SYNOPSYS®
Silicon to Software™

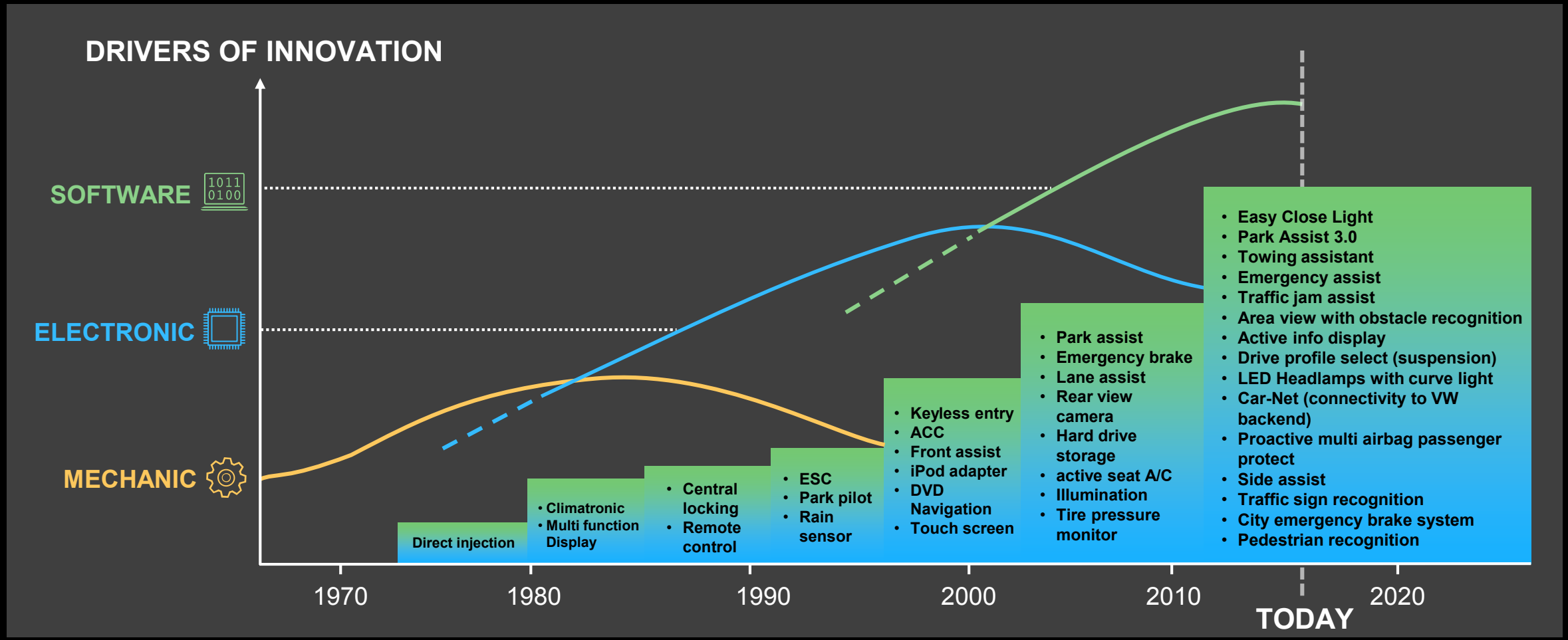
Drive Security From The Inside Out ...

