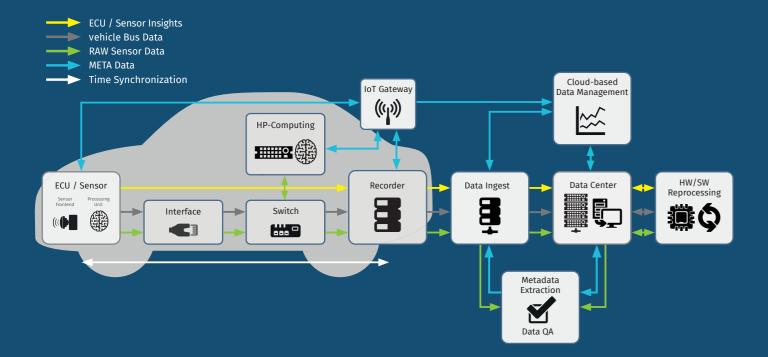


DATA RECORDING TOOLS

Efficient Setup for your Test Carrier

+ b-plus Automotive Toolbox



The development, testing, and validation processes for ECUs and vehicle systems for Advanced Driver Assistance Systems (ADAS) and Automated Driving (AD) are critically dependent on extensive data collection and the execution of real-world test drives. These processes are complex and multifaceted, requiring a sophisticated approach to capture and analyze the vast amounts of generated data.

The b-plus Automotive Toolbox is specifically designed to meet these challenges head-on. With its modular design that can be expanded and customized according to specific requirements, the Toolbox provides everything that engineers and developers are seeking to navigate the task of capturing vehicle data and subsequent analysis. This flexibility allows for the seamless integration of components, ensuring that the system remains at the cutting edge of technology.

One of the key strengths of the b-plus Automotive Toolbox is its commitment to data integrity and accuracy. Across the entire system it ensures the highest quality of data through the use of checksums and synchronized time stamps, showcasing unparalleled performance for the next generation of sensor technology.

Moreover, the Toolbox extends its capabilities beyond data acquisition, offering the option for further processing of the collected data in replay scenarios. This means that after the test drive data has been acquired, it enables the replay and simulation of the data in Hardware-in-the-Loop (HiL) systems. This is crucial for developers who aim to test their validation systems under controlled conditions.

By simulation real-world scenarios within a HiL environment, the b-plus Automotive Toolbox enhances the depth and scope of testing and thereby improves the reliability and safety of ADAS and AD systems.

+ What We Offer for Your In-Vehicle Recording Application

At the center of the development, testing and validation of automated and autonomous systems, b-plus is your expert for the development of hardware, software components and integrated complete solutions. Our approach is based on a modular, robust and reliable product range, complemented by the development of customized solutions for our customers. By intelligently combining our modules and services, we enable the quick implementation of scalable and future-proof systems.



Robustness for demanding environments

Our hardware is specially designed for use in extreme conditions, whether in the vehicle or in challenging environments. It can withstand high humidity, dust loads, shocks and vibrations as well as changing temperature conditions.

In order to put the robustness of our hardware to the test, the products are attached to shaking and vibrating plates in the laboratory and put through their paces. In addition, thanks to efficient cooling technologies, our products reliably ensure even heat distribution in the setup and prevent components from overheating.



Modularity throughout the whole system

Our hardware and software components are precisely coordinated to ensure smooth integration and maximum efficiency in your measurement technology setup. Thanks to the option of individually expanding our systems with additional add-ons and storage solutions, we guarantee perfect adaptation to your specific requirements. This ensures that your investment not only meets the latest technology standards, but also remains future-oriented.



Everything from one source

b-plus presents you with a wide range of solutions covering all aspects - from hardware and software to comprehensive system configurations. Our portfolio ranges from simple media converters to versatile multi-I/O recording systems and complex test environments. Save yourself the headache of getting different components to work - we ensure smooth integration and guarantee the optimal functioning of your overall system.

+ BRICK

Data Recorder

Powerful measurement platform for driver assistance systems and autonomous driving



The BRICK measurement platform was developed specifically for the acquisition of raw data from sensors and ECUs during test drives. BRICK is a powerful platform for very flexible adaptation and integration into the development and validation systems of sensors and ECUs. Due to its optimized architecture, the measurement technology platform opens up a wide range of validation applications.

