

Focus on the road ahead.

From infrastructure to end user, IBM is putting practical telematics offerings within reach.





Your customers' lives are evolving. And managing these changes in an accelerating world has become a job in itself. Work. Family. Friends. All require us to stay within reach. So it's no wonder that wireless technologies that allow people to stay better connected to the office and to their lives outside of work are quickly changing from a luxury to a necessity. Which is right where you come into the picture.

Telematics—the convergence of telecommunications and informatics—is poised to help you deliver on customer expectations in a wireless world. Telematics offers exciting new ways to keep you better connected to your customers, while allowing your customers to keep in touch with the world around them. It stands to change the way we live. Communicate. Conduct business. Even manage personal safety issues. For you, it also means a new avenue to providing customer-centric offerings that are designed, deployed and brought to market faster, at lower cost. And an end result that includes increased customer loyalty and greater profitability.

IBM is helping companies in the automotive, petroleum, insurance, telecommunications, heavy equipment and transportation industries, as well as governments around the globe, take advantage of the new capabilities telematics technologies offer. From hardware and software solutions to consulting expertise that aligns business processes for greater efficiency and profitability, we're helping our customers break new ground. Each day, as the number of potential telematics applications grows, so does the list of organizations and their customers who stand to gain from them. As one of the pioneers in telematics research and development, IBM can offer your company an end-to-end solution, whether you want to build an offering from the ground up, or expand on your existing telematics programs.



Delivering cost-effective telematics offerings —the IBM “off-board” approach

In the automotive industry, telematics-equipped vehicles have already begun to draw some attention in the marketplace. But so far, their availability has been limited by the expense of proprietary systems, which are dependent on hardware and software packages that reside onboard the vehicle and require large data-storage capacity. In addition to their expense, these systems often require manual upgrades and have a tendency to grow obsolete long before the end of the vehicle’s useful life. Not surprisingly, telematics functionality has been offered only in high-end vehicles or as an expensive add-on for early adopters familiar with the technology.

To make telematics more readily available to car buyers—and more cost-effective for automakers to develop, deploy and manage—IBM is taking an “off-board” approach. That means keeping the bulk of the computing power outside the vehicle to leverage both existing and developing technologies, making telematics-equipped vehicles less expensive to offer and easier to upgrade remotely. By reducing both the cost and bulk of equipment built into each vehicle, automakers can more easily expand telematics functionality across price classes and increase profitability before and after the sale of these vehicles.

A new world of hands-free functionality

At IBM, our goal is to help automakers deliver both safe and convenient telematics functionality to their customers. Using IBM Embedded ViaVoice® software, an interactive voice technology, drivers can gain access to a range of services without having to take their eyes off the road or their hands off the wheel. Systems can also be engineered to shut down specific functions when the vehicle is in motion, during braking or at other key points where a distraction could affect the driver adversely. As has been the case with cellular technology, consumer awareness campaigns illustrating the appropriate times to use these devices will play a role in helping promote the safety of drivers and passengers alike.

Voice technologies can also relay navigation information, faxes, phone calls and Web content, eliminating the need for the driver to look at a dashboard screen. Existing proprietary technologies already notify emergency services at the time an accident occurs. Further extensions of this could include vehicle sensors that can detect the severity of the damage to the vehicle, and notify a driver’s insurance provider if they opt in on the service. By reducing the time it takes an emergency service to respond, this technology could save lives. The actual vehicle data gained could also aid automakers in designing safer vehicles and help reduce the cost to insurers.

The personal automobile—from simple conveyance to wireless convenience

Beyond enhanced safety features, telematics also offers new and exciting opportunities to enhance the lives of passengers along for the ride. One example is the IBM infotainment system, *Imaj*. Consisting of three 12-inch LCD screens built into the car seats facing three rear-seat passengers, these screens provide passengers access to radio, audio player, video player (multiple videos with three-seat cinema mode), fax, phone, e-mail, calculator, satellite mapping, local information, word processing, Web browser and calendar functions. All controlled either by mouse or by speech using a specially written version of IBM ViaVoice technology. The video is based on MPEG II (DVD equivalent) and passes true six-channel AC3 digital surround sound audio to a 15-speaker BOSE audio system.

Currently available as an accessory in Germany, “e-business on Mercedes-Benz V-Class” demonstrates how e-business and automobile networking can enhance productivity. The vehicle is equipped with a completely innovative business console, putting a mobile office environment at the disposal of the traveling business person. When not driving, travelers can work at the computer during a trip, receive faxes, search the Internet, send and receive e-mail, track schedules, get messages and make calls. Tasks can be carried out

manually or by voice control. A number of the personal digital assistants currently available can also be added to further increase productivity. All solutions use the GSM mobile telephony standard, making it possible to access any current business data—anytime, anywhere.

