SDH Multiplexing

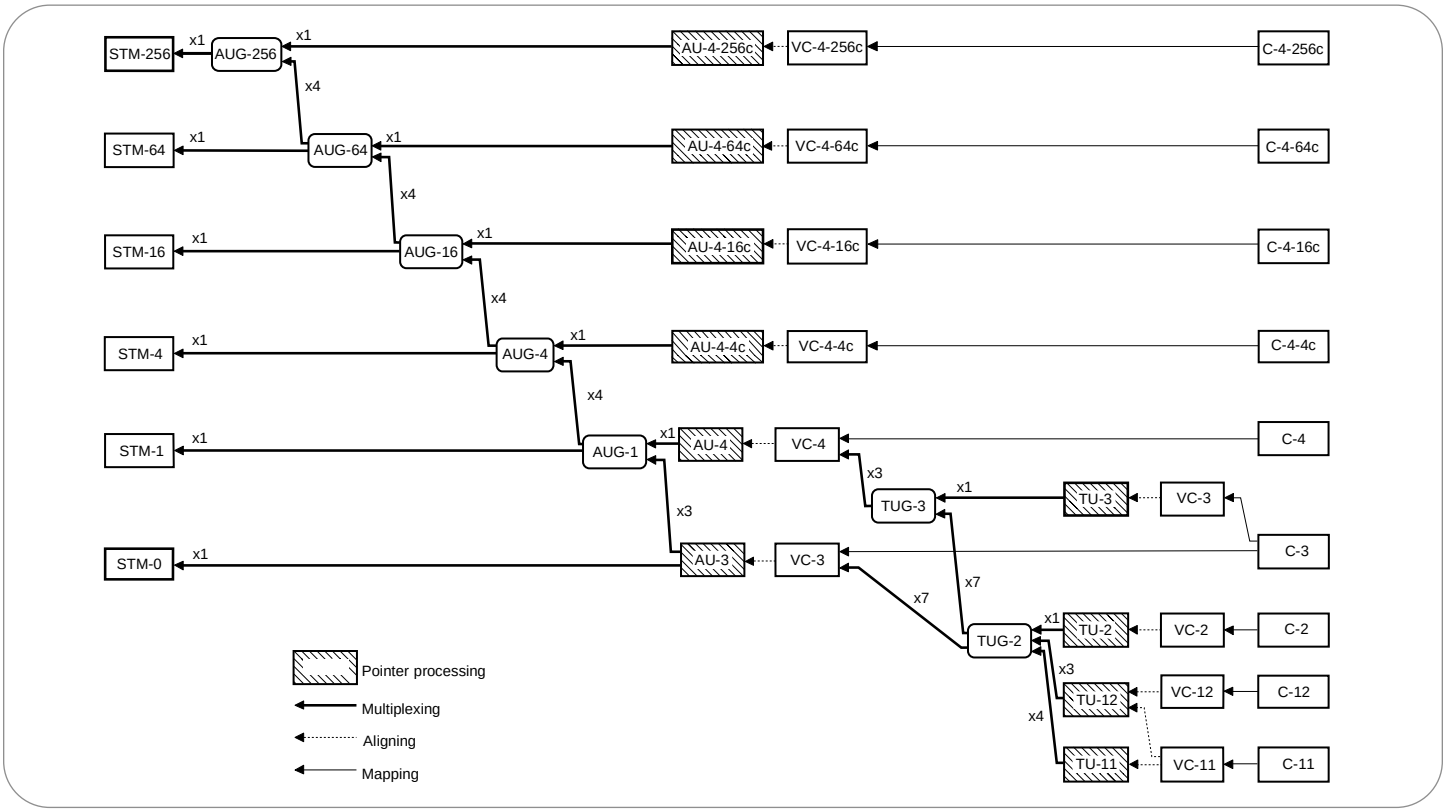
The multiplexing principles of SDH follow, using these terms and definitions:

- Mapping – A process used when tributaries are adapted into Virtual Containers (VCs) by adding justification bits and Path Overhead (POH) information.
- Aligning – This process takes place when a pointer is included in a Tributary Unit (TU) or an Administrative Unit (AU), to allow the first byte of the Virtual Container to be located.
- Multiplexing – This process is used when multiple lower-order path layer signals are adapted into a higher-order path signal, or when the higher-order path signals are adapted into a Multiplex Section.
- Stuffing – As the tributary signals are multiplexed and aligned, some spare capacity has been designed into the SDH frame to provide enough space for all the various tributary rates. Therefore, at certain points in the multiplexing hierarchy, this space capacity is filled with "fixed stuffing" bits that carry no information, but are required to fill up the particular frame.

Figure 12 illustrates the ITU-T SDH multiplexing structure defined in Rec. G.707. The notations in the boxes, such as C-1, VC-3, and AU-4, are explained in Table 10.

At the lowest level, containers (C) are input to virtual containers (VC). The purpose of this function is to create a uniform VC payload by using bit-stuffing to bring all inputs to a common bit-rate ready for synchronous multiplexing. Various containers (ranging from VC-11 at 1.728 Mbit/s to VC-4 at 150.336 Mbit/s) are covered by the SDH hierarchy. Next, VCs are aligned into tributary units (TUs), where pointer processing operations are implemented.

These initial functions allow the payload to be multiplexed into TU groups (TUGs). As Figure 12 illustrates, the xN label indicates the multiplexing integer used to multiplex the TUs to the TUGs. The next step is the multiplexing of the TUGs to higher level VCs, and TUG-2 and TUG-3 are multiplexed into VC-3 (ANSI mappings) and VC-4. These VCs are multiplexed with fixed byte-stuffing to form administration units (AUs) which are finally multiplexed into the AU group (AUG). This payload then is multiplexed into the Synchronous Transport Module (STM).



▶ ***Figure 12.*** *SDH multiplexing structure.*

Table 10. SDH Multiplexing Structure

Term	Contents	User
C-N	N = 1 to 4	Payload at lowest multiplexing level
VC-N	N = 1, 2 (Lower-Order)	Single C-n plus VC POH
VC-N	N = 3, 4 (Higher-Order)	C-N, TUG-2s, or TUG-3s, plus POH for the specific level
TU-N	N = 1 to 3	VC-N plus tributary unit pointer
TUG-2	1, 3 or 4 (TU-N)	Multiplex of various TU-Ns
TUG-3	TU-3 or 7 TUG-2s	TU-3 or multiplex of 7 TUG-2s
AU-N	N = 3, 4	VC-N plus AU pointer
AUG	1, 3 (AU-n)	Either 1 AU-4 or multiplex of 3 AU-3s
STM-N	N = 1, 4, 16, 64 AUGs	N synchronously-multiplexed STM-1 signals

POH = Path Overhead

C = Container

TU = Tributary Unit

AU = Administrative Unit

VC = Virtual Container

TUG = Tributary Unit Group

STM = Synchronous Transport Module