

Appendices

A

Field Definitions for IEEE 1588 Messages

This appendix discusses the field definitions for IEEE 1588 messages. In all cases, the fields are marshalled into their on-the-wire format in the order given in the tables.

A.1 Message Fields Common to All PTP Messages

The fields common to all PTP messages are defined in Clause 8.2 [24]. These fields and their purposes are shown in Table A.1.

Table A.1. Common PTP message fields

Field name	Purpose
versionPTP	The version of the standard
versionNetwork	The version of the relevant network annex
subdomain	The application subdomain of the protocol
messageType	Identifies message as event or general
sourceCommunicationTechnology	First element in unique source identification
sourceUuid	Second element in unique source identification
sourcePortId	Third element in unique source identification
sequenceId	The counter associated with the message
control	Indicates the message type, <i>e.g.</i> , Sync
flags	Message source or contents configuration
reserved	Reserved for future use

A.2 Sync and Delay_Req Message Fields

The fields of PTP Sync and Delay_Req messages are defined in Clause 8.3 [24]. These fields and their purposes are shown in Table A.2. The common fields from Table A.1 are not repeated in Table A.2.

Table A.2. Sync and Delay_Req message fields

Field name	Purpose
common	Fields in Table A.1
originTimestamp	Estimated sending time of message
epochNumber	Epoch portion of the time scale
currentUTCOffset	Difference between UTC and TAI
grandmasterCommunicationTechnology	Used by best master clock algorithm
grandmasterClockUuid	Used by best master clock algorithm
grandmasterPortId	Used by best master clock algorithm
grandmasterSequenceId	Used by best master clock algorithm
grandmasterClockStratum	Used by best master clock algorithm
grandmasterClockIdentifier	Used by best master clock algorithm
grandmasterClockVariance	Used by best master clock algorithm
grandmasterIsPreferred	Used by best master clock algorithm
grandmasterIsBoundaryClock	Used by best master clock algorithm
syncInterval	Characterizes the sending clock
localClockVariance	Characterizes the sending clock
localSepsRemoved	Characterizes the sending clock
localClockStratum	Characterizes the sending clock
localClockIdentifier	Characterizes the sending clock
parentCommunicationTechnology	Characterizes the sending clock
parentUuid	Characterizes the sending clock
estimatedMasterVariance	Sending clock characterizes its master
estimatedMasterDrift	Sending clock characterizes its master
utcReasonable	Sending clock characterizes its master

A.3 Follow_Up Message Fields

The fields of PTP Follow_Up messages are defined in Clause 8.4 [24]. These fields and their purposes are shown in Table A.3. The common fields from Table A.1 are not repeated in Table A.3.

Table A.3. Follow_Up message fields

Field name	Purpose
common	Fields in Table A.1
associatedSequenceId	Sequence number of the associated Sync message
preciseOriginTimestamp	Precise sending time of associated Sync message

A.4 Delay_Resp Message Fields

The fields of PTP Delay_Resp messages are defined in Clause 8.5 [24]. These fields and their purposes are shown in Table A.4. The common fields from Table A.1 are not repeated in Table A.4.

Table A.4. Delay_Resp message fields

Field name	Purpose
common	Fields in Table A.1
delayReceiptTimestamp	Delay_Req receipt timestamp
requestingSourceCommunicationTechnology	Delay_Req identification
requestingSourceUuid	Delay_Req identification
requestingSourcePortId	Delay_Req identification
requestingSourceSequenceId	Delay_Req identification

A.5 Management Message Fields

The common fields of PTP management messages are defined in Clause 8.6 [24]. These fields and their purposes are shown in Table A.5. The common fields from Table A.1 are not repeated in Table A.5. The detailed specifications of the messageParameter field for each of the different management messages are given in Clause 8.6 [24], and are not repeated here.

Table A.5. Management message fields

Field name	Purpose
common	Fields in Table A.1
targetCommunicationTechnology	Identifies recipient
targetUuid	Identifies recipient
targetPortId	Identifies recipient
startingBoundaryHops	Used to limit forwarding
boundaryHops	Used to limit forwarding
managementMessageKey	Semantics of management message
parameterLength	Length of messageParameters field
messageParameters	Message payload

B

IEEE 1588 Data Sets

This appendix discusses the definitions of IEEE 1588 data sets. In each case, the names of the members of the data set are given, along with an indication of their purpose.

