

Automated, Electrified, **Smart and Connected**

Transforming Automotive with **Next-Gen Technology**



 **embitel**
A VOLKSWAGEN GROUP COMPANY

DICONIUM

The Future of Mobility is Fully Charged & Energy Efficient

Vehicles are evolving into intelligent platforms, driven by software. The future of mobility is being shaped by vehicles that are smarter, cleaner, and more energy efficient.

From the systems that power Electric Vehicles to the technologies that connect and secure them, Embitel brings end-to-end automotive engineering expertise to the evolving EV ecosystem.

With deep expertise in electric powertrain engineering, EV power electronics and verification & validation, we help OEMs and Tier-1 suppliers build reliable, efficient and production-ready automotive systems.



Focus Areas

- Electric Powertrain & Battery Systems
- EV Power Electronics & Energy Management
- Verification & Validation (V&V)
- Automotive Embedded Software & AUTOSAR
- Infotainment, Connectivity & Digital Cockpit
- Functional Safety & Automotive Cybersecurity

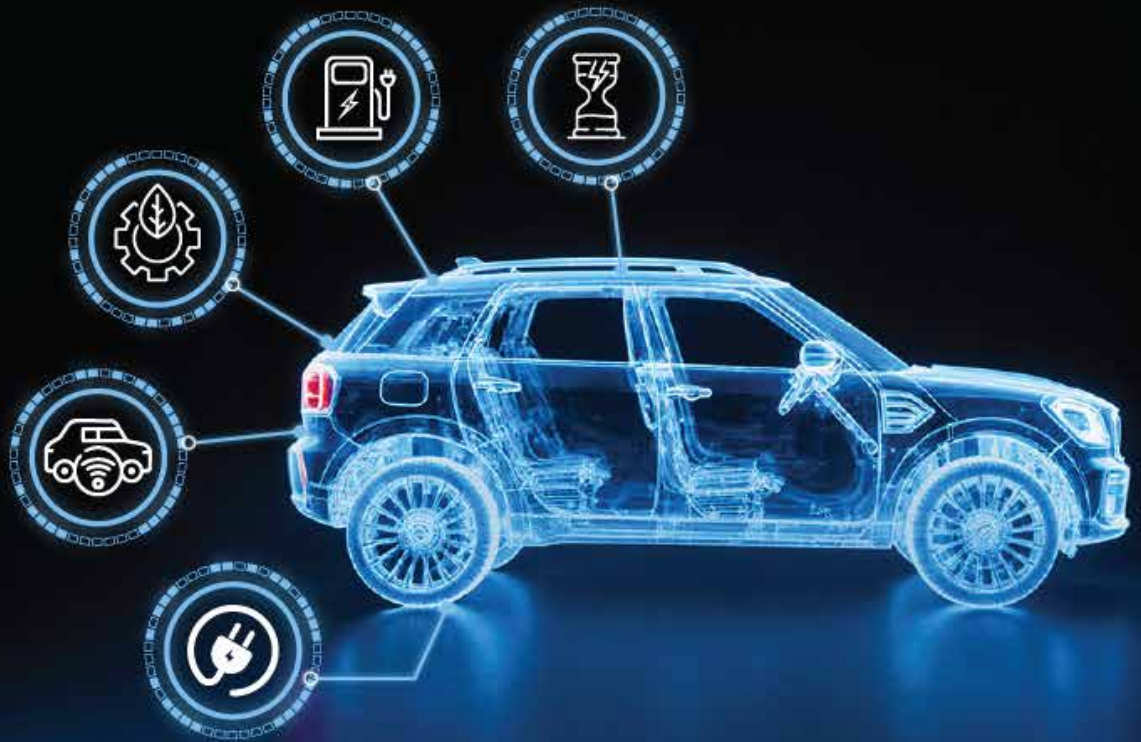
Our capabilities extend across the connected mobility ecosystem, spanning automotive software, connected vehicle solutions, cybersecurity and IoT engineering.

Engineering the **EV Ecosystem**

Energy and charging systems are the cornerstones of the **electric mobility experience**.

