

Microsoft in Automotive

Peak Performance Initiative:
Accelerating Insight and Innovation

Microsoft in Automotive: Vision

Enable the global automotive industry to anticipate, innovate, and deliver world class products and services through visionary technology leadership

Leveraging Technology in the Automotive Industry

America's auto industry always has moved forward through innovation to overcome the bumps in the road raised by changing consumer preferences and economic conditions. Today, however, those bumps have become steep inclines—and occasionally potholes—as the industry struggles to adjust to competitive cost pressures throughout the supply chain, globalization of the manufacturing and marketing process, the need for improved productivity in operations and consumers' evolving view of their vehicles' capabilities and purpose.

Unprecedented worldwide demand for vehicles and raw materials will require automakers, suppliers and marketers to leverage their existing technology as never before, adopting new ways to reduce costs and improve performance in the plant, in the field, in the showroom and in the vehicle.

Technology developers, including Microsoft, are partnering with the auto industry in smoothing the path for marketing, product development, operations and integration of supply chains. New methods of using existing technology and advance-technology platforms that offer a much broader range of solutions than those of the past are poised to transform automotive development inside the plant, the office and the design studio; under the hood and on the dashboard; throughout the OEM's dealerships and all across the automaker's global enterprise.

The Difficulty with Differentiation

In the past, the auto industry has embraced change. Changing styles and features have served as differentiators in the marketplace. Now, however, the speed with which innovation is occurring is far greater than earlier rates of change. Yesterday's innovations—from heated seats to antilock brakes—have become commodities and no longer can differentiate vehicles effectively in the public's mind. New features, therefore, must be introduced quickly and continuously to enable an OEM to gain a competitive advantage.

Moreover, automakers are determined to focus on innovation to stay ahead of the competitive curve and utilize rapidly emerging technology. They understand they must be able to predict and leap ahead of the next innovation if they are to remain viable. In this way, the automotive and technology industries are sharing a common path: both are highly competitive business sectors and each is focused on anticipating the way consumers will want to use their products in its next iteration.

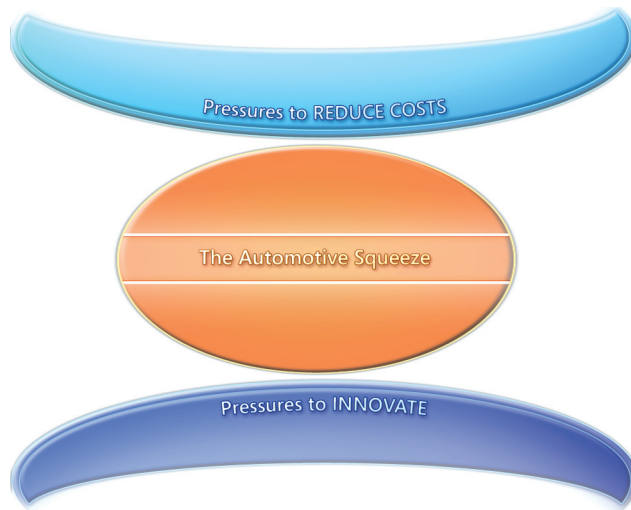
OEMs are responding to the increase in personal mobile technology by integrating "infotainment" and mobile devices into their vehicles. They understand that autos not only are becoming mobile entertainment centers—with, hands-free phones, voice-activated telematics, satellite radio, backset video and gaming systems—but now consumers are expecting vehicles to be more of a mobile home/work station than just a vehicle for transportation. The industry can turn to Microsoft's automotive groups,

such as Automotive & Industrial Equipment and the Automotive Business Unit, to gain differentiating technology solutions to accelerate the mobile computing environment into their vehicles.

The Automotive Squeeze

The automotive community is under pressure to achieve better cost optimization and to continue to compete, innovate and satisfy consumer demands for increased mobile technology within their vehicles—as well as to meet continuously expanding safety requirements. They are being squeezed by the economic realities of healthcare and a global marketplace.

