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Stage 3
(3GPP TS 24.539 version 19.3.0 Release 19)**



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Foreword

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- z the third digit is incremented when editorial only changes have been incorporated in the document.

In the present document, modal verbs have the following meanings:

- shall** indicates a mandatory requirement to do something
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The constructions "must" and "must not" are not used as substitutes for "shall" and "shall not". Their use is avoided insofar as possible, and they are not used in a normative context except in a direct citation from an external, referenced, non-3GPP document, or so as to maintain continuity of style when extending or modifying the provisions of such a referenced document.

- should** indicates a recommendation to do something
- should not** indicates a recommendation not to do something
- may** indicates permission to do something
- need not** indicates permission not to do something

The construction "may not" is ambiguous and is not used in normative elements. The unambiguous constructions "might not" or "shall not" are used instead, depending upon the meaning intended.

- can** indicates that something is possible
- cannot** indicates that something is impossible

The constructions "can" and "cannot" are not substitutes for "may" and "need not".

- will** indicates that something is certain or expected to happen as a result of action taken by an agency the behaviour of which is outside the scope of the present document
- will not** indicates that something is certain or expected not to happen as a result of action taken by an agency the behaviour of which is outside the scope of the present document
- might** indicates a likelihood that something will happen as a result of action taken by some agency the behaviour of which is outside the scope of the present document

might not indicates a likelihood that something will not happen as a result of action taken by some agency the behaviour of which is outside the scope of the present document

In addition:

is (or any other verb in the indicative mood) indicates a statement of fact

is not (or any other negative verb in the indicative mood) indicates a statement of fact

The constructions "is" and "is not" do not indicate requirements.

1 Scope

The present document specifies the protocols of communication between:

- a) a DS-TT and a TSN AF;
- b) a NW-TT and a TSN AF;
- c) a DS-TT and a TSCTSF; and
- d) a NW-TT and a TSCTSF;

as specified in 3GPP TS 23.501 [2] for:

- a) port management regarding Ethernet ports or PTP ports; and
- b) user plane node management.

2 References

The following documents contain provisions which, through reference in this text, constitute provisions of the present document.

- References are either specific (identified by date of publication, edition number, version number, etc.) or non-specific.
- For a specific reference, subsequent revisions do not apply.
- For a non-specific reference, the latest version applies. In the case of a reference to a 3GPP document (including a GSM document), a non-specific reference implicitly refers to the latest version of that document *in the same Release as the present document*.

- [1] 3GPP TR 21.905: "Vocabulary for 3GPP Specifications".
- [2] 3GPP TS 23.501: "System Architecture for the 5G System; Stage 2".
- [3] 3GPP TS 23.502: "Procedures for the 5G System; Stage 2".
- [4] 3GPP TS 24.007: "Mobile radio interface signalling layer 3; General aspects".
- [5] 3GPP TS 24.501: "Non-Access-Stratum (NAS) protocol for 5G System (5GS); Stage 3".
- [5A] 3GPP TS 29.244: "Interface between the Control Plane and the User Plane nodes".
- [5B] 3GPP TS 29.512: "5G System; Session Management Policy Control Service; Stage 3".
- [6] IEEE Std 802.1AB-2016: "IEEE Standard for Local and metropolitan area networks -- Station and Media Access Control Connectivity Discovery".
- [7] IEEE Std 802.1Q-2022: "Standard for Local and metropolitan area networks--Bridges and Bridged Networks".
- [8] Void
- [9] IEEE Std 802.1Qcc-2018: "Standard for Local and metropolitan area networks - Bridges and Bridged Networks - Amendment: Stream Reservation Protocol (SRP) Enhancements and Performance Improvements".
- [10] IEEE Std 802.1CB-2017: "IEEE Standard for Local and metropolitan area networks-Frame Replication and Elimination for Reliability".
- [11] IEEE Std 1588-2019: "IEEE Standard for a Precision Clock Synchronization Protocol for Networked Measurement and Control Systems".

- [12] IEEE Std 802.1AS-2020: "IEEE Standard for Local and metropolitan area networks--Timing and Synchronization for Time-Sensitive Applications".
- [13] ST 2059-2:2015 - SMPTE Standard - "SMPTE Profile for Use of IEEE-1588 Precision Time Protocol in Professional Broadcast Applications".
- [14] IETF RFC 8655: "Deterministic Networking Architecture".
- [15] IETF RFC 8343: "A YANG Data Model for Interface Management".
- [16] IETF RFC 8344: "A YANG Data Model for IP Management".
- [17] IETF RFC 7224: "IANA Interface Type YANG Module".
- [18] ITU-T Recommendation G.810: "Definitions and terminology for synchronization networks".

3 Definitions of terms, symbols and abbreviations

3.1 Terms

For the purposes of the present document, the terms given in 3GPP TR 21.905 [1] and the following apply. A term defined in the present document takes precedence over the definition of the same term, if any, in 3GPP TR 21.905 [1].

Sub-parameter: port parameter or user plane node parameter included into another port parameter or user plane node parameter consisting of a collection of sub-parameters. For instance, the PTP profile port parameter is a sub-parameter of the PTP instance list port parameter.

Parameter-entry: entry of a port parameter or user plane node parameter data structure supporting instantiation. For example:

- Static filtering with port-map support entry is a parameter-entry of Static filtering with port-map support entries as specified in clause 9.6B referred by a combination of MacAddress value and VID value;
- Stream filter instance is a parameter-entry of Stream filter instance table as specified in clause 9.8 referred by DS-TT port number value;
- Stream gate instance is a parameter-entry of Stream gate instance table as specified in clause 9.9 referred by StreamGateInstance value;
- DS-TT port neighbor discovery configuration for DS-TT ports instance is a parameter-entry of DS-TT port neighbor discovery configuration for DS-TT ports as specified in clause 9.10 referred by DS-TT port number value; or
- PTP instance is a parameter-entry of PTP instance list as specified in clause 9.15 referred by PTP instance ID value.

For the purposes of the present document, the following terms and definitions given in 3GPP TS 23.501 [2] apply:

5G System
Time Sensitive Communication

3.2 Abbreviations

For the purposes of the present document, the abbreviations given in 3GPP TR 21.905 [1] and the following apply. An abbreviation defined in the present document takes precedence over the definition of the same abbreviation, if any, in 3GPP TR 21.905 [1].

5GS	5G System
AF	Application function
UMS	User plane node Management Service
CNC	Centralized Network Configuration
DetNet	Deterministic Networking

DS-TT	Device-Side TSN Translator
MTU	Maximum Transmission Unit
PMS	Port management service
NW-TT	Network-Side TSN Translator
TSC	Time Sensitive Communication
TSCTSF	Time Sensitive Communication and Time Synchronization Function
TSN	Time-Sensitive Networking

4 General

For time sensitive communication (TSC), a 5G system (5GS) can act as a user plane node of an external network or a 5GS can be independently used to enable TSC.

The device-side TSN translator (DS-TT) is deployed at the UE-side edge and the network-side TSN translator (NW-TT) is deployed at the network-side edge (see 3GPP TS 23.501 [2]).

When integrated with IEEE TSN network, the TSN application function (TSN AF) is deployed to exchange user plane node information (i.e. TSN bridge information) with the centralized network configuration (CNC) as defined in IEEE Std 802.1Qcc-2018 [9]. The user plane node information includes port management information and user plane node management information. Port management information is related to ports located in the DS-TT and NW-TT. User plane node management information is related to the NW-TT.

In order to support user plane node information exchange between TSN AF and CNC, the DS-TT, NW-TT, and TSN AF support procedures for port management and user plane node management. Clause 5 describes details of the elementary procedures between TSN AF and DS-TT for port management. Clause 6 describes details of the elementary procedures between TSN AF and NW-TT for port management (clause 6.2) and user plane node management (clause 6.3). The operations supported by the TSN AF for port management and user plane node management are listed in 3GPP TS 23.501 [2] table K.1-1 and table K.1-2.

A 5GS supports AF-requested time synchronization services. For this purpose, an NEF in the 5GS exposes 5GS capabilities to support the services as described in 3GPP TS 23.501 [2] and the Time Sensitive Communication and Time Synchronization Function (TSCTSF) manages the user plane node and ports (either Ethernet ports or PTP ports) in the DS-TT and NW-TT for time synchronization. Therefore, the DS-TT, NW-TT, and TSCTSF support procedures for port management and user plane node management. Clause 5 describes details of the elementary procedures between the TSCTSF and DS-TT for port management for time synchronization. Clause 6 describes details of the elementary procedures between the TSCTSF and NW-TT for port management (clause 6.2) and user plane node management (clause 6.3) for time synchronization. The operations supported by the TSCTSF for port management and user plane node management are listed in 3GPP TS 23.501 [2] table K.1-1 and table K.1-2.

When integrated with a deterministic networking (DetNet) as defined in RFC 8655 [14], A 5GS acts as a router in a DetNet as specified in 3GPP TS 23.501 [2]. The NW-TT reports the exposure information to the TSCTSF. Clause 6 describes details of the elementary procedures between the TSCTSF and the NW-TT for port management (clause 6.2). The operations supported by the TSCTSF for port management for DetNet are listed in 3GPP TS 23.501 [2] table K.1-1.

NOTE: What is applicable for a TSN AF in this technical specification can be applied for a TSCTSF unless specified otherwise.

5 Elementary procedures between TSN AF and DS-TT

5.1 General

The UE and the network may support transfer of standardized and deployment-specific port management information between a time-sensitive networking (TSN) AF and the DS-TT at the UE, to manage the port used at the DS-TT for a PDU session of "Ethernet" PDU session type, "IPv4" PDU session type, "IPv6" PDU session type or "IPv4v6" PDU session type. The port management messages are included in a Port management information container IE and transported using the UE-requested PDU session establishment procedure, the network-requested PDU session modification procedure or the UE-requested PDU session modification procedure as specified in 3GPP TS 24.501 [5] clauses 6.4.1.2, 6.3.2 and 6.4.2.

5.2 Procedures

5.2.1 Network-requested port management procedure

5.2.1.1 General

The purpose of the network-requested port management procedure is to enable the TSN AF to:

- a) obtain the list of port management parameters supported by the DS-TT;
- b) obtain the current values of port management parameters at the DS-TT port;
- c) set the values of port management parameters at the DS-TT port;
- d) subscribe to be notified by the DS-TT if the values of certain port management parameters change at the DS-TT port;
- e) unsubscribe to be notified by the DS-TT for one or more port management parameters; or
- f) delete a port management parameter-entry at the DS-TT port.

5.2.1.2 Network-requested port management procedure initiation

In order to initiate the network-requested port management procedure, the TSN AF shall:

- a) encode the information about the port management parameters values to be read, the port management parameters values to be set, the port management parameters changes to (un)subscribe to, the port management parameter-entry to be deleted and whether the TSN AF requests the list of port management parameters supported by the DS-TT in a port management list IE as specified in clause 9.2 and include it in a MANAGE PORT COMMAND message;
- c) send the MANAGE PORT COMMAND message to the UE via the PCF and the SMF as specified in 3GPP TS 23.502 [3]; and
- d) start timer T100 (see example in figure 5.2.1.2.1).

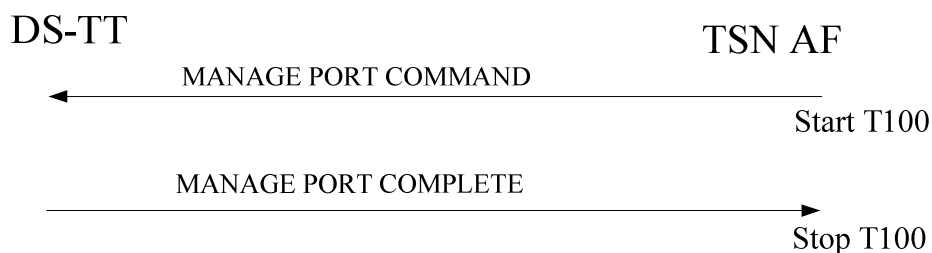


Figure 5.2.1.2.1: Network-requested port management procedure

5.2.1.3 Network-requested port management procedure completion

Upon receipt of the MANAGE PORT COMMAND message, for each operation included in the port management list IE, the DS-TT shall:

- a) if the operation code is "get capabilities", include the list of port management parameters supported by the DS-TT in the port management capability IE of the MANAGE PORT COMPLETE message;
- b) if the operation code is "read parameter", attempt to read the value of the parameter at the DS-TT port, and:
 - 1) if the value of the parameter at the DS-TT port is read successfully, include the parameter and its current value in the port status IE of the MANAGE PORT COMPLETE message; and

- 2) if the value of the parameter at the DS-TT port was not read successfully, include the parameter and associated port management service cause value in the port status IE of the MANAGE PORT COMPLETE message;
- c) if the operation code is "selective read parameter", attempt to read the value of the selected sub-parameter(s) of the parameter at the DS-TT port, and:
 - 1) if the value of the selected sub-parameter(s) at the DS-TT port is read successfully, include the parameter with the selected sub-parameter(s) and their current value(s) in the port status IE of the MANAGE PORT COMPLETE message; and
 - 2) if the value of the selected sub-parameter(s) at the DS-TT port was not read successfully, include the parameter and associated port management service cause value in the port status IE of the MANAGE PORT COMPLETE message;
- d) if the operation code is "set parameter", attempt to set the value of the parameter at the DS-TT port to the value specified in the operation, and:
 - 1) if the value of the parameter at the DS-TT port is set successfully, include the parameter and its current value in the port update result IE of the MANAGE PORT COMPLETE message; and
 - 2) if the value of the parameter at the DS-TT port was not set successfully, include the parameter and associated port management service cause value in the port update result IE of the MANAGE PORT COMPLETE message;

NOTE 1: The value and status at the DS-TT of any optional sub-parameter not included in a parameter value field associated with operation code "set parameter" in the port management list IE of the MANAGE PORT COMMAND remains unchanged.

- e) if the operation code is "subscribe-notify for parameter", store the request from the TSN AF to be notified of changes in the value of the corresponding parameter;
- f) if the operation code is "selective subscribe-notify for parameter", store the request from the TSN AF to be notified of changes in the value of the corresponding selected sub-parameter(s) of the parameter;
- g) if the operation code is "unsubscribe for parameter", delete the stored request from the TSN AF to be notified of changes in the value of the corresponding parameter, if any;
- h) if the operation code is "selective unsubscribe for parameter", delete the stored request from the TSN AF to be notified of changes in the value of the corresponding selected sub-parameter(s) of the parameter, if any;

NOTE 2: If the operation code is "subscribe-notify for parameter", the request from the TSN AF to be notified of changes in the value of the parameter is stored for each individual sub-parameter of the parameter. If the operation code is "selective unsubscribe for parameter", the stored requests from the TSN AF to be notified of changes in the value of sub-parameters are deleted only for the sub-parameters included in the parameter value field. If the operation code is "unsubscribe for parameter", the stored requests from the TSN AF to be notified of changes in the value of sub-parameters are deleted for all sub-parameters of the parameter.

- i) if the operation code is "delete parameter-entry", attempt to delete the referred parameter-entry of the parameter at the DS-TT port; and
 - 1) if the parameter-entry of the parameter at the DS-TT port is deleted successfully, include the parameter and its current value in the port update result IE of the MANAGE PORT COMPLETE message; and
 - 2) if the parameter-entry of the parameter at the DS-TT port was not deleted successfully, include the parameter and associated port management service cause value in the port update result IE of the MANAGE PORT COMPLETE message; and
- j) send the MANAGE PORT COMPLETE to the TSN AF via the SMF and the PCF as specified in 3GPP TS 23.502 [3].

5.2.1.4 Abnormal cases on the network side

The following abnormal cases can be identified:

- a) T100 expired.

The TSN AF shall, on the first expiry of the timer T100, retransmit the MANAGE PORT COMMAND message and shall reset and start timer T100. This retransmission is repeated four times, i.e. on the fifth expiry of timer T100, the TSN AF shall abort the procedure.

5.2.1.5 Abnormal cases in the DS-TT

The following abnormal cases can be identified:

- a) Transmission failure of the MANAGE PORT COMPLETE message indication from lower layers.

The DS-TT shall not diagnose an error and consider the network-initiated port management procedure complete.

NOTE: Considering the network-initiated port management procedure complete as a result of this abnormal case does not cause the DS-TT to revert the execution of the operations included in the MANAGE PORT COMMAND message.

5.2.2 DS-TT-initiated port management procedure

5.2.2.1 General

The purpose of the DS-TT-initiated port management procedure is to notify the TSN AF of one or more changes in the value of port management parameters for which the TSN AF had requested to be notified of changes via the network-initiated port management procedure.

5.2.2.2 DS-TT-initiated port management procedure initiation

In order to initiate the DS-TT-initiated port management procedure, the DS-TT shall create a PORT MANAGEMENT NOTIFY message and shall:

- include the port management parameters to be reported to the TSN AF with their current value in the Port status IE of the PORT MANAGEMENT NOTIFY message;
- start timer T200; and
- send the PORT MANAGEMENT NOTIFY message to the TSN AF via the SMF and the PCF as specified in 3GPP TS 23.502 [3].

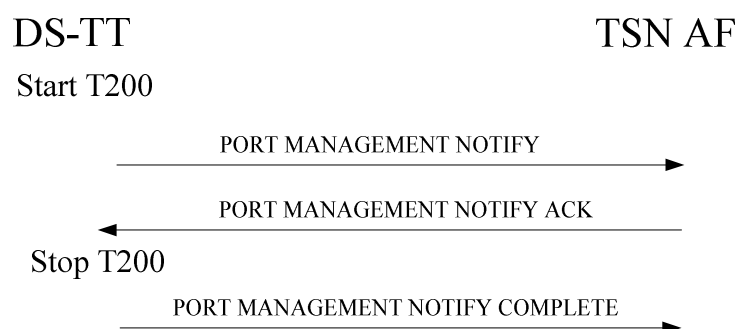


Figure 5.2.2.2.1: DS-TT-initiated port management procedure

5.2.2.3 DS-TT-initiated port management procedure accepted by the TSN AF

Upon receipt of the PORT MANAGEMENT NOTIFY message, the TSN AF shall:

- a) create a MANAGE PORT MANAGEMENT NOTIFY ACK message; and

- b) send the PORT MANAGEMENT NOTIFY ACK message to the UE via the PCF and the SMF as specified in 3GPP TS 23.502 [3].

5.2.2.4 DS-TT-initiated port management procedure completion

Upon receipt of the PORT MANAGEMENT NOTIFY ACK message, the DS-TT shall:

- a) stop timer T200;
- b) create a PORT MANAGEMENT NOTIFY COMPLETE message; and
- c) send the PORT MANAGEMENT NOTIFY COMPLETE message to the TSN AF via the SMF and the PCF as specified in 3GPP TS 23.502 [3].

5.2.2.5 Abnormal cases on the network side

The following abnormal cases can be identified:

- a) Transmission failure of the PORT MANAGEMENT NOTIFY ACK indication from lower layers.

The TSN AF shall not diagnose an error and consider the DS-TT-initiated port management procedure complete.

5.2.2.6 Abnormal cases in the DS-TT

The following abnormal cases can be identified:

- a) T200 expired.

The DS-TT shall, on the first expiry of the timer T200, retransmit the PORT MANAGEMENT NOTIFY message and shall reset and start timer T200. This retransmission is repeated four times, i.e. on the fifth expiry of timer T200, the DS-TT shall abort the procedure.

- b) Transmission failure of the PORT MANAGEMENT NOTIFY COMPLETE message indication from lower layers.

The DS-TT shall not diagnose an error and consider the DS-TT-initiated port management procedure complete.

5.2.3 DS-TT-initiated port management capability procedure

5.2.3.1 General

The purpose of the DS-TT-initiated port management capability procedure is to provide the DS-TT supported port management capabilities to the TSN AF during PDU session establishment as specified in 3GPP TS 23.502 [3].

5.2.3.2 DS-TT-initiated port management capability procedure

In order to initiate the DS-TT-initiated port management capability procedure, the DS-TT shall create a PORT MANAGEMENT CAPABILITY message and shall:

- a) include the DS-TT port management capabilities in the port management capability IE of the PORT MANAGEMENT CAPABILITY message; and
- b) send the PORT MANAGEMENT CAPABILITY message to the TSN AF via the SMF and the PCF as specified in 3GPP TS 23.502 [3].

DS-TT

TSN AF

PORT MANAGEMENT CAPABILITY

Figure 5.2.3.2.1: DS-TT-initiated port management capability procedure

6 Elementary procedures between TSN AF and NW-TT

6.1 General

The TSN AF and NW-TT supports transfer of standardized and deployment-specific port management information, to manage the port used at the NW-TT. The TSN AF and NW-TT supports transfer of standardized and deployment-specific User plane node management information, to manage the NW-TT. The port management messages are included in the "PortManagementContainer" data type (as specified in 3GPP TS 29.512 [5B]) and the Port Management Information Container IE (as specified in 3GPP TS 29.244 [5A]) and the User plane node management messages are included in the "BridgeManagementContainer" data type (as specified in 3GPP TS 29.512 [5B]) and the User Plane node Management Information Container IE (as specified in 3GPP TS 29.244 [5A]). Both the port management messages and the User plane node management messages are transported using the N4 Session Level Reporting Procedure and the SM policy association modification procedure as specified in 3GPP TS 23.502 [3].

6.2 Procedures for port management service

6.2.1 TSN AF-requested port management procedure

6.2.1.1 General

The purpose of the TSN AF-requested port management procedure is to enable the TSN AF to:

- a) obtain the list of port management parameters supported by the NW-TT;
- b) obtain the current values of port management parameters at the NW-TT port;
- c) set the values of port management parameters at the NW-TT port;
- d) subscribe to be notified by the NW-TT if the values of certain port management parameters change at the NW-TT port;
- e) unsubscribe to be notified by the NW-TT for one or more port management parameters; or
- f) delete a port management parameter-entry at the NW-TT port.

6.2.1.2 TSN AF-requested port management procedure initiation

In order to initiate the TSN AF-requested port management procedure, the TSN AF shall:

- a) encode the information about the port management parameters values to be read, the port management parameters values to be set, the port management parameters change to (un)subscribe to, the port management parameter-entry to be deleted and whether the TSN AF requests the list of port management parameters supported by the NW-TT in a port management list IE as specified in clause 9.2 and include it in a MANAGE PORT COMMAND message;

- b) send the MANAGE PORT COMMAND message to the NW-TT via the PCF and the SMF as specified in 3GPP TS 23.502 [3]; and
- c) start timer T100 (see example in figure 6.2.1.2.1).

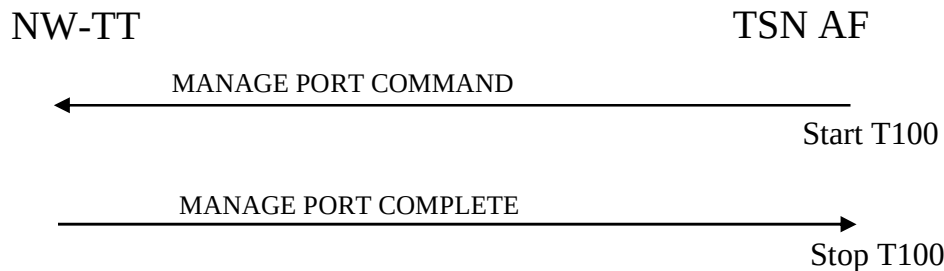


Figure 6.2.1.2.1: TSN AF-requested port management procedure

6.2.1.3 TSN AF-requested port management procedure completion

Upon receipt of the MANAGE PORT COMMAND message, for each operation included in the port management list IE, the NW-TT shall:

- a) if the operation code is "get capabilities", include the list of port management parameters supported by the NW-TT in the port management capability IE of the MANAGE PORT COMPLETE message;
- b) if the operation code is "read parameter", attempt to read the value of the parameter at the NW-TT port, and:
 - 1) if the value of the parameter at the NW-TT port is read successfully, include the parameter and its current value in the port status IE of the MANAGE PORT COMPLETE message; and
 - 2) if the value of the parameter at the NW-TT port was not read successfully, include the parameter and associated port management service cause value in the port status IE of the MANAGE PORT COMPLETE message;
- c) if the operation code is "selective read parameter", attempt to read the value of the selected sub-parameter(s) of the parameter at the NW-TT port, and:
 - 1) if the value of the selected sub-parameter(s) at the NW-TT port is read successfully, include the parameter with the selected sub-parameter(s) and their current value(s) in the port status IE of the MANAGE PORT COMPLETE message; and
 - 2) if the value of the selected sub-parameter(s) at the NW-TT port was not read successfully, include the parameter and associated port management service cause value in the port status IE of the MANAGE PORT COMPLETE message;
- d) if the operation code is "set parameter", attempt to set the value of the parameter at the NW-TT port to the value specified in the operation, and:
 - 1) if the value of the parameter at the NW-TT port is set successfully, include the parameter and its current value in the port update result IE of the MANAGE PORT COMPLETE message; and
 - 2) if the value of the parameter at the NW-TT port was not set successfully, include the parameter and associated port management service cause value in the port update result IE of the MANAGE PORT COMPLETE message;

NOTE 1: The value and status at the NW-TT of any optional sub-parameter not included in the parameter value field associated with operation code "set parameter" in the port management list IE of the MANAGE PORT COMMAND remains unchanged.

- e) if the operation code is "subscribe-notify for parameter", store the request from the TSN AF to be notified of changes in the value of the corresponding parameter;
- f) if the operation code is "selective subscribe-notify for parameter", store the request from the TSN AF to be notified of changes in the value of the corresponding sub-parameter(s) of the parameter;

- g) if the operation code is "unsubscribe for parameter", delete the stored request from the TSN AF to be notified of changes in the value of the corresponding parameter, if any;
- h) if the operation code is "selective unsubscribe for parameter", delete the stored request from the TSN AF to be notified of changes in the value of the corresponding sub-parameter(s) of the parameter, if any;

NOTE 2: If the operation code is "subscribe-notify for parameter", the request from the TSN AF to be notified of changes in the value of the parameter is stored for each individual sub-parameter of the parameter. If the operation code is "selective unsubscribe for parameter", the stored requests from the TSN AF to be notified of changes in the value of sub-parameters are deleted only for the sub-parameters included in the parameter value field. If the operation code is "unsubscribe for parameter", the stored requests from the TSN AF to be notified of changes in the value of sub-parameters are deleted for all sub-parameters of the parameter.

- i) if the operation code is "delete parameter-entry", attempt to delete the referred parameter-entry of the parameter at the NW-TT port; and
 - 1) if the parameter-entry of the parameter at the NW-TT port is deleted successfully, include the parameter and its current value in the port update result IE of the MANAGE PORT COMPLETE message; and
 - 2) if the parameter-entry of the parameter at the NW-TT port was not deleted successfully, include the parameter and associated port management service cause value in the port update result IE of the MANAGE PORT COMPLETE message; and
- j) send the MANAGE PORT COMPLETE to the TSN AF via the SMF and the PCF as specified in 3GPP TS 23.502 [3].

6.2.1.4 Abnormal cases in the TSN AF

The following abnormal cases can be identified:

- a) T100 expired.

The TSN AF shall, on the first expiry of the timer T100, retransmit the MANAGE PORT COMMAND message and shall reset and start timer T100. This retransmission is repeated four times, i.e. on the fifth expiry of timer T100, the TSN AF shall abort the procedure.

6.2.1.5 Abnormal cases in the NW-TT

The following abnormal cases can be identified:

- a) Transmission failure of the MANAGE PORT COMPLETE message indication from lower layers.

The NW-TT shall not diagnose an error and consider the TSN AF-initiated port management procedure complete.

NOTE: Considering that the TSN AF-initiated port management procedure complete as a result of this abnormal case does not cause the NW-TT to revert the execution of the operations included in the MANAGE PORT COMMAND message.

6.2.2 NW-TT-initiated port management procedure

6.2.2.1 General

The purpose of the NW-TT-initiated port management procedure is to notify the TSN AF of one or more changes in the value of port management parameters for which the TSN AF had requested to be notified of changes via the TSN AF-initiated port management procedure.

6.2.2.2 NW-TT-initiated port management procedure initiation

In order to initiate the NW-TT-initiated port management procedure, the NW-TT shall create an PORT MANAGEMENT NOTIFY message and shall:

- a) include the port management parameters to be reported to the TSN AF with their current value in the port status IE of the PORT MANAGEMENT NOTIFY message;
- b) start timer T300; and
- c) send the PORT MANAGEMENT NOTIFY message to the TSN AF via the SMF and the PCF as specified in 3GPP TS 23.502 [3].

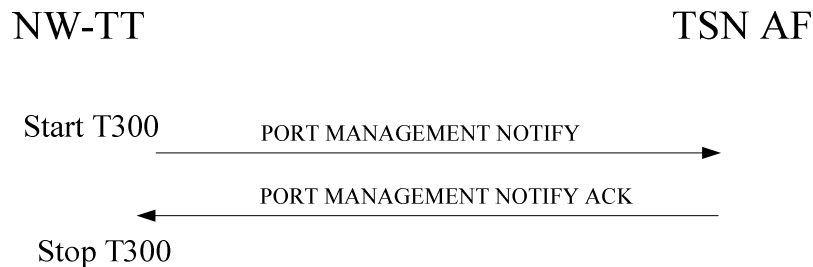


Figure 6.2.2.2.1: NW-TT-initiated port management procedure

6.2.2.3 NW-TT-initiated port management procedure completion

Upon receipt of the PORT MANAGEMENT NOTIFY message, the TSN AF shall:

- a) create a PORT MANAGEMENT NOTIFY ACK message; and
- b) send the PORT MANAGEMENT NOTIFY ACK message to the NW-TT via the PCF and the SMF as specified in 3GPP TS 23.502 [3].

Upon receipt of the PORT MANAGEMENT NOTIFY ACK message, the NW-TT shall stop timer T300.

6.2.2.4 Abnormal cases in the TSN AF

The following abnormal cases can be identified:

- a) Transmission failure of the PORT MANAGEMENT NOTIFY ACK indication from lower layers.

The TSN AF shall not diagnose an error and consider the NW-TT-initiated port management procedure complete.

6.2.2.5 Abnormal cases in the NW-TT

The following abnormal cases can be identified:

- a) T300 expired.

The NW-TT shall, on the first expiry of the timer T300, retransmit the PORT MANAGEMENT NOTIFY message and shall reset and start timer T300. This retransmission is repeated four times, i.e. on the fifth expiry of timer T300, the NW-TT shall abort the procedure.

6.3 Procedures for User plane node management service

6.3.1 TSN AF-requested User plane node management procedure

6.3.1.1 General

The purpose of the TSN AF-requested User plane node management procedure is to enable the TSN AF to:

- a) obtain the list of user plane node management parameters supported at the NW-TT;
- b) obtain the current values of user plane node management parameters at the NW-TT;

- c) set the values of user plane node management parameters at the NW-TT;
- d) subscribe to be notified by the NW-TT if the values of certain user plane node management parameters change at the NW-TT;
- e) unsubscribe to be notified by the NW-TT for one or more user plane node management parameters; or
- f) delete a user plane node management parameter-entry at the NW-TT.

6.3.1.2 TSN AF-requested User plane node management procedure initiation

In order to initiate the TSN AF-requested User plane node management procedure, the TSN AF shall:

- a) encode the information about the user plane node management parameters values to be read, the user plane node management parameters values to be set, the user plane node management parameters changes to (un)subscribe to, the user plane node management parameter-entry to be deleted and whether the TSN AF requests the list of user plane node management parameters supported by the NW-TT in an User plane node management list IE as specified in clause 9.5B and include it in a MANAGE USER PLANE NODE COMMAND message;
- b) send the MANAGE USER PLANE NODE COMMAND message to the NW-TT via the PCF and the SMF as specified in 3GPP TS 23.502 [3]; and
- c) start timer T150 (see example in figure 6.3.1.2.1).

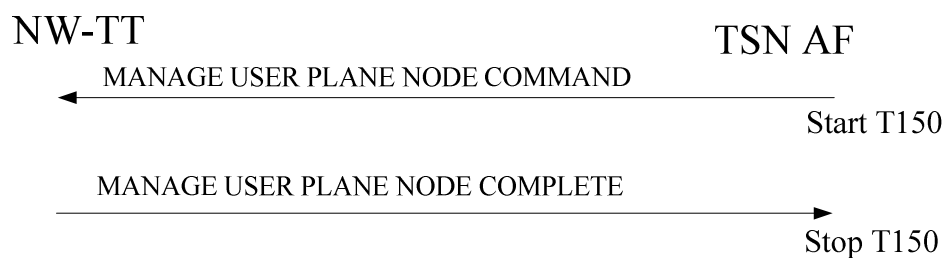


Figure 6.3.1.2.1: TSN AF-requested User plane node management procedure

6.3.1.3 TSN AF-requested User plane node management procedure completion

Upon receipt of the MANAGE USER PLANE NODE COMMAND message, for each operation included in the User plane node management list IE, the NW-TT shall:

- a) if the operation code is "get capabilities", include the list of User plane node management parameters supported by the NW-TT in the User plane node management capability IE of the MANAGE USER PLANE NODE COMPLETE message;
- b) if the operation code is "read parameter", attempt to read the value of the user plane node management parameter at the NW-TT, and:
 - 1) if the value of the parameter at the NW-TT is read successfully, include the parameter and its current value in the User plane node status IE of the MANAGE USER PLANE NODE COMPLETE message; and
 - 2) if the value of the parameter at the NW-TT was not read successfully, include the parameter and associated User plane node management service cause value in the User plane node status IE of the MANAGE USER PLANE NODE COMPLETE message;
- c) if the operation code is "selective read parameter", attempt to read the value of the selected sub-parameter(s) of the user plane node management parameter at the NW-TT port, and:
 - 1) if the value of the selected sub-parameter(s) at the NW-TT port is read successfully, include the parameter with the selected sub-parameter(s) and their current value(s) in the User plane node status IE of the MANAGE USER PLANE NODE COMPLETE message; and

- 2) if the value of the selected sub-parameter(s) at the NW-TT port was not read successfully, include the parameter and associated User plane node management service cause value in the User plane node status IE of the MANAGE USER PLANE NODE COMPLETE message;
- d) if the operation code is "set parameter", attempt to set the value of the user plane node management parameter at the NW-TT to the value specified in the operation, and:
 - 1) if the value of the parameter at the NW-TT is set successfully, include the parameter and its current value in the User plane node update result IE of the MANAGE USER PLANE NODE COMPLETE message; and
 - 2) if the value of the parameter at the NW-TT was not set successfully, include the parameter and associated User plane node management service cause value in the User plane node update result IE of the MANAGE USER PLANE NODE COMPLETE message;

NOTE 1: The value and status at the NW-TT of any sub-parameter not included in the parameter value field associated with operation code "set parameter" in the user plane node management list IE of the MANAGE USER PLANE NODE COMMAND remains unchanged.

