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ABSTRACT

This contribution seeks editorial and technical improvement of ITU-T Recommendation Q.2111 Annex D (SSCOP in a Multiframe or Connectionless Environment when operating over Ethernet).

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1. INTRODUCTION

A number of minor editorial matters have been identified through a review of the baseline text for ITU-T Recommendation Q.2111 Annex D. A few technical issues were raised during the last SG 11 meeting. The following section identifies these matters. The attachment provides proposed replacement text.

2. DISCUSSION

The following list describes the proposed modifications to the Q.2111 Annex D baseline by section:

Section 3 (Ethernet Interface)

1. Figure D1 is revised to clarify the scope of the IEEE 802.2 and 802.3 standards, respectively.
2. Additional description of the Class of Service, CFI and VLAN sub-fields in the 802.1 tag is included.
3. References to other Ethernet frame types are deleted to focus the annex solely on IEEE-based Ethernet networks.
4. The use of the LLC header is removed from the text and the figures, since it is not used in the latest Ethernet implementations and, more importantly, since its intended function makes that header partially redundant with the function of the port identifier fields.

Section 4 (Mappings)
Figures D2 and D3 have removed depiction of the LLC header from the Ethernet PDU.

Section 5 (Upper Layer Service Access)
Mention of the LLC header field is removed.

Section 6 (Bibliography)
The order of the references and their associated numeration in the text have been changed to reflect their order of use in the annex.

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3. PROPOSAL

It is proposed that the enclosed text be accepted as modified baseline text for a new Annex D / Q.2111.

Annex D
Convergence Function for SSCOPMCE Above Ethernet

(This annex forms an integral part of this Recommendation)

1. General Description

The convergence function for SSCOPMCE above Ethernet specifies the deployment of SSCOPMCE on top of the connectionless service provided by IEEE 802.3 Ethernet networks.

A primary driver for this configuration is to realize an open-systems databus for closed-loop systems. A switched, full-duplex mode of operation is assumed, though not required, for operation of SSCOPMCE above an Ethernet-based infrastructure.

2. Functions of the Convergence Function

The purpose of the convergence function is to map information between SSCOPMCE and Ethernet PDUs.

3. Ethernet Interface

The user interface to an Ethernet MAC layer service is defined by the IEEE 802.3 MAC frame format, as shown in Figure D1 [1]. Each frame represents the equivalent of an Ethernet PDU.

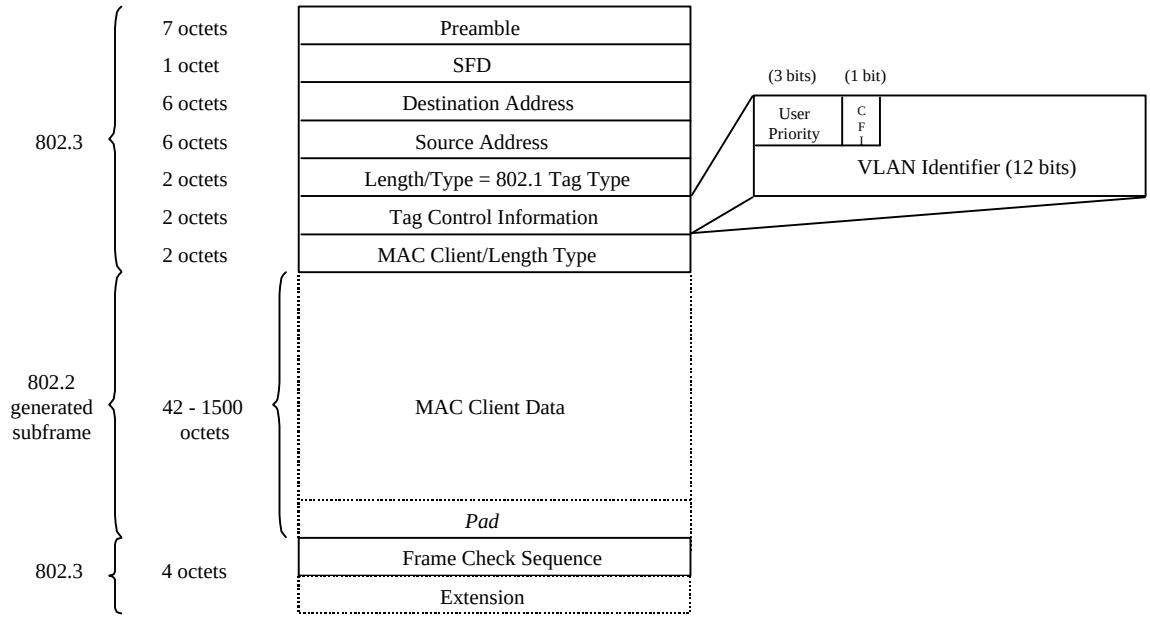

Figure D1. 802.3 MAC frame format

The 802.3 MAC frame has the following fields:

3.1 Preamble Field

Preamble is a 7-octet field that is used to allow circuitry to reach synchronization with the received frame timing.

