

# The Role of Software in Tomorrow's Cars

Christian Senger, Head of Digital Car & Services, Volkswagen

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Volkswagen

INCREASING  
TECHNOLOGICAL  
COMPLEXITY



CONTINUOUS &  
AGILE DELIVERY



CONTINUOUS  
INTEGRATION



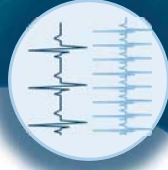
EFFICIENCY



SOFTWARE STANDARDIZATION  
ACROSS MODELS AND BRANDS



DECOUPLING OF HARDWARE  
& SOFTWARE DEVELOPMENT  
CYCLES



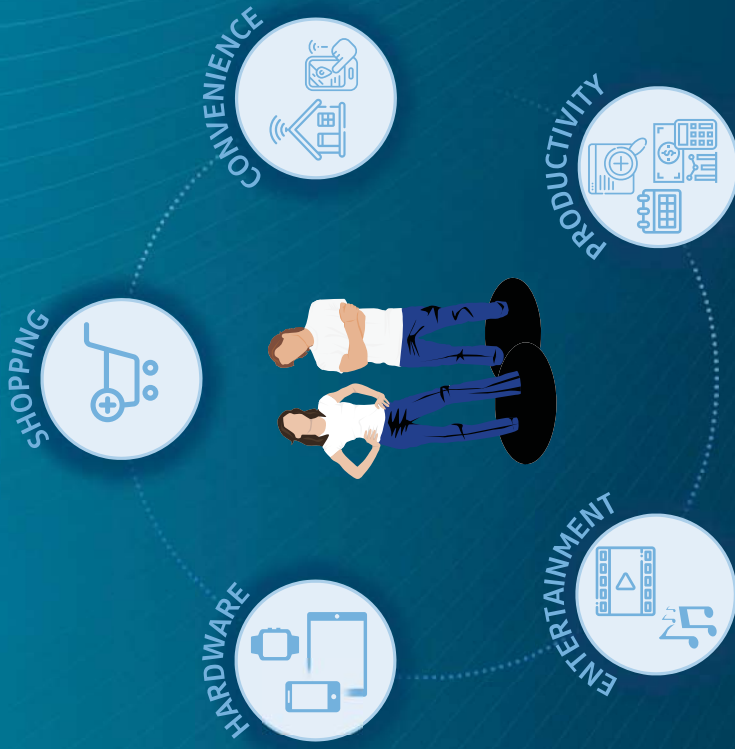
SOFTWARE  
& HARDWARE  
ABSTRACTION



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Microsoft



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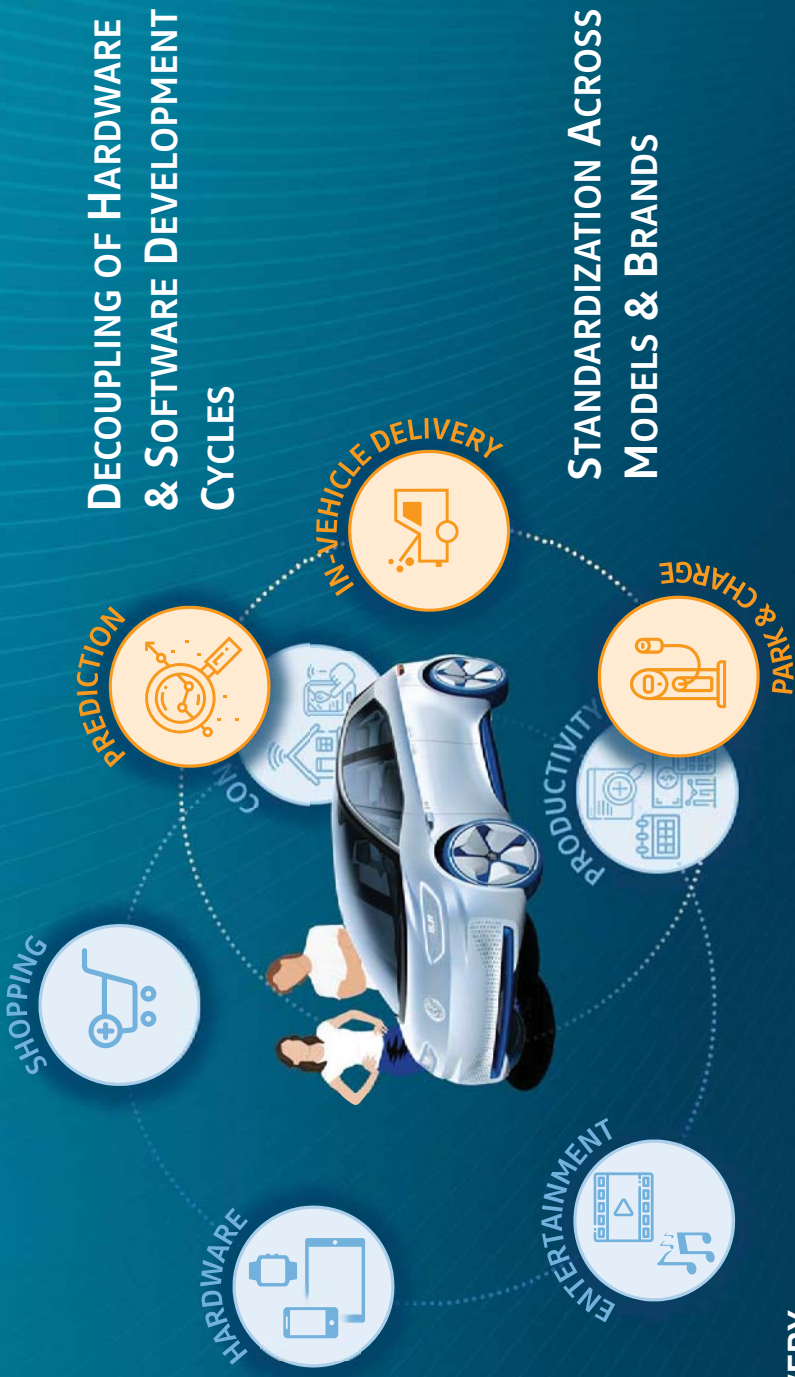
Microsoft

INCREASING  
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CONTINUOUS  
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CONTINUOUS & AGILE DELIVERY