- e) if the operation code is "subscribe-notify for parameter", store the request from the TSN AF to be notified of changes in the value of the corresponding user plane node management parameter;
- f) if the operation code is "selective subscribe-notify for parameter", store the request from the TSN AF to be notified of changes in the value of the corresponding selected sub-parameter(s) of the user plane node management parameter;
- g) if the operation code is "unsubscribe for parameter", delete the stored request from the TSN AF to be notified of changes in the value of the corresponding user plane node management parameter, if any;
- h) if the operation code is "selective unsubscribe for parameter", delete the stored request from the TSN AF to be notified of changes in the value of the corresponding selected sub-parameter(s) of the user plane node parameter, if any;

NOTE 2: If the operation code is "subscribe-notify for parameter", the request from the TSN AF to be notified of changes in the value of the parameter is stored for each individual sub-parameter of the parameter. If the operation code is "selective unsubscribe for parameter", the stored requests from the TSN AF to be notified of changes in the value of sub-parameters are deleted only for the sub-parameters included in the parameter value field. If the operation code is "unsubscribe for parameter", the stored requests from the TSN AF to be notified of changes in the value of sub-parameters are deleted for all sub-parameters of the parameter.

- i) if the operation code is "delete parameter-entry", attempt to delete the referred parameter-entry of the parameter at the NW-TT; and
 - 1) if the parameter-entry of the parameter at the NW-TT is deleted successfully, include the parameter and its current value in the User plane node update result IE of the MANAGE USER PLANE NODE COMPLETE message; and
 - 2) if the parameter-entry of the parameter at the NW-TT was not deleted successfully, include the parameter and associated User plane node management service cause value in the User plane node update result IE of the MANAGE USER PLANE NODE COMPLETE message; and
- j) send the MANAGE USER PLANE NODE COMPLETE to the TSN AF via the SMF and the PCF as specified in 3GPP TS 23.502 [3].

6.3.1.4 Abnormal cases in the TSN AF

The following abnormal cases can be identified:

- a) T150 expired.

The TSN AF shall, on the first expiry of the timer T150, retransmit the MANAGE USER PLANE NODE COMMAND message and shall reset and start timer T150. This retransmission is repeated four times, i.e. on the fifth expiry of timer T150, the TSN AF shall abort the procedure.

6.3.1.5 Abnormal cases in the NW-TT

The following abnormal cases can be identified:

- a) Transmission failure of the MANAGE USER PLANE NODE COMPLETE message indication from lower layers.

The NW-TT shall not diagnose an error and consider the TSN AF-initiated User plane node management procedure complete.

NOTE: Considering that the TSN AF-initiated User plane node management procedure complete as a result of this abnormal case does not cause the NW-TT to revert the execution of the operations included in the MANAGE USER PLANE NODE COMMAND message.

6.3.2 NW-TT-initiated User plane node management procedure

6.3.2.1 General

The purpose of the NW-TT-initiated User plane node management procedure is to notify the TSN AF of one or more changes in the value of User plane node management parameters for which the TSN AF had requested to be notified of changes via the TSN AF-initiated User plane node management procedure.

6.3.2.2 NW-TT-initiated User plane node management procedure initiation

In order to initiate the NW-TT-initiated User plane node management procedure, the NW-TT shall create a USER PLANE NODE MANAGEMENT NOTIFY message and shall:

- a) include the User plane node management parameters to be reported to the TSN AF with their current value in the User plane node status IE of the USER PLANE NODE MANAGEMENT NOTIFY message;
- b) start timer T350; and
- c) send the USER PLANE NODE MANAGEMENT NOTIFY message to the TSN AF via the SMF and the PCF as specified in 3GPP TS 23.502 [3].

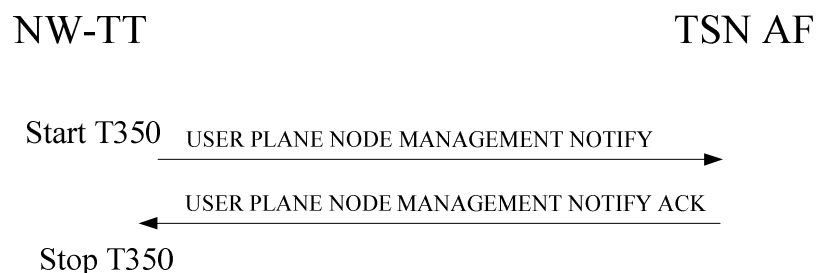


Figure 6.3.2.2.1: NW-TT-initiated User plane node management procedure

6.3.2.3 NW-TT-initiated User plane node management procedure completion

Upon receipt of the USER PLANE NODE MANAGEMENT NOTIFY message, the TSN AF shall:

- a) create a MANAGE USER PLANE NODE MANAGEMENT NOTIFY ACK message; and
- b) send the MANAGE USER PLANE NODE MANAGEMENT NOTIFY ACK message to the NW-TT via the PCF and the SMF as specified in 3GPP TS 23.502 [3].

Upon receipt of the USER PLANE NODE MANAGEMENT NOTIFY ACK message, the NW-TT shall stop timer T350.

6.3.2.4 Abnormal cases in the TSN AF

The following abnormal cases can be identified:

- a) Transmission failure of the USER PLANE NODE MANAGEMENT NOTIFY ACK indication from lower layers.

The TSN AF shall not diagnose an error and consider the NW-TT-initiated User plane node management procedure complete.

6.3.2.5 Abnormal cases in the NW-TT

The following abnormal cases can be identified:

- a) T350 expired.

The NW-TT shall, on the first expiry of the timer T350, retransmit the USER PLANE NODE MANAGEMENT NOTIFY message and shall reset and start timer T350. This retransmission is repeated four times, i.e. on the fifth expiry of timer T350, the NW-TT shall abort the procedure.

- b) Transmission failure of the USER PLANE NODE MANAGEMENT NOTIFY COMPLETE message indication from lower layers.

The NW-TT shall not diagnose an error and consider the NW-TT-initiated User plane node management procedure complete.

7 Handling of unknown, unforeseen, and erroneous port management service and user plane node management service data

7.1 General

The procedures specified in clause 5 and clause 6 apply to those messages which pass the checks described in clause 7.

Clause 7 also specifies procedures for the handling of unknown, unforeseen, and erroneous port management service (PMS) and User plane node management service (UMS) data by the receiving entity. These procedures are called "error handling procedures", but in addition to providing recovery mechanisms for error situations they define a compatibility mechanism for future extensions of the PMS or UMS.

Clauses 7.1 to 7.7 shall be applied in order of precedence.

Detailed error handling procedures in the TSN AF are implementation dependent and may vary from network to network. However, when extensions of PMS or UMS are developed, TSN AFs are assumed to have the error handling which is indicated in this clause as mandatory ("shall") and that is indicated as strongly recommended ("should").

Also, the error handling of the TSN AF is only considered as mandatory or strongly recommended when certain thresholds for errors are not reached during a dedicated connection.

For definition of semantical and syntactical errors see 3GPP TS 24.007 [4], clause 11.4.2.

The procedures specified for TT are applicable for DS-TT or NW-TT.

7.2 Message too short or too long

7.2.1 Message too short

When a message is received that is too short to contain a complete message type information element, that message shall be ignored, cf. 3GPP TS 24.007 [4].

7.2.2 Message too long

The maximum size of a PMS message sent by the DS-TT to the TSN AF or sent by the TSN AF to the DS-TT is 65535 octets. The maximum size of a PMS message sent by the NW-TT to the TSN AF or sent by the TSN AF to the NW-TT is 65523 octets. The maximum size of a UMS message is 65531 octets.

7.3 Unknown or unforeseen message type

If the TT or the TSN AF receives a PMS message with message type not defined for the PMS or not implemented by the receiver, it shall ignore the PMS message.

NOTE: A message type not defined for the PMS in the given direction is regarded by the receiver as a message type not defined for the EPMS, see 3GPP TS 24.007 [4].

If the TT receives a message not compatible with the PMS state, the TT shall ignore the PMS message.

If the TSN AF receives a message not compatible with the PMS state, the TSN AF actions are implementation dependent.

If the NW-TT or the TSN AF receives a UMS message with message type not defined for the UMS or not implemented by the receiver, it shall ignore the UMS message. If the DS-TT receives a UMS message with message type defined for the UMS or implemented by the receiver, it shall ignore the UMS message.

NOTE: A message type not defined for the UMS in the given direction is regarded by the receiver as a message type not defined for the UMS, see 3GPP TS 24.007 [4].

If the NW-TT receives a message not compatible with the UMS state, the NW-TT shall ignore the UMS message.

If the TSN AF receives a message not compatible with the UMS state, the TSN AF actions are implementation dependent.

7.4 Non-semantical mandatory information element errors

When on receipt of a message,

- a) an "imperative message part" error; or
- b) a "missing mandatory IE" error

is diagnosed or when a message containing:

- a) a syntactically incorrect mandatory IE;
- b) an IE unknown in the message, but encoded as "comprehension required" (see 3GPP TS 24.007 [4]); or
- c) an out of sequence IE encoded as "comprehension required" (see 3GPP TS 24.007 [4]) is received,

If the message is a PMS message, the TT shall ignore the PMS message. If the message is a UMS message, the NW-TT shall ignore the UMS message;

the TSN AF shall proceed as follows:

the TSN AF shall:

- 1) try to treat the message (the exact further actions are implementation dependent); or
- 2) ignore the message.

7.5 Unknown and unforeseen IEs in the non-imperative message part

7.5.1 IEs unknown in the message

The TT shall ignore all IEs unknown in a message which are not encoded as "comprehension required" (see 3GPP TS 24.007 [4]).

The TSN AF shall take the same approach.

7.5.2 Out of sequence IEs

The TT shall ignore all out of sequence IEs in a message which are not encoded as "comprehension required" (see 3GPP TS 24.007 [4]).

The TSN AF should take the same approach.

7.5.3 Repeated IEs

If an information element with format T, TV, TLV, or TLV-E is repeated in a message in which repetition of the information element is not specified in clause 8, the TT shall handle only the contents of the information element appearing first and shall ignore all subsequent repetitions of the information element. When repetition of information elements is specified, the TT shall handle only the contents of specified repeated information elements. If the limit on repetition of information elements is exceeded, the TT shall handle the contents of information elements appearing first up to the limit of repetitions and shall ignore all subsequent repetitions of the information element.

The TSN AF should follow the same procedures.

7.6 Non-imperative message part errors

7.6.1 General

This category includes:

- a) syntactically incorrect optional IEs; and
- b) conditional IE errors.

7.6.2 Syntactically incorrect optional IEs

The TT shall treat all optional IEs that are syntactically incorrect in a message as not present in the message.

The TSN AF shall take the same approach.

7.6.3 Conditional IE errors

When upon receipt of a PMS message the TT diagnoses a "missing conditional IE" error or an "unexpected conditional IE" error, or when it receives a PMS message containing at least one syntactically incorrect conditional IE, the TT shall ignore the message.

When upon receipt of a UMS message the NW-TT diagnoses a "missing conditional IE" error or an "unexpected conditional IE" error, or when it receives a UMS message containing at least one syntactically incorrect conditional IE, the NW-TT shall ignore the message.

When the TSN AF receives a message and diagnoses a "missing conditional IE" error or an "unexpected conditional IE" error or when it receives a message containing at least one syntactically incorrect conditional IE, the TSN AF shall either:

- a) try to treat the message (the exact further actions are implementation dependent); or
- b) ignore the message.

7.7 Messages with semantically incorrect contents

When a message with semantically incorrect contents is received, the TT shall perform the foreseen reactions of the procedural part of clause 5 and clause 6. If, however no such reactions are specified, the TT shall ignore the message.

The TSN AF should follow the same procedure.

8 Message functional definition and contents

8.1 Manage port command

8.1.1 Message definition

The MANAGE PORT COMMAND message is sent by the TSN AF to the DS-TT or NW-TT to manage the port at the DS-TT or NW-TT, see table 8.1.1.1

Message type: MANAGE PORT COMMAND

Significance: dual

Direction: TSN AF to DS-TT, TSN AF to NW-TT

Table 8.1.1.1: MANAGE PORT COMMAND message content

IEI	Information Element	Type/Reference	Presence	Format	Length
	MANAGE PORT COMMAND message identity	Port management service message type 9.1	M	V	1
	Port management list	Port management list 9.2	M	LV-E	3-65534

8.2 Manage port complete

8.2.1 Message definition

The MANAGE PORT COMPLETE message is sent by the DS-TT or NW-TT to the TSN AF to complete the network-initiated port management procedure or the TSN AF-initiated port management procedure, see table 8.2.1.1

Message type: MANAGE PORT COMPLETE

Significance: dual

Direction: DS-TT to TSN AF, NW-TT to TSN AF

Table 8.2.1.1: MANAGE PORT COMPLETE message content

IEI	Information Element	Type/Reference	Presence	Format	Length
	MANAGE PORT COMPLETE message identity	Port management service message type 9.1	M	V	1
70	Port management capability	Port management capability 9.3	O	TLV-E	5-65534
71	Port status	Port status 9.4	O	TLV-E	5-65534
72	Port update result	Port update result 9.5	O	TLV-E	5-65534

8.2.2 Port management capability

This IE shall be included if the TSN AF has included an operation with operation code set to "get capabilities" in the MANAGE PORT COMMAND message.

8.2.3 Port status

This IE shall be included if the TSN AF has included one or more operations with operation code set to "read parameter" in the MANAGE PORT COMMAND message.

8.2.4 Port update result

This IE shall be included if the TSN AF has included one or more operations with operation code set to "set parameter" or "delete parameter-entry" in the MANAGE PORT COMMAND message.

8.3 Port management notify

8.3.1 Message definition

The PORT MANAGEMENT NOTIFY message is sent by the DS-TT or NW-TT to the TSN AF to notify the TSN AF of one or more changes in the value of port management parameters, see table 8.3.1.1

Message type: PORT MANAGEMENT NOTIFY

Significance: dual

Direction: DS-TT to TSN AF, NW-TT to TSN AF

Table 8.3.1.1: PORT MANAGEMENT NOTIFY message content

IEI	Information Element	Type/Reference	Presence	Format	Length
	PORT MANAGEMENT NOTIFY message identity	Port management service message type 9.1	M	V	1
	Port status	Port status 9.4	M	LV-E	4-65533

8.4 Port management notify ack

8.4.1 Message definition

The PORT MANAGEMENT NOTIFY ACK message is sent by the TSN AF to the DS-TT or NW-TT to acknowledge a PORT MANAGEMENT NOTIFY message, see table 8.4.1.1

Message type: PORT MANAGEMENT NOTIFY ACK

Significance: dual

Direction: TSN AF to DS-TT, TSN AF to NW-TT

Table 8.4.1.1: PORT MANAGEMENT NOTIFY ACK message content

IEI	Information Element	Type/Reference	Presence	Format	Length
	PORT MANAGEMENT NOTIFY ACK message identity	Port management service message type 9.1	M	V	1

8.5 Port management notify complete

8.5.1 Message definition

The PORT MANAGEMENT NOTIFY COMPLETE message is sent by the DS-TT to the TSN AF to complete the DS-TT-initiated port management procedure, see table 8.5.1.1

Message type: PORT MANAGEMENT NOTIFY COMPLETE

Significance: dual

Direction: DS-TT to TSN AF

Table 8.5.1.1: PORT MANAGEMENT NOTIFY COMPLETE message content

IEI	Information Element	Type/Reference	Presence	Format	Length
	PORT MANAGEMENT NOTIFY COMPLETE message identity	Port management service message type 9.1	M	V	1

8.6 Port management capability

8.6.1 Message definition

The PORT MANAGEMENT CAPABILITY message is sent by the DS-TT to provide the DS-TT supported port management capabilities to the TSN AF, see table 8.6.1.1

Message type: PORT MANAGEMENT CAPABILITY

Significance: dual

Direction: DS-TT to TSN AF

Table 8.6.1.1: PORT MANAGEMENT CAPABILITY message content

IEI	Information Element	Type/Reference	Presence	Format	Length
	PORT MANAGEMENT CAPABILITY message identity	Port management service message type 9.1	M	V	1
	Port management capability	Port management capability 9.3	M	LV-E	4-65533

8.6.2 Void

8.7 Manage User plane node command

8.7.1 Message definition

The MANAGE USER PLANE NODE COMMAND message is sent by the TSN AF to the NW-TT to manage the User plane node functionalities, see table 8.7.1.1

Message type: MANAGE USER PLANE NODE COMMAND

Significance: dual

Direction: TSN AF to NW-TT

Table 8.7.1.1: MANAGE USER PLANE NODE COMMAND message content

IEI	Information Element	Type/Reference	Presence	Format	Length
	MANAGE USER PLANE NODE COMMAND message identity	User plane node management service message type 9.5A	M	V	1
	User plane node management list	User plane node management list 9.5B	M	LV-E	3-65530

8.8 Manage User plane node complete

8.8.1 Message definition

The MANAGE USER PLANE NODE COMPLETE message is sent by the NW-TT to the TSN AF to complete the TSN AF-initiated User plane node management procedure, see table 8.8.1.1

Message type: MANAGE USER PLANE NODE COMPLETE

Significance: dual

Direction: NW-TT to TSN AF

Table 8.8.1.1: MANAGE USER PLANE NODE COMPLETE message content

IEI	Information Element	Type/Reference	Presence	Format	Length
	MANAGE USER PLANE NODE COMPLETE message identity	User plane node management service message type 9.5A	M	V	1
70	User plane node management capability	User plane node management capability 9.5C	O	TLV-E	5-65530
71	User plane node status	User plane node status 9.5D	O	TLV-E	5-65530
72	User plane node update result	User plane node update result 9.5E	O	TLV-E	5-65530

8.8.2 User plane node management capability

This IE shall be included if the TSN AF has included an operation with operation code set to "get capabilities" in the MANAGE USER PLANE NODE COMMAND message.

8.8.3 User plane node status

This IE shall be included if the TSN AF has included one or more operations with operation code set to "read parameter" in the MANAGE USER PLANE NODE COMMAND message.

8.8.4 User plane node update result

This IE shall be included if the TSN AF has included one or more operations with operation code set to "set parameter" or "delete parameter-entry" in the MANAGE USER PLANE NODE COMMAND message.

8.9 User plane node management notify

8.9.1 Message definition

The USER PLANE NODE MANAGEMENT NOTIFY message is sent by the NW-TT to the TSN AF to notify the TSN AF of one or more changes in the value of User plane node management parameters, see table 8.9.1.1

Message type: USER PLANE NODE MANAGEMENT NOTIFY

Significance: dual

Direction: NW-TT to TSN AF

Table 8.9.1.1: USER PLANE NODE MANAGEMENT NOTIFY message content

IEI	Information Element	Type/Reference	Presence	Format	Length
	USER PLANE NODE MANAGEMENT NOTIFY message identity	User plane node management service message type 9.5A	M	V	1
	User plane node status	User plane node status 9.5D	M	LV-E	4-65530

8.10 User plane node management notify ack

8.10.1 Message definition

The USER PLANE NODE MANAGEMENT NOTIFY ACK message is sent by the TSN AF to the NW-TT to acknowledge a USER PLANE NODE MANAGEMENT NOTIFY message, see table 8.10.1.1

Message type: USER PLANE NODE MANAGEMENT NOTIFY ACK

Significance: dual

Direction: TSN AF to NW-TT

Table 8.10.1.1: USER PLANE NODE MANAGEMENT NOTIFY ACK message content

IEI	Information Element	Type/Reference	Presence	Format	Length
	USER PLANE NODE MANAGEMENT NOTIFY ACK message identity	User plane node management service message type 9.5A	M	V	1

9 Information elements coding

9.1 Port management service message type

Table 9.1.1: Port management service message type

Bits								
8	7	6	5	4	3	2	1	
0	0	0	0	0	0	0	0	Reserved
0	0	0	0	0	0	0	1	MANAGE PORT COMMAND message
0	0	0	0	0	0	1	0	MANAGE PORT COMPLETE message
0	0	0	0	0	0	1	1	PORT MANAGEMENT NOTIFY message
0	0	0	0	0	1	0	0	PORT MANAGEMENT NOTIFY ACK message
0	0	0	0	0	1	0	1	PORT MANAGEMENT NOTIFY COMPLETE message
0	0	0	0	0	1	1	0	PORT MANAGEMENT CAPABILITY message
All other values are reserved								

9.2 Port management list

The purpose of the port management list information element is to transfer from the TSN AF to the DS-TT or NW-TT a list of operations related to port management of the DS-TT or NW-TT to be performed at the DS-TT or NW-TT.

The port management list information element is coded as shown in figure 9.2.1, figure 9.2.2, figure 9.2.3, figure 9.2.4, figure 9.2.5, and table 9.2.1.

The port management list information element has a minimum length of 4 octets and a maximum length of 65535 octets.

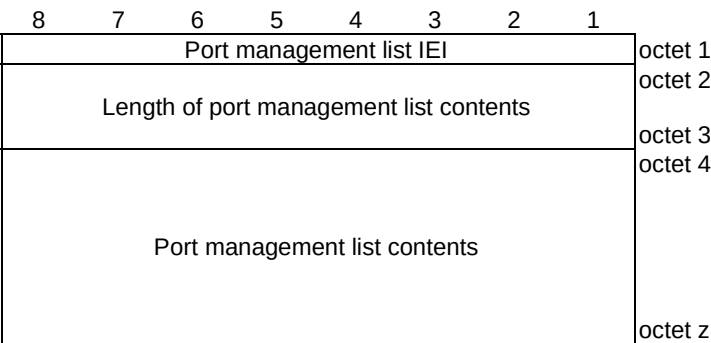


Figure 9.2.1: Port management list information element

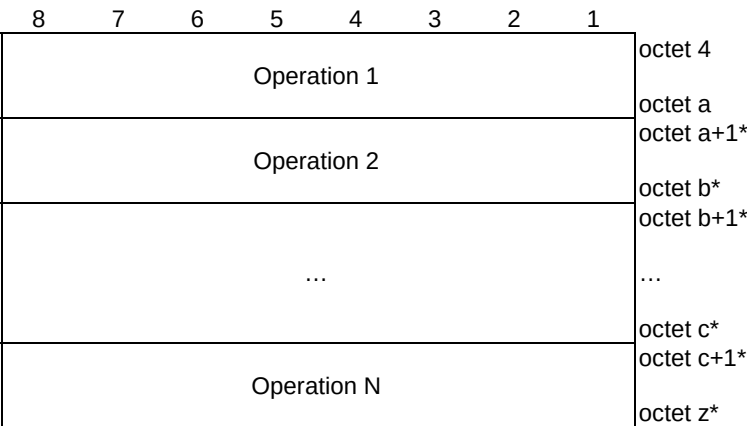


Figure 9.2.2: Port management list contents

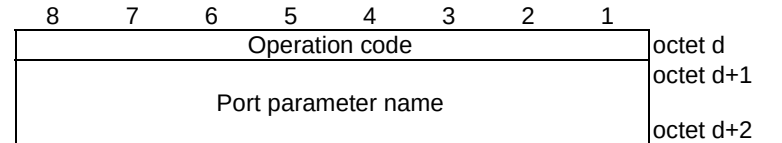
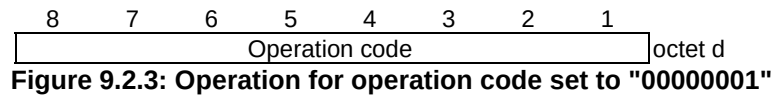


Figure 9.2.4: Operation for operation code set to "00000010", "00000100", or "00000101"

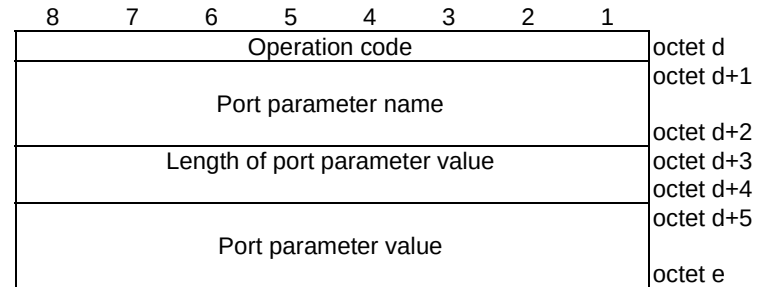


Figure 9.2.5: Operation for operation code set to "00000011", "00000110", "00000111", "00001000" and "00001001"

Table 9.2.1: Port management list information element

Value part of the port management list information element (octets 4 to z)	
The value part of the port management list information element consists of one or several operations.	
Operation	
Operation code (octet d)	
Bits	
8 7 6 5 4 3 2 1	
0 0 0 0 0 0 0 0	Reserved
0 0 0 0 0 0 0 1	Get capabilities
0 0 0 0 0 0 1 0	Read parameter
0 0 0 0 0 0 1 1	Set parameter (NOTE 1, NOTE in Table 9.22.1, NOTE 5 in Table 9.15.1)
0 0 0 0 0 1 0 0	Subscribe-notify for parameter
0 0 0 0 0 1 0 1	Unsubscribe for parameter
0 0 0 0 0 1 1 0	Selective read parameter
0 0 0 0 0 1 1 1	Selective subscribe-notify for parameter
0 0 0 0 1 0 0 0	Selective unsubscribe for parameter
0 0 0 0 1 0 0 1	Delete parameter-entry (NOTE 3)
All other values are spare.	
Port parameter name (octets d+1 to d+2)	

This field contains the name of the port parameter to which the operation applies, encoded as follows:

- 0000H Reserved;
- 0001H txPropagationDelay;
- 0002H Traffic class table;
- 0003H GateEnabled;
- 0004H AdminBaseTime;
- 0005H AdminControlListLength;
- 0006H AdminControlList;
- 0007H AdminCycleTime;
- 0008H Tick granularity;
- 0009H txPropagationDelayDeltaThreshold;
- 000AH AdminCycleTimeExtension
- 000BH SupportedListMax;
- 000CH queueMaxSDUTable;
- 000DH AdminGateStates;
- 000EH
to Spare
- 003FH
- 0040H IldpV2PortConfigAdminStatusV2;
- 0041H IldpV2LocChassisIdSubtype;
- 0042H IldpV2LocChassisId;
- 0043H IldpV2MessageTxInterval;
- 0044H IldpV2MessageTxHoldMultiplier;
- 0045H
to Spare
- 005FH
- 0060H IldpV2LocPortIdSubtype;
- 0061H IldpV2LocPortId;
- 0062H IldpLocSysCap;
- 0063H IldpLocManAddr list;
- 0064H
to Spare
- 009FH
- 00A0H IldpV2RemChassisIdSubtype;
- 00A1H IldpV2RemChassisId;
- 00A2H IldpV2RemPortIdSubtype;
- 00A3H IldpV2RemPortId;
- 00A4H IldpTTL;
- 00A5H IldpRemSysCap;
- 00A6H IldpRemManAddr list;
- 00A7H
to Spare
- 00CFH
- 00D0H PSFPMAXStreamFilterInstances;
- 00D1H PSFPMAXStreamGateInstances;
- 00D2H PSFPMAXFlowMeterInstances;
- 00D3H PSFPSupportedListMax;
- 00D4H TSN time domain number;
- 00D5H
to Spare
- 00DFH
- 00E0H Stream filter instance table
- 00E1H Stream gate instance table

- 00E2H Supported PTP instance types
- 00E3H Supported transport types
- 00E4H Supported delay mechanisms
- 00E5H PTP grandmaster capable
- 00E6H gPTP grandmaster capable
- 00E7H Supported PTP profiles
- 00E8H Number of supported PTP instances
- 00E9H PTP instance list

- 00EAH
to Spare
- 00EFH

- 00F0H Interface type (NOTE 4);
- 00F1H Interface enable status (NOTE 4);
- 00F2H Phys-address (NOTE 4);

- 00F3H IPv4 enable status (NOTE 4);
- 00F4H IPv4 forwarding status (NOTE 4);
- 00F5H IPv4 MTU (NOTE 4);
- 00F6H IPv4 address information (NOTE 4);
- 00F7H IPv4 neighbor information (NOTE 4);

- 00F8H IPv6 enable status (NOTE 4);
- 00F9H IPv6 forwarding status (NOTE 4);
- 00FAH IPv6 MTU (NOTE 4);
- 00FBH IPv6 address information (NOTE 4);
- 00FCH IPv6 neighbor information (NOTE 4);

- 00FDH
to Spare
- 7FFFH

- 8000H
to Reserved for deployment specific parameters
- FFFFH

Length of port parameter value (octets d+3 to d+4)

This field contains the binary encoding of the length of the port parameter value

Port parameter value (octet d+5 to e)

This field contains the value to be set for the port parameter.

When the port parameter name indicates txPropagationDelay, the port parameter value field contains the binary representation of the txPropagationDelay as defined in IEEE Std 802.1Qcc [9], expressed in unit of nanoseconds and multiplied by 2^{16} , with the LSB bit included in bit 1 of the first octet. If the txPropagationDelay is too big to be represented, all bits of the port parameter value field shall be coded as "1" except the MSB bit. The length of port parameter value indicates a value of 8.

When the port parameter name indicates Traffic class table, the port parameter value field contains the traffic class table as defined in IEEE Std 802.1Q [7], encoded as the value part of the Traffic class information element as specified in clause 9.7.

When the port parameter name indicates GateEnabled, the port parameter value field contains the value of GateEnabled as defined in IEEE Std 802.1Q [7], with a Boolean value of FALSE encoded as "00000000" and a Boolean value of TRUE encoded as "00000001". The length of port parameter value field indicates a value of 1.

When the port parameter name indicates AdminBaseTime, the port parameter value field contains the value of the administrative base time as specified in IEEE Std 802.1Q [7]. The length of port parameter value field indicates a value of 10.

When the port parameter name indicates AdminControlListLength, the port parameter value field contains the value of the AdminControlListLength as specified in IEEE Std 802.1Q [7] and encoded as `ieee8021STAdminControlListLength` object in IEEE Std 802.1Q [7] clause 17.7.22. The length of port parameter value field indicates a value of 4.

When the port parameter name indicates AdminControlList, the port parameter value field contains the concatenation of entries, and is encoded as `ieee8021STAdminControlList` object in IEEE Std 802.1Q [7] clause 17.2.22. AdminControlListLength value indicates the number of entries. In each entry, the first octet, corresponding to the gate operation name, shall be set to 0 (SetGateStates). The receiver shall interpret any other value as 0.

When the port parameter name indicates AdminCycleTime, the port parameter value field contains the value of the AdminCycleTime as specified in IEEE Std 802.1Q [7]. The length of port parameter value field indicates a value of 8.

When the port parameter name indicates Tick granularity, the port parameter value field contains the value of the Tick granularity as specified in IEEE Std 802.1Q [7]. The length of port parameter value field indicates a value of 4.

When the port parameter name indicates txPropagationDelayDeltaThreshold, the port parameter value field contains the binary representation of the txPropagationDelayDeltaThreshold as defined in 3GPP TS 23.501 [2] table K.1-1, expressed in unit of nanoseconds and multiplied by 216, with the LSB bit included in bit 1 of the first octet. The length of port parameter value indicates a value of 8.

When the port parameter name indicates AdminCycleTimeExtension, the port parameter value field contains the value of the AdminCycleTimeExtension as specified in IEEE Std 802.1Q [7]. The length of port parameter value field indicates a value of 4.

When the Ethernet port parameter name indicates AdminGateStates, the Ethernet port parameter value field contains the value of the AdminGateStates in IEEE Std 802.1Q [7] section 8.6.9.4.5 and is encoded as `ieee8021STAdminGateStates` as specified in IEEE Std 802.1Q [7] section 17.2.22. The length of Ethernet port parameter value field indicates a value of 1.

When the port parameter name indicates SupportedListMax, the port parameter value field contains the value of the SupportedListMax as specified in IEEE Std 802.1Q [7]. The length of port parameter value field indicates a value of 4.

When the Ethernet port parameter name indicates queueMaxSDUTable, the Ethernet port parameter value field contains the value of a queueMaxSDUTable as defined in 3GPP TS 23.501 [2] table K.1-1, encoded as the value part of the queueMaxSDUTable information element as specified in clause 9.22. The length of Ethernet port parameter value field indicates a value between 5 and 104.

