

Connected, Intelligent, Sustainable:

How Bosch is transforming the face of industry



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In the face of disruptions, enterprises across industries need to develop resilience, tech-savviness and a proactive approach towards sustainability. We, at Bosch, help enterprises be future-ready.

As a long-standing pioneer of the industrial world, the Bosch name is an industry byword for excellence. Our continuous focus on innovation, investments in new age technology and a strong partner network has resulted in global delivery excellence across domains.

What makes the Bosch experience different?

With thoughtful investments in emerging technologies, we are constantly evolving to deliver superior value to our customers. We experience these technologies first-hand before recommending them to our clients. In other words, we bring a Practitioner's Approach to help companies across the world on their digital transformation journeys.

Our Digital First Strategy combines extensive experience with best practices in AIoT and Cloud. With our suite of solutions, organizations can become smarter, easier to manage and more efficient.

Be it delivering lean, green, transparent supply chains, automating regulatory burdens, or engineering HMIs – we have your enterprise needs covered.

Bosch is revolutionizing the automotive and industrial world, with advanced end-to-end solutions that help to create a connected, intelligent, and most importantly, sustainable new world of industry.

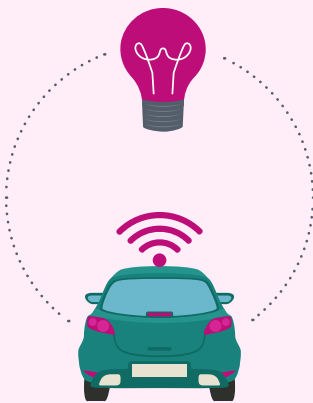
HERE'S
HOW. >

Connected Mobility

The future of mobility is intelligent, efficient and convenient. The future of mobility is connected.

Seamless connectivity between users, vehicles and services ensures a fascinating experience for the one behind the wheel. Connected Mobility is all about a continuous endeavor to enhance user experience and make the journey as safe, hassle-free and enjoyable as possible.

Bosch connects systems and services inside and outside vehicles, transforming them into intelligent mobility solutions.



Connected Car

Mobility never looked easier or smoother, as Bosch brings you a range of smart connected solutions for a delightful, seamless experience. Experience enhanced safety and convenience like never before through our end-to-end ecosystem, which offers 200 features across 3 segments – passenger vehicle, commercial vehicle and two-wheelers. You can now connect your car to a range of devices and apps for a fully personalized experience. The scalable and elastic cloud infrastructure allows you to connect from anywhere, anytime for a truly comfortable experience with mobility.

Why connected cars? Connected cars provide a unique customer experience, so much that more than a third of consumers state they would switch car brands to unlock the benefits of this technology. Connected car technology also delivers cost and revenue benefits to mobility players across the value chain.

Here's a glimpse into some of the many features that our Connected Car Technology offers:



Hazardous Location Warning

Using V2X infrastructure, our solution sends information to the OEM cloud about locations with speed breakers and potholes, locations where accidents have taken place. The cloud transmits alerts to approaching vehicles on the same route. Drive safer, faster and better with Connected Car Technology.



Personalised Recommendations

Your automobiles understand you better than ever before. Based on the user's vehicle use pattern, Connected Car provides contextual recommendations and smart voice commands – such as when you'd like to start your vehicle, switch on the AC or control your smart home equipment.



In Vehicle Purchasing

Our in-built infotainment systems mean you can now enjoy your drive and get a number of things done simultaneously – from refueling your car, picking up food to go, to booking a room at a hotel.



Digital Twin for Troubleshooting

That's not all – our digital twin simplifies troubleshooting for any issues and concerns regarding your automobile. This advanced data analytics solution collects data from all vehicles to identify patterns and scenarios for predictive maintenance.

