



The Connected, Automated Vehicle: Meeting the Challenges of Car 2.0

STRATEGY ANALYTICS

TODAY'S AGENDA

01

Defining Car 2.0

What is it? What do Consumers Actually Want?

02

Connected and Automated Vehicles

How Many? How Soon? Architecture Implications?

03

Ecosystem Challenges

Is there an existential threat?

04

Conclusions

What has Ian said today? Q&A

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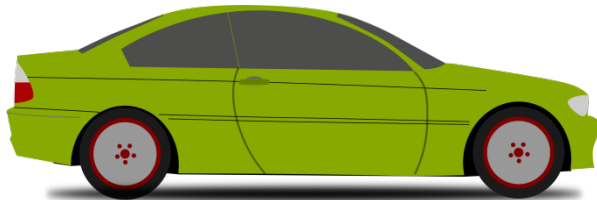
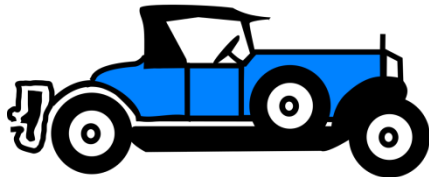
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DEFINING CAR 2.0

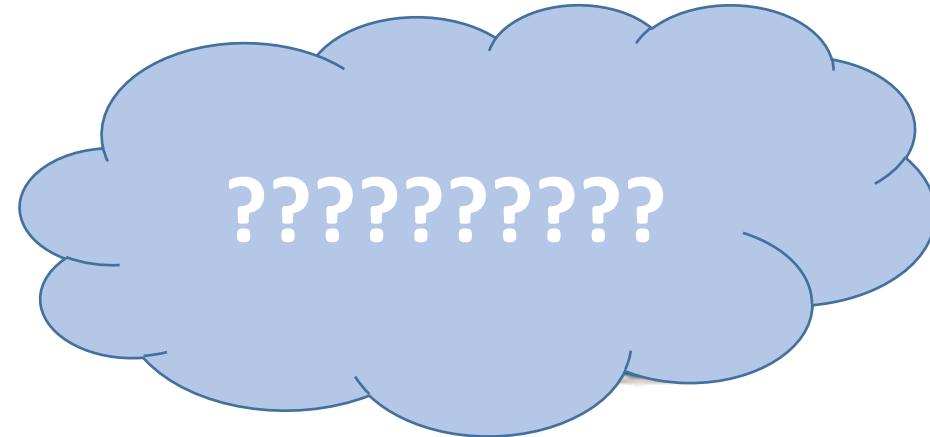
Car 1.0

- Needs a trained driver
- Is not connected
- Uses an internal combustion engine



Car 2.0

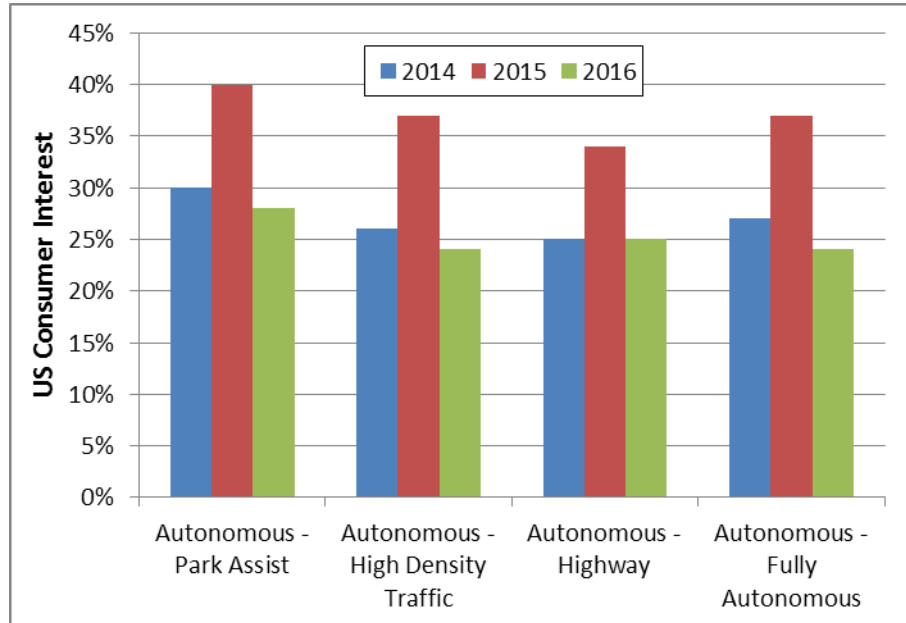
- Can drive itself
- Is fully-connected
- Is powered by electricity





