

# Security Use Cases for Software Defined Vehicles

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# Agenda

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- Introduction
- Who We Are
- What We Do
- Security Use Cases
- Q&A

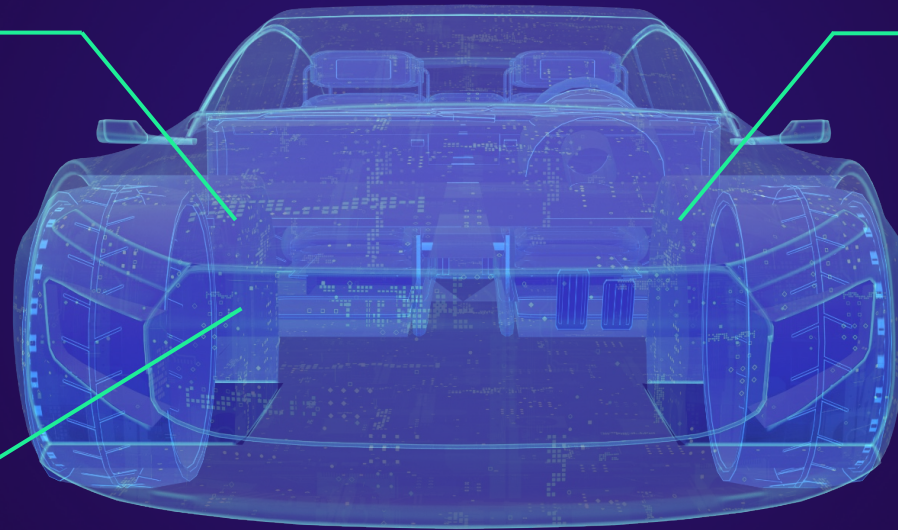
# Who am I ?

- Yasser Aziza
- Senior Product Security Engineer
  - HW/SW Security
  - Key Management Systems
  - Security Architecture
- Berlin, Germany

# The automotive industry is in the midst of a software revolution – the car and the industry will never be the same

## New tech capabilities

- // Artificial intelligence
- // Virtual & augmented reality
- // Quantum computing



## New revenue streams

- // Function on demand
- // Updates & upgrades
- // Data & e-commerce

## New customer expectations

- // Assisted & automated driving
- // Always up-to-date over lifetime
- // Immersive user experience

# Revolutionizing automotive mobility requires **tech expertise** and **scale**. CARIAD and Volkswagen Group have both.

14

million connected vehicles today and counting

9

leading car brands

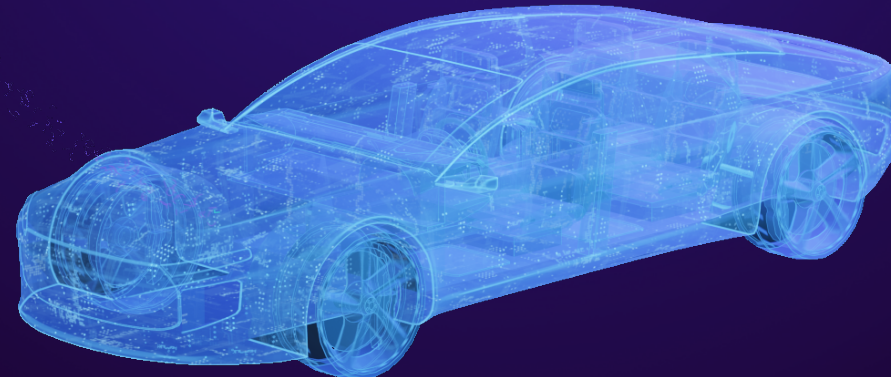


7

million km per day of ADAS/AD data collected

1

consolidated software platform for the entire Volkswagen Group as goal



# Redefining German Engineering building on the unmatched scale of the Volkswagen Group



## Exceptional fleet size

Up to 40 million connected cars running on CARIAD software by 2030



## Safe, secure, reliable

Unified software platform offers data security, enables a safer automotive mobility