B.1 Default Data Set

The default data set and its members are defined in Clause 7.4.2 [24]. The members and their purposes are shown in Table B.1. In general, the members of the default data set provide information characterizing the clock. This information is used by the best master clock algorithm, and in populating the fields of the PTP messages issued by the clock in the master state.

B.2 Current Data Set

The current data set and its members are defined in Clause 7.4.3 [24]. The members and their purposes are shown in Table B.2. This information is used by the best master clock algorithm, and by the servo in a slave clock.

B.3 Parent Data Set

The parent data set and its members are defined in Clause 7.4.4 [24]. The members and their purposes are shown in Table B.3. In general, the members of the parent data set provide information characterizing the master of the clock. This information is used primarily in populating the fields of the PTP messages issued by the clock in the master state.

Table B.1. Default data set members

Member name	Purpose
clock_communication_technology	Identifier information
clock_uuid_field	Identifier information
clock_port_field	Identifier information
clock_stratum	Clock quality information
clock_identifier	Clock quality information
clock_variance	Clock quality information
clock_followup_capable	Capability information
preferred	Clock quality information
initializable	Capability information
external_timing	Capability information
is_boundary_clock	Clock quality information
sync_interval	synchronization interval
subdomain_name	Subdomain
number_ports	Capability information
number_foreign_records	Capability information

Table B.2. Current data set members

Member name	Purpose
steps_removed	The number of boundary clocks in the path to the master
offset_from_master	The time offset of the slave from the master
one_way_delay	The propagation time between master and slave

B.4 Global Time Properties Data Set

The global time properties data set and its members are defined in Clause 7.4.5 [24]. The members and their purposes are shown in Table B.4. This information plays no role in the PTP protocol, but is provided as a service to applications to allow them to manage leap seconds, and translate between the PTP time scale and UTC.

B.5 Port Configuration Properties Data Set

The port configuration data set and its members are defined in Clause 7.4.6 [24]. The members and their purposes are shown in Table B.5. This information characterizes a PTP port. It is used by the state machine, and for populating PTP messages.

Table B.3. Parent data set members

Member name	Purpose
parent_communication_technology	Parent identification
parent_uuid	Parent identification
parent_port_id	Parent identification
parent_last_sync_sequence_number	Message counter
parent_followup_capable	Parent capability
parent_external_timing	Parent capability
parent_variance	Parent characterization
parent_stats	Parent characterization
observed_variance	Parent characterization
observed_drift	Parent characterization
utc_reasonable	Parent characterization
grandmaster_communication_technology	Grandmaster identification
grandmaster_uuid_field	Grandmaster identification
grandmaster_port_id_field	Grandmaster identification
grandmaster_stratum	Grandmaster characterization
grandmaster_identifier	Grandmaster characterization
grandmaster_variance	Grandmaster characterization
grandmaster_preferred	Grandmaster characterization
grandmaster_is_boundary_clock	Grandmaster characterization
grandmaster_sequence_number	Grandmaster message counter

Table B.4. Global time properties data set members

Member name	Purpose
current_utc_offset	Offset between UTC and TAI
leap_59	Indicates the current day will be 1 s shorter
leap_61	Indicates the current day will be 1 s longer
epoch_number	Current epoch number of the PTP time scale

Table B.5. Port configuration data set members

Member name	Purpose
port_state	Current port PTP state
last_sync_event_sequence_number	Message counters
last_general_event_sequence_number	Message counters
subdomain_address	Addressing information
event_port_address	Addressing information
general_port_address	Addressing information
port_communication_technology	Port identification
port_uuid_field	Port identification
port_id_field	Port identification
burst_enabled	Port identification

B.6 Foreign Master Data Set

The foreign master data set and its members are defined in Clause 7.4.7 [24]. The members and their purposes are shown in Table B.6. This information is used in the qualification process for incoming Sync messages.

Table B.6. Foreign master data set members

Member name	Purpose
foreign_master_communication_technology	Identification
foreign_master_uuid_field	Identification
foreign_master_port_id_field	Identification
foreign_master_syncs	Qualification status

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