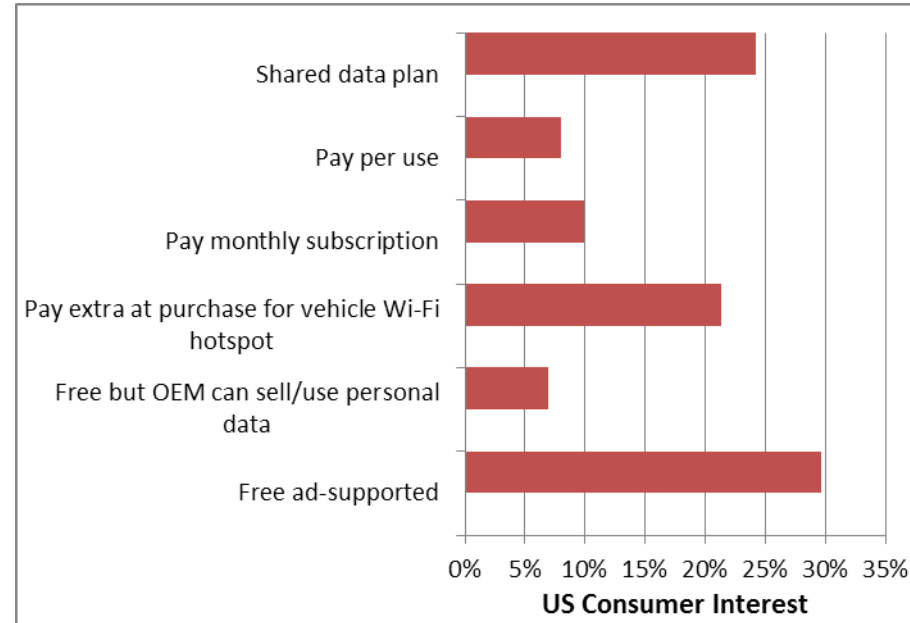
WHAT IS THE CONSUMER THINKING?

Is uncertain about automated driving



US qualified car purchasers asked to rank systems as “Pay More For”; “Tie Breaker”; “Nice to Have” or “Not Interested”. Percentage shown is the sum of “Pay More For” and “Tie Breaker”.

Doesn't want a monthly subscription



US qualified car purchasers asked to rank their “Preferred Payment Method for Connectivity” Research undertaken Apr/May 2016. N = 1552

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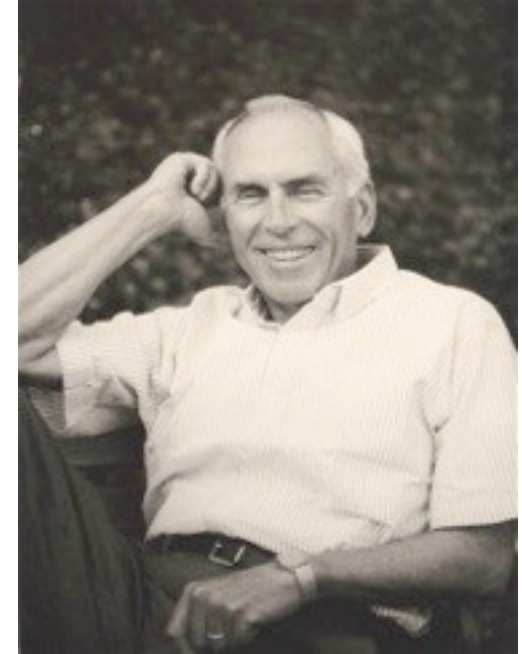
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AMARA'S LAW APPLIES TO AUTOMOTIVE

