MIL-STD 188-220B Class C (Types 1 and 4) Link Layer Estelle Specification

The Class C specification is documented by several diagrams and tables. They are:

- Datalink Layer Interface - an abstract view of the datalink layer's interface with its upper (Network) layer, its lower layer (Physical), and a proposed peer representing an operator or management component. This diagram summarizes all service primitives that define the information flow between the datalink layer and its neighboring layers.

- Datalink Layer Class C Architecture - an abstract, yet more detailed, view of the proposed internal datalink layer structure of a machine that provides both Type 1 and 4 service. This architecture is modeled after the ISO 8802 Link Layer specification, and in particular, in the definition of a single Station Component containing two SAP Components: one to provide Type 1 service and one to provide Type 4 service. DL_Unitdata.Requests that arrive from the Network Layer are demultiplexed either to the Type 1 Service Box or the Type 4 Service Box, depending on the specified QOS parameters.

- Class C Station Component: This Component contains a Type 1 SAP Component and a Type 4 SAP Component. It accepts interactions from the Network and Physical layers and properly demultiplexes them to the appropriate Type SAP Component. For example, depending on the quality of service requested by a DL_Unitdata.Request, the Station Component will forward the request either to the Type 1 SAP Component or the Type 4 SAP Component. Prior to June 1996, the Station Component operation was divided into 3 phases: *initialization* when a station tries to join a net; *active* during normal operation when communicating with other nodes; and *leave* when a station leaves the network, either gracefully or abruptly. After June 1996, the CNR WG decided to replace joining/leaving the net via link layer actions with Network Layer XNP messages; thus the Station Component was reduced to a single active phase. Class C's Station Component active phase is enhanced over Class A's to handle the demultiplexing. The active phase has an EFSM diagram and a transition table. Additionally, the Station Component has a set of *common* transitions; these are transitions that define global independent actions (i.e., actions that may occur either regardless of the current state or for a large subset of states). This set was significantly reduced with the removal of XID PDUs from the link layer.[1]

- The Type 1 Service Box has three components. This structure is identical to Class A (Type 1 only) service. The components are: Type 1 SAP Component - performs all functionality to process incoming and outgoing Type 1 packets; Busy Timers - timers that keep record of which other stations on the net are ready/not ready to receive Type 1 packets; and Ack Timer - a timer needed for coupled acknowledgments. (A fourth component: NETCON was removed to the Network Layer when XID was replaced with XNP messages.)

- Type 1 SAP Component EFSM and State Transition Table: The Type 1 SAP Component has primary responsibility for processing DL_PDUs receiving type 1 service either with or without coupled ack, i.e., managing destination lists, starting and stopping timers for PDUs requiring retransmission, monitoring which destinations are ready to receive and which are not, etc.

- Busy Timer; Ack Timer EFSMs and State Transition Tables - these diagrams and tables summarize the behaviors of timers needed to manage acknowledgments.

- The Type 4 Service Box has three components. They are: Type 4 SAP Component - performs all functionality to process incoming and outgoing Type 4 packets, Ack Timers - timers that indicate when retransmissions of Type 4 packets are required due to lack of an acknowledgment, and DRR/DRNR Busy Timers - timers that keep record of which other stations on the net are ready/not ready to receive Type 4 packets.

[1] To avoid possible confusion from renaming/renumbering transitions following removal of XID handling, transitions kept their original names/numbers. The removal of XID handling thus results in some numbering gaps.

- Type 4 SAP Component EFSM and State Transition Table - has responsibility for processing all DL_PDUs requiring type 4 service, that is, a decoupled ack. It must maintain destination lists, start/stop busy timers to monitor which destinations are ready/busy to receive, stop ack timers, respond to timeouts by sending retransmissions, etc.

- Ack Timers, DRR/DRNR Busy Timers EFSM and State Transition Tables - There are two arrays of timers associated with each Type 4 SAP Component: Ack Timers, one for each possible outstanding type 4 PDU; and Busy Timers, one for each possible destination on the net. The Busy Timers help control which other stations on the net are ready to receive Type 4 packets.

- Estelle Specification - 19 double pages defining the architecture and behavior of Class C Link Layer service.