BRICKplus

Processor and Intel® Core™ i7-6820EQ Main Memory 32 GB RAM DDR4-2133

128 GB internal M.2 SSD

Ethernet 2x 10GBase-T Ethernet (g)PTP

5x 1000Base-T Ethernet (g)PTP 1x 1000Base-T Ethernet

USB 4x USB3.1 Gen1 Host

Operating Temp closed finned heat sink

-25 °C to +70 °C



BRICK2

Processor and Hexa Intel® Core™ i7-9850HE Main Memory 64 GB RAM DDR4-2666

04 GB NAM DDN4 2000

512 GB internal M.2 SSD

Ethernet 6x 10GBase-T Ethernet (g)PTP

3x 1000Base-T Ethernet (g)PTP 1x 1000Base-T Ethernet

USB 4x USB3.1 Gen1

4x USB A 2.0

Operating Temp closed finned heat sink

-20 °C to +60 °C



+ xSTORAGE

Removable Storage Unit

Powerful storage with sliding mechanism for easy data handling



The xSTORAGE is a removable logging storage system for BRICK and DATALynx measurement and recording systems and ensures fast, efficient and secure data handling. The focus of the xSTORAGEs is on user-friend-liness, emphasized by a simple sliding mechanism that makes inserting and removing the storage unit uncomplicated. The hot-plug and hot-swap capabilities enable uninterrupted data exchange.

BRICK STORAGEplus

PCI Express 3.0 x4 SATA RAID 8 x SATA SSD

8/16/32 TB 16 Gbit/s @ATX4 / @BRICK2



BRICK2 STORAGE

PCI Express 3.0 x8 SATA RAID 8 x SATA SSD

8/16/32 TB 24 Gbit/s @ATX4 / @BRICK2



BRICK2 STORAGE NVMe

PCI Express 3.0 x8 NVMe JBoF 8 x E1.S NVMe SSD

15/30/60 TB 48 Gbit/s @ATX4 | 32 Gbit/s @BRICK2



x8 STORAGE Gen4 E1.S

PCIe 4.0 x8 NVMe RAID 8 x E1.S NVMe SSD 2x USB-C Data Interface*

15/30/60 TB 96 Gbit/s @ATX4 PCIe4 | 48 Gbit/s @ATX4 PCIe3 32 Gbit/s @BRICK2 | 20 Gbit/s @USB-C



^{*}USB-C Data Interface on request

+ BRICK Add-Ons

Expansion Options

Customize your BRICK system according to your individual requirements or use case



BRICK Add-Ons elevate the BRICK measurement platform, transforming it into an even more powerful and flexible tool for data acquisition. With options for enhanced connectivity, expanded networking, increased processing capabilities or advanced graphics processing, these modules tailor the platform to fit the unique demands of your project.

BRICK BMC VB2

Measurement Card 4x CAN-FD and 2x FR



BRICK BMC ETH6000

Measurement Card 6x 1000Base-T Ethernet (g)PTP, PoE



BRICK SPC

2 x8-PCIe 3.0 Slot Cards 60 W max



BRICK PCIe GPU

NVIDIA® RTX3060 GPU 3584 CUDA core 12 GB GDDR6 12,9 TFLOPs (FP32)

2 x4 PCle 3.0 Slot Cards 60 W max



How Cutting-Edge Measurement Technology Platforms are Transforming Raw Data Recording

The measurement platform BRICK was specially developed for the recording of raw data with high bandwidth from sensors and ECUs during test drives. It is particularly convincing due to its high interface diversity, high data throughput and a consistently open system concept. From high-performance hardware to the appropriate software - we offer the right, coordinated components for your individual recording application – all from one source from b-plus.

The BRICK product line, including models such as BRICKplus, BRICK2, and BRICK25, is built on a flexible modular foundation. This structure supports a wide range of enhancements and storage solutions, allowing users to customize their setups based on distinct needs and operational scenarios. This modularity ensures that clients receive not just a product but a tailored solution offering additional adaptability through various add-ons. For instance, the SPC add-on accommodates PCIe cards, while the BMC add-on introduces compatibility with advanced communication protocols like CAN-FD or FlexRay. The compatibility across the BRICK system's modules secures a future-proof investment for users, ensuring that the technology will remain relevant and adaptable to evolving requirements. The platform's open architecture facilitates seamless integration with other AVETO components, proprietary software, and even solutions from third parties.

