IEEE 802.1CB Maintenance Item 0343
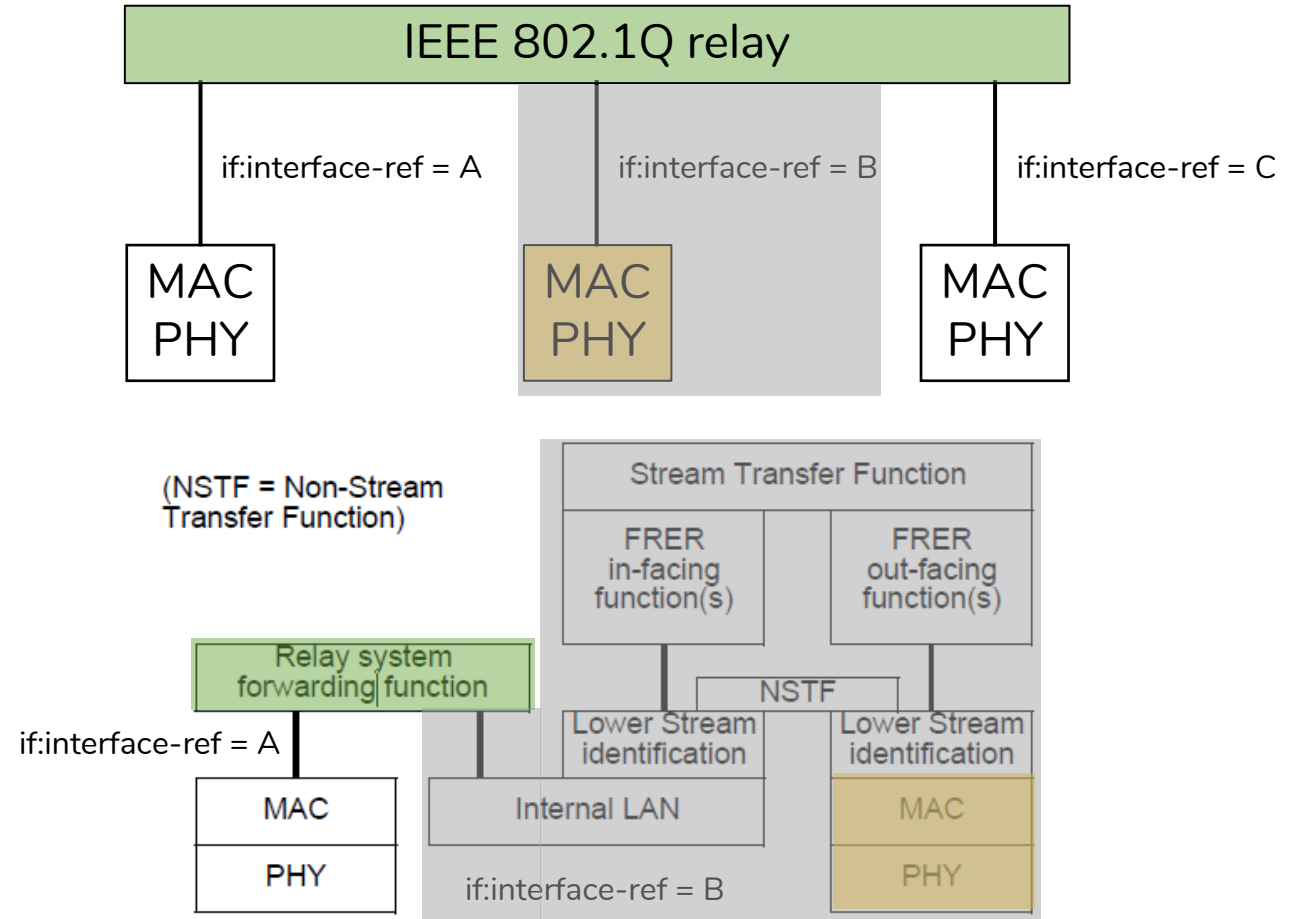
Differences in the interaction of Stream Identification with PSFP&ATS vs. FRER

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Port Interface References

- IEEE 802.1CBcv-2021 uses if:interface-refs to attach Stream Identification Functions to Ports.