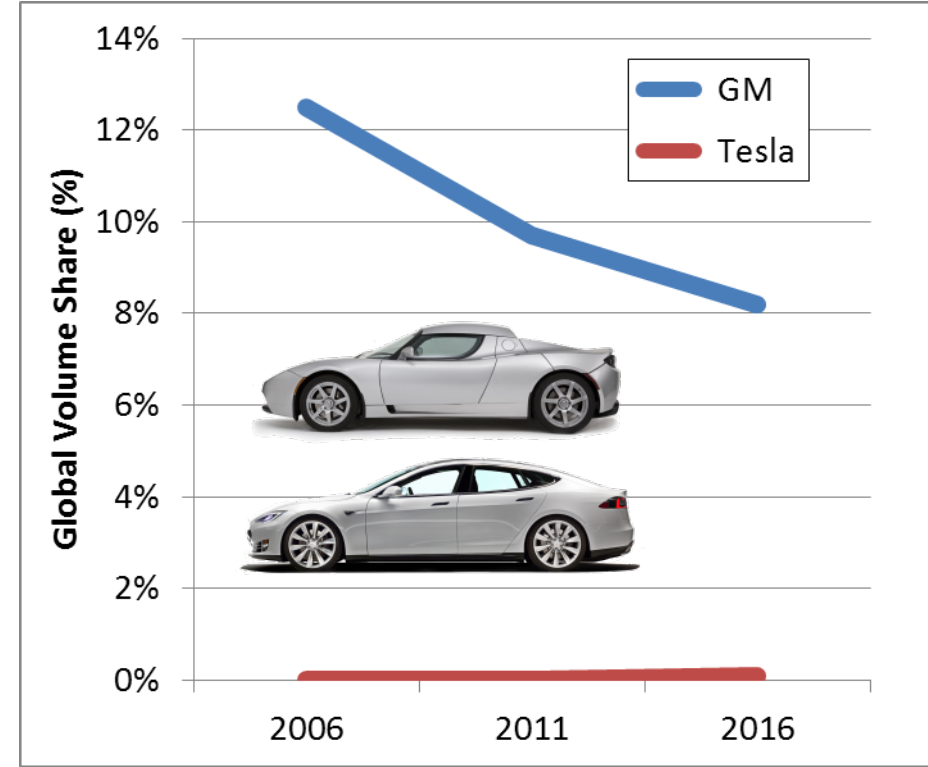
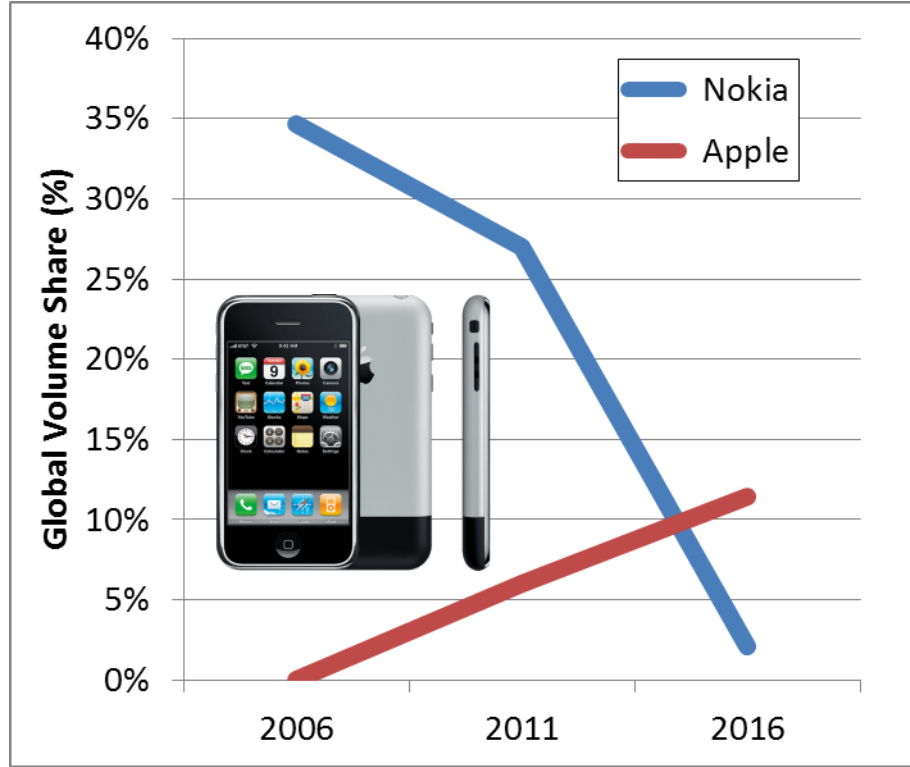
*“We tend to **overestimate** the effect of a technology in the short run and **underestimate** the effect in the long run”*

