default `ipc_sockets_dir` is `'/opt/mellanox/doca/services/telemetry/ipc_sockets'`

`bool doca_telemetry_ipc_attr_t::ipc_enabled`

User defined switch for enabling/disabling IPC transport.

`char *doca_telemetry_ipc_attr_t::ipc_sockets_dir`

Path to a folder containing Telemetry Service sockets.

3.27. `doca_telemetry_ipc_timeout_attr_t` Struct Reference

DOCA schema IPC attribute. Applied to all DOCA sources.

Used to overwrite default values of timeouts for attach/reattach attempts and IPC socket timeout.

`uint32_t`

`doca_telemetry_ipc_timeout_attr_t::ipc_max_reconnect_time`

Time limit for reconnect attempts. If the limit is reached, the client is considered disconnected. Default is 100 msec.

`int`

`doca_telemetry_ipc_timeout_attr_t::ipc_max_reconnect_tries`

Number of reconnect attempts during reconnection period. Default is 3.

`uint32_t`

`doca_telemetry_ipc_timeout_attr_t::ipc_socket_timeout_msec`

Timeout for IPC messaging socket. If timeout is reached during send_receive, client is considered disconnected. Default is 500 msec.

3.28. `doca_telemetry_opaque_events_attr_t` Struct Reference

DOCA schema opaque events attribute. Applied to all DOCA sources.

Use to enable/disable opaque events transport. Disabled by default.

`bool`

`doca_telemetry_opaque_events_attr_t::opaque_events_enable`

User defined switch for enabling/disabling Opaque Events sending.

3.29. `doca_telemetry_source_name_attr_t` Struct Reference

DOCA telemetry source attributes: id and tag.

ID and Tag are used to create proper folder structure. All the data collected from the same host is written to "source_id" folder under data root. Binary file will have {source_tag}_{timestamp}.bin name format.

`char`

`*doca_telemetry_source_name_attr_t::source_id`

Hostname or guid.

`char`

`*doca_telemetry_source_name_attr_t::source_tag`

User defined datafile name prefix.

Chapter 4. Data Fields

Here is a list of all documented struct and union fields with links to the struct/union documentation for each field:

A

action

[doca_dpi_sig_info](#)

actions

[doca_flow_pipe_cfg](#)

aging

[doca_flow_monitor](#)

[doca_flow_cfg](#)

application_name

[doca_netflow_default_record](#)

array_length

[doca_telemetry_field_info_t](#)

B

buffer_size

[doca_telemetry_buffer_attr_t](#)

C

cir

[doca_flow_monitor](#)

D

d_octets

[doca_netflow_default_record](#)

d_pkts

[doca_netflow_default_record](#)

data_root

[doca_telemetry_buffer_attr_t](#)

dec_ttl

[doca_flow_actions](#)

decap

[doca_flow_actions](#)

description

[doca_telemetry_field_info_t](#)

devargs

[doca_flow_port_cfg](#)

dst_addr_v4

[doca_netflow_default_record](#)

dst_addr_v6

[doca_netflow_default_record](#)

dst_as

[doca_netflow_default_record](#)

dst_ip

[doca_dpi_parsing_info](#)

[doca_flow_encap_action](#)

dst_mac

[doca_flow_encap_action](#)

dst_mask

[doca_netflow_default_record](#)

dst_port

[doca_netflow_default_record](#)

E**encap**

[doca_flow_actions](#)

ethertype

[doca_dpi_parsing_info](#)

F**field_count**

[doca_netflow_template](#)

field_name

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gtp_teid

[doca_flow_tun](#)

H**has_encap**

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in_dst_port

[doca_flow_match](#)