Our **end-to-end engineering services** cover the complete EV ecosystem - from embedded firmware to backend integration, enabling reliable, scalable, and future-ready charging infrastructures and more -

- Seamless **integration of Battery Management System (BMS), On Board Charger (OBC) & Vehicle Control Unit (VCU)** charging workflows
- Automotive lighting, body control solutions, in-cabin air quality and purification systems
- Functional Safety (FuSa) engineering aligned with ISO 26262
- Automotive cybersecurity engineering aligned with ISO/SAE 21434
- Verification & Validation (V&V), including test automation and HIL/SIL/MIL validation



**Smarter charging. Connected with energy.
Scalable EV ecosystems.**

Electric Powertrain Solutions

Motor Control Unit

- Ready-to-adapt traction motor control platform for faster development
- ~60% platform readiness with reusable hardware and software building blocks
- 6 kW to 9 kW power range for light EV applications
- FOC-based control for 3-phase and 6-phase PMSM motors
- Four-quadrant operation with regenerative braking capability
- Pre-built vehicle functions including hill hold and cruise control
- Model-based software with ISO 26262 ASIL D safety architecture



Vehicle Control Unit

- VCU hardware design meeting stringent safety and performance requirements
- Pre-validated VCU application modules through simulation and testing
- Layered software architecture covering drivers, middleware, and application layers
- FUSA-compliant design with secure bootloader integration
- HARA-driven functional safety requirements for HW & SW design and implementation

Battery Management System

- Scalable BMS platform supporting 48V to 1000V applications
- ~60% platform readiness with reusable hardware and software blocks
- SOC/SOH estimation for intelligent battery health management
- Modular cell monitoring architecture for scalable configurations
- Customizable battery parameters across diverse vehicle platforms
- CAN/CAN-FD communication with UDS diagnostics support
- Reusable platform architecture for faster development cycles



EV Power Electronics Solutions

Traction Inverter

- Power device selection for specific applications
- SPWM, SVPWM and FOC control techniques
- Support for induction, BLDC, PMSM and SRM motors
- Plant-based model development and simulation
- Power ratings based on customer requirements
- Model in the Loop (MIL), Software in the Loop (SIL) and Hardware in the Loop (HIL) testing support
- Functional safety compliance as per ISO 26262

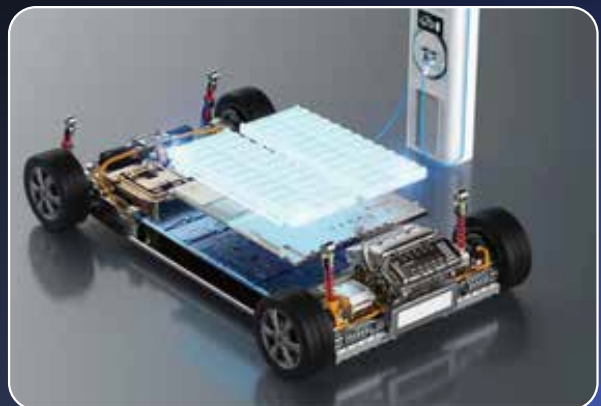


On Board Charger (OBC)

- Power devices, passives & microcontroller selection
- SiC MOSFET technology for high efficiency and high-frequency operation
- Sendust core inductors with distributed air gap for low loss & thermal stability
- AUTOSAR-based software architecture
- Interleaved boost / totem-pole bridgeless PFC with bidirectional SiC control (AFE stage)

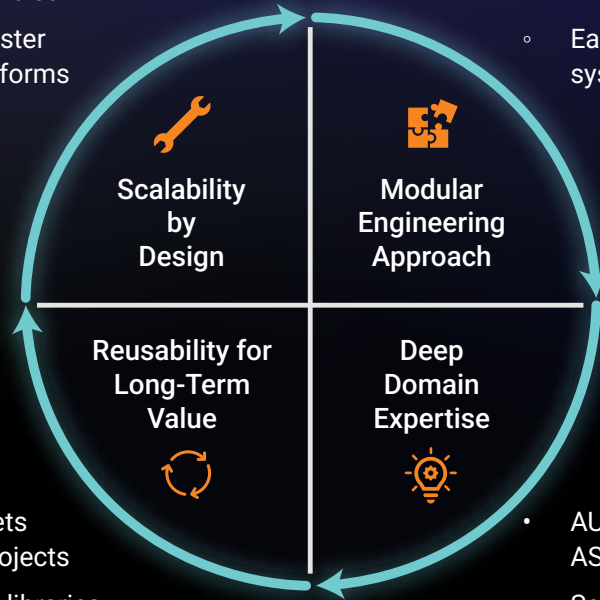
DC-DC Converter

- Power topology selection based on application requirements
- PWM control and switching frequency optimization
- High-voltage power conversion and regulation
- Selection of IGBT, MOSFET and SiC power devices
- Plant-based model development and simulation
- Load and line regulation for stable performance
- Isolation and fault protection mechanisms



