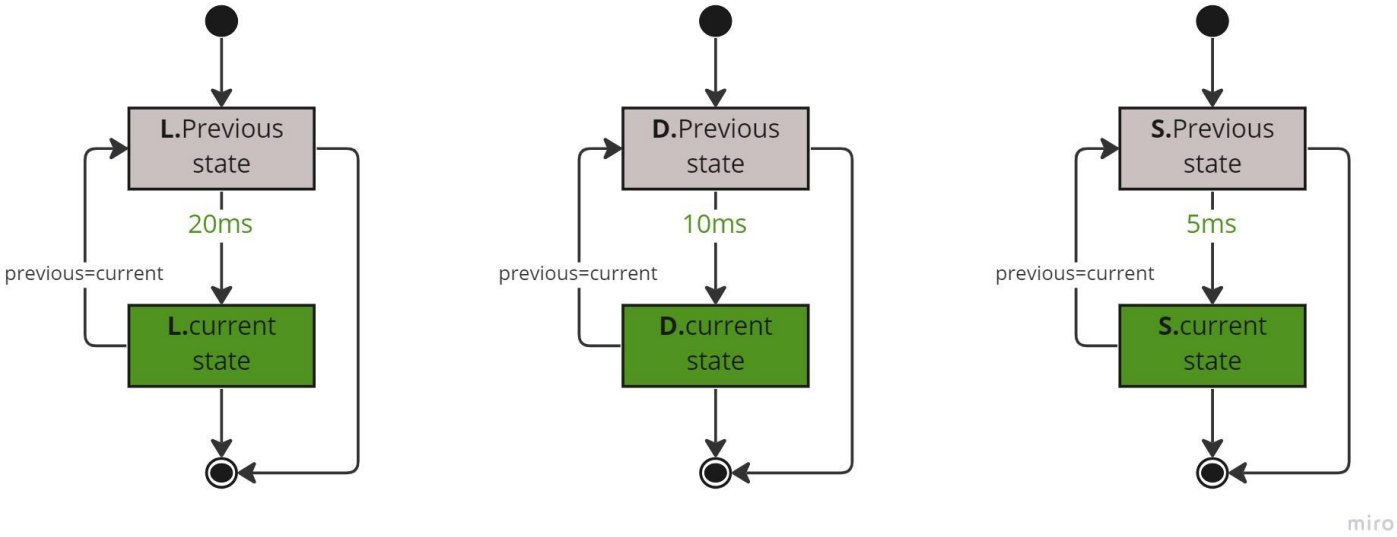
[AUTOMOTIVE DOOR CONTROL SYSTEM DESIGN]