3.2 Start Frame Delimiter

The SFD field has the value 10101011. It indicates the start of a frame.

3.3 Address Fields

A destination address field specifies the destination address for which the fame in intended. The Source address identifies the station from which the frame is initiated. In both cases, the address field is 6 octets (48 bits) long. The first bit in the address identifies the address an individual or group address. The second bit distinguished between locally or globally administered addresses. An all 1s in the destination address field is defined as the broadcast address to all stations on the communication medium.

3.4 Length/Type Field

A length/type field is 2 octets long. A value of x8100 indicates the existence of a tag field.

3.5 Tag Control Information

Tag control information is 2 octets long and is subdivided into the following sub-fields:

- A 3-bit user priority field (Class of Service)
- A 1-bit Canonical Format Identifier (CFI)
- A 12-bit Virtual Local Area Network (VLAN) identifier

The priority sub-field enables differentiated treatment of frames based on their priority. The CFI sub-field is a flag indicating that the current frame is actually a Token Ring frame encapsulated in an Ethernet frame format. The VLAN sub-field provides explicit tagging of VLAN membership information in order to contain broadcast data within a switched Ethernet network. The priority and VLAN sub-fields denote the IEEE 802.1p and 802.1q standards, respectively.

3.6 Length/Type Field

The Length/Type field as two interpretations, depending upon its value. For numeric evaluation, the first octet is the most significant octet of this field.

- When the value of this field is less than or equal to the value of `maxValidFrame` [1], then the field indicates the number of octets contained in the subsequent data field of the frame (Length interpretation).
- When the value of the field is greater than or equal to 1536 decimal (x0600) the field indicates the nature of the MAC client protocol (Type interpretation).

~~In current Ethernet networks, the former interpretation is used, whereas the latter interpretation is used mainly when referring to older non-IEEE Ethernet standards, e.g., based on the DIX II frame type.~~ This annex defines the SSCOPMCE mapping to IEEE-based (i.e., 802.3) Ethernet networks only.

3.7 Logical Link Control, Data and Pad Fields

~~A Logical Link Control (LLC) is appended before the MAC specific data. Defined by the IEEE's 802.2 standard [4],~~ Logical Link Control (LLC) defines MAC-independent logical layer services to pass incoming

frames to an appropriate network layer protocol~~. The LLC header consists of the following 1-octet subfields~~[2]:

~~- DSAP: Destination Service Access Point~~
~~- SSAP: Source Service Access Point~~
~~- Control: Control (to identify LLC Class 1 service frames)~~

~~The values of the DSAP and SSAP fields are usually identical. For the purposes of this annex, a new SAP value will be obtained from ISO to designate the DSAP/SSAP LLC subfields as a frame carrying SSCOPMCE data.~~

~~The data field consists of a sequence of n octets.~~

The 802.2 subframe generated by the LLC layer has traditionally contained a LLC header field and a data field. Since a minimum frame size is required for correct MAC-layer operation, the data field may be appended with extra bits, i.e., a pad field. Recently, use of the LLC header has been deprecated in practice and thus it is not to be used. Instead, alternate protocol fields (i.e., port identifiers discussed in Section 5) providing an identical function in a simpler manner have been specified.

3.8 Frame Check Sequence Field

A cyclic redundancy check is used by the transmit and the receive algorithms to generate a CRC value for the FCS field. The FCS field contains a 4-octet CRC value.

3.9 Extension Field

The Extension field contains a sequence of extension bits. Its length may be zero to (`slotTime – minFrameSize`) bits [2]. The contents of the Extension field are not included in the FCS computation.

4. Mappings

Mappings between SSCOPMCE and Ethernet are shown in Figures 2 and 3, which depict the service data units and parameters passed between the SSCOPMCE/Convergence Function and the Ethernet layer at the transmitting and receiving side, respectively.