SIP-adus Workshop 2018
Tokyo Japan November 2018


Data
… EVERYTHING AUTOMONOUS

Software & Electronics Become Core Competencies of Automotive Industry

This competence is the key Success Factor of Future Products



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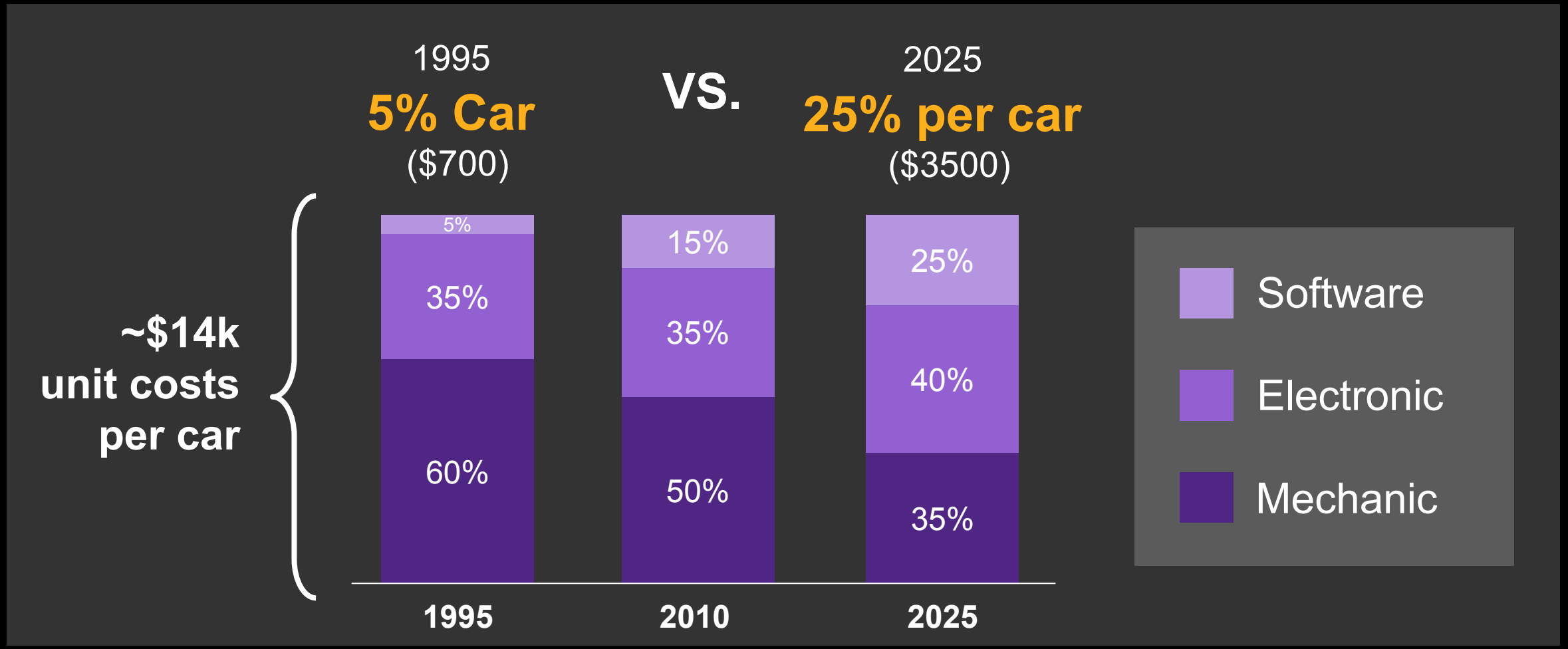
Increasing Software & Electronics Content



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Comprehensive Automotive Design – Safe & Secure