SOFTWARE & HARDWARE ABSTRACTION



EFFICIENCY



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**Touareg**  
100.000.000



**F35 Fighter Jet**  
24.000.000



**Android**  
12.000.000



**Boeing 787**  
6.500.000

**Space Shuttle**  
400.000

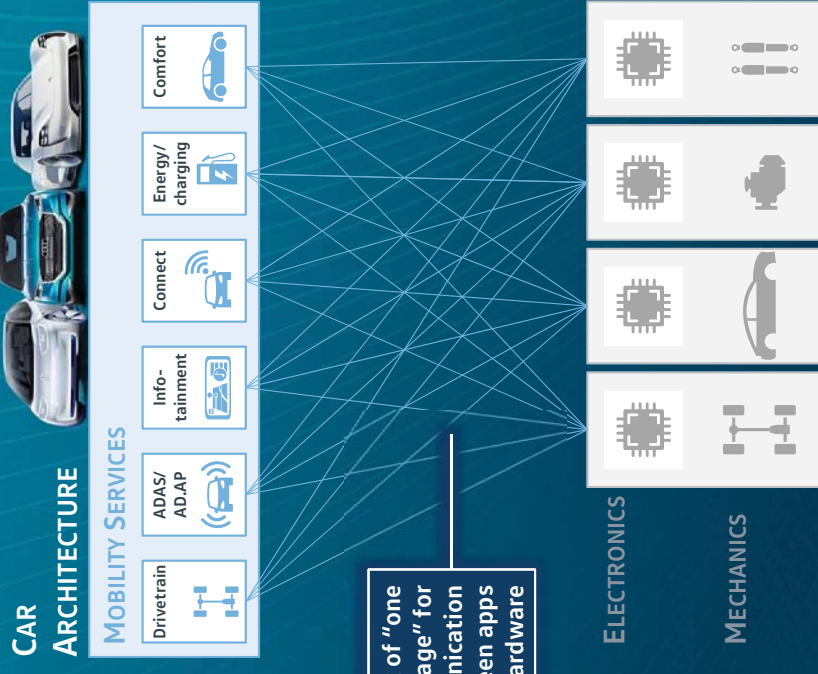
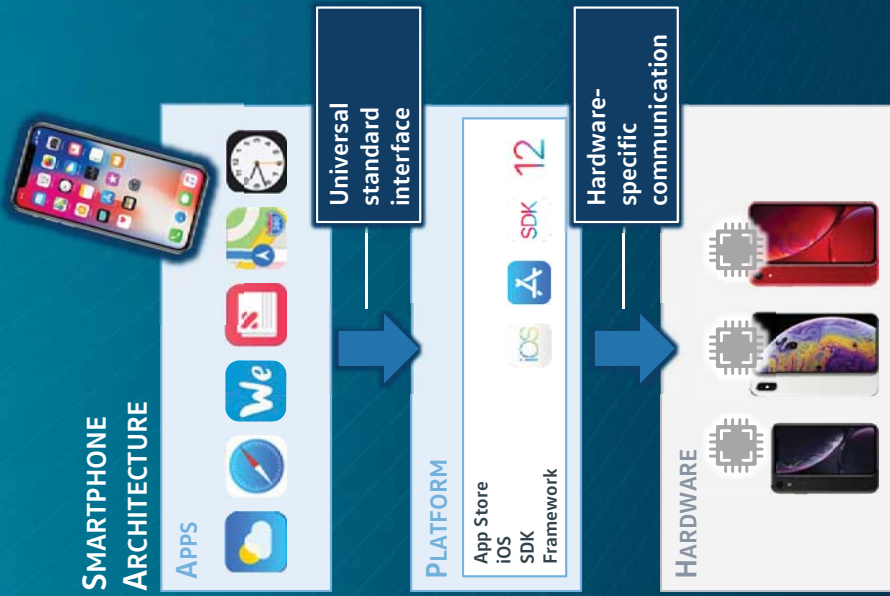


**LINES OF CODE**



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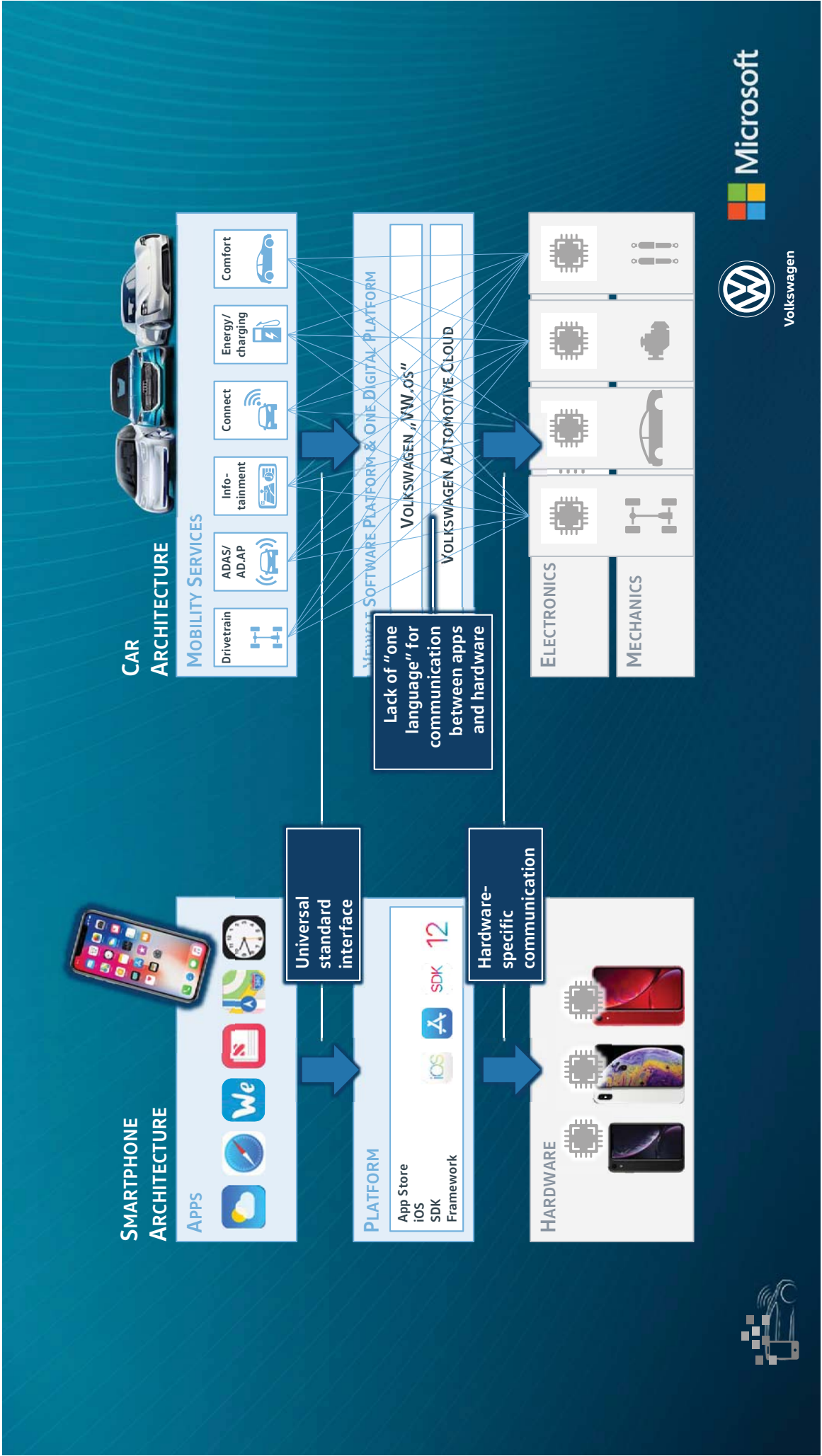




