



Driving new opportunities

for the Automotive Industry



Interpreting the headlines

It's in the news now almost every day: Internet and wireless networks are converging in one of the most important developments in the history of information technology. It's called pervasive computing.

Pervasive computing frees information from the desktop and makes it readily available anywhere, at any time. Through the push of a button, a spoken command, or a handwritten request.

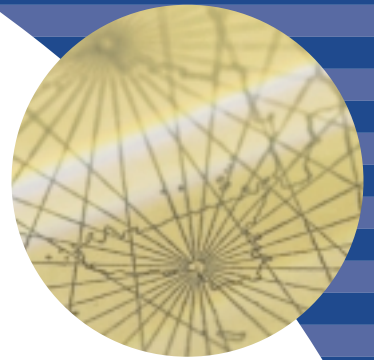
Through pervasive computing, people can receive the customized information they increasingly expect through simple, intuitive devices. In their homes. At the office. Or in an automobile on the road in between.

By 2002, more than 55 million information appliances will be in use. These devices will account for approximately 50 percent of all Web-enabled units. International Data Corporation, 1998. *Forecast of the Worldwide Information Appliance Market, 1997 - 2002*



Gearing up for higher consumer expectations

Whether commuting or working on the road ... running personal errands ... doing carpool duty ... or driving to vacation getaways ... people are spending longer periods of time in their cars. And they're looking for ways to make this time safer, more productive, and less stressful. Even more entertaining and fun.



Taking in-vehicle information systems to the next level: pervasive computing

In-vehicle navigation and mapping features have become relatively common. Now new technology will allow extending information delivery well beyond navigational tools — with applications for diagnostics, e-mail, news, education and entertainment. So your customers can access information much as they do at work and at home, but in their vehicles.

More flexible, powerful applications

For greater convenience, safety and security

Advanced voice recognition will help ensure safe operation by letting drivers keep their eyes on the road and their hands on the wheel — as they send and receive e-mail, make calendar changes, or listen to instructions.

Traffic and congestion alerts can be integrated with route guidance directions to save driving time and avoid frustration.

Remote diagnostics and updates will make maintenance easier, faster and less expensive.

With new forms of in-vehicle entertainment, such as music, games and movies-on-demand, travel can become more enjoyable.



Connecting the wired and wireless worlds

Using Java™ technology, tiny embedded microprocessors will let drivers and passengers download real-time information services via wireless connection to the Internet. On request, information residing on a server can be delivered to the vehicle via wireless data transmission.



Helping build brand loyalty

Because the data and applications for in-vehicle information systems will reside on servers, they can be continually updated and enhanced without requiring customer involvement.

This will improve customer service and enhance customers' experience with your product. Ultimately, it may increase brand loyalty. Ongoing contact through updates also helps you maintain relationships with customers throughout the period of ownership.

Shifting the computing model offboard for greater capabilities

The present generation of in-vehicle information systems requires onboard technology. This means large amounts of data and storage capacity must reside in the vehicle. Updates require replacing data, and adding features means that new applications need to be purchased and loaded. The result is a technology architecture that may become obsolete well before the vehicle does.

The coming generation of in-vehicle information systems will be based on an offboard computing model. In this model, some data processing and applications remain resident in the vehicle ... and some are offloaded onto network servers located elsewhere.

Among the advantages are lower costs of ownership and consistently up-to-date applications.

Offboard computing is being made possible through recent advances such as:

Embedded processors that provide higher performance in smaller packages

Java language-based network computing with its cross-platform capabilities

Higher-bandwidth wireless technologies



Delivering high-value applications and services to your customers

Offboard computing will increase the power and flexibility of the applications and services you can provide. At the same time, it will reduce in-vehicle technology requirements and costs. Benefits of offboard in-vehicle information systems include:

- Significantly reducing in-vehicle technology requirements lowers cost per vehicle.
- The useful life of the in-vehicle device is longer since the system can be updated through upgrades of network software, applications and data. So devices won't become obsolete in 3 or 4 or 5 years.
- The life-cycle costs of maintaining applications and data are reduced, too, because of the upgradeable platform.
- What's more, a single device might be shared by multiple users but still have the ability to be customized for individual preferences.
- The same applications and information available on a wide variety of mobile devices can be brought to the automobile.