Electronics Hardware

Software

SAFE

SECURE

QUALITY

Safety Monitor

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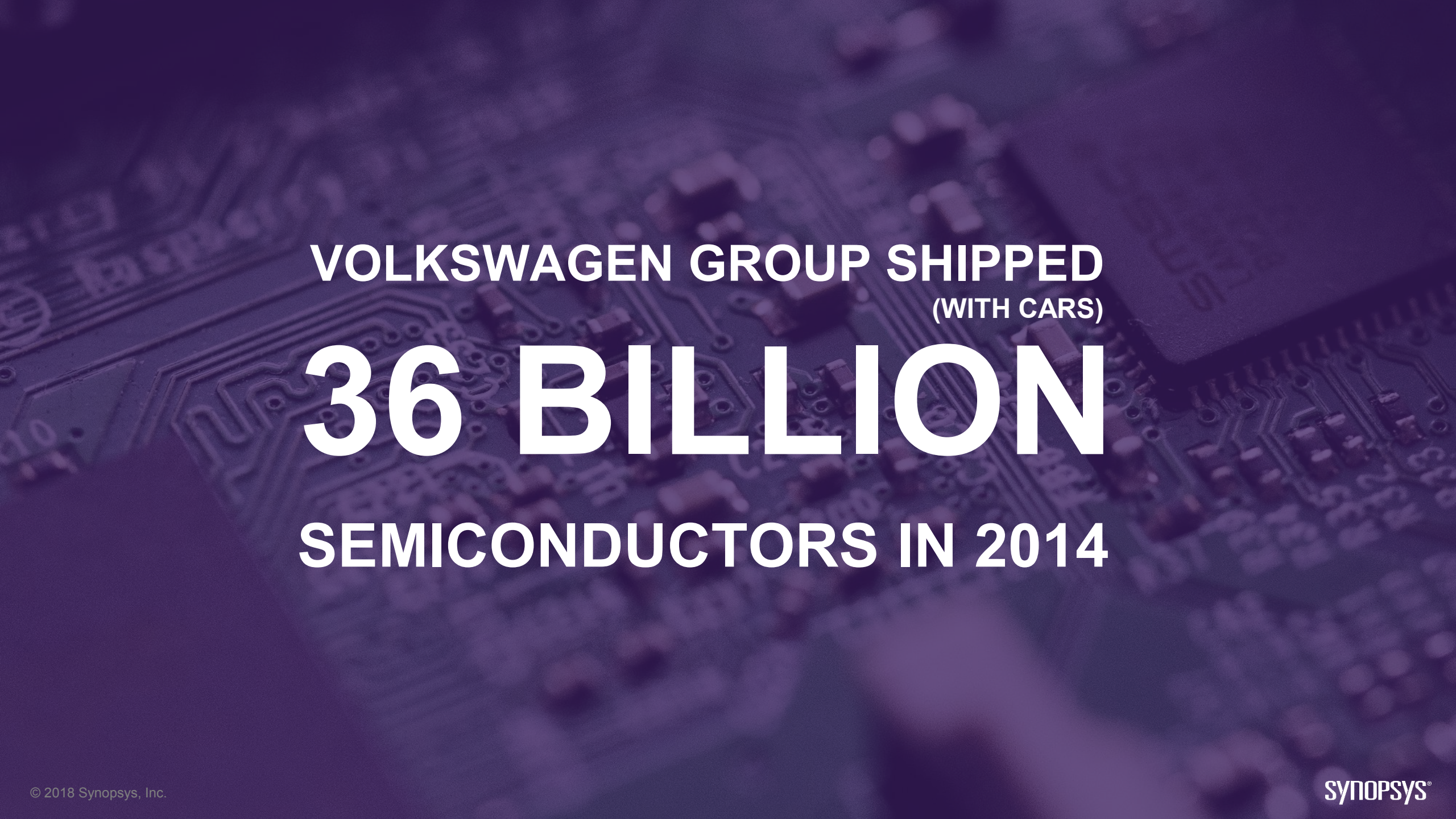