The costs associated with warranty reserves, maintaining retiree pensions and healthcare costs, especially in North America, are continuing to grow and have been tremendous issues for major automakers address. Cost pressures are amplified further by such issues as liability, regulatory requirements and the often less-than-optimal use of labor in a global setting.



Supplier Performance in a Global Setting

As a result of these and similar pressures, OEMs are seeking help from their suppliers in lowering product costs. Simultaneously, auto makers are requiring suppliers to take on more of the responsibility for designing and delivering full systems, rather than only components, serving in the role of systems integrator. These systems, however, are becoming commoditized, producing a differentiation issue for suppliers that is very much like that facing the OEMs. Additionally, OEMs can be expected to pass much more of their warranty costs down to the suppliers, generating the need for improved traceability as well as visibility of flawed processes and components. Moreover, with supply chains now extending across the globe, adjusting inventories, determining from which location to source a specific process or component, and ensuring optimal flow within the system when stretching across cultures and global resources present extraordinary challenges to supply-chain management.

To meet the automakers' pressure to lower costs while raw materials become more expensive, workloads increase to handle systems, supply chains grow more extensive and marketing costs rise to seek a differentiated position, suppliers must become extremely lean, reducing waste to take cost out of their supply chain and products. Likewise, suppliers must operate more efficiently, reducing inventories, correcting flaws early in the production process and anticipating changing requirements for materials and end products. They are turning to Microsoft for new Web-enabled technology that provides them unprecedented visibility and control over their position in the supply chain.

The Millennial Generation

All these innovations and advances in wireless and mobile technology filter down to the sticker price and the competitive value of the dealerships' vehicle offerings and inventory. Here, again, change is occurring at a rapid pace. We now have a group of young, technology savvy consumers, the Millennial Generation, a group that has grown up with a hi-tech lifestyle. They cannot remember an era before cell phones, digital-cable, CDs, wireless laptops and gaming. Mobile technology has become an essential part of their lifestyle and their environment impacting how they work, shop, live and entertain and even their transportation. They use it without a thought; they rely on it. This new group of consumers will research their vehicle purchases online and walk into a dealership with a higher level of demands than previous generations.

The brand owner and the dealerships are working to personalize and accessorize vehicles to differentiate their business and their vehicles. Accessories have become a \$24 billion business. Automakers have responded to the customer demands by inventing unique brands, such as Scion, that are geared toward the customization of interiors and exteriors. Other OEMs are creating vehicles targeted to ever more refined niches of the market with features and accessories that attempt to distinguish those brands.

Automakers Build Change on a Microsoft Platform

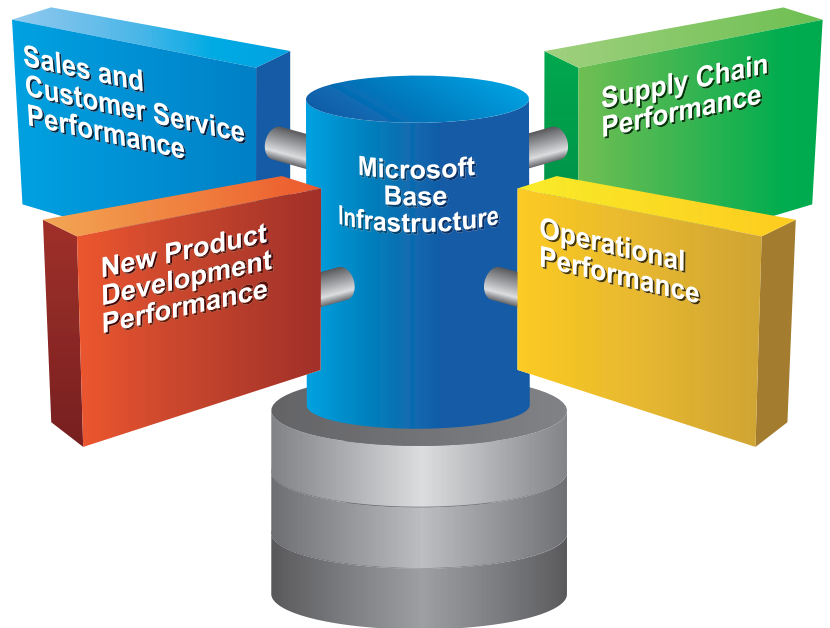
Today, the Microsoft automotive team is working with its partners to deliver solutions that help customers maximize the benefits of their existing IT infrastructure for optimum performance across operational functions. The Microsoft platform provides a breadth of technologies that enhance communication and collaboration for the automotive community. This platform also offers robust security and