The IBM automotive health monitoring and remote diagnostics solution prototype is now showcased in a Chrysler Concorde. Built on IBM Pervasive Computing (PvC) end-to-end architecture, it was jointly developed by the IBM Telematics Solutions group, the Automotive Solutions project team of IBM Research and the PvC Advanced Technology and Research team. Also, three companies (Vetronix Corporation, Micro Processor Systems, Inc. and GenRad, Inc.) will support the diagnostic connections to the car.

The new advanced diagnostics application addresses one of the most important aspects of telematics services—providing drivers with assistance before technical vehicle problems arise. Realistic scenarios dealing with engine overheating, engine misfiring, a loose gas cap, airbag deployment and health checkups demonstrate how the driver can be informed, alerted or warned about vehicle health status. Optionally, the driver could then obtain guidance through the Web or receive emergency help from remote service advisors. All helping to reduce the hassle of vehicle downtime.

IBM continues to lead the IT world in the number of annual patent applications approved—nearly double our nearest competitor for 2001. Recently, IBM was awarded patent approval for our Artificial Passenger technology—a breakthrough sleep-prevention function that, using interactive voice technology, is designed to detect and alert a driver who has grown drowsy at the wheel, preventing an accident.

Automotive applications are just the beginning

Certainly, the automotive industry presents an abundance of opportunities to put telematics solutions to work. But it is by no means the only industry that stands to make significant gains for both companies and their customers. Currently, IBM is working with leaders in several industries to bring this vision to life.

Examples of potential uses in other industries include:

- *Insurance and Risk Management*

IBM is working with the insurance industry to develop better risk-assessment strategies. For example, using actual vehicle data collected on a model-by-model basis and monitoring the driving habits of a policy-holder (who opts in) to establish fair premiums for a car and driver's safety record. Or using global positioning satellite (GPS) technology to manage assets that have a defined geographic area of coverage, such as rental cars or commercial equipment required to be kept within national borders.

- *Petroleum*

In conjunction with the petroleum industry, IBM is helping to bring telematics curbside. By using wireless technology at the pump, consumers could download music, Web content and e-mail through short-range data transmission. By designing more intelligent gas stations, pumps could be programmed to communicate with vehicles as they pull up, initiating payment authorization and calculating the driver's fuel needs instantaneously.

- *Transportation*

Using the realtime data transmission capabilities of telematics technology, Fleet Management could be improved by reducing downtime and taking advantage of GPS technologies for better routing. IBM is working with innovators in the industry to design systems that could monitor sensitive cargo, like perishable foods, to reduce liability and take advantage of actual capacity on a daily basis.

- *Public Sector*

Intelligent Transportation Systems (ITS) help the public sector work more efficiently. Already in use in Japan and other parts of Asia Pacific, ITS has shown that traffic flow and civil engineering projects can be greatly improved using the realtime data collected from telematics systems embedded in roadways, sidewalks and other structures. Using vehicle-based technologies, emergency service response time could be reduced significantly, with immediate notification of an event and GPS navigation systems leading crews directly to an emergency.

Every day, practical research at IBM sparks new ideas for additional applications in the field of telematics. And using an open standards infrastructure, adding new applications and content from disparate sources is easier to manage.





Cutting-edge IT technology to match your cutting-edge automotive skills

To advance the future of telematics, IBM employs the same breakthrough technologies that have placed us at the forefront of e-business. These solutions include:

IBM Web Services

- *IBM WebSphere® Everyplace™ Server*
Provides the open, mobile application platform to deliver multiple network-connected services with speed and ease.
- *IBM WebSphere Portal Server*
Delivers access to the information, people, and applications your customers need, without an information overload.
- *IBM WebSphere Commerce* software
The transaction software will help propel your company into the next generation of e-commerce.
- *IBM WebSphere Voice Response with DirectTalk® Technology*
A versatile platform bringing expanded functionality to Interactive Voice Response (IVR) applications, including advanced speech recognition and VoiceXML for the Web.