Lack of "one language" for communication between apps and hardware

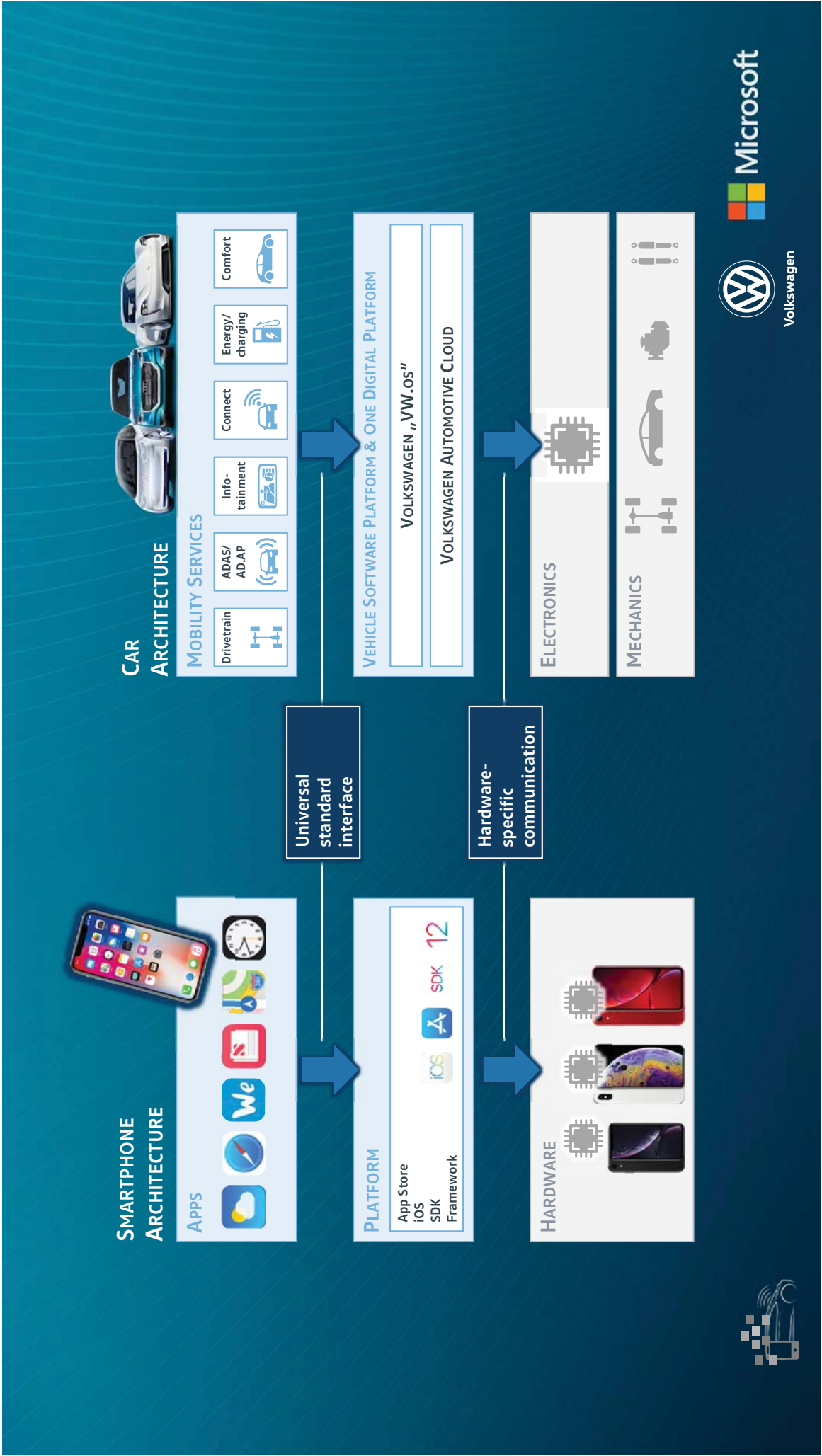


