

# IEEE Standard for Radio over Ethernet Encapsulations and Mappings

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**Abstract:** The encapsulation and mapping of radio protocols for transport over Ethernet frames, using radio over Ethernet (RoE), are defined in this standard. Structure-agnostic definitions are provided for any digitized radio data. Structure-aware definitions are provided for the Common Public Radio Interface (CPRI™). Native mode definitions are provided for digitized radio in-phase and quadrature (I/Q) payload.

**Keywords:** IEEE 1914.3™, native RoE, radio over Ethernet, RoE, RoE de-mapper, RoE mapper, structure-agnostic, structure-aware

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## Introduction

This introduction is not part of IEEE Std 1914.3-2018, IEEE Standard for Radio over Ethernet Encapsulations and Mappings.

This standard defines the encapsulation and mapping of radio protocols for transport over Ethernet frames, using radio over Ethernet (RoE). It is an integral part of the IEEE 1914™ family of standards, which facilitates the implementation of key technologies for next generation (5G) cellular services, from a transport networking perspective.

The transport networking solution for these cellular services is expected to provide, at least, the following.

- High link capacity
- High link efficiency
- Load balancing for pooled resources (Cloud-RAN)
- Latency guarantees
- Phase alignment of radio data
- Flexible mapping (e.g., different functional splits of radio data) of radio traffic for transport between radio units, aggregation points, and/or centralized baseband unit pools

Today's transport networking solutions cannot satisfy all these expectations. On the other hand, Ethernet technology has experienced steady and cost-efficient speed and capacity growth, driven by the enterprise, access, and data-center markets, and has inherent characteristics that allow it to satisfy the other expectations.

IEEE Std 1914.3 specifies details that allow Ethernet to participate in the new RoE transport networking solution for 5G cellular services.

## Contents

1. Overview .....	14
1.1 Scope .....	14
1.2 Purpose .....	14
2. Normative references .....	14
3. Definitions, acronyms, and abbreviations .....	15
3.1 Definitions .....	15
3.2 Acronyms and abbreviations .....	15
4. Type conventions .....	16
4.1 General .....	16
4.2 RoE Ethernet type .....	16
4.3 Bit, octet ordering, and numerical presentation .....	17
5. Radio over Ethernet (RoE) .....	17
5.1 General .....	17
5.2 RoE architecture .....	18
5.3 RoE objects .....	21
5.4 RoE traffic types .....	22
5.5 RoE common frame format .....	23
6. Timing and synchronization considerations .....	28
6.1 General .....	28
6.2 General assumptions .....	28
6.3 RoE presentation time .....	28
6.4 Presentation time measurement points .....	29
7. RoE parameters .....	29
7.1 General .....	29
7.2 Parameter introduction .....	29
7.3 Parameter lists .....	30
8. RoE mappers .....	35
8.1 General .....	35
8.2 Structure-agnostic RoE mapper .....	35
8.3 Structure-aware RoE mapper .....	37
8.4 Native RoE time domain packet mapper .....	45
8.5 Native RoE frequency domain packet mapper .....	46
9. RoE control packet header format .....	50
9.1 General .....	50
9.2 OAM/TLV control packet .....	51
9.3 Ctrl_AxC control packet .....	54
9.4 MSD control packet .....	54
9.5 Timing control packet .....	55
Annex A (normative) Protocol Implementation Conformance Statement (PICS) proforma .....	57
Annex B (informative) Structure-aware examples .....	65
Annex C (informative) Presentation time usage .....	69
Annex D (informative) Sequence number example code .....	72

Annex E (informative) RoE OAM TLV example .....	74
Annex F (informative) Bibliography .....	75