When the port parameter name indicates `IldpV2PortConfigAdminStatusV2`, the port parameter value field contains values of `IldpV2PortConfigAdminStatusV2` as specified in IEEE Std 802.1AB [6] clause 9.2.5.1 with value of `txOnly` encoded as 01H, `rxOnly` encoded as 02H, `txAndRx` encoded as 03H, and disabled encoded as 04H. The length of port parameter value field indicates a value of 1.

When the port parameter name indicates `IldpV2LocChassisIdSubtype`, the port parameter value field contains values of `IldpV2LocChassisIdSubtype` as specified in IEEE Std 802.1AB [6] clause 8.5.2.2. The length of port parameter value field indicates a value of 1.

When the port parameter name indicates `IldpV2LocChassisId`, the port parameter value field contains values of `IldpV2LocChassisId` in the form of an octet string as specified in IEEE Std 802.1AB [6] clause 8.5.2.3. The length of port parameter value field indicates the length of the octet string with a maximum value of 255.

When the port parameter name indicates `IldpV2MessageTxInterval`, the port parameter value field contains the value of `IldpV2MessageTxInterval` as specified in IEEE Std 802.1AB [6] table 11-2. The length of port parameter value field indicates a value of 2.

When the port parameter name indicates `IldpV2MessageTxHoldMultiplier`, the port parameter value field contains the value of `IldpV2MessageTxHoldMultiplier` as specified in IEEE Std 802.1AB [6] table 11-2. The length of port parameter value field indicates a value of 1.

When the port parameter name indicates `IldpV2LocPortIdSubtype`, the port parameter value field contains values of `IldpV2LocPortIdSubtype` as specified in IEEE Std 802.1AB [6] clause 8.5.3.2. The length of port parameter value field indicates a value of 1.

When the port parameter name indicates `IldpV2LocPortId`, the port parameter value field contains values of `IldpV2LocPortId` in the form of an octet string as specified in IEEE Std 802.1AB [6] clause 8.5.3.3. The length of port parameter value field indicates the length of the octet string with a maximum value of 255.

When the port parameter name indicates `IldpLocSysCap`, the port parameter value field contains system capabilities as specified in IEEE Std 802.1AB [6] clause 8.5.8.1 in the first two octets and enabled capabilities as specified in IEEE Std 802.1AB [6] clause 8.5.8.2 in the next two octets. The length of port parameter value field indicates a value of 4.

When the port parameter name indicates `IldpLocManAddr` list, the port parameter value field contains one or more `IldpLocManAddr` fields. The coding of the `IldpLocManAddr` field is specified in Figure 9.10.5. The length of port parameter value field indicates the length of the entire `IldpLocManAddr` field(s) included in the port parameter value field.

When the port parameter name indicates `IldpV2RemChassisIdSubtype`, the port parameter value field contains values of `IldpV2RemChassisIdSubtype` as specified in IEEE Std 802.1AB [6] clause 8.5.2.2. The length of port parameter value field indicates a value of 1.

When the port parameter name indicates `IldpV2RemChassisId`, the port parameter value field contains values of `IldpV2RemChassisId` in the form of an octet string as specified in IEEE Std 802.1AB [6] clause 8.5.2.3. The length of port parameter value field indicates the length of the octet string with a maximum value of 255.

When the port parameter name indicates `IldpV2RemPortIdSubtype`, the port parameter value field contains values of `IldpV2RemPortIdSubtype` as specified in IEEE Std 802.1AB [6] clause 8.5.3.2. The length of port parameter value field indicates a value of 1.

When the port parameter name indicates `IldpV2RemPortId`, the port parameter value field contains values of `IldpV2RemPortId` in the form of an octet string as specified in IEEE Std 802.1AB [6] clause 8.5.3.3. The length of port parameter value field indicates the length of the octet string with a maximum value of 255.

When the port parameter name indicates lldpTTL, the port parameter value field contains the value of TTL as specified in IEEE Std 802.1AB [6] clause 8.5.4. The length of port parameter value field indicates a value of 2.

When the port parameter name indicates lldpRemSysCap, the port parameter value field contains system capabilities as specified in IEEE Std 802.1AB [6] clause 8.5.8.1 in the first two octets and enabled capabilities as specified in IEEE Std 802.1AB [6] clause 8.5.8.2 in the next two octets. The length of port parameter value field indicates a value of 4.

When the port parameter name indicates lldpRemManAddr list, the port parameter value field contains one or more lldpRemManAddr fields. The coding of the lldpRemManAddr field is specified in Figure 9.11.5. The length of port parameter value field indicates the length of the entire lldpRemManAddr field(s) included in the port parameter value field.

When the port parameter name indicates PSFPMaxStreamFilterInstances, the parameter value field contains the value of MaxStreamFilterInstances as specified in IEEE Std 802.1Q [7] clause 12.31.1.1. The length of port parameter value field indicates a value of 4.

When the port parameter name indicates PSFPMaxStreamGateInstances, the parameter value field contains the value of MaxStreamGateInstances as specified in IEEE Std 802.1Q [7] clause 12.31.1.2. The length of port parameter value field indicates a value of 4.

When the port parameter name indicates PSFPMaxFlowMeterInstances, the parameter value field contains the value of MaxFlowMeterInstances as specified in IEEE Std 802.1Q [7] clause 12.31.1.3. The length of port parameter value field indicates a value of 4.

When the port parameter name indicates PSFPSupportedListMax, the parameter value field contains the value of SupportedListMax as specified in IEEE Std 802.1Q [7] clause 12.31.1.4. The length of port parameter value field indicates a value of 4.

When the port parameter name indicates TSN time domain number, the port parameter value field contains the binary representation of the TSN time domain number as defined in 3GPP TS 23.501 [2] table K.1-1. The length of port parameter value field indicates a value of 1.

When the port parameter name indicates Stream filter instance table, the port parameter value field contains a Stream filter instance table as defined in 3GPP TS 23.501 [2] table K.1-1, encoded as the value part of the Stream filter instance table information element as specified in clause 9.8.

When the port parameter name indicates Stream gate instance table, the port parameter value field contains a Stream gate instance table as defined in 3GPP TS 23.501 [2] table K.1-1, encoded as the value part of the Stream gate instance table information element as specified in clause 9.9.

When the port parameter name indicates Supported PTP instance types, the port parameter value field contains an enumeration of supported PTP instance types as defined in IEEE Std 1588-2019 [11] clause 8.2.1.5.5 (see NOTE 2). The length of port parameter value field is set to the number of supported PTP instance types.

When the port parameter name indicates Supported transport types, the port parameter value field contains an enumeration of supported transport types as defined in IEEE Std 1588-2019 [11] Annexes C, D and E, with transport type "IPv4" encoded as "00000000", transport type "IPv6" encoded as "00000001" and transport type "Ethernet" encoded as "00000010". The length of port parameter value field is set to the number of supported transport types.

When the port parameter name indicates Supported PTP delay mechanisms, the port parameter value field contains an enumeration of supported delay mechanisms as defined in IEEE Std 1588-2019 [11] clause 8.2.15.4.4. The length of port parameter value field is set to the number of supported delay mechanisms.

When the port parameter name indicates PTP grandmaster capable, the port parameter value field indicates whether the DS-TT supports acting as a PTP

grandmaster, with a Boolean value of FALSE encoded as "00000000" and a Boolean value of TRUE encoded as "00000001". The length of port parameter value field indicates a value of 1.

When the port parameter name indicates gPTP grandmaster capable, the port parameter value field indicates whether the DS-TT supports acting as a gPTP grandmaster, with a Boolean value of FALSE encoded as "00000000" and a Boolean value of TRUE encoded as "00000001". The length of port parameter value field indicates a value of 1.

When the port parameter name indicates Supported PTP profiles, the port parameter value field contains an enumeration of supported PTP profiles' profileNames as defined in IEEE Std 1588-2019 [11] clause 20.3.3, with the "SMPTE Profile for Use of IEEE-1588 Precision Time Protocol in Professional Broadcast Applications" as defined in ST 2059-2:2015 [13] encoded as "00000000", the "IEEE 802.1AS PTP profile for transport of timing" profile as defined in IEEE Std 802.1AS [12] encoded as "00000001", the "Default delay request-response profile" as defined in IEEE Std 1588-2019 [11] clause I.3 encoded as "00000010", the "Default delay peer-to-peer delay profile" as defined in IEEE Std 1588-2019 [11] clause I.4 encoded as "00000011" and the "High Accuracy Delay Request-Response Default PTP profile" as defined in IEEE Std 1588-2019 [11] clause I.5 encoded as "00000100". The length of port parameter value field is set to the number of supported PTP profiles.

When the port parameter name indicates Number of supported PTP instances, the port parameter value field contains the binary encoding of the number of supported PTP instances. The length of port parameter value field indicates a value of 2.

When the port parameter name indicates PTP instance list, the port parameter value field contains a PTP instance list as defined in 3GPP TS 23.501 [2] table K.1-1, encoded as the value part of the PTP instance list information element as specified in clause 9.15.

When the port parameter name indicates Interface type, the port parameter value field contains the name of interface type as specified in IETF RFC 8343 [15], coded as UTF-8 string of interface type listed in IETF RFC 7224 [17]. The length of port parameter value field indicates the length of the UTF-8 string with a maximum value of 64.

When the port parameter name indicates Interface enable status, the port parameter value field contains the enable status of an interface as specified in IETF RFC 8343 [15], with a Boolean value of FALSE encoded as "00000000" and a Boolean value of TRUE encoded as "00000001". The length of port parameter value field indicates a value of 1.

When the port parameter name indicates Phys-address, the port parameter value field contains the value of interface address at protocol sub-layer as specified in IETF RFC 8343 [15].

When the port parameter name indicates IPv4 enable status, the port parameter value field contains the IPv4 enable status for an interface as specified in IETF RFC 8344 [16], with a Boolean value of FALSE encoded as "00000000" and a Boolean value of TRUE encoded as "00000001". The length of port parameter value field indicates a value of 1.

When the port parameter name indicates IPv4 forwarding status, the port parameter value field contains if the IP packet forwarding for the address family is enabled on the interface as specified in IETF RFC 8344 [16], with a Boolean value of FALSE encoded as "00000000" and a Boolean value of TRUE encoded as "00000001". The length of port parameter value field indicates a value of 1.

When the port parameter name indicates IPv4 MTU, the port parameter value field contains the value of "mtu" parameter for IPv4 packets as specified in IETF RFC 8344 [16]. The IPv4 MTU starts from 68(decimal). The length of port parameter value field indicates a value of 2.

When the port parameter name indicates IPv4 address information, the port parameter value field contains a list of IPv4 addresses, encoded as the value part of the IPv4 address information information element as specified in clause 9.17.

When the port parameter name indicates IPv4 neighbor information, the port parameter value field contains the "neighbor" parameter for IPv4 as specified in IETF RFC 8344 [16], encoded as the value part of the IPv4 neighbor information element as specified in clause 9.18.

When the port parameter name indicates IPv6 enable status, the port parameter value field contains the IPv6 enable status for an interface as specified in IETF RFC 8344 [16], with a Boolean value of FALSE encoded as "00000000" and a Boolean value of TRUE encoded as "00000001". The length of port parameter value field indicates a value of 1.

When the port parameter name indicates IPv6 forwarding status, the port parameter value field contains if the IP packet forwarding for the address family is enabled on the interface as specified in IETF RFC 8344 [16], with a Boolean value of FALSE encoded as "00000000" and a Boolean value of TRUE encoded as "00000001". The length of port parameter value field indicates a value of 1.

When the port parameter name indicates IPv6 MTU, the port parameter value field contains the value of "mtu" parameter for IPv6 packets as specified in IETF RFC 8344 [16]. The IPv6 MTU starts from 1280(decimal). The length of port parameter value field indicates a value of 2.

When the port parameter name indicates IPv6 address information, the port parameter value field contains a list of IPv6 addresses, encoded as the value part of the IPv6 address information element as specified in clause 9.19.

When the port parameter name indicates IPv6 neighbor information, the port parameter value field contains the "neighbor" parameter for IPv6 as specified in IETF RFC 8344 [16], encoded as the value part of the IPv6 neighbor information element as specified in clause 9.20.

When the hexadecimal encoding of the port parameter name is in the "8000H" to "FFFFH" range, the encoding of the port parameter value field and the value of the length of port parameter value field are deployment-specific.

NOTE 1:	The "Set parameter" operation shall not be applicable for the following port parameter names: - 0001H txPropagationDelay; - 0008H Tick granularity; - 000BH SupportedListMax; - 00A0H IldpV2RemChassisIdSubtype; - 00A1H IldpV2RemChassisId; - 00A2H IldpV2RemPortIdSubtype; - 00A3H IldpV2RemPortId; - 00A4H IldpTTL; - 00A5H IldpRemSysCap; - 00A6H IldpRemManAddr list; - 00D0H PSFPMaxStreamFilterInstances; - 00D1H PSFPMaxStreamGateInstances; - 00D2H PSFPMaxFlowMeterInstances; - 00D3H PSFPSupportedListMax; - 00F0H Interface type; - 00F1H Interface enable status; - 00F2H Phys-address; - 00F3H IPv4 enable status; - 00F4H IPv4 forwarding status; - 00F5H IPv4 MTU; - 00F6H IPv4 address information; - 00F7H IPv4 neighbor information; - 00F8H IPv6 enable status; - 00F9H IPv6 forwarding status; - 00FAH IPv6 MTU; - 00FBH IPv6 address information; and - 00FCH IPv6 neighbor information.
NOTE 2:	The DS-TT signals support for PTP instance type "PTP relay instance" by indicating support for PTP profile "IEEE 802.1AS PTP profile for transport of timing" in the Supported PTP profiles port parameter.
NOTE 3:	The "Delete parameter-entry" operation shall not be applicable for the following port parameter names: - 00F0H Interface type; - 00F1H Interface enable status; - 00F2H Phys-address; - 00F3H IPv4 enable status; - 00F4H IPv4 forwarding status; - 00F5H IPv4 MTU; - 00F6H IPv4 address information; - 00F7H IPv4 neighbor information; - 00F8H IPv6 enable status; - 00F9H IPv6 forwarding status; - 00FAH IPv6 MTU; - 00FBH IPv6 address information; - 00FCH IPv6 neighbor information.
NOTE 4:	This parameter is defined for the communication between NW-TT and TSCTSF for DetNet.

9.3 Port management capability

The purpose of the port management capability information element is to inform the TSN AF of the port parameters supported by the DS-TT or NW-TT.

The port management capability information element is coded as shown in figure 9.3.1, figure 9.3.2, and table 9.3.1.

The port management capability information element has a minimum length of 5 octets and a maximum length of 65534 octets.

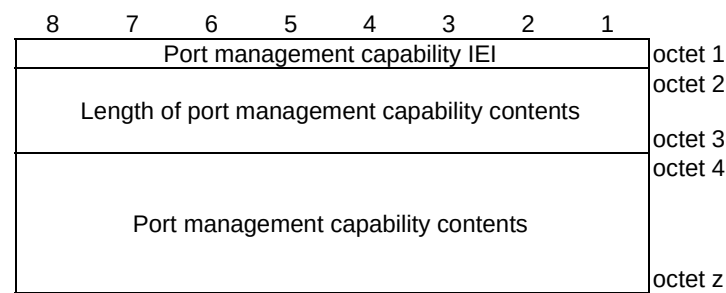


Figure 9.3.1: port management capability information element

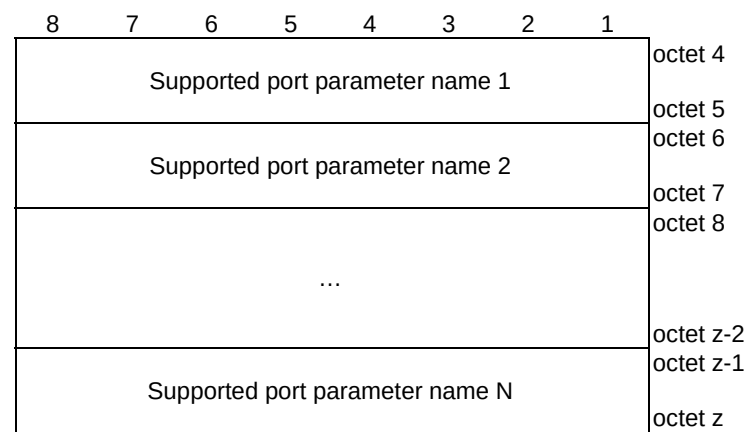


Figure 9.3.2: Port management capability contents

Table 9.3.1: Port management capability information element

Value part of the port management capability information element (octets 4 to z)
The value part of the port management capability information element consists of one or several supported port parameter names, each encoded over 2 octets as specified in table 9.2.1 for the DS-TT or NW-TT to TSN AF direction.

9.4 Port status

The purpose of the port status information element is to report the values of port parameters of the DS-TT or NW-TT to the TSN AF, or to report the values of port parameters of the NW-TT to the TSCTSF in case of DetNet.

The port status information element is coded as shown in figure 9.4.1, figure 9.4.2, figure 9.4.3, figure 9.4.4, figure 9.4.5, and table 9.4.1.

The port status information element has a minimum length of 5 octets and a maximum length of 65534 octets.

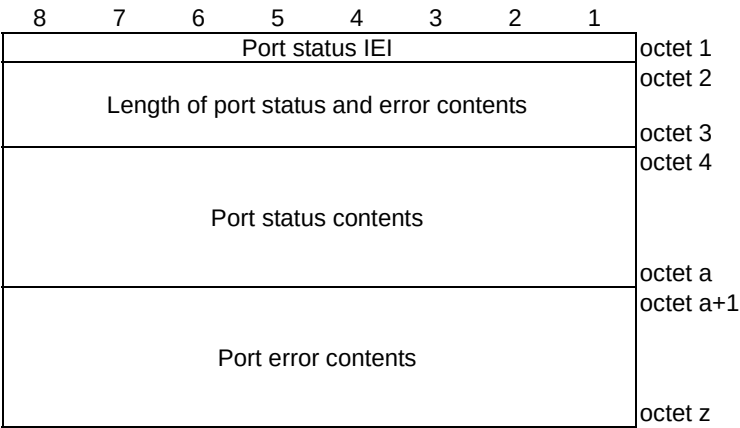


Figure 9.4.1: Port status information element

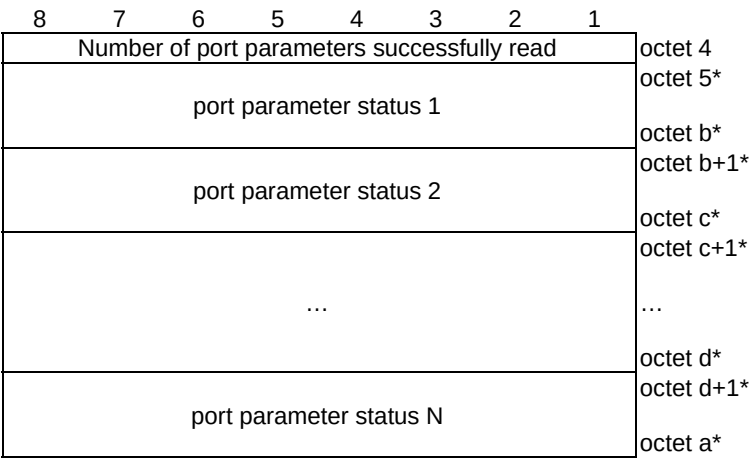


Figure 9.4.2: Port status contents

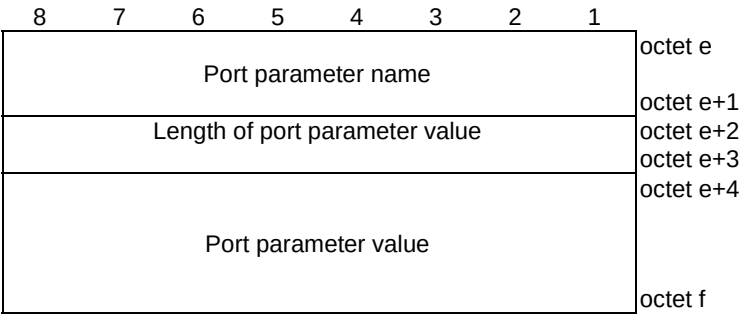


Figure 9.4.3: Port parameter status

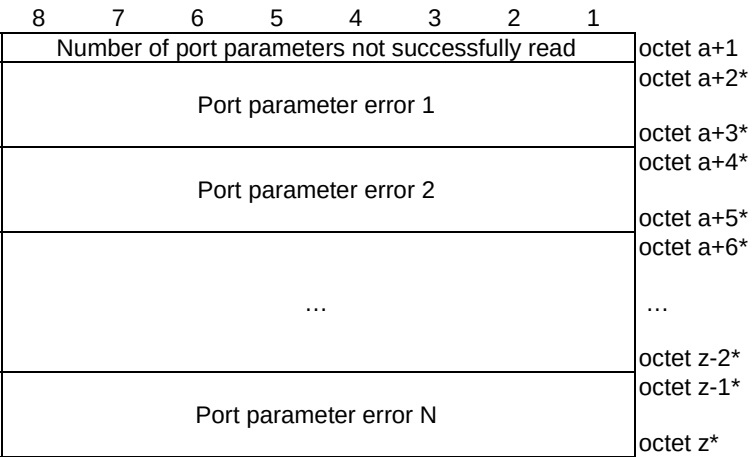


Figure 9.4.4: port error contents

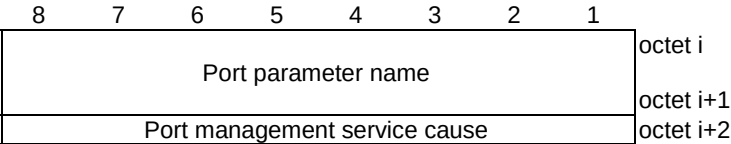


Figure 9.4.5: Port parameter error

Table 9.4.1: Port status information element

Value part of the port status information element (octets 4 to z)
Port status contents (octets 4 to a)
This field consists of zero or several port parameter statuses.
Port parameter status
Port parameter name (octets e to e+1)
This field contains the name of the port parameter which could be read successfully, encoded over 2 octets as specified in table 9.2.1 for the DS-TT or NW-TT to TSN AF direction or NW-TT to TSCTSF direction in case of DetNet.
Length of port parameter value (octets e+2 to e+3)
This field contains the binary encoding of the length of the port parameter value
Port parameter value (octets e+4 to f)
This field contains the value for the port parameter, encoded as specified in table 9.2.1.
Port error contents (octets a+1 to z)
This field consists of zero or several port parameter errors.
Port parameter error
Port parameter name (octets i to i+1)
This field contains the name of the port parameter whose value could not be read successfully, encoded over 2 octets as specified in table 9.2.1 for the DS-TT or NW-TT to TSN AF direction or NW-TT to TSCTSF direction in case of DetNet.
Port management service cause (octet i+2)
This field contains the port management service cause indicating the reason why the value of the port parameter could not be read successfully, encoded as follows:
Bits
8 7 6 5 4 3 2 1
0 0 0 0 0 0 0 0 Reserved
0 0 0 0 0 0 0 1 Port parameter not supported
0 0 0 0 0 0 1 0 Invalid port parameter value
0 0 0 0 0 0 1 1 Port parameter value unavailable
0 1 1 0 1 1 1 1 Protocol error, unspecified
The receiving entity shall treat any other value as 0110 1111, "protocol error, unspecified".

9.5 Port update result

The purpose of the port update result information element is to report to the TSN AF the outcome of the request from the TSN AF to set one or more port parameters to a specific value or to delete one or more port parameters.

The port update result information element is coded as shown in figure 9.5.1, figure 9.5.2, figure 9.5.3, figure 9.5.4, figure 9.5.5, figure 9.5.6, figure 9.5.7 and table 9.5.1.

The port update result information element has a minimum length of 5 octets and a maximum length of 65534 octets.

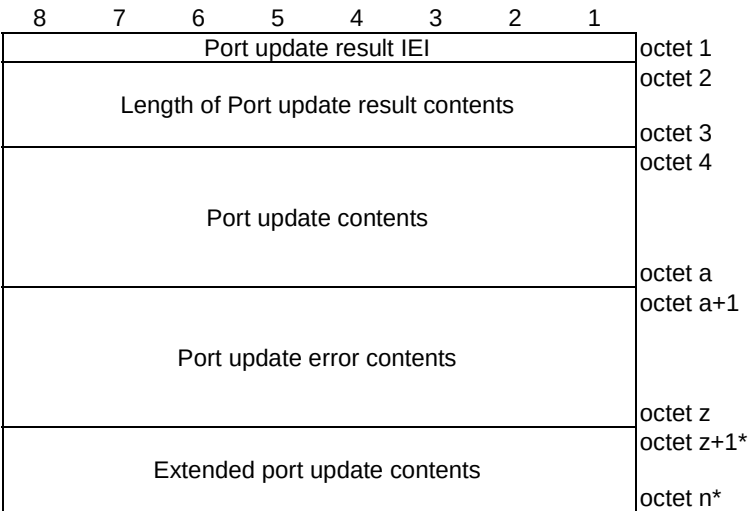


Figure 9.5.1: Port update result information element

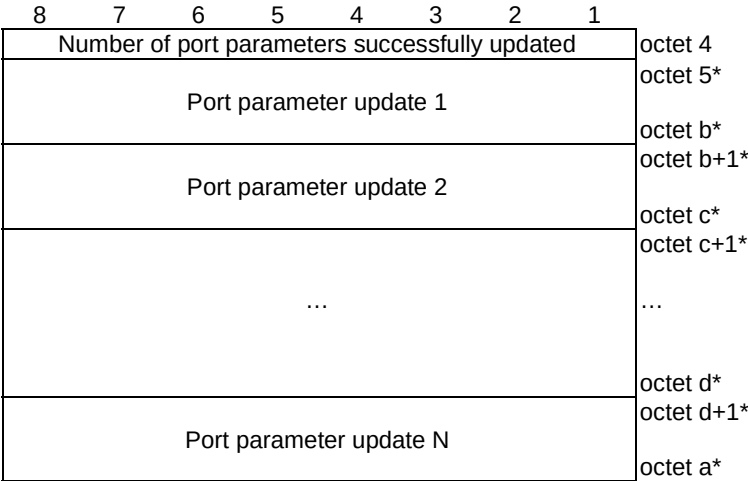


Figure 9.5.2: Port update contents

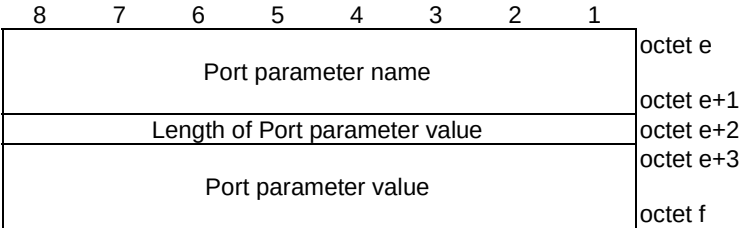


Figure 9.5.3: Port parameter update

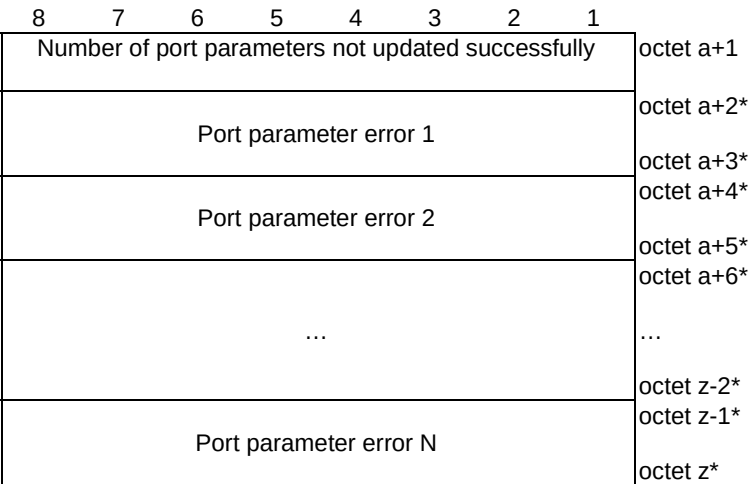


Figure 9.5.4: Port update error contents

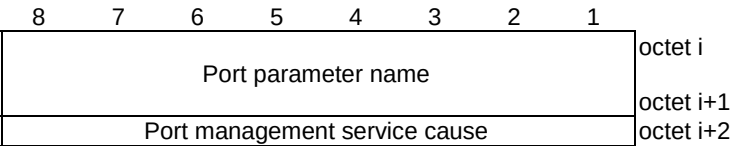


Figure 9.5.5: Port parameter error

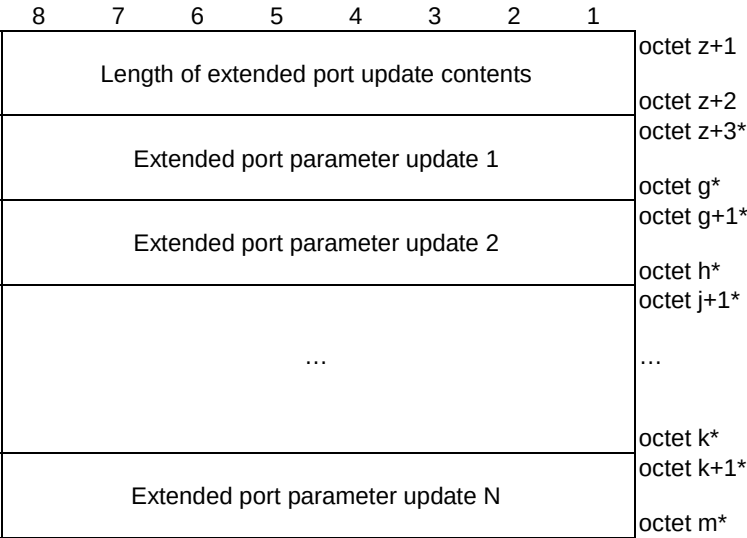


Figure 9.5.6: Extended port update contents

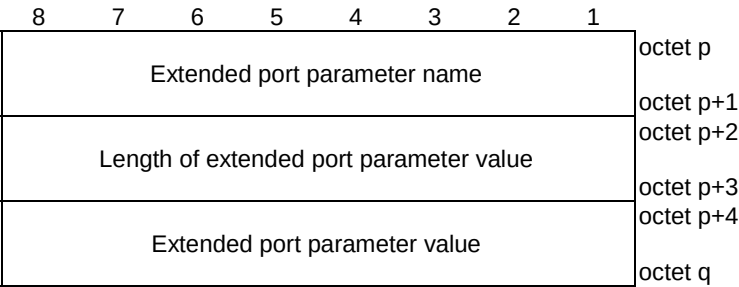


Figure 9.5.7: Extended port parameter update

Table 9.5.1: Port update result information element

Value part of the port update result information element (octets 4 to z)

Port update contents (octets 4 to a)

This field consists of zero or several port parameter updates.

Port parameter update

Port parameter name (octets e to e+1)

This field contains the name of the port parameter which could be set or deleted successfully, encoded over 2 octets as specified in table 9.2.1 for the DS-TT or NW-TT to TSN AF direction.

Length of port parameter value (octet e+2)

This field contains the binary encoding of the length of the port parameter value.

Port parameter value (octets e+3 to f)

When the port parameter is reported for the "delete parameter-entry" operation, the receiving entity considers the corresponding port parameter as deleted at the sending entity.

Port error contents (octets a+1 to z)

This field consists of zero or several port parameter errors.

Port parameter error

Port parameter name (octets i to i+1)

This field contains the name of the port parameter whose value could not be set successfully, encoded over 2 octets as specified in table 9.2.1 for the DS-TT or NW-TT to TSN AF direction.

Port management service cause (octet i+2)

This field contains the port management service cause indicating the reason why the value of the port parameter could not be set successfully, encoded as follows:

Bits

8 7 6 5 4 3 2 1

0 0 0 0 0 0 0 0 Reserved

0 0 0 0 0 0 0 1 port parameter not supported

0 0 0 0 0 0 1 0 Invalid port parameter value

0 1 1 0 1 1 1 1 Protocol error, unspecified

The receiving entity shall treat any other value as 0110 1111, "protocol error, unspecified".

Extended port update contents (NOTE)

This field consists of zero or several extended port parameter updates. Each extended port parameter update has 2 octet length field.

Length of extended port update contents (octets z+1 to z+2)

This field contains the binary encoding of the length of the extended port update contents.

Extended port parameter update

Extended port parameter name (octets p to p+1)

This field contains the name of the port parameter which could be set successfully, encoded over 2 octets as specified in table 9.2.1 for the DS-TT or NW-TT to TSN AF direction.

Length of extended port parameter value (octets p+2 to p+3)

This field contains the binary encoding of the length of the port parameter value.

Extended port parameter value (octets p+4 to q)

NOTE: The extended port update contents are used to convey the value of port parameters with a length greater than 255 octets.

9.5A User plane node management service message type

Table 9.5A.1: User plane node management service message type

Bits								
8	7	6	5	4	3	2	1	
0	0	0	0	0	0	0	0	Reserved
0	0	0	0	0	0	0	1	MANAGE USER PLANE NODE COMMAND message
0	0	0	0	0	0	1	0	MANAGE USER PLANE NODE COMPLETE message
0	0	0	0	0	0	1	1	USER PLANE NODE MANAGEMENT NOTIFY message
0	0	0	0	0	1	0	0	USER PLANE NODE MANAGEMENT ACK message
All other values are reserved								

9.5B User plane node management list

The purpose of the User plane node management list information element is to transfer from the TSN AF to the NW-TT a list of operations related to User plane node management of the NW-TT to be performed at the NW-TT.

The User plane node management list information element is coded as shown in figure 9.5B.1, figure 9.5B.2, figure 9.5B.3, figure 9.5B.4, figure 9.5B.5, and table 9.5B.1.

