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Part 1Q: **Bridges and bridged networks**

AMENDMENT 3: Virtual station interface (VSI) discovery and configuration protocol (VDP) extension to support network virtualization overlays over layer 3 (NVO3)

Télécommunications et échange entre systèmes informatiques — Exigences pour les réseaux locaux et métropolitains —

Partie 1Q: Ponts et réseaux pontés

AMENDEMENT 3

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Institute of Electrical and Electronics Engineers, Inc
3 Park Avenue, New York
NY 10016-5997, USA

Email: stds.ipr@ieee.org
Website: www.ieee.org

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IEEE Std 802.1Qcy™-2019
(Amendment to IEEE Std 802.1Q™-2018
as amended by IEEE Std 802.1Qcp™-2018
and IEEE Std 802.1Qcc™-2018)

IEEE Standard for
Local and Metropolitan Area Networks—

Bridges and Bridged Networks

Amendment 32: Virtual Station Interface (VSI) Discovery and Configuration Protocol (VDP) Extension to Support Network Virtualization Overlays Over Layer 3 (NVO3)

Sponsor

LAN/MAN Standards Committee
of the
IEEE Computer Society

Approved 21 March 2019

IEEE-SA Standards Board

Abstract: Extensions to the Virtual Station Interface (VSI) Discovery and Configuration Protocol (VDP) to support using the protocol between an end station and a device doing encapsulation/ decapsulation for Network Virtualization Overlays Over Layer 3 (NVO3) are specified in this amendment to IEEE Std 802.1Q-2018. The extensions include adding format types [e.g., Internet Protocol (IP) addresses] and enhancing indication of migration events.

Keywords: amendment, IEEE 802.1Q™, IEEE 802.1Qcy™, NVO3, VDP extension, VDP IP address extension

The Institute of Electrical and Electronics Engineers, Inc.
3 Park Avenue, New York, NY 10016-5997, USA

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When the IEEE-SA Standards Board approved this amendment on 21 March 2019, it had the following membership:

Introduction

This introduction is not part of IEEE Std 802.1Qcy-2019, IEEE Standard for Local and Metropolitan Area Networks—Bridges and Bridged Networks—Amendment 32: Virtual Station Interface (VSI) Discovery and Configuration Protocol (VDP) Extension to Support Network Virtualization Overlays over Layer 3 (NVO3).

This amendment to IEEE Std 802.1Q-2018 provides extensions to the Virtual Station Interface (VSI) Discovery and Configuration Protocol (VDP) to support using the protocol between an end station and a device doing encapsulation/decapsulation for Network Virtualization Overlays Over Layer 3 (NVO3). The extensions include adding format types [e.g., Internet Protocol (IP) addresses] and enhancing indication of migration events.

This standard contains state-of-the-art material. The area covered by this standard is undergoing evolution. Revisions are anticipated within the next few years to clarify existing material, to correct possible errors, and to incorporate new related material. Information on the current revision state of this and other IEEE 802 standards may be obtained from

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Bridges and Bridged Networks

Amendment 32: Virtual Station Interface (VSI) Discovery and Configuration Protocol (VDP) Extension to Support Network Virtualization Overlays Over Layer 3 (NVO3)

(This amendment is based on IEEE Std 802.1Q™-2018, as amended by IEEE Std 802.1Qcp™-2018 and IEEE Std 802.1Qcc™-2018.)

NOTE—The editing instructions contained in this amendment define how to merge the material contained therein into the existing base standard and its amendments to form the comprehensive standard.

The editing instructions are shown in ***bold italic***. Four editing instructions are used: change, delete, insert, and replace. ***Change*** is used to make corrections in existing text or tables. The editing instruction specifies the location of the change and describes what is being changed by using ~~strike through~~ (to remove old material) and <u>underscore</u> (to add new material). ***Delete*** removes existing material. ***Insert*** adds new material without disturbing the existing material. Insertions may require renumbering. If so, renumbering instructions are given in the editing instruction. ***Replace*** is used to make changes in figures or equations by removing the existing figure or equation and replacing it with a new one. Editing instructions, change markings, and this NOTE will not be carried over into future editions because the changes will be incorporated into the base standard.[1]

1. Overview

1.3 Introduction

Change the second to last paragraph of 1.3 as follows and renumber the subsequent list items accordingly:

This standard specifies protocols, procedures, and managed objects that

ck) Allow for the filtering and policing of individual traffic streams.
<u>cl) Provide for Network Virtualization Overlays over Layer 3 (NVO3) related port configuration.</u>

[1] Notes in text, tables, and figures are given for information only and do not contain requirements needed to implement the standard.

