NGAUTO – Objectives
Uses Cases + speedgrades

Helge Zinner, Continental AG

Supporters

- Looking for supporters at the next interim meeting on Feb 21./22. …

Cameras categories in cars

Different cameras/resolutions for different use cases

- Viewing and Warning
  - e.g. rear-view, surround view, dash board, driver monitoring, mirror replacement
  - 30fps is enough for most of cameras
  - start up time > 2 seconds
  - compression is ok for most use cases

Surround view for parking

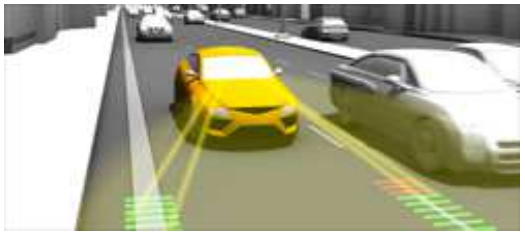
Mirror replacement

Driver monitoring

Cameras categories in cars
Different resolutions for different use cases

- Assist
  - front (mono, stereo camera)
  - machine vision for automated driving
  - raw video processing

Lane departure warning



Traffic sign recognition

Object detection

Uncompressed video transmission Camera & Display

In Gbps

Hres	Vres	Fps	8bit	12bit	16bit	20bit	24bit
1280	720	30	0,22	0,33	0,44	0,55	0,66
1280	1080	30	0,33	0,50	0,66	0,83	1
1280	720	60	0,44	0,66	0,88	1,11	1,33
1920	1080	30	0,50	0,75	1,00	1,24	1,49
1280	1080	60	0,66	1,00	1,33	1,66	1,99
1920	1080	60	1,00	1,49	1,99	2,49	2,99
3840	2160	30	1,99	2,99	3,98	4,98	5,97
3840	2160	60	3,98	5,97	7,96	9,95	11,94

100BASE-T1 — No use case

1000BASE-T1 — Available

Multi-Gig Ethernet 2,5 Gbit/s

Multi-Gig Ethernet 5 Gbit/s

Multi-Gig Ethernet 10Gbit/s

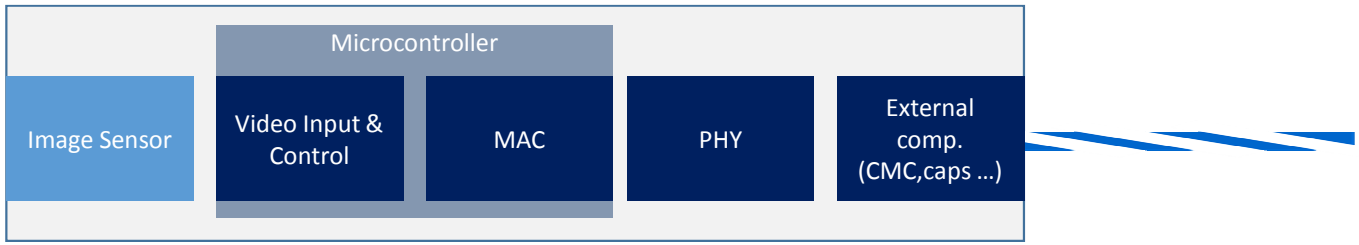
Speed grades which a currently discussed

- Ethernet with 2.5 and 5 Gbit/s covers many video related use cases

Link operation
Camera & Display

- Camera/Display link are asymetric links
  - reverse channel for configuration only
  - symmetric only in the case of rings

