Text Proposal for section 6: In-vehicle network topology, 9: Traffic Separation and 11: Latency and congestion loss in IEEE 802.1DG/D1.3

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6. Automotive In-Vehicle Networks

6.1 Introduction

6.1.2 In-vehicle network topology considerations

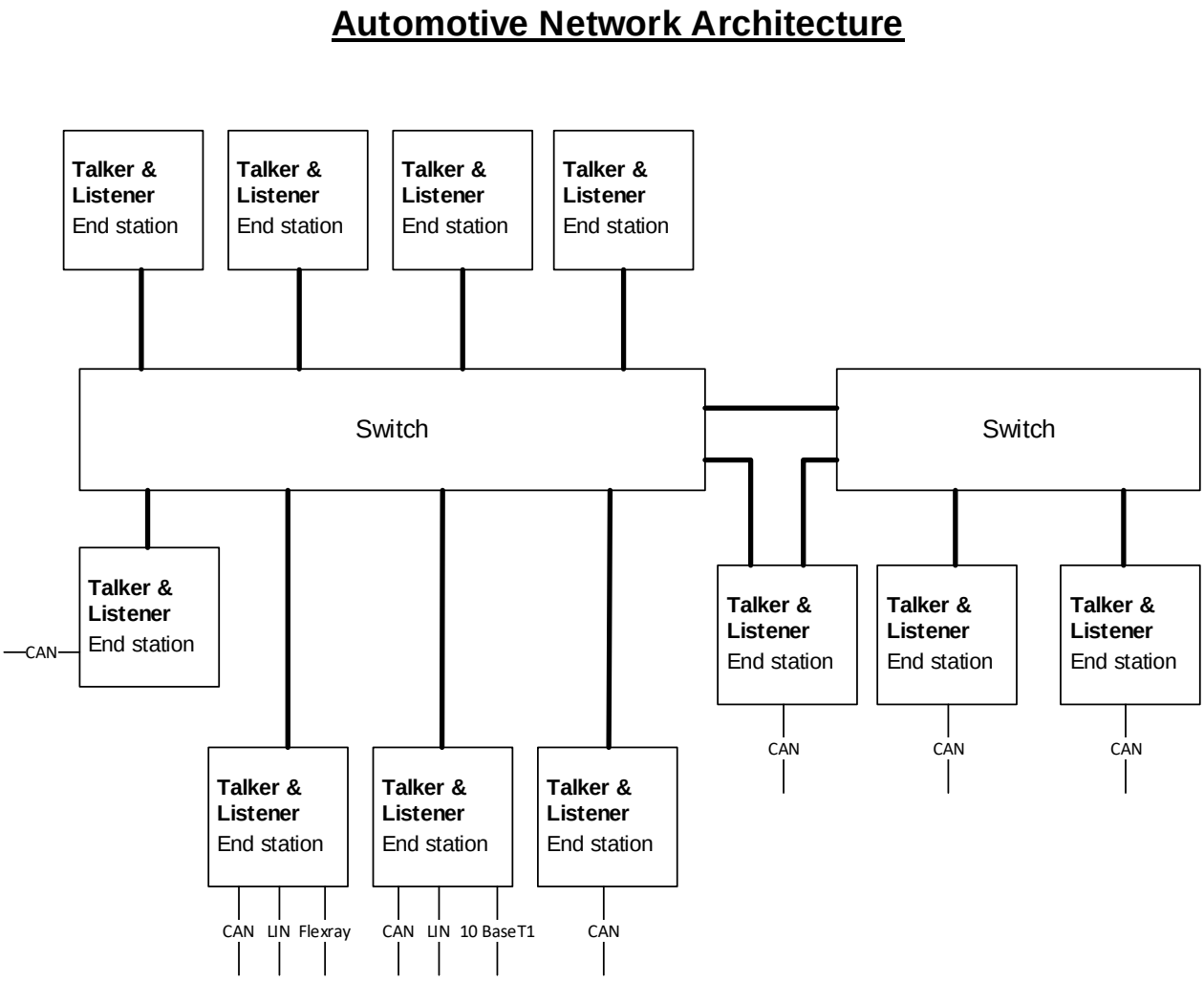

Figure: Example of Typical Automotive Network Architecture

9. Traffic Separation

9.1 Introduction

9.1.1 Automotive In-Vehicle Traffic Types

Data streams are classified into traffic types based on the application they intended for.

1. Command & Control 1 – Time critical and safety-relevant status and control signals.
2. Command & Control 2 – Vehicle status, A/C, seats, infotainment system, etc.
3. Network Control/Management – PTP, LLDP, network configuration, network diagnostics.
4. Audio – Chimes/Alerts, entertainment.
5. Video Stream 1 – Time critical and safety-relevant video. example - Sensor fusion (AR,V2V etc.)
6. Video Stream 2 – Camera at low speed, displays, entertainment.
7. Best Effort – Data collection upload, OTA download, vehicle diagnostic.

9.1.2 1 Automotive In-Vehicle Traffic Priority

The following table maps traffic types to traffic classes.

PCP	Traffic Class	Traffic type	Attributes
7	TC 8	**Command & Control 1**	Size: 64 – 512 bytes Periodicity: 1 – 20ms
6	TC 7	**Reserved for future use**	N/A
5	TC 6	**Video Stream 1**	Size: 64 – 1518 bytes
4	TC 5	**Command & Control 2**	Size: 64 –1518 bytes Periodicity: 21 – 500ms
3	TC 4	**Network Control/Management**	Size: 64 – 500 bytes
2	TC 3	**Reserved for future use**	N/A
1	TC 2	**Video Stream 2**	Size: 64 – 1518 bytes
0	TC 1	**Best Effort**	Size: 64 – 1518 bytes

Table: Traffic Class

11. Latency and congestion loss

11.1 Introduction

11.1.1 Latency

Latency is measured as time taken from first bit out to last bit in with a maximum of 3 hops.
Latency requirement is the time within which an Ethernet frame is required to be received.
This is not application to application latency. This is MAC (source) to MAC (destination) latency.

11.1.2 Criticality

Application criticality -

1. High: Critical system malfunction may occur if packet is lost or delayed.
2. Medium: Degraded operation may occur if packet is lost or delayed.
3. Low: Packet loss can be compensated by retransmission; delayed packets will not cause major loss in functionality.

11.1.3 Loss Tolerance -

Tolerance to consecutive packet loss -
None: 0 frame loss
Few: TBD
Some: TBD

11.1.4 Traffic class latency requirements

The following table defines latency requirement for each traffic class.

Traffic Class	Traffic type	Latency requirement	Criticality	Loss Tolerance
TC 8	**Command & Control 1**	**1ms**	High	None
TC 7	Reserved for future use	N/A	N/A	N/A
TC 6	**Video Stream 1**	**16ms**	High	Few
TC 5	**Command & Control 2**	**100ms**	Medium	Few
TC 4	**Network Control/Management**	**100ms**	Medium	Few
TC 3	Reserved for future use	N/A	N/A	N/A
TC 2	**Video Stream 2**	**33ms**	Low	Some
TC 1	**Best Effort**	**2000ms**	Low	Some

Table: Latency requirement for each traffic class.