- While in a Stack Model view, the interface may seem "split up", it is in fact not.

- While in a Stack Model view there is a sequence of entities implied, this is actually not strictly mandated.

IEEE 802.1Q relay

if:interface-ref = A   if:interface-ref = B   if:interface-ref = C

MAC PHY   MAC PHY   MAC PHY

(NSTF = Non-Stream Transfer Function)

Stream Transfer Function

FRER in-facing function(s)   FRER out-facing function(s)

NSTF

Relay system forwarding function

if:interface-ref = A

Lower Stream identification   Lower Stream identification

MAC   Internal LAN   MAC

PHY   if:interface-ref = B   PHY

# Up/Down - In/Out

9.1.1.2 tsnStreamIdInFacOutputPortList

The list of ports on which an in-facing Stream identification function (6.2) using this identification method (9.1.1.6, 9.1.1.7) is to be placed for this Stream (9.1.1.1) in the output (towards the system forwarding function) direction. At most one tsnStreamIdEntry can list a given port for a given tsnStreamIdHandle in its tsnStreamIdInFacOutputPortList.

9.1.1.3 tsnStreamIdOutFacOutputPortList

The list of ports on which an out-facing Stream identification function (6.2) using this identification method (9.1.1.6, 9.1.1.7) is to be placed for this Stream (9.1.1.1) in the output (towards the physical interface) direction. At most one tsnStreamIdEntry can list a given port for a given tsnStreamIdHandle in its tsnStreamIdOutFacOutputPortList.

9.1.1.4 tsnStreamIdInFacInputPortList

The list of ports on which an in-facing Stream identification function (6.2) using this identification method (9.1.1.6, 9.1.1.7) is to be placed for this Stream (9.1.1.1) in the input (coming from the system forwarding function) direction. Any number of tsnStreamIdEntry objects can list the same port for the same tsnStreamIdHandle in its tsnStreamIdInFacInputPortList.