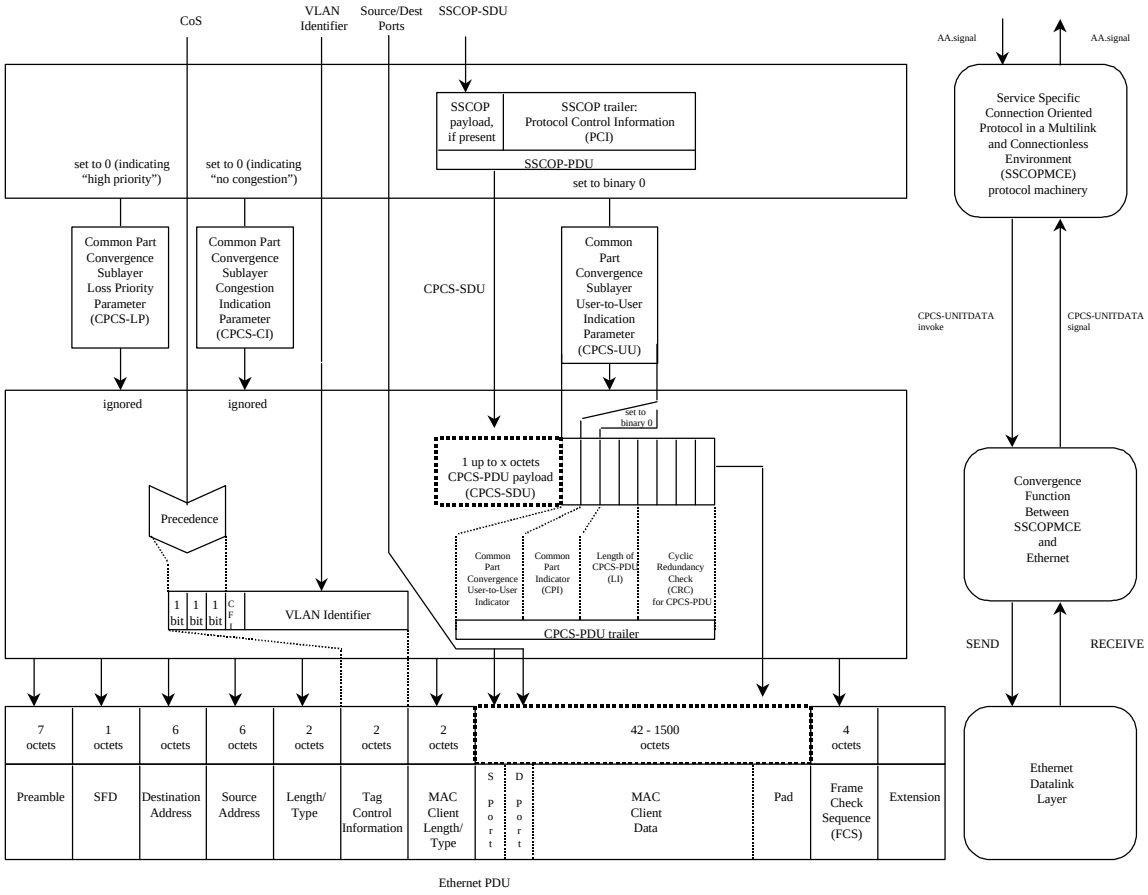

Figure D2. Service Data Unit and Parameters Passed Between SSCOP/Convergence Function and Ethernet – Transmitting Side