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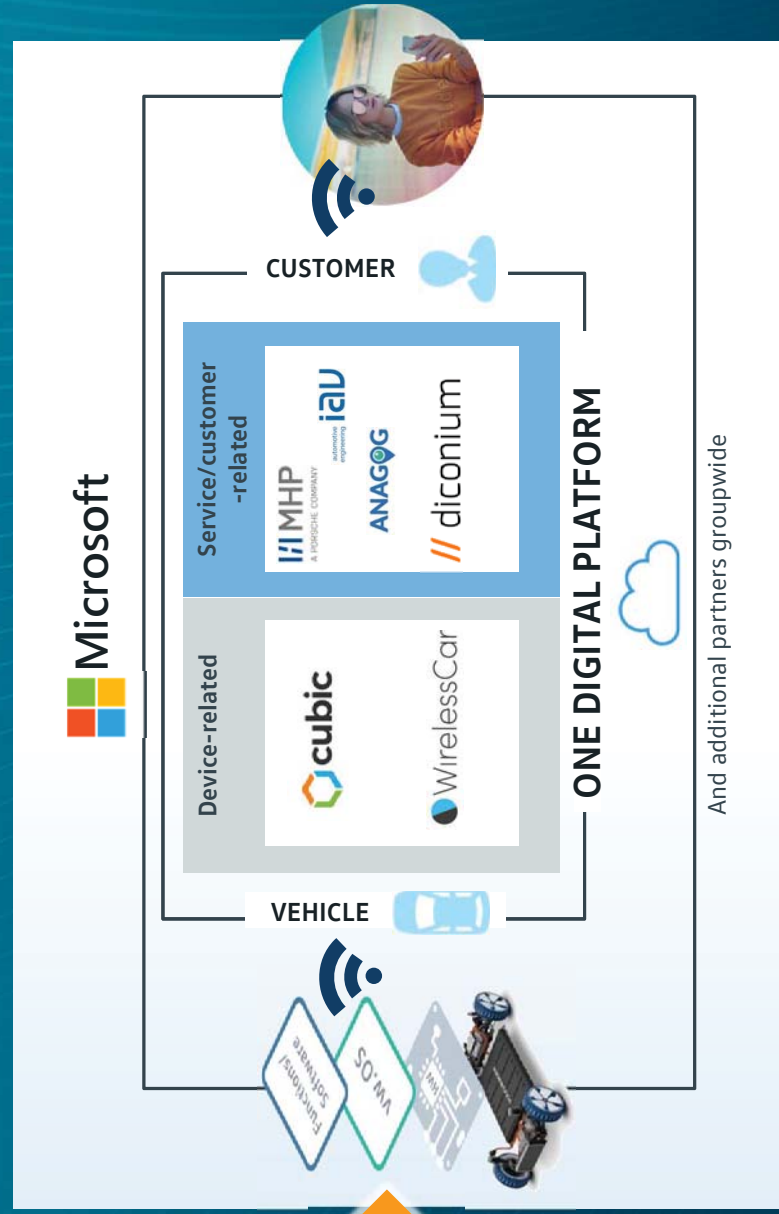


