



T1X1.5/99-268r1 Overview

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Agenda

- **Context**
- **Background on T1X1.5 EoS**
- **Overview of T1X1.5/99-268r1**

Context

- **Liaison from T1X1 referring to T1X1.5/99-268r1 received by 802.3 at November Kauai plenary**
- **802.3 EoS Ad Hoc drafted a liaison reply**
- **Liaison reply tabled at closing 802.3 plenary**

Background on T1X1.5 EoS

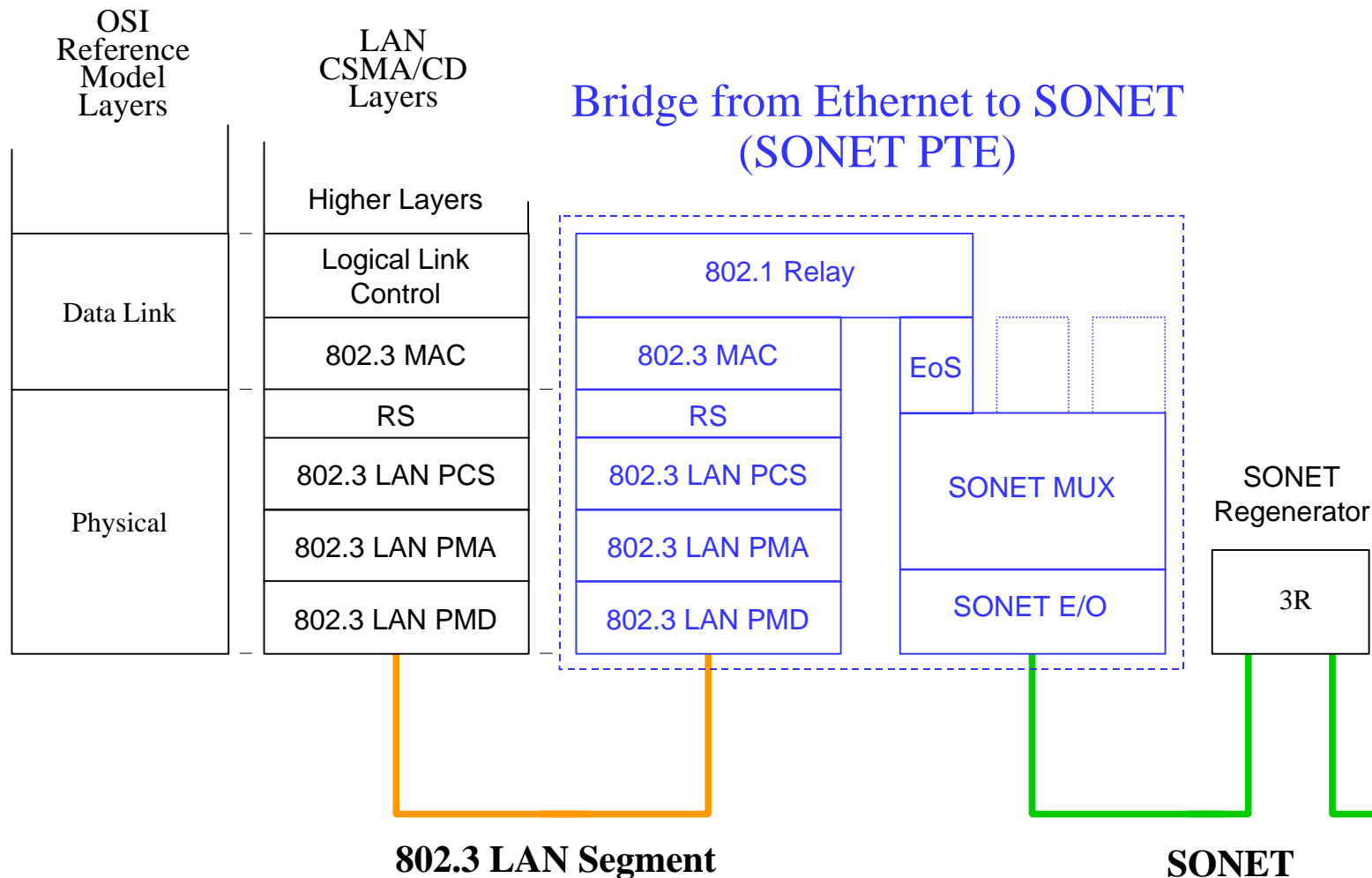
- **Ethernet over SONET definition**
- **SONET connection types**

