PPP over SONET from STS-1 (STM-0/AU-3) to STS-192c (STM-64/AU-4-64c)

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Shahrukh Merchant
Cimaron Communications

smerchant@cimaron.com
+1 978 623-0009 Ext. 3020

Purpose

- Document existing practice on previous technology (STS-3c, STS-12c)
- Document what appears to be consensus and/or current practice on current technology (STS-48c)
- Propose extension for future technology (STS-192c)

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Philosophy

Preserve scope of *PPP* over *SONET*

- Do describe how to carry PPP over SONET
- Don't describe how to map IP into PPP
- Don't describe how to map SONET payloads into SONET frame

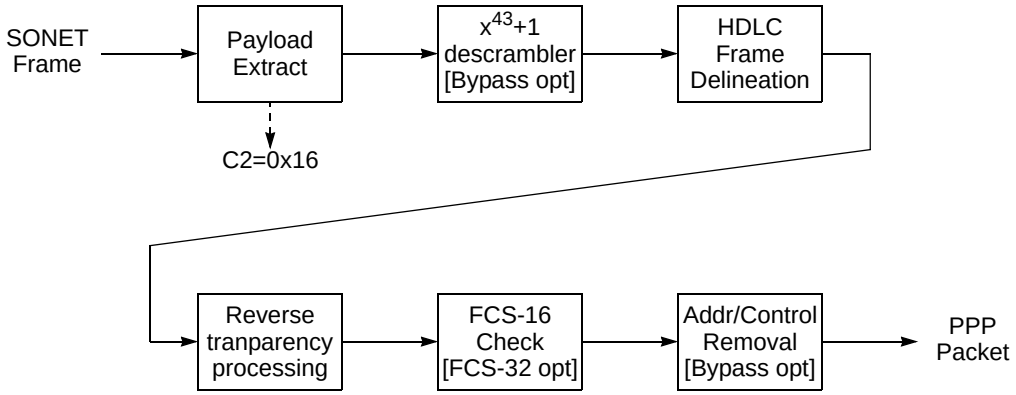
(The latter two are properly the domain of other standards and specifications)

For extensions for future technology

- Practicality of implementation
- Retain familiarity of proven concepts where possible and reasonable

STS-1, STS-3c, STS-12c

- HDLC per RFC 1662
- Revised ANSI T1.105.02 or Revised G.707 for SONET mapping (C2=0x16, $x^{43}+1$ payload scrambling)



STS-48c

- Same as above except FCS-32 is default (FCS-16 not a specified option)

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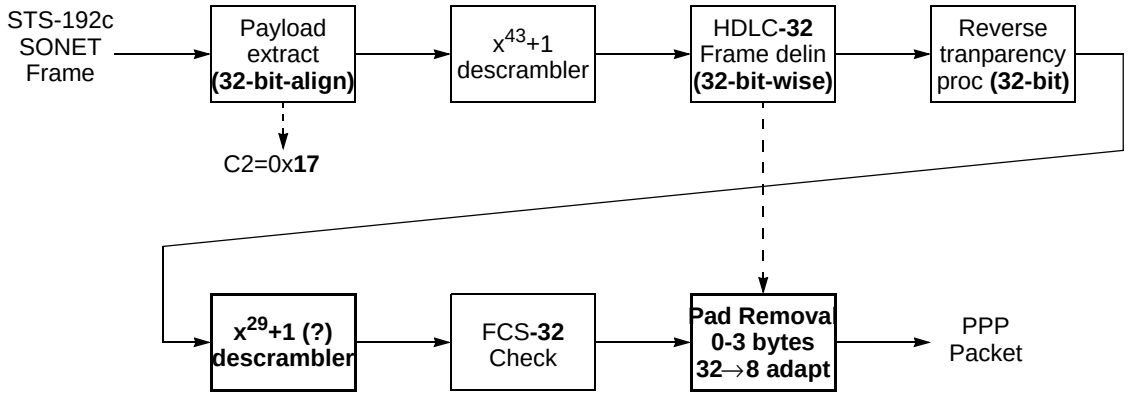
STS-192c

- 32-bit-oriented HDLC-32
- **32-bit alignment in SONET payload**
- Eliminates options
- HDLC-32 payload scrambling prevents potential malicious bandwidth expansion



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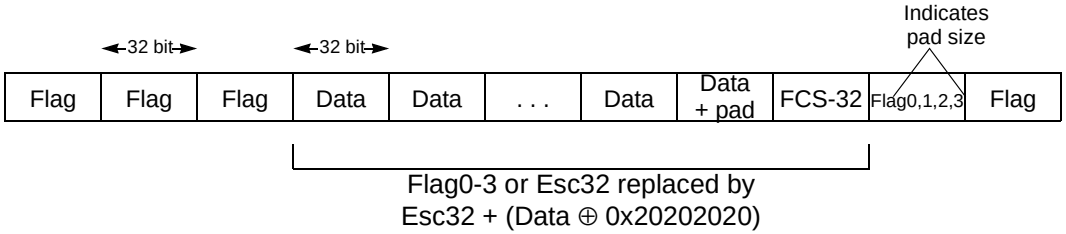
HDLC-32 Motivation

- Byte-wise HDLC processing is extremely complicated at high rates (where internal data bus widths are much wider)
  → 32-bit-wide processing
- Retain familiarity and proven approach of HDLC, modifying minimally as needed to accommodate 32-bit-wide processing
  - Error in an HDLC frame rarely affects adjacent HDLC frames
  - Independent of packet format and length
  - Stream-based (no storage required beyond a few bytes for internal buffering)

HDLC-32 Frame Format



Flag is one of: Flag0 or Flag1 or Flag2 or Flag3

Flag0 = E7 81 CA 34
Flag1 = E7 81 CA 35
Flag2 = E7 81 CA 36
Flag3 = E7 81 CA 37

Esc32 = EB 8D C6 38

Abort = Esc32 + Flag0

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Errata and Omissions in Submitted Document

- “No FCS” is not an option (for STS-1/3c/12c/48c)—must be FCS-16 or -32
- FCS-16 is not a specified option for STS-48c
- ACCM is not used (although an HDLC *decoder* would always decode it properly anyway)

Next Steps

- Incorporate comments, discussions and suggestions
- Fill in Appendix A, B, C (clarifying bit ordering of scrambling and CRC calculations)
- Fill in Appendix D (PPP over DS3) and expand to include DS1-DS3 and E1-E3