9.1.1.5 tsnStreamIdOutFacInputPortList

The list of ports on which an out-facing Stream identification function (6.2) using this identification method (9.1.1.6, 9.1.1.7) is to be placed for this Stream (9.1.1.1) in the input (coming from the physical interface) direction. Any number of tsnStreamIdEntry objects can list the same port for the same tsnStreamIdHandle in its tsnStreamIdOutFacInputPortList.
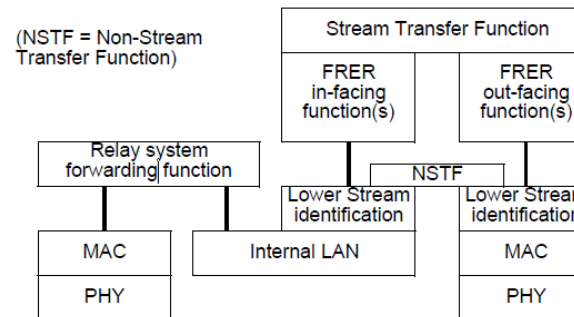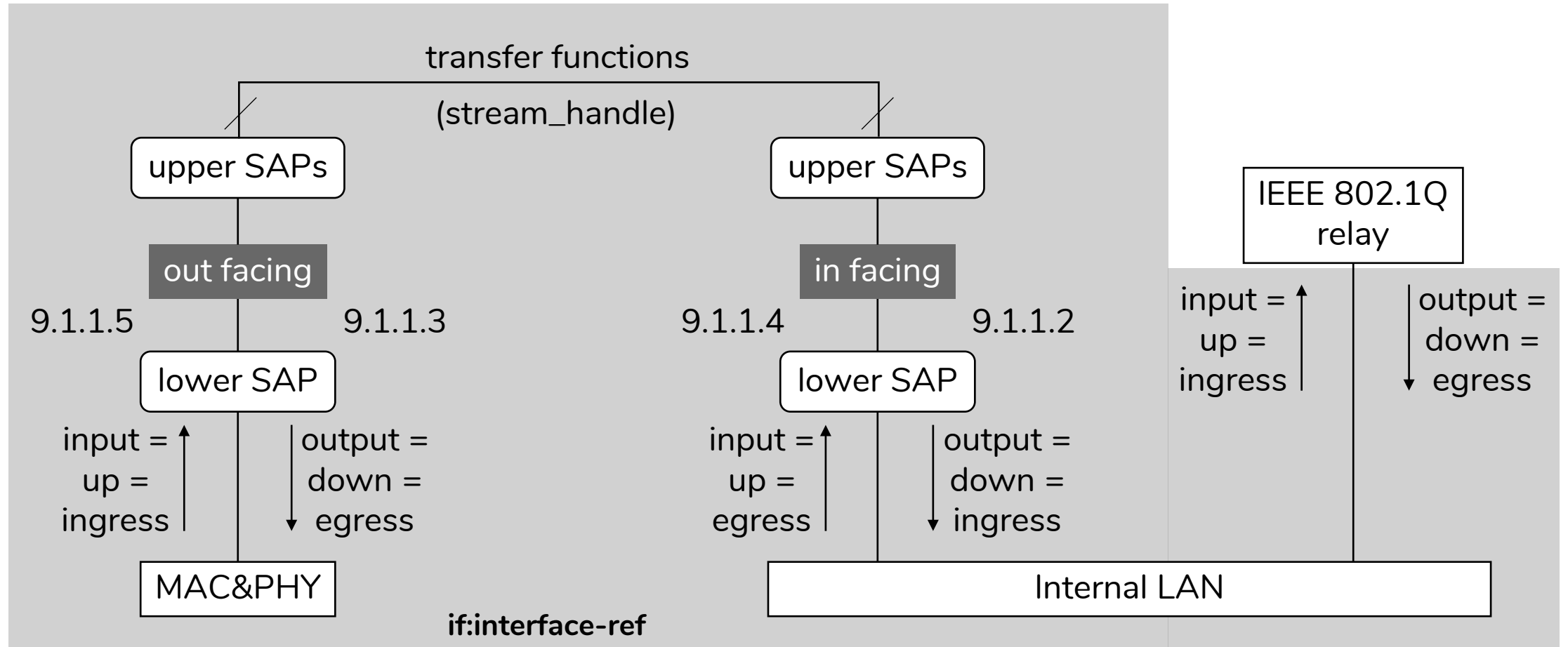

down: The direction through the protocol stack from a sublayer using a service provided by another sublayer to the sublayer whose services it uses; the direction of output packets.

output: Output packets are those moving down the protocol stack, regardless of the position of receiving function relative to the physical media, for example, by the M_UNITDATA.request primitive of the Internal Sublayer Service (ISS).

up: The direction through the protocol stack from a sublayer offering a service to the sublayer making use of that service; the direction of input packets.

input: Input packets are those moving up the protocol stack, regardless of the position of receiving function relative to the physical media, for example, by the M_UNITDATA.indication primitive of the Internal Sublayer Service (ISS).

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Model Nomenclature

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stream_handle on UP/DOWN path

As illustrated in Figure 6-3, the Stream identification function can be described as having two SAPs (see IEEE Std 802.1AC). One SAP connects Stream identification function to the upper layers. This SAP includes a stream_handle subparameter and can include a sequence_number subparameter. The other SAP connects to the lower layers. This SAP can, but typically does not, include the stream_handle or sequence_number subparameters.
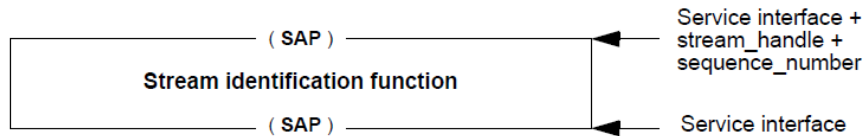
Figure 6-3—Stream identification function: single upper SAP