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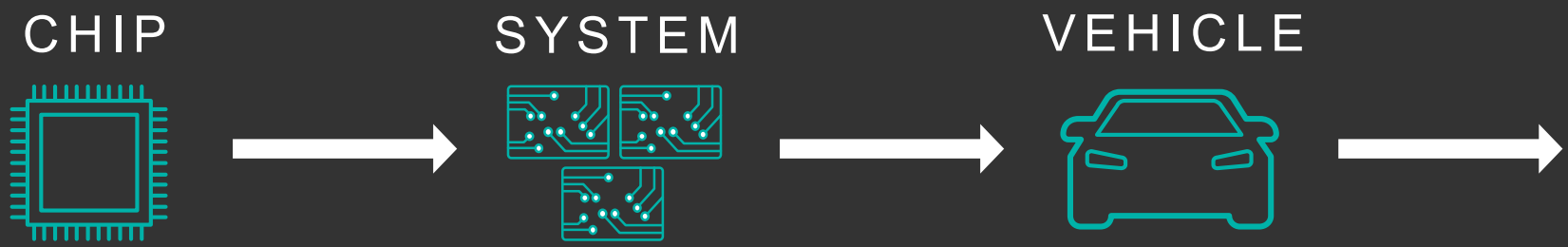
Comprehensive Automotive Design – Safe & Secure

Electronics Hardware



Software

SAFE

SECURE

QUALITY

Safety Monitor

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Is a Complex Supply Chain Safe & Secure?

Electronics Hardware

Software

SAFE

SECURE

QUALITY

Feedback Loop

Safety Monitor

DIAGNOSTIC CAPABLE ∞ FROM SOC ∞ TO SYSTEM ∞ TO CAR ∞ TO END OF CAR LIFE

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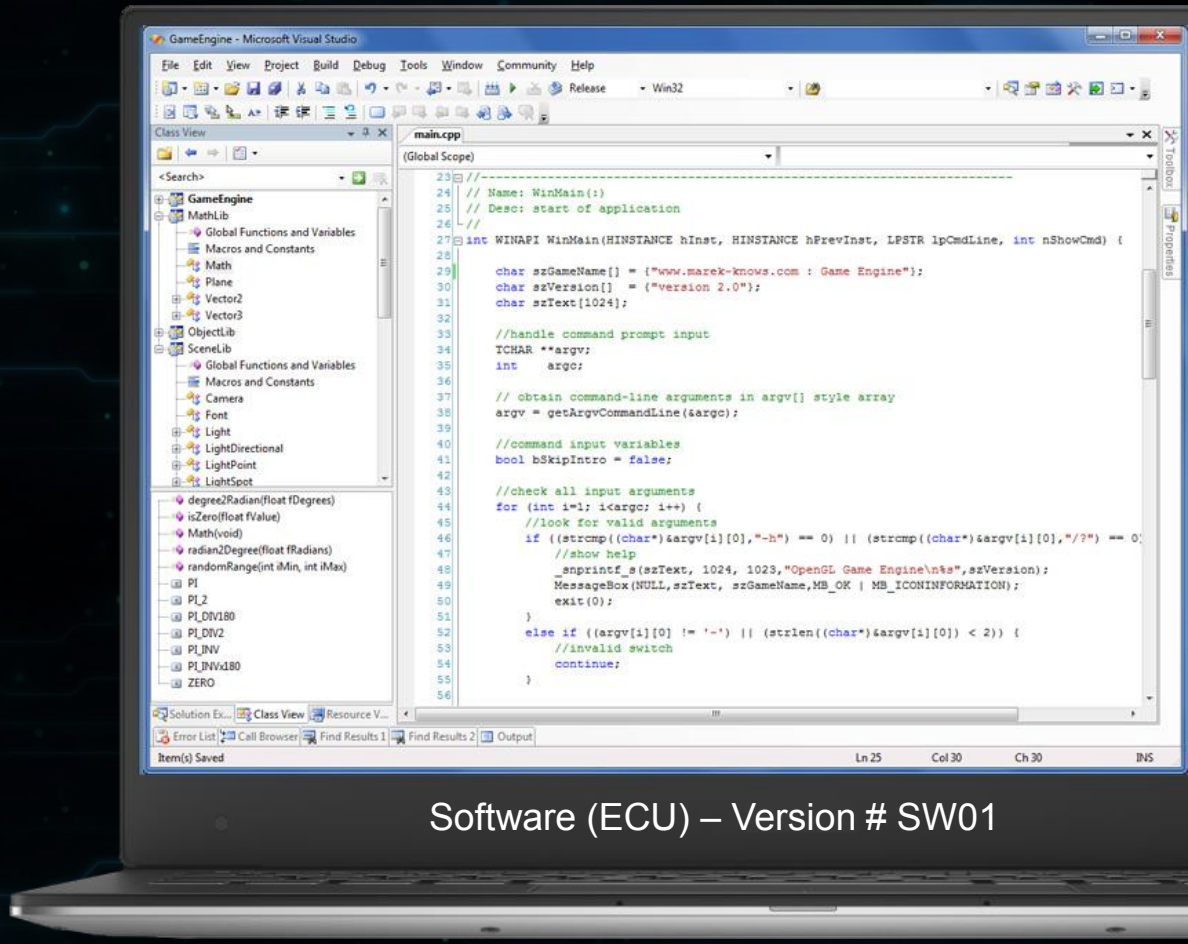
Electronic Architecture in Cars