Ethernet over SONET: In Words

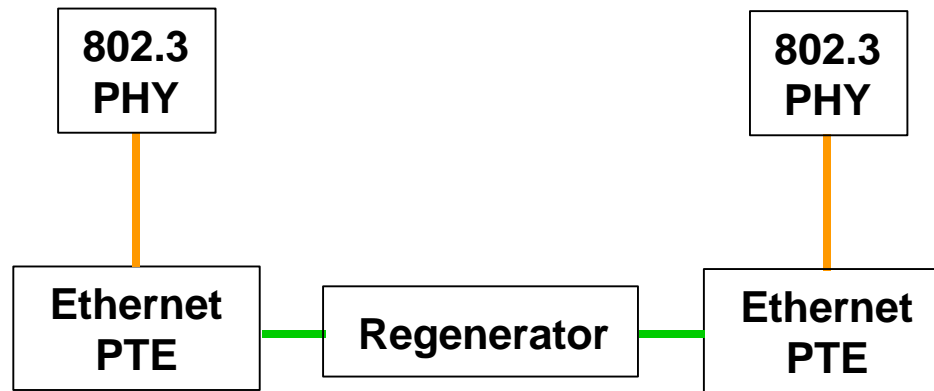
- a) **A proposed methodology for mapping 802.3 Ethernet MAC frames intact into SONET payloads.**
- b) **The SONET *Path* termination is at the interface between the SONET mux and the EoS mapping function.**
- c) **This gets mapped over a system fully compliant with all requirements of SONET/SDH standards.**
- d) **Enables service providers to provide services and service level agreements (SLAs) based on SONET/SDH performance and operations management.**

* for more definitions refer to http://grouper.ieee.org/groups/802/3/10G_study/public/jan00/law_1_0100.pdf

Ethernet over SONET: As OSI layer model



Pt-Pt SONET

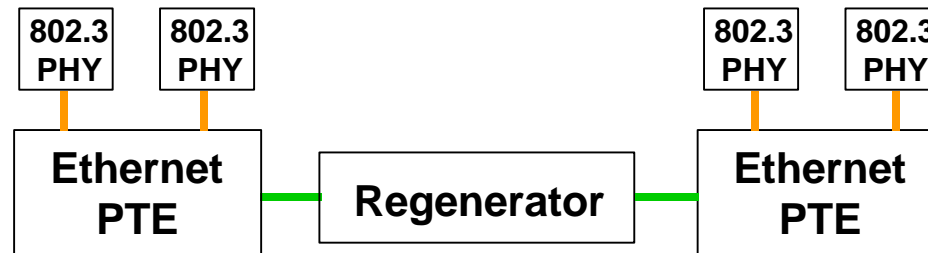


— SONET

— 802.3 LAN Segment

PTE - Path Termination Equipment

Shared Bandwidth SONET



———— SONET

———— 802.3 LAN Segment

PTE - Path Termination Equipment

Shared Bandwidth SONET

- a) **The multiplexing of layer 2 client signals into the same SONET path.**
- b) **The SONET path bandwidth may be less than the sum of the multiple client signals.**
- c) **Requires client signals to be encapsulated with transport node/port addressing info, used by layer 2 aware transport equipment.**
- d) **May be over linear pt-pt or ring topologies.**