a reliable foundation that partners can use to create solutions that address specific industry needs. Microsoft's AIE group have launched a Peak Performance Initiative that will adapt and apply technology specifically to the needs of four industry arenas:

- New-product development performance
- Operational performance
- Supply-chain performance
- Sales and customer service performance

Microsoft in Automotive's vision for this initiative is to enable the global automotive industry to anticipate, innovate, and deliver world-class products and services through visionary technology leadership.

With its partners, Microsoft is developing solutions on an integrated technology platform, incorporating Microsoft Business Solutions, Microsoft Office, Windows Mobile and Windows Server System and other products and technologies, all centered on our open-standards, Web-



enabling .Net platform. This Microsoft base infrastructure underlies the four "pillars" that support the Peak Performance Initiative.

For some time, Microsoft has played an integral role in helping OEMs, suppliers and dealers change the way they speed innovation to market, meet the demands of cost pressures and manage their global operations. Microsoft solutions address today's needs in the auto industry to realize best practices in lean manufacturing, bring new products to market more rapidly, respond quickly to customers, comply with changing regulations, and compete on a global scale. Microsoft is continually examining and anticipating the innovations that consumers and businesses require, predicting their needs in the workplace and responding quickly with new technological developments and adaptations.

Microsoft's platform provides the infrastructure, allowing real-time collaboration that is required today and that will continue to drive innovation forward in

tomorrow's design arenas, manufacturing plants and global supply chains. The Microsoft infrastructure provides the means for that automotive community to achieve peak performance with an integrated platform and interoperability.

The Microsoft automotive team includes three core assets of Microsoft: the solutions that assist in the manufacturing environment and product design; the in-vehicle technologies solutions part of the Automotive Business Unit (ABU) that allow automotive manufacturers to increase market share by providing the capability for

consolidating work that once was carried out on a variety of platforms onto a single, cost-saving platform. In the past, high-performance computing required UNIX work stations, but Microsoft's 64-bit WinTel platform can consolidate the business aspects of a project from Windows with the design and engineering files from CAD. The result is that far fewer terminals are required to carry out the same work in a more accessible and flexible fashion.

Microsoft also is leveraging existing in-car technology. That connectivity not only can provide entertainment and computing power, but it can be used also to determine

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them to offer the latest in-car telematics; and MSN Autos, the dedicated automotive channel of MSN.com and the world's leading online consumer automotive platform, live in 19 markets and 11 languages. Its comprehensive research, buying and ownership content and services include new and used-car marketplaces and unique ownership and maintenance features for car owners.

New-Product Development Performance

As OEMs reach out to more niche markets and work to stay ahead of consumer expectations, the need for collaboration has expanded to reach from concept to launch to vehicle retirement. Collaborative decisions must be implemented in creation of CAD drawings among a number of designers, outsourced and in-house design and engineering work, testing of the vehicle, provision for components from suppliers, generation of an Advance Plan and Quality

Process (APQP) and other elements of the development process.

Traditionally, these steps have been carried out with applications and platforms that do not provide compatible file formats—different CAD systems, work stations vs.

personal computers. Microsoft's initiative intends to provide connectivity and interoperability for all the data required for collaboration on design and production of vehicles.