The compact rack design of the BRICK system is a significant advantage, particularly for the installation of complete ADAS (Advanced Driver-Assistance Systems) solutions within vehicles. This design minimizes the need for excessive installation space and extensive cabling, making it an ideal choice for environments where space is at a premium. Furthermore, its robust construction is specifically tailored to withstand the rigors of harsh environmental conditions, ensuring reliability and durability even under challenging circumstances.

Especially in the ADAS/AD area, an exactly time-synchronous recording of data is necessary. All BRICKs support completely synchronous recording of raw and bus data thanks to the Time Synchronization Software XTSS from b-plus. The BRICK is synchronized both internally via the hardware and externally via Ethernet interfaces. With XTSS you get a precise time correlation of the data packets of your connected sensors. This level of precision is cruicial for the accurate analysis and interpretation of sensor information, which, in turn, is essential for the development and refinement of ADAS/AD technologies.



BRICKplus



BRICK2





+ DATALynx

19" Vehicle Server

Powerful high performance computer for use in the automotive area



The DATALynx ATX series is a high-performance computing solution that achieves the next level for invehicle applications. With a completely new designed power supply and an extremely powerful and fully integrated liquid cooling setup the device enables maximum CPU and GPU performance. Thanks to its high-quality components and robust construction, it is ideally suited for use in demanding vehicle environments.

Generation EP3

Processor and Main Memory AMD EPYC™ 7003 Supermicro H12SSL-i

8x 8-64GB DDR4-3200

2x PCle 4.0 x8

Interfaces

2x 1000Base-T Ethernet 5x PCle 4.0 x16

USB 6x USB 3.0

Operating Temp

liquid cooled (DC) -10 °C to +60 °C (AC) 0 °C to +40 °C



Generation SX2

Processor and Main Memory

Interfaces

2nd Gen Intel® Xeon® Scalable

Supermicro X11DPH-T 12x 8-64GB DDR4-2933

2x 10GBase-T Ethernet

3x PCIe 3.0 x16 4x PCIe 3.0 x8

USB 6x USB 3.0

Operating Temp liquid cooled

(DC) -10 °C to +60 °C (AC) 0 °C to +40 °C



+ xSTORAGE

Removable Storage Unit

Powerful storage with sliding mechanism for easy data handling



The xSTORAGE is a removable logging storage system for BRICK and DATALynx measurement and recording systems and ensures fast, efficient and secure data handling. The focus of the xSTORAGEs is on user-friend-liness, emphasized by a simple sliding mechanism that makes inserting and removing the storage unit uncomplicated. The hot-plug and hot-swap capabilities enable uninterrupted data exchange.

BRICK STORAGEplus

PCI Express 3.0 x4 SATA RAID 8 x SATA SSD

8/16/32 TB 16 Gbit/s @ATX4 / @BRICK2



BRICK2 STORAGE

PCI Express 3.0 x8 SATA RAID 8 x SATA SSD

8/16/32 TB 24 Gbit/s @ATX4 / @BRICK2



BRICK2 STORAGE NVMe

PCI Express 3.0 x8 NVMe JBoF 8 x E1.S NVMe SSD

15/30/60 TB 48 Gbit/s @ATX4 | 32 Gbit/s @BRICK2



x8 STORAGE Gen4 E1.S

PCIe 4.0 x8 NVMe RAID 8 x E1.S NVMe SSD 2x USB-C Data Interface*

15/30/60 TB 96 Gbit/s @ATX4 PCIe4 | 48 Gbit/s @ATX4 PCIe3 32 Gbit/s @BRICK2 | 20 Gbit/s @USB-C



*USB-C Data Interface on request

+ DATALynx Add-Ons

Expansion Options

Customize your DATALynx system according to your individual requirements or use case



BRICK Add-Ons elevate the BRICK measurement platform, transforming it into an even more powerful and flexible tool for data acquisition. With options for enhanced connectivity, expanded networking, increased processing capabilities or advanced graphics processing, these modules tailor the platform to fit the unique demands of your project.