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[doca_flow_match](#)

in_l4_type

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ipc_enabled

[doca_telemetry_ipc_attr_t](#)

ipc_max_reconnect_time_msec

[doca_telemetry_ipc_timeout_attr_t](#)

ipc_max_reconnect_tries

[doca_telemetry_ipc_timeout_attr_t](#)

ipc_socket_timeout_msec

[doca_telemetry_ipc_timeout_attr_t](#)

ipc_sockets_dir

[doca_telemetry_ipc_attr_t](#)

ipv4[doca_dpi_parsing_info](#)**ipv4_addr**[doca_flow_ip_addr](#)**ipv6**[doca_dpi_parsing_info](#)**ipv6_addr**[doca_flow_ip_addr](#)**is_hairpin**[doca_flow_cfg](#)**is_root**[doca_flow_pipe_cfg](#)**L****l4_dport**[doca_dpi_parsing_info](#)**l4_protocol**[doca_dpi_parsing_info](#)**l4_sport**[doca_dpi_parsing_info](#)**last**[doca_netflow_default_record](#)**length**[doca_netflow_flowset_field](#)**M****match**[doca_flow_pipe_cfg](#)**match_mask**[doca_flow_pipe_cfg](#)**matched**[doca_dpi_result](#)**max_file_age**[doca_telemetry_file_write_attr_t](#)**max_file_size**[doca_telemetry_file_write_attr_t](#)**max_packets_per_queue**[doca_dpi_config_t](#)**max_sig_match_len**[doca_dpi_config_t](#)**message**[doca_flow_error](#)

mod_dst_ip[doca_flow_actions](#)**mod_dst_mac**[doca_flow_actions](#)**mod_dst_port**[doca_flow_actions](#)**mod_src_ip**[doca_flow_actions](#)**mod_src_mac**[doca_flow_actions](#)**mod_src_port**[doca_flow_actions](#)**monitor**[doca_flow_pipe_cfg](#)**N****name**[doca_dpi_sig_data](#)[doca_flow_pipe_cfg](#)**nb_http_parser_based**[doca_dpi_stat_info](#)**nb_matches**[doca_dpi_stat_info](#)**nb_other_l4**[doca_dpi_stat_info](#)**nb_other_l7**[doca_dpi_stat_info](#)**nb_queues**[doca_dpi_config_t](#)**nb_scanned_pkts**[doca_dpi_stat_info](#)**nb_ssl_parser_based**[doca_dpi_stat_info](#)**nb_tcp_based**[doca_dpi_stat_info](#)**nb_udp_based**[doca_dpi_stat_info](#)**next_hop_v4**[doca_netflow_default_record](#)**next_hop_v6**[doca_netflow_default_record](#)**next_pipe**[doca_flow_fwd](#)

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out_dst_port

[doca_flow_match](#)

out_eth_type

[doca_flow_match](#)

out_l4_type

[doca_flow_match](#)

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Q**queues**

[doca_flow_cfg](#)

R**rss_flags**[doca_flow_fwd](#)**rss_mark**[doca_flow_fwd](#)**rss_queues**[doca_flow_fwd](#)**S****sig_id**[doca_dpi_sig_info](#)[doca_dpi_sig_data](#)**source_id**[doca_telemetry_source_name_attr_t](#)**source_tag**[doca_telemetry_source_name_attr_t](#)**src_addr_v4**[doca_netflow_default_record](#)**src_addr_v6**[doca_netflow_default_record](#)**src_as**[doca_netflow_default_record](#)**src_ip**[doca_dpi_parsing_info](#)[doca_flow_encap_action](#)**src_mac**[doca_flow_encap_action](#)**src_mask**[doca_netflow_default_record](#)**src_port**[doca_netflow_default_record](#)**status_flags**[doca_dpi_result](#)**T****tcp_flags**[doca_netflow_default_record](#)**tos**[doca_netflow_default_record](#)**total_bytes**[doca_flow_query](#)

total_pkts

[doca_flow_query](#)

total_sessions

[doca_flow_cfg](#)

tun

[doca_flow_match](#)

[doca_flow_encap_action](#)

type

[doca_flow_ip_addr](#)

[doca_flow_fwd](#)

[doca_netflow_flowset_field](#)

[doca_flow_tun](#)

[doca_flow_error](#)

[doca_flow_port_cfg](#)

type_name

[doca_telemetry_field_info_t](#)

U**user_data**

[doca_dpi_result](#)

[doca_flow_aged_query](#)

[doca_flow_monitor](#)

V**vlan_id**

[doca_flow_match](#)

vxlan_tun_id

[doca_flow_tun](#)

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