QoS requirements for Automotive Ethernet backbone systems

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QoS requirements for automotive control data class

Performance requirements for automotive control data class

- Maximum latency: 100 us / 4 AVB hops @ FE
  - Guaranteed latency
  - Topology independent
  - Automotive control data class to have higher priority than SR classes
    - Maximum 2 priority classes (e.g. Control data class and SR class A)

Preconditions for performance requirements

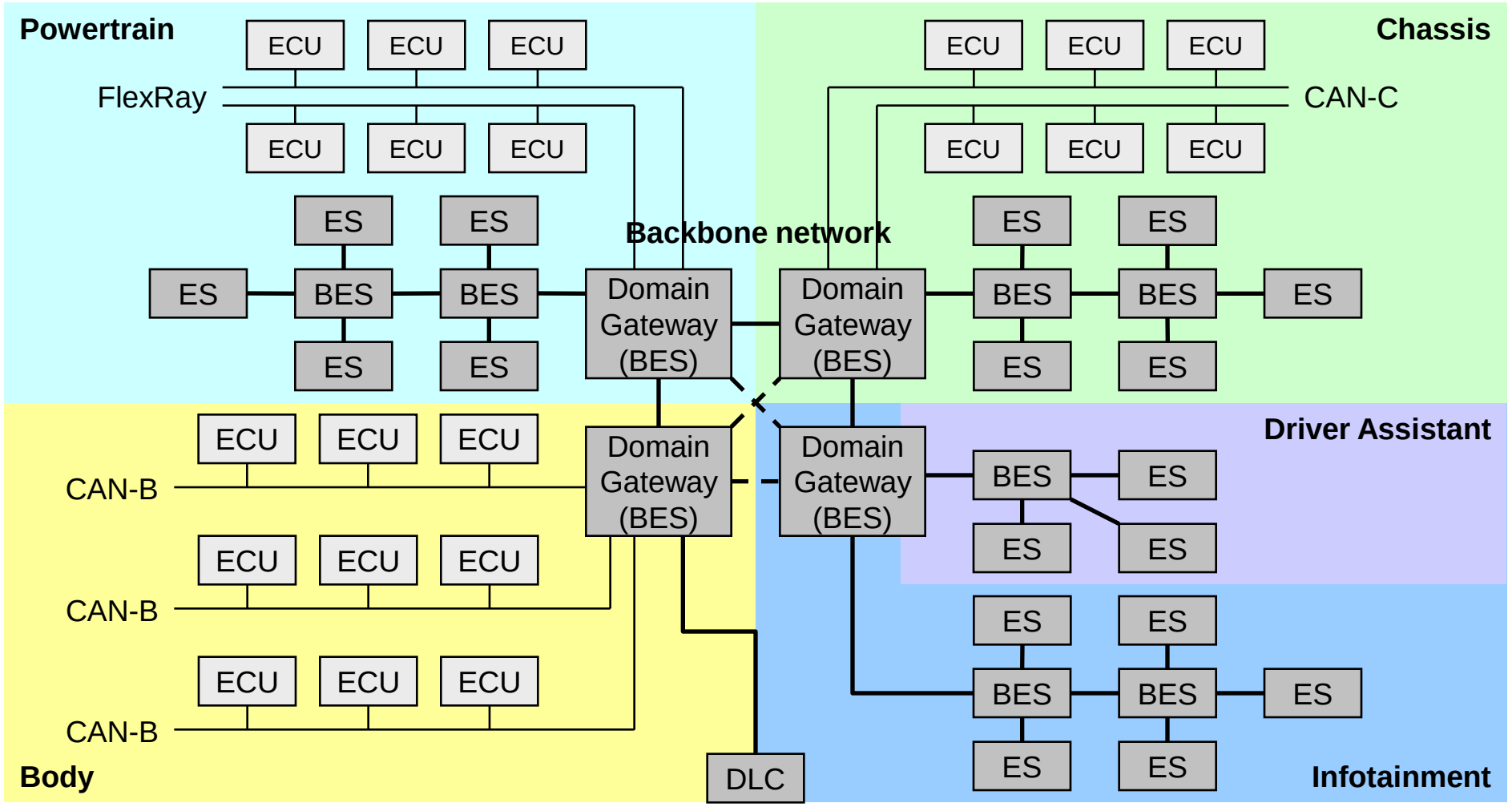
- Network type: Dedicated network in a vehicle
- Network attributes
  - Maximum AVB hop count: 8
  - Maximum number of nodes (bridges & end stations): 32
  - Maximum cable length: 24 m
  - Maximum end-to-end cable length: 30 m
- Automotive control data class attributes
  - Maximum data size (payload size): 256 bytes
  - Maximum number of simultaneous transmission: 8 initially ~ 32 in the future *
  - Transmission period: 500 us
- Payload size for other/lower traffic classes: 256 initially ~ 1500 bytes in the future *

These are our best estimates derived from multiple assumptions of the current and future automotive applications.

** FE is preferable initially and GE is most likely solution in the future.*

Example next-generation automotive network architecture

Ethernet AVB applied to automotive control data transmission between domain gateways and in powertrain/chassis domains



: Possible AVB network (bold line)

ECU: Electronic control unit, DLC: Diagnostic link connector
BES: Bridged end station (ECU), ES: End station (ECU)