IBM uses open Internet technologies

- *Open Internet language and architecture*
Including eXtensible Markup Language (XML), VoiceXML, Simple Object Access Protocol (SOAP), Web Service Description Language (WSDL) and Universal Description, Discovery and Integration (UDDI), Open Services Gateway initiative (OSGi) — to allow Telematics Service Providers (TSPs) to deliver dynamic content to customers on demand.
- *Java™ technology-based network computing solutions*
Make use of embedded microprocessors onboard to download realtime information services to drivers and passengers.

Hardware

- *Microdrives*
- *e-Servers*

Embedded Development Suites

- *IBM WebSphere Studio Device Developer*
Based on embedded Java 2 technology, this suite of tools is used by Daimler-Chrysler, Motorola and Intel Corporation to develop the future of vehicle-based embedded computing.
- *IBM Embedded ViaVoice interactive voice-recognition software*
Allows both in-cabin and wireless hands-free operation for navigation, phone and Web services.
- *IBM WebSphere Everyplace Embedded Foundation for Telematics*
A cross-platform, embedded software offering for telematics that includes device/content management, connection management, communication, user interfaces, encryption, authentication, and message queuing.

Services

- *IT consulting*
Proven telematics experience to help you design, develop and implement the right solutions for your customers.
- *Systems design and integration*
Extensive telematics experience and business knowledge combine to deliver the best systems structure for you.
- *e-business Hosting and Strategic Outsourcing*
From local to global, the hosting capabilities to manage, deliver and support the content your customers want.
- *Wireless e-business Solutions*
Designed to extend enterprise applications and data to customers, employees and suppliers — wherever they are.
- *Wireless Security Services*
IBM Security and Privacy Services, together to help your company assess, architect, design and build security-rich wireless e-business solutions.

IBM combines extensive business expertise across industries with the leading brands in e-business to deliver a complete, end-to-end telematics offering.



Drive technology, deliver opportunity

Telematics technologies from IBM provide more than a new set of features for your customers. They provide new profit centers. Increased customer loyalty. And a healthy return on investment. By leveraging IBM telematics solutions to keep you closer to your customers, the benefits are tangible:

Faster routes to innovation, at lower cost

Critical field data gained from telematics sensors can be incorporated into the design and production processes in near realtime, allowing designers and engineers to identify existing product strengths and weaknesses. And develop new products and services that address specific, targeted needs for your customers. Without the guesswork. All built on the architecture for a managed network, allowing you the scalability to support the vehicles, from hundreds to millions, under customer or third party control.

Increased customer loyalty

By keeping the dialogue with your customers open, telematics technologies from IBM allow you to constantly keep connected to your customers. To offer new services. Respond more quickly to customer service issues. Reinforce the brand image that your customers bought into at the time of purchase. And the one you want them to buy into with their next vehicle.

Improved safety and security

Telematics technologies that improve vehicle safety, emergency response times and reduce loss of life stand to benefit everyone. Insurance providers realize a savings in policy payouts. Automakers have an opportunity to initiate faster, more targeted recalls and potentially avoid negative press exposure.

And drivers can be better equipped to prevent accidents themselves. Vehicle tracking systems, used to locate a stolen vehicle, could become a standard feature, helping to deter thefts and reduce insurance costs to the vehicle owner.

Service enhancement

Using remote diagnostics and on-site vehicle plug-ins, service retailers have the opportunity to maintain a closer relationship with their customers, immediately notify them of critical service requirements and market service incentives, to foster service loyalty, directly into the vehicle. By helping drivers anticipate problems before they arise, telematics can help the service provider establish itself as the ultimate expert on the proper maintenance of the vehicle.

New revenue streams

Telematics solutions from IBM not only help you deliver the features and services your customers want, they allow you to stay competitive by reducing the time and costs required for your company to bring new offerings to market. Whether launching new features or upgrading existing ones, telematics give you the opportunity to enhance the driving experience for years after the sale, creating a new source of revenue from existing customers.

Evolve your business model smoothly

Beyond the technology, IBM offers the practical expertise to help you continue your transformation to e-business quickly and easily. That means helping you reach real profitability faster, with fewer headaches along the way. From consulting to hosting, IBM can help ensure your telematics offering is in sync with the rest of your business, and your bottom line.

IBM Automotive ServiceAfterSales

Combining the strengths of IBM Product Lifecycle Management and telematics technologies, IBM Automotive ServiceAfterSales provides asset-based solutions that help deliver dynamic support throughout a vehicle's lifetime. From remote diagnostics and in-vehicle service reminders for your customers to expert call center support and interactive parts catalogs for your service teams, telematics solutions from IBM can help you keep the dialogue with your customers open. All while providing new opportunities to make your service processes more profitable. To learn more, visit ibm.com/industries/automotive.