Microsoft also works with OEMs to leverage Excel and Word applications to capture and share ideas and then generate forms through InfoPath to standardize the format of data from multiple applications. This capability expedites collaboration and approval and dramatically cuts the time to market for new products.

Not only is Microsoft providing a standard, familiar interface for more functions through Office, but it is

how the car's features are being used by the driver, how well products are holding up in the vehicle and potential component failures to which drivers should be alerted. If in-car connectivity is employed to shrink the "detection-to-correction" manufacturing cycle by providing early feedback of component flaws or failures, changes can be made earlier in the launch process and the number of vehicles involved in any recall can be sharply reduced.

Operational Performance

While most manufacturing control, execution and plant-floor security systems are based on Microsoft technology, the most advanced developments are enabling new approaches to lean manufacturing as well. Reducing wasted time, effort and materials to create a lean environment requires the mapping of processes. Until now, process mapping has been a function carried out primarily on paper, covering walls with charts that are static in nature. Making a change in one part of the process did not automatically indicate the result that could be expected.

Microsoft and its partner, Orlando Software, have created an application that can simulate the impact of

changes in a process map. It analyzes the time required to complete the process, conducts value stream analysis and determines the time saved by making a specific change in a process. It also can simulate the

impact of other revisions in the process, reporting what will happen if a particular step is moved to another point, if one event is separated into two and similar actions. Then it will use Microsoft Project to create an actionable plan simulation, determining the impact of the changes on the production time for large numbers of vehicles.



New Product Development Performance



Operational Performance

Plant floor visibility is another area in which Microsoft is enhancing operations. Considerable data resides within the various stations involved in assembling a vehicle, but today's assembly line may stretch across ten plants on three continents. Globalization has diminished visualization of resources in the assembly process. Microsoft helps managers determine what will happen if they shift part of a process to a different plant or source a component to the United States from an overseas supplier. Microsoft can install applications in each facility to connect them through a centralized hub that provides management a "dashboard" with complete information about the entire process. They can view the capacity in each plant; see the sources and impact of lost parts, productivity or efficiencies; and view where they can reduce losses in the process.

Supply Chain Performance

For suppliers to maintain the agility required for their increased responsibilities under often severe cost restraints, visibility, interoperability and integration are crucial attributes for their production processes. Microsoft is enabling suppliers to view their customers' inventories so they can better predict upcoming orders and respond to schedule changes. By integrating supply-chain management systems with Office and Outlook, customers



can send email messages when they have a shortage. That same email message can be synchronized with the part number and scheduling so actions can be taken. Notification of a potential parts shortage can be emailed to the supplier's operations manager so corrective actions can be taken. Email notifications and forwarding for resolution all take place on the same enterprise system, without having to switch to a separate computer to tie into Outlook or other Office applications.

Supplier quality collaboration and product lifecycle management are facilitated as well by Microsoft technology embedded in the supply chain. It enables manufacturers to develop their APQP documents and analyze quality performance metrics, based on scrap, rejects, recalls and other forms of wasted operations.

A Microsoft-based warranty solution by partner Active Web Services examines root causes, claims, quality and traceability to determine the supplier of origin for faulty parts and to take corrective action that will reduce future claims.

Service parts management becomes much more effective with Microsoft solutions that provide OEMs with visibility into the inventory of parts within their supply chain so they can determine where to move components and when to replenish supplies in the field.

Visibility, collaboration and connections all factor into greater interoperability within the supply chain, using a common platform that brings data from all sources together in a manner that allows manufacturers to take actions that improve efficiency, cost and quality performance.

Sales and Customer Service Performance

Microsoft and its partners in the dealer management space (DMS) are implementing technology for dealers that provides customer insight management. With these systems, dealers gain a complete 360-degree view of their customers to understand more completely who they are, what they seek in vehicles and accessories and how the dealer can use technology to predict sales and service lifecycles of the customer.