Hardware & Software

Hardware (ECU) – Part # HW01



Software (ECU) – Version # SW01

Part # & SW Version #

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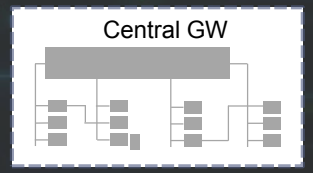
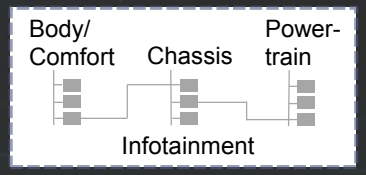
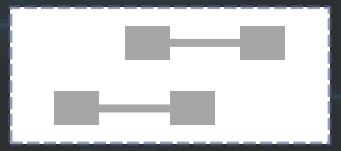
Electronic Architecture in Cars

3rd generation central gateway

GENERATION	HIGH-LEVEL ARCHITECTURE	MAIN FEATURES
TODAY 3rd Generation		• Stronger collaboration via central gateway • Cross-functional connection • Ability to handle complex function, e.g. ACC
2nd Generation		• Collaboration of ECUs within one domain • Domains: body/comfort, chassis, powertrain, and infotainment • 3-4 independent networks • Limited communication between domains
1st Generation		• Independent ECUs • Isolated Functions • Each function has its ECU (1:1 connection)

Distributed E/E Architecture

Information provided by Mckinesy & Company*

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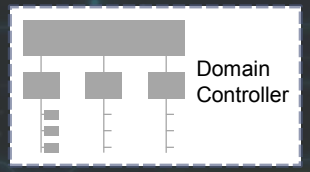
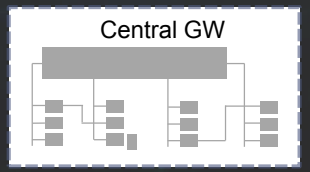
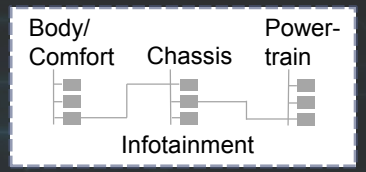
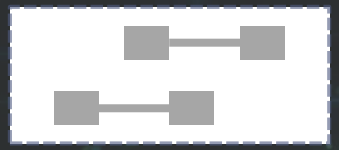
Electronic Architecture in Cars

4th generation central gateway

GENERATION	HIGH-LEVEL ARCHITECTURE	MAIN FEATURES
Domain centralized E/E architecture 4th Generation		• Central domain controller • Ability to handle more complex functions, e.g. L3 AD • Consolidation of function (cost optimization)
TODAY 3rd Generation		• Stronger collaboration via central gateway • Cross-functional connection • Ability to handle complex function, e.g. ACC
Distributed E/E Architecture 2nd Generation		• Collaboration of ECUs within one domain • Domains: body/comfort, chassis, powertrain, and infotainment • 3-4 independent networks • Limited communication between domains
1st Generation		• Independent ECUs • Isolated Functions • Each function has its ECU (1:1 connection)