**The future of transport is intelligent. The future of transport is connected.
Connect with us today to redefine your mobility experience.**

HMI Engineering



Automobiles today are evolving from mere means of transport to being fully connected devices. The cabin experience is fast becoming one of the biggest vehicle differentiators for consumers. That's where Bosch, as a global expert with over 15 years of experience in HMI engineering, makes a difference. We bring you an end-to-end suite of HMI solutions to enhance your in-vehicle experience. Through expertise with flexibility, assured quality, unmatched productivity, and personalized user experience, we are adding to customer delight every day.

What we offer

We provide end-to-end solutions with standard HMI at an accelerated pace, reduced cost, and increased value. These solutions include HMI SW, HMI design and HMI view templates. Our software and digital solutions encompass domains ranging from cloud-based HMI management to testing and validation.



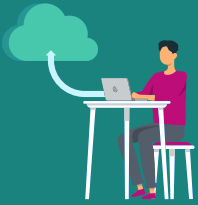
Graphics Test System (GTS)

Weighed down by tedious testing & validation processes? Advanced HMIs are a challenge for SW testing, one that can take up a lot of time and resources. Our automated V&V solutions offer advanced HMI validation capabilities to address all your needs. Graphics Test System is an innovative and interactive software tool for HMI validation.

Features & Benefits

- ✓ Patented '3EYE' technology for TEXT validation with 98% accuracy
- ✓ Supports UNICODE and ASCII
- ✓ Easy adaptability for different display resolutions
- ✓ Detailed image logging and reporting
- ✓ Powerful User Interface for simple and quick test configuration
- ✓ Supports 48 languages
- ✓ Customized Add-Ons to increase productivity
- ✓ Complete integration with ALM systems

Grab your chance to avail Bosch's industry-leading HMI validation service using our patented technology and deep expertise.



LeapX

HMI development is loaded with difficulties – be it hardware testing and simulation, text-related issues in translation, or design issues with the UI. Currently available market tools address specific issues in isolation. What if there was a single solution that solved all these difficulties?

LeapX is a Next gen cloud-based platform for HMI SW engineering. LeapX represents a holistic approach to solving the challenges of HMI development. It helps simplify HMI development, manage UX designs & requirements on cloud for global teams that use various tools.

Leapx - Benefits

- ✓ Up to 25% reduction in HMI visualization change Handling & release, though asset though asset Atomation and Reuse
- ✓ Up to 20% reduction in HMI visualiization release turn around time
- ✓ Early simulation & detection of visual & performance issues
- ✓ Transparent & Enhanced collaboration experience for all Stakeholders
- ✓ Easy variant management and multi-language text translations management with text fitment validation

With LeapX, you can seamlessly collaborate across teams to quickly iterate and deploy UX/UI across product lines and variants.

Test Automation

From cumbersome processes to inaccuracies to quality inconsistencies - manual testing across industries is layered with several challenges and bottlenecks. Could test automation be the key to solving these problems? Test automation becomes even more important in an era defined by AIoT products and services that leverage big data and deep tech.



SVENTA

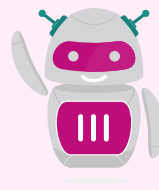
SVENTA (Sound & Vibration based Engineering Test data Analytics) platform is an AI powered sound engineering & diagnostic platform for acoustic or NVH (Noise, Vibration & Harshness) assessments. Experts can visualize elaborate analysis results and a smart summary on the SVENTA webapp portal. This has enabled field engineers & NVH experts to reduce **over 98% lead time** for field problem investigation.

Why SVENTA?



Easy of use

Minimal expertise or training and less than 2 minutes for Data acquisition and automated reporting



AI powered

Vehicle Model/subsystem specific ML Model deployment capability on cloud.



Portable

Portable and easy Connectivity with smartphone compatible USB-OTG plug-and play digital sensors (Sensors < 50 mm size, < 150 gms)



Less capital investments

Minimal Instrument cost (50% less than Conventional system cost). Software as a service Model, allowing users to choose yearly subscription based on need.



