

# 1 Virtual Link Control (VLC) Overview and Architecture

2 **Editorial Note:** This is clause 4

## 3 1.1 Principles of operation

4 Virtual Link Control (VLC) defines the method of encapsulating various protocol data units (xPDUs) in  
5 Ethernet frames with VLC Ethertype (0xA8-C8). An Ethernet frame with VLC Ethertype is called a Virtual  
6 Link Control Protocol Data Unit (VLC PDU). That portion of the network path that xPDUs traverse while  
7 they are encapsulated as VLC PDUs is referred to as a *tunnel*.

8 The xPDU-to-VLC PDU and VLC PDU-to-xPDU conversions take place within the VLC sublayer (see 1.2).  
9 Both VLC client and VLC sublayer are optional, i.e., in any multi-port device, the VLC sublayer may be  
10 implemented in only some ports. Devices that implement the VLC sublayer in at least one of the ports are  
11 said to be VLC-aware.

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12 Devices that do not implement VLC sublayer in any of the ports are called VLC-unaware. VLC-unaware  
13 devices are able to relay VLC PDUs as generic Ethernet frames using existing L2 forwarding mechanisms  
14 but are unable to consume or generate VLC PDUs.

15 All VLC PDUs except the *VLC CONFIG* VLC PDUs carry tunneling payloads associated with specific  
16 protocols (xPDU). Any payload-carrying VLC PDU that is consumed by a device is first converted into its  
17 native xPDU format and then passed to a specific client associated with that xPDU protocol type.  
18 Correspondingly, any payload-carrying VLC PDU that is generated by a device originates in a protocol-  
19 specific client as xPDU and is then converted into VLC PDU within the VLC sublayer.

Deleted: The VLC sublayer includes the Classification and Translation Engine (CTE) that converts xPDUs into VLC PDUs and vice versa. The CTE behavior is governed by a set of rules that are either statically configured or dynamically provisioned by the NMS (see 6.1).  
The VLC sublayer provides a service interface to OAM sublayer, VLC client, and may provide service interface to other L2 protocol-specific clients. The only messages that are passed to and received from the VLC client are the VLC configuration messages (see *VLC CONFIG* VLC PDU in 8.1.1).

20 A device port where xPDUs are converted into VLC PDUs (within the VLC sublayer) is referred to as *VLC*  
21 *entrance point* and a port where the opposite conversion takes place is referred to as *VLC exit point*.

### 22 1.1.1 VLC discovery protocol

23 The tunnel entrance and exit points may be pre-configured or provisioned via *VLC CONFIG* VLC PDUs  
24 based on known network topology and L2 device addresses. An automatic VLC discovery protocol is out-  
25 of-scope for this revision of the standard.

## 26 1.2 VLC sublayer

27 VLC functionality is confined to the VLC sublayer. **Error! Reference source not found,** depicts  
28 architectural positioning of the VLC sublayer, which is a client of the MAC Control sublayer (see IEEE Std  
29 802.3, Clause 31). [The VLC Sublayer functionality is fully specified in Clause 6.](#)

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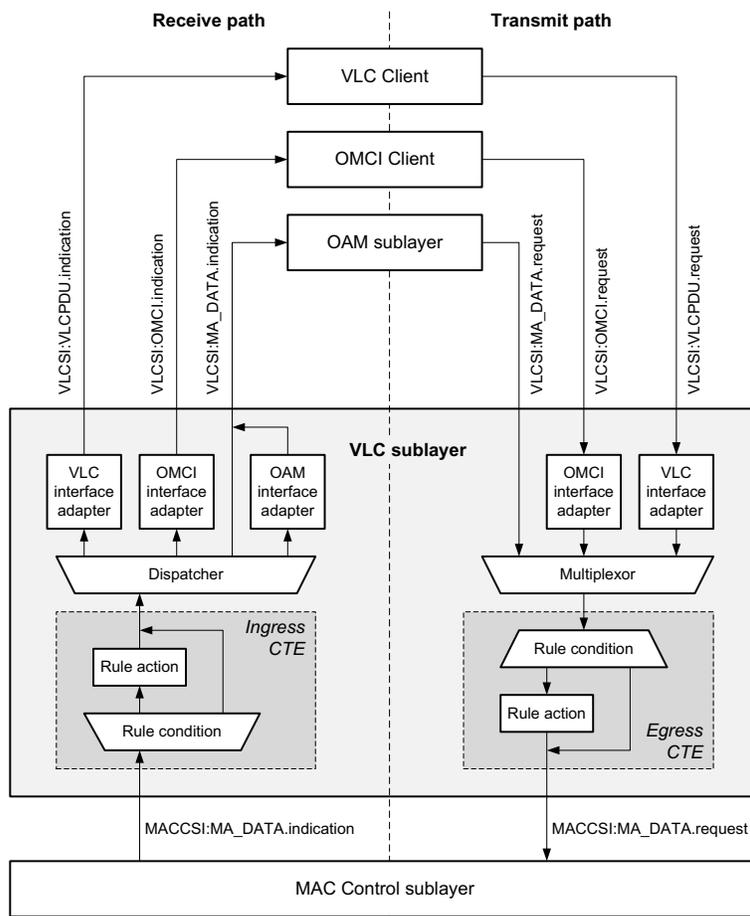
1 **2 VLC sublayer**

