



GEPOF for Automotive / O-GEAR

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O-GEAR: Optical Gigabit Ethernet for Automotive aRchitecture

Disclaimer

This presentation attempts to show the technical feasibility for automotive optical network systems are done today.

This presentation is not providing a complete list of requirements

In-vehicle Communication

Increasing data traffic in internal- and external- communications

Internal

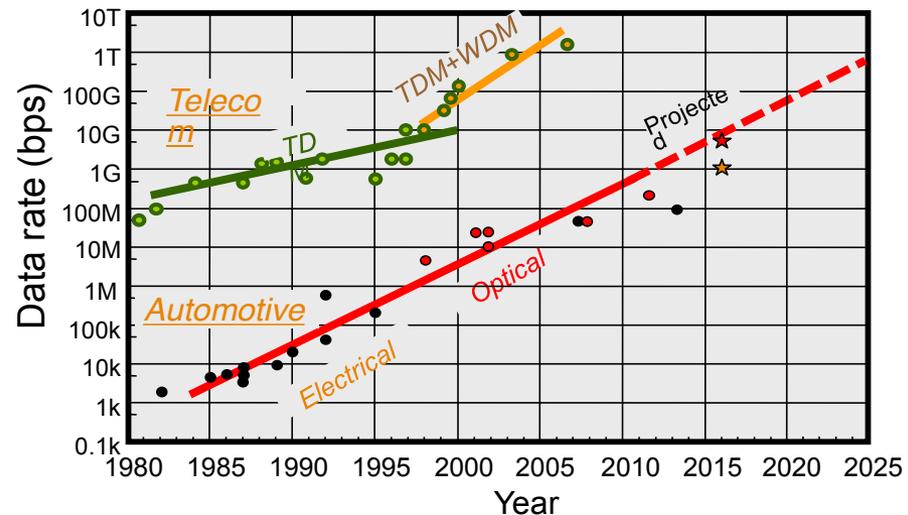
- Infotainment
 - Navigation
 - Tuner/Radio/TV
 - Entertainment
- Safety
 - Camera network
 - Sensor network
 - Automatic breaking system
- Control
 - Chassis
 - Body
 - Powertrain

External

- Telematics
- Internet
- Car to car
- Car to infrastructure
- GPS
- ...

Next Generation System

- ADAS (Advanced Driver Assistance Systems)
- Autonomous driving system



Problems of Automotive

- Electrical noise
 - ECUs
 - Wire harnesses
 - EV, HEV, PHEV
 - Wireless communication, Internal- and external-
 - High speed digital
- Wire harness
 - Volume
 - Weight
 - Complexity
- Brought leading-edge consumer devices by drivers and passengers
 - Have to offer good connectivity over a decade

Advantages of Optical Fiber System

- No EMC/EMI
- Complete electrical insulated
- Low weight
- Small cable diameter
- Scalability and expandability
- Low cost in comparison to shielded copper solutions
- Full automation manufacturing
- Low Bit Error Rate for reliable system

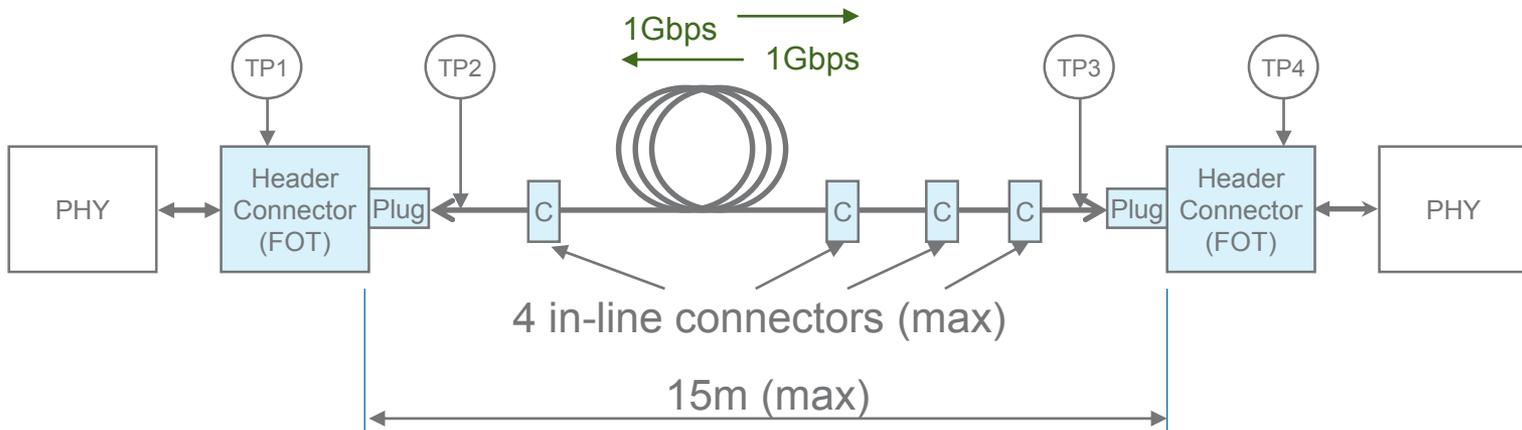
Requirements for Automotive



- Data rate: 1 Gbps
- Bit Error Rate: 10^{-14}
- Length: 15 m, max
- In-line Connections: 4, max

Control System (ex. FlexRay):
 $BER 10^{-12} / 10 \text{ Mbps} \rightarrow BER 10^{-14} / 1 \text{ Gbps}$

Infotainment system:
 $BER 10^{-10} / 1 \text{ Gbps}$



Proven Technology

Optical Communication in Cars



- More than **100,000,000** nodes
- More than **150** car models
- Over **10** years

In-vehicle Optical Components



- Can be used proven technologies

Thank you