Information provided by Mckinesy & Company*

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Central Domain Controller

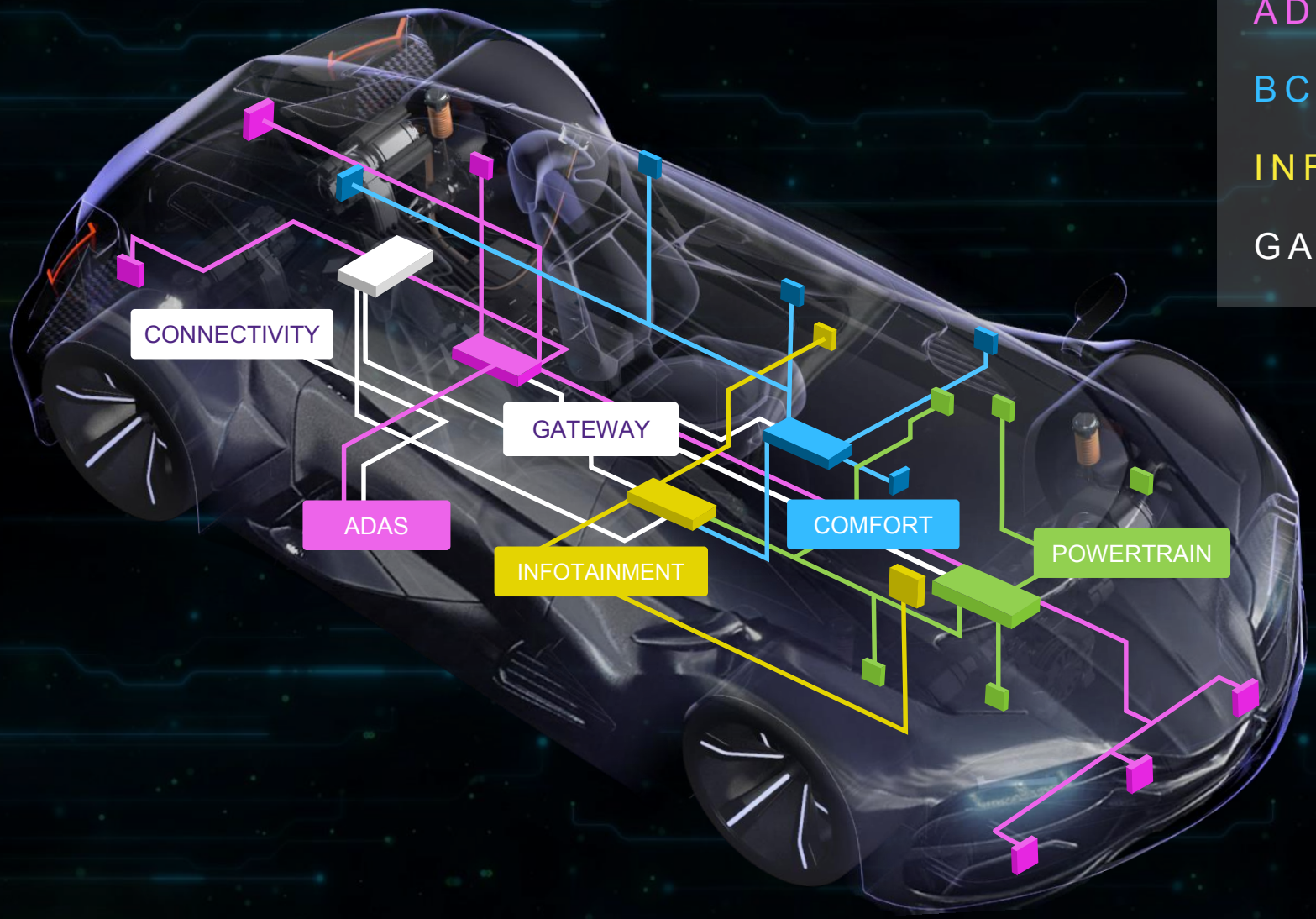
POWERTRAIN (ECU)