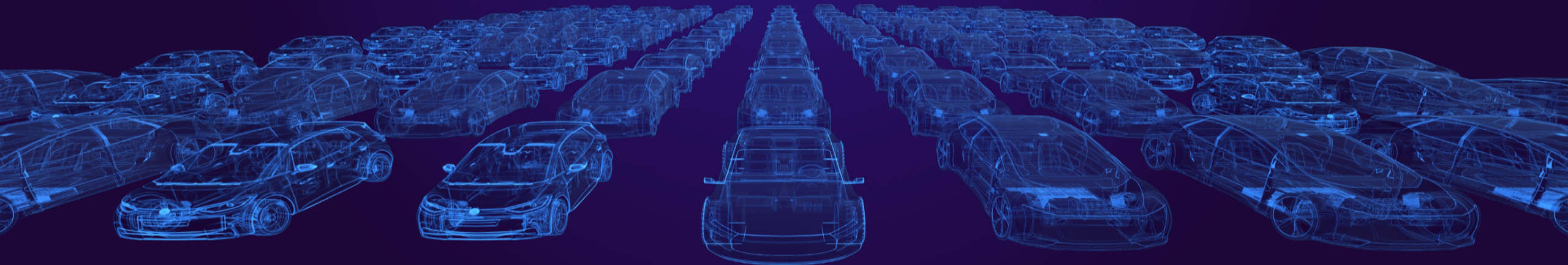
## One tech stack for all car segments

Best-in-class software solutions for 9 VW Group car brands: from entry to luxury level



## Unique cost advantage, boosting returns

Solutions only need to be developed once and are scaled up through VW brands

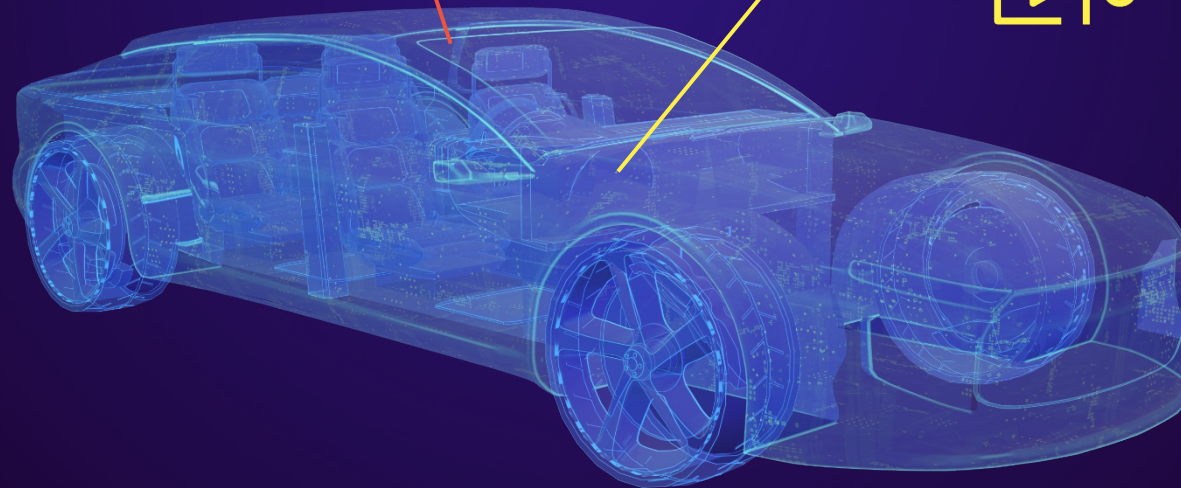


CARIAD makes automotive mobility safer,  
more comfortable and more sustainable



## The 'Driver'

RELAX & BE SAFE



## The Digital Experience

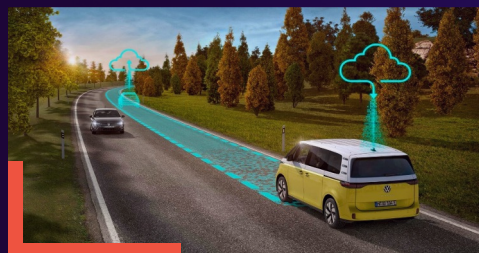
ENJOY THE RIDE &  
STAY CONNECTED



# The 'Driver' - Your automated personal chauffeur, up to level L3/L4, driving safer than ever before

## Travel Assist (L2)

In Europe, it is the benchmark for driving assistance functions. Using swarm data, it keeps you in your lane and at a safe distance from the vehicle ahead.



## Intelligent Park Assist (L2/L3)

Helps you to park – even while you are outside your vehicle. Remembers complex and individual parking maneuvers.



## Highway Pilot (L3/L4)

Enjoy your favorite videos while your car takes care of driving on the highway.





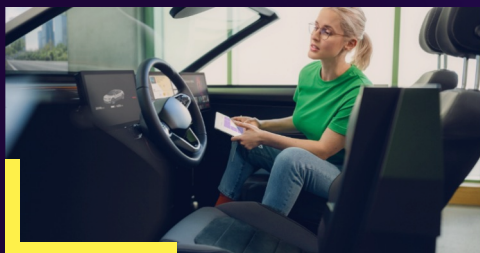


# The Digital Experience - Transforming your car into a relaxing, entertainment and focus zone

## In-car Application Store

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One Volkswagen Group-wide application store with your favorite VW and third-party apps.