Our Solutions are Versatile, Integrated & Future-Ready

- Architecture built to support 2-wheelers to heavy vehicles
- Agile frameworks for faster deployment across platforms



- State-of-the-art features for BMS, MCU, VCU, OBC components
- Easy integration with legacy systems and third-party stacks

- Reusable software assets across multiple OEM projects
- Platform-agnostic code libraries and toolchains

- AUTOSAR, ISO 26262, ISO 21434, ASPICE-compliant delivery
- Seamless integration of communication and diagnostic stacks

Ready-to-deploy ASW Layer Algorithms



Throttle/torque management



Brake management



Cruise control



Battery check



System check



Wakeup/ Sleep



Rider assist



Vehicle authentication

Case Studies

- Development of AUTOSAR-Based Motor Control Solution for Traction Coolant Pumps
- ASIL-D Compliant Hardware & Software Development for Battery Management System
- BMS Platform Software Development for Tier-1 BMS Solution Vendor
- Development of Network Connectivity Interface APIs for 3-Wheeler Vehicle Control Unit
- Development of ASIL B Compliant Electric Vehicle MCU Platform Software
- ASIL C Compliant Software Development for a VCU Application for a Global Motorcycle OEM

Verification & Validation (V&V)

Tested for Safety. Proven for the Real World.

Automotive software demands rigorous validation at every stage of development.

At Embitel, we combine automated testing, simulation-based validation and end-to-end verification to help OEMs and Tier-1 suppliers build reliable, safe and production-ready systems.

Our expertise spans the complete testing lifecycle from individual software components and Electronic Control Units (ECUs) to integrated vehicle systems.

With a strong focus on automation, we help reduce repetitive manual testing effort, accelerate test execution and support faster release cycles.



Recognised for Testing & Validation Excellence

Our commitment to rigorous automotive verification and validation was recognised with the **Testing & Validation Excellence Award** at the **AutoTech Awards 2026**.

The recognition reflects Embitel's continued investment in automotive testing expertise, automation frameworks and validation processes that support the development of reliable and high-quality mobility solutions.

This achievement reinforces our focus on delivering engineering solutions that meet the evolving demands of the automotive industry.

It also inspires us to keep pushing the boundaries of innovation and contribute to the future of connected and electric mobility.



Built for Every Stage of Validation Automated for Speed



Complete V&V Solutions

Automation Testing

Development and execution of automated test workflows including:

- Automated functional and regression testing
- Test case development and execution automation
- ECU testing using automotive test tools and scripting
- Continuous validation across evolving software releases
- Automated testing for complex embedded and connected systems



EV Systems Testing

Validation of critical Electric Vehicle systems, including:

- Battery Management System (BMS)
- Vehicle Control Unit (VCU)
- On-Board Charger (OBC)
- Motor Control Unit (MCU)

Model, Software and Hardware-in-the-Loop Testing

Validation across different stages of the development lifecycle through:

- Model-in-the-Loop (MIL) testing
- Software-in-the-Loop (SIL) testing
- Hardware-in-the-Loop (HIL) testing



Automotive ECU Testing

Validation of vehicle Electronic Control Units and body systems, including:

- Seating control systems
- Heating, Ventilation and Air Conditioning (HVAC)
- Anti-lock Braking Systems (ABS)
- Automotive body and comfort systems

Cockpit and Connected Systems Validation

End-to-end validation of in-vehicle and connected technologies, including:

- Driver monitoring systems
- Dash cameras
- Digital Instrument Cluster (DIC)
- In-Vehicle Infotainment (IVI)
- Telematics systems



Advanced Driver Assistance Systems (ADAS) Validation

Validation of safety and driver-assistance functions, including:

- Driver Monitoring System (DMS)
- Cruise control
- Automatic Emergency Braking (AEB)
- Parking assistance
- Lane detection and warning systems

Safety and Compliance Testing

- ISO 26262-compliant testing
- Functional safety validation
- Requirement-based verification and traceability
- Diagnostics and fault testing



SUCCESS STORIES

- Automotive ECU Testing of Driver Monitoring System
- End-to-End Validation and Testing of BMS and VCU for a Tier-1 Automotive Company
- Validation and Testing of Over-the-Air Updates and Telematics Systems

Automotive Solutions Development

Software-Defined Vehicles are Built on Strong Embedded Foundations.