The User plane node management list information element has a minimum length of 4 octets and a maximum length of 65530 octets.

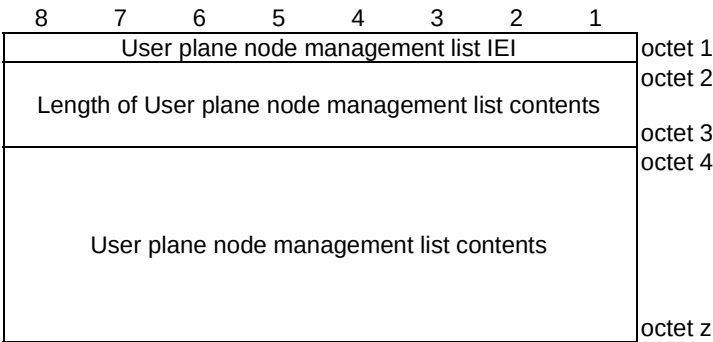


Figure 9.5B.1: User plane node management list information element

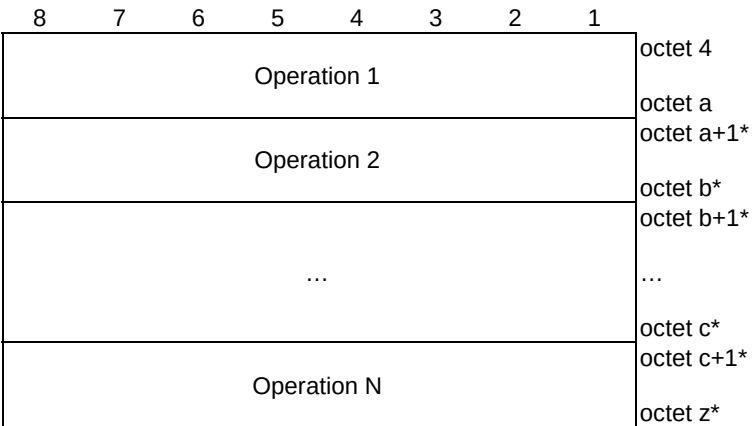


Figure 9.5B.2: User plane node management list contents

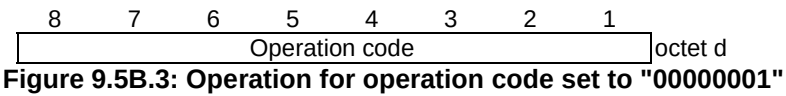


Figure 9.5B.3: Operation for operation code set to "00000001"

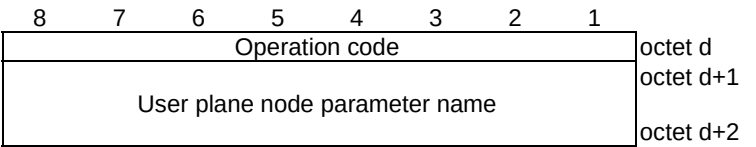


Figure 9.5B.4: Operation for operation code set to "00000010", "00000100", or "00000101"

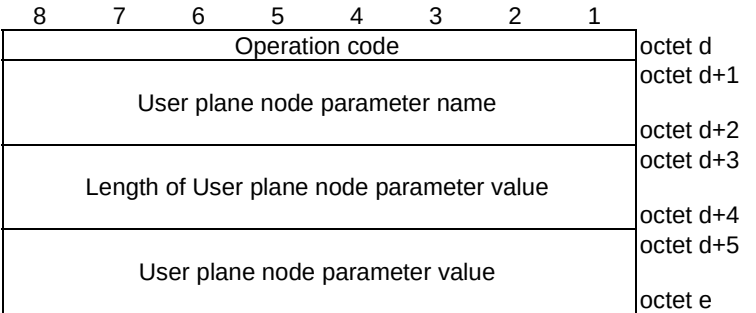


Figure 9.5B.5: Operation for operation code set to "00000011", "00000110", "00000111", "00001000" and "00001001"

Table 9.5B.1: User plane node management list information element

Value part of the User plane node management list information element (octets 4 to z)

The value part of the User plane node management list information element consists of one or several operations.

Operation

Operation code (octet d)

Bits

8	7	6	5	4	3	2	1	
0	0	0	0	0	0	0	0	Reserved
0	0	0	0	0	0	0	1	Get capabilities
0	0	0	0	0	0	1	0	Read parameter
0	0	0	0	0	0	1	1	Set parameter (NOTE 1)
0	0	0	0	1	0	0	0	Subscribe-notify for parameter
0	0	0	0	1	0	1	0	Unsubscribe for parameter
0	0	0	0	1	1	0	0	Selective read parameter
0	0	0	0	1	1	1	0	Selective subscribe-notify for parameter
0	0	0	0	1	0	0	0	Selective unsubscribe for parameter
0	0	0	0	1	0	0	1	Delete parameter-entry

All other values are spare.

User plane node parameter name (octets d+1 to d+2)

This field contains the name of the User plane node parameter to which the operation applies, encoded as follows:

- 0000H Reserved;
- 0001H User plane node Address;
- 0002H Spare (NOTE 2)
- 0003H User plane node ID;
- 0004H NW-TT port numbers;
- 0005H
to Spare
- 0009H
- 0010H Spare (NOTE 3)
- 0010H Spare (NOTE 4)
- 0012H Static filtering entries; (NOTE 6, NOTE 7)
- 0013H Static filtering with port-map support entries; (NOTE 6, NOTE 7)
- 0013H
to Spare
- 0019H
- 0020H IldpV2PortConfigAdminStatusV2;
- 0021H IldpV2LocChassisIdSubtype;
- 0022H IldpV2LocChassisId;
- 0023H IldpV2MessageTxInterval;
- 0024H IldpV2MessageTxHoldMultiplier;
- 0025H
to Spare
- 004FH
- 0050H DS-TT port neighbor discovery configuration for DS-TT ports
- 0051H Discovered neighbor information for DS-TT ports
- 0052H
to Spare
- 006FH
- 0070H PSFPMaxStreamFilterInstances;
- 0071H PSFPMaxStreamGateInstances;
- 0072H PSFPMaxFlowMeterInstances;
- 0073H PSFPSupportedListMax;
- 0074H Supported PTP instance types
- 0075H Supported transport types
- 0076H Supported delay mechanisms
- 0077H PTP grandmaster capable
- 0078H gPTP grandmaster capable
- 0079H Supported PTP profiles
- 007AH Number of supported PTP instances
- 007BH DS-TT port time synchronization information list
- 007CH PTP instance specification
- 007DH
to Spare
- 008FH
- 0090H Synchronization state
- 0091H Clock quality
- 0092H Parent time source
- 0093H
to Spare
- 7FFFFH

- 8000H
to Reserved for deployment specific parameters
- FFFFH

Length of User plane node parameter value (octets d+3 to d+4)

This field contains the binary encoding of the length of the User plane node parameter value

User plane node parameter value (octet d+5 to e)

This field contains the value to be set for the User plane node parameter.

When the User plane node parameter name indicates User plane node Address, the User plane node parameter value field contains the values of User plane node Address as defined in IEEE Std 802.1Q [7] clause 8.13.8. The length of User plane node parameter value field indicates a value of 6.

When the User plane node parameter name indicates User plane node ID, the User plane node parameter value field contains the values of User plane node Identifier as defined in IEEE Std 802.1Q [7] clause 14.2.5. The length of User plane node parameter value field indicates a value of 8.

When the User plane node parameter name indicates NW-TT port numbers, the User plane node parameter value field contains NW-TT port numbers as defined in 3GPP TS 23.501 [2] table K.1-2, encoded as the value part of the NW-TT port numbers information element as specified in clause 9.14.

When the User plane node parameter name indicates Static filtering entries, the User plane node parameter value field contains Static filtering entries as defined in 3GPP TS 23.501 [2] table K.1-2, encoded as the value part of the Static filtering entries information element as specified in clause 9.6. (NOTE 6, NOTE 7)

When the User plane node parameter name indicates Static filtering with port-map support entries, the User plane node parameter value field contains Static filtering entries as defined in 3GPP TS 23.501 [2] table K.1-2, encoded as the value part of the Static filtering with port-map support entries information element as specified in clause 9.6B. (NOTE 6, NOTE 7)

When the User plane node parameter name indicates IldpV2PortConfigAdminStatusV2, the User plane node parameter value field contains values of IldpV2PortConfigAdminStatusV2 as specified in IEEE Std 802.1AB [6] clause 9.2.5.1 with value of txOnly encoded as 01H, rxOnly encoded as 02H, txAndRx encoded as 03H, and disabled encoded as 04H. The length of User plane node parameter value field indicates a value of 1.

When the User plane node parameter name indicates IldpV2LocChassisIdSubtype, the User plane node parameter value field contains values of IldpV2LocChassisIdSubtype as specified in IEEE Std 802.1AB [6] clause 8.5.2.2. The length of User plane node parameter value field indicates a value of 1.

When the User plane node parameter name indicates IldpV2LocChassisId, the User plane node parameter value field contains values of IldpV2LocChassisId in the form of an octet string as specified in IEEE Std 802.1AB [6] clause 8.5.2.3. The length of User plane node parameter value field indicates the length of the octet string with a maximum value of 255.

When the User plane node parameter name indicates IldpV2MessageTxInterval, the User plane node parameter value field contains the value of IldpV2MessageTxInterval as specified in IEEE Std 802.1AB [6] table 11-2. The length of User plane node parameter value field indicates a value of 2.

When the User plane node parameter name indicates IldpV2MessageTxHoldMultiplier, the User plane node parameter value field contains the value of IldpV2MessageTxHoldMultiplier as specified in IEEE Std 802.1AB [6] table 11-2. The length of User plane node parameter value field indicates a value of 1.

When the User plane node parameter name indicates DS-TT port neighbor discovery configuration for DS-TT ports, the User plane node parameter value field contains DS-TT port neighbor discovery configuration for DS-TT ports as defined in 3GPP TS 23.501 [2] table K.1-2, encoded as the value part of the DS-TT port neighbor discovery configuration for DS-TT ports information element as specified in clause 9.10.

When the User plane node parameter name indicates Discovered neighbor information for DS-TT ports, the User plane node parameter value field contains Discovered neighbor information for DS-TT ports as defined in 3GPP TS 23.501 [2] table K.1-2, encoded as the value part of the Discovered neighbor information for DS-TT ports information element as specified in clause 9.11.

When the User plane node parameter name indicates MaxStreamFilterInstances, the User plane node parameter value field contains the value of PSFPMaxStreamFilterInstances as specified in IEEE Std 802.1Q [7] clause 12.31.1.1. The length of User plane node parameter value field indicates a value of 4.

When the User plane node parameter name indicates PSFPMaxStreamGateInstances, the User plane node parameter value field contains the value of MaxStreamGateInstances as specified in IEEE Std 802.1Q [7] clause 12.31.1.1. The length of User plane node parameter value field indicates a value of 4.

When the User plane node parameter name indicates PSFPMaxFlowMeterInstances, the User plane node parameter value field contains the value of MaxFlowMeterInstances as specified in IEEE Std 802.1Q [7] Table 12-31. The length of User plane node parameter value field indicates a value of 4.

When the User plane node parameter name indicates PSFPSupportedListMax, the User plane node parameter value field contains the value of SupportedListMax as specified in IEEE Std 802.1Q [7] clause 12.31.1.4. The length of User plane node parameter value field indicates a value of 4.

When the User plane node parameter name indicates Supported PTP instance types, the User plane node parameter value field contains an enumeration of supported PTP instance types as defined in IEEE Std 1588-2019 [11] clause 8.2.1.5.5 (see NOTE 5). The length of User plane node parameter value field is set to the number of supported PTP instance types.

When the User plane node parameter name indicates Supported transport types, the User plane node parameter value field contains an enumeration of supported transport types as defined in IEEE Std 1588-2019 [11] Annexes C, D and E, with transport type "IPv4" encoded as "00000000", transport type "IPv6" encoded as "00000001" and transport type "Ethernet" encoded as "00000010". The length of User plane node parameter value field is set to the number of supported transport types.

When the User plane node parameter name indicates Supported PTP delay mechanisms, the User plane node parameter value field contains an enumeration of supported delay mechanisms as defined in IEEE Std 1588-2019 [11] clause 8.2.15.4.4. The length of User plane node parameter value field is set to the number of supported delay mechanisms.

When the User plane node parameter name indicates PTP grandmaster capable, the User plane node parameter value field indicates whether the NW-TT supports acting as a PTP grandmaster, with a Boolean value of FALSE encoded as "00000000" and a Boolean value of TRUE encoded as "00000001". The length of User plane node parameter value field indicates a value of 1.

When the User plane node parameter name indicates gPTP grandmaster capable, the User plane node parameter value field indicates whether the NW-TT supports acting as a gPTP grandmaster, with a Boolean value of FALSE encoded as "00000000" and a Boolean value of TRUE encoded as "00000001". The length of User plane node parameter value field indicates a value of 1.

When the User plane node parameter name indicates Supported PTP profiles, the User plane node parameter value field contains an enumeration of supported PTP profiles' profileNames as defined in IEEE Std 1588-2019 [11] clause 20.3.3, with the "SMPTE Profile for Use of IEEE-1588 Precision Time Protocol in Professional Broadcast Applications" as defined in ST 2059-2:2015 [13] encoded as "00000000", the "IEEE 802.1AS PTP profile for transport of timing" profile as defined in IEEE Std 802.1AS [12] encoded as "00000001", the "Default delay request-response profile" as defined in IEEE Std 1588-2019 [11] clause I.3 encoded as "00000010", the "Default delay peer-to-peer delay profile" as defined in IEEE Std 1588-2019 [11] clause I.4 encoded as "00000011" and the "High Accuracy Delay Request-Response Default PTP profile" as defined in IEEE Std 1588-2019 [11] clause I.5 encoded as "00000100". The length of User plane node parameter value field is set to the number of supported PTP profiles.

When the User plane node parameter name indicates Number of supported PTP instances, the User plane node parameter value field contains the binary encoding of

the number of supported PTP instances. The length of User plane node parameter value field indicates a value of 2.

When the User plane node parameter name indicates DS-TT port time synchronization information list, the User plane node parameter value field contains a DS-TT port time synchronization information list as defined in 3GPP TS 23.501 [2] table K.1-2, encoded as the value part of the DS-TT port time synchronization information list information element as specified in clause 9.16.

When the User plane node parameter name indicates PTP instance specification, the User plane node parameter value field contains a PTP instance specification as defined in 3GPP TS 23.501 [2] table K.1-2, encoded as the value part of the PTP instance list information element as specified in clause 9.15.

When the User plane node parameter name indicates Synchronization state, the User plane node parameter value field contains an octet encoded as:

- 00000000 for "Locked" mode;
- 00000001 for "Handover" mode; or
- 00000010 for "Freerun" mode;

where all other values are spare. The modes specified above are as defined in ITU-T Recommendation G.810 [18]. The length of User plane node parameter value field indicates a value of 1.

When the User plane node parameter name indicates Clock quality, the User plane node parameter value field contains clock quality information as defined in 3GPP TS 23.501 [2] table K.1-2, encoded as the value part of the Clock quality information element as specified in clause 9.21.

When the User plane node parameter name indicates Parent time source, the User plane node parameter value field contains an octet encoded as:

- 00000000 for "PTP";
- 00000001 for "GNSS";
- 00000010 for "atomic clock";
- 00000011 for "terrestrial radio";
- 00000100 for "serial time code";
- 00000101 for "NTP";
- 00000110 for "hand set"; or
- 11111111 for "other";

where all other values are spare and shall be interpreted as "other". The length of User plane node parameter value field indicates a value of 1.

When the hexadecimal encoding of the User plane node parameter name is in the "8000H" to "FFFFH" range, the encoding of the User plane node parameter value field and the value of the length of User plane node parameter value field are deployment-specific.

NOTE 1:	The "Set parameter" operation shall not be applicable for the following parameter names: - 0001H User plane node Address; - 0003H User plane node ID; - 0004H NW-TT port numbers; - 0051H Discovered neighbor information for DS-TT ports; - 0070H PSFPMaxStreamFilterInstances; - 0071H PSFPMaxStreamGateInstances; - 0072H PSFPMaxFlowMeterInstances; - 0073H PSFPSupportedListMax; - 0090H Synchronization state; - 0091H Clock quality; and - 0092H Parent time source.
NOTE 2:	Implementations compliant with earlier versions of this release of the specification can interpret these values as signalling the User plane node Name.
NOTE 3:	Implementations compliant with earlier versions of this release of the specification can interpret these values as signalling the Chassis ID subtype.
NOTE 4:	Implementations compliant with earlier versions of this release of the specification can interpret these values as signalling the Chassis ID.
NOTE 5:	The NW-TT signals support for PTP instance type "PTP relay instance" by indicating support for PTP profile "IEEE 802.1AS PTP profile for transport of timing" in the Supported PTP profiles User plane node parameter.
NOTE 6:	If a NW-TT includes User plane node parameter names 0012H Static filtering entries and 0013H Static filtering with port-map entries in the User plane node management capability IE, a TSN AF compliant with this version of the specification shall only include User plane node parameter name 0013H Static filtering with port-map entries.
NOTE 7:	A NW-TT compliant with this version of the specification shall include User plane node parameter names 0012H Static filtering entries and 0013H Static filtering with port-map entries in the User plane node management capability IE.

9.5C User plane node management capability

The purpose of the User plane node management capability information element is to inform the TSN AF of the User plane node parameters supported by the NW-TT.

The User plane node management capability information element is coded as shown in figure 9.5C.1, figure 9.5C.2, and table 9.5C.1.

The User plane node management capability information element has a minimum length of 5 octets and a maximum length of 65530 octets.

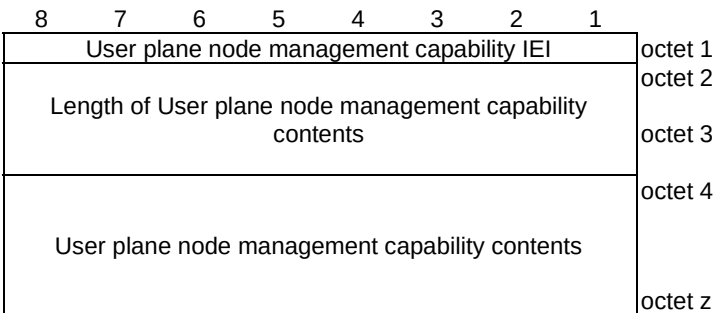


Figure 9.5C.1: User plane node management capability information element

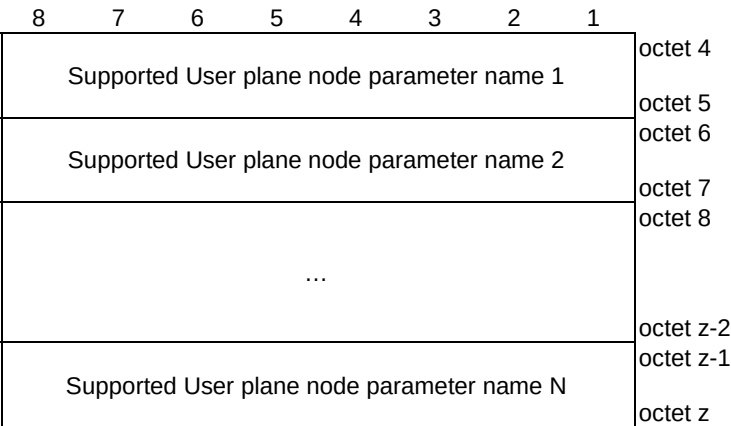


Figure 9.5C.2: User plane node management capability contents

Table 9.5C.1: User plane node management capability information element

Value part of the User plane node management capability information element (octets 4 to z)
The value part of the User plane node management capability information element consists of one or several supported User plane node parameter names, each encoded over 2 octets as specified in table 9.5B.1 for the NW-TT to TSN AF direction.

9.5D User plane node status

The purpose of the User plane node status information element is to report the values of User plane node parameters of the NW-TT to the TSN AF.

The User plane node status information element is coded as shown in figure 9.5D.1, figure 9.5D.2, figure 9.5D.3, figure 9.5D.4, figure 9.5D.5, and table 9.5D.1.

The User plane node status information element has a minimum length of 5 octets and a maximum length of 65530 octets.

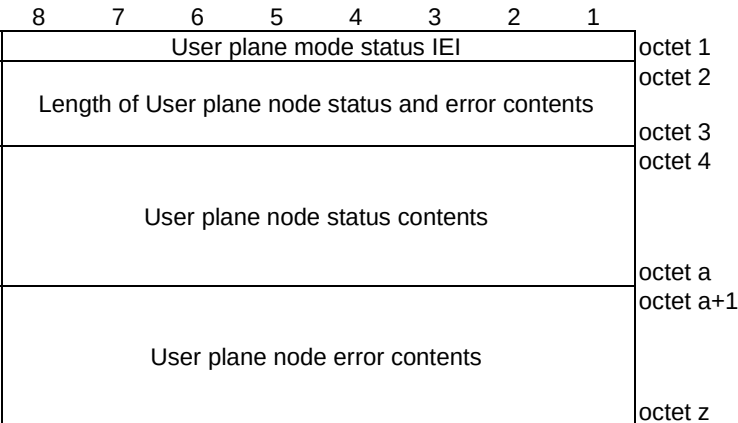


Figure 9.5D.1: User plane node status information element

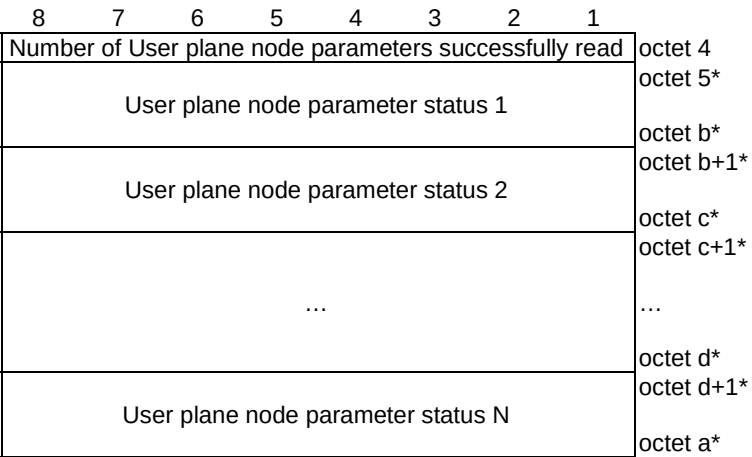


Figure 9.5D.2: User plane node status contents

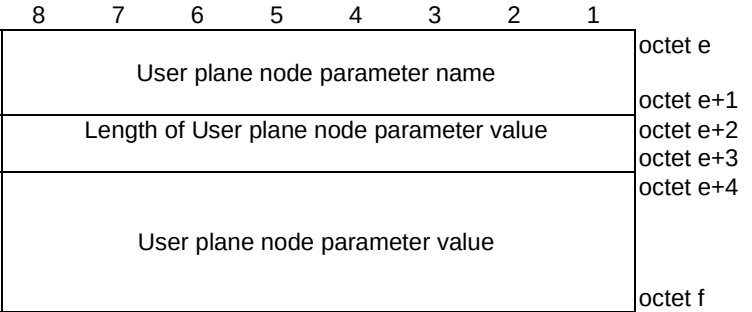


Figure 9.5D.3: User plane node parameter status

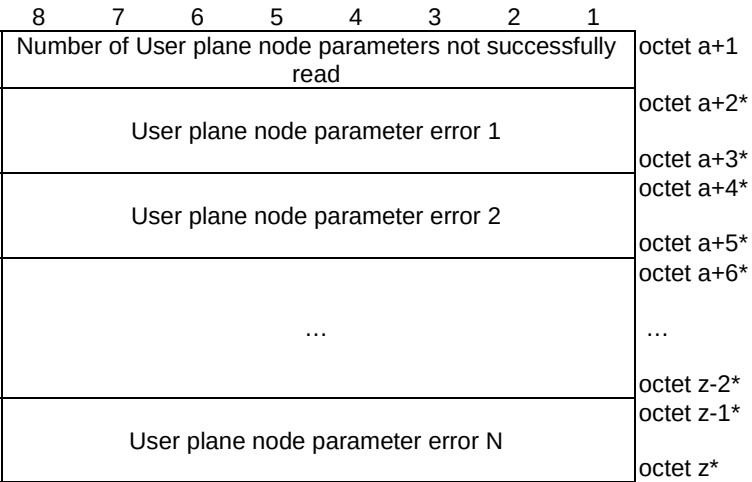


Figure 9.5D.4: User plane node error contents

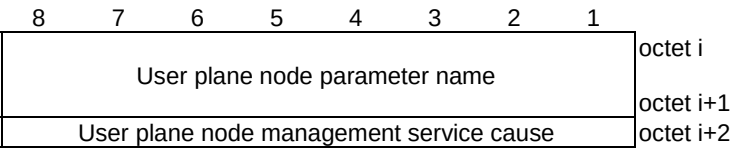


Figure 9.5D.5: User plane node parameter error

Table 9.5D.1: User plane node status information element

Value part of the User plane node status information element (octets 4 to z)
User plane node status contents (octets 4 to a)
This field consists of zero or several User plane node parameter statuses.
User plane node parameter status
User plane node parameter name (octets e to e+1)
This field contains the name of the User plane node parameter which could be read successfully, encoded over 2 octets as specified in table 9.5B.1 for the NW-TT to TSN AF direction.
Length of User plane node parameter value (octets e+2 to e+3)
This field contains the binary encoding of the length of the User plane node parameter value
User plane node parameter value (octets e+4 to f)
This field contains the value for the User plane node parameter, encoded as specified in table 9.5B.1.
User plane node error contents (octets a+1 to z)
This field consists of zero or several User plane node parameter errors.
User plane node parameter error
User plane node parameter name (octets i to i+1)
This field contains the name of the User plane node parameter whose value could not be read successfully, encoded over 2 octets as specified in table 9.5B.1 for the NW-TT to TSN AF direction.
User plane node management service cause (octet i+2)
This field contains the User plane node management service cause indicating the reason why the value of the User plane node parameter could not be read successfully, encoded as follows:
Bits
8 7 6 5 4 3 2 1
0 0 0 0 0 0 0 0 Reserved
0 0 0 0 0 0 0 1 User plane node parameter not supported
0 0 0 0 0 0 1 0 Invalid User plane node parameter value
0 0 0 0 0 0 1 1 User plane node parameter value unavailable
0 1 1 0 1 1 1 1 Protocol error, unspecified
The receiving entity shall treat any other value as 0110 1111, "protocol error, unspecified".

9.5E User plane node update result

The purpose of the User plane node update result information element is to report to the TSN AF the outcome of the request from the TSN AF to set one or more User plane node parameters to a specific value or to delete the referred parameter-entry of the parameter.

The User plane node update result information element is coded as shown in figure 9.5E.1, figure 9.5E.2, figure 9.5E.3, figure 9.5E.4, figure 9.5E.5, figure 9.5E.6, figure 9.5E.7, and table 9.5E.1.

The User plane node update result information element has a minimum length of 5 octets and a maximum length of 65530 octets.

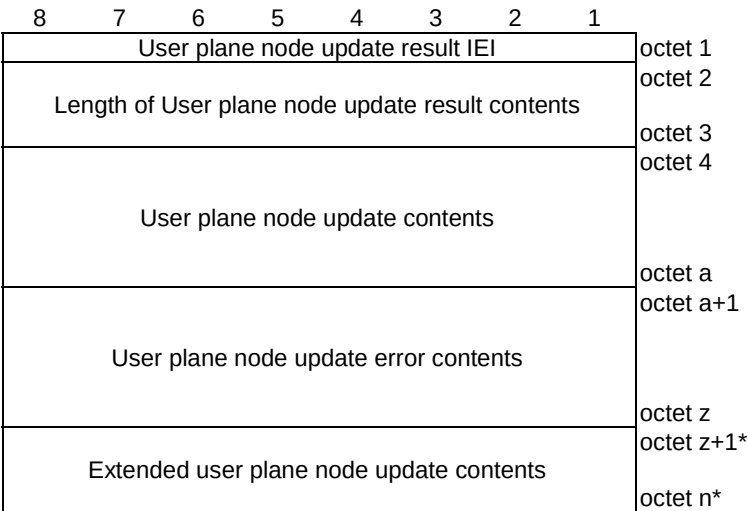


Figure 9.5E.1: User plane node update result information element

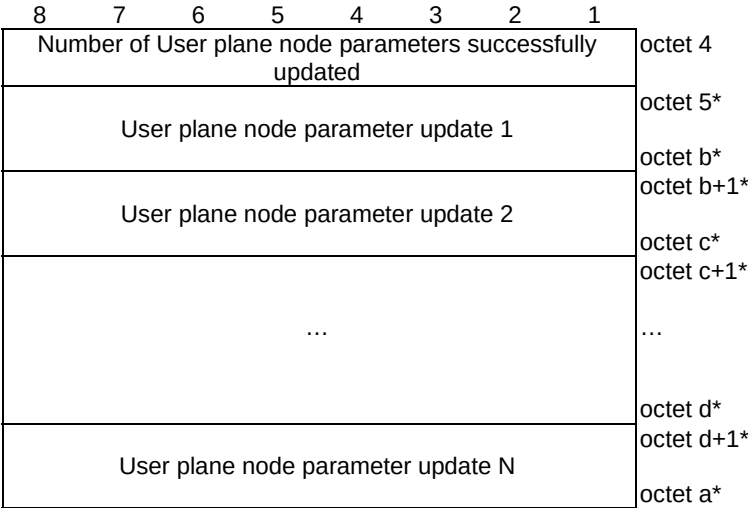


Figure 9.5E.2: User plane node update contents

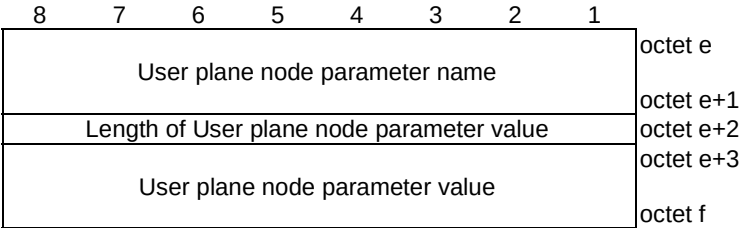


Figure 9.5E.3: User plane node parameter update

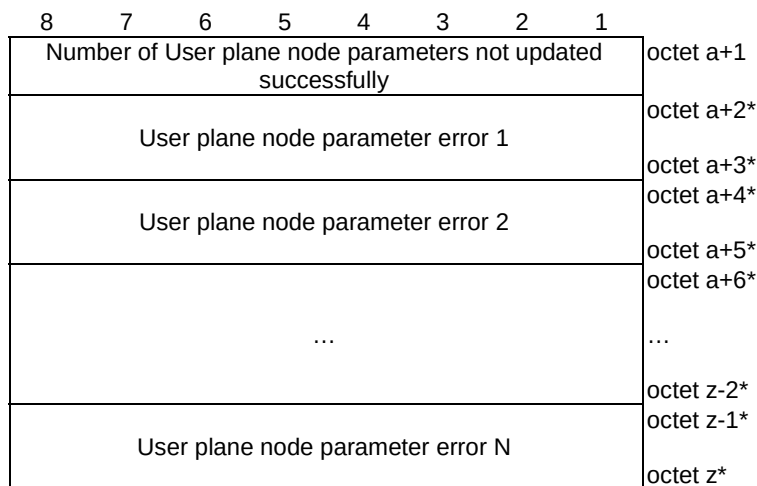
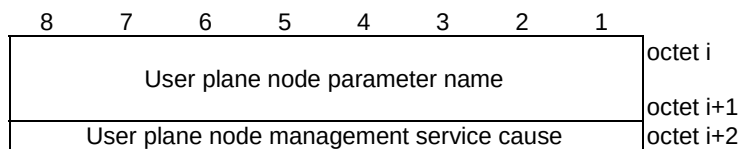
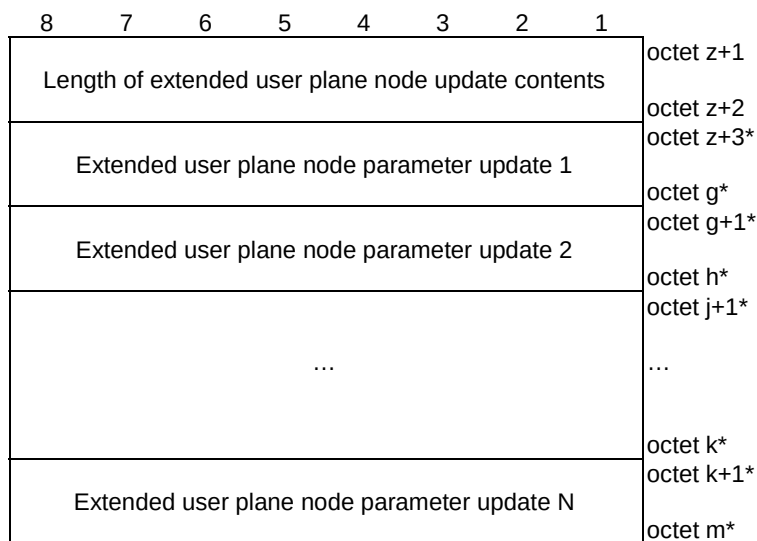
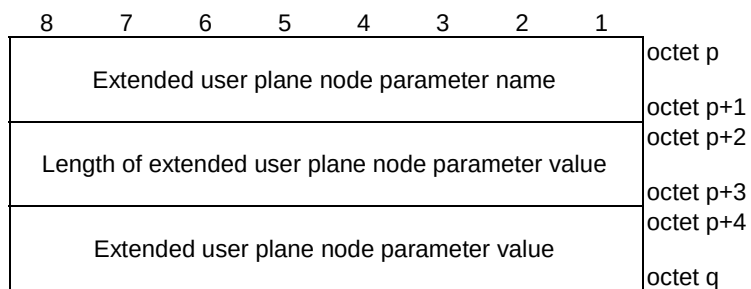
**Figure 9.5E.4: User plane node update error contents****Figure 9.5E.5: User plane node parameter error****Figure 9.5E.6: Extended user plane node update contents****Figure 9.5E.7: Extended user plane node parameter update**

Table 9.5E.1: User plane node update result information element

Value part of the User plane node update result information element (octets 4 to z)

User plane node update contents (octets 4 to a)

This field consists of zero or several User plane node parameter updates.