6.4 Null Stream identification

The Null Stream identification is a passive Stream identification function that operates at the frame level. It can be defined using the Enhanced Internal Sublayer Service (EISS) described in 6.9 of IEEE Std 802.1Q-2014, in which case it is enhanced with the extra stream_handle subparameter of the connection_identifier, specified in 6.1 of the present standard. It discards the stream_handle subparameter passed down the stack. It generates a stream_handle subparameter on frames passed up the stack based on the frame's destination MAC address and VLAN ID. It does not change any of a packet's other parameters. It is suitable for applications in which all data packets to a particular {MAC address, VLAN} pair are Stream packets. For example, AVB Streams (IEEE Std 802.1BA-2011 [B1]) have a unique {destination MAC address, VLAN} pair per Stream. In order to instantiate the Null Stream identification function, the tsnStreamIdIdentificationType managed object (9.1.1.6) is encoded using the OUI (00-80-C2) and the type values as shown in Table 9-1.

6.4 Null Stream identification
6.5 Source MAC and VLAN Stream identification
6.7 IP Stream identification
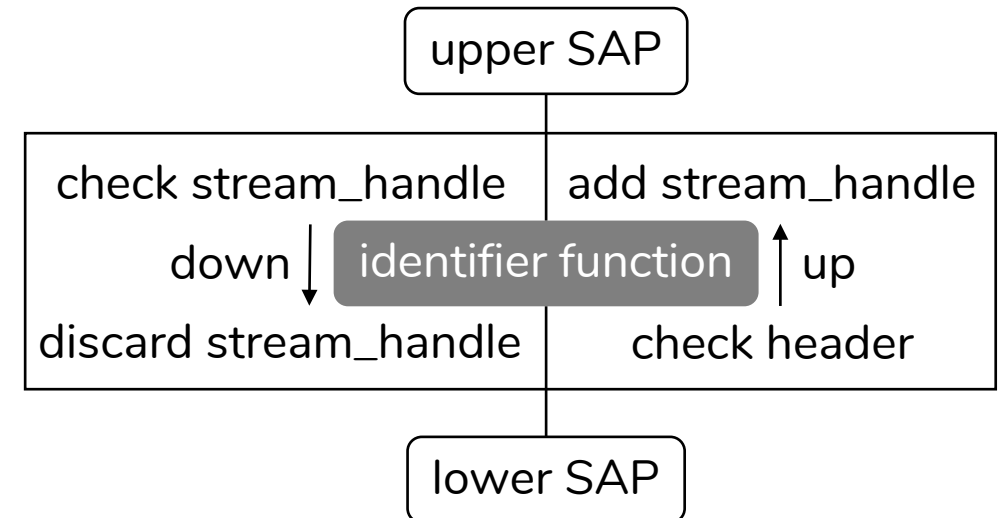**6.8 Mask-and-match Stream identification**
all state:
"… discards the stream_handle subparameter for packets passed down the stack."

no statement for
6.6 Active Destination MAC and VLAN Stream identification

Passive Stream Identification does nothing on DOWN path

As illustrated in Figure 6-3, the Stream identification function can be described as having two SAPs (see IEEE Std 802.1AC). One SAP connects Stream identification function to the upper layers. This SAP includes a stream_handle subparameter and can include a sequence_number subparameter. The other SAP connects to the lower layers. This SAP can, but typically does not, include the stream_handle or sequence_number subparameters.
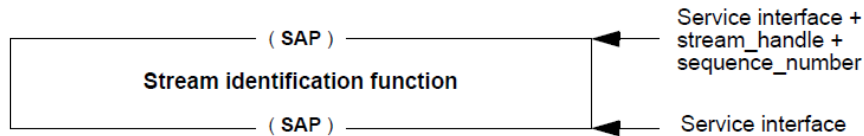
Stream identification function