We help OEMs and Tier-1s build the software foundation for next-generation vehicles.

Our expertise spans every layer of automotive solutions development-from platform software to application layer and validation.

Our Automotive Software Focus Areas

Platform Software & AUTOSAR

AUTOSAR

MCAL

BSW

BSP

Middleware

Device Drivers

Bootloader

Model-Based Development

Model-Based Design

Control Algorithms

Auto Code Generation

MIL

SIL

Functional Safety & Cybersecurity

ISO 26262

ISO/SAE 21434

HARA

TARA

Secure Boot

Secure Diagnostics

SDV Communication

Automotive Ethernet

DoIP

CAN FD

UDS

Secure Onboard Communication & Diagnostics

SecOC

SecOD

EV Diagnostics

SAE J1979-2 OBDOnUDS

SAE J1979-3 ZEVonUDS

Software-Driven Vehicle Functions

Automotive Lighting

In-Cabin Air Purification

EV Control Software

SDV ENABLEMENT

OTA Updates

Remote Diagnostics

Vehicle-to-Cloud Connectivity

Software Update Management

From Embedded Software To Software-Defined Vehicles.

Automotive Embedded & SDV Engineering Capabilities

Ready-To-Deploy Automotive Stacks

Pre-engineered automotive software stacks designed to accelerate ECU development and integration.

Automotive Ethernet

UDS

J1939

CAN FD

DoIP

J1979-2 OBDOnUDS

J1979-3 ZEVonUDS

SecOC

SecOD

Ready to Deploy

Reusable, production-oriented stacks that help reduce development and integration effort by up to 50%.

Model-Based Design Ready

Designed for seamless integration into model-based development and control software workflows.

Safety-Critical ECU Ready

Built for integration into safety-critical automotive ECU architectures.

Tooling Solutions

- PC-based ECU flashing tools (CAN / LIN / Ethernet)
- Communication interface configuration tools
- End-of-Line (EOL) configuration & HEX file generation tools
- UDS-based diagnostic tools (ISO 14229)
- OBD-based diagnostic tools (ISO 15031)
- ODX / Excel-based UDS stack configuration tools
- COM & Diagnostics stack integration in Simulink environment

Software-Driven Vehicle Functions

Automotive Lighting

Adaptive

Projection

Ambient

Lighting ECU Software

Diagnostics

In-Cabin Air Purification

Air Quality Monitoring

AQI Logic

ASPICE CL 2

Sensor Integration

Control Software

Diagnostics

SDV & Connected Vehicle Enablement

Connecting embedded ECUs with the broader software-defined vehicle ecosystem.

Automotive Ethernet

OTA/FOTA

Remote Diagnostics

Vehicle-to-Cloud Connectivity

Data Logging

Software Update Management

Infotainment & Connectivity Solutions

User Experience in SDVs Starts with Digital Cockpit & Connected Mobility Solutions.

We Engineer Them.

SOFTWARE-DEFINED. CONNECTED. PERSONALIZED. INTELLIGENT.

Our end-to-end engineering services, platforms and reusable IPs reduce complexities in automotive software development.

These include both - On-Board (Embedded) & Off-Board (Cloud) Competencies.



Reduce Time to Market with our Accelerator Solutions

30%

Android IVI Accelerator

50%

OTA Update Accelerator

50%

Telematics SDK

Companion App Accelerator – Build a Branded App in 3 Months

WE SERVE



OEMs



Tier-1s



Third-Party
Solution Providers

AUTOMOBILE TYPES



2W, 3W, passenger vehicles, & fleets

How We Enable Next-Gen In-Vehicle Experiences

Defining the Cockpit Experience	In-Vehicle Infotainment Digital Instrument Cluster Telematics Control Unit (TCU) Rear Seat Entertainment
Building on Proven Platforms	Android Linux QNX Renesas FreeRTOS Quectel
Kickstarting System Development	Hardware Design & Development Bootloader Bring-Up System Integration Connectivity Modules
Powering the Automotive Cockpit	AAOS IVI AAOS SDV AOSP Android/Linux Porting BSP Kernel Device Drivers Virtualization Hypervisors Multi-Domain Features
Connecting the Layers	Middleware Software OS Integration OS Abstraction Hardware - Software Abstraction Inter Processor Communication System Services
Bringing the Experience to the Driver	API Development Frontend & Backend UI/UX Custom App Store Companion Apps Media Navigation Wi-Fi Phone Audio & Radio HVAC Bluetooth Settings Camera
Expanding the Automotive App Ecosystem	Google Automotive Services (GAS) Non-GAS Applications Third-Party Applications

