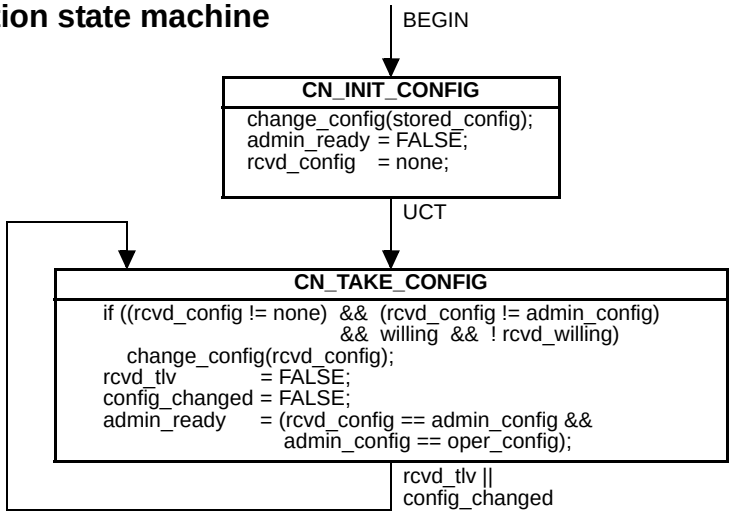
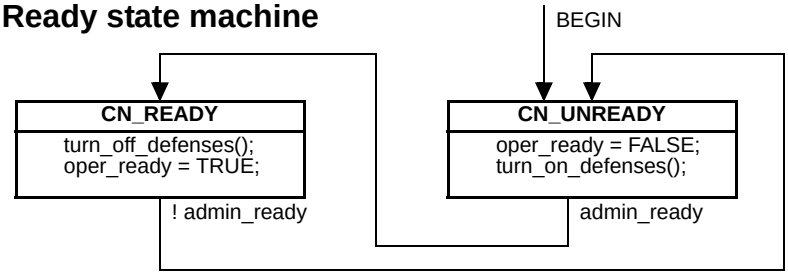
Per-port per-priority state machines for LLDP TLVs for CN

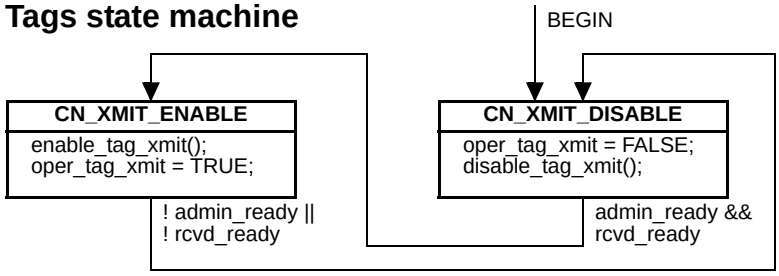
Configuration state machine



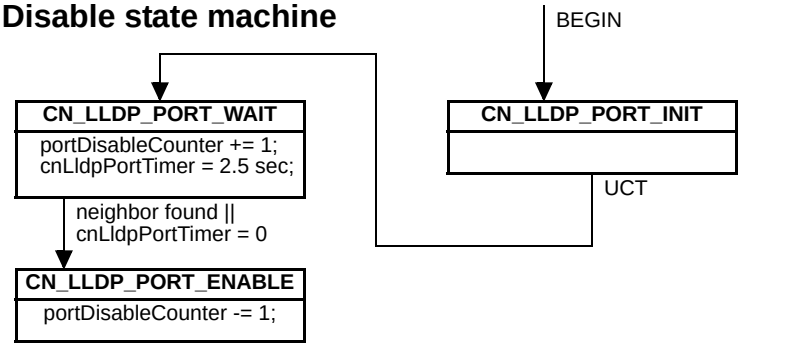
Receive Ready state machine



Transmit Tags state machine



M/RSTP Disable state machine



Notes:

1) UCT = UnConditional Transfer (fall through).

2) BEGIN is the usual initialization signal. It is asserted when the port is not operational.

3) There is one set of state machines per port per CN Priority.

4) The Configuration state machine runs whenever the CN TLV is received on the port or the local configuration changes. It can update the local configuration based on CN TLVs received. It compares the received configuration to the local configuration, and sets the output, admin_ready, that drives the Receive Ready and Transmit Tags state machines.

5) admin_ready is set (TRUE) by the Configuration state machine when the configuration of the port and priority matches that of the neighbor, else is reset (FALSE).

6) The Receive Ready state machine is driven by admin_ready. Its purpose is to turn on or off the defense of its Port and priority. That defense remaps all frame received on the CN Priority to a best-effort priority.

7) The Transmit Tags state machine is driven by both admin_ready and the receipt of the Ready flag in the neighbor's LLDP CN TLV. It enables the output of CN-tagged frames. This state machine provides oper_tag_xmit as an output that is not transmitted in the CN LLDP TLV, but may be useful in an end station for enabling CN applications.

8) The per-Bridge Port M/RSTP Disable state machine is proposed. It stops the spanning tree from using the Bridge Port until either an LLDP neighbor is found or a timer (2.5 seconds is proposed) expires. The "neighbor found" exit condition from the CN_LLDP_PORT_WAIT state is tied to the LLDP MIB. This state machine ensures against an interruption of CN service when a new inter-bridge LAN is connected, at the cost of a timeout when connecting to a bridge or station that does not run LLDP.

   Rather than defining a control for the spanning tree protocol that is peculiar to CN, Clause 17.19.18 of IEEE Std 802.1D-2004, which defines the portEnabled variable, can be modified to add a fourth bullet:

   d) portDisableCounter equals zero.

   and a new clause 17.19.20 inserted:

   ### 17.19.20 portDisableCounter

   An unsigned integer. This variable can be atomically incremented or decremented by any protocol in the bridge (e.g., DCBx) to control portEnabled (17.19.18).

9) The rcvd_xxx variables are set by each received LLDP TLV for my priority. rcvd_tlv indicates that the received TLV value has changed, appeared or disappeared. For example, if the neighbor is lost to LLDP, rcvd_tlv = TRUE, rcvd_ready = FALSE, and rcvd_willing = FALSE.

10) oper_config and oper_ready are transmitted in the LLDP TLV. Whenever either one changes, LLDP switches to fast mode and transmits three PDUs at one per second.

11) xxx_config includes only those variables that must match between two systems. change_config (new_config) may run in 0 time, or it may take some time. If it runs in 0 time, it sets admin_config = oper_config = new_config and config_changed = TRUE. If it takes time, it sets admin_config = new_config, oper_config = invalid, and when the reconfiguration completes, oper_config = new_config and config_changed = TRUE. change_config() can be called outside this state machine.

12) If I'm willing and he's not, and I cannot match his configuration (e.g., I have too few queues), my admin_config never matches my oper_config. The protocol doesn't flail.