Importantly, because offboard in-vehicle information systems can be separated from the design and product cycles of the automobile itself, your speed to market can be accelerated.

Improving vehicle maintenance

With in-vehicle information systems, automotive manufacturers can interact with the vehicle through an encrypted link — for security. This will enable reporting on operating status of vehicle functions and components. It can also provide instant auto self-assessment and remote electronic repair. For example:

- If signs of malfunction are detected, information could be relayed to the dealer or manufacturer.
- Electronically, the problem could be diagnosed and repaired.
- Or, the owner could be notified to bring the vehicle in for servicing, saving time and expense on maintenance.

Accurate, timely warranty data also helps reduce warranty costs. What's more, information can be put to valuable use in design and manufacturing improvements.

Capitalizing on new business-model options

Offboard in-vehicle information systems will open opportunities for new revenue streams. For example, in-vehicle content might be supported by fees for monthly service, pay-for-use or transactional service. Plus, content delivery offers potential for advertising and referral fees. These additional revenue streams can be used to increase profit or subsidize manufacturing expenses.

Realizing benefits down the road

With the rapid pace of change in technology today, one of the greatest benefits of server-supported offboard computing is that it will let you grow services efficiently and economically, in response to your customers' evolving needs.

Delivering high-value applications and services

We are committed to providing you with the ability to create distinctive, competitive advantages — by helping you deliver high-value, in-vehicle applications and services to customers.

Putting offboard in-vehicle information systems on the road

When you work with IBM, you can leverage our unequaled knowledge of e-business and its extension into the world of pervasive computing. And you can take advantage of our industry-leading voice and Java software technologies to create new and exciting business opportunities.

You'll also have access to our unique server-processing capabilities for supporting offboard in-vehicle information systems — which come from our being one of the world's largest makers of servers.

In addition, you'll receive the benefit of our unsurpassed experience in technology integration. By building on this experience, we can create a seamless framework between wired and wireless networks, so that in-vehicle information systems solutions have the security, reliability, and around-the-clock accessibility they require.

To develop, customize and implement your systems and solutions, you'll be able to draw on the vast expertise and reach of one of the world's largest technology organizations: IBM Global Services.

In short, by working with IBM, you'll enjoy the benefits of scale, depth of understanding and experience that only we can provide.

How IBM will help deliver automobile network solutions

Develop better ways of delivering content, applications and services to vehicles

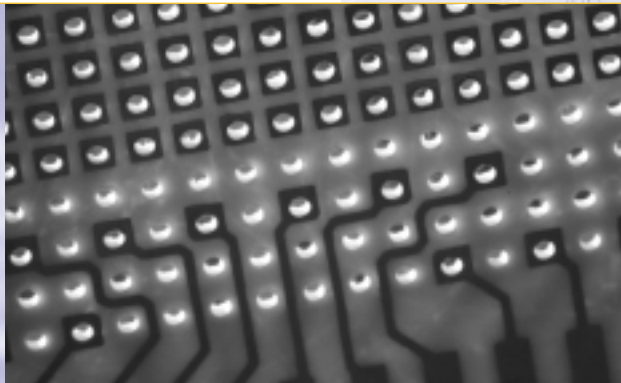
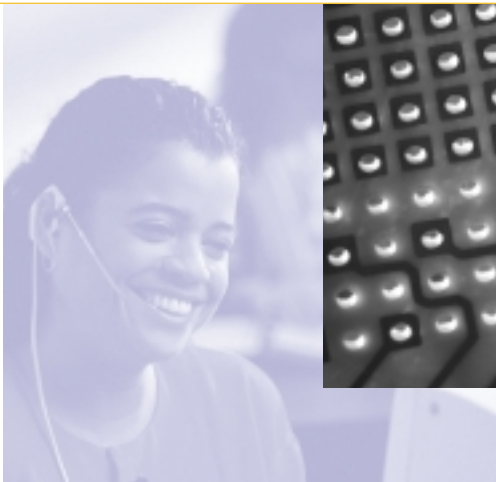
Promote communications integrity over the network — and between the network and vehicle