User plane node parameter update

User plane node parameter name (octets e to e+1)

This field contains the name of the User plane node parameter which could be set or deleted successfully, encoded over 2 octets as specified in table 9.5B.1 for the NW-TT to TSN AF direction.

Length of User plane node parameter value (octet e+2)

This field contains the binary encoding of the length of the User plane node parameter value.

User plane node parameter value (octets e+3 to f)

When the user plane node parameter is reported for the "delete parameter-entry" operation, the receiving entity considers the corresponding user plane node parameter as deleted at the sending entity.

User plane node error contents (octets a+1 to z)

This field consists of zero or several User plane node parameter errors.

User plane node parameter error

User plane node parameter name (octets i to i+1)

This field contains the name of the User plane node parameter whose value could not be set successfully, encoded over 2 octets as specified in table 9.5B.1 for the NW-TT to TSN AF direction.

User plane node management service cause (octet i+2)

This field contains the User plane node management service cause indicating the reason why the value of the User plane node parameter could not be set successfully, encoded as follows:

Bits

8 7 6 5 4 3 2 1

0 0 0 0 0 0 0 0 Reserved

0 0 0 0 0 0 0 1 User plane node parameter not supported

0 0 0 0 0 0 1 0 Invalid User plane node parameter value

0 1 1 0 1 1 1 1 Protocol error, unspecified

The receiving entity shall treat any other value as 0110 1111, "protocol error, unspecified".

Extended user plane node update contents (NOTE)

This field consists of zero or several extended user plane node parameter updates.

Each extended user plane node parameter update has 2 octet length field.

Length of extended user plane node update contents (octets z+1 to z+2)

This field contains the binary encoding of the length of the extended user plane node update contents.

Extended user plane node parameter update

Extended user plane node parameter name (octets p to p+1)

This field contains the name of the user plane node parameter which could be set successfully, encoded over 2 octets as specified in table 9.5B.1 for the NW-TT to TSN AF direction.

Length of extended user plane node parameter value (octets p+2 to p+3)

This field contains the binary encoding of the length of the user plane node parameter value.

Extended user plane node parameter value (octets p+4 to q)

NOTE: The extended user plane node update contents are used to convey the value of user plane node parameters with a length greater than 255 octets.

9.6 Static filtering entries

The purpose of the Static filtering entries information element is to convey Static filtering entries as defined in 3GPP TS 23.501 [2] table K.1-2.

The Static filtering entries information element is coded as shown in figure 9.6.1, figure 9.6.2 and table 9.6.1.

The Static filtering entries information element has a minimum length of 3 octets.

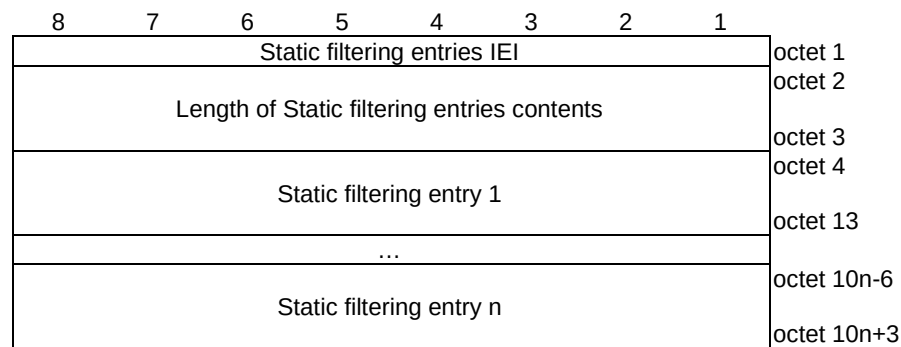


Figure 9.6.1: Static filtering entries information element

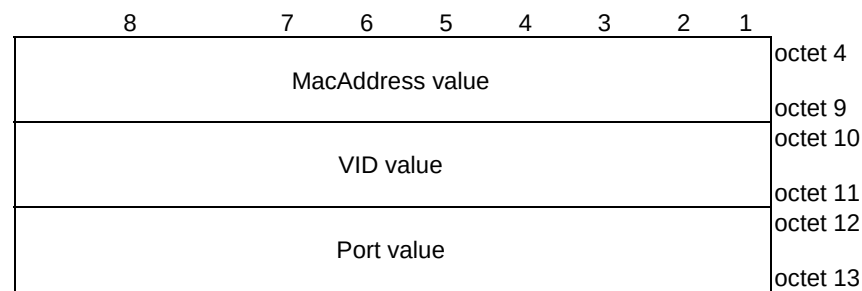


Figure 9.6.2: Static filtering entry

Table 9.6.1: Static filtering entries

Value part of the Static filtering entries information element (octets 4 to 10n+3)
Static filtering entries contents (octets 4 to 10n+3)
This field consists of zero or more Static filtering entries.
Static filtering entry (octets 4 to 13)
MacAddress value (octets 4 to 9)
MacAddress value contains the value of MAC address as specified in IEEE Std 802.1Q [7] clause 8.8.1.
VID value (octets 10 to 11)
VID value contains the value of VID specification as specified in IEEE Std 802.1Q [7] clause 8.8.1.
Port value (octets 12 to 13)
Port value contains the value of outbound Port as specified in IEEE Std 802.1Q [7] clause 8.8.1.

9.6B Static filtering with port-map support entries

The purpose of the Static filtering with port-map support entries information element is to convey Static filtering entries as defined in 3GPP TS 23.501 [2] table K.1-2 and IEEE Std 802.1Q [7] clause 8.8.1.

The Static filtering with port-map support entries information element is coded as shown in figure 9.6B.1, figure 9.6B.2, figure 9.6B.3, figure 9.6B.4 and table 9.6B.1.

The Static filtering with port-map support entries information element has a minimum length of 3 octets.

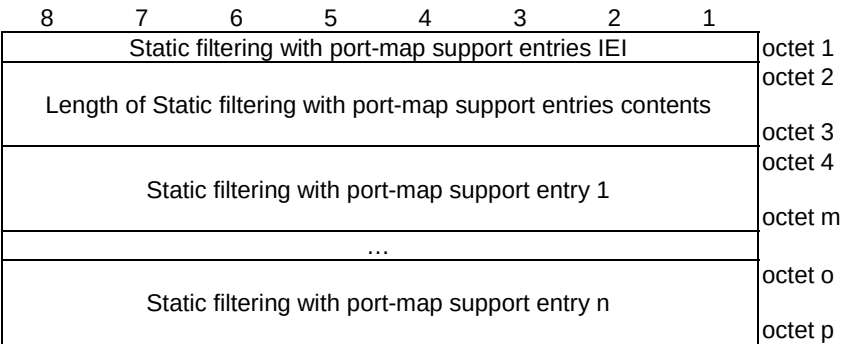


Figure 9.6B.1: Static filtering with port-map support entries information element

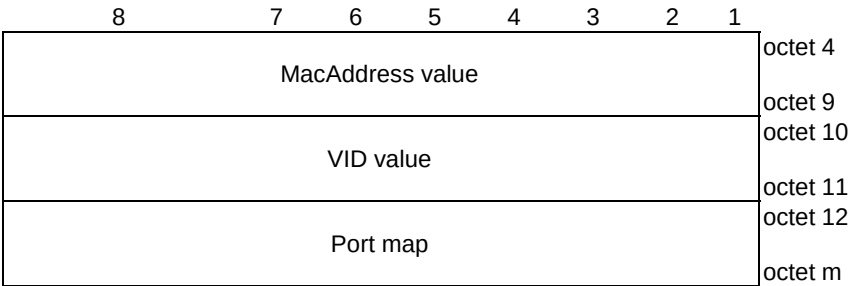


Figure 9.6B.2: Static filtering with port-map support entry

Length of Port map	octet 12 octet 13 octet 14
Port map entry 1	octet q octet q+1
...	octet r octet r+1
Port map entry n	octet s

Figure 9.6B.3: Port map

Length of Port map entry	octet 14
Port value	octet 15 octet 16
Control element value	octet 17
Connection identifier value	octet 18* octet 19*

Figure 9.6B.4: Port map entry

Table 9.6B.1: Static filtering with port-map support entries

Value part of the Static filtering with port-map support entries information element (octets 4 to p)
Static filtering with port-map support entries contents (octets 4 to p)
This field consists of zero or more Static filtering with port-map support entries.
Static filtering with port-map support entry (octets 4 to m)
MacAddress value (octets 4 to 9)
MacAddress value contains the value of MAC address as specified in IEEE Std 802.1Q [7] clause 8.8.1.
VID value (octets 10 to 11)
VID value contains the value of VID specification as specified in IEEE Std 802.1Q [7] clause 8.8.1.
Port map entry (octets 14 to 19)
Port value (octets 15 to 16)
Port value contains the value of outbound Port as specified in IEEE Std 802.1Q [7] clause 8.8.1.
Control element value (octet 17)
Control element value contains an enumerated value of control element as specified in IEEE Std 802.1Q [7] clause 8.8.1 in the form of a binary encoded octet. IEEE Std 802.1Q [7] clause 8.8.1 item c1) is encoded as binary 0, IEEE Std 802.1Q [7] clause 8.8.1 item c2) is encoded as binary 1, and IEEE Std 802.1Q [7] clause 8.8.1 item c3) is encoded as binary 2. All other values are reserved.
Connection identifier value (octet 18 to 19)
Connection identifier value contains the connection_identifier for the outbound Port as specified in IEEE Std 802.1Q [7] clause 8.8.1.
NOTE: When Static filtering with port-map support entries is received in a user plane node management list and associated with operation code "delete parameter-entry" then port value, control element value and connection identifier value are ignored by the receiver.

9.7 Traffic class table

The purpose of the Traffic class table information element is to convey a traffic class table as defined in IEEE Std 802.1Q [7].

The Traffic class table information element is coded as shown in figure 9.7.1, figure 9.7.2, figure 9.7.3, and table 9.7.1.

The Traffic class table information element has a minimum length of 3 octets and a maximum length of 19 octets.

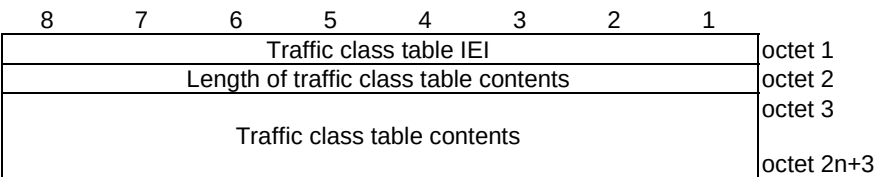


Figure 9.7.1: Traffic class table information element

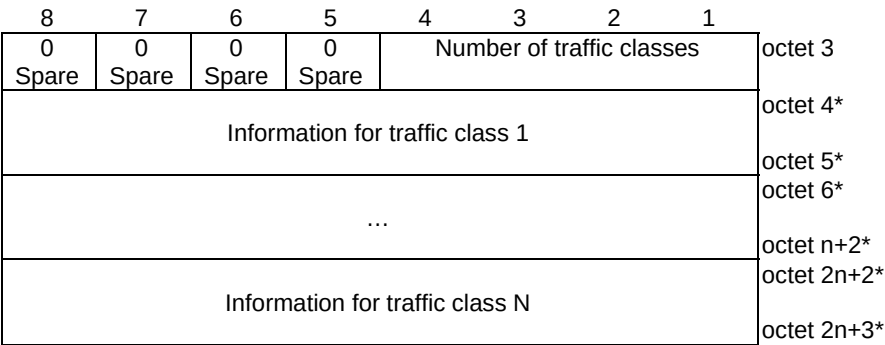


Figure 9.7.2: Traffic class table contents

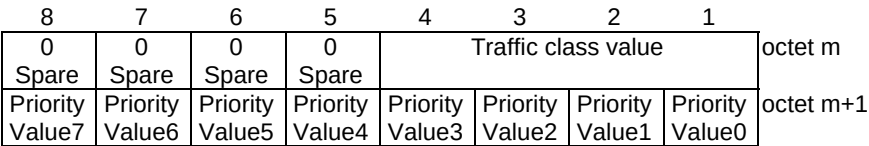


Figure 9.7.3: Information for traffic class

Table 9.7.1: Traffic class information

Number of traffic classes (bit 1 to bit 3 of octet 3)

Bits

4 3 2 1

0 0 0 0 No traffic class information is included
 0 0 0 1 Information on one traffic class is included
 0 0 1 0 Information on two traffic classes is included
 0 0 1 1 Information on three traffic classes is included
 0 1 0 0 Information on four traffic classes is included
 0 1 0 1 Information on five traffic classes is included
 0 1 1 0 Information on six traffic classes is included
 0 1 1 1 Information on seven traffic classes is included
 1 0 0 0 Information on eight traffic classes is included
 1 0 0 1
 to Reserved
 1 1 1 1

Traffic class value (bit 1 to bit 3 of octet m)

Bits

3 2 1

0 0 0 The value of the traffic class is 0
 0 0 1 The value of the traffic class is 1
 0 1 0 The value of the traffic class is 2
 0 1 1 The value of the traffic class is 3
 1 0 0 The value of the traffic class is 4
 1 0 1 The value of the traffic class is 5
 1 1 0 The value of the traffic class is 6
 1 1 1 The value of the traffic class is 7

PriorityValue0 (bit 1 of octet m+1)

Bit

1

0 Priority value 0 is not assigned to the traffic class
 1 Priority value 0 is assigned to the traffic class

PriorityValue1 (bit 2 of octet m+1)

Bit

2

0 Priority value 1 is not assigned to the traffic class
 1 Priority value 1 is assigned to the traffic class

PriorityValue2 (bit 3 of octet m+1)

Bit

3

0 Priority value 2 is not assigned to the traffic class
 1 Priority value 2 is assigned to the traffic class

PriorityValue3 (bit 4 of octet m+1)

Bit

4

0 Priority value 3 is not assigned to the traffic class
 1 Priority value 3 is assigned to the traffic class

PriorityValue4 (bit 5 of octet m+1)

Bit

5

0 Priority value 4 is not assigned to the traffic class
 1 Priority value 4 is assigned to the traffic class

PriorityValue5 (bit 6 of octet m+1)

Bit

6

0 Priority value 5 is not assigned to the traffic class
 1 Priority value 5 is assigned to the traffic class

PriorityValue6 (bit 7 of octet m+1)

Bit

7

0 Priority value 6 is not assigned to the traffic class

1	Priority value 6 is assigned to the traffic class
PriorityValue7 (bit 8 of octet m+1)	
Bit	
8	
0	Priority value 7 is not assigned to the traffic class
1	Priority value 7 is assigned to the traffic class

9.8 Stream filter instance table

The purpose of the Stream filter instance table information element is to convey a Stream filter instance table as defined 3GPP TS 23.501 [2] table K.1-1.

The Stream filter instance table information element is coded as shown in figure 9.8.1, figure 9.8.2, figure 9.8.3, figure 9.8.4, figure 9.8.5, and table 9.8.1.

The Stream filter instance table is a type 6 information element with a minimum length of 3 octets.

8	7	6	5	4	3	2	1	
Stream filter instance table IEI								octet 1
Length of Stream filter instance table contents								octet 2
								octet 3
Stream filter instance 1								octet 4*
								octet m*
...								
Stream filter instance n								octet n*
								octet o*

Figure 9.8.1: Stream filter instance table information element

8	7	6	5	4	3	2	1	
Length of Stream filter instance contents								octet 4
PrioritySpec value								octet 5
								octet 8
StreamGateInstanceID value								octet 9
								octet 12
tsnStreamIdIdentificationType value								octet 13
								octet 16
tsnStreamIdParameters								octet 17
								octet m-4
StreamFilterInstanceIndex value								octet m-3*
								octet m*

Figure 9.8.2: Stream filter instance

8	7	6	5	4	3	2	1	
Length of tsnStreamIdParameters contents								octet 17
tsnCpeNullDownDestMac value								octet 18
								octet 23
tsnCpeNullDownTagged value								octet 24
tsnCpeNullDownVlan value								octet 25
								octet 26

Figure 9.8.3: tsnStreamIdParameters for tsnStreamIdIdentificationType = 00-80-C2 01

8	7	6	5	4	3	2	1	
Length of tsnStreamIdParameters contents								octet 17
tsnCpeSmacVlanDownSrcMac value								octet 18
								octet 23
tsnCpeSmacVlanDownTagged value								octet 24
tsnCpeSmacVlanDownVlan value								octet 25
								octet 26

Figure 9.8.4: tsnStreamIdParameters for tsnStreamIdIdentificationType = 00-80-C2 02

8	7	6	5	4	3	2	1	
Length of tsnStreamIdParameters contents								octet 17
tsnCpeDmacVlanDownDestMac value								octet 18
								octet 23
tsnCpeDmacVlanDownTagged value								octet 24
tsnCpeDmacVlanDownVlan value								octet 25
								octet 26
tsnCpeDmacVlanDownPriority value								octet 27
tsnCpeDmacVlanUpDestMac value								octet 28
								octet 33
tsnCpeDmacVlanUpTagged value								octet 34
tsnCpeDmacVlanUpVlan value								octet 35
								octet 36
tsnCpeDmacVlanUpPriority value								octet 37

Figure 9.8.5: tsnStreamIdParameters for tsnStreamIdIdentificationType = 00-80-C2 03

Table 9.8.1: Stream filter instance table

Value part of the Stream filter instance table information element (octets 4 to o)
Stream filter instance table contents (octets 4 to o)
This field consists of zero or more Stream filter instances.
Stream filter instance (octets 4 to m)
Length of Stream filter instance contents (octet 4)
Length of Stream filter instance contents contains the length of the value part of Stream filter instance in octets.
PrioritySpec value (octets 5to 8)
PrioritySpec value contains the value of PrioritySpec as specified in IEEE Std 802.1Q [7] table 12-32.

StreamGateInstanceID value (octets 9 to 12)

StreamGateInstanceID value contains the value of StreamGateInstanceID as specified in IEEE Std 802.1Q [7] table 12-32.

tsnStreamIdIdentificationType value (octets 13 to 16)

tsnStreamIdIdentificationType value contains the value of tsnStreamIdIdentificationType in the form of four octets as specified in IEEE Std 802.1CB [10] clause 9.1.1.6. The first 3 octets contain the binary encoding of Organizationally Unique Identifier (OUI) or Company ID (CID). The 4th octet contains the binary encoded value of type number. In this document only OUI/CID value 00-80-C2 with type number value 1, 2 and 3 are specified. Other type number values are reserved. Other OUI/CID values are outside the scope of the present document.

tsnStreamIdParameters (octets 17 to m-4)

Length of tsnStreamIdParameters (octet 17)

Length of tsnStreamIdParameters contents contains the length of the value part of tsnStreamIdParameters in octets.

tsnCpeNullDownDestMac value (octets 18 to 23)

tsnCpeNullDownDestMac value contains the value of tsnCpeNullDownDestMac as specified in IEEE Std 802.1CB [10] clause 9.1.2.1.

tsnCpeNullDownTagged value (octet 24)

tsnCpeNullDownTagged value contains an enumerated value of tsnCpeNullDownTagged as specified in IEEE Std 802.1CB [10] clause 9.1.2.2 in the form of a binary encoded octet. Value "tagged" is encoded as binary 0, value "priority" is encoded as binary 1, and value "all" is encoded as binary 2. All other values are reserved.

tsnCpeNullDownVlan value (octets 25 to 26)

tsnCpeNullDownVlan value contains the value of tsnCpeNullDownVlan as specified in IEEE Std 802.1CB [10] clause 9.1.2.3.

tsnCpeSmacVlanDownSrcMac value (octets 18 to 23)

tsnCpeSmacVlanDownSrcMac value contains the value of tsnCpeSmacVlanDownSrcMac as specified in IEEE Std 802.1CB [10] clause 9.1.3.1.
tsnCpeSmacVlanDownTagged value (octet 24)

tsnCpeSmacVlanDownTagged value contains an enumerated value of tsnCpeSmacVlanDownTagged as specified in IEEE Std 802.1CB [10] clause 9.1.3.2 in the form of a binary encoded octet. Value "tagged" is encoded as binary 0, value "priority" is encoded as binary 1, and value "all" is encoded as binary 2. All other values are reserved.

tsnCpeSmacVlanDownVlan value (octets 25 to 26)

tsnCpeSmacVlanDownVlan value contains the value of tsnCpeSmacVlanDownVlan as specified in IEEE Std 802.1CB [10] clause 9.1.3.3.

tsnCpeDmacVlanDownDestMac value (octets 18 to 23)

tsnCpeDmacVlanDownDestMac value contains the value of tsnCpeDmacVlanDownDestMac as specified in IEEE Std 802.1CB [10] clause 9.1.4.1.

tsnCpeDmacVlanDownTagged value (octet 24)

tsnCpeDmacVlanDownTagged value contains an enumerated value of tsnCpeDmacVlanDownTagged as specified in IEEE Std 802.1CB [10] clause 9.1.4.2 in the form of a binary encoded octet. Value "tagged" is encoded as binary 0, value

"priority" is encoded as binary 1, and value "all" is encoded as binary 2. All other values are reserved.

tsnCpeDmacVlanDownVlan value (octets 25 to 26)

tsnCpeDmacVlanDownVlan value contains the value of tsnCpeDmacVlanDownVlan as specified in IEEE Std 802.1CB [10] clause 9.1.4.3.

tsnCpeDmacVlanDownPriority value (octet 27)

tsnCpeDmacVlanDownPriority value contains the value of tsnCpeDmacVlanDownPriority as specified in IEEE Std 802.1CB [10] clause 9.1.4.4.

tsnCpeDmacVlanUpDestMac value (octets 28 to 33)

tsnCpeDmacVlanUpDestMac value contains the value of tsnCpeDmacVlanUpDestMac as specified in IEEE Std 802.1CB [10] clause 9.1.4.5.

tsnCpeDmacVlanUpTagged value (octet 34)

tsnCpeDmacVlanUpTagged value contains an enumerated value of tsnCpeDmacVlanUpTagged as specified in IEEE Std 802.1CB [10] clause 9.1.4.6 in the form of a binary encoded octet. Value "tagged" is encoded as binary 0, value "priority" is encoded as binary 1, and value "all" is encoded as binary 2. All other values are reserved.

tsnCpeDmacVlanUpVlan value (octets 35 to 36)

tsnCpeDmacVlanUpVlan value contains the value of tsnCpeDmacVlanUpVlan as specified in IEEE Std 802.1CB [10] clause 9.1.4.7.

tsnCpeDmacVlanUpPriority value (octet 37)

tsnCpeDmacVlanUpPriority value contains the value of tsnCpeDmacVlanUpPriority as specified in IEEE Std 802.1CB [10] clause 9.1.4.8.

StreamFilterInstanceIndex value (octet m-3 to m)

StreamFilterInstanceIndex value contains the value of StreamFilterInstance as specified in IEEE Std 802.1Q [7] table 12-32.

NOTE 1: A sender compliant with this release of the specification shall include the StreamFilterInstanceIndex value in the Stream filter instance of the Stream filter instance table information element. A sender compliant with earlier versions of this specification does not include the StreamFilterInstanceIndex value in the Stream filter instance of the Stream filter instance table information element.

NOTE 2: When Stream filter instance table is received in a port management list and associated with operation code "delete parameter-entry" then PrioritySpec value, StreamGateInstanceID value, tsnStreamIdIdentificationType value and tsnStreamIdParameters are ignored by the receiver.

9.9 Stream gate instance table

The purpose of the Stream gate instance table information element is to convey a Stream gate instance table as defined in 3GPP TS 23.501 [2] table K.1-1.

The Stream gate instance table information element is coded as shown in figure 9.9.1, figure 9.9.2, and table 9.9.1.

The Stream gate instance table is a type 6 information element with a minimum length of 3 octets.

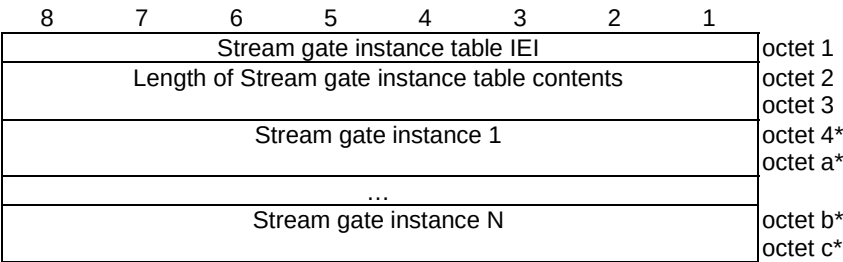


Figure 9.9.1: Stream gate instance table information element

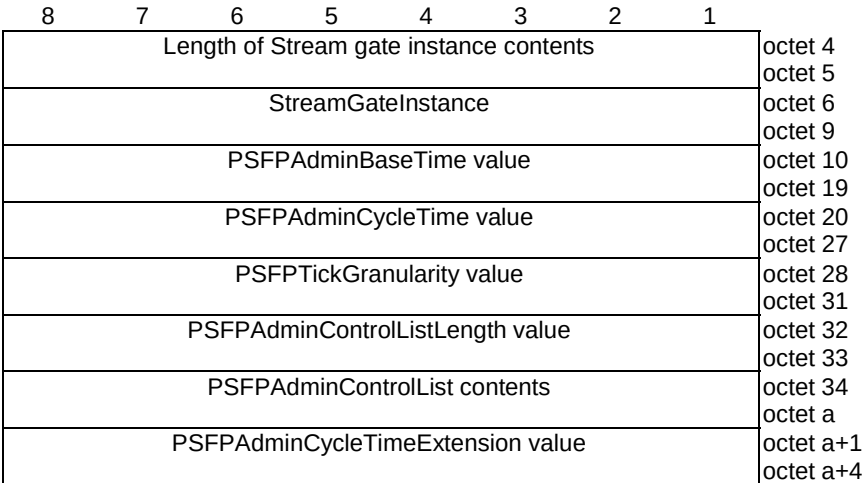


Figure 9.9.2: Stream gate instance

Table 9.9.1: Stream gate instance table

Value part of the Stream gate instance table information element (octets 4 to c)
Stream gate instance table contents (octets 4 to c)
This field consists of zero or more Stream gate instances.
Stream gate instance (octets 4 to a)
Length of Stream gate instance (octets 4 to 5)
Length of Stream gate instance contents contains the length of the value part of Stream gate instance in octets.
StreamGateIndexInstance value (octets 6 to 9)
StreamGateIndexInstance value contains the value of StreamGateIndexInstance as specified in IEEE Std 802.1Q [7] table 12-33.
PSFPAdminBaseTime value (octets 10 to 19)
PSFPAdminBaseTime value contains the value of PSFPAdminBaseTime as specified in IEEE Std 802.1Q [7] table 12-33.
PSFPAdminCycleTime value (octets 20 to 27)
PSFPAdminCycleTime value contains the value of PSFPAdminCycleTime as specified in IEEE Std 802.1Q [7] table 12-33.
PSFPTickGranularity value (octets 28 to 31)
PSFPTickGranularity value contains the value of PSFPTickGranularity as specified in IEEE Std 802.1Q [7] table 12-33.
PSFPAdminControlListLength value (octets 32 to 33)
PSFPAdminControlListLength value contains the value of PSFPAdminControlListLength as specified in IEEE Std 802.1Q [7] table 12-33 and is encoded as ieee8021PSFPAdminControlListLength object in IEEE Std 802.1Q [7] clause 17.7.24.
PSFPAdminControlList contents (octets 34 to a)
This field contains the concatenation of entries as specified in IEEE Std 802.1Q [7] table 12-33. PSFPAdminControlList is encoded as ieee8021PSFPAdminControlList object in IEEE Std 802.1Q [7] clause 17.7.24. PSFPAdminControlListLength value indicates the number of entries in this field.
PSFPAdminCycleTimeExtension value (octets a+1 to a+4)
PSFPAdminCycleTimeExtension value contains the value of PSFPAdminCycleTimeExtension as specified in IEEE Std 802.1Q [7] table 12-33.
NOTE: When Stream gate instance table is received in a port management list and associated with operation code "delete parameter-entry" then PSFPAdminBaseTime value, PSFPAdminCycleTime value, PSFPTickGranularity value and PSFPAdminControlList contents are ignored by the receiver.

9.10 DS-TT port neighbor discovery configuration for DS-TT ports

The purpose of the DS-TT port neighbor discovery configuration for DS-TT ports information element is to convey DS-TT port neighbor discovery configuration for DS-TT ports as defined in 3GPP TS 23.501 [2] table K.1-2.

The DS-TT port neighbor discovery configuration for DS-TT ports information element is coded as shown in figure 9.10.1, figure 9.10.2 and table 9.10.1.

The DS-TT port neighbor discovery configuration for DS-TT ports information element has a minimum length of 3 octets.

8	7	6	5	4	3	2	1	
DS-TT port neighbor discovery configuration for DS-TT ports IEI								octet 1
Length of DS-TT port neighbor discovery configuration for DS-TT ports contents								octet 2
								octet 3
DS-TT port neighbor discovery configuration for DS-TT ports instance 1								octet 4*
								octet x*
...								
DS-TT port neighbor discovery configuration for DS-TT ports instance n								octet y*
								octet z*

Figure 9.10.1: DS-TT port neighbor discovery configuration for DS-TT ports information element

8	7	6	5	4	3	2	1	
Length of DS-TT port neighbor discovery configuration for DS-TT ports instance								octet 4
								octet 5
DS-TT port number value								octet 6
								octet 7
IldpV2LocPortIdSubtype value								octet 8
Length of IldpV2LocPortId value								octet 9
IldpV2LocPortId value								octet 10
								octet a
0 Spare	0 Spare	0 Spare	0 Spare	0 Spare	0 Spare	IldpLoc ManAddr list included	IldpLoc SysCap included	octet (a+1)*
								octet (a+2)*
IldpLocSysCap								octet (a+5)*
								octet e*
IldpLocManAddr list								octet x*

Figure 9.10.2: DS-TT port neighbor discovery configuration for DS-TT ports instance

8	7	6	5	4	3	2	1	
System capabilities								octet a+2
								octet a+3
Enabled capabilities								octet a+4
								octet a+5

Figure 9.10.3: IldpLocSysCap

8	7	6	5	4	3	2	1	
Length of IldpLocManAddr list								octet e
								octet e+1
IldpLocManAddr 1								octet e+2
								octet b
...								
								octet c*
IldpLocManAddr N								octet x*

Figure 9.10.4: IldpLocManAddr list

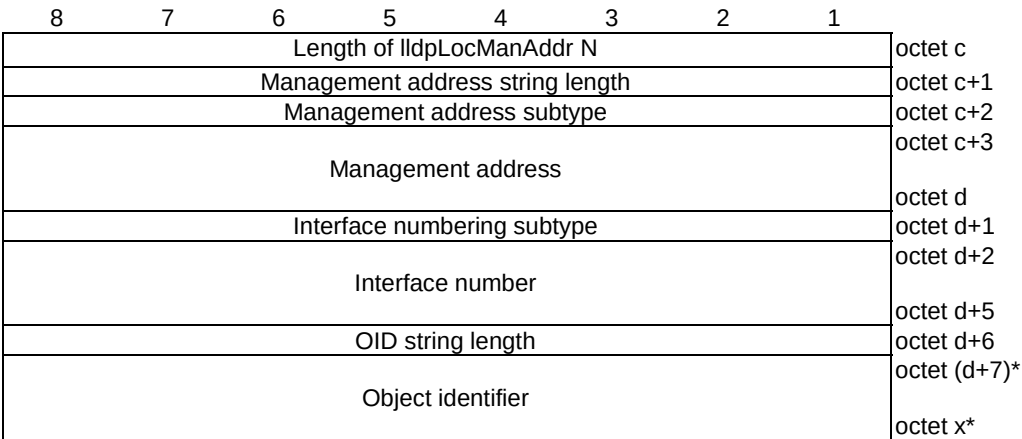


Figure 9.10.5: IldpLocManAddr N

Table 9.10.1: DS-TT port neighbor discovery configuration for DS-TT ports

Value part of the DS-TT port neighbor discovery configuration for DS-TT ports information element (octets 4 to z)
DS-TT port neighbor discovery configuration for DS-TT ports contents (octets 4 to z) This field consists of zero or more DS-TT port neighbor discovery configuration for DS-TT ports instances.
DS-TT port neighbor discovery configuration for DS-TT ports instance (octets 4 to x)
Length of DS-TT port neighbor discovery configuration for DS-TT ports instance (octets 4 to 5) Length of DS-TT port neighbor discovery configuration for DS-TT ports instance contains the length of the value part of DS-TT port neighbor discovery configuration for DS-TT ports instance in octets.
DS-TT port number value (octets 6 to 7) DS-TT port number value contains the value of Port Number as specified in IEEE Std 802.1Q [7].
IldpV2LocPortIdSubtype value (octet 8) IldpV2LocPortIdSubtype value contains the value of IldpV2LocPortIdSubtype as specified in IEEE Std 802.1AB [6] clause 8.5.3.2.
Length of IldpV2LocPortId value (octet 9) Length of IldpV2LocPortId value contains the binary coded length in octets of IldpV2LocPortId value.
IldpV2LocPortId value (octets 10 to a) IldpV2LocPortId value contains the value of IldpV2LocPortId in the form of an octet string as specified in IEEE Std 802.1AB [6] clause 8.5.3.3.
IldpLocSysCap included (bit 1 of octet a+1) Bit 1 0 IldpLocSysCap is not included 1 IldpLocSysCap is included
IldpLocManAddr list included (bit 2 of octet a+1) Bit 2 0 IldpLocManAddr list is not included 1 IldpLocManAddr list is included
System capabilities (octets a+2 to a+3) The field contains a bitmap of capabilities as specified in IEEE Std 802.1AB [6] clause 8.5.8.1.
Enhanced capabilities (octets a+4 to a+5) The field contains a bitmap of capabilities as specified in IEEE Std 802.1AB [6] clause 8.5.8.2.
Length of IldpLocManAddr list (octets e to e+1)
Length of IldpLocManAddr N (octet c)
Management address string length (octet c+1) The field contains the length of the management address subtype field and management address field as specified in IEEE Std 802.1AB [6] clause 8.5.9.2.
Management address subtype (octet c+2) The field contains an integer value indicating the type of address that is listed in the management address field as specified in IEEE Std 802.1AB [6] clause 8.5.9.3.
Management address (octets c+3 to d) The field contains a management address as specified in IEEE Std 802.1AB [6] clause 8.5.9.4.
Interface numbering subtype (octet d+1) The field contains an integer value indicating the numbering method used for defining the interface number as specified in IEEE Std 802.1AB [6] clause 8.5.9.5.