GPU Add-On*

Add-On (top)

PCIe 5.0 x16 interface for high power graphics >300W

integrated liquid cooling 850W extra DC Power Supply



B2S Add-On

Add-On (bottom) for two xSTORAGE slots

actively cooled includes a PCIe 3.0/4.0 switch μC based FAN control and power management

Supports:

xSTORAGE Hot-Swap and Hot-Plug



PCIe Add-On

Add-On (bottom) for PCIe extension cards

actively cooled µC based FAN control

Possible slot configurations:

4x4 / 2x8 / 4x8 / 2x16

Optional:

Extra 500W DC or 750W AC Power Supply 802.1AS Extension



Using High-Performance Computers to Optimize ADAS Data Acquisition for Efficient Validation

In the ever-evolving field of advanced driver assistance systems (ADAS) and autonomous vehicles, efficient data acquisition is the key to success. With this issue of b-plus news, you will experience how our High-Performance Computers (HPC) are revolutionizing raw data acquisition and setting the stage for unprecedented validation.

Powerful Hardware

HPCs are equipped with particularly powerful hardware that enables high computing performance. This includes fast processors, large amounts of RAM and powerful graphics cards. They enable the system to deliver massive AI computing power for intelligent measurement and recording applications.

Efficient Data Storage

HPCs have fast and efficient data storage solutions that enable fast access to large amounts of data. Suitable storage solutions, which are optimally matched to the hardware, are an absolute must for successful data handling. Our recording platforms are all designed for modularity and expandability, so that all components can work hand in hand across different systems.

Scalability

To handle even more demanding tasks, HPCs can be expanded by adding further resources, such as additional PCIe slots, measurement cards, various storage solutions or other add-ons. This not only increases the performance of the systems, but also makes them a future-proof investment because of the flexibility. Scale your setup from entry-level to advanced multi-I/O recording or a Deep Learning and AI platform.

High Power Efficiency

Since HPCs can consume a lot of energy, they are often combined with efficient cooling systems to ensure that the heat from components with a high power consumption, e.g. the CPU, is dissipated quickly enough so that they do not overheat. This is especially important when used in vehicles. Our high-performance solutions are based on both air cooling and liquid cooling.

Ruggedized Hardware

In-vehicle setups are often exposed to harsh environmental conditions. One of them being extreme temperature variations, from freezing cold to scorching heat. Ruggedized hardware is equipped with thermal management systems to maintain consistent performance across all extended temperature ranges. Furthermore, measurement setups can experience significant vibrations and shocks while in operation. Our hardware is built with sturdy components and vibration-absorbing mechanisms to prevent damage and always ensure data accuracy.

Specialized Software

The software is responsible for the control, analysis, and management of the collected data. It provides the ability to visualize, process and evaluate the collected measurement data in real time. With software that does not work seamlessly with the hardware components, it can be difficult to take full advantage of the collected data and gain the desired insights. HPCs therefore often use specially developed software that is optimized for parallel processing and hardware utilization.



+ COPYLynx

Data Copy Station

For data ingestion into the data center or the cloud



To facilitate the handling of very large storage data, b-plus offers a data copy station, which was specially designed for the b-plus STORAGE units. This copy station is used for the transfer of multi-sensor data to data centers or the cloud. To ensure utmost data integrity, sophisticated hash algorithms as well as a powerful CPU have been integrated.

COPYLynx ATX4 Gen3

CPU Platform AMD Epyc[™] 7003, 24 Core CPU

64GB DDR4 memory, Linux OS

xSTORAGE Support 4x STORAGE slot, PCIe 3.0 x8

PCIe x8 STORAGE BRICK2 STORAGE / BRICK2 STORAGE NVMe

PCIe x4 STORAGE BRICK STORAGE / BRICK STORAGEplus

LAN Source/Target 2x 1GbE

4x 10GbE

2x 100G QSFP56

USB Source/Target 6x USB 3.0



COPYLynx ATX4 Gen4

CPU Platform AMD Epyc[™] 7003, 64 Core CPU

128GB DDR4 memory, Linux OS

xSTORAGE Support 6x STORAGE slot, PCIe 4.0 x8

PCIe x8 STORAGE x8 STORAGE - Gen4 E1.S

BRICK2 STORAGE / BRICK2 STORAGE NVMe

PCIe x4 STORAGE BRICK STORAGE / BRICK STORAGEplus

LAN Source/Target 2x 1GbE

4x 10GbE, 4x 10G SFP+

4x 100G OSFP56

USB Source/Target 6x USB 3.0



+ NETLion

Automotive Ethernet Tool

Development tool with speeds of 100BASE to 10GBASE



Whether for software and hardware development at the ECU, measuring data in the vehicle, analyzing data streams in the lab or flashing ECUs – the Automotive Ethernet TAP and media converter NETLion offers the optimal solution for each of your requirements. It connects the world of automotive Ethernet with that of standard Ethernet, making it an indispensable tool in development.