2. Normative references

Insert the following references into Clause 2 in alphanumeric order:

IETF RFC 7365, Framework for Data Center (DC) Network Virtualization, October 2014.[2]

IETF RFC 8394, Split Network Virtualization Edge (Split-NVE) Control Plane Requirements, May 2018.

[2] IETF documents (e.g., RFCs) are available from the Internet Engineering Task Force (https://tools.ietf.org/html/).

3. Definitions

Change the following definitions of Clause 3 as specified:

3.70 downlink relay port (DRP): A port of an edge relay (ER) that is capable of supporting at least one Virtual Station Interface (VSI). For NVO3 a port of a tNVE that is capable of supporting at least one NVO3 Tenant Station Interface (TSI) (see IETF RFC 8394).

3.255 Station-facing Bridge Port (SBP): A Bridge Port that supports the Edge Virtual Bridging (EVB) status parameters with an EVBMode parameter value of "EVB Bridge". For NVO3 a port of an nNVE that supports VDP.

NOTE—See 40.4.

3.296 Virtual Station Interface (VSI): An interface to a virtual station that is attached to a downlink relay port (DRP) of an edge relay (ER). For NVO3 a VSI is equivalent to an NVO3 Tenant Station Interface (TSI) (see IETF RFC 8394).

Insert the following definitions into Clause 3 in alphabetic order, number them appropriately, and renumber the subsequent terms in the clause accordingly:

3.x Network Virtualization Edge (NVE): A term as defined in IETF RFC 7365.[3]

3.x Network Virtualization Overlays over Layer 3 (NVO3): A framework conforming to IETF RFC 7365.

3.x nNVE: A term as defined in IETF RFC 8394.

3.x tNVE: A term as defined in IETF RFC 8394.

3.x Virtual Network Instance (VNI): A term as defined in IETF RFC 7365.

3.x Virtual Network Instance Identifier (VNI ID): A 3-octet identifier for a VNI.

[3] Information about references can be found in Clause 2.

4. Abbreviations

Insert the following abbreviations into Clause 4 in alphabetic order:

NVE	Network Virtualization Edge
NVO3	Network Virtualization Overlays over Layer 3
VNI	Virtual Network Instance
VNI ID	Virtual Network Instance Identifier

5. Conformance

5.2 Conformant components and equipment

Change 5.2 as follows:

This subclause specifies requirements and options for the following core components:

a) VLAN Bridge component (5.4)
b) MAC Bridge component (5.13)

for the following components that use that core functionality:

c) Customer VLAN (C-VLAN) component (5.5)
d) Service VLAN (S-VLAN) component (5.6)
e) I-component (5.7)
f) B-component (5.8)
g) TPMR component (5.15)
h) T-component (5.17)
i) Edge relay (ER) (5.24.1)

and for the following systems that include instances of the above components:

j) C-VLAN Bridge (5.9)
k) S-VLAN Bridge (5.10.1)
l) Provider Edge Bridge (5.10.2)
m) Backbone Edge Bridge (BEB) (5.12)
n) MAC Bridge (5.14)
o) TPMR (5.16)
p) Edge Virtual Bridging (EVB) Bridge (5.23)
q) EVB station (5.24)
r) TSN CNC station (5.29)
s) VDP-NVO3 (5.31)

NOTE—Both S-VLAN Bridges and Provider Edge Bridges are examples of Provider Bridges.

Insert the following subclause (5.31 and its subclauses) after 5.29 (subclause 5.30 is reserved for a future amendment):

5.31 VDP-NVO3 requirements

In the Split-NVE scenario, the nNVE implements the bridge role VDP and tNVE implements the station role VDP. While the nNVE and tNVE share the VDP functionality of an EVB Bridge and an EVB Station, their conformance requirements are different. This clause lists the conformance requirements for nNVE and tNVE to operate VDP in the Split-NVE scenario.

5.31.1 VDP-NVO3 nNVE requirements

A conformant VDP-NVO3 nNVE implementation shall

a) Support the Bridge role of VDP on each SBP (Clause 41).
b) Support assignment of VIDs to GroupIDs (41.2.9).

A conformant VDP-NVO3 nNVE implementation may

c) Support the functionality of a C-VLAN component (5.5).
d) Support at least one SBP on the C-VLAN component (Clause 40).
e) Support an LLDP nearest Customer Bridge database (Clause 40).
f) Support the EVB status parameters for EVBMode = NVO3 Mode (40.4.4) and NVERole = nNVE (40.5.1).
g) Support the EVB Bridge status parameters about IPv4 and IPv6 address capability (D.2.12.3).
h) Support the EVB TLV on each SBP (D.2.12).
i) Support ECP on each SBP (Clause 43).
j) Support the use of the M, S and N bits in VDP (41.2.3).
k) Support the use of IP addresses in VDP filter info format (41.2.9).