Interface number (octets d+2 to d+5) The field contains an assigned number within the system that identifies the specific interface associated with the management address in the management address field as specified in IEEE Std 802.1AB [6] clause 8.5.9.6.
OID string length (octet d+6) The field contains the length of the object identifier field as specified in IEEE Std 802.1AB [6] clause 8.5.9.7.
Object identifier (octets d+7 to x) The field contains an object identifier as specified in IEEE Std 802.1AB [6] clause 8.5.9.8. The field shall not be present if the OID string length field indicates the value of 0.
NOTE 1: When DS-TT port neighbor discovery configuration for DS-TT ports is received in a user plane node management list and associated with operation code "delete parameter-entry" then lldpV2LocPortIdSubtype value, and lldpV2LocPortId value are ignored by the receiver.
NOTE 2: Octet a+1 shall be present if the value of Length of DS-TT port neighbor discovery configuration for DS-TT ports instance is greater than {(the value of Length of lldpV2LocPortId value) + 4}.

9.11 Discovered neighbor information for DS-TT ports

The purpose of the Discovered neighbor information for DS-TT ports information element is to convey Discovered neighbor information for DS-TT ports as defined in 3GPP TS 23.501 [2] table K.1-2.

The Discovered neighbor information for DS-TT ports information element is coded as shown in figure 9.11.1, figure 9.11.2 and table 9.11.1.

The Neighbor discovery information information element has a minimum length of 3 octets.

8	7	6	5	4	3	2	1	
Discovered neighbor information for DS-TT ports IEI								octet 1
Length of Discovered neighbor information for DS-TT ports contents								octet 2
Discovered neighbor information for DS-TT ports instance 1								octet 3
								octet 4*
...								octet x*
Discovered neighbor information for DS-TT ports instance n								octet y*
								octet z*

Figure 9.11.1: Discovered neighbor information for DS-TT ports information element

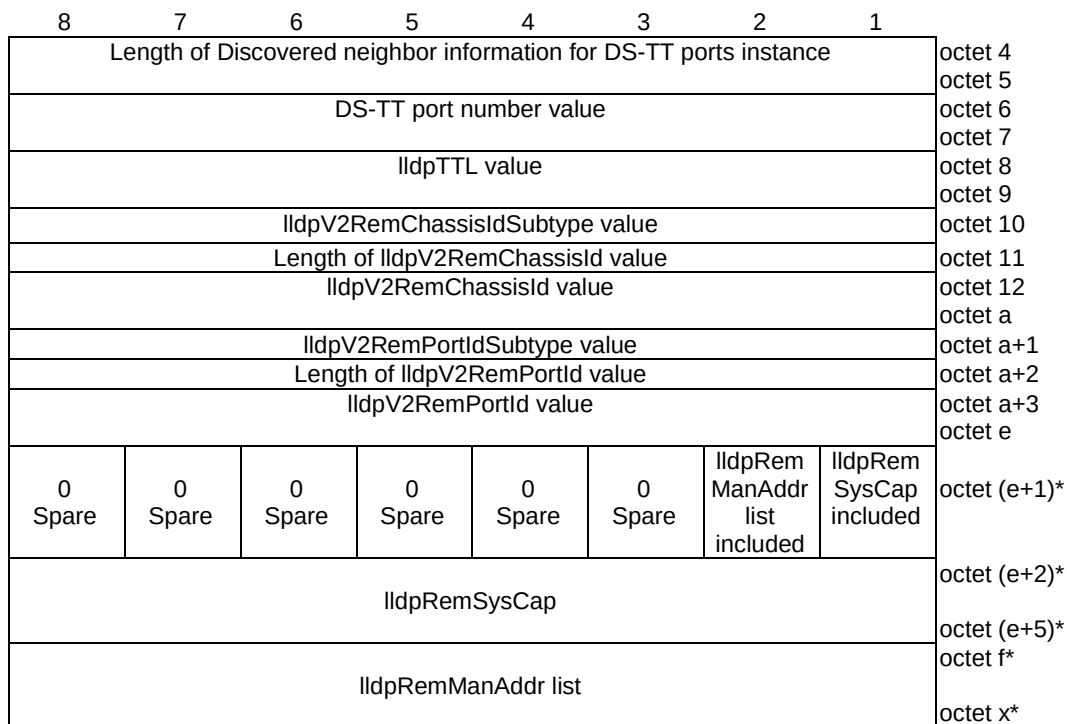


Figure 9.11.2: Discovered neighbor information for DS-TT ports instance

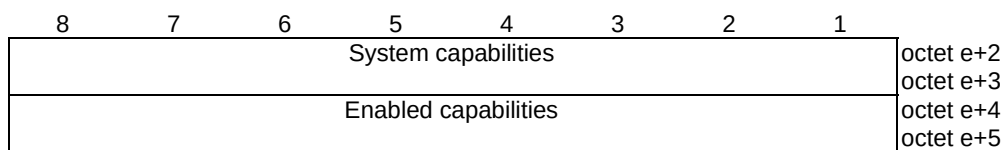


Figure 9.11.3: lldpRemSysCap

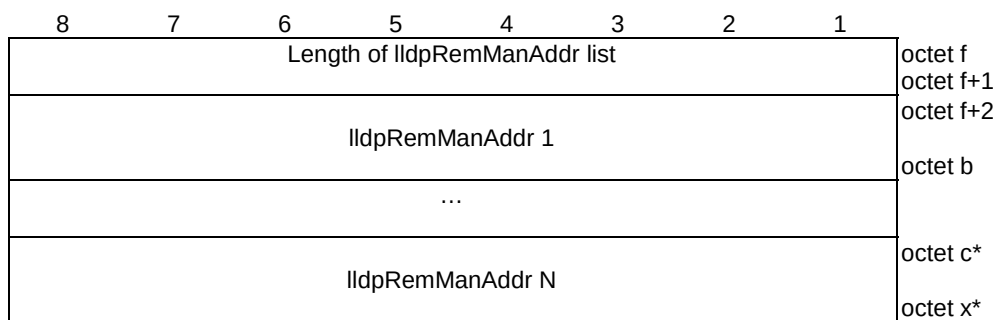


Figure 9.11.4: lldpRemManAddr list

8	7	6	5	4	3	2	1	
Length of IldpRemManAddr N								octet c
Management address string length								octet c+1
Management address subtype								octet c+2
Management address								octet c+3
Interface numbering subtype								octet d
Interface number								octet d+1
OID string length								octet d+2
OID string length								octet d+5
OID string length								octet d+6
Object identifier								octet (d+7)*
Object identifier								octet x*

Figure 9.11.5: IldpRemManAddr N

Table 9.11.1: Discovered neighbor information for DS-TT ports

Value part of the Discovered neighbor information for DS-TT ports information element (octets 4 to z)

Neighbor discovery information contents (octets 4 to z)

This field consists of zero or more Neighbor discovery information instances.

Neighbor discovery information instance (octets 4 to x)

Length of Discovered neighbor information for DS-TT ports instance (octets 4 to 5)

Length of Discovered neighbor information for DS-TT ports instance contains the length of the value part of Discovered neighbor information for DS-TT ports instance in octets.

DS-TT port number value (octets 6 to 7)

DS-TT port number value contains the value of Port Number as specified in IEEE Std 802.1Q [7].

IldpTTL value (octets 8 to 9)

IldpTTL value contains the value of TTL as specified in IEEE Std 802.1AB [6] clause 8.5.4.

IldpV2RemChassisIdSubtype value (octet 10)

IldpV2RemChassisIdSubtype value contains the value of IldpV2RemChassisIdSubtype as specified in IEEE Std 802.1AB [6] clause 8.5.2.2.

Length of IldpV2RemChassisId value (octet 11)

Length of IldpV2RemChassisId value contains the binary coded length in octets of IldpV2RemChassisId value.

IldpV2RemChassisId value (octets 12 to a)

IldpV2RemChassisId value contains the value of IldpV2RemChassisId in the form of an octet string as specified in IEEE Std 802.1AB [6] clause 8.5.2.3.

IldpV2RemPortIdSubtype value (octet a+1)

IldpV2RemPortIdSubtype value contains the value of IldpV2RemPortIdSubtype as specified in IEEE Std 802.1AB [6] clause 8.5.3.2.

Length of IldpV2RemPortId value (octet a+2)

Length of IldpV2RemPortId value contains the binary coded length in octets of IldpV2RemPortId value.

IldpV2RemPortId value (octets a+3 to x)

IldpV2RemPortId value contains the value of IldpV2RemPortId in the form of an octet string as specified in IEEE Std 802.1AB [6] clause 8.5.3.3.

IldpRemSysCap included (bit 1 of octet e+1)

Bit

1

0 IldpRemSysCap is not included

1 IldpRemSysCap is included

IldpRemManAddr list included (bit 2 of octet e+1)

Bit

2

0 IldpRemManAddr list is not included

1 IldpRemManAddr list is included

System capabilities (octets e+2 to e+3)

The field contains a bitmap of capabilities as specified in IEEE Std 802.1AB [6] clause 8.5.8.1.

Enhanced capabilities (octets e+4 to e+5)

The field contains a bitmap of capabilities as specified in IEEE Std 802.1AB [6] clause 8.5.8.2.

Length of IldpRemManAddr list (octets f to f+1)

Length of IldpRemManAddr N (octet c)

Management address string length (octet c+1)

The field contains the length of the management address subtype field and management address field as specified in IEEE Std 802.1AB [6] clause 8.5.9.2.

Management address subtype (octet c+2) The field contains an integer value indicating the type of address that is listed in the management address field as specified in IEEE Std 802.1AB [6] clause 8.5.9.3.
Management address (octets c+3 to d) The field contains a management address as specified in IEEE Std 802.1AB [6] clause 8.5.9.4.
Interface numbering subtype (octet d+1) The field contains an integer value indicating the numbering method used for defining the interface number as specified in IEEE Std 802.1AB [6] clause 8.5.9.5.
Interface number (octets d+2 to d+5) The field contains an assigned number within the system that identifies the specific interface associated with the management address in the management address field as specified in IEEE Std 802.1AB [6] clause 8.5.9.6.
OID string length (octet d+6) The field contains the length of the object identifier field as specified in IEEE Std 802.1AB [6] clause 8.5.9.7.
Object identifier (octets d+7 to x) The field contains an object identifier as specified in IEEE Std 802.1AB [6] clause 8.5.9.8. The field shall not be present if the OID string length field indicates the value of 0.
NOTE: Octet e+1 shall be present if the value of Length of Length of Discovered neighbor information for DS-TT ports instance is greater than {(the value of Length of IldpV2RemChassisId value) + (the value of Length of IldpV2RemPortId value) + 8}.

9.12 Void

9.13 Void

9.14 NW-TT port numbers

The purpose of the NW-TT port numbers information element is to convey NW-TT port numbers as defined in 3GPP TS 23.501 [2] table K.1-2.

The NW-TT port numbers information element is coded as shown in figure 9.14.1 and table 9.14.1.

The NW-TT port numbers information element has a minimum length of 3 octets.

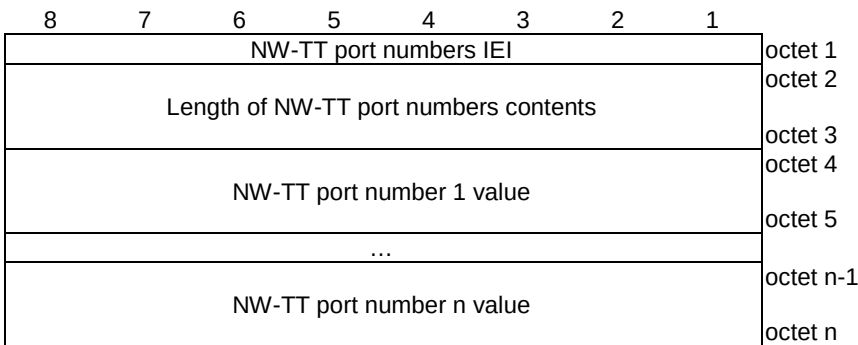


Figure 9.14.1: NW-TT port numbers information element

Table 9.14.1: NW-TT port numbers

Value part of the NW-TT port numbers information element (octets 4 to n)
NW-TT port numbers contents (octets 4 to n)
This field consists of zero or more NW-TT port numbers.
NW-TT port number (octets 4 to 5)
NW-TT port number value contains the value of Port Number as specified in IEEE Std 802.1Q [7].

9.15 PTP instance list

The purpose of the PTP instance list information element is to convey a list of PTP instances as defined 3GPP TS 23.501 [2] table K.1-1 and table K.1-2.

The PTP instance list information element is coded as shown in figure 9.15.1, figure 9.15.2, figure 9.15.3, figure 9.15.4, and table 9.15.1.

The PTP instance list is a type 6 information element with a minimum length of 3 octets.

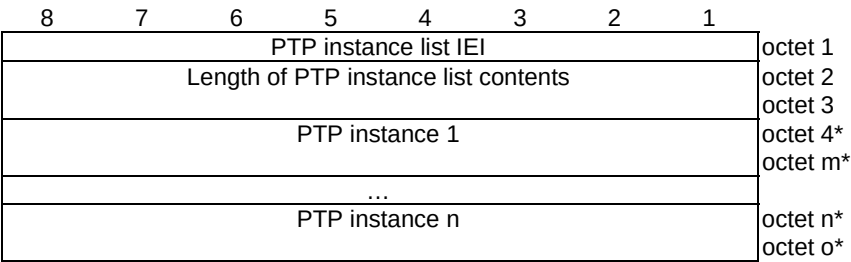


Figure 9.15.1: PTP instance list information element

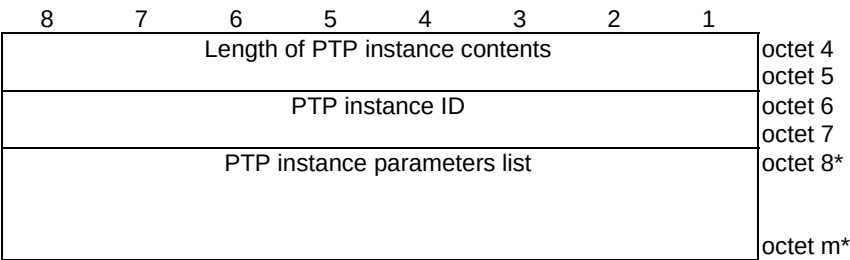


Figure 9.15.2: PTP instance

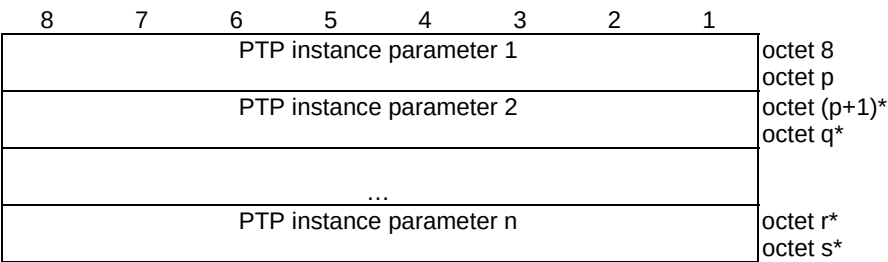


Figure 9.15.3: PTP instance parameters list

8	7	6	5	4	3	2	1	
PTP instance parameter name								octet 8
Length of PTP instance parameter								octet 9
PTP instance parameter value								octet 10
								octet 11
								octet t

Figure 9.15.4: PTP instance parameter

Table 9.15.1: PTP instance list

Value part of the PTP instance list information element (octets 4 to o)

PTP instance list contents (octets 4 to o) (NOTE 6, NOTE 7, NOTE 8)

This field consists of zero or more PTP instances.

PTP instance (octets 4 to m)

Length of PTP instance contents (octets 4 to 5)

Length of PTP instance contents contains the length of the value part of PTP instance in octets.

PTP instance ID value (octets 6 to 7)

PTP instance ID value contains the binary encoding of the value of the identifier for the PTP instance.

PTP instance parameter name (octets 8 to 9) (NOTE 1, NOTE 2, NOTE 3, NOTE 4)

This field contains the name of the PTP instance parameter, encoded as follows:

- 0000H Reserved;
- 0001H PTP profile
- 0002H Transport type
- 0003H Grandmaster enabled
- 0004H Grandmaster on behalf of DS-TT enabled
- 0005H Grandmaster candidate enabled
- 0006H defaultDS.clockIdentity
- 0007H defaultDS.clockQuality.clockClass
- 0008H defaultDS.clockQuality.clockAccuracy
- 0009H defaultDS.clockQuality.offsetScaledLogVariance
- 000AH defaultDS.priority1
- 000BH defaultDS.priority2
- 000CH defaultDS.domainNumber
- 000DH defaultDS.sdId
- 000EH defaultDS.instanceEnable
- 000FH defaultDS.externalPortConfigurationEnabled
- 0010H defaultDS.instanceType
- 0011H portDS.portIdentity
- 0012H portDS.portState
- 0013H portDS.logMinDelayReqInterval
- 0014H portDS.logAnnounceInterval
- 0015H portDS.announceReceiptTimeout
- 0016H portDS.logSyncInterval
- 0017H portDS.delayMechanism
- 0018H portDS.logMinPdelayReqInterval
- 0019H portDS.versionNumber
- 001AH portDS.minorVersionNumber
- 001BH portDS.delayAssymetry
- 001CH portDS.portEnable
- 001DH timePropertiesDS.currentUtcOffset
- 001EH timePropertiesDS.timeSource
- 001FH externalPortConfigurationPortDS.desiredState
- 0020H defaultDS.timeSource
- 0021H portDS.ptpPortEnabled
- 0022H portDS.isMeasuringDelay
- 0023H portDS.asCapable
- 0024H portDS.meanLinkDelay
- 0025H portDS.meanLinkDelayThresh
- 0026H portDS.neighborRateRatio
- 0027H portDS.initialLogAnnounceInterval
- 0028H portDS.currentLogAnnounceInterval
- 0029H portDS.useMgtSettableLogAnnounceInterval
- 002AH portDS.mgtSettableLogAnnounceInterval
- 002BH portDS.initialLogSyncInterval
- 002CH portDS.currentLogSyncInterval
- 002DH portDS.useMgtSettableLogSyncInterval
- 002EH portDS.mgtSettableLogSyncInterval
- 002FH portDS.syncReceiptTimeout
- 0030H portDS.syncReceiptTimeoutTimeInterval
- 0031H portDS.initialLogPdelayReqInterval
- 0032H portDS.currentLogPdelayReqInterval
- 0033H portDS.useMgtSettableLogPdelayReqInterval
- 0034H portDS.mgtSettableLogPdelayReqInterval
- 0035H portDS.initialLogGtpCapableMessageInterval
- 0036H portDS.currentLogGtpCapableMessageInterval
- 0037H portDS.useMgtSettableLogGtpCapableMessageInterval
- 0038H portDS.mgtSettableLogGtpCapableMessageInterval
- 0039H portDS.initialComputeNeighborRateRatio
- 003AH portDS.currentComputeNeighborRateRatio
- 003BH portDS.useMgtSettableComputeNeighborRateRatio
- 003CH portDS.mgtSettableComputeNeighborRateRatio
- 003DH portDS.initialComputeMeanLinkDelay
- 003EH portDS.currentComputeMeanLinkDelay

- 003FH portDS.useMgtSettableComputeMeanLinkDelay
- 0040H portDS.mgtSettableComputeMeanLinkDelay
- 0041H portDS.allowedLostResponses
- 0042H portDS.allowedFaults
- 0043H portDS.gPtpCapableReceiptTimeout
- 0044H portDS.nup
- 0045H portDS.ndown
- 0046H portDS.oneStepTxOper
- 0047H portDS.oneStepReceive
- 0048H portDS.oneStepTransmit
- 0049H portDS.initialOneStepTxOper
- 004AH portDS.currentOneStepTxOper
- 004BH portDS.useMgtSettableOneStepTxOper
- 004CH portDS.mgtSettableOneStepTxOper
- 004DH portDS.syncLocked
- 004EH portDS.pdelayTruncatedTimestampsArray

- 004FH
- to Spare
- FFFFH

PTP instance parameter value (octets 11 to t)

This field contains the value of the PTP instance parameter.

When the PTP instance parameter name indicates PTP profile, the PTP instance parameter value field indicates the PTP profile's profileName, with the "SMPTE Profile for Use of IEEE-1588 Precision Time Protocol in Professional Broadcast Applications" as defined in ST 2059-2:2015 [13] encoded as "00000000", the "IEEE 802.1AS PTP profile for transport of timing" profile as defined in IEEE Std 802.1AS-2020 [12] encoded as "00000001", the "Default delay request-response profile" as defined in IEEE Std 1588-2019 [11] clause I.3 encoded as "00000010", the "Default delay peer-to-peer delay profile" as defined in IEEE Std 1588-2019 [11] clause I.4 encoded as "00000011" and the "High Accuracy Delay Request-Response Default PTP profile" as defined in IEEE Std 1588-2019 [11] clause I.5 encoded as "00000100". The length of PTP instance parameter value field indicates a value of 1.

When the PTP instance parameter name indicates Transport type, the PTP instance parameter value field indicates the transport type to use as defined in 3GPP TS 23.501 [2] clause 5.28.3.1, with transport type "IPv4" encoded as "00000000", transport type "IPv6" encoded as "00000001" and transport type "Ethernet" encoded as "00000010". The length of PTP instance parameter value field indicates a value of 1.

When the PTP instance parameter name indicates Grandmaster enabled as defined in 3GPP TS 23.501 [2] clause 5.28.3.1, the PTP instance parameter value field indicates whether to act as a PTP grandmaster, with "Do not act as grandmaster" encoded as "00000000" and "Act as grandmaster" encoded as "00000001". The length of PTP instance parameter value field indicates a value of 1.

When the PTP instance parameter name indicates Grandmaster on behalf of DS-TT enabled as defined in 3GPP TS 23.501 [2] clause 5.28.3.1, the PTP instance parameter value field indicates whether to act as grandmaster on behalf of a DS-TT port or not if 5GS is determined to be the grandmaster clock, with "Do not act as grandmaster" encoded as "00000000" and "Act as grandmaster" encoded as "00000001". The length of PTP instance parameter value field indicates a value of 1.

When the PTP instance parameter name indicates Grandmaster candidate enabled as defined in 3GPP TS 23.501 [2] clause 5.28.3.1, the PTP instance parameter value field indicates whether a PTP instance of a NW-TT is a grandmaster candidate, with a Boolean value of FALSE encoded as "00000000" and a Boolean value of TRUE encoded as "00000001". The length of PTP instance parameter value field indicates a value of 1.

When the PTP instance parameter name indicates defaultDS.clockIdentity, the PTP instance parameter value field contains the defaultDS.clockIdentity as specified in IEEE Std 1588-2019 [11] clause 8.2.1.2.2 and in IEEE Std 802.1AS-2020 [12] clause 14.2.2. The length of PTP instance parameter value field indicates a value of 8.

When the PTP instance parameter name indicates defaultDS.clockQuality.clockClass, the PTP instance parameter value field contains the defaultDS.clockQuality.clockClass as

specified in IEEE Std 1588-2019 [11] clause 8.2.1.3.1.2 and in IEEE Std 802.1AS [12] clause 14.2.4.2. The length of PTP instance parameter value field indicates a value of 1.

When the PTP instance parameter name indicates defaultDS.clockQuality.clockAccuracy, the PTP instance parameter value field contains the defaultDS.clockQuality.clockAccuracy as specified in IEEE Std 1588-2019 [11] clause 8.2.1.3.1.3 and in IEEE Std 802.1AS [12] clause 14.2.4.3. The length of PTP instance parameter value field indicates a value of 1.

When the PTP instance parameter name indicates defaultDS.clockQuality.offsetScaledLogVariance, the PTP instance parameter value field contains the defaultDS.clockQuality.offsetScaledLogVariance as specified in IEEE Std 1588-2019 [11] clause 8.2.1.3.1.4 and in IEEE Std 802.1AS [12] clause 14.2.4.4. The length of PTP instance parameter value field indicates a value of 4.

When the PTP instance parameter name indicates defaultDS.priority1, the PTP instance parameter value field contains the defaultDS.priority1 as specified in IEEE Std 1588-2019 [11] clause 8.2.1.4.1 and in IEEE Std 802.1AS [12] clause 14.2.5. The length of PTP instance parameter value field indicates a value of 4.

When the PTP instance parameter name indicates defaultDS.priority2, the PTP instance parameter value field contains the defaultDS.priority2 as specified in IEEE Std 1588-2019 [11] clause 8.2.1.4.2 and in IEEE Std 802.1AS [12] clause 14.2.6. The length of PTP instance parameter value field indicates a value of 4.

When the PTP instance parameter name indicates defaultDS.domainNumber, the PTP instance parameter value field contains the defaultDS.domainNumber as specified in IEEE Std 1588-2019 [11] clause 8.2.1.4.3 and in IEEE Std 802.1AS [12] clause 14.2.16. The length of PTP instance parameter value field indicates a value of 4.

When the PTP instance parameter name indicates defaultDS.sdold, the PTP instance parameter value field contains the defaultDS.sdold as specified in IEEE Std 1588-2019 [11] clause 8.2.1.4.5 and in IEEE Std 802.1AS [12] clause 14.2.4.3. The length of PTP instance parameter value field indicates a value of 4.

When the PTP instance parameter name indicates defaultDS.instanceEnable, the PTP instance parameter value field contains the defaultDS.instanceEnable as specified in IEEE Std 1588-2019 [11] clause 8.2.1.5.2 and in IEEE Std 802.1AS [12] clause 14.2.19, with a value of FALSE encoded as "00000000" and a value of TRUE encoded as "00000001". The length of PTP instance parameter value field indicates a value of 1.

When the PTP instance parameter name indicates defaultDS.externalPortConfigurationEnabled, the PTP instance parameter value field contains the defaultDS.externalPortConfigurationEnabled as specified in IEEE Std 1588-2019 [11] clause 8.2.1.5.3 and in IEEE Std 802.1AS [12] clause 14.2.18, with a value of FALSE encoded as "00000000" and a value of TRUE encoded as "00000001". The length of PTP instance parameter value field indicates a value of 1.

When the PTP instance parameter name indicates defaultDS.instanceType, the PTP instance parameter value field contains the defaultDS.instanceType as specified in IEEE Std 1588-2019 [11] clause 8.2.1.5.5. The length of PTP instance parameter value field indicates a value of 1. If this PTP instance parameter is received for a PTP instance with PTP profile set to "IEEE 802.1AS PTP profile for transport of timing", the receiver shall ignore the PTP instance parameter.

When the PTP instance parameter name indicates portDS.portIdentity, the PTP instance parameter value field contains the portDS.portIdentity as specified in IEEE Std 1588-2019 [11] clause 8.2.15.2.1 and in IEEE Std 802.1AS [12] clause 14.8.2. The length of PTP instance parameter value field indicates a value of 10. It contains clockIdentity (octets 1 to 8) and portNumber (octets 9 and 10) attributes. The clockIdentity is encoded as an array of eight unsigned octets. The portNumber is encoded as an unsigned sixteen-bit long integer.

When the PTP instance parameter name indicates portDS.portState, the PTP instance parameter value field contains the portDS.portState as specified in IEEE Std 1588-2019 [11] clause 8.2.15.3.1 and in IEEE Std 802.1AS [12] clause 14.8.3. The length of PTP instance parameter value field indicates a value of 1.

When the PTP instance parameter name indicates portDS.logMinDelayReqInterval, the PTP instance parameter value field contains the portDS.logMinDelayReqInterval as

specified in IEEE Std 1588-2019 [11] clause 8.2.15.3.2. The length of PTP instance parameter value field indicates a value of 1. If this PTP instance parameter is received for a PTP instance with PTP profile set to "IEEE 802.1AS PTP profile for transport of timing", the receiver shall ignore the PTP instance parameter.

When the PTP instance parameter name indicates portDS.logAnnounceInterval, the PTP instance parameter value field contains the portDS.logAnnounceInterval as specified in IEEE Std 1588-2019 [11] clause 8.2.15.4.1. The length of PTP instance parameter value field indicates a value of 1. If this PTP instance parameter is received for a PTP instance with PTP profile set to "IEEE 802.1AS PTP profile for transport of timing", the receiver shall ignore the PTP instance parameter.

When the PTP instance parameter name indicates portDS.announceReceiptTimeout, the PTP instance parameter value field contains the portDS.announceReceiptTimeout as specified in IEEE Std 1588-2019 [11] clause 8.2.15.4.2 and in IEEE Std 802.1AS [12] clause 14.8.16. The length of PTP instance parameter value field indicates a value of 1.

When the PTP instance parameter name indicates portDS.logSyncInterval, the PTP instance parameter value field contains the portDS.logSyncInterval as specified in IEEE Std 1588-2019 [11] clause 8.2.15.4.3. The length of PTP instance parameter value field indicates a value of 1. If this PTP instance parameter is received for a PTP instance with PTP profile set to "IEEE 802.1AS PTP profile for transport of timing", the receiver shall ignore the PTP instance parameter.

When the PTP instance parameter name indicates portDS.delayMechanism, the PTP instance parameter value field contains the portDS.delayMechanism as specified in IEEE Std 1588-2019 [11] clause 8.2.15.4.4 and in IEEE Std 802.1AS [12] clause 14.8.5. The length of PTP instance parameter value field indicates a value of 1.

When the PTP instance parameter name indicates portDS.logMinPdelayReqInterval, the PTP instance parameter value field contains the portDS.logMinPdelayReqInterval as specified in IEEE Std 1588-2019 [11] clause 8.2.15.4.5. The length of PTP instance parameter value field indicates a value of 1. If this PTP instance parameter is received for a PTP instance with PTP profile set to "IEEE 802.1AS PTP profile for transport of timing", the receiver shall ignore the PTP instance parameter.

When the PTP instance parameter name indicates portDS.versionNumber, the PTP instance parameter value field contains the portDS.versionNumber as specified in IEEE Std 1588-2019 [11] clause 8.2.15.4.6 and in IEEE Std 802.1AS [12] clause 14.8.42. The length of PTP instance parameter value field indicates a value of 1.

When the PTP instance parameter name indicates portDS.minorVersionNumber, the PTP instance parameter value field contains the portDS.minorVersionNumber as specified in IEEE Std 1588-2019 [11] clause 8.2.15.4.7 and in IEEE Std 802.1AS [12] clause 14.8.54. The length of PTP instance parameter value field indicates a value of 1.

When the PTP instance parameter name indicates portDS.delayAssymetry, the PTP instance parameter value field contains the portDS.delayAssymetry as specified in IEEE Std 1588-2019 [11] clause 8.2.15.4.8 and in IEEE Std 802.1AS [12] clause 14.8.10. The length of PTP instance parameter value field indicates a value of 8.

When the PTP instance parameter name indicates portDS.portEnable, the PTP instance parameter value field contains the portDS.portEnable as specified in IEEE Std 1588-2019 [11] clause 8.2.15.5.1. with a value of FALSE encoded as "00000000" and a value of TRUE encoded as "00000001". The length of PTP instance parameter value field indicates a value of 1. If this PTP instance parameter is received for a PTP instance with PTP profile set to "IEEE 802.1AS PTP profile for transport of timing", the receiver shall ignore the PTP instance parameter.

When the PTP instance parameter name indicates timePropertiesDS.currentUtcOffset, the PTP instance parameter value field contains the timePropertiesDS.currentUtcOffset as specified in IEEE Std 1588-2019 [11] clause 8.2.4.2 and in IEEE Std 802.1AS [12] clause 14.5.2. The length of PTP instance parameter value field indicates a value of 2.

When the PTP instance parameter name indicates timePropertiesDS.timeSource, the PTP instance parameter value field contains the timePropertiesDS.timeSource as specified in IEEE Std 1588-2019 [11] clause 8.2.4.9. The length of PTP instance parameter value field indicates a value of 1. If this PTP instance parameter is received for a PTP instance with

PTP profile set to "IEEE 802.1AS PTP profile for transport of timing", the receiver shall ignore the PTP instance parameter.