- Roy Amara (1925-2007), researcher, scientist, forecaster and long-term president of the Institute for the Future





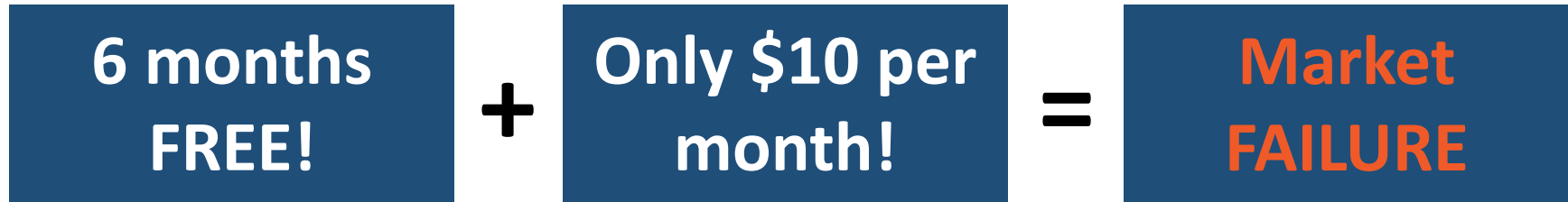
REMEMBER AUTOMOTIVE TIMESCALES



WHAT IS **NOT** DRIVING THE CONNECTED CAR?

- **Telematics 1.0 business model**

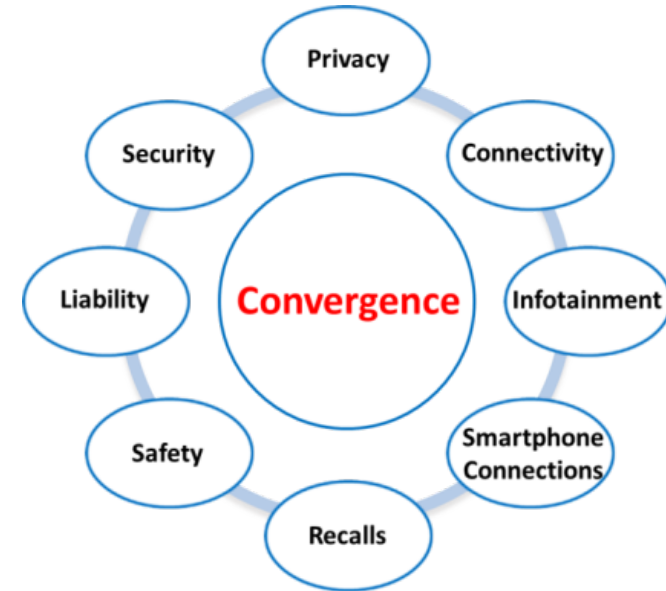
- Trying to monetize the consumer directly
- Too many de-activated subscriptions
- “Free periods” too short