Integration to cloud platform

Centralized Data Base for ensuring NVH performance tracking during complete product development life-cycle (currently AWS)



Class-II accuracy

Compatible with sensors having sound data quality inline with Class-2 accuracy as specified by IEC 61672 Sound Level Meter standards

SVENTA INCORPORATES ALL THE ABOVE FEATURES

With Bosch's trusted promise of quality and expertise, SVENTA offers you the ability to intelligently accelerate your efficiency and effectiveness across multiple areas of your business-

SVENTA : AI powered Sound Engineering Platform



NVH Experts

- ✔ Quicker Analysis data from Field or Test Track
- ✔ Portable
- ✔ Faster Feedback to Test engineers

End of Line Quality Teams

- ✔ Avoid Subjective assessments
- ✔ Minimize rejections
- ✔ Connected Solution for improved Quality

Maintenance Teams

- ✔ Continuous Monitoring of Machine status in harsh environments
- ✔ Service alerts to Maintenance teams
- ✔ Reduce machine Down time

Field Service Engineers

- ✔ Quicker Response to Field Failure issues
- ✔ Connect with Experts
- ✔ Customer satisfaction

Benefits



Cutting-edge data collection techniques guarantee real-time and accurate data



Optimized for speedy deployment, zero additional infrastructure investment



Forecasts time and location-based trend patterns on key measured parameters like vibration and temperature signature analysis.



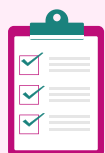
Real time alerts and notifications on monitored information across different device platforms including computers, tablets and smartphones.

Verification & Validation Services

Test Automation

Bosch provides end-to-end, intelligent automation services for rapid digitization across domains. Our AI-enabled automation is open source and uses a tool-based framework. We enable large-scale digital transformation for the medtech, healthcare, health insurance and life sciences domains with our test automation.

Here's how we at Bosch enable unified test automation:



Consult

- Recommended test automation: Setup and tools
- Automation test strategy



Design

- Work Instructions (for training purposes)
- Data generator utilities & test data files
- Reusable libraries
- Automated test scripts



Execute

- Requirement traceability matrix
- Automation Test coverage matrix
- Test Execution & defect reports
- Script maintenance

Accelerate test automation implementation through our customizable frameworks



All-in-one test scripts for web, mobile APL



Data and Behavior driven capabilities



Data flow integration across platforms



Continuous integration with automated tests



Custom graphical reports with automated test traceability



Automated defect Creation



Test Automation Solution Benefits



Support across platforms, devices and browsers



Improved quality from higher test coverage



Increased savings year-on-year due to reduced testing costs



Faster feedback with earlier detection of defects



Reusable test suite coupled with accelerated results



Reduced turn-around time leading to faster time to market

Bosch Connectivity Test Center

We live in a connected world, but companies are a long way from perfect connectivity. Connected products today are plagued by a number of challenges including critical data loss, pairing issues, frequent connection loss, slow data transfer and limited range. Bosch's Connectivity Test Center is an Interoperability (IOP) testing house providing consulting and services customized for a connected products strategy. With skilled Bluetooth Qualification Consultants (BQCs) and ISTQB certified testers, the center provides services across a wide spread of connectivity technologies globally.

Our consulting and services cover a spectrum of industries including automotive, industrial & power tools, consumer electronics and connected healthcare.

Key technologies - Bluetooth, Wireless, Smartphone Projection, Media and more



Automotive



Industrial & Power Tools



Connected Healthcare



Smart Homes & IOT



Consumer Electronics



Wearables & Accessories

Industries

Market Research → **Device Library** → **Test Strategy** → **Test Execution** → **Defect Isolation**

- In- house
- Strategic Tie-ups (Ext)

- Extensive device library
- Local Asset augmentation

- Connected Technologies standards
- Test Automation

- Global Centers
- Region specific test execution & support

- Sniffer trace analysis
- Dependency analysis
- Device specific traces



Capabilities



Bluetooth & NFC



Wireless & RF



USB & Media



Smartphone Projection



MNO Field

Technologies



Web Portal Development



Data Analytics



L2 Support Setup

Bosch Services

Connect with us today to resolve your connectivity challenges.