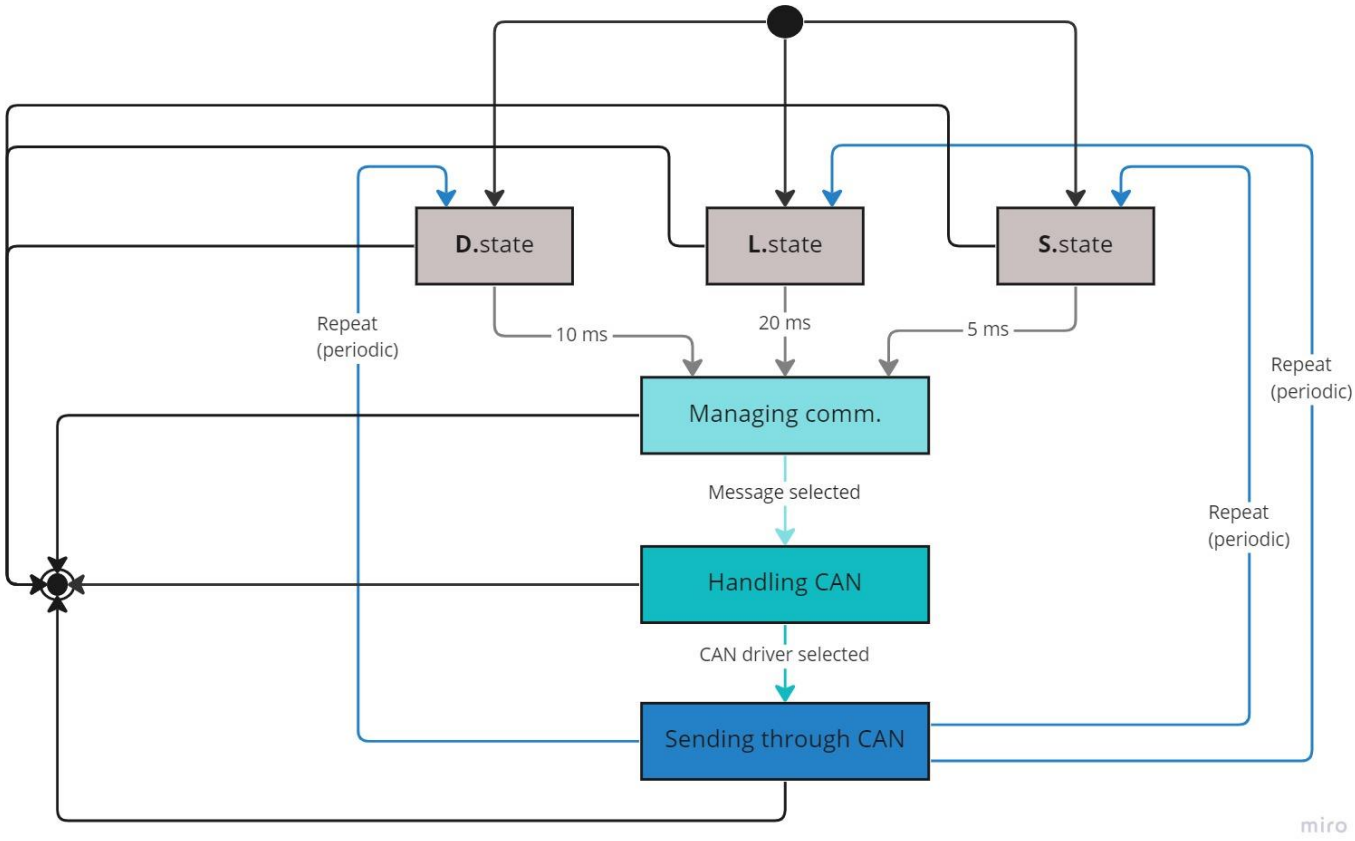
Dynamic Design

ECU1

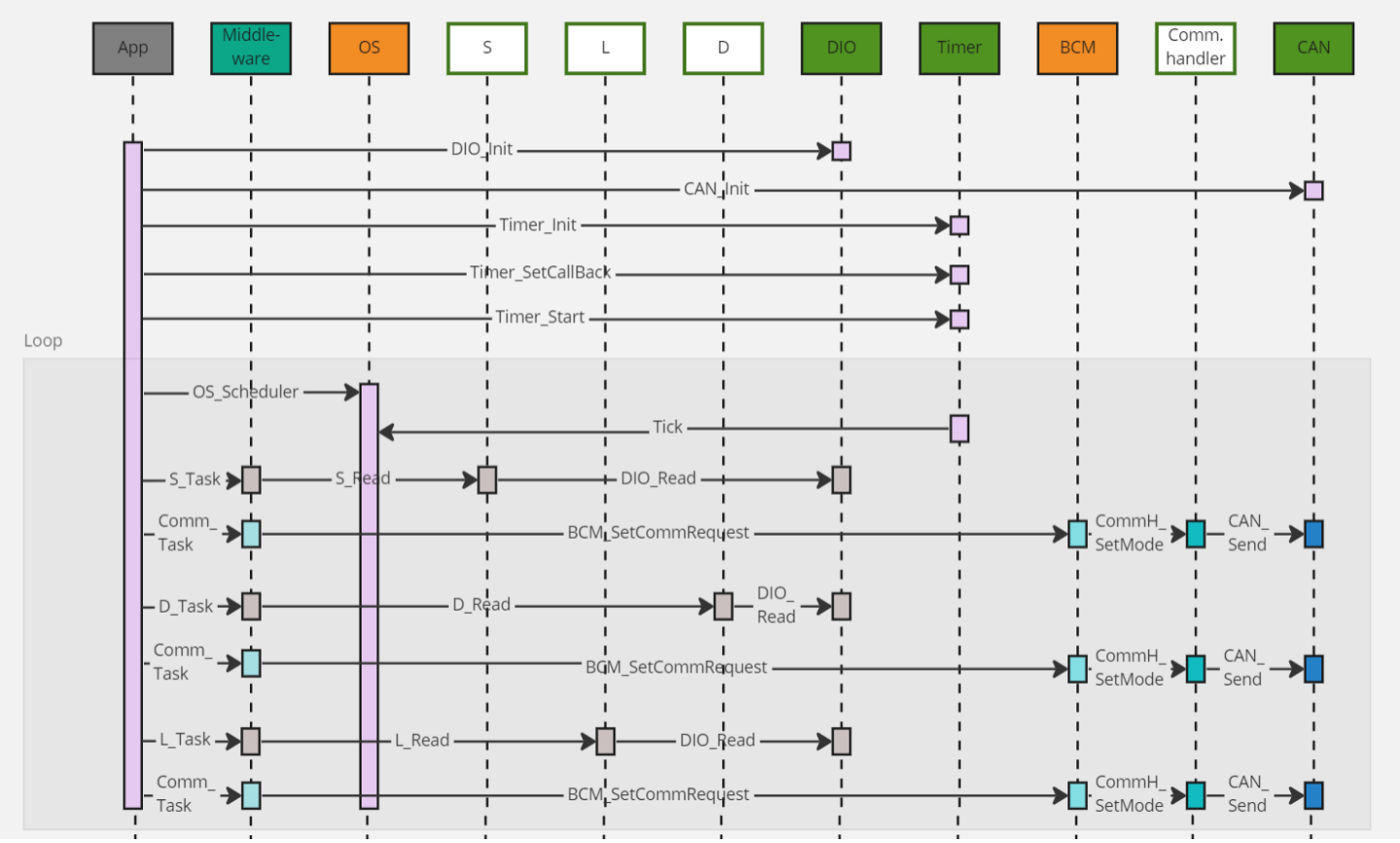
- **A state machine diagram for each component:**



- **A state machine diagram for the ECU operation:**