Managing the balance between gathering data and protecting privacy

Protecting user privacy—it's a tricky situation. As the number of technologies that enable the collection of customer data—including telematics—continues to increase, so do the number of questions about how to balance your need for data and your customers' needs for privacy. While legislation will dictate some of the answers, establishing privacy policies and standards for your customers will become an integral part of your brand.

With nearly 1000 security and privacy professional consultants around the world, this is familiar ground for IBM. Along with an enterprise-wide commitment to managing privacy issues and data practices, we've helped pioneer solutions that address these important questions. One answer is Privacy Manager software, which allows enterprises to manage data in accordance with the privacy and security policies assigned to it. Regardless of how complex a data-management task your company faces as privacy practices become more common, IBM can design a solution to satisfy your need for information and your customers' needs for privacy.





Our Business Partners and customers are already in the fast lane

IBM is successfully collaborating with a growing number of automakers, suppliers and standards organizations to help give motorists more convenience and benefits through telematics technology. A sampling includes:

Suppliers and technology providers

- **ATX**
Award-winning ATX Technologies, using IBM ViaVoice solutions, has developed Interactive Voice Recognition (IVR) speech-response technology to provide motorists with enhanced navigation, safety and convenience. The company has selected IBM DirectTalk voice-processing platform and ViaVoice speech-recognition technology as the foundation for IVR. Most recently, ATX and IBM announced that ATX has developed the capability of telematics connectivity between vehicles and wireless devices using IBM WebSphere Everyplace Server technology. BMW of North America has announced that it will use ATX's IBM-enabled technology in the automaker's model-year 2003 vehicles.
- **CAA**
IBM and CAA AG of Filderstadt, Germany, are developing the architecture for new telematics applications. CAA and IBM will jointly offer integrated, wireless and multimedia telematics capabilities to automotive manufacturers worldwide for installation into new vehicles.
- **Intel**
IBM and Intel Corporation are collaborating on in-vehicle computing solutions. Intel will provide its Personal Internet Client Architecture (Intel PCA). IBM will provide its pervasive computing software, a suite of advanced software for managing in-vehicle telematics systems.

- **Motorola**
IBM and Motorola are dedicated to breaking new ground in the development of technology that helps automakers bring wireless and Web-based services to motorists. They will combine their technologies, products and services for a joint in-vehicle telematics systems approach to auto manufacturers.
- **Work on standardization**
Automotive Multimedia Interface Collaboration (AMI-C) has selected IBM as a contributing consultant in the development of AMI-C use cases, requirements and initial architecture.

Automakers

- **Audi**
With help from IBM, Audi-Europe has created an innovative concept for upscale automobiles by integrating Internet access into its cars of the future. IBM has developed major components of the project's wireless and Internet technology, adapted to the special requirements of automotive Internet communications. IBM and Motorola combined to deliver the telematics architecture and major components for the Audi A8 line introduced for sale in Europe.
- **Johnson Controls and Chrysler Group**
IBM technology is helping to power an industry-first Vehicle Communications System. Thanks to Johnson Controls (JCI), Chrysler Group will offer a hands-free, voice recognition communications system that, unlike competitive offerings, is delivered through a user's wireless phone and works inside and outside the vehicle. IBM is providing JCI the speech software platform, called Embedded ViaVoice, to enable users to dial telephone numbers or access their audio address books by speaking preprogrammed commands.

Deliver the ultimate customer-centric offering

Connect with your customers and you can do amazing things. Build loyalty. Reduce costs. Increase profitability. Sharpen your competitive edge. With telematics solutions from IBM, you can take advantage of the new possibilities wireless technologies offer today. And with our open-platform approach, easily incorporate the advances of tomorrow.

From the initial architecture to deployment, hosting and customer support, IBM has the end-to-end telematics expertise to help you keep the dialogue with your customers open. Providing measurable results for you — and a better way to manage an ever-quickening lifestyle for your customers. With a continued focus on practical research, IBM has the industry leadership you can depend on to make the most of your telematics offerings.

For more information

Learn how end-to-end telematics solutions from IBM can benefit your organization at every stage of your business processes. And can keep your customers coming back for more.

For case studies and the latest updates about current telematics research from IBM and IBM Business Partners, visit IBM Telematics Solutions group today at ibm.com/industries/automotive.

Have a question? Contact the IBM Telematics Solutions group today for specific inquiries about how we can help you take advantage of our extensive industry expertise and forward-thinking technologies, at telematx@us.ibm.com.





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