NETLion 1000

Automotive Ethernet 2x 100BASE-T1/1000BASE-T1

IEEE 802.3bw / 802.3bp

Standard Ethernet 2x 100BASE-TX/1000BASE-T

IEEE 802.3 Clause 40

Hardware Technology Ethernet Layer 1

Operating Modes Network TAP (Test Access Point)

Dual Media Converter

Cable Tester

Operating Temp -40 °C to +75 °C

Supply Voltage 9 - 48 V



NETLion 10G

Automotive Ethernet 2x 2.5/5/10GBASE-T1

IEEE 802.3ch

Standard Ethernet 2x 2.5/5/10GBASE-T1

IEEE 802.3an / 802.3bz

Hardware Technology Ethernet Layer 1

Operating Modes Network TAP (Test Access Point)

Dual Media Converter

Operating Temp -25 °C to +75 °C

Supply Voltage 9 - 32 V



+ MDILink

Measurement Data Interface

SerDes measurement data converter for decoupling of raw sensor data



In the ADAS/AD area, measurement data converters are used when you want to decouple raw data from sensors, such as cameras, radars or lidars. With the MDILink you get a SerDes measurement data converter, enabling a smooth transition from the development stage to series production. The sensor data can be analyzed in measurement platforms and integrated into other modules of the b-plus Automotive Toolbox.

MDILink GMSL2 TAP

2x GMSL2 Input (RX) MAX96716 Deserializer 2x GMSL2 Output (TX) MAX96717 Serializer 2x 10 GbE Dataport | 1x 1 GbE Mgmt Port Timesync IEEE 1588-2008 Protocol ASAM CMP Power Supply 8 - 32 V



MDILink GMSL2 4EP

4x GMSL2 Input (RX) MAX96716 Deserializer 2x 10 GbE Dataport | 1x 1 GbE Mgmt Port Timesync IEEE 1588-2008 Protocol ASAM CMP Power Supply 8 - 32 V



MDILink FPD-Link III

2x FPD III Input (RX) DS90UB954-Q1 Deserializer
2x FPD III Output (TX) DS90UB953-Q1 Serializer
2x 10 GbE Dataport | 1x 1 GbE Mgmt Port
Timesync IEEE 1588-2008
Protocol ASAM CMP
Power Supply 8 - 32 V



MDILink CSI-2

2x CSI-2 Input (Rx) Deserializer 2x CSI-2 Output (Tx) Serializer 2x 10 GbE Dataport | 1x 1 GbE Mgmt Port Timesync IEEE 1588-2008 Protocol ASAM CMP Power Supply 8 - 32 V



Custom-Fit Precision with MDILink: "Out of the Box" Is Not Always the Right Solution.

With our MDI (Measurement data interface) technology we specialize in decentralized measurement data acquisition from sensors, the conversion and exact time stamping of data from synchronized clocks, and the subsequent transfer via Ethernet to the recorder. Our technology is used in the development process of ECUs, for automated and autonomous driving, in prototypes and tests for data acquisition.

Broad-based

Out-of-the-box, MDILink is equipped with industry-standard interfaces such as GMSL2, FPD-Link III, and CSI-2 to cater to a broad spectrum of applications. However, the true value of MDILink lies in its outstanding customization options. Depending on the specific use case, MDILink can be tailored to meet unique requirements, ensuring seamless integration with any ECU and sensor setup.

Efficient

At the heart of the MDILink's customization capabilities is its use of advanced FPGA technology, which facilitates highly efficient and parallel processing of various interfaces at highest data rates.

