

EtherLoop Technology

Tesla has introduced an Ethernet technology called **Etherloop** in some of its vehicles, such as the Cybertruck. Here are the key parameters and features:

Key Parameters of Etherloop

- **Gigabit Ethernet Loop:** Etherloop connects high-speed controllers within the vehicle, drastically reducing wiring requirements.
- **Wiring Reduction:** The system reduces the number of wires from 490 in the Model 3 to just 155 in the Cybertruck, marking a significant 68% decrease.
- **Efficiency and Weight:** This reduction in wiring not only enhances communication speeds but also contributes to weight reduction, improving overall vehicle efficiency.
- **Communication Speeds:** Etherloop offers millisecond-scale latency, showcasing its efficiency in data flow within the vehicle.
- **Audio Data Transmission:** The system is utilized for bi-directional transmission of audio data to the car's speakers, enabling features like the sound system and active road noise cancellation.

TTPoE (Tesla Transport Protocol over Ethernet)

- **High Bandwidth:** TTPoE can handle high bandwidths exceeding 100Gbps.
- **Low Latency:** Designed to replace traditional TCP, TTPoE reduces delays and enhances the efficiency of data transmission.
- **Open-Source:** Built on the C programming language and open-sourced under the GPLv2 license, allowing developers to improve and adapt it.
- **Connection Management:** Streamlined connection management with a simple two-step process for establishing connections and a straightforward opcode for closing connections.
- **Congestion Control:** Uses a straightforward method for congestion control, dropping packets when the buffer is full and retransmitting lost data.

These advancements in Ethernet technology are part of Tesla's ongoing efforts to push the boundaries of innovation in electric vehicles.

<Source: Microsoft Pilot inquiry>