Sustainability

In our efforts towards contributing to a circular economy, we, at Bosch strive to build technologies which reduce environmental strain and encourage sustainable production. Intelligent manufacturing and digital transformation should go hand-in-hand with sustainability. Here's how we are doing our bit:



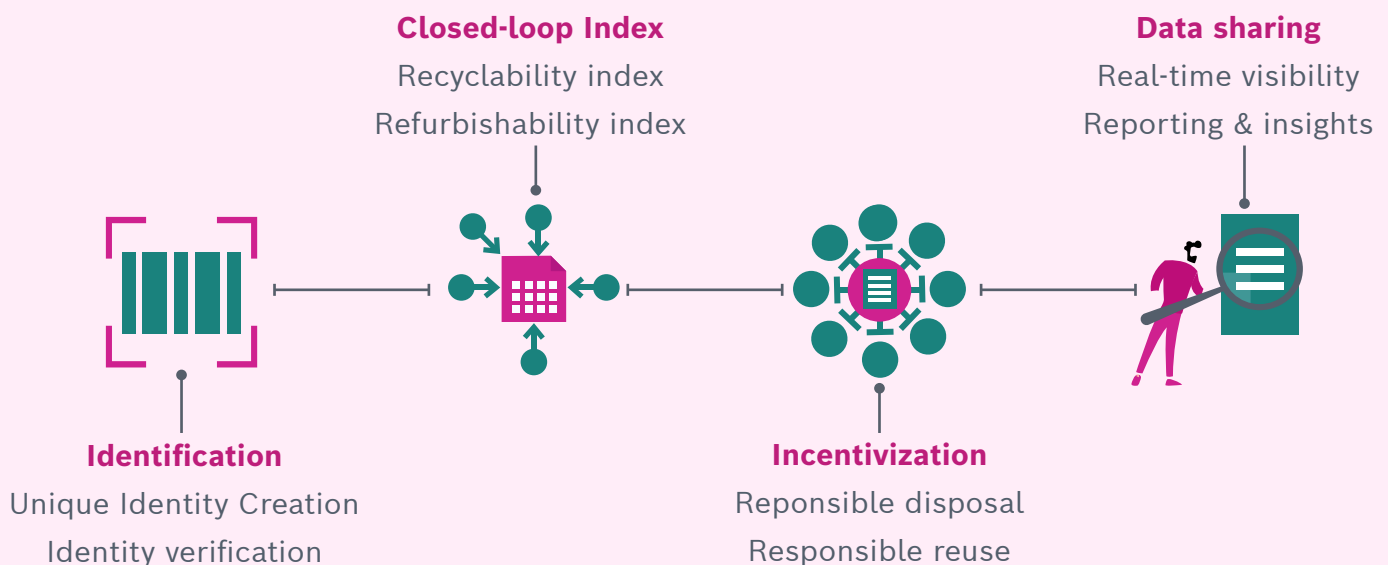
Autotrace

Manufacturers and policy-makers increasingly have sustainability goals that involve creating a circular economy. Circular economy is a model of production which involves optimizing and extending the lifecycle of products and materials as-long-as possible. The circular economy represents great potential as a market that is expected to reach \$4.5 trillion by 2030. Currently, only 8.6% of materials are being recycled and our world economy is only 9% circular. This represents a massive circularity gap, because of the lack of visibility in supply chains.

Automotive supply chains are especially complex. Circular economy approaches can help the automotive industry reduce lifecycle carbon emissions per passenger km by up to 75% by 2030. Counterfeit products frequently enter the auto supply chain and recall management processes are extremely inefficient, leading to heavy losses for the industry(estimated to be as high as \$22 billion annually). This is where Bosch Autotrace can make a difference.