Figure 6-3—Stream identification function: single upper SAP

Service interface +
stream_handle +
sequence_number

Service interface

6.4 Null Stream identification

The Null Stream identification is a passive Stream identification function that operates at the frame level. It can be defined using the Enhanced Internal Sublayer Service (EISS) described in 6.9 of IEEE Std 802.1Q-2014, in which case it is enhanced with the extra stream_handle subparameter of the connection_identifier, specified in 6.1 of the present standard. It discards the stream_handle subparameter passed down the stack. It generates a stream_handle subparameter on frames passed up the stack based on the frame's destination MAC address and VLAN ID. It does not change any of a packet's other parameters. It is suitable for applications in which all data packets to a particular {MAC address, VLAN} pair are Stream packets. For example, AVB Streams (IEEE Std 802.1BA-2011 [B1]) have a unique {destination MAC address, VLAN} pair per Stream. In order to instantiate the Null Stream identification function, the object (9.1.1.6) is encoded using the OUI (00-80-C2) and the type
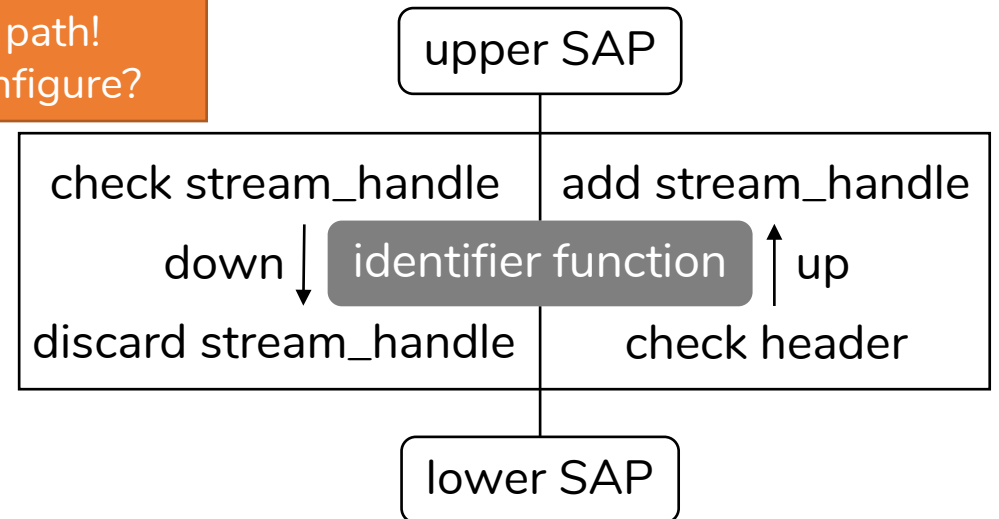
6.4 Null Stream identification
6.5 Source MAC and VLAN Stream identification
6.7 IP Stream identification
6.8 Mask-and-match Stream identification

all state:

"... discards the stream_handle subparameter for packets passed down the stack."

no statement for
6.6 Active Destination MAC and VLAN Stream identification

Basically do NOTHING on the DOWN path!
Why even configure?

upper SAP

check stream_handle | add stream_handle

down | identifier function | up

discard stream_handle | check header

lower SAP

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Active Stream Identification

