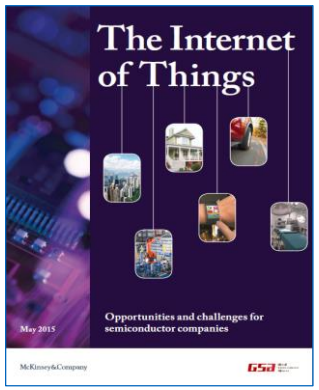
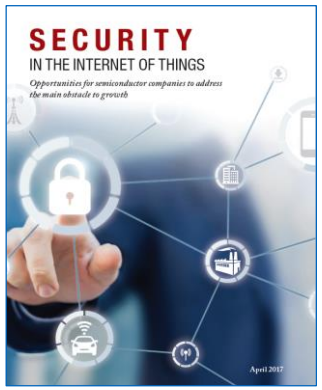
Background and purpose of our workshops

Background: GSA-McKinsey cooperation

- Intensive research collaboration focusing on the most relevant topics for the semiconductor industry
  - The Internet of Things – opportunities and challenges for semiconductor companies (2015)
  - Security in the Internet of Things (2016)
- Project steering by GSA EMEA Executive Forum, with knowledge input through interviews and surveys by many industry players / GSA members
- Publications and wide industry dissemination





Current hot topic: connectivity and autonomy – what does it mean for automotive electronics?

- Recent developments and trends in automotive electronics are on top of mind for many industry leaders and GSA members
- Key challenges is that this is a deeply technical topic that has significant strategic implications for many players across the value chain
- Therefore, we are jointly inviting experts from across the automotive industry to workshops, focusing on the areas
  - Nov 17: Computing platforms / architecture and sensing
  - Nov 21: Data connectivity and on-board networks
- In preparation we have developed 10 hypotheses on the of automotive electronics & software. Now, we want to
  - Discuss and develop a perspective on these hypotheses
  - Derive and discuss implications of those developments on the semiconductor industry

10 working hypotheses for the automotive software and E/E architecture of the future

Computing platform	1	**ECUs are getting consolidated:** Instead of a multitude of specific ECUs for specific functionalities, the industry will move to a consolidated vehicle architecture with few domain controllers doing all the calculations – on the long-term, further virtualization will lead to more SW agnostic HW
	2	**Limited number of architecture stacks with integrated hardware and software:** The number of stacks will decline, but stacks per se will remain and will be connected with each other. Stacks will be optimized within themselves
	3	**Expanded middleware layer will abstract applications from the hardware:** On top of ECU hardware in the car, the middleware layer will allow for abstraction and virtualization, a service-based architecture, and distributed computing
Sensing	4	**Significant mid-term spike in the number of in-vehicle sensors:** Sensors with similar functionalities will be installed in the next 2-3 vehicle generations to ensure functional safety – in the long-term, OEMs will opt for specific sensor solutions to reduce the number of sensors/costs
	5	**Sensors will become more intelligent:** Intelligence will move from ECUs into sensors. Future sensors can pre-process data for simple calculations, trigger actuators directly, and inform ECUs retrospectively about the actions – HAD will require central computing to connect sensors
On-board networks	6	**Full redundancy of power and data networks:** (Safety-) critical applications will require fully redundant circles for data transmission and power supply that are intelligently controlled to support steer-by-wire and other HAD functions
	7	**Rise of automotive Ethernet:** Due to increased data rates and redundancy requirements for HAD, automotive Ethernet will emerge as a key enabler, especially for the central data bus
Connec-tivity	8	**Data connectivity for functional safety and ADAS will always be channeled via the OEM; more open interfaces in infotainment:** Central connectivity gateways transmitting/receiving safety critical data will always connect solely to an OEM backend which 3rd parties can connect to for data access. In infotainment, more open interfaces will allow for deployment of content according to standards set by the OEM
	9	**Increasing use of cloud to combine in-vehicle data with environmental data:** Data that is neither safety-critical nor personal will be increasingly processed in the cloud to derive additional insights
	10	**Components will be updateable and communicate bi-directionally:** Test systems in the vehicle allow for function and integration tests of updates, which form the basis of lifecycle management and post-purchase feature enhancement/unlocking. All ECUs will be able to send and receive data to/from sensors/actuators. Data sets can be retrieved to support innovative use cases (e.g., route calculation based on vehicle parameters).

SOURCE: McKinsey

Preliminary workshop agenda

Workshop Fri Nov 17 – Architecture and Sensing

10:00 - 10:30	Welcome & introduction - *plenary*
10:30 - 12:00	Breakouts Session 1 ECU consolidation *Breakout room 1* Increasing number of sensors *Breakout room 2*
12:00 - 12:30	Debrief of session 1 - *plenary*
12:30 - 13:30	Networking lunch - *restaurant area*
13:30 - 15:00	Breakouts Session 2 Service oriented architecture & architecture stacks *Breakout room 1* Intelligent sensors on the rise *Breakout room 2*
15:00 - 15:30	Debrief of Session 2 - *plenary*
15:30 - 16:00	Wrap-up and Closing - *plenary*

Workshop Tue, Nov 21 – Connectivity on-board networks

10:00 - 10:30	Welcome & introduction - *plenary*
10:30 - 12:00	Breakouts Session 1 Data connectivity through OEM *Breakout room 1* Cloud sensors and OTA *Breakout room 2*
12:00 - 12:30	Debrief of Session 1 - *plenary*
12:30 - 13:30	Networking lunch - *restaurant area*
13:30 - 15:00	Breakouts Session 2 Rise of automotive Ethernet *Breakout room 1* Power and data redundancy *Breakout room 2*
15:00 - 15:30	Debrief of Session 2 - *plenary*
15:30 - 16:00	Wrap-up and Closing - *plenary*