5.31.2 VDP-NVO3 tNVE requirements

A conformant VDP-NVO3 tNVE implementation shall

a) Support the station role of VDP for each URP (Clause 41).
b) Support assignment of VIDs to GroupIDs (41.2.9).

A conformant VDP-NVO3 tNVE implementation may

c) Support one ER (5.23.1, Clause 40).
d) Support an LLDP nearest Customer Bridge database (Clause 40).
e) Support the EVB status parameters for EVBMode = NVO3 Mode (40.4.4) and NVERole = tNVE (40.5.2).
f) Support the EVB station status parameters about IPv4 and IPv6 address capability (D.2.12.4).
g) Support the EVB TLV on each URP (D.2.12).
h) Support ECP on each URP (Clause 43).
i) Support the use of the M, S and N bits in VDP (41.2.3).
j) Support the use of IP addresses in VDP filter info format (41.2.9).

12. Bridge management

12.3 Data types

Change 12.3 as follows:

This subclause specifies the semantics of operations independent of their encoding in management protocol. The data types of the parameters of operations are defined only as required for that specification.

The following data types are used:

a) Boolean.
b) Enumerated, for a collection of named values.
c) Unsigned, for all parameters specified as "the number of" some quantity, and for spanning tree priority values that are numerically compared. When comparing spanning tree priority values, the lower number represents the higher priority value.
d) MAC address.
e) Latin1 String, as defined by ANSI X3.159, for all text strings.
f) Time Interval, an Unsigned value representing a positive integral number of seconds, for all spanning tree protocol timeout parameters.
g) Counter, for all parameters specified as a "count" of some quantity. A counter increments and wraps with a modulus of 2 to the power of 64.
h) MRP Time Interval, an Unsigned value representing a positive integral number of centiseconds, for all MRP timeout parameters.
i) Port Number, an Unsigned value assigned to a Port as part of a Port Identifier. Valid Port Numbers are in the range 1 through 4095.
j) Port Priority, an Unsigned value used to represent the priority component of a Port Identifier. Valid Port Priorities are in the range 0 through 240, in steps of 16.
k) Bridge Priority, an Unsigned value used to represent the priority component of a Bridge Identifier. Valid Bridge Priorities are in the range 0 through 61440, in steps of 4096.
l) ComponentID, an unsigned value used to uniquely identify the management objects for a particular VLAN Bridge component (12.2, Clause 8, 5.4) within a system (such as a BEB) comprising multiple such components. ComponentIDs start at 1 and go through 4294967295. If the system has a single component it will have a ComponentID equal to 1.
m) ComponentType, an enumerated list used to classify a particular VLAN Bridge component within a system comprising multiple components.
n) Port Index, a handle, unique within a system, that identifies a port.
o) PIP Index, a Port Index for a PIP.
p) Percentage.
q) ECT-ALGORITHM. A 4-byte unsigned identifier. Used as a worldwide unique definition of an Equal Cost Tree (ECT) Algorithm, the first 3 bytes are expected to be taken from the OUI or CID space for the organization that has defined the algorithm. The last byte is allocated by that organization.
r) SPSourceID. A 20-bit Unsigned identifier. Used to represent a node uniquely within an SPT Domain (27.10).
s) Timer exp, an unsigned value from 0–31 representing a positive integer for the exponent of 2, which forms the multiplier of 10 µs, used for EVB protocol timeout parameters.

NOTE—For example, a value of 4 represents $2^4 \times 10$ µs, or 160 µs.

t) Boolean array, an array of Boolean values.
u) IP Address, an IPv4 address, IPv6 address, or null for no IP address.

12.26 Edge Virtual Bridging (EVB) management

12.26.3 VSI table entry

Change 12.26.3 as follows:

Each EVB system maintains a table of the active VSIs. The structure of a VSI table entry is shown in Table 12-25. This read-only table provides the current operation parameters of each VSI along with the VDP state associated with the VSI. The table is keyed on the SBP's or URP's ComponentID and Port Number and on the VSIID. The operation that can be performed on the VSI table is as follows:

a) Read entry for a ComponentID, Port Number and VSIID

Table 12-25—VSI table entry

Name	Data type	Operations supported[a]	Conformance[b]	References
evbVsiComponentID	ComponentID	R	BE	12.4.1.5
evbVsiPortNumber	Port Number	R	BE	12.4.2
evbVsiIDType	enumerated	R	BE	41.2.6, Table 41-5
evbVsiID	Latin1 String (SIZE(16))	R	BE	41.2.7
evbVsiTimeSinceCreate	time interval	R	BE	Clause 41
evbVsiVdpOperCmd	enumerated	R	BE	41.2.1, Table 41-1
evbVsiOperRevert	Boolean	R	BE	41.2.3
evbVsiOperHard	Boolean	R	BE	41.2.3
evbVsiOperReason	unsigned (0..15)	R	BE	41.2.3
evbVsiMgrID	Latin1 String (SIZE(1))	R	BE	41.1.3
evbVsiType	Latin1 String (SIZE(3))	R	BE	41.2.9
evbVsiTypeVersion	Latin1 String (SIZE(1))	R	BE	41.2.10
evbVsiMvFormat	Latin1 String (SIZE(1))	R	BE	41.2.8
evbVsiNumMACs	unsigned	R	BE	41.2.9
evbVdpMachineState	enumerated	R	BE	41.5.5.14
evbVdpCmdsSucceeded	counter	R	BE	41.5
evbVdpCmdsFailed	counter	R	BE	41.5
evbVdpCmdsReverts	counter	R	BE	41.5

[a] R = Read-only access; RW = Read/Write access.
[b] B = Required for an EVB Bridge system; E = Required for an EVB station system.

Each EVB Bridge or EVB station maintains a table of the VID/MACs on each VSI. The structure of a VSI MAC/VLAN table entry is shown in Table 12-26. This read-only table provides the current GroupID/VID/MAC assignments for each VSI. The operations that can be performed on the VSI table are as follows:

b) Read entries for a ComponentID, Port Number, and VSIID
c) Read entries for a ComponentID and Port Number

Table 12-26—VSI MAC/VLAN table entry

Name	Data type	Operations supported[a]	Conformance[b]	References
evbMvComponentID	ComponentID	R	BE	12.4.1.5
evbMvPortNumber	Port Number	R	BE	12.4.2
evbMvVsiIDType	enumerated	R	BE	41.2.6, Table 41-5
evbMvVsiID	Latin1 String (SIZE(16))	R	BE	41.2.7
evbMvVsiGroupID	unsigned	R	BE	41.2.9
evbMvVsiVID	unsigned (1..4094)	R	BE	41.2.9
evbMvVsiMAC	MAC address	R	BE	41.2.9
evbMvVsiIpAddress	IP address	R		41.2.9

[a] R= Read-only access; RW = Read/Write access.
[b] B = Required for an EVB Bridge system; E = Required for an EVB station system.

40. Edge Virtual Bridging (EVB)

40.4 EVB status parameters

Change 40.4 as follows:

In EVB Bridges and EVB Stations, an **EVBMode** parameter is associated with each port that provides EVB functionality. The parameter represent the EVB status of the port.

The **EVBMode** parameter determines whether EVB functionality is supported, and in what mode. The parameter can take one of the following ~~three~~ four values:

a) **EVB Bridge.** The port supports the functionality of an EVB Bridge.
b) **EVB station.** The port supports the functionality of an EVB station.
c) **Not Supported.** The port does not support EVB functionality. This value is assumed if the EVB status parameters are not implemented.
d) **NVO3 Mode.** The port supports the revised EVB functionality to be used in NVO3 Split-NVE scenario.

Insert the following subclauses (40.4.4 and 40.5 and its subclauses) after 40.4.3:

40.4.4 EVBMode = NVO3

If the value of the EVBMode parameter is NVO3, then further parameters are available in 40.5.

40.5 EVB Status Parameter for NVO3 Mode Support

In NVO3 Split-NVE scenario, tNVE is located in a station which may not be an EVB Station and nNVE is located in a bridge or router which may not be an EVB Bridge. Hence tNVE and nNVE will be used to refer to EVB Station and EVB Bridge revised to support NVO3.

The parameters of the EVB TLV provide the required parameter list. EVB TLV (Annex D) and status parameters are amended to support NVO3.

When **EVBMode** is set to **NVO3 Mode**, an **NVERole** parameter is to be further inspected. The parameter represent the NVE role of the port.

40.5.1 NVERole = nNVE

If the value of the **NVERole** parameter is **nNVE**, then further parameters are available, as follows:

a) **reflectiveRelayCapable.** This parameter is FALSE in NVO3 as tNVE has no requirement to support reflective relay.

NOTE 1—The value of the reflectiveRelayCapable parameter is an inherent property of the implementation and is not subject to administrative control.

b) **operReflectiveRelayControl**. If this parameter is TRUE, then reflective relay is enabled; if FALSE, reflective relay is disabled. In NVO3 scenario, it is always FALSE since tNVE will not request reflective relay to be enabled.

