In-Vehicle Networking with NDN

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Evolving In-vehicle Networks

- Vehicle networks are rapidly evolving
  - Few Kbps -> 100s Mbps
  - Sensors, cameras LiDARs

- Several technologies
  - LIN, LVDS, CAN, CAN-FD, FlexRay, Ethernet
  - Mix of networks in near future, converge in long term
  - IP/Automotive Ethernet is actively being considered as the next networking technology

- Drivers: cost, weight, compatibility, bandwidth, real-time, safety, security

- Applications: In-vehicle entertainment, advanced driver assistance (ADAS), Autonomy, V2X

https://blogs.keysight.com/
A Case of NDN for In-Car Networking

- **Naming**
  - Aligns with Vehicle Signal Specification Data Model (W3C)

- **Stateful name-based forwarding**
  - Map to existing CAN structure
  - Support complex inter-vehicle relations

- **Data security**
  - True end-to-end
  - Flexible privilege separation

- **Caching**

- **Multicast**

- **Our Automotive Testbed**
  - Raspberry Pis with Ethernet and CAN interfaces
  - Running NDN
  - Actual CAN datasets
  - Experiments with NDN and IP to evaluate forwarding, security, etc.