Digitizing the automotive supply chain

Bosch Autotrace is an end-to-end solution which uses blockchain technology to close the circularity gap. Blockchain technology tokenizes assets (both physical and virtual) to give them unique digital identities.

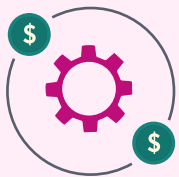


Bosch Autotrace enables tracking and monitoring critical aspects of the supply chain: parts provenance, carbon emissions, and materials of high concern. This helps streamline inventory management and enables responsible disposal and reuse. It provides incentives for manufacturers to adopt circular economy practices and drive circular behaviours in the automotive supply chain.

Two immediate use cases for Bosch Autotrace:

More than half of EV batteries and Heavy Vehicle Parts (HVPs) end up in scrapyards and landfills because of poor tracking mechanisms. With Autotrace, their high profit potential can be realized through improved traceability and recycling of materials.

Why Bosch Autotrace?



Helps optimize manufacturing costs



Eases and improves regulatory compliances

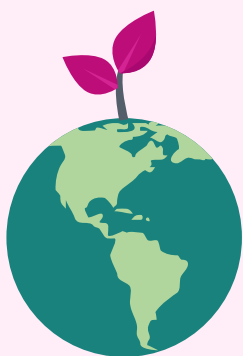


Results in significant cost savings for manufacturers



Accelerates the move towards environmentally conscious and sustainable manufacturing

Partner with us today to accelerate your journey towards sustainability.



DEEPSights

A zero-carbon economy is becoming a sustainability goal for economies across the globe. Poor sustainability performance can slow down a company's growth. Effective resource management is key to reducing the carbon footprint and ensuring business continuity. As Industry 4.0 accelerates the digital transformation across industries, organizations today need a solution that combines the benefits of Industry 4.0 with sustainability goals. Bosch DEEPSights brings you such a solution.





Bosch DEEPSights – Where Digitalization meets Sustainability

Bosch DEEPSights uses digitalization to measure, monitor and analyze an enterprise’s resource utilization. This enables increased transparency, accountability and value creation for businesses.

DEEPSights offers two solutions under its umbrella:



Digitalization Services

Enterprises can avail:

Full stack digitalization platform to monitor and manage energy and utility consumption across all enterprise assets.

Digitalization for remote asset health monitoring using cloud or edge analytics

Value Added Benefits



KPI-based approach

60+ built-in KPIs to accelerate performance management



ISO 50001 certification

Support provided for energy management certification programs



Digitized process expertise

Built-in analytics models for various asset classes enables easy knowledge transfer for future teams



Enterprise level scalability

Access, monitor and manage data from all sites anywhere and anytime



Legacy system digitalization

Capture various data from existing systems (sensors or controllers or management systems) for centralized monitoring and management



Digital excellence programs

Improvement projects for energy and utility consumption efficiency. OEE optimization & CO₂ reduction



Advisory Services

Enterprises can avail:

Enterprise digital strategy for energy consumption and utility, which provides a digitalization roadmap to improve business KPIs

Advanced, custom analytics for pre-identified problems in the enterprise involving multiple asserts and production processes

Features



Digital Readiness

- Digital maturity assessment
- Digital road map definition
- Use case identification



KPI driven approach

- Process specific KPI breakdown
- Role based ownership mapping



Value driven approach

- Enterprise wide digital use cases across value chain
- Sustained value generation through proven frameworks

Features



Custom analytics use cases

- Budd custom analytics solutions for pre-identified problems
- Proven approach for problem solving



Expertise in diverse domains

- Expert team of consultants and analysts with competency in multiple domains



Multiple engagement models

- Performance driven engagement models for revenue sharing

DEEPSights has proven benefits to manufacturing plants, utility companies, commercial buildings and smart campuses. Partner with us today to accelerate your journey towards sustainability.