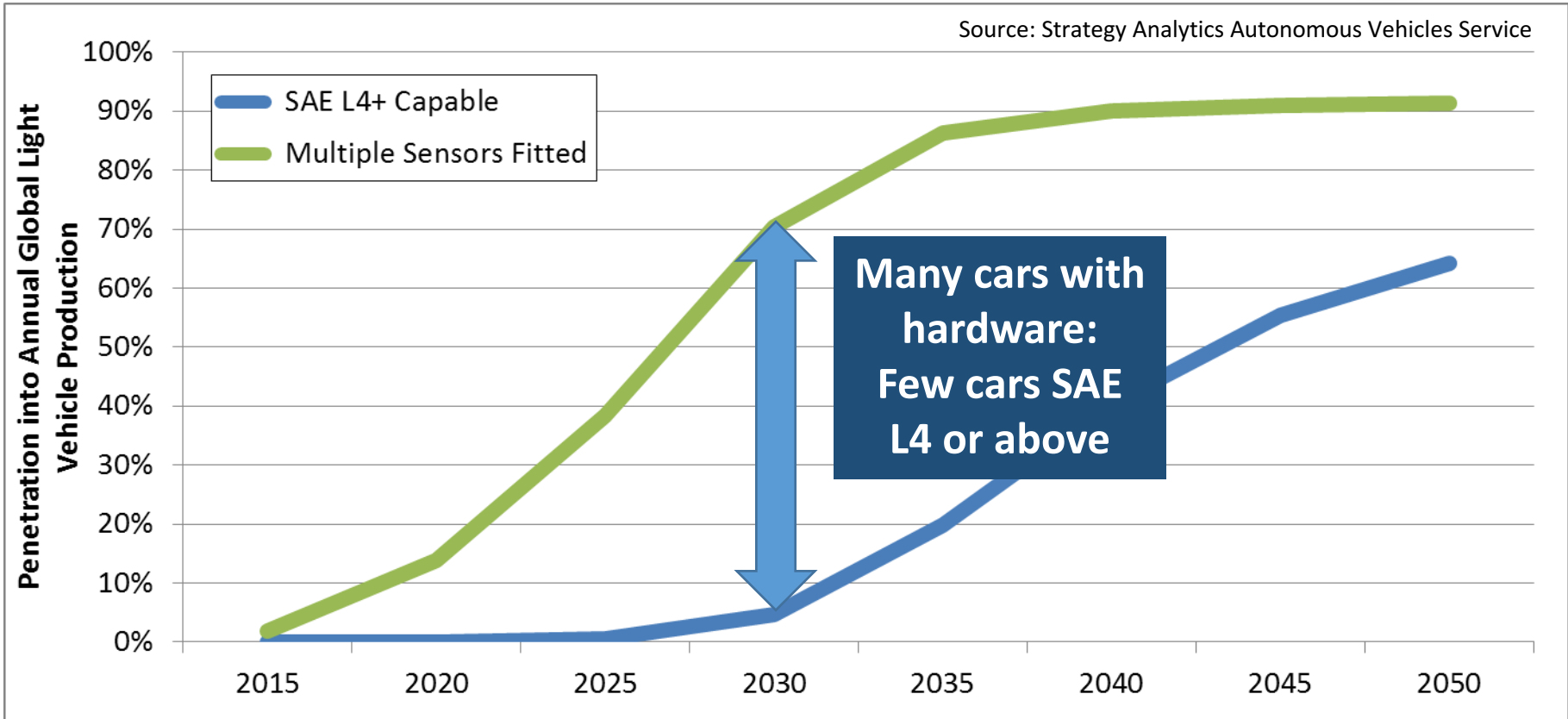
WHAT **WILL** DRIVE THE CONNECTED CAR?

- Data Collection & Management
- Wallet on Wheels
- Software Updates (SOTA/FOTA)
- Cloud Platforms, AI & Digital Assistants
- Cyber Security
- Memory and Storage: Onboard vs. Offboard
- V2V – DSRC vs. 5G
- Smart Antenna