## List of Figures

Figure 1—Bit ordering and numbering within an octet .....	17
Figure 2—Bit and octet ordering and numbering within a 32-bit double word.....	17
Figure 3—RoE endpoints and supported functions .....	18
Figure 4—RoE nodes and supported functions .....	19
Figure 5—RoE topology examples: a) single point-to-point, b) multiple point-to-point, c) point-to-multipoint, d) chain, e) ring, f) tree .....	20
Figure 6—RoE objects and hierarchy.....	21
Figure 7—RoE encapsulation in Ethernet frames .....	22
Figure 8—RoE encapsulation common frame format—the RoE header.....	23
Figure 9—Sequence number composition .....	25
Figure 10—Format of the timeStamp field.....	27
Figure 11—Presentation time measurement points .....	28
Figure 12—Example of how a CPRI basic frame appears in a structure-agnostic packet: a) originating CPRI basic frame, b) common header (first 8 B in the packet), c) remainder of packet with I/Q samples .....	38
Figure 13—Example mapping CPRI basic frame using structure-aware packet: a) originating CPRI basic frames (total series of four), b) common header (first 8 B in the packet), c) remainder of packet with I/Q samples (assuming total four basic frames of 15-bit samples).....	40
Figure 14—CPRI basic frame and “control process” interaction .....	41
Figure 15—A simple example of CPRI fast C&M transport over native Ethernet .....	42
Figure 16—Example RoE packet for transporting CPRI Slow C&M flow.....	43
Figure 17—Native RoE time domain packet example with I/Q sample payload: a) common header (first 8 B in the packet), b) remainder of packet (only two complete 15-bit i/Q sample pairs are shown) .....	46
Figure 18—Native RoE frequency domain packet example with I/Q sample payload: a) common header (first 8 B in the packet), b) remainder of packet (only two complete 15-bit I/Q sample pairs are shown).....	48
Figure 19—Native RoE PRACH packet example: a) Common header (first 8 B in the packet), b) Remainder of packet (only two complete 15-bit I/Q sample pairs are shown).....	50
Figure 20—RoE control packet common frame format .....	50
Figure 21—OAM TLV packet format .....	51
Figure 22—Basic TLV format.....	51
Figure 23—OAM TLV write control packet (without child ID).....	52
Figure 24—OAM TLV read request control packet for Mapper PRACH parameter values.....	53
Figure 25—OAM TLV read response control packet for Mapper PRACH parameter values .....	53

Figure 26—Timing packet format .....	56
Figure B.1—Packed position AxC Container mapping in the I/Q data block .....	65
Figure B.2—Flexible position AxC Container mapping in the I/Q data block .....	65
Figure B.3—Example of CPRI mapping method #3 .....	66
Figure B.4—Example of using modulo rules and the structure-aware RoE mapper.....	66
Figure B.5—Example of configuration parameter sets.....	67
Figure E.1—RoE OAM TLV Example.....	74

## List of Tables

Table 1—RoE EtherType .....	17
Table 2—subType mapping table .....	22
Table 3—RoE subType values .....	23
Table 4—RoE flowID values.....	24
Table 5—Sequence number related parameters.....	26
Table 6—Object type enumeration.....	30
Table 7—Ethernet link parameters .....	30
Table 8—CPRI port parameters .....	31
Table 9—RoE mapper/de-mapper parameter relevance.....	31
Table 10—RoE mapper parameters.....	32
Table 11—RoE de-mapper parameters.....	34
Table 12—subType mapping object parameters.....	35
Table 13—Parameters under RoE.Container branch.....	38
Table 14—Control process RoE mappers for CPRI control words.....	41
Table 15—CPRI control word RoE mapper container parameters .....	43
Table 16—Subchannel word bit masks .....	44
Table 17—Hyper-frame filtering options .....	44
Table 18—Parameters under mapper[mapperID].[fftID] branch .....	47
Table 19—Parameters mapper[mapperID].[fftID].[PRACH] branch .....	49
Table 20—RoE control packet opCode values .....	50

# IEEE Standard for Radio over Ethernet Encapsulations and Mappings

## 1. Overview

### 1.1 Scope

This standard defines the encapsulation and mapping of radio protocols for transport over Ethernet frames, using radio over Ethernet (RoE). Structure-agnostic definitions are provided for any digitized radio data. Structure-aware definitions are provided for the Common Public Radio Interface (CPRI™). Native mode definitions are provided for digitized radio in-phase and quadrature (I/Q) payload and control data channels.

### 1.2 Purpose

This standard enables the transfer of I/Q user-plane data, vendor-specific data, and control and management (C&M) information channels across an Ethernet-based packet-switched network. The standard fosters interoperability among implementations by defining the framing, the encapsulation of the information, and a common Ethernet Type for RoE purposes.

## 2. Normative references

The following referenced documents are indispensable for the application of this standard (i.e., they must be understood and used; therefore, each referenced document is cited in text, and its relationship to this standard is explained). For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments or corrigenda) applies.

3GPP Specification TS 36.211, Evolved Universal Terrestrial Radio Access (E-UTRA); Physical channels and modulation.<sup>1</sup>

Common Public Radio Interface (CPRI™) Specification, v7.0.<sup>2,3</sup>

IEEE Std 754™-2008, IEEE Standard for Binary Floating-Point Arithmetic.<sup>4,5</sup>

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<sup>1</sup>The 3GPP specification is available from the 3GPP Website, <http://www.3gpp.org/specifications/releases>.

<sup>2</sup>The CPRI specification is available from the CPRI Website, <http://www.cpri.info/>.

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