Ethernet vs. SerDes camera

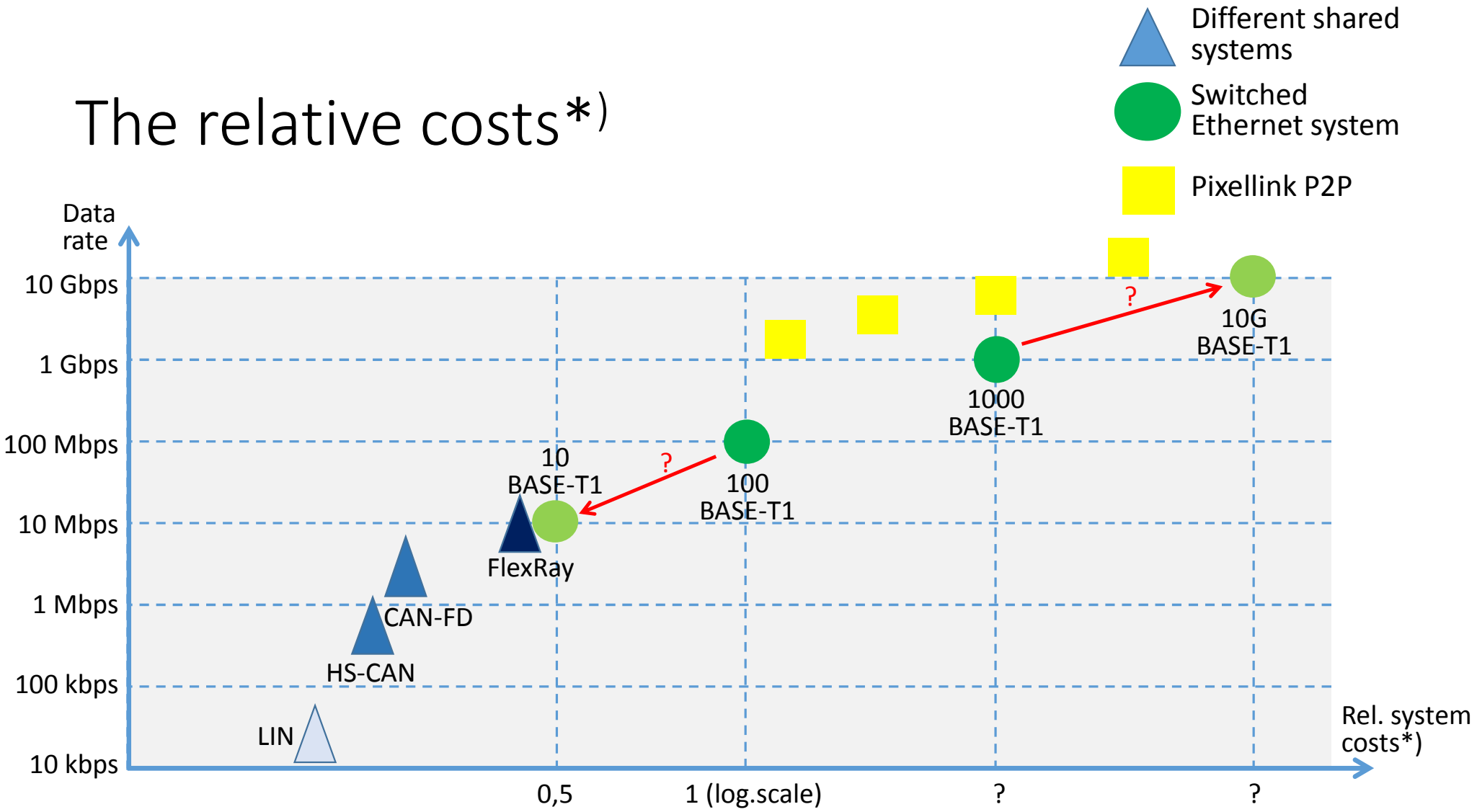


Ethernet based camera (uncompressed video)

- Ethernet in cameras is still a huge component overhead (independent of speed grade)

SerDes based camera (uncompressed video)

The relative costs*)



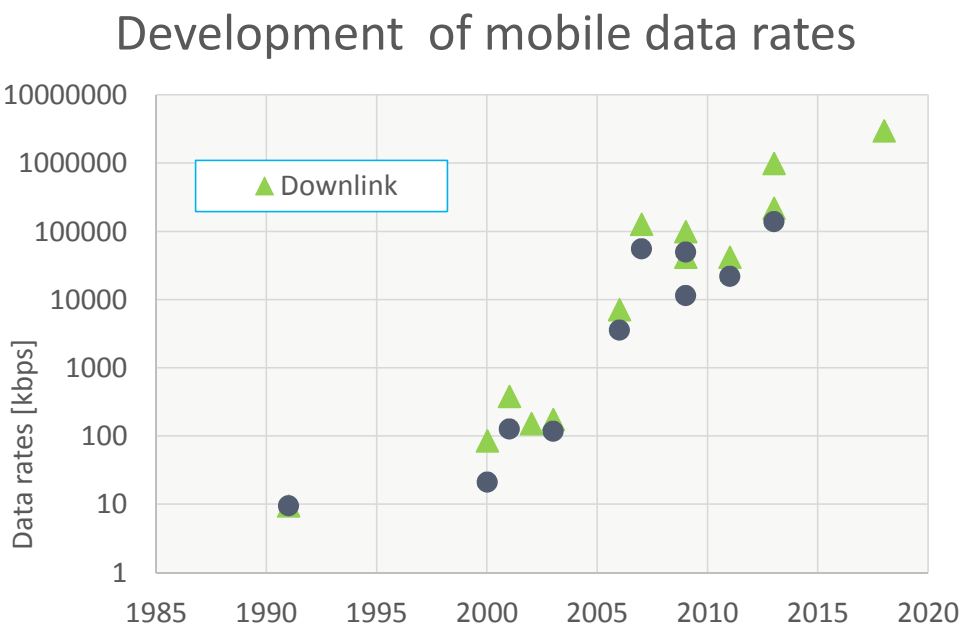
*) The cost values are very dependent on the exact topology that is being compared, this chart gives an indication only.

Car connectivity

- Connectivity is need for almost all future vehicles
  - over the air update
  - Infotainment and multimedia
  - precise navigation

- European Parliament makes eCall mandatory from 2018
  - all cars need mobile (data) interface by then
  - 1 Gbps is not enough to support 802.11ac + LTE + …
  - but more than 2,5gbps wouldn‘t be needed

Connectivity solutions
Versatile & scalable future technologies for cars



Dr. Kirsten Matheus, BMW AG, Automotive Ethernet Congress, February 2017

Conclusion

- Broad market potential can only be achieved by multiple speed grades > 1Gpbs & <= 10Gbps
- There are many application which do not require10Gbps, but slightly more then 1Gbps
- The approach for lower speeds less than 10Gbps does **not exclude** a 10Gbps solution

Proposal: Adopt objectives to allow for other speed grades than 10 Gbps

- 2,5 Gbps and optional 5 Gbps