In the Active Destination MAC and VLAN Stream identification, the destination_address, vlan_identifier, and priority parameters of the frame passed down the stack from the upper layers or up the stack from the lower layers are replaced with alternate values. The replacement values for frames transmitted down the stack to the Active Destination MAC and VLAN Stream identification, and used to recognize frames passed up the stack to the Active Destination MAC and VLAN Stream identification function, are those listed in 9.1.2. The replacement values for frames passed up the stack (not including the priority parameter) are in 9.1.4.
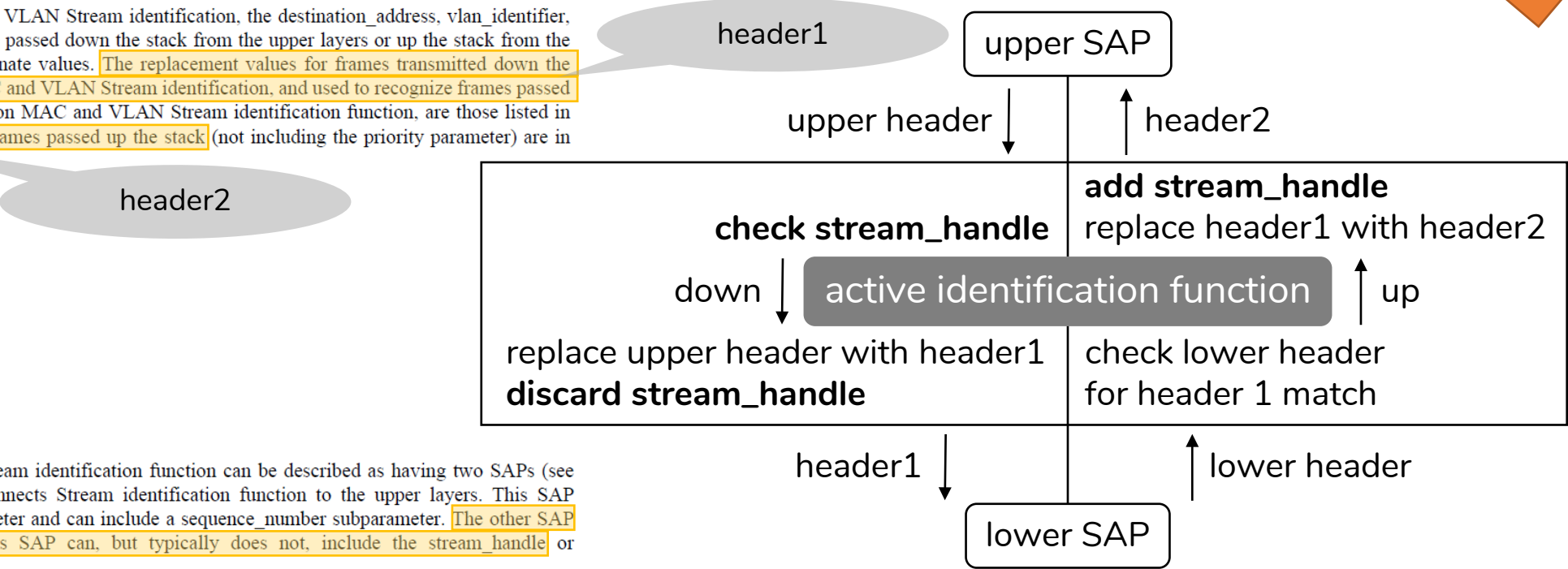
header1

header2

upper SAP

upper header ↓ ↑ header2

add stream_handle
check stream_handle replace header1 with header2

down ↓ active identification function ↑ up

replace upper header with header1 **discard stream_handle**

check lower header for header 1 match

header1 ↓ ↑ lower header

lower SAP

As illustrated in Figure 6-3, the Stream identification function can be described as having two SAPs (see IEEE Std 802.1AC). One SAP connects Stream identification function to the upper layers. This SAP includes a stream_handle subparameter and can include a sequence_number subparameter. The other SAP connects to the lower layers. This SAP can, but typically does not, include the stream_handle or sequence_number subparameters.
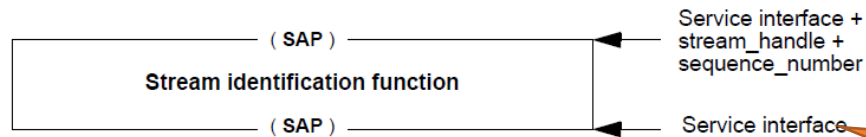
(SAP) ——— Service interface + stream_handle + sequence_number