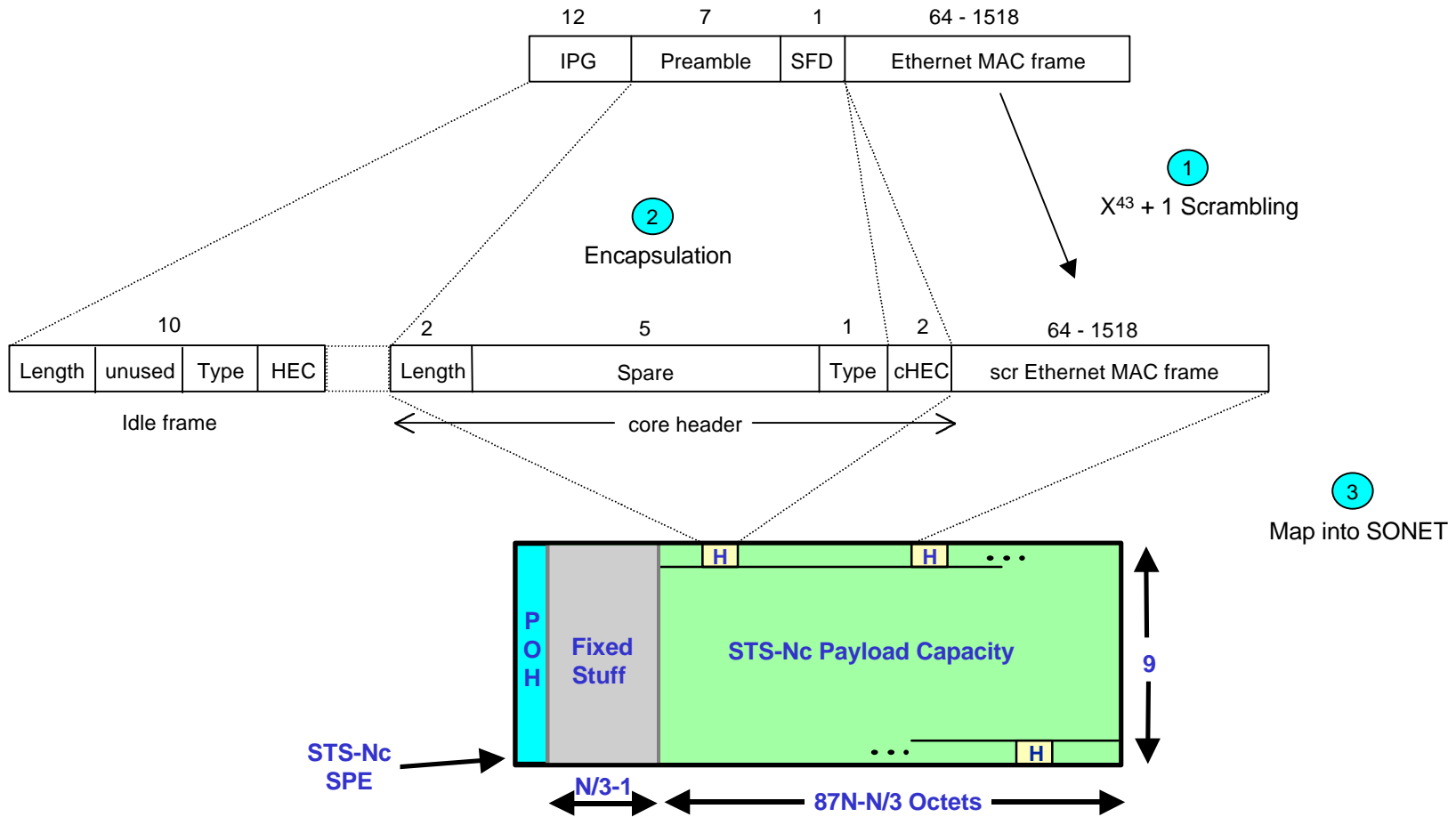
Overview of T1X1.5/99-268r1

- **Line code termination**
- **MAC frame encapsulation**
- **Mapping into SONET**
- **Benefits**