2 **Editorial Note: This is clause 6**

3 [The VLC Sublayer is where xPDU-to-VLCPDU and VLCPDU-to-xPDU conversions take place. The](#)  
4 [internal functional structure of the VLC Sublayer is shown in Figure 6-1.](#)

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6 **Figure 2-1—VLC sublayer functional block diagram**

7 [The VLC sublayer includes a set of interface adapters and the Classification and Translation Engine \(CTE\).](#)  
8 [Together these functional blocks convert xPDUs into VLCPDUs and vice versa. The CTE behavior is](#)  
9 [governed by a set of rules that are either statically configured or dynamically provisioned by the NMS \(see](#)  
10 [2.1\).](#)

1 The VLC sublayer also includes the conceptual Dispatcher block and Multiplexor block. The Dispatcher is  
2 responsible for distributing xPDUs processed in the Ingress CTE to the appropriate higher-layer block. The  
3 Multiplexor is responsible for multiplexing xPDUs received from higher-layer blocks into the egress CTE.

4 The interface adapter blocks and the Multiplexor and Dispatcher blocks are not specified separately in this  
5 standard, but the equivalent functionality is incorporated into the transmit path specification in 6.3 and the  
6 receive path specification in 6.2.

7 The VLC sublayer provides a service interface to the OAM sublayer, the VLC client, and may provide service  
8 interface to other L2 protocol-specific clients. The only messages that are passed to and received from the  
9 VLC client are the VLC configuration messages (see *VLC\_CONFIG* VLCPDU in [Error! Reference source  
10 not found.](#)).

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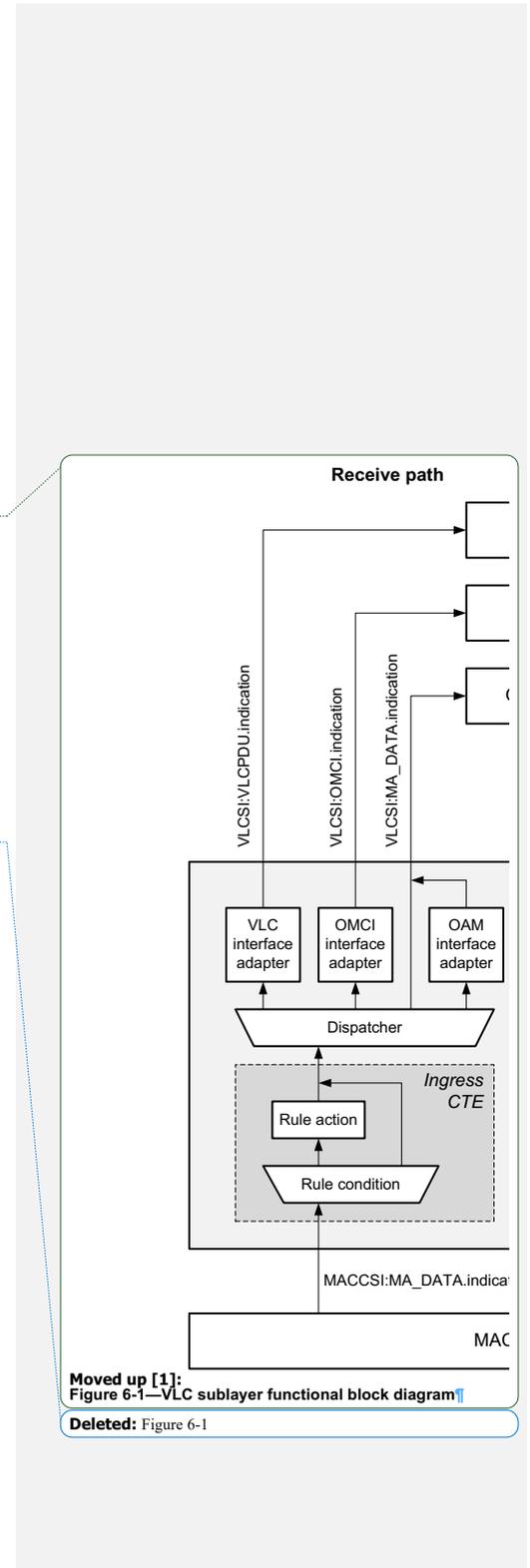
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## 13 2.1 VLC Classification and Translation Engine

14 The function of the VLC Classification and Translation Engine (CTE) is to classify frames by certain criteria  
15 and to perform specific modification on the frames that match the criteria. The classification criteria together  
16 with the associated modification action comprise an entity called a *rule*. The concept of a rule is similar to  
17 that defined in IEEE 1904.1, 6.5.2.1.

18 By matching frames to specific rules, the CTE is able to translate VLCPDUs into xPDUs (i.e., into frames  
19 with different Ethertype values) and vice versa.

20 There are separate CTE instances in the transmit path and in the receive path of each physical or virtual port.  
21 The CTE located in the receive path is called *Ingress CTE* and the CTE located in the transmit path is called  
22 *Egress CTE* (see [Figure 2-1](#)). Fundamentally, a CTE instance is simply a table that stores multiple rules.  
23 Some of the rules are statically pre-configured (i.e., available and active at all times); other rules are  
24 dynamically added/deleted by NMS when tunnels are established or destroyed.



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Figure 6-1—VLC sublayer functional block diagram

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