When the PTP instance parameter name indicates externalPortConfigurationPortDS.desiredState, the PTP instance parameter value field contains the externalPortConfigurationPortDS.desiredState as specified in IEEE Std 1588-2019 [11] clause 15.5.3.7.15.1 and in IEEE Std 802.1AS [12] clause 14.12.2. The length of PTP instance parameter value field indicates a value of 1.

When the PTP instance parameter name indicates defaultDS.timeSource, the PTP instance parameter value field contains the defaultDS.timeSource as specified in IEEE Std 802.1AS [12] clause 14.2.14. The length of PTP instance parameter value field indicates a value of 1. If this PTP instance parameter is received for a PTP instance with PTP profile set to "SMPTE Profile for Use of IEEE-1588 Precision Time Protocol in Professional Broadcast Applications", the receiver shall ignore the PTP instance parameter.

When the PTP instance parameter name indicates portDS.ptpPortEnabled, the PTP instance parameter value field contains the portDS.ptpPortEnabled as specified in IEEE Std 802.1AS [12] clause 14.8.4, with a value of FALSE encoded as "00000000" and a value of TRUE encoded as "00000001". The length of PTP instance parameter value field indicates a value of 1. If this PTP instance parameter is received for a PTP instance with PTP profile set to "SMPTE Profile for Use of IEEE-1588 Precision Time Protocol in Professional Broadcast Applications", the receiver shall ignore the PTP instance parameter.

When the PTP instance parameter name indicates portDS.isMeasuringDelay, the PTP instance parameter value field contains the portDS.isMeasuringDelay as specified in IEEE Std 802.1AS [12] clause 14.8.6, with a value of FALSE encoded as "00000000" and a value of TRUE encoded as "00000001". The length of PTP instance parameter value field indicates a value of 1. If this PTP instance parameter is received for a PTP instance with PTP profile set to "SMPTE Profile for Use of IEEE-1588 Precision Time Protocol in Professional Broadcast Applications", the receiver shall ignore the PTP instance parameter.

When the PTP instance parameter name indicates portDS.asCapable, the PTP instance parameter value field contains the portDS.asCapable as specified in IEEE Std 802.1AS [12] clause 14.8.7, with a value of FALSE encoded as "00000000" and a value of TRUE encoded as "00000001". The length of PTP instance parameter value field indicates a value of 1. If this PTP instance parameter is received for a PTP instance with PTP profile set to "SMPTE Profile for Use of IEEE-1588 Precision Time Protocol in Professional Broadcast Applications", the receiver shall ignore the PTP instance parameter.

When the PTP instance parameter name indicates portDS.meanLinkDelay, the PTP instance parameter value field contains the portDS.meanLinkDelay as specified in IEEE Std 802.1AS [12] clause 14.8.8. The length of PTP instance parameter value field indicates a value of 12. If this PTP instance parameter is received for a PTP instance with PTP profile set to "SMPTE Profile for Use of IEEE-1588 Precision Time Protocol in Professional Broadcast Applications", the receiver shall ignore the PTP instance parameter.

When the PTP instance parameter name indicates portDS.meanLinkDelayThresh, the PTP instance parameter value field contains the portDS.meanLinkDelayThresh as specified in IEEE Std 802.1AS [12] clause 14.8.9. The length of PTP instance parameter value field indicates a value of 12. If this PTP instance parameter is received for a PTP instance with PTP profile set to "SMPTE Profile for Use of IEEE-1588 Precision Time Protocol in Professional Broadcast Applications", the receiver shall ignore the PTP instance parameter.

When the PTP instance parameter name indicates portDS.neighborRateRatio, the PTP instance parameter value field contains the portDS.neighborRateRatio as specified in IEEE Std 802.1AS [12] clause 14.8.11. The length of PTP instance parameter value field indicates a value of 8. If this PTP instance parameter is received for a PTP instance with PTP profile set to "SMPTE Profile for Use of IEEE-1588 Precision Time Protocol in Professional Broadcast Applications", the receiver shall ignore the PTP instance parameter.

When the PTP instance parameter name indicates portDS.initialLogAnnounceInterval, the PTP instance parameter value field contains the portDS.initialLogAnnounceInterval as specified in IEEE Std 802.1AS [12] clause 14.8.12. The length of PTP instance parameter value field indicates a value of 4. If this PTP instance parameter is received for a PTP instance with PTP profile set to "SMPTE Profile for Use of IEEE-1588 Precision Time Protocol in Professional Broadcast Applications", the receiver shall ignore the PTP instance parameter.

When the PTP instance parameter name indicates portDS.currentLogAnnounceInterval, the PTP instance parameter value field contains the portDS.currentLogAnnounceInterval as specified in IEEE Std 802.1AS [12] clause 14.8.13. The length of PTP instance parameter value field indicates a value of 4. If this PTP instance parameter is received for a PTP instance with PTP profile set to "SMPTE Profile for Use of IEEE-1588 Precision Time Protocol in Professional Broadcast Applications", the receiver shall ignore the PTP instance parameter.

When the PTP instance parameter name indicates portDS.useMgtSettableLogAnnounceInterval, the PTP instance parameter value field contains the portDS.useMgtSettableLogAnnounceInterval as specified in IEEE Std 802.1AS [12] clause 14.8.14, with a value of FALSE encoded as "00000000" and a value of TRUE encoded as "00000001". The length of PTP instance parameter value field indicates a value of 1. If this PTP instance parameter is received for a PTP instance with PTP profile set to "SMPTE Profile for Use of IEEE-1588 Precision Time Protocol in Professional Broadcast Applications", the receiver shall ignore the PTP instance parameter.

When the PTP instance parameter name indicates portDS.mgtSettableLogAnnounceInterval, the PTP instance parameter value field contains the portDS.mgtSettableLogAnnounceInterval as specified in IEEE Std 802.1AS [12] clause 14.8.15. The length of PTP instance parameter value field indicates a value of 4. If this PTP instance parameter is received for a PTP instance with PTP profile set to "SMPTE Profile for Use of IEEE-1588 Precision Time Protocol in Professional Broadcast Applications", the receiver shall ignore the PTP instance parameter.

When the PTP instance parameter name indicates portDS.initialLogSyncInterval, the PTP instance parameter value field contains the portDS.initialLogSyncInterval as specified in IEEE Std 802.1AS [12] clause 14.8.17. The length of PTP instance parameter value field indicates a value of 4. If this PTP instance parameter is received for a PTP instance with PTP profile set to "SMPTE Profile for Use of IEEE-1588 Precision Time Protocol in Professional Broadcast Applications", the receiver shall ignore the PTP instance parameter.

When the PTP instance parameter name indicates portDS.currentLogSyncInterval, the PTP instance parameter value field contains the portDS.currentLogSyncInterval as specified in IEEE Std 802.1AS [12] clause 14.8.18. The length of PTP instance parameter value field indicates a value of 4. If this PTP instance parameter is received for a PTP instance with PTP profile set to "SMPTE Profile for Use of IEEE-1588 Precision Time Protocol in Professional Broadcast Applications", the receiver shall ignore the PTP instance parameter.

When the PTP instance parameter name indicates portDS.useMgtSettableLogSyncInterval, the PTP instance parameter value field contains the x portDS.useMgtSettableLogSyncInterval as specified in IEEE Std 802.1AS [12] clause 14.8.19, with a value of FALSE encoded as "00000000" and a value of TRUE encoded as "00000001". The length of PTP instance parameter value field indicates a value of 1. If this PTP instance parameter is received for a PTP instance with PTP profile set to "SMPTE Profile for Use of IEEE-1588 Precision Time Protocol in Professional Broadcast Applications", the receiver shall ignore the PTP instance parameter.

When the PTP instance parameter name indicates portDS.mgtSettableLogSyncInterval, the PTP instance parameter value field contains the portDS.mgtSettableLogSyncInterval as specified in IEEE Std 802.1AS [12] clause 14.8.20. The length of PTP instance parameter value field indicates a value of 4. If this PTP instance parameter is received for a PTP instance with PTP profile set to "SMPTE Profile for Use of IEEE-1588 Precision Time Protocol in Professional Broadcast Applications", the receiver shall ignore the PTP instance parameter.

When the PTP instance parameter name indicates portDS.syncReceiptTimeout, the PTP instance parameter value field contains the portDS.syncReceiptTimeout as specified in

IEEE Std 802.1AS [12] clause 14.8.21. The length of PTP instance parameter value field indicates a value of 4. If this PTP instance parameter is received for a PTP instance with PTP profile set to "SMPTE Profile for Use of IEEE-1588 Precision Time Protocol in Professional Broadcast Applications", the receiver shall ignore the PTP instance parameter.

When the PTP instance parameter name indicates portDS.syncReceiptTimeoutTimeInterval, the PTP instance parameter value field contains the portDS.syncReceiptTimeoutTimeInterval as specified in IEEE Std 802.1AS [12] clause 14.8.22. The length of PTP instance parameter value field indicates a value of 12. If this PTP instance parameter is received for a PTP instance with PTP profile set to "SMPTE Profile for Use of IEEE-1588 Precision Time Protocol in Professional Broadcast Applications", the receiver shall ignore the PTP instance parameter.

When the PTP instance parameter name indicates portDS.initialLogPdelayReqInterval, the PTP instance parameter value field contains the portDS.initialLogPdelayReqInterval as specified in IEEE Std 802.1AS [12] clause 14.8.23. The length of PTP instance parameter value field indicates a value of 4. If this PTP instance parameter is received for a PTP instance with PTP profile set to "SMPTE Profile for Use of IEEE-1588 Precision Time Protocol in Professional Broadcast Applications", the receiver shall ignore the PTP instance parameter.

When the PTP instance parameter name indicates portDS.currentLogPdelayReqInterval, the PTP instance parameter value field contains the portDS.currentLogPdelayReqInterval as specified in IEEE Std 802.1AS [12] clause 14.8.24. The length of PTP instance parameter value field indicates a value of 4. If this PTP instance parameter is received for a PTP instance with PTP profile set to "SMPTE Profile for Use of IEEE-1588 Precision Time Protocol in Professional Broadcast Applications", the receiver shall ignore the PTP instance parameter.

When the PTP instance parameter name indicates portDS.useMgtSettableLogPdelayReqInterval, the PTP instance parameter value field contains the portDS.useMgtSettableLogPdelayReqInterval x as specified in IEEE Std 802.1AS [12] clause 14.8.25, with a value of FALSE encoded as "00000000" and a value of TRUE encoded as "00000001". The length of PTP instance parameter value field indicates a value of 1. If this PTP instance parameter is received for a PTP instance with PTP profile set to "SMPTE Profile for Use of IEEE-1588 Precision Time Protocol in Professional Broadcast Applications", the receiver shall ignore the PTP instance parameter.

When the PTP instance parameter name indicates portDS.mgtSettableLogPdelayReqInterval, the PTP instance parameter value field contains the portDS.mgtSettableLogPdelayReqInterval as specified in IEEE Std 802.1AS [12] clause 14.8.26. The length of PTP instance parameter value field indicates a value of 4. If this PTP instance parameter is received for a PTP instance with PTP profile set to "SMPTE Profile for Use of IEEE-1588 Precision Time Protocol in Professional Broadcast Applications", the receiver shall ignore the PTP instance parameter.

When the PTP instance parameter name indicates portDS.initialLogGtpCapableMessageInterval, the PTP instance parameter value field contains the portDS.initialLogGtpCapableMessageInterval as specified in IEEE Std 802.1AS [12] clause 14.8.27. The length of PTP instance parameter value field indicates a value of 4. If this PTP instance parameter is received for a PTP instance with PTP profile set to "SMPTE Profile for Use of IEEE-1588 Precision Time Protocol in Professional Broadcast Applications", the receiver shall ignore the PTP instance parameter.

When the PTP instance parameter name indicates portDS.currentLogGtpCapableMessageInterval, the PTP instance parameter value field contains the portDS.currentLogGtpCapableMessageInterval as specified in IEEE Std 802.1AS [12] clause 14.8.28. The length of PTP instance parameter value field indicates a value of 4. If this PTP instance parameter is received for a PTP instance with PTP profile set to "SMPTE Profile for Use of IEEE-1588 Precision Time Protocol in Professional Broadcast Applications", the receiver shall ignore the PTP instance parameter.

When the PTP instance parameter name indicates portDS.useMgtSettableLogGtpCapableMessageInterval, the PTP instance parameter

value field contains the portDS.useMgtSettableLogGtpCapableMessageInterval as specified in IEEE Std 802.1AS [12] clause 14.8.29, with a value of FALSE encoded as "00000000" and a value of TRUE encoded as "00000001". The length of PTP instance parameter value field indicates a value of 1. If this PTP instance parameter is received for a PTP instance with PTP profile set to "SMPTE Profile for Use of IEEE-1588 Precision Time Protocol in Professional Broadcast Applications", the receiver shall ignore the PTP instance parameter.

When the PTP instance parameter name indicates portDS.mgtSettableLogGtpCapableMessageInterval, the PTP instance parameter value field contains the portDS.mgtSettableLogGtpCapableMessageInterval as specified in IEEE Std 802.1AS [12] clause 14.8.30. The length of PTP instance parameter value field indicates a value of 4. If this PTP instance parameter is received for a PTP instance with PTP profile set to "SMPTE Profile for Use of IEEE-1588 Precision Time Protocol in Professional Broadcast Applications", the receiver shall ignore the PTP instance parameter.

When the PTP instance parameter name indicates portDS.initialComputeNeighborRateRatio, the PTP instance parameter value field contains the portDS.initialComputeNeighborRateRatio as specified in IEEE Std 802.1AS [12] clause 14.8.31. The length of PTP instance parameter value field indicates a value of 4. If this PTP instance parameter is received for a PTP instance with PTP profile set to "SMPTE Profile for Use of IEEE-1588 Precision Time Protocol in Professional Broadcast Applications", the receiver shall ignore the PTP instance parameter.

When the PTP instance parameter name indicates portDS.currentComputeNeighborRateRatio, the PTP instance parameter value field contains the portDS.currentComputeNeighborRateRatio as specified in IEEE Std 802.1AS [12] clause 14.8.32. The length of PTP instance parameter value field indicates a value of 4. If this PTP instance parameter is received for a PTP instance with PTP profile set to "SMPTE Profile for Use of IEEE-1588 Precision Time Protocol in Professional Broadcast Applications", the receiver shall ignore the PTP instance parameter.

When the PTP instance parameter name indicates portDS.useMgtSettableComputeNeighborRateRatio, the PTP instance parameter value field contains the portDS.useMgtSettableComputeNeighborRateRatio as specified in IEEE Std 802.1AS [12] clause 14.8.33, with a value of FALSE encoded as "00000000" and a value of TRUE encoded as "00000001". The length of PTP instance parameter value field indicates a value of 1. If this PTP instance parameter is received for a PTP instance with PTP profile set to "SMPTE Profile for Use of IEEE-1588 Precision Time Protocol in Professional Broadcast Applications", the receiver shall ignore the PTP instance parameter.

When the PTP instance parameter name indicates portDS.mgtSettableComputeNeighborRateRatio, the PTP instance parameter value field contains the portDS.mgtSettableComputeNeighborRateRatio as specified in IEEE Std 802.1AS [12] clause 14.8.34. The length of PTP instance parameter value field indicates a value of 4. If this PTP instance parameter is received for a PTP instance with PTP profile set to "SMPTE Profile for Use of IEEE-1588 Precision Time Protocol in Professional Broadcast Applications", the receiver shall ignore the PTP instance parameter.

When the PTP instance parameter name indicates portDS.initialComputeMeanLinkDelay, the PTP instance parameter value field contains the portDS.initialComputeMeanLinkDelay as specified in IEEE Std 802.1AS [12] clause 14.8.35. The length of PTP instance parameter value field indicates a value of 4. If this PTP instance parameter is received for a PTP instance with PTP profile set to "SMPTE Profile for Use of IEEE-1588 Precision Time Protocol in Professional Broadcast Applications", the receiver shall ignore the PTP instance parameter.

When the PTP instance parameter name indicates portDS.currentComputeMeanLinkDelay, the PTP instance parameter value field contains the portDS.currentComputeMeanLinkDelay x as specified in IEEE Std 802.1AS [12] clause 14.8.36. The length of PTP instance parameter value field indicates a value of 4. If this PTP instance parameter is received for a PTP instance with PTP profile set to "SMPTE Profile for Use of IEEE-1588 Precision Time Protocol in Professional Broadcast Applications", the receiver shall ignore the PTP instance parameter.

When the PTP instance parameter name indicates portDS.useMgtSettableComputeMeanLinkDelay, the PTP instance parameter value field contains the portDS.useMgtSettableComputeMeanLinkDelay as specified in IEEE Std 802.1AS [12] clause 14.8.37, with a value of FALSE encoded as "00000000" and a value of TRUE encoded as "00000001". The length of PTP instance parameter value field indicates a value of 1. If this PTP instance parameter is received for a PTP instance with PTP profile set to "SMPTE Profile for Use of IEEE-1588 Precision Time Protocol in Professional Broadcast Applications", the receiver shall ignore the PTP instance parameter.

When the PTP instance parameter name indicates portDS.mgtSettableComputeMeanLinkDelay, the PTP instance parameter value field contains the portDS.mgtSettableComputeMeanLinkDelay as specified in IEEE Std 802.1AS [12] clause 14.8.38. The length of PTP instance parameter value field indicates a value of 4. If this PTP instance parameter is received for a PTP instance with PTP profile set to "SMPTE Profile for Use of IEEE-1588 Precision Time Protocol in Professional Broadcast Applications", the receiver shall ignore the PTP instance parameter.

When the PTP instance parameter name indicates portDS.allowedLostResponses, the PTP instance parameter value field contains the portDS.allowedLostResponses as specified in IEEE Std 802.1AS [12] clause 14.8.39. The length of PTP instance parameter value field indicates a value of 4. If this PTP instance parameter is received for a PTP instance with PTP profile type set to "SMPTE Profile for Use of IEEE-1588 Precision Time Protocol in Professional Broadcast Applications", the receiver shall ignore the PTP instance parameter.

When the PTP instance parameter name indicates portDS.allowedFaults, the PTP instance parameter value field contains the portDS.allowedFaults as specified in IEEE Std 802.1AS [12] clause 14.8.40. The length of PTP instance parameter value field indicates a value of 4. If this PTP instance parameter is received for a PTP instance with PTP profile set to "SMPTE Profile for Use of IEEE-1588 Precision Time Protocol in Professional Broadcast Applications", the receiver shall ignore the PTP instance parameter.

When the PTP instance parameter name indicates portDS.gPtpCapableReceiptTimeout, the PTP instance parameter value field contains the portDS.gPtpCapableReceiptTimeout as specified in IEEE Std 802.1AS [12] clause 14.8.41. The length of PTP instance parameter value field indicates a value of 4. If this PTP instance parameter is received for a PTP instance with PTP profile set to "SMPTE Profile for Use of IEEE-1588 Precision Time Protocol in Professional Broadcast Applications", the receiver shall ignore the PTP instance parameter.

When the PTP instance parameter name indicates portDS.nup, the PTP instance parameter value field contains the portDS.nup as specified in IEEE Std 802.1AS [12] clause 14.8.43. The length of PTP instance parameter value field indicates a value of 8. If this PTP instance parameter is received for a PTP instance with PTP profile set to "SMPTE Profile for Use of IEEE-1588 Precision Time Protocol in Professional Broadcast Applications", the receiver shall ignore the PTP instance parameter.

When the PTP instance parameter name indicates portDS.ndown, the PTP instance parameter value field contains the portDS.ndown as specified in IEEE Std 802.1AS [12] clause 14.8.44. The length of PTP instance parameter value field indicates a value of 64. If this PTP instance parameter is received for a PTP instance with PTP profile set to "SMPTE Profile for Use of IEEE-1588 Precision Time Protocol in Professional Broadcast Applications", the receiver shall ignore the PTP instance parameter.

When the PTP instance parameter name indicates portDS.oneStepTxOper, the PTP instance parameter value field contains the portDS.oneStepTxOper as specified in IEEE Std 802.1AS [12] clause 14.8.45, with a value of FALSE encoded as "00000000" and a value of TRUE encoded as "00000001". The length of PTP instance parameter value field indicates a value of 1. If this PTP instance parameter is received for a PTP instance with PTP profile set to "SMPTE Profile for Use of IEEE-1588 Precision Time Protocol in Professional Broadcast Applications", the receiver shall ignore the PTP instance parameter.

When the PTP instance parameter name indicates portDS.oneStepReceive, the PTP instance parameter value field contains the portDS.oneStepReceive as specified in IEEE Std 802.1AS [12] clause 14.8.46, with a value of FALSE encoded as "00000000" and

a value of TRUE encoded as "00000001". The length of PTP instance parameter value field indicates a value of 1. If this PTP instance parameter is received for a PTP instance with PTP profile set to "SMPTE Profile for Use of IEEE-1588 Precision Time Protocol in Professional Broadcast Applications", the receiver shall ignore the PTP instance parameter.

When the PTP instance parameter name indicates portDS.oneStepTransmit, the PTP instance parameter value field contains the portDS.oneStepTransmit as specified in IEEE Std 802.1AS [12] clause 14.8.47, with a value of FALSE encoded as "00000000" and a value of TRUE encoded as "00000001". The length of PTP instance parameter value field indicates a value of 1. If this PTP instance parameter is received for a PTP instance with PTP profile set to "SMPTE Profile for Use of IEEE-1588 Precision Time Protocol in Professional Broadcast Applications", the receiver shall ignore the PTP instance parameter.

When the PTP instance parameter name indicates portDS.initialOneStepTxOper, the PTP instance parameter value field contains the portDS.initialOneStepTxOper as specified in IEEE Std 802.1AS [12] clause 14.8.48, with a value of FALSE encoded as "00000000" and a value of TRUE encoded as "00000001". The length of PTP instance parameter value field indicates a value of 1. If this PTP instance parameter is received for a PTP instance with PTP profile set to "SMPTE Profile for Use of IEEE-1588 Precision Time Protocol in Professional Broadcast Applications", the receiver shall ignore the PTP instance parameter.

When the PTP instance parameter name indicates portDS.currentOneStepTxOper, the PTP instance parameter value field contains the portDS.currentOneStepTxOper as specified in IEEE Std 802.1AS [12] clause 14.8.49, with a value of FALSE encoded as "00000000" and a value of TRUE encoded as "00000001". The length of PTP instance parameter value field indicates a value of 1. If this PTP instance parameter is received for a PTP instance with PTP profile set to "SMPTE Profile for Use of IEEE-1588 Precision Time Protocol in Professional Broadcast Applications", the receiver shall ignore the PTP instance parameter.

When the PTP instance parameter name indicates portDS.useMgtSettableOneStepTxOper, the PTP instance parameter value field contains the portDS.useMgtSettableOneStepTxOper as specified in IEEE Std 802.1AS [12] clause 14.8.50, with a value of FALSE encoded as "00000000" and a value of TRUE encoded as "00000001". The length of PTP instance parameter value field indicates a value of 1. If this PTP instance parameter is received for a PTP instance with PTP profile set to "SMPTE Profile for Use of IEEE-1588 Precision Time Protocol in Professional Broadcast Applications", the receiver shall ignore the PTP instance parameter.

When the PTP instance parameter name indicates portDS.mgtSettableOneStepTxOper, the PTP instance parameter value field contains the portDS.mgtSettableOneStepTxOper as specified in IEEE Std 802.1AS [12] clause 14.8.51, with a value of FALSE encoded as "00000000" and a value of TRUE encoded as "00000001". The length of PTP instance parameter value field indicates a value of 1. If this PTP instance parameter is received for a PTP instance with PTP profile set to "SMPTE Profile for Use of IEEE-1588 Precision Time Protocol in Professional Broadcast Applications", the receiver shall ignore the PTP instance parameter.

When the PTP instance parameter name indicates portDS.syncLocked, the PTP instance parameter value field contains the portDS.syncLocked as specified in IEEE Std 802.1AS [12] clause 14.8.52, with a value of FALSE encoded as "00000000" and a value of TRUE encoded as "00000001". The length of PTP instance parameter value field indicates a value of 1. If this PTP instance parameter is received for a PTP instance with PTP profile set to "SMPTE Profile for Use of IEEE-1588 Precision Time Protocol in Professional Broadcast Applications", the receiver shall ignore the PTP instance parameter.

When the PTP instance parameter name indicates portDS.pdelayTruncatedTimestampsArray, the PTP instance parameter value field contains the portDS.pdelayTruncatedTimestampsArray as specified in IEEE Std 802.1AS [12] clause 14.8.53. The length of PTP instance parameter value field indicates a value of 24. If this PTP instance parameter is received for a PTP instance with PTP profile set to "SMPTE Profile for Use of IEEE-1588 Precision Time Protocol in Professional Broadcast Applications", the receiver shall ignore the PTP instance parameter.

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NOTE 1:	When the TSN AF sends a port management list to the NW-TT or the NW-TT sends a port management list to the TSN AF and the port parameter PTP instance list is included, then the following PTP instance parameter names are not applicable:
-	0001H PTP profile
-	0002H Transport type
-	0003H Grandmaster enabled
-	0004H Grandmaster on behalf of DS-TT enabled
-	0005H Grandmaster candidate enabled
-	0006H defaultDS.clockIdentity
-	0007H defaultDS.clockQuality.clockClass
-	0008H defaultDS.clockQuality.clockAccuracy
-	0009H defaultDS.clockQuality.offsetScaledLogVariance
-	000AH defaultDS.priority1
-	000BH defaultDS.priority2
-	000CH defaultDS.domainNumber
-	000DH defaultDS.sdId
-	000EH defaultDS.instanceEnable
-	000FH defaultDS.externalPortConfigurationEnabled
-	0010H defaultDS.instanceType
-	001DH timePropertiesDS.currentUtcOffset
-	001EH timePropertiesDS.timeSource
-	001FH externalPortConfigurationPortDS.desiredState
-	0020H defaultDS.timeSource
NOTE 2:	When the TSN AF sends a port management list to the DS-TT or the DS-TT sends a port management list to the TSN AF and the port parameter PTP instance list is included, then the following PTP instance parameter names are not applicable:
-	0004H Grandmaster on behalf of DS-TT enabled
-	0005H Grandmaster candidate enabled
-	000FH defaultDS.externalPortConfigurationEnabled
-	0015H portDS.announceReceiptTimeout
-	001FH externalPortConfigurationPortDS.desiredState
-	002FH portDS.syncReceiptTimeout
-	0030H portDS.syncReceiptTimeoutTimeInterval
NOTE 3:	When the TSN AF sends a user plane node management list to the NW-TT or the NW-TT sends a user plane node management list to the TSN AF and the user plane node parameter PTP instance specification is included, then the following PTP instance parameter names are not applicable:
-	0003H Grandmaster enabled
-	0004H Grandmaster on behalf of DS-TT enabled
-	0011H portDS.portIdentity
-	0012H portDS.portState
-	0013H portDS.logMinDelayReqInterval
-	0014H portDS.logAnnounceInterval
-	0015H portDS.announceReceiptTimeout
-	0016H portDS.logSyncInterval
-	0017H portDS.delayMechanism
-	0018H portDS.logMinPdelayReqInterval
-	0019H portDS.versionNumber
-	001AH portDS.minorVersionNumber
-	001BH portDS.delayAssymetry
-	001CH portDS.portEnable
-	001FH externalPortConfigurationPortDS.desiredState
-	0021H portDS.ptpPortEnabled
-	0022H portDS.isMeasuringDelay
-	0023H portDS.asCapable
-	0024H portDS.meanLinkDelay
-	0025H portDS.meanLinkDelayThresh
-	0026H portDS.neighborRateRatio
-	0027H portDS.initialLogAnnounceInterval
-	0028H portDS.currentLogAnnounceInterval
-	0029H portDS.useMgtSettableLogAnnounceInterval
-	002AH portDS.mgtSettableLogAnnounceInterval
-	002BH portDS.initialLogSyncInterval
-	002CH portDS.currentLogSyncInterval
-	002DH portDS.useMgtSettableLogSyncInterval
-	002EH portDS.mgtSettableLogSyncInterval

-	002FH	portDS.syncReceiptTimeout
-	0030H	portDS.syncReceiptTimeoutTimeInterval
-	0031H	portDS.initialLogPdelayReqInterval
-	0032H	portDS.currentLogPdelayReqInterval
-	0033H	portDS.useMgtSettableLogPdelayReqInterval
-	0034H	portDS.mgtSettableLogPdelayReqInterval
-	0035H	portDS.initialLogGtpCapableMessageInterval
-	0036H	portDS.currentLogGtpCapableMessageInterval
-	0037H	portDS.useMgtSettableLogGtpCapableMessageInterval
-	0038H	portDS.mgtSettableLogGtpCapableMessageInterval
-	0039H	portDS.initialComputeNeighborRateRatio
-	003AH	portDS.currentComputeNeighborRateRatio
-	003BH	portDS.useMgtSettableComputeNeighborRateRatio
-	003CH	portDS.mgtSettableComputeNeighborRateRatio
-	003DH	portDS.initialComputeMeanLinkDelay
-	003EH	portDS.currentComputeMeanLinkDelay
-	003FH	portDS.useMgtSettableComputeMeanLinkDelay
-	0040H	portDS.mgtSettableComputeMeanLinkDelay
-	0041H	portDS.allowedLostResponses
-	0042H	portDS.allowedFaults
-	0043H	portDS.gPtpCapableReceiptTimeout
-	0044H	portDS.nup
-	0045H	portDS.ndown
-	0046H	portDS.oneStepTxOper
-	0047H	portDS.oneStepReceive
-	0048H	portDS.oneStepTransmit
-	0049H	portDS.initialOneStepTxOper
-	004AH	portDS.currentOneStepTxOper
-	004BH	portDS.useMgtSettableOneStepTxOper
-	004CH	portDS.mgtSettableOneStepTxOper
-	004DH	portDS.syncLocked
-	004EH	portDS.pdelayTruncatedTimestampsArray
-	NOTE 4: When the TSN AF sends a user plane node management list to the NW-TT or the NW-TT sends a user plane node management list to the TSN AF and the user plane node parameter DS-TT port time synchronization information list is included, then the following PTP instance parameter names are not applicable:	
-	0001H	PTP profile
-	0002H	Transport type
-	0003H	Grandmaster enabled
-	0006H	defaultDS.clockIdentity
-	0007H	defaultDS.clockQuality.clockClass
-	0008H	defaultDS.clockQuality.clockAccuracy
-	0009H	defaultDS.clockQuality.offsetScaledLogVariance
-	000AH	defaultDS.priority1
-	000BH	defaultDS.priority2
-	000CH	defaultDS.domainNumber
-	000DH	defaultDS.sdId
-	000EH	defaultDS.instanceEnable
-	000FH	defaultDS.externalPortConfigurationEnabled
-	0010H	defaultDS.instanceType
-	001DH	timePropertiesDS.currentUtcOffset
-	001EH	timePropertiesDS.timeSource
-	0020H	defaultDS.timeSource
-	NOTE 5: The "Set parameter" operation shall not be applicable for the following PTP instance parameter names:	
-	0012H	portDS.portState
-	0022H	portDS.isMeasuringDelay
-	0023H	portDS.asCapable
-	0024H	portDS.meanLinkDelay
-	0026H	portDS.neighborRateRatio
-	0028H	portDS.currentLogAnnounceInterval
-	002CH	portDS.currentLogSyncInterval
-	0032H	portDS.currentLogPdelayReqInterval
-	0036H	portDS.currentLogGtpCapableMessageInterval
-	003AH	portDS.currentComputeNeighborRateRatio
-	003EH	portDS.currentComputeMeanLinkDelay
-	0046H	portDS.oneStepTxOper
-	0047H	portDS.oneStepReceive

-	0048H portDS.oneStepTransmit
-	004DH portDS.syncLocked
NOTE 6:	When the PTP instance list is received in a port management list and associated with operation code "selective read parameter", "selective subscribe-notify for parameter" or "selective unsubscribe for parameter", the PTP instance parameter value field of each PTP instance parameter is ignored by the receiver. If no PTP instance parameter is included in a specific PTP instance, the entire PTP instance is selected with all PTP instance parameters stored at the DS-TT or NW-TT port.
NOTE 7:	When the PTP instance list is included in a DS-TT port time synchronization information list received in a user plane node management list and associated with operation code "selective read parameter", "selective subscribe-notify for parameter" or "selective unsubscribe for parameter", the PTP instance parameter value field of each PTP instance parameter is ignored by the receiver. If no PTP instance is included in a specific DS-TT port time synchronization information instance the entire DS-TT port time synchronization information instance is selected with all PTP instances stored at the NW-TT. If no PTP instance parameter is included in a specific PTP instance, the entire PTP instance is selected with all PTP instance parameters stored at the NW-TT. In case of DS-TT port number set to zero (wildcard value) the selected PTP instance(s) and selected PTP instance parameter(s) are selected in all DS-TT port time synchronization information instance(s) stored at the NW-TT.
NOTE 8:	When the PTP instance list is received in a port management list or included in a DS-TT port time synchronization information list received in a user plane node management list and in both cases associated with operation code "delete parameter-entry" then PTP instance parameters list is ignored by the receiver.

9.16 DS-TT port time synchronization information list

The purpose of the DS-TT port time synchronization information list information element is to convey a list of DS-TT ports and associated time synchronization information as defined in 3GPP TS 23.501 [2] table K.1-1.

The DS-TT port time synchronization information list information element is coded as shown in figure 9.16.1, figure 9.16.2, and table 9.16.1.