## AI-based Digital Assistant

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AI-based, Intelligent and proactively interactive voice assistant as your central touch-point in the car.



## In-car Gaming & Office

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Play video games, listen to interactive adventures, enjoy the Holoride VR Experience and get some of your work done too.



## Wellbeing & Health

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Use breathing exercises to de-stress, track your heart rate, and monitor your blood sugar level to check e.g. if it's time for a snack.



# How do we do it? With our **Technology Stack**, one scalable platform provided by CARIAD with renowned partners

## The "Driver"

Automated Driving Functions

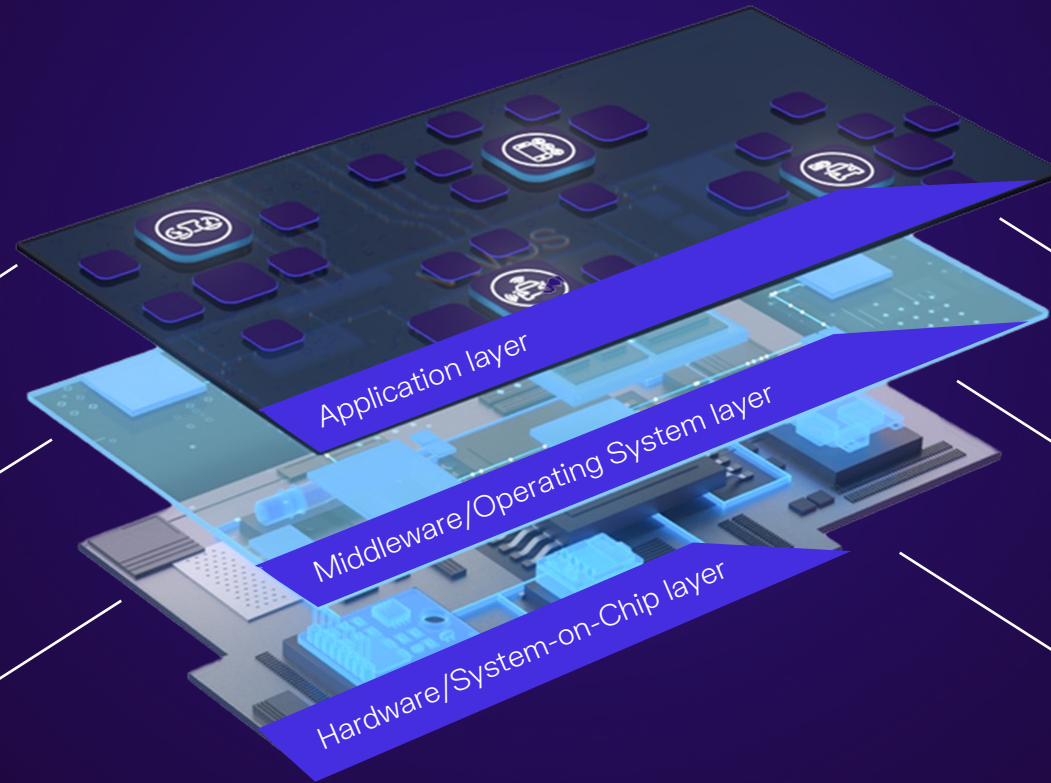
CARIAD

Middleware/Operating System

CARIAD |  BOSCH

Hardware/System-on-Chip

CARIAD |  Qualcomm  Horizon Robotics



## The Digital Experience

Vehicle Experience

CARIAD | 3<sup>rd</sup> Party

Middleware/Operating System

CARIAD |  AOSP

Hardware/System-on-Chip

CARIAD | 3<sup>rd</sup> Party

# We aim to **team up** with the best of the best to fulfil our mission.



**In-house IP development** only for strategic core control points



ADAS/AD Digital Experience

VW.OS/VW.AC Hardware/SoC



**Partnerships** where speed is key while building/retaining IP access



**BOSCH**



**Qualcomm**



Horizon Robotics



**Selected M&A** to boost in-house competence and IP ownership along Strategic Control Points



**PARAGON** SEMVOX



**INTENTA**

Founded in 2020, we have built a corporate startup from scratch attracting **the best Tech Talents** worldwide