NOTE 2—Reflective relay is enabled if a remote EVB station has requested that it be provided (as determined by protocol exchanges between the EVB station and EVB Bridge) and the EVB Bridge is capable of providing it, or disabled if the EVB station has not requested that it be provided or the EVB Bridge is not capable of providing it.

c) **BGID**. This parameter is set to TRUE which indicates that the nNVE wishes to control VID assignments and use the GroupID in VDP exchanges.

NOTE 3—GroupID in VDP is equivalent to VNI ID in NVO3 which is a mandatory parameter to be supported. Both bridge and station sides support it.

40.5.2 NVERole = tNVE

If the value of the **EVBMode** parameter is **tNVE**, then further parameters are available, as follows:

a) **adminReflectiveRelayRequest**. This parameter is set to FALSE which indicates the attached nNVE is requested to disable reflective relay.
b) **operReflectiveRelayStatus**. This parameter can be FALSE or Unknown.

NOTE 1—The value of operReflectiveRelayStatus indicates whether the nNVE has enabled reflective relay, or whether the nNVE status is not currently known, as determined by protocol exchanges between the tNVE and nNVE. The nNVE status can be unknown during initialization or until the protocol exchanges have completed. However The nNVE status cannot be reflective relay enabled.

c) **SGID**. This parameter is set to TRUE which indicates that the tNVE can support the use of the GroupID.

NOTE 2—GroupID in VDP is equivalent to VNI ID in NVO3 which is a mandatory parameter to be supported. Both bridge and station sides should support it.

41. VSI Discovery and Configuration Protocol (VDP)

Change the introductory text of Clause 41 as follows:

VDP associates (registers) a VSI instance with an Station-facing Bridge Port (SBP) of an EVB Bridge. VDP simplifies and automates virtual station configuration by enabling the movement of a VSI instance (and its related VSI Type information) from one virtual station to another or from one EVB Bridge to another. VDP supports VSI discovery and configuration across a channel interconnecting an EVB station and an EVB Bridge. VDP TLVs are exchanged between the station and the Bridge in support of this protocol.

This subclause defines the VDP TLV structure and state machines.

When VDP is used between EVB Station and EVB Bridge, VDP uses ECP (Clause 43) as a transport protocol for VDP TLV exchanges. When ECP is used as a transport protocol for VDP, ECP uses the Nearest Customer Bridge group MAC address (Table 8-1) as the destination address for ECPDUs. Three VDP TLVs are defined as follows:

a) The VSI manager ID TLV (41.1). There is a single instance of this TLV in any ECPDU that carries VDP, and it appears as the first TLV in the ECPDU.
b) The VDP association TLV (41.2). One or more of these TLVs can appear in any ECPDU, following the VSI manager ID TLV.
c) The organizationally defined TLV (41.3).

~~When ECP is used as a transport protocol for VDP, ECP uses the Nearest Customer Bridge group MAC address (Table 8-1) as the destination address for ECPDUs.~~

NOTE 1—If there are multiple VSI managers, then their TLVs are transmitted in separate ECPDUs.

NOTE 2—Beyond the requirement stated, that the VSI manager ID TLV appears as the first TLV in ECPDUs carrying VDP, there are no further constraints placed upon how an implementation chooses to pack VDP TLVs into an ECPDU.

NOTE 3—VDP TLVs are not LLDP TLVs, and the TLV type values used in VDP TLVs are assigned from a distinct number space from those used in LLDP TLVs.

When VDP is used between tNVE and nNVE in NVO3 Split-NVE scenario, VDP may use ECP (Clause 43) as a transport protocol for VDP TLV exchanges. When ECP is used as a transport protocol for VDP in NVO3, ECP uses a specific unicast MAC address or the Nearest Customer Bridge group MAC address (Table 8-1) as the destination address for ECPDUs. The VDP TLVs used between a tNVE and nNVE are as follows:

d) The VDP association TLV (41.2). One or more of these TLVs can appear in any ECPDU or other transport protocol.
e) The organizationally defined TLV (41.3).

41.2 VDP association TLV definitions

41.2.3 Status

Change 41.2.3 as follows:

The Status field contains a 4-bit error type, encoded in bits 1–4, and four individual Boolean flags, encoded in bits 5–8.

For all requests, the error type field is reserved for future standardization; it is transmitted as 0x0 and is ignored on receipt.

For all requests, the Boolean flags are interpreted as shown in Table 41-2.