ADAS

BCM (Body Control Module)

INFOTAINMENT

GATEWAY & CONNECTIVITY



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Disrupting the Current Development Process

Hardware / Software CoDesign for Automotive Electronics

TODAY

- All virtual development process
- Hardware / Software CoDesign
- Virtual Prototyping
- Simulation model
- Semiconductor industry standard

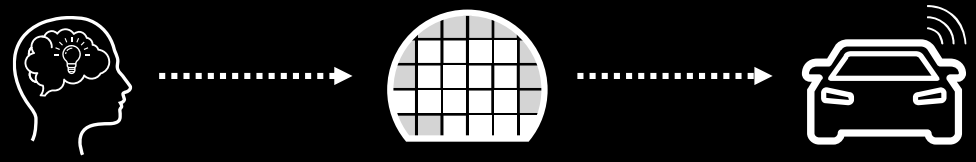
Information provided by Audi DVNCON2017 Keynote Berthold Hellenthal Audi*

TODAY

- Linear non virtual development process
- No virtual Prototypes

TOMORROW

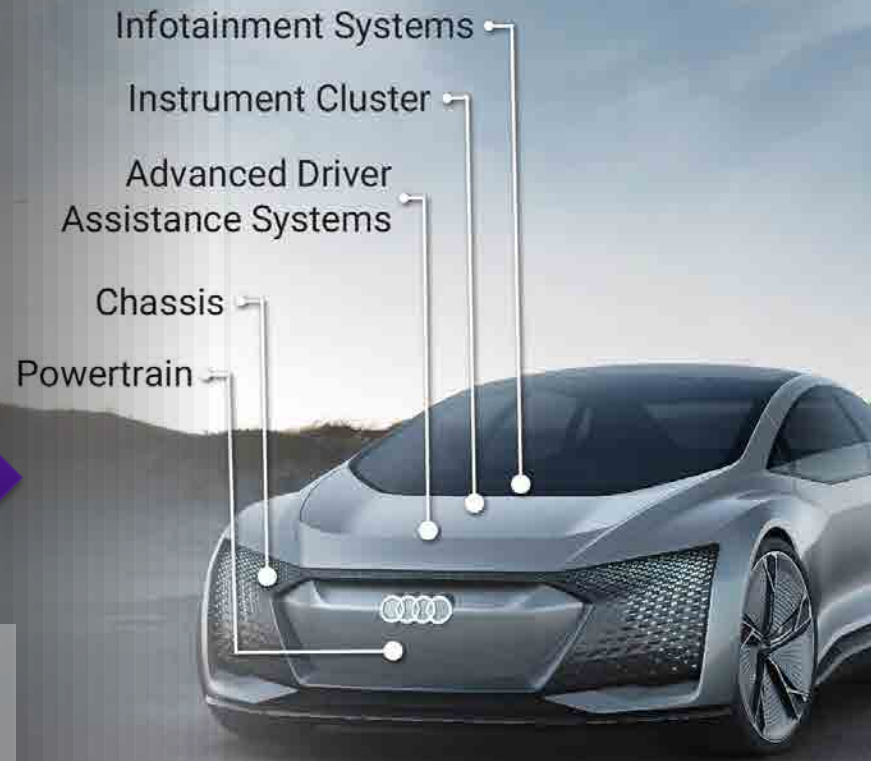
- Virtual development process
- Hardware / Software CoDesign
- Virtual Prototyping
- ECU simulation models



Pre-System Development | **Continuous System Testing**

Silicon | *System HW Samples*

Develop Earlier	Increase Coverage	Accelerate Cycles
Pre-System Debug Efficiency	Frontload test development Fault and coverage testing	Virtualize Testbench Regression



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THANK YOU