How We Enable Connected Experiences

Connecting the Vehicle-to-Cloud	Cloud Infrastructure Platform Migration DevOps & DevSecOps CI/CD Data Ingestion Data Management Analytics & Reporting
Making the Connected Vehicle Intelligent	AI/ML Integration AI-Assisted Development GenAI Use Cases
Connectivity Enablers	Communication Protocols V2X Communication Connected Vehicle Services Telematics Data Management OTA & Telematics Integration
Turning Vehicle Data into Intelligence	Fleet Management Predictive Maintenance Driver Behaviour Monitoring Driving Coach Driving Trends Remote Diagnostics
Keeping Vehicles Updated, Anywhere	Cloud-based OTA Update Backend OTA Dashboard OTA Update Campaign Management Rollback Mechanisms User & Data Management VIN Based OTA Rollout

Turning Engineering Capabilities into Real-World Impact

- Developed a Dual-display Android Infotainment System for an EV Startup
- Engineered a Scalable Digital Instrument Cluster for Electric Two-Wheelers
- Delivered a Remote Diagnostics & OTA Solution for an Electric Vehicle OEM

Automotive Cybersecurity Services

Building a Verified Defence Architecture Resilient to Remote & Physical Attacks

Cybersecurity in connected products and SDV platforms depends on an architecture that is secure-by-design. At Embitel, we design them from concept and validate it at every stage of the development lifecycle.

Our engineering processes are grounded in the operational realities of large-scale production focused on embedding security layers that turn raw compliance mandates into field-proven vehicle defence.

Standards and Compliance Frameworks

- Vehicle Cybersecurity Regulations: UN R155 & UN R156
- Cybersecurity Engineering: ISO/SAE 21434
- Process Quality: ASPICE Level 2
- Information & Facility Security: ISO 27001 & TISAX

Global Footprint

Engineering teams and test labs across:
India | Germany | Romania

Who We Serve

- Automotive OEMs
- Tier-1 Powertrain & Component Suppliers
- Connected Fleet Ecosystems
- Connected Product & Mobility Service Providers



Our Cybersecurity Portfolio

Product Security

PKI as a Service | Firmware Vulnerability Analysis | DACE Test Automation

Software Security

Security by Design | Security by Default | Security Engineering

IT Security

Network Security | Cloud Security | Zero Trust | DevSecOps

Security-Infrastructure-as-a-Service

Secure Application Hosting | Testing Infrastructure | SecGenAI

**Penetration
testing is
delivered across
all domains.**

Our Security Platforms and Tools:

Entropy AI: Agentic AI platform that runs penetration tests on firmware and binaries, with no source code or test environment. Validates every finding with proof before it's reported.

DACE: Automated security testing for ECUs that runs inside your development pipeline and produces audit-ready reports.

Security-Infrastructure-as-a-Service: Managed labs, hosting and AI tooling for security testing that includes:

- **Testing infrastructure:** Remote, round-the-clock access to test labs.
- **Secure application hosting:** Your applications or on-premises systems hosted in our cloud or labs, with encryption, multi-factor authentication, monitoring and network isolation.
- **SecGenAI:** An AI assistant that learns your project, writes test cases, generates the code and runs it in a secure environment.