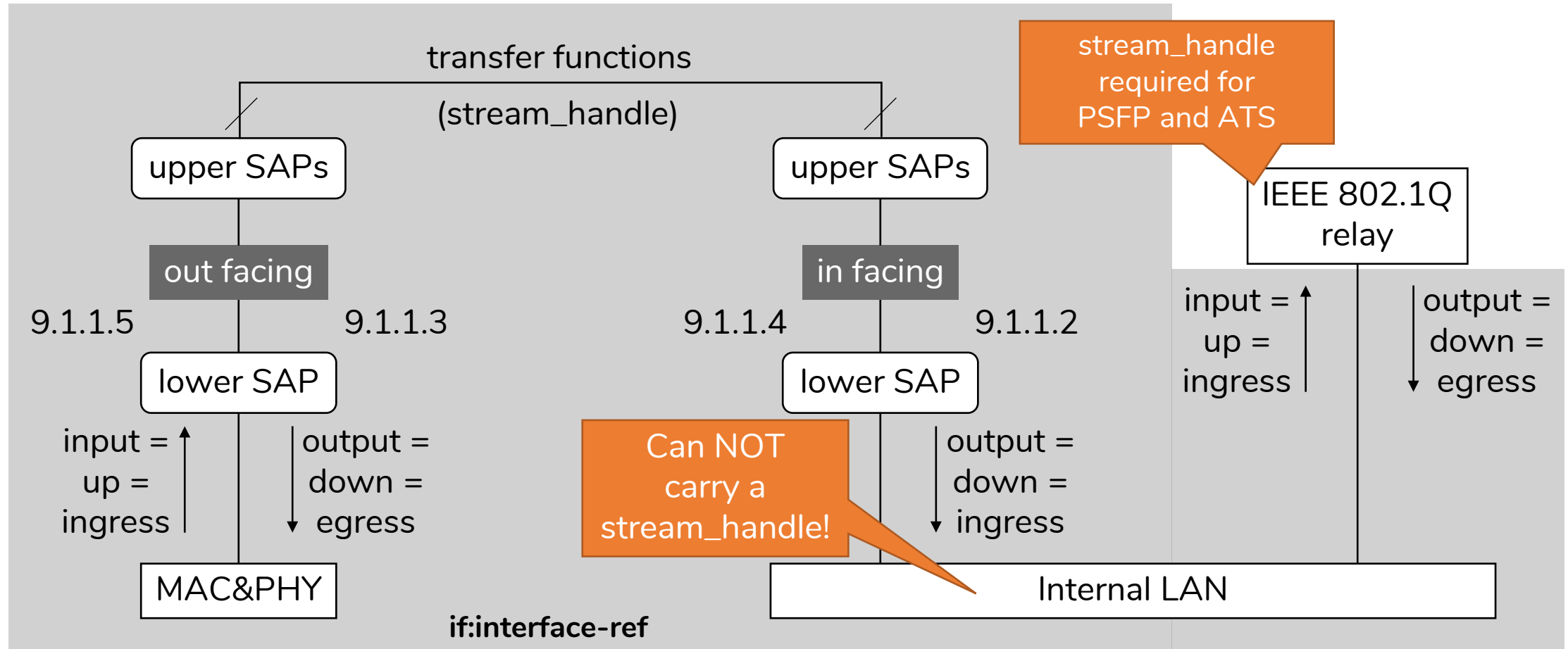**Stream identification function**

(SAP) ——— Service interface

Figure 6-3—Stream identification function: single upper SAP

… also practically: "… discards the stream_handle subparameter for packets passed down the stack."

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Limitations of the Internal LAN

Ambiguity of 2 Out-Facing Functions

NEW Maintenance Item?

transfer functions
(stream_handle)

upper SAPs

upper SAPs

stream_handle required for PSFP and ATS

IEEE 802.1Q relay

out facing

in facing

9.1.1.5   9.1.1.3

9.1.1.4   9.1.1.2

input = up = ingress

output = down = egress

lower SAP

lower SAP

input = up = ingress

output = down = egress

Can NOT carry a stream_handle!

output = down = ingress

out facing

to assign a new stream_handle!

MAC&PHY

Internal LAN

if:interface-ref

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THANK YOU

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