- **A sequence diagram for the ECU:**



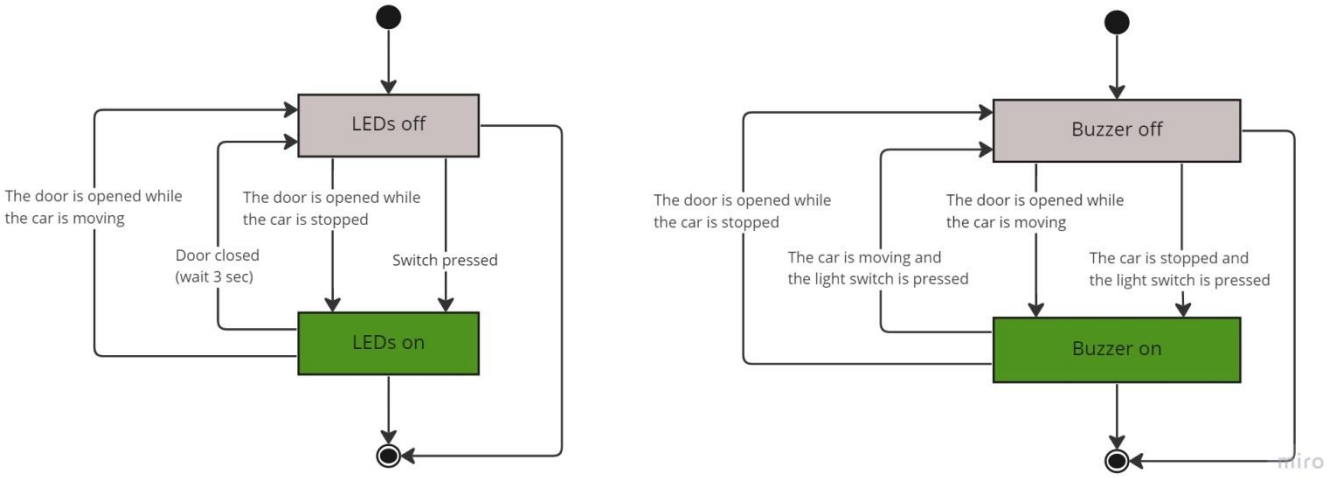
- **CPU load for the ECU:**

Cpu load = total execution time / hyperperiod (assume 0.5 ms execution time for each task)