AUTONOMOUS IS A SOFTWARE PROBLEM

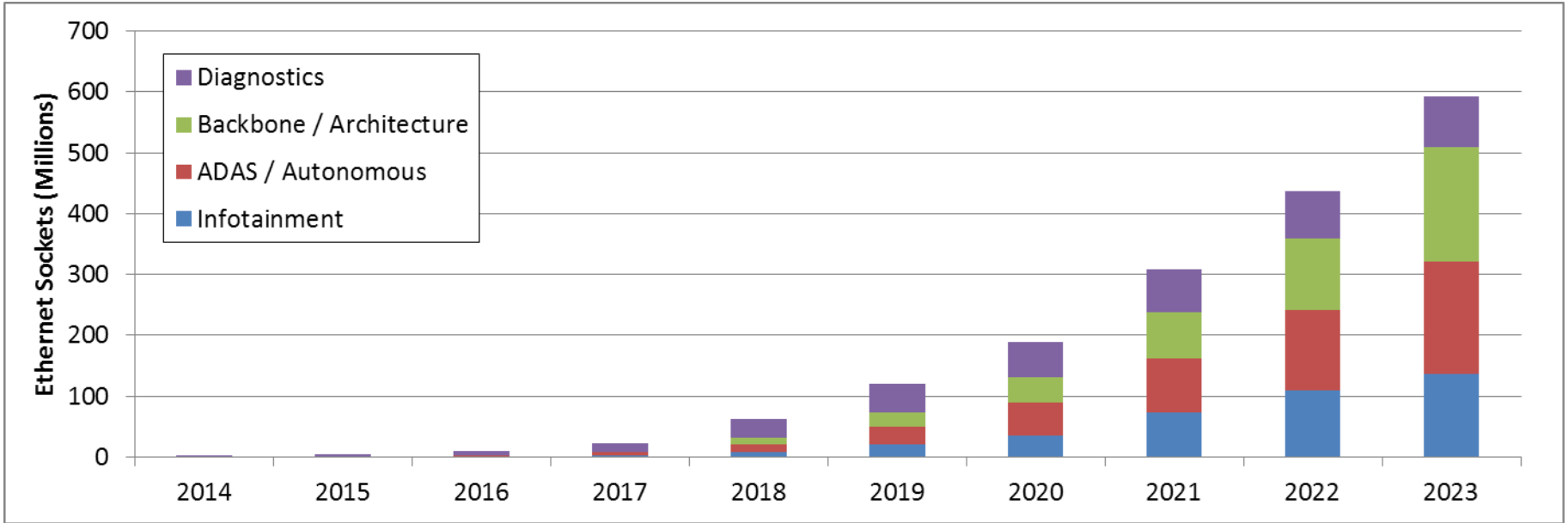




VEHICLE ARCHITECTURE TRENDS

- Everyone agrees architecture WILL be come **more centralized**
- Little agreement on **pace** of change
- Automated driving and significant **sensor fusion** is the main driver for increased centralization
- Many players, **old and new**, seeking to provide solutions, e.g.:
 - Intel (Go platform, now acquiring Mobileye, partnership with BMW, Altera FPGA technology)
 - NVIDIA (zFAS with Audi, used on Tesla, agreements with ZF-TRW and Bosch)
 - Samsung (will manufacture for Tesla, getting into infotainment)
 - Qualcomm (positioning Snapdragon for mapping, playing up connected angle, intending to acquire NXP)
 - Mentor Graphics (DRS 360 platform – multiple semi possibilities across Xilinx, Intel and ARM-based)
 - Renesas (positioning R-Car variants)
 - Google (Tensor Processor Unit)
 - ...and many more...
- Sensor vendors **conflicted** over centralization – moves value away from sensor
- Opportunities are real but should not be overstated. Still very strong market for conventional ADAS / **discrete** solutions

ETHERNET DEMAND WILL BECOME DRIVEN BY ARCHITECTURE CHANGE



- Forecast has been increased – mainly due to more activity by OEMs in installing Ethernet backbones / gateways in vehicles
- Europe leads, followed by US. Asia lags

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ECOSYSTEM CHALLENGES (1/2)

- End-user revenue from fully automated driving is **ZERO**
- This market of zero is **re-shaping** the value chain
- Biggest challenge is for **T1 suppliers**
 - Automakers are increasingly looking to **start-ups** for innovation and to develop their own IP and solutions
 - **Separation** of hardware and software. Integration of hardware and software no longer only done by T1 – but also by OEM and engineering services partners
 - How can a T1 **add value**? What can Magna add to a Mobileye solution? What can ZF-TRW add to an NVIDIA solution?



ECOSYSTEM CHALLENGES (2/2)

Selected quotes:

- *“We are moving from a value chain to a **value network**”* – T1 Supplier
- *“We offer two levels of software with our sensor, one which effectively just filters and passes on the data, and one which does object detection and classification. Almost all of our OEM clients **take the simplest software**, and want to do the detection and classification themselves”* – LiDAR sensor vendor
- *“Tier Ones need to get **faster**”* – volume OEM
- *“At some stage we will need a **manufacturing partner**”* – luxury OEM
- *“I don’t want to pay a Tier One to learn things that **I need to learn** for myself”* – luxury OEM

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CONCLUSIONS (1/2)

- The car **will become more connected and more automated** – but we will not see Car 2.0 appear overnight
 - Connectivity business model needs to change from B2C to VRM/CRM
 - Automated driving technology will take time to mature
 - Consumers are not yet convinced...
- A **high-speed** in-vehicle communications network will be at the heart of the enabling technologies required
 - Automotive Ethernet is at the heart of this change – but does face competition from high-speed point-to-point links
- The automotive value chain is evolving into a **value network**
 - ALL players will need to identify and secure their place in this network

CONCLUSIONS (2/2)

What do you think you've heard Ian say today?

“Nothing much is changing, I can call it as I see it.”



“There's a huge pot of new money to tap TOMORROW.”



“I must position for the coming change, but not expect short-term gains.”




Any Questions?



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