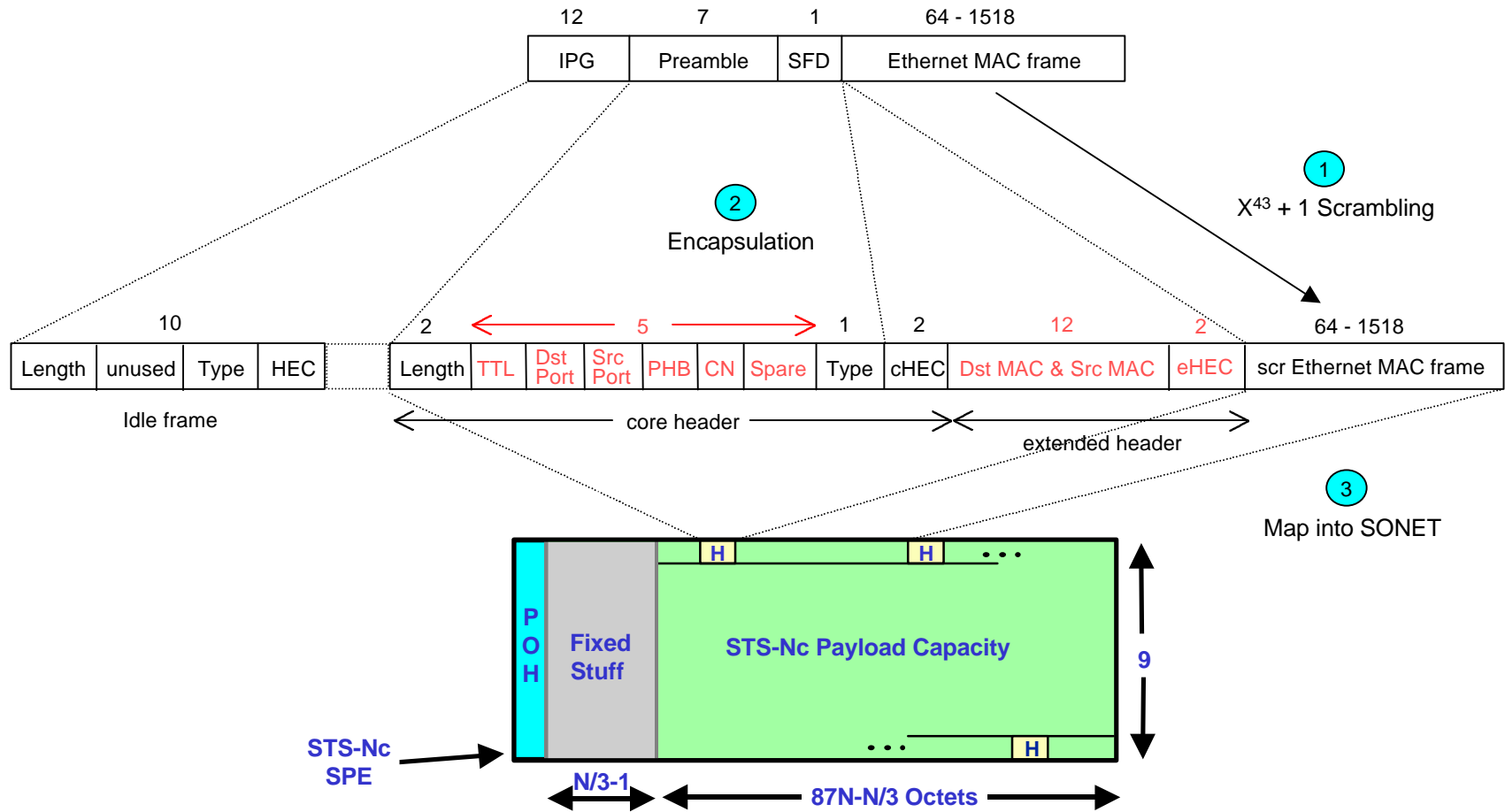
Line Code Termination

- **802.3 line code is terminated & MAC frames are recovered**
- **Provides optimum transport bandwidth efficiency**
 - Manchester encode of 100% eliminated
 - 8B/10B encode of 25% eliminated
- **Enables a common mapping for MAC frames, independent of interface**

MAC Frame Encap/Mapping: Pt-Pt



MAC Frame Encap/Mapping: Shared Bandwidth



Red fields specific to shared bandwidth mapping

MAC Frame Encap/Mapping (cont'd)

Core header for pt-pt connections:

- *Length (2B)* of payload + extended header
- *Type (1B)* to identify payload type and header format
- *cHEC (2B)* (core Header Error Check) over header & for delineation
- *5B* reserved for other uses (also preserves 802.3 preamble structure of 8B)

Additional core header fields for shared bandwidth connections:

- *TTL (1B)* (Time To Live) to avoid endless propagation in a ring
- *Destination/Source Port (1B)* to address a port on a multi-port circuit pack
- *PHB (6b)* (Per Hop Behavior) for discard eligibility & class of service
- *CN (2b)* (Congestion Notification) for use with congestion avoidance schemes
- *2B* spare

MAC Frame Encap/Mapping (cont'd)