How we Deliver

We secure your product across three lifecycle stages where our engagements are tailored based on your requirements:

Lifecycle Stage	Service Focus	Key Capabilities
Plan	Governance & Risk	CSMS and Cybersecurity program planning Cybersecurity Plans and Cases relevance and reuse analysis
	Threat & Risk Analysis	TARA execution Attack path and impact analysis Risk treatment definition
	Compliance Readiness	TARA reviews ISO/SAE 21434 and UN R155/R156 gap analysis Homologation and type approval
Build	Embedded & ECU Security	Secure boot and anti-rollback HSM integration and key management SecOC Secure diagnostics AUTOSAR and non-AUTOSAR Implementations
	Secure Software & Trusted Execution	Secure-by-Design and Secure-by-Default SDLC integration Trusted Application development OP-TEE and Kinibi Secure key storage Trusted OTA logic
	Platform & IT Security	Network security Cloud security (Azure and AWS) Zero Trust architecture DevSecOps integration
	Intrusion Detection	IDS/IPS and AUTOSAR IdsM for CAN and Ethernet Secure event logging vSOC reporting
Validate	Security Testing	Vulnerability Analysis and Penetration testing (VAPT) across ECUs, networks, and vehicles Fuzz testing Cybersecurity Functional Testing
	Cybersecurity Assurance	Control validation SOP and post-SOP readiness assessment

AI Transformation

Using AI is easy. Making it pay off isn't.

Diconium helps organizations turn AI ambition into measurable business value: by setting a clear direction, enabling people to work differently, and building the structures needed to bring AI into everyday operations.

Typical Challenges Of Our Clients

Where Should We Focus?

AI ideas are plentiful, but it is hard to decide which opportunities are worth pursuing.

How Do We Bring People Along?

Tools and training alone do not change how teams lead, collaborate, and work.

How Do We Scale What Works?

Promising pilots often remain disconnected from core processes and measurable outcomes.

Three Ways To Move AI Transformation Forward

Set Direction

1

Align AI initiatives with business priorities, identify valuable use cases and build a practical roadmap from ambition to action.

-> AI Strategy Consulting

Enable The Organization

2

Equip leaders and teams with the skills, shared routines and confidence to apply AI in their work and sustain adoption.

-> AI Enablement Workshops

Turn AI Into Impact

3

Define the roles, governance, processes and technology foundations that help move AI beyond isolated pilots and into scalable operations.

-> AI Value Analysis

AI in E-Commerce

From visibility in ChatGPT to automated processes, Diconium supports you in identifying the right AI initiatives and implements them in a focused, practical way.

Typical Challenges Of Our Clients

Improve Visibility In AI Systems

Your brand does not appear in ChatGPT & Co. or is not correctly understood.

Improve Conversion & Customer Experience

Your customer journey is not personalized or not reaching its full potential.

Automate Processes & Increase Efficiency

Manual processes waste time and hinder scaling.

3 Pillars For Ai In E-Commerce

Agentic Commerce

Ensure your brand is visible in AI systems and leverage interfaces like chatbots and agents to reach customers early in their decision-making process.

Topics:

- Generative Engine Optimization (GEO)
- Technical Empowerment

AI Commerce Experience

From generative interfaces to intelligent recommendations – enhance your personalized and dynamic customer journey and sustainably boost conversion and customer loyalty.

Topics:

- Generative User Interfaces
- Conversational Commerce 2.0
- AI-Ready Commerce Stack
- AI-Augmented CRM & Loyalty
- Human-Centered AI

Operational Efficiency

Automate manual tasks, optimize operational decisions, and reduce complexity in areas such as customer service, content management, or pricing.

Topics:

- Agentic AI for backend operations
- AI-Driven Content & PIM Automation
- Dynamic Pricing & Predictive Inventory
- AI-Powered Customer Service
- AI-Driven Software Engineering & Digital Products

How To Get Started



Embitel Technologies is a global product engineering company delivering end-to-end software, embedded, and digital engineering solutions to enterprises worldwide. A wholly owned Volkswagen Group company, Embitel combines deep automotive expertise with capabilities in cloud, AI, enterprise digital transformation, eCommerce, and data-driven solutions.

Serving both Volkswagen Group companies and global enterprises across industries through our unique GCC+ model, Embitel enables customers to accelerate innovation, optimize operations, reduce time-to-market, and build next-generation products and digital experiences.



Diconium is a global tech company and end-to-end partner for building, running, and scaling intelligence across the entire value chain.

From first customer interaction to the product itself, we connect software, data, and AI into solutions that perform in real business environments. With responsibility for results. And the human expertise to make them work. As part of the Volkswagen Group, we operate in large-scale, global environments across some of the most complex and demanding industries — automotive, industrial, and beyond.

Everything we do is focused on making businesses intelligent.



Innovating Today, Shaping Tomorrow

100+
Global clientele

3500+
People and counting

20+
Years of Expertise

7 Million
Automobiles upgraded



Want to know more about us? Contact us

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