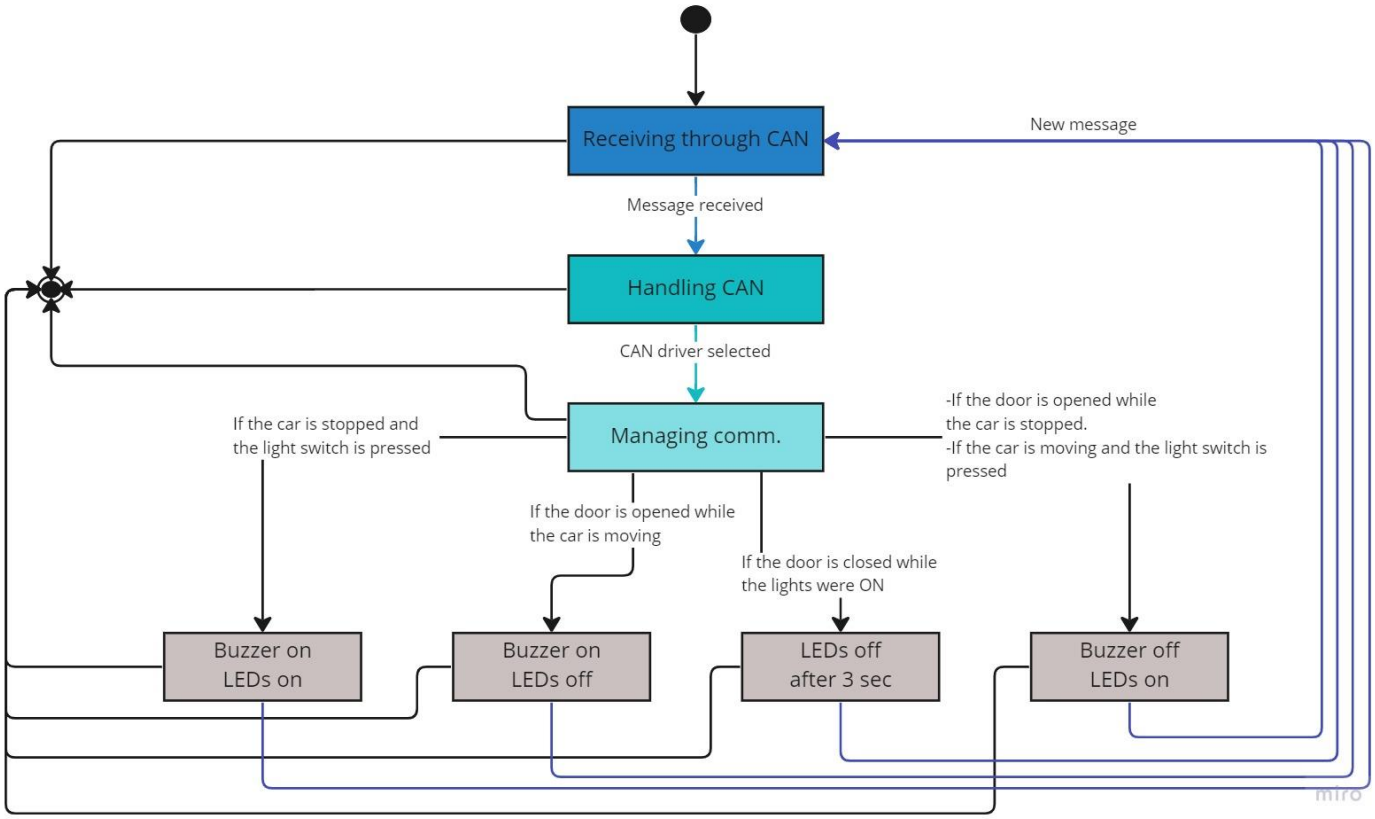
= (.5*1)+(.5*2)+(.5*4)/20 = 0.175*100 = 17.5%