Provide e-business functionality and security, including management of applications and transaction-related services

Deliver archiving and data mining capabilities

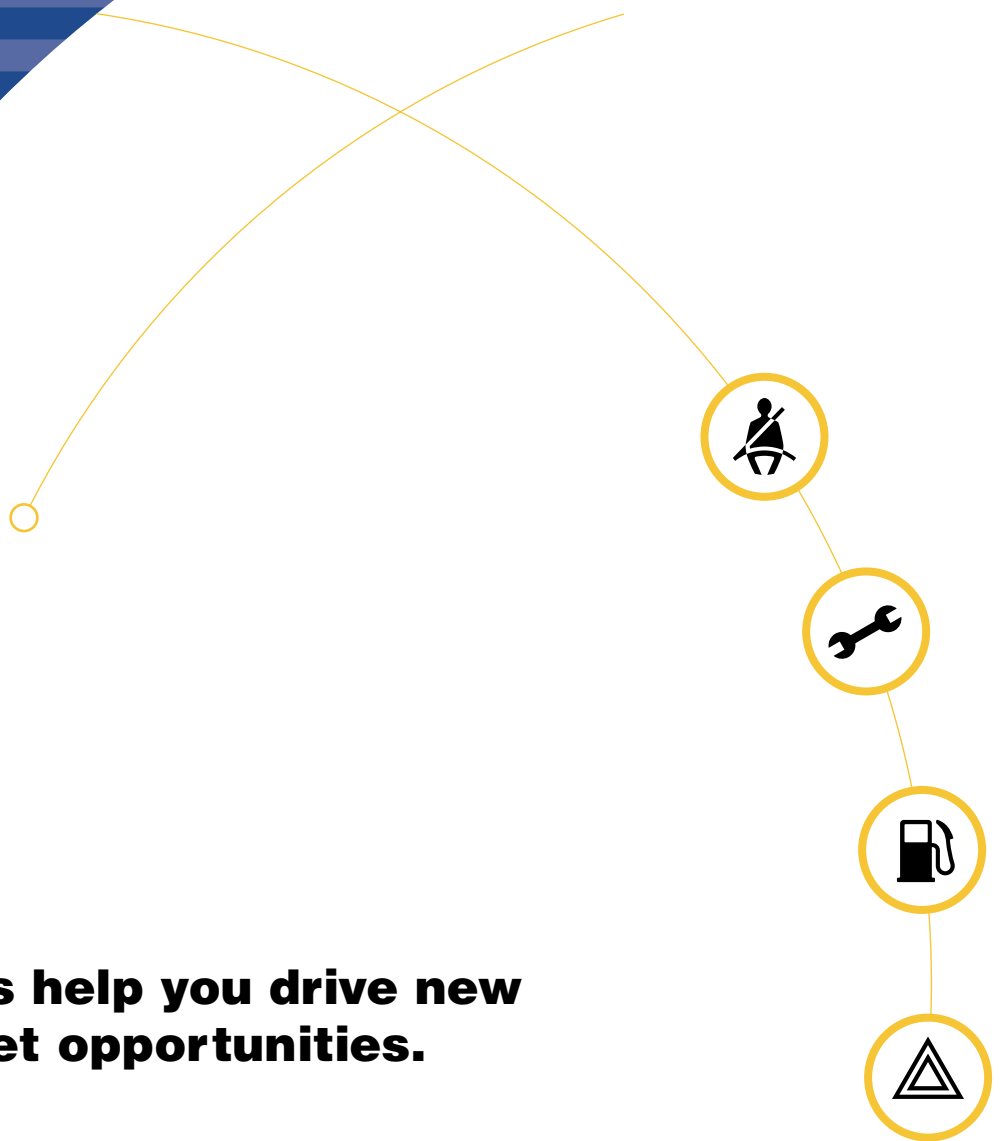
Open solutions for in-vehicle information systems

IBM intends to support the open standards developed by the Automotive Multimedia Interface-Collaboration (AMI-C), as well as the IT and automotive industry standards of the future.



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