**6,000+**

CARIAD employees  
worldwide today

**80+**

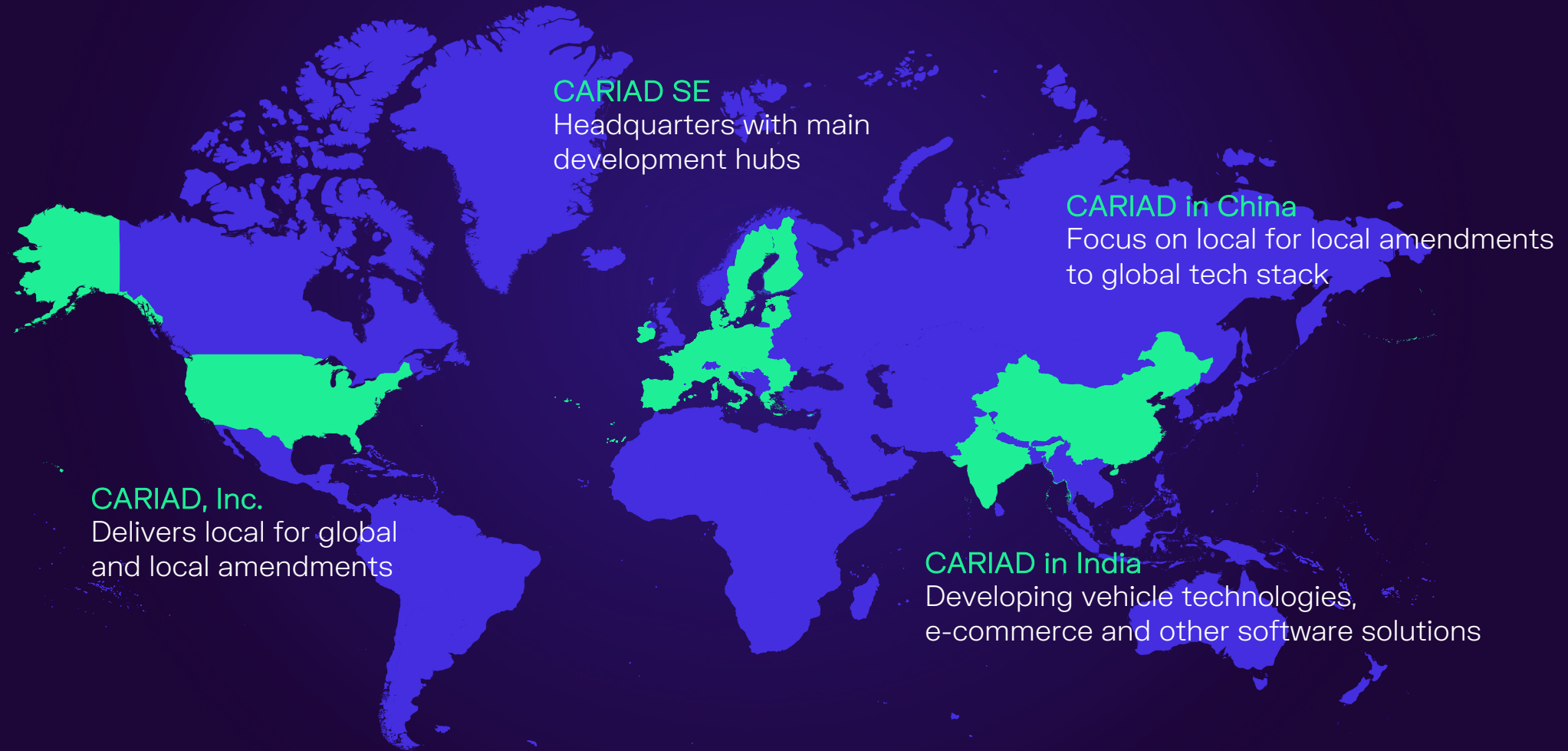
Nationalities working at  
CARIAD

**360**

teams at CARIAD

Join our mission and become part of one of the biggest endeavors in the automotive industry.

# CARIAD is global: Tech hubs with full-stack competence in all key regions



# Key Management System

- Creating cryptographic keys using state of the art algorithms
- Securely storing cryptographic keys
- Regularly rotating keys to limit exposure
- Revoking keys that are no longer needed or compromised

# Cryptographic Agility

- Being able to react quickly to
  - cryptographic vulnerabilities
  - new cryptographic requirements
- Ensure quick compliance with national/internal regulations
- Crypto Bill Of Material (CBOM)

# Defensive Product

- Suite of tools and control mechanisms to control alerts from the fleet
- Perform in-depth analysis of potential security threats
- Coordinate response



# Intrusion Detection System (IDS)

- Continuously monitor cars worldwide to identify suspected threats
- Detection of anomalies and suspicious behavior
- Reporting towards the Defensive Backend

# Analysis

- Perform remote analysis of suspected threats against cars
- On demand data collection with further remote analysis options

# Intrusion Reaction System (IRS)

- Enable defenders to respond to threats wherever the cars are
- Enable automated and manual (e.g. remote) response

# Secure Storage

- Protecting data at rest
- Ensuring compliance with regulatory requirements

Thank you. Danke. Merci.  
Takk. 谢谢.  
Gracias. Obrigado. Grazie.  
Aitäh. Hvala.

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