Table 41-2—Flag values in VDP requests

Name	Bit position	Interpretation
M-bit	Bit 5	Indicates that the user of the VSI (e.g., the virtual station) is migrating (M-bit = 1) or provides no guidance on the migration of the user of the VSI (M-bit = 0). The M-bit is used as an indicator relative to the VSI to which the user is migrating.
S-bit	Bit 6	Indicates that the VSI user (e.g., the virtual station) is suspended (S-bit = 1) or provides no guidance about whether the user of the VSI is suspended (S-bit = 0). A keep-alive Associate request with S-bit = 1 can be sent when the VSI user is suspended. The S-bit is used as an indicator relative to the VSI that the user is migrating from.
Req/Ack	Bit 7	Set to 0 to indicate that the TLV contains a request.
N-bit ~~Reserved~~	Bit 8	Indicates that the user of the VSI is NOT migrating (N-bit = 1) or provides no guidance on the migration of the user of the VSI (N-bit = 0). ~~Reserved for future standardization.~~

NOTE 1—The M-bit is restored to 0 when migration has stopped, either because the migration has succeeded, or it has failed. The S-bit is restored to 0 when the VSI user is no longer suspended.

NOTE 2—Interpretation of M and N bits is described in the following table:

M bit	N bit	Interpretation
0	0	No guidance on the migration of the user of the VSI
0	1	User of the VSI (e.g., the virtual station) is NOT migrating
1	0	User of the VSI (e.g., the virtual station) is migrating
1	1	Reserved

For all responses, the value of the error type indicates the outcome of the request, as shown in Table 41-3, and the Boolean flags are interpreted as shown in Table 41-4.

Table 41-3—Error types in VDP responses

Name	Value	Interpretation
Success	0x0	The VDP Request was successfully completed by the Bridge.
Invalid Format	0x1	The VDP TLV format is invalid.
Insufficient Resources	0x2	The Bridge does not have enough resources to complete the VDP operation successfully.
Unable to contact VSI manager	0x3	The Bridge was unable to contact the VSI manager.
Other failure	0x4	The operation failed for some other reason.
Invalid VID, GroupID, or MAC address	0x5	The operation failed because the VID, GroupID, or MAC address was invalid.
Reserved	0x6–0xF	Reserved for future standardization.

NOTE—"Success" is only interpreted as success by the state machines if all of the flag bits (Table 41-4) are zero.

Table 41-4—Flag values in VDP responses

Name	Bit position	Interpretation
Hard error	Bit 5	Set to 1 to indicate that the operation failed, and if the same operation is re-tried, it is likely to fail in the same way.
Keep	Bit 6	Set to 1 to indicate that the command was rejected and the state prior to the requested command has been kept.
Req/Ack	Bit 7	Set to 1 to indicate that the TLV contains a response.
Reserved	Bit 8	Reserved for future standardization.

41.2.8 Filter Info format

Change Table 41-6 as follows:

Table 41-6—Filter Info format values

Format	Value
VID (41.2.9.1)	0x01
MAC/VID (41.2.9.2)	0x02
GroupID/VID (41.2.9.3)	0x03
GroupID/MAC/VID (41.2.9.4)	0x04
GroupID/VID/IPv4 (41.2.9.5)	0x05
GroupID/MAC/VID/IPv4 (41.2.9.6)	0x06
GroupID/VID/IPv6 (41.2.9.7)	0x07
GroupID/MAC/VID/IPv6 (41.2.9.8)	0x08
Reserved for future standardization	0x00, 0x09~~5~~ through 0xFF

41.2.9 Filter Info field

Change 41.2.9 as follows:

The Filter Info field contains information from which a filter can be constructed. The filter is a set of VID values or a set of MAC/VID values. The MAC address in a MAC/VID value is an individual MAC address. The filter is applied to traffic transiting ports that do not have direct knowledge of the associated VSI, such as an EVB SBP, in order to identify the traffic associated with a particular VSI. This allows such ports to apply a VSI Type to the traffic of an individual VSI. Other devices that have direct knowledge of the traffic associated with a VSI, for example devices that form a 1:1 relationship between a port and VSI, simply provide this information via management interfaces.

The Filter Info field can also contain information that is not part of the filter. In particular, the Filter Info field can contain GroupID values. Like the VID, the GroupID identifies a VLAN. When the number of VLANs in the network is less than 4095, each VLAN can be assigned a VID value that is global within the network. When the number of VLANs in the network exceeds 4094, a globally-scoped VID can no longer be used to uniquely identify each VLAN. Instead, overlapping VIDs may be used in different regions of the network, and a per-region mapping between the global VLAN and the region-specific VID is maintained. In this case, the VLAN is uniquely and globally identified by a GroupID.

When VLANs are identified by GroupID, the station has knowledge of the GroupID but it does not, in general, know the corresponding VID to be used by traffic associated with the VLAN. The Bridge is aware of, or can obtain knowledge of, the VID associated with the specified GroupID. Thus, the station can send GroupID values to the Bridge via the Filter Info field of the VDP Request. The Bridge can map GroupID values to local VID values. The VID is included in the filter constructed by the Bridge and is returned with its corresponding GroupID to the station via the VDP Response.