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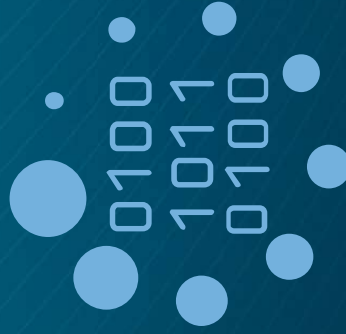
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### TRADITIONAL "CAR BEAT"



MULTI-YEAR  
PRODUCT LIFECYCLES



### "OEM SOFTWARE BEAT"



- Hardware-driven
- Safety-focused
- Robust
- Built to last

LOW SPEED OF SOFTWARE  
INNOVATION

- Tied to hardware cycle
- Focused on hardware functionality
- Hence, not a means in itself but a means to an end



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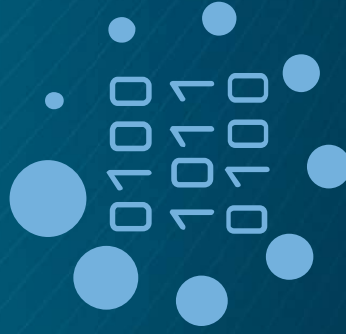
Microsoft



### TRADITIONAL "CAR BEAT"



MULTI-YEAR  
PRODUCT LIFECYCLES



### "OEM SOFTWARE BEAT"



DAILY UPDATES

- Hardware-driven
- Safety-focused
- Robust
- Built to last



Volkswagen  
**Microsoft**  
 LOW SPEED SOFTWARE  
 DECOUPLING OF SW &  
 HW INNOVATION

- Dedicated development
- Focused on hardware
- Drive for stability
- High-level, and-agnostic self-driving software culture



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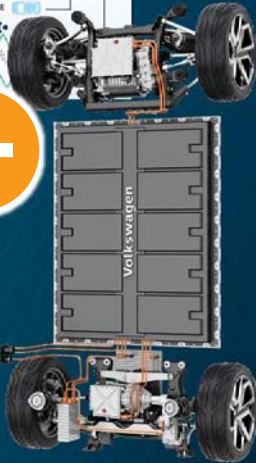
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STANDARDIZATION TODAY



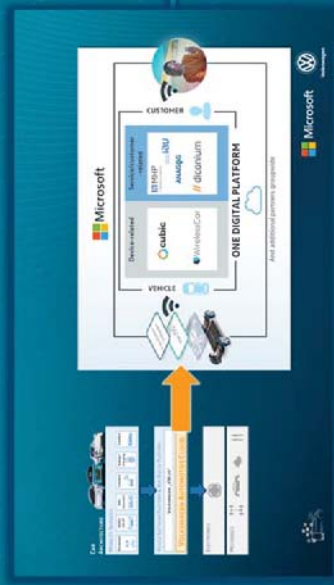
STANDARDIZATION TOMORROW



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DEVELOPMENT CENTER  
NEAR SEATTLE LIVE



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CREATION OF RESORT FOR  
DIGITAL CAR & SERVICES



Volkswagen

Microsoft  
KICK-OFF OF 1ST  
JOINT PROJECTS



Volkswagen

WirelessCar  
// diconium  
ACQUISITION OF 49% &  
75.1% STAKES BY



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Microsoft  
COOPERATION  
AGREEMENT SIGNED



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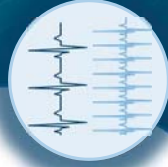
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