

DAIMLERCHRYSLER

Automotive Networks

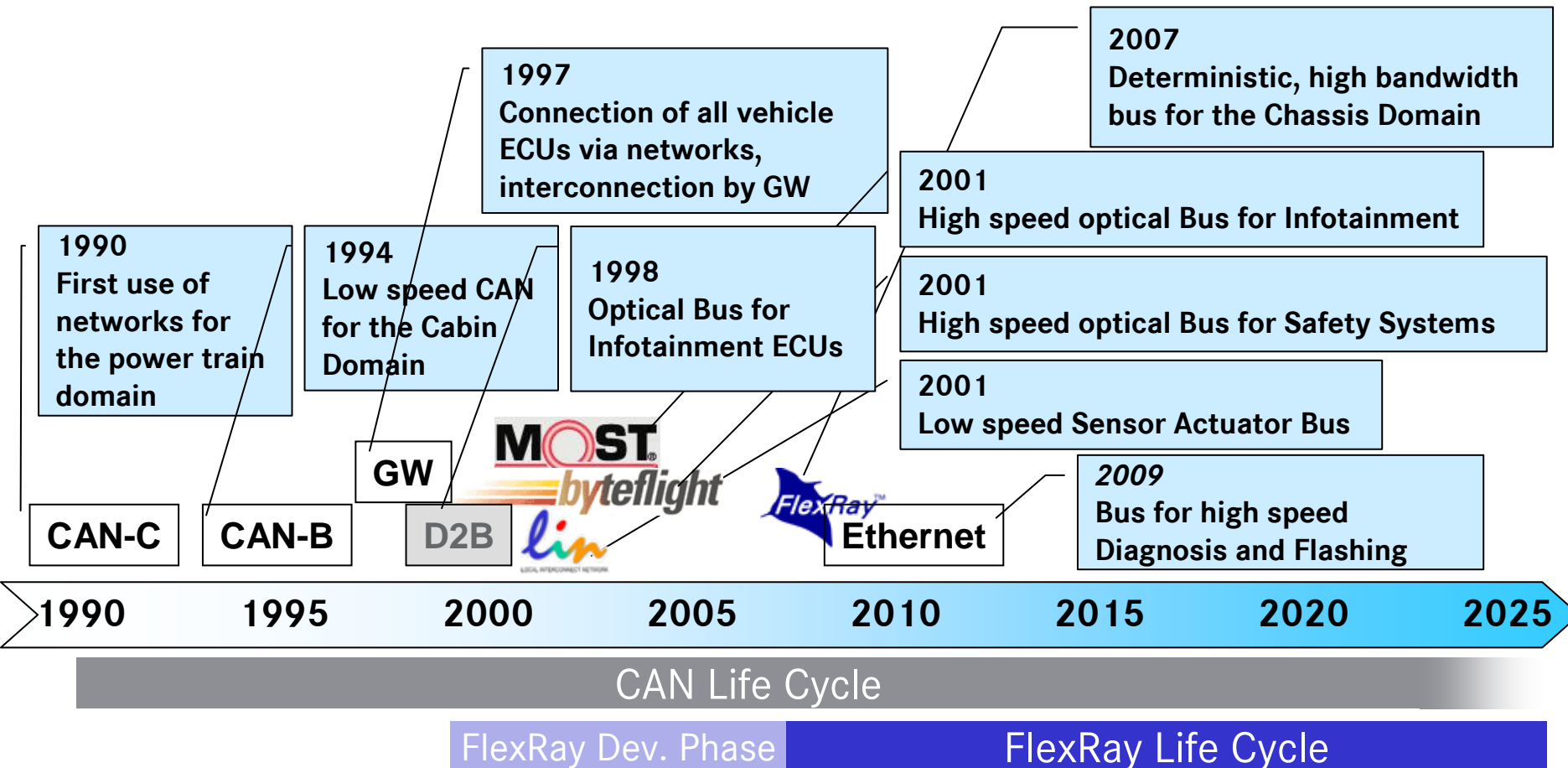
- Are New Busses and Gateways the Answer
or Just Another Challenge?**

An OEM view

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ESWEEK 2007

Development of Automotive Networks



Are the current protocols, architectures, design methods and tools appropriate? What innovations are most urgently needed?



Challenges in Automotive Networks

- Cost and performance optimization of current networks
- Extension of CAN life cycle, e.g.
 - Dependable operation of the CAN bus in permanent high load conditions
- Introduction of FlexRay in the Premium segment
 - Design process of a FlexRay schedule is complex, under the preconditions: Long life-cycle of E/E-platforms (e.g. 10 years), Carry over of ECUs, module strategy, ...

Challenges in Automotive E/E-Architectures

- Complexity and number of functions will further increase, in parallel the number of ECUs will decrease
- Introduction of the new automotive safety standard ISO 26262
- CO₂ Reduction:
 - Future E/E-Platforms have to be ready for Hybrid technology
 - Reduction of weight of E/E-Systems
 - Reduction of power consumption, e.g. new low power modes

Who shall develop the networks in the future, the OEM or a 1st tier supplier?
What would be the consequence for the design process?



“Who owns the current automotive networks?”

- CAN – Bosch
- LIN – LIN Consortium (SC: Audi, BMW, DaimlerChrysler, Freescale, Mentor, VW, Volvo)
- MOST – MOST Cooperation (Core: Audi, BMW, DaimlerChrysler, Harman/Becker, SMSC)
- FlexRay – FlexRay Consortium (Core: BMW, Bosch, DaimlerChrysler, Freescale, GM, NXP, VW)



Some statements from Daimler´s perspective:

- Automotive networks are not competition relevant!
- The OEMs are responsible for system configuration & integration:
 - In the past, the OEMs defined the requirements of new networks, the 1st tiers played a secondary role (exception Bosch)
 - The semiconductor manufacturers are early integrated in development process
- Series introduction of a new Networking Technology will take 8 – 10 years
- The challenges in automotive networks are sometimes not what you first think, e.g. power management, network management, physical layer, EMC,...

Do we need interoperable network service standards, e.g. as a complement to AUTOSAR? Will there be a unified automotive “internet protocol” that eventually dominates all communication in a car?



Some remarks...

- The FlexRay life cycle is at the beginning, currently there is no pressure to develop a new technology for in-vehicle networking
- There is ongoing development in current Automotive Networks, e.g.:
 -  New baud rates: 50MBit/s (electrical PL), 150 MBit/s (optical PL), samples available
 -  FlexRay 3.0 planned for End 2008
New features: TT-Master Mode, flexible CHI, ...
- The goal of AUTOSAR is to enable interoperability of applications, therefore from an application point of view an „unified automotive protocol“ is not needed

How will future car-to-car communication be included in the automotive network strategy if it shall be used for real-time applications, such as in driver assistance systems?



CAR2CAR Consortium (Audi, BMW, DC, Fiat, Honda, Opel, Renault, VW...)

Goal: Develop an European industry standard for CAR 2 CAR communication systems based on wireless LAN components and to guarantee European-wide inter-vehicle operability

Use cases:

- Advanced driver assistance
- Improving local traffic flow and efficiency of road traffic
- User communications and information services, comfort and business applications to driver and passengers