In the NVO3 Split-NVE scenario, the VNI ID is carried in the lower 3 octets of the GroupID. The upper octet of the GroupID should be all zeros.

NOTE 1—The mechanism by which the EVB Bridge determines the GroupID to local VID associations is outside the scope of this standard.

Additionally, the Filter Info field of a VDP TLV in a VDP Response can specify a Priority Code Point (PCP) value associated with any, or all, of the VID values carried by that VDP Response. The PCP value, if specified, is used by the EVB station as the default PCP value associated with the VSI and VID. The Filter Info field contains a PCP Significant (PS) bit associated with each PCP field, indicating whether the PCP field carries a PCP value (binary 1) or does not carry a PCP value (binary 0). If the PCP field carries a PCP value, then the EVB station can adopt that value as the default PCP value associated with the VSI and VID. When sending data frames associated with a given VSI and VID, the EVB station can determine the PCP value associated with each frame by using an algorithm local to the EVB station. For example, the PCP value can be based on the identity of an application associated with the frame as determined by examining higher layer information. For any given frame, it is possible that the algorithm does not provide a specific value of PCP. In such cases, the PCP field is assigned the value of the default PCP associated with the VSI and VID.

NOTE 2—Specification of a PCP value in the VDP Response does not imply that all frames sent by the EVB station, associated with the VSI and VID, carry the specified PCP. It implies only that, if the EVB station has no other information regarding the PCP value that should appear in that particular frame, then the specified default PCP value is used.

Insert after 41.2.9.4 the following subclauses (41.2.9.5 through 41.2.9.8, including Figure 41-7 through Figure 41-10), and renumber the subsequent figures in this clause:

41.2.9.5 GroupID/VID/IPv4 Filter Info format

The GroupID/VID/IPv4 Filter Info format indicates that the Format Info field specifies a sequence of GroupID/VID/IPv4 triples to be associated with the VSI instance (41.2.7).

Figure 41-7 illustrates the GroupID/VID/IPv4 Filter Info format of the Filter Info field.

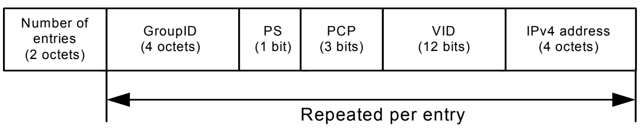

Figure 41-7—GroupID/VID/IPv4 filter format

The number of GroupID/VID/IPv4 triples is specified by the Number of entries field.

The null VID (see Table 9-2) can be used in a GroupID/VID/IPv4 triple when the GroupID/VID/IPv4 filter format is specified in the VDP Request. In this case, the Bridge is expected to supply the corresponding local VID value in the VDP Response. For this purpose, the Bridge maintains, or has access to, the mapping between GroupID and local VID.

41.2.9.6 GroupID/MAC/VID/IPv4 Filter Info format

The GroupID/MAC/VID/IPv4 Filter Info format indicates that the Format Info field specifies a sequence of GroupID/MAC/VID/IPv4 values to be associated with the VSI instance (41.2.7).

Figure 41-8 illustrates the GroupID/MAC/VID/IPv4 Filter Info format of the Filter Info field.

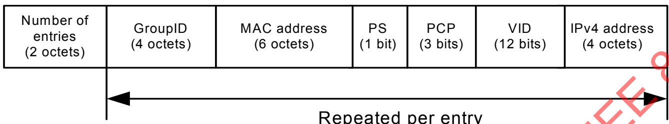

Figure 41-8—GroupID/MAC/VID/IPv4 filter format

The number of GroupID/MAC/VID/IPv4 values is specified by the Number of entries field. The null VID (see Table 9-2) can be used in a GroupID/MAC/VID/IPv4 value when the GroupID/MAC/VID/IPv4 filter format is specified in the VDP Request. In this case, the Bridge is expected to supply the corresponding local VID value in the VDP Response. For this purpose, the Bridge maintains, or has access to, the mapping between GroupID and local VID.

41.2.9.7 GroupID/VID/IPv6 Filter Info format

The GroupID/VID/IPv6 Filter Info format indicates that the Format Info field specifies a sequence of GroupID/VID/IPv6 triples to be associated with the VSI instance (41.2.7).

Figure 41-9 illustrates the GroupID/VID/IPv6 Filter Info format of the Filter Info field.