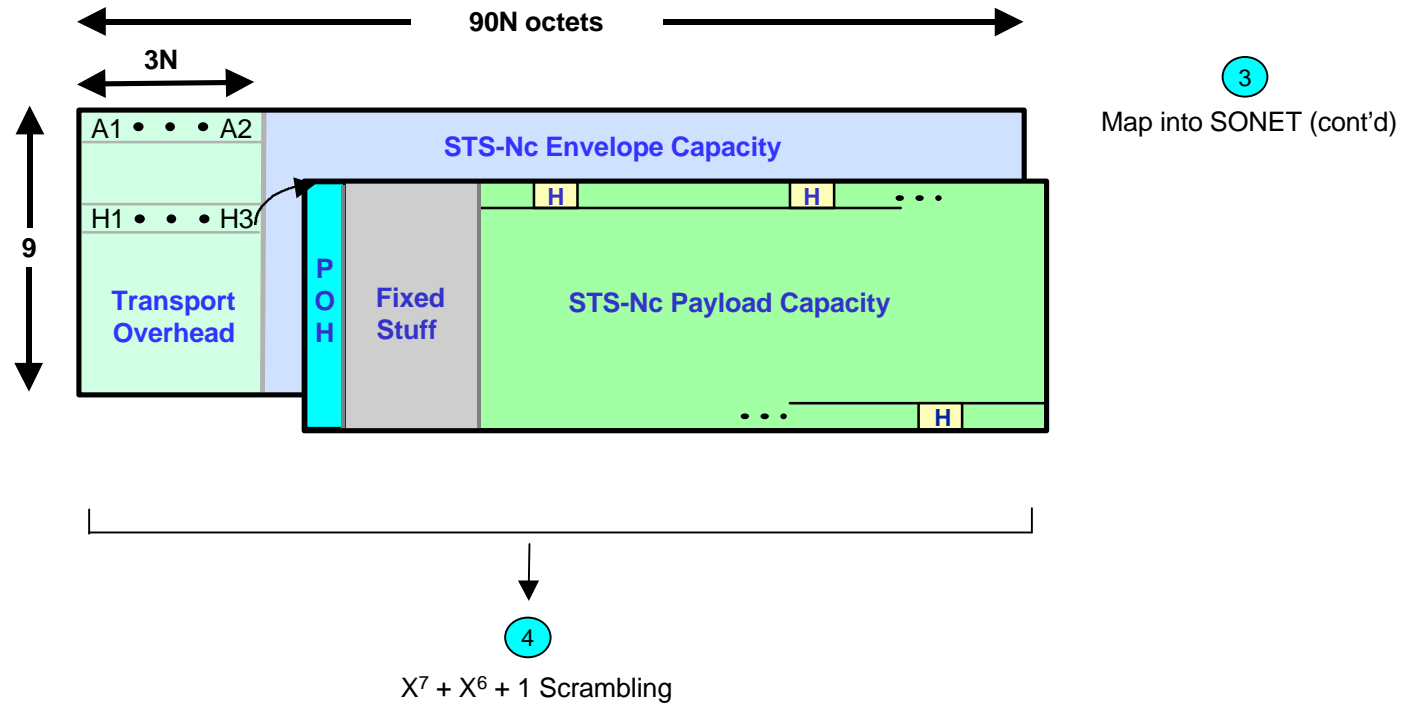
Plus extended header for shared bandwidth connections:

- *Destination/Source MAC (12B)* to address a circuit pack at a node
- *eHEC (2B)* (extended Header Error Check) over extended header

Idle frames:

- a core header with *Length=10B*
- replaces IPGs or when no data from MAC to send

Mapping Into SONET



- mapping into contiguously concatenated SPE shown
- another option is mapping into virtually concatenated SPEs

SPE = Synchronous Payload Envelope

Benefits

- **The mapping is uniform for all Ethernet interfaces/rates. It is also common for both linear and ring transport topologies. This minimizes cost by maximizing equipment commonality.**
- **All the relevant MAC layer information, from Destination address through FCS inclusive, is preserved intact by the mapping. This maintains a clear distinction between layers.**
- **Since the FCS is preserved, the native Ethernet error detection capability is protected. Consequently, the error detection capability is not degraded.**
- **Because the mapping doesn't inflate the frame length in a non-deterministic way (e.g. like HDLC), the throughput capacity and performance is predictable. This eases network planning.**
- **A robust delineation mechanism is utilized.**