OEMs and the dealers are integrating their electronic business management systems more tightly with Microsoft Business Solutions to allow the manufacturer to see the



dealer's vehicle inventory and the dealers to see available options. This increased visibility, made possible by the .Net platform, allows OEMs to use Microsoft's Web services to fulfill orders and price vehicles for the dealer. Soon pricing, contracts and the sale all will be integrated into a single solution.

Now able to share information electronically, dealer and OEM can look at consumers together, market to them together and share the information they compile about each customer. Marketing is the dealer's greatest cost, and the analytical capabilities of Microsoft technology will help dealers become more focused in targeting consumers and thereby reduce the expenses associated with mass marketing.

Current Commitment to the Automotive Industry

Microsoft has introduced to the automotive community many of the solutions it will require on the road ahead, and with its partners is continuously developing new automotive business solutions in advance of future needs.

- More than 25 vehicle models within ten different brands have Microsoft on board, from the Windows Automotive platform to applications like MapPoint and systems that alert drivers to upcoming maintenance requirements.
- Dealers are using Microsoft technology to manage their businesses and to predict the service needs of their customers.
- OEMs are launching vehicles on the MSN Autos Web site. When Ford introduced its F150 truck on MSN Autos, it determined that 6 percent of its leads tracked back to that single Internet campaign. Toyota re-launched the Prius on the same site, and Lexus is building an entire owner environment on MSN Autos.

In vehicles and online, Microsoft's presence in the automotive marketplace is extensive. But our contribution to the continued success of the auto industry begins long before these cars and trucks touch the road.

- Microsoft is responsible for 80 to 90 percent of the market for plant-floor devices.
- GE Fanuc built its plant-wide automation system on a Microsoft platform. Using this system, Nissan has been able to increase the speed of its lines, manage a mix of models and reduce downtime and waste.
- Delphi employs Microsoft Windows DNA for Manufacturing to guide its just-in-time delivery capability, linking operations among plants around the world to reduce costs and speed the time to market. In one facility it gained a 98 percent improvement in total quality and an overall 35 percent improvement in operational efficiency.
- Dealers could predict which of their customers' vehicles required service and could proactively schedule maintenance that respects the busy schedules of their customers
- Brand owners, suppliers and dealers could accurately predict and prioritize which customers have reached the point when they are ready to seek a new vehicle
- A sales executive could capture information regarding a customer and look up their information via a voice-enabled portable device
- Visibility of all plant floor operations is available across the extended enterprise through one single, integrated view

Microsoft's automotive teams are positioned to assist with cost optimizations, new-products development, supply chain performance and operational factors in the marketplace.

- Microsoft is on virtually every desktop in the offices of auto manufacturers, and the industry is working with Microsoft as its preferred CAD system.
- Collaboration is being carried out across automotive enterprises through Microsoft's SharePoint services that bring engineers and designers together for creation, approval and adaptation of plans.
- Intelligent systems and alerts could enable rapid proactive identification and diagnosis of production issues before they lead to significant quality and productivity losses
- Digital 3-D simulation tools could optimize processes across plants and identify potential production issues before a single tool is built
- Early warning systems and proactive alerts could dramatically collapse the time to recognize and react to post-launch warranty issues
- The ability existed to trace and identify in-market failures to specific vehicle sub-systems, components, and/or manufacturing processes across the extended enterprise

From the OEM and the supplier to the dealer and ultimately the consumer, Microsoft's automotive teams are positioned at each turn to assist the auto community with cost optimizations, new-products development, supply chain performance and operational factors in the marketplace. Microsoft operates much like the auto industry in partnering with closely aligned companies to produce best-of-breed solutions for the entire vertical operations of the automotive community.

Future Potential

Microsoft's Peak Performance Initiative can lead to a dramatically different environment for the auto industry. Imagine an industry in which:

- One common platform can enable seamless integration between the dealers and brand owners

In all these ways, Microsoft in Automotive will be accelerating the auto industry to hasten the day when automotive manufacturers operate with previously unachievable integration, when dealers and marketers have comprehensive consumer information at their finger tips, when new products speed to market with unprecedented quality and customization.

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