ECU2

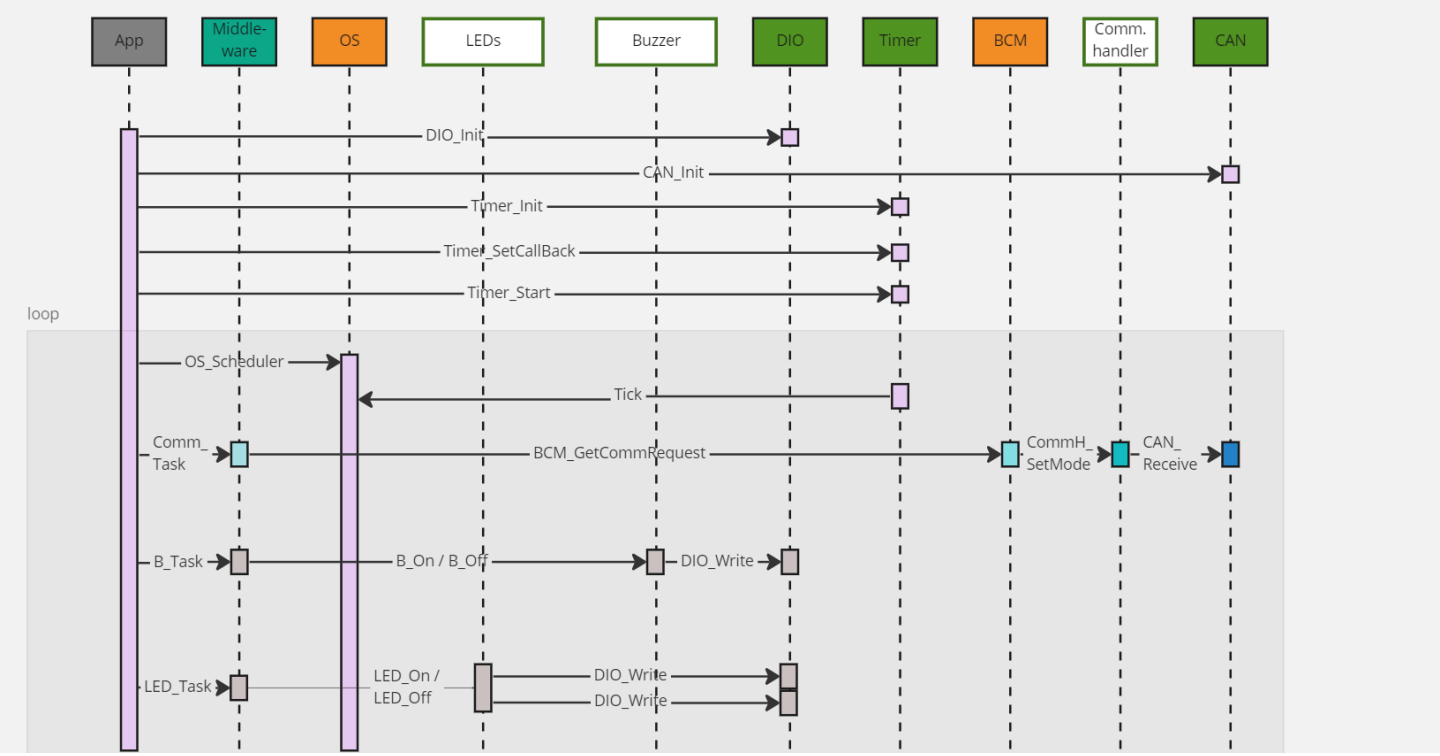
- **A state machine diagram for each component:**



- **A state machine diagram for the ECU operation:**



- **A sequence diagram for the ECU:**



- **CPU load for the ECU:**

Cpu load = total execution time / hyperperiod (assume 0.5 ms execution time for each task)

= (.5*4)+(.5*4) /20 = 0.2*100 = 20%

➢ Bus load

1 CAN fram contain approximately 125 bit.
bit time = 1/bit rate = 1/(500*1000s) = 2u
1 bit will take 2u o transfer
Time to transfer 1 frame = 2*125 = 250

1 frame every 5ms = 200 frame every 1000ms
1 frame every 10ms = 100 frame every 1000ms
1 frame every 20ms = 50 frame every 1000ms
Total 350 frame = ((350*250)u/(1000*1000))*100 = 8.75%