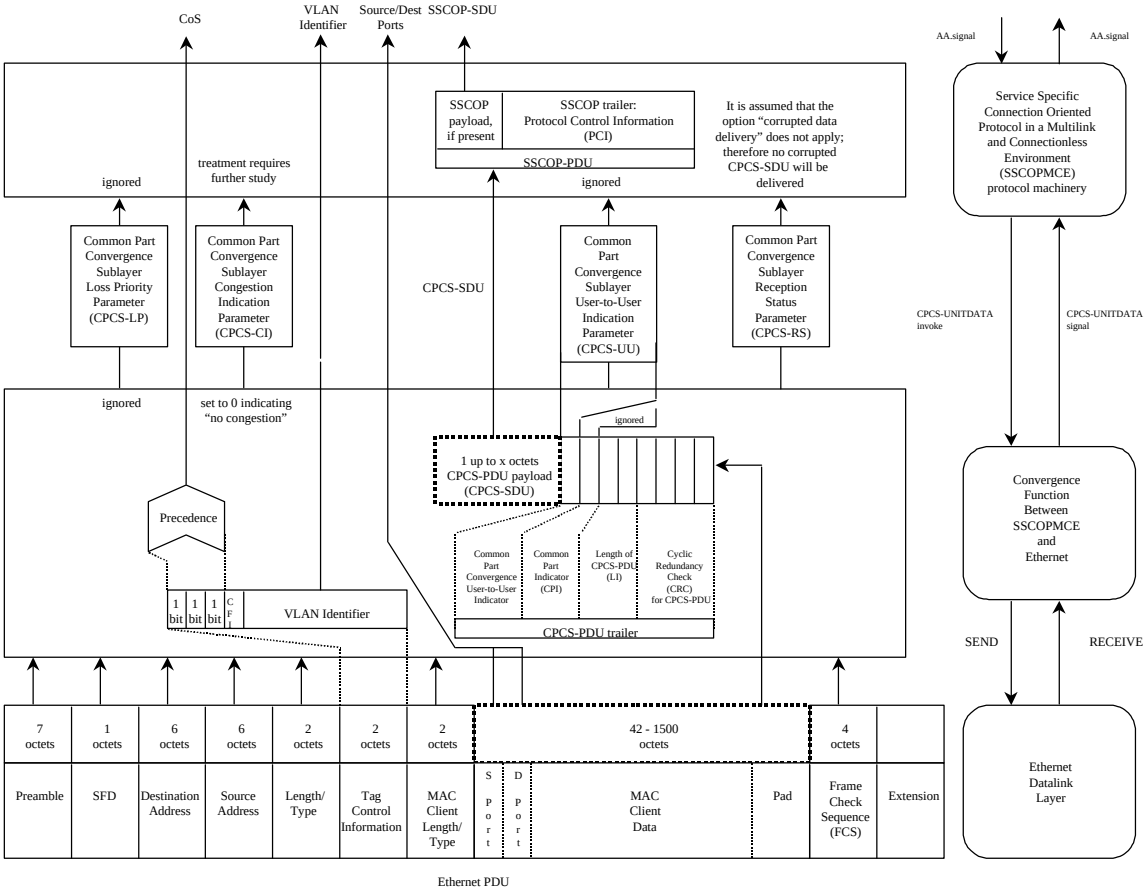

Figure D3. Service Data Unit and Parameters Passed Between SSCOP/Convergence Function and Ethernet – Receiving Side

5. Upper Layer Service Access

The SSCF sublayer provides the SAP to applications that utilize SSCOPMCE services. (That SAP is in contrast to the SAP between the convergence function and datalink layer, defined in Section 3). The mapping between the SSCF and SSCOP sublayers is the same as that defined for the Service Specific Coordination Function for Support of Signalling at the User Network Interface (SSCF at UNI) specified in [3]. As a result, applications will be able to utilize the SAP to access the following services enabled by SSCOPMCE:

- Unacknowledged transfer of data
- Assured transfer of data
- Transparency of transferred information
- Establishment and release of connections for assured transfer of data

The SSCF SAP, as well as a SAP to Ethernet MAC-layer elements, together form a user-network interface. For the purpose of this annex, the only unique requirement on that interface is that it support the specification of port information. Within the SSCOPMCE protocol machinery and convergence function, this means that four octets will be aligned with each SSCOP SDU, to be located ~~after the LLC~~before the data field; two octets representing a source port, and two octets representing a destination port. These identifiers will be used to multiplex/demultiplex SSCOPMCE sessions across multiple application processes; the processes would be utilizing a common Ethernet interface. (The port identifier can be thought of as reusing a subset of the space traditionally occupied by the five-octet SNAP field, which ~~also follows~~ followed the LLC field, but is rarely used on IEEE 802.3 networks.) Whether or not the SSCOP SDU is segmented by the convergence function to conform to the Ethernet maximum transmission unit, the port identifiers must be replicated in each Ethernet

PDU ~~– specifically after the LLC field –~~ on the transmitting side (Fig. D2), and extracted and aligned with a complete SSCOP SDU on the receiving side (Fig. D3).

6. References

[1] ANSI/IEEE Std 802.3ac, *Specific Requirements Part 3: Carrier Sense Multiple Access with Collision Detection (CSMA/CD) Frame Extensions for Virtual Bridged Local Area Networks (VLAN) Tagging*, 1998.

[~~4~~2] ANSI/IEEE Std 802.2, *Information technology - Telecommunications and information exchange between systems - Local and metropolitan area networks - Specific requirements - Part 2: Logical Link Control*, 1998.

[~~2~~3] ANSI/IEEE, Std 802.3, *CSMA/CD Access Method and Physical Layer Specifications*, 1998.

[~~3~~4] ITU-T, *B-ISDN Signalling ATM Adaptation Layer – Service Specific Coordination Function for Support of Signalling at the User Network Interface (SSCF at UNI), Q.2130*, 1994.