Adaptable

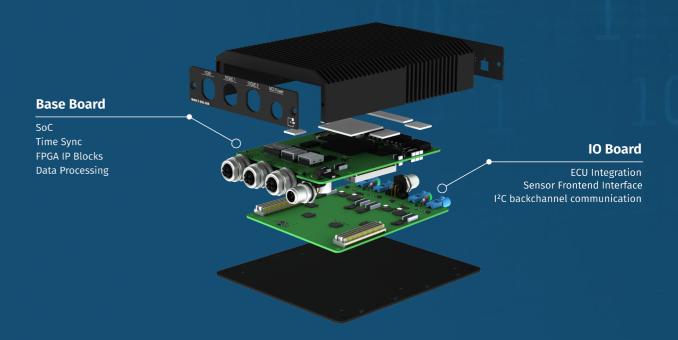
Integration with existing tool chains is smooth thanks to well-defined software interfaces, making MDILink a versatile and open solution that can adapt to a wide array of software frameworks. This interoperability is key for developers looking to incorporate the MDILink into their existing systems without the need for extensive modifications.

Customizable

Furthermore, our MDILink can be customized to support unique interfaces, accommodate various data formats for input and output, and apply specific data compression, conversion, and encryption techniques. This high degree of adaptability ensures that MDILink can be fine-tuned to align with the precise demands of any project, offering a personalized solution that off-the-shelf products simply cannot match.

Integer

Whether it is for handling complex sensor arrays or ensuring data integrity in the most challenging of automotive applications, MDILink proves our commitment to flexible, tailored solutions in state-of-the-art technology.



+ xDSwitch SN2000

Managed Ethernet Switch

Switch suitable for use in mobile applications or data centers



With our xDSwitches of the SN2000 line we offer highest Ethernet switching capacity and transmission bandwidths for use in high-end ADAS/AD validation setups, as well as in classic data center IT applications. Regardless of your specific setup, our xDSwitches SN2000 ensure seamless and reliable communication between the various components in your respective application area.

MDSwitch SN2010

Suitable for test carrier operation SFP28 18x 25 Gbit/s QSFP28 4x 100 Gbit/s USB 1x USB 2.0

Max Throughput 1,7 Tb/s

1,26 Billion packets per second



MDSwitch SN2100

Suitable for test carrier operation

SFP28

 QSFP28
 16x 100 Gbit/s

 USB
 1x Mini USB 2.0

 Max Throughput
 3,2 Tb/s

2,38 Billion packets per second



EDSwitch SN2010

Suitable for data center operation SFP28 18x 25 Gbit/s

QSFP28 4x 100 Gbit/s **USB** 1x USB 2.0

Max Throughput 1,7 Tb/s

1,26 Billion packets per second



EDSwitch SN2100

Suitable for data center operation

SFP28

 QSFP28
 16x 100 Gbit/s

 USB
 1x Mini USB 2.0

 Max Throughput
 3,2 Tb/s

2,38 Billion packets per second



+ EDSwitch 10G

Managed Ethernet Switch

Switch suitable for use in mobile applications with or without PoE support



The high flexible EDSwitch 10G series offers different versions with or without PoE support to match your specific needs. The 12 or 20 port versions of the device provide 4x 1/10 Gigabit Ethernet SFP+ uplinks and result in a cost-effective and reliable industrial solution where high-throughput and high-reliability is fundamental.

EDSwitch 10G 12-Port

Switching Fabric 128 Gbit/s non blocking

RJ45 8x 1 Gbit/s

SFP

SFP+ 4x 10 Gbit/s
Operating Temp -40 °C to +70 °C

PoE Support optional

EDSwitch 10G 20-Port

Switching Fabric 128 Gbit/s non blocking

RJ45 16x 1 Gbit/s

SFP

 SFP+
 4x 10 Gbit/s

 Operating Temp
 -40 °C to +70 °C

PoE Support optional

EDSwitch 10G 20-Port

Switching Fabric 128 Gbit/s non blocking

 RJ45
 12x 1 Gbit/s

 SFP
 4x 1 Gbit/s

 SFP+
 4x 10 Gbit/s

 Operating Temp
 -40 °C to +70 °C

 PoE Support
 optional









+ What sets us apart?

b-plus combines two major areas of expertise: software solutions and hardware expertise.

Customers describe us as exceptionally reliable and flexible.

We are technology drivers and engineering partners for the development, testing and validation of driver assistance systems and control units.

Our expertise is based on know-how from committees, over 200 successful customer projects and numerous research projects.

With the **big picture** in mind, we are already planning for the **technology of tomorrow**.

With our **passion** for innovative and technological solutions, we are shaping the **safe automation** of the **mobile future**.





Contact us

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