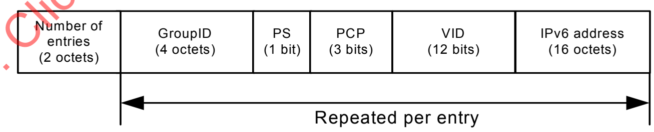

Figure 41-9—GroupID/VID/IPv6 filter format

The number of GroupID/VID/IPv6 triples is specified by the Number of entries field.

The null VID (see Table 9-2) can be used in a GroupID/VID/IPv6 triple when the GroupID/VID/IPv6 filter format is specified in the VDP Request. In this case, the Bridge is expected to supply the corresponding local VID value in the VDP Response. For this purpose, the Bridge maintains, or has access to, the mapping between GroupID and local VID.

41.2.9.8 GroupID/MAC/VID/IPv6 Filter Info format

The GroupID/MAC/VID/IPv6 Filter Info format indicates that the Format Info field specifies a sequence of GroupID/MAC/VID/IPv6 values to be associated with the VSI instance (41.2.7).

Figure 41-10 illustrates the GroupID/MAC/VID/IPv6 Filter Info format of the Filter Info field.

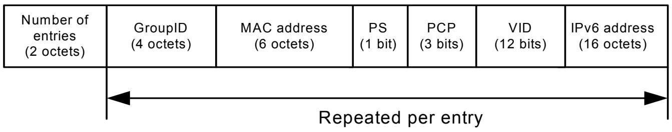

Figure 41-10—GroupID/MAC/VID/IPv6 filter format

The number of GroupID/MAC/VID/IPv6 values is specified by the Number of entries field. The null VID (see Table 9-2) can be used in a GroupID/MAC/VID/IPv6 value when the GroupID/MAC/VID/IPv6 filter format is specified in the VDP Request. In this case, the Bridge is expected to supply the corresponding local VID value in the VDP Response. For this purpose, the Bridge maintains, or has access to, the mapping between GroupID and local VID.

Change the title of 41.2.10 as follows:

41.2.10 VDP TLV type and ~~S~~status semantics

Change 41.2.10.1 and 41.2.10.2 as follows:

41.2.10.1 Pre-Associate

The Pre-Associate TLV type is used to pre-associate a VSI instance with a Bridge Port. The Bridge validates the request (see below) and returns a failure Status in case of errors. Successful pre-association does not imply that the VSI Type will be applied to any traffic flowing through the VSI. The pre-associate enables faster response to an associate by allowing the Bridge to obtain the VSI Type prior to an association.

The station can send Pre-Associate TLV to roll back the station and bridge from associated to pre-associate status.

NOTE—If the VSI Type changes without a corresponding change to its version, then inconsistent behavior can result.

41.2.10.2 Pre-Associate with Resource Reservation

Pre-Associate with Resource Reservation involves the same steps as Pre-Associate (41.2.10.1), but on successful pre-association also reserves resources in the Bridge to prepare for a subsequent Associate request.

The station can send Pre-Associate with Resource Reservation TLV to roll back the station and bridge from associated to pre-associate with Resource Reservation status.

Annex A

(normative)

PICS proforma—Bridge implementations[4]

A.5 Major capabilities

Insert the following rows at the end of the table in A.5:

Item	Feature	Status	References	Support
VDPnNVE	Does the implementation support the VDP NVO3 functionality of an nNVE?	O	5.31.1	Yes [ ] No [ ]
VDPtNVE	Does the implementation support the VDP NVO3 functionality of a tNVE?	O	5.31.2	Yes [ ] No [ ]

Insert the following subclauses (A.51 and A.52) after A.50:

A.51 VDP for NVO3 nNVE Devices

Item	Feature	Status	Reference	Support
	If VDP-NVO3 nNVE functionality (VDP-NVO3-nNVE in Table A.5) is not supported, mark N/A and ignore the remainder of this table.			N/A [ ]
VDP-nNVE-1	Does the implementation support the Bridge role of VDP on each SBP?	M	5.31.1,41	Yes [ ]
VDP-nNVE-2	Does the implementation support the Bridge VDP state machine as specified in Clause 41?	M	Clause 41, 41.5.2	Yes [ ]
VDP-nNVE-3	Does the implementation support assignment of VIDs to GroupIDs?	M	5.31.1, 41.2.9	Yes [ ]
VDP-nNVE-4	Does the implementation support at least one SBP on the nNVE?	M	5.31.1, 40	Yes [ ]
VDP-nNVE-5	Does the implementation support an LLDP nearest Customer Bridge database including the EVB TLV on each SBP?	O	5.31.1, D.2.12	Yes [ ] No [ ]
VDP-nNVE-6	Does the implementation support the EVB status parameters for EVBMode = NVO3 and NVERole = nNVE for the nNVE role?	O	5.31.1, 40.4, 40.5	Yes [ ] No [ ]

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