The DS-TT port time synchronization information list is a type 6 information element with a minimum length of 3 octets.

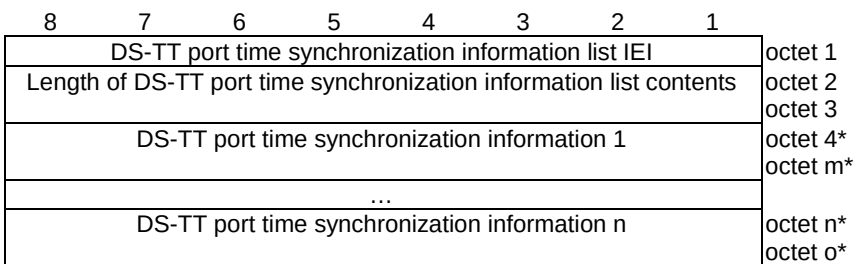


Figure 9.16.1: DS-TT port time synchronization information list information element

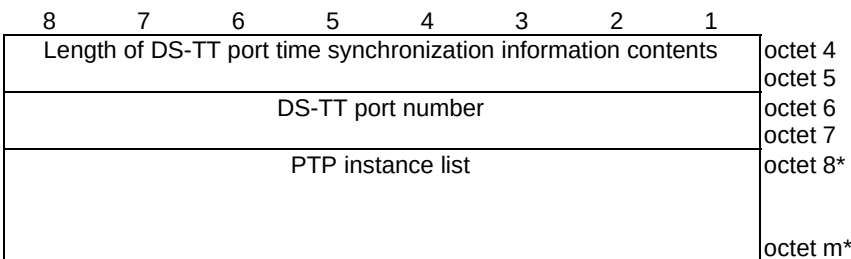


Figure 9.16.2: DS-TT port time synchronization information

Table 9.16.1: DS-TT port time synchronization information list

Value part of the DS-TT time synchronization information list information element (octets 4 to o)
DS-TT time synchronization information list contents (octets 4 to o)
This field consists of zero or more DS-TT time synchronization information.
DS-TT time synchronization information (octets 4 to m)
Length of DS-TT time synchronization information contents (octets 4 to 5)
Length of DS-TT time synchronization information contents contains the length of the value part of DS-TT time synchronization information in octets.
DS-TT port number (octets 6 to 7)
DS-TT port number contains the binary encoding of the DS-TT port number to which the time synchronization information applies.
PTP instance list (octets 8 to m)
The PTP instance list field contains a PTP instance list as defined in 3GPP TS 23.501 [2] table K.1-1 and table K.1-2, encoded as the value part of the PTP instance list information element as specified in clause 9.15.

9.17 IPv4 address information

The purpose of the IPv4 address information information element is to convey a list of IPv4 addresses as defined in 3GPP TS 23.501 [2] table K.1-1.

The IPv4 address information information element is coded as shown in figure 9.17.1, figure 9.17.2, and table 9.17.1.

The IPv4 address information information element has a minimum length of 12 octets.

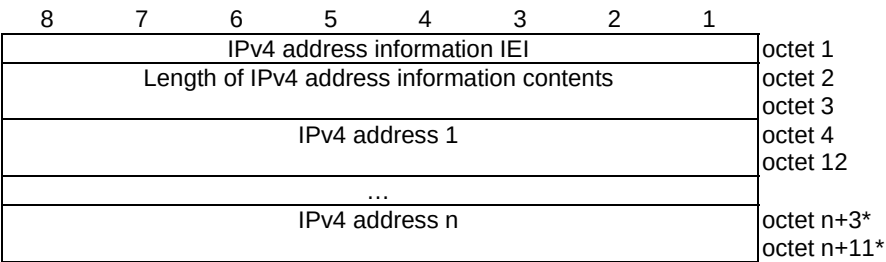


Figure 9.17.1: IPv4 address information information element

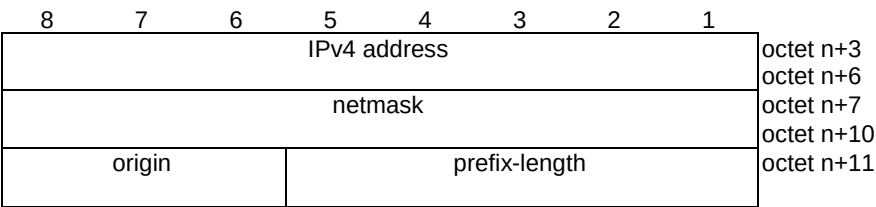


Figure 9.17.2: IPv4 address entry n

Table 9.17.1: IPv4 address information

Value part of the IPv4 address information information element (octets 4 to n+11)							
IPv4 address information contents (octets 4 to n+11)							
This field consists of a list of IPv4 addresses on the interface as specified in IETF RFC 8344 [16].							
IPv4 address (octets n+3 to n+6)							
The IPv4 address field contains the IPv4 address on the interface.							
netmask (octets n+7 to n+10)							
The netmask field contains the netmask of the IPv4 address on the interface.							
prefix-length (bits 1 to 5 of octet n+11)							
The prefix-length field contains the prefix-length of an IPv4 address. The value range of the prefix-length is from 0 to 32(decimal).							
origin (bits 6 to 8 of octet n+11)							
The origin field contains the origin of an IP address as specified in IETF RFC 8344 [16].							
Bits							
8	7	6					
0	0	1	static				
0	1	0	DHCP				
0	1	1	random				
1	0	0	other				
All other values are reserved.							
If the origin field indicates static, then it indicates that the address has been statically configured.							
If the origin field indicates DHCP, then it indicates that the address has been assigned to this system by a DHCP server.							
If the origin field indicates random, then it indicates that address is randomly chosen by the system.							
If the origin field indicates other, then it indicates that that address is assigned by other method.							

9.18 IPv4 neighbor information

The purpose of the IPv4 neighbor information information element is to convey a list of IPv4 neighbor information as defined in 3GPP TS 23.501 [2] table K.1-1.

The IPv4 neighbor information information element is coded as shown in figure 9.18.1, figure 9.18.2, and table 9.18.1.

The IPv4 neighbor information information element has a minimum length of 14 octets.

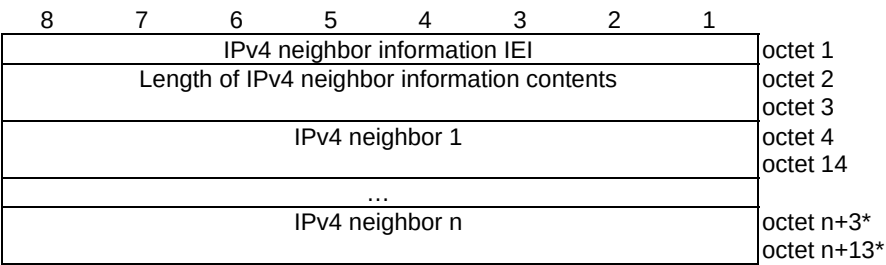


Figure 9.18.1: IPv4 neighbor information information element

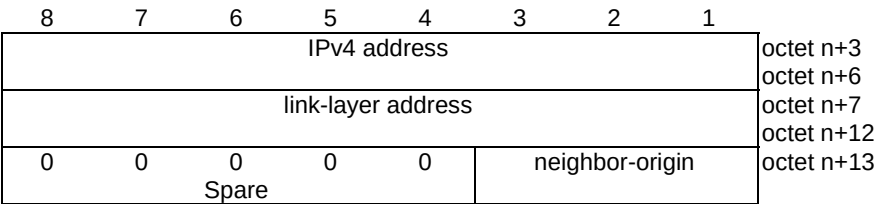


Figure 9.18.2: IPv4 neighbor entry n

Table 9.18.1: IPv4 neighbor information

Value part of the IPv4 neighbor information information element (octets 4 to n+13)
IPv4 neighbor information contents (octets 4 to n+13) This field consists of a list of neighbor entries for IPv4 addresses as specified in IETF RFC 8344 [16].
IPv4 address (octets n+3 to n+6) IPv4 address field contains the IPv4 address of the neighbor node.
link-layer address (octets n+7 to n+12) link-layer address field contains the link-layer address of the neighbor node.
neighbor-origin (bits 1 to 3 of octet n+13) The neighbor-origin field contains the origin of the neighbor entry as specified in IETF RFC 8344 [16]. Bits 3 2 1 0 0 1 static 0 1 0 dynamic 0 1 1 other All other values are reserved.
If the neighbor-origin field indicates static, then it indicates that the neighbor information has been statically configured.
If the neighbor-origin field indicates dynamic, then it indicates that the neighbor information has been dynamically set, e.g., using IPv4 ARP.
If the neighbor-origin field indicates other, then it indicates that the other method is used.

9.19 IPv6 address information

The purpose of the IPv6 address information information element is to convey a list of IPv6 addresses as defined in 3GPP TS 23.501 [2] table K.1-1.

The IPv6 address information information element is coded as shown in figure 9.19.1, figure 9.19.2, and table 9.19.1.

The IPv6 address information information element has a minimum length of 21 octets.

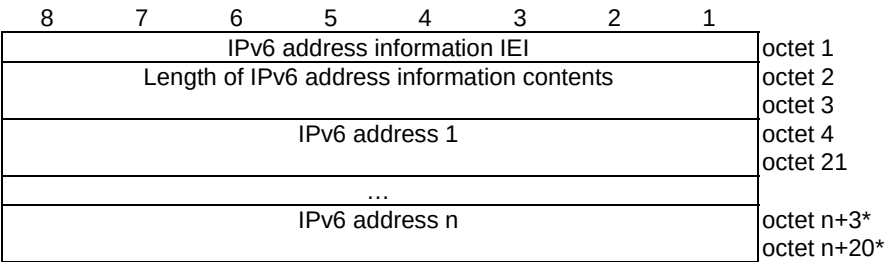


Figure 9.19.1: IPv6 address information information element

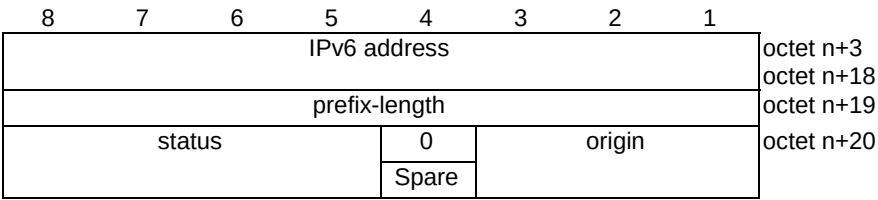


Figure 9.19.2: IPv6 address entry n

Table 9.19.1: IPv6 address information

Value part of the IPv6 address information information element (octets 4 to n+20)
IPv6 address information contents (octets 4 to n+20) This field consists of a list of IPv6 addresses on the interface as specified in IETF RFC 8344 [16].
IPv6 address (octets n+3 to n+18) IPv6 address field contains the IPv6 address on the interface.
prefix-length (bits 1 to 8 of octet n+19) The prefix-length field contains the prefix-length of an IPv6 address. The value range of the prefix-length is from 0 to 128(decimal).
origin (bits 1 to 3 of octet n+20) The origin field contains the origin of an IP address as specified in IETF RFC 8344 [16].
Bits
3 2 1
0 0 1 static
0 1 0 DHCP
0 1 1 link-layer
1 0 0 random
1 0 1 other
All other values are reserved.
If the origin field indicates static, then it indicates that the address has been statically configured.
If the origin field indicates DHCP, then it indicates that the address has been assigned to this system by a DHCP server.
If the origin field indicates link-layer, then it indicates that the address is created by IPv6 stateless autoconfiguration that embeds a link-layer address in its interface identifier.
If the origin field indicates random, then it indicates that address is randomly chosen by the system.
If the origin field indicates other, then it indicates that that address is assigned by other method.

status (bits 5 to 8 of octet n+20)							
The status field contains the status of an address. Most of the states correspond to states from the IPv6 Stateless Address Autoconfiguration protocol.							
Bits							
8	7	6	5				
0	0	0	1	preferred			
0	0	1	0	deprecated			
0	0	1	1	invalid			
0	1	0	0	inaccessible			
0	1	0	1	unknown			
0	1	1	0	tentative			
0	1	1	1	duplicate			
1	0	0	0	optimistic			
All other values are reserved.							
If the status field indicates preferred, then the address is a valid address that can appear as the destination or source address of a packet.							
If the status field indicates deprecated, then the address is a valid but deprecated address that should no longer be used as a source address in new communications, but packets addressed to such an address are processed as expected.							
If the status field indicates invalid, then the address is not a valid address, and it should not appear as the destination or source address of a packet.							
If the status field indicates inaccessible, then the address is not accessible because the interface to which this address is assigned is not operational.							
If the status field indicates unknown, then the status of the address can not be determined for some reason.							
If the status field indicates tentative, then the uniqueness of the address on the link is being verified. Addresses in this state should not be used for general communication and should only be used to determine the uniqueness of the address.							
If the status field indicates duplicate, then the address has been determined to be non-unique on the link and so must not be used.							
If the status field indicates optimistic, then the address is available for use, subject to restrictions, while its uniqueness on a link is being verified.							

9.20 IPv6 neighbor information

The purpose of the IPv6 neighbor information information element is to convey a list of IPv6 neighbors as defined in 3GPP TS 23.501 [2] table K.1-1.

The IPv6 neighbor information information element is coded as shown in figure 9.20.1, figure 9.20.2, and table 9.20.1.

The IPv6 neighbor information information element has a minimum length of 26 octets.

8	7	6	5	4	3	2	1	
IPv6 neighbor information IEI								octet 1
Length of IPv6 neighbor information contents								octet 2
								octet 3
IPv6 neighbor 1								octet 4
								octet 26
...								
IPv6 neighbor n								octet n+3*
								octet n+25*

Figure 9.20.1: IPv6 neighbor information information element

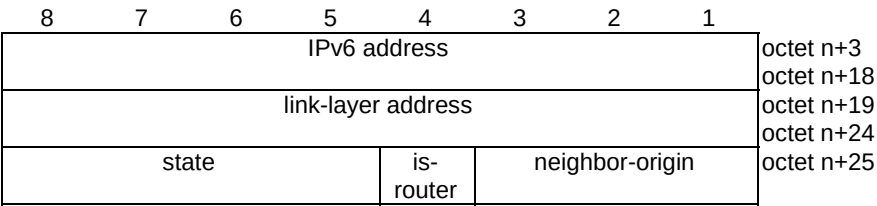


Figure 9.20.2: IPv6 neighbor entry n

Table 9.20.1: IPv6 neighbor information

Value part of the IPv6 neighbor information information element (octets 4 to n+25)

IPv6 neighbor information contents (octets 4 to n+25)

This field consists of a list neighbor entries for IPv6 as specified in IETF RFC 8344 [16].

IPv6 address (octets n+3 to n+18)

IPv6 address field contains the IPv6 address of the neighbor node.

link-layer address (octets n+19 to n+24)

link-layer address field contains the link-layer address of the neighbor node.

neighbor-origin (bits 1 to 3 of octet n+25)

The neighbor-origin field contains the origin of this neighbor entry as specified in IETF RFC 8344 [16].

Bits

3 2 1

0 0 1 static

0 1 0 dynamic

0 1 1 other

All other values are reserved.

If the neighbor-origin field indicates static, then it indicates that the neighbor information has been statically configured.

If the neighbor-origin field indicates dynamic, then it indicates that the neighbor information has been dynamically set using, e.g., the IPv6 Neighbor Discovery protocol.

If the neighbor-origin field indicates other, then it indicates that the other method is used.

is-router (bit 4 of octet n+25)

The is-router field indicates that the neighbor node acts as a router or not.

Bit

4

0 The neighbor node does not act as a router

1 The neighbor node acts as a router

State (bits 5 to 8 of octet n+25)

The state field contains the Neighbor Unreachability Detection state of this entry.

Bits

8 7 6 5

0 0 0 1 incomplete

0 0 1 0 reachable

0 0 1 1 stale

0 1 0 0 delay

0 1 0 1 probe

All other values are reserved.

If the state field indicates incomplete, then the address resolution is in progress, and the link-layer address of the neighbor has not yet been determined.

If the state field indicates reachable, then the neighbor is known to have been reachable recently.

If the state field indicates stale, then the neighbor is no longer known to be reachable, but until traffic is sent to the neighbor no attempt should be made to verify its reachability.

If the state field indicates delay, then the neighbor is no longer known to be reachable, and traffic has recently been sent to the neighbor. Rather than probe the neighbor immediately, however, delay sending probes for a short while in order to give upper-layer protocols a chance to provide reachability confirmation.

If the state field indicates probe, then the neighbor is no longer known to be reachable, and unicast Neighbor Solicitation probes are being sent to verify reachability.

9.21 Clock quality

The purpose of the Clock quality information element is to convey clock quality information as defined in 3GPP TS 23.501 [2] table K.1-2.

The Clock quality information element is coded as shown in figure 9.21.1 and table 9.21.1.

The Clock quality information element information element has a minimum length of 4 octets and a maximum length of 7 octets.

8	7	6	5	4	3	2	1	
Clock quality IEI								octet 1
Length of Clock quality contents								octet 2
								octet 3
0	0	0	0	Clk	Freq	Trac	Trac	octet 4
Spare	Spare	Spare	Spare	Acc	Stab	GNSS	UTC	
Frequency stability								octet 5*
								octet 6*
Clock accuracy								octet 7*

Figure 9.21.1: Clock quality information element

Table 9.21.1: Clock quality

Traceable to UTC (TracUTC) (octet 4, bit 1)
The bit indicates whether the current time source is traceable to the UTC.
Bit
1
0 Not traceable to UTC
1 Traceable to UTC

Traceable to GNSS (TracGNSS) (octet 4, bit 2)
The bit indicates whether the current time source is traceable to the GNSS.
Bit
2
0 Not traceable to GNSS
1 Traceable to GNSS

Frequency stability (FreqStab) (octet 4, bit 3)
The bit indicates whether the Frequency stability field is included in the Clock quality IE.
Bit
3
0 Frequency stability not included
1 Frequency stability included

Clock accuracy (ClkAcc) (octet 4, bit 4)
The bit indicates whether the Clock accuracy field is included in the Clock quality IE.
Bit
4
0 Clock accuracy not included
1 Clock accuracy included

Frequency stability (octets 5 and 6)
The field includes the estimate of the variation of the local clock when it is not synchronized to another source calculated in the same manner as for offsetScaledLogVariance attribute defined in clause 7.6.3.5 of IEEE Std 1588-2019 [11].

Clock accuracy (octet 7)
The field includes the mean over an ensemble of measurements of the time between the clock under test and a reference clock. The value of the field shall follow the clockAccuracy specifications of clause 7.6.2.6 in IEEE Std 1588-2019 [11].

9.22 queueMaxSDUTable

The purpose of the queueMaxSDUTable information element is to convey parameters for handling of the MAC queue for each traffic class, as defined in 3GPP TS 23.501 [2] table K.1-1.

The queueMaxSDUTable information element is coded as shown in figure 9.22.1, figure 9.22.2, and table 9.22.1.

The queueMaxSDUTable is a type 4 information element with a minimum length of 7 octets and a maximum length of 106 octets.

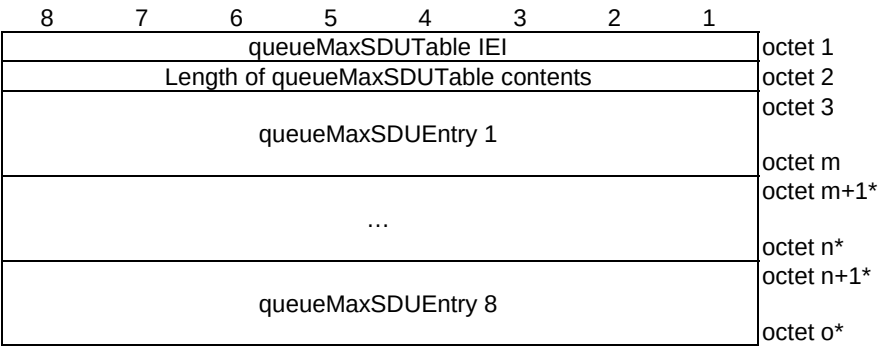


Figure 9.22.1: queueMaxSDUTable information element

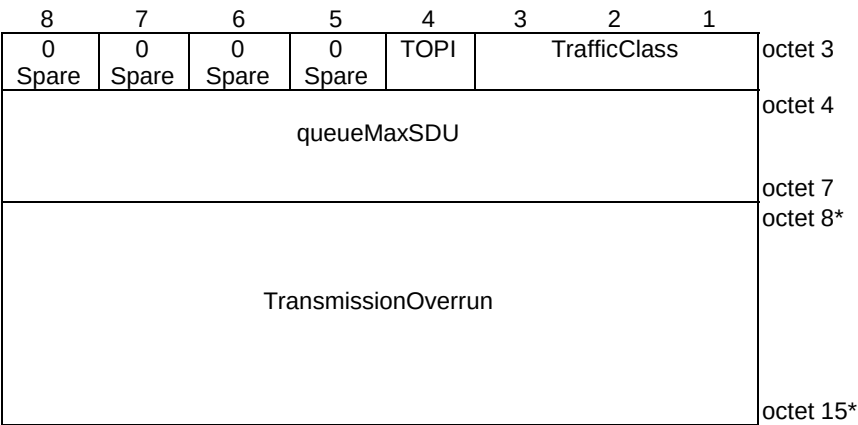


Figure 9.22.2: queueMaxSDUEnter

Table 9.22.1: queueMaxSDUEntry

TrafficClass (octet 1 bits 1 to 3) This field indicates the traffic class associated with the queueMaxSDUEntry as specified in IEEE Std 802.1Q [7] section 8.6.8.4. The values range from 0 to 7, encoded in the binary format.	
TransmissionOverrun presence indicator (TOPI) Bit 4 0 TransmissionOverrun is not present 1 TransmissionOverrun is present	
queueMaxSDU (octets 4 to 7) This field contains the value of the maximum SDU size for the queue associated with the traffic class indicated in the TrafficClass field as specified in IEEE Std 802.1Q [7] section 8.6.8.4 and is encoded as ieee8021STMaxSDU in IEEE Std 802.1Q [7] section 17.2.22.	
TransmissionOverrun (octets 5 to 13) This field contains the value of the counter of the transmitted SDUs when the gate-close event occurs for the queue associated with the traffic class indicated in the TrafficClass field as specified in IEEE Std 802.1Q [7] section 8.6.8.4 and is encoded as ieee8021TransmissionOverrun specified in IEEE Std 802.1Q [7] section 17.2.22. This field shall not be included if the TOPI is set to "TransmissionOverrun is not present".	
NOTE: The "Set parameter" operation shall not be applicable to TransmissionOverrun	

10 Timers of port management service

Timers of port management service are shown in table 10.1, table 10.2, table 10.3, table 10.4 and table 10.5.

Table 10.1: Timers of port management service – TSN AF side

TIMER NUM.	TIMER VALUE	CAUSE OF START	NORMAL STOP	ON THE 1 st , 2 nd , 3 rd , 4 th EXPIRY
T100	NOTE	Transmission of MANAGE PORT COMMAND message	MANAGE PORT COMPLETE message received	Retransmission of MANAGE PORT COMMAND message
NOTE: The value of this timer is network dependent.				

Table 10.2: Timers of User plane node management service – TSN AF side

TIMER NUM.	TIMER VALUE	CAUSE OF START	NORMAL STOP	ON THE 1 st , 2 nd , 3 rd , 4 th EXPIRY
T150	NOTE	Transmission of MANAGE USER PLANE NODE COMMAND message	MANAGE USER PLANE NODE COMPLETE message received	Retransmission of MANAGE USER PLANE NODE PORT COMMAND message
NOTE: The value of this timer is network dependent.				

Table 10.3: Timers of port management service – DS-TT side

TIMER NUM.	TIMER VALUE	CAUSE OF START	NORMAL STOP	ON THE 1 st , 2 nd , 3 rd , 4 th EXPIRY
T200	NOTE	Transmission of PORT MANAGEMENT NOTIFY message	PORT MANAGEMENT NOTIFY ACK message received	Retransmission of PORT MANAGEMENT NOTIFY message
NOTE: The value of this timer is DS-TT dependent.				

Table 10.4: Timers of port management service – NW-TT side

TIMER NUM.	TIMER VALUE	CAUSE OF START	NORMAL STOP	ON THE 1 st , 2 nd , 3 rd , 4 th EXPIRY
T300	NOTE	Transmission of PORT MANAGEMENT NOTIFY message	PORT MANAGEMENT NOTIFY ACK message received	Retransmission of PORT MANAGEMENT NOTIFY message
NOTE: The value of this timer is NW-TT dependent.				

Table 10.5: Timers of User plane node management service – NW-TT side

TIMER NUM.	TIMER VALUE	CAUSE OF START	NORMAL STOP	ON THE 1 st , 2 nd , 3 rd , 4 th EXPIRY
T350	NOTE	Transmission of USER PLANE NODE MANAGEMENT NOTIFY message	USER PLANE NODE MANAGEMENT NOTIFY ACK message received	Retransmission of USER PLANE NODE MANAGEMENT NOTIFY message
NOTE: The value of this timer is NW-TT dependent.				

Annex A (informative): Change history

Change history							
Date	Meeting	TDoc	CR	Rev	Cat	Subject/Comment	New version
2019-11	CT1#121	C1-198752				Draft skeleton provided by the rapporteur	0.0.0
2019-11	CT1#121					Implementation of the following pseudo CRs agreed by CT1: C1-198019, C1-198174, C1-198482, C1-198753, C1-198757, C1-198758, and C1-199024 Corrections made by the rapporteur	0.1.0
2019-12	CT#86	CP-193159				Presentation for information at TSG CT	1.0.0
2019-12	CT#86	CP-193292				A title corrected	1.0.1
2020-03	CT1#122					Implementation of the following pseudo CRs agreed by CT1: C1-200330, C10200331, C1-200573, C1-200687, C1-200706, C1-200708, C1-200832 Corrections made by the rapporteur	1.1.0
2020-03	CT-87e	CP-200166				Presentation for approval at TSG CT	2.0.0
2020-03	CT-87e	CP-200288				Revision after implementation of CP-200095. Presentation for approval at TSG CT	2.1.0
2020-03	CT-87e	CP-200292				Correction of implementation of CP-200095	2.2.0
2020-03	CT-87e					Version 16.0.0 created after approval	16.0.0
2020-06	CT-88e	CP-201137	0001	1	F	Correction of the abnormal case in NW-TT-initiated Ethernet port management procedure	16.1.0
2020-06	CT-88e	CP-201137	0002		D	Abbreviation correction	16.1.0
2020-06	CT-88e	CP-201137	0003		F	IEEE Std 802.1Qbv-2016 rolled into IEEE Std 802.1Q-2018	16.1.0
2020-06	CT-88e	CP-201137	0004	1	F	Introduction of Bridge management information	16.1.0
2020-06	CT-88e	CP-201137	0005		F	Updating definitions for Ethernet port management messages	16.1.0
2020-06	CT-88e	CP-201137	0006	1	F	Assignment of timer numbers and IEIs	16.1.0
2020-06	CT-88e	CP-201137	0007		F	Splitting port management information into port- and bridge-specific information	16.1.0
2020-06	CT-88e	CP-201137	0008		F	Correct the ETHERNET PORT MANAGEMENT NOTIFY ACK message name	16.1.0
2020-09	CT-89e	CP-202170	0009		F	Clarification on CNC	16.2.0
2020-09	CT-89e	CP-202170	0010r2		F	Update PSFP stream identification parameters	16.2.0
2020-09	CT-89e	CP-202170	0011		F	Maximum size of EPMS/BMS messages	16.2.0
2020-09	CT-89e	CP-202170	0012		F	Bridge management information correction	16.2.0
2020-12	CT-90e	CP-203219	0016		F	The "Set parameter" operation not applicable for read-only parameters	16.3.0
2020-12	CT-90e	CP-203219	0017		F	Correction in stream parameters in BMIC	16.3.0
2020-12	CT-90e	CP-203219	0018	1	F	Adding NW-TT port numbers to BMIC	16.3.0
2020-12	CT-90e	CP-203219	0019		F	Adding Stream parameters to PMIC	16.3.0
2020-12	CT-90e	CP-203219	0020	1	F	Bridge name and Chassis ID no more needed	16.3.0
2020-12	CT-90e	CP-203219	0021	2	F	Correction to transfer of Ethernet port management information between a time-sensitive networking (TSN) AF and the DS-TT at the UE	16.3.0
2020-12	CT-90e	CP-203267	0022	2	F	Per-instance parameter handling for stream filter table	16.3.0
2020-12	CT-90e	CP-203219	0023		F	Clarification on max BMS message length	16.3.0
2021-03	CT-91e	CP-210134	0025	1	F	Location of the Ethernet port parameter name and bridge parameter name	17.0.0
2021-03	CT-91e	CP-210134	0026	1	F	StreamFilterInstanceIndex value usage	17.0.0
2021-06	CT-92e	CP-211136	0024	3	C	Control of PTP functionality in DS-TT and NW-TT (24.519 CR)	17.1.0
2021-06	CT-92e	CP-211136	0028	4	B	Extension of the scope of the TS (24.519 CR)	17.1.0
2021-06	CT-92e	CP-211136	0027	3	B	Correction on DS-TT/NW-TT Ethernet port and replacement of bridge with user plane node (24.519 CR)	17.1.0
2021-06	CT-92e					Change of TS number from 24.519 to 24.539 with change of title and scope	
NOTE: From CT#93 CR numbers are allocated for new TS number, TS 24.539. The CR numbers above were related TS 24.519 which changed the scope, title and TS number in CT#92e.							
2021-09	CT-93e	CP-212128	0002	1	C	Clarification of applicability of port and user plane node management parameters	17.2.0
2021-09	CT-93e	CP-212128	0003	1	C	Introducing new service cause values for port/user plane node parameter unavailable	17.2.0
2021-09	CT-93e	CP-212128	0006	1	F	PTP instance parameter updates	17.2.0
2021-12	CT-94e	CP-213035	0001	2	F	Resolve the issue on length of port/user plane node parameter value	17.3.0
2021-12	CT-94e	CP-213028	0009	1	A	Addition of txPropagationDelayDeltaThreshold and TSN time domain number to port management information	17.3.0
2021-12	CT-94e	CP-213035	0008	1	C	Enabling selective read, set and subscribe/notify of port and user plane node parameters	17.3.0
2021-12	CT-94e	CP-213035	0012	-	D	Editorial cleanup	17.3.0
2021-12	CT-94e	CP-213035	0010	1	F	Time Synchronization Information updates	17.3.0
2021-12	CT-94e	CP-213171	0011	2	F	Support for multiple egress ports per Static filtering entry	17.3.0
2022-03	CT-95e	CP-220229	0013	1	A	Support for deletion of selected parameter entries	17.4.0
2022-03	CT-95e	CP-220229	0014	-	A	Addition of AdminCycleTimeExtension and PSFPAdminCycleTimeExtension in the port management parameters	17.4.0

2022-06	CT-96	CP-221200	0015	1	A	Addition of SupportedListMax in the port management parameters	17.5.0
2022-09	CT-96	CP-222136	0016	1	A	Removal of TSN AF feature support IE and TT feature support IE	17.6.0
2022-12	CT-98e	CP-223144	0017	1	F	Correction to TSN AF-requested port management	18.0.0
2023-03	CT-99	CP-230226	0018	1	B	Update PMIC for 5GS DetNet node reporting	18.1.0
2023-03	CT-99					Correction of Errors and Misimplementation	18.1.1
2023-06	CT-100	CP-231232	0021	-	F	Correction to TSN AF-requested port management	18.2.0
2023-06	CT-100	CP-231229	0022	-	F	Adding missing reference and other fixes for NetNet	18.2.0
2023-06	CT-100	CP-231276	0019	5	B	Timing synchronization status information from NW-TT To TSCTSF	18.2.0
2023-06	CT-100	CP-231232	0023	1	D	Correction to purpose of PMIC and UMIC	18.2.0
2023-06	CT-100					Fixing errors	18.2.1
2023-09	CT-101	CP-232216	0025	1	A	Correction to the encoding of AdminControlList and AdminControlListlength information elements	18.3.0
2023-12	CT-102	CP-233189	0037	-	F	Correction to port management procedure and User plane node management procedure	18.4.0
2023-12	CT-102	CP-233189	0038	-	F	Correction to port parameter list	18.4.0
2023-12	CT-102	CP-233187	0032	3	A	Addition of gate control information	18.4.0
2023-12	CT-102	CP-233190	0034	1	F	Correction to port update result and user plane node update result	18.4.0
2023-12	CT-102	CP-233142	0036	1	F	Correction to user plane node update result IE	18.4.0
2023-12	CT-102	CP-233143	0035	1	F	Correction to port update result IE	18.4.0
2023-12	CT-102	CP-233314	0030	6	A	Update to PMIC and UMIC references for implementation	18.4.0
2024-06	CT-104	CP-241201	0039	1	F	Reference updates	18.5.0
2024-06	CT-104	CP-241168	0040	1	F	Corrections to the port management information for DetNet	18.5.0
2024-09	CT-105	CP-242201	0041	-	F	Corrections to references to notes in the PTP instance list IE	19.0.0
2024-12	CT-106	CP-243220	0044	2	A	Corrections to the encoding of portIdentity	19.1.0
2025-03	CT#107	CP-250164	0046	1	A	Addition of missing LLDP TLVs	19.2.0
2025-06	CT#108	CP-251190	0047	-	F	Correction to network-requested port management procedure completion and User plane node status	19.3.0

History

Document history		
V19.3.0	January 2026	Publication