



BP Cuts Hours Off Emergency Response with Visual Solution that Tracks Threats to Assets

Overview

Country or Region: United States
Industry: Manufacturing—Oil and gas

Customer Profile

BP, headquartered in London, England, is one of the world's largest energy companies, providing customers with fuel for transportation, energy for heat and light, retail services, and petrochemicals.

Business Situation

After Hurricane Katrina, the Gulf of Mexico Strategic Performance Unit of BP wanted a better way to locate people and material assets, and to make decisions about their care in the event of a natural disaster.

Solution

BP created a data-visualization solution using real-time weather data along with Microsoft® Virtual Earth™ mapping software, SQL Server™ 2005 database software, and Office SharePoint® Portal Server 2003.

Benefits

- Visualization of data enables greater understanding, decision making
- Solution cuts hours off emergency response
- Extensibility enables broader use for other needs

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Steve Fortune, Information Management Director, Gulf of Mexico Strategic Performance Unit, BP

Energy giant BP saved its employees when Hurricane Katrina struck, but the process of locating its people and material assets, and making decisions about their care, was time-consuming when every second counted. The company sought a better solution. That’s what BP has now with its Hurricane Management System, which combines the 3-D satellite imagery of Microsoft® Virtual Earth™ mapping software and real-time weather data with a visual representation of BP people and facilities. The solution uses existing BP infrastructure, including the Microsoft application environment. It saves BP crisis managers hours each day by automatically consolidating data from 20 sources. Most important, BP personnel worldwide can understand and respond to threats hours faster—with the potential both to better care for the safety of their workers and to save millions of dollars.

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Brian Autio, Principal Mapping Lead, Crisis Team, BP

Situation

The Gulf of Mexico Strategic Performance Unit of BP, the global energy company, is focused on the exploration and production of oil and gas. Based in Houston, Texas, the unit is responsible for a complex mix of assets, including eight deep-water oil production and drilling platforms that feed thousands of miles of pipelines, and more than 100 fuel terminals and offices. Combined, these resources use the talents of 1,500 people.

BP’s people and facilities are located throughout the Gulf States and beyond. When a storm approaches the region, BP has to predict who will be affected. Tracking and projecting storm paths and intensity are crucial to protecting employees and aiding storm victims. The effectiveness of these operations depends on BP having fast, accurate storm information, as well as a complete understanding of where people and facilities are.

Traditionally, BP managed this process with wall-mounted paper charts and pushpins to represent storm paths and employee locations. The crisis team would use other physical tools to measure the distance between a hurricane and BP facilities. To obtain the data for this setup, Brian Autio, Principal Mapping Lead for the BP crisis team, would spend three or four hours before a planning meeting pulling data manually

from as many as 20 databases and Web-based sources. He would then import the data into ESRI ArcInfo mapping software, check it for accuracy, and send out e-mail messages to the crisis team. The meetings would become increasingly tense as a storm approached.

“We would have 40 people lining the walls in a room that might typically hold only 15 or 20 people, trying to analyze what was going on,” says Autio. “This isn’t just about employees and contractors—these people offshore are our friends, so it was very personal. And it was all about making sure that they were safe.”

In the wake of Hurricane Katrina in 2005, BP crisis managers began to explore better ways to obtain and manage information that would keep their friends safe. They wanted a solution that would integrate BP personnel and asset data from disparate databases and marry that data to visual imagery to make it easy—even intuitive—to understand who might be at risk, without the delay inherent in the existing process.

BP staff wanted to take advantage of systems that existed outside the company—weather feeds, traffic feeds, housing feeds—and to overlay them with internal data to speed planning and aid. They also wanted a fully Web-based solution to eliminate the need for deployment and maintenance of client software and to enable BP people anywhere in the world—at the U.K. world headquarters, at the Houston regional center, or even on the deep-water platforms—to view and share the same intelligence.

Meanwhile, another BP functional area was considering a solution to engage a similar forecasting ability in the service of identifying risks to BP physical assets. In this case, BP was reconsidering its method of assessing the after-the-fact impact of hurricanes on its

BP Fast Facts	
Global operations	100 countries
Global employment	96,000 people (27,000 in North America)
Revenue (FY 2006)	U.S.\$265 billion
Solution helps protect	<ul style="list-style-type: none"> • Thousands of miles of pipeline • 100 fuel terminals and offices • 1,500 people
Time to benefit	Cut by 50 percent
Application platform capabilities	Development, data management, business intelligence

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facilities. The company needs to know very quickly if damage has been sustained to drilling platforms, underwater pipelines, and other infrastructure so that it can begin repair operations as soon as possible.

Traditionally, BP would send out aircraft, as soon as it was safe, to take aerial photographs, which would be evaluated back at regional headquarters. But, aware of advances in satellite imagery, BP wondered if there was a solution that could not only take advantage of that imagery to depict damaged sites, but also capture predisaster images for comparative analysis, decreasing the risk to staff deployed to perform reconnaissance.

Solution

To help solve these challenges, BP turned to Microsoft® Gold Certified Partner IDV Solutions. Together, the companies created the BP Hurricane Management System solution, which combines three-dimensional satellite imagery and real-time weather data with symbols representing BP people and assets. The result is a highly visual representation that enables crisis managers to see weather patterns—and their potential impact on people and facilities—more clearly and quickly than before.

IDV created a working prototype of the solution in just two weeks by taking advantage of technologies that were already part of the Microsoft application environment deployed at BP—including the Microsoft Visual Studio® 2005 development system, SQL Server™ 2005 database software, and Office SharePoint® Portal Server 2003—as well as technologies new to BP, such as Microsoft Virtual Earth™ mapping software.

With the prototype created so quickly, BP felt it was reasonable to see the completed solution in production on an equally fast track: in time for the start of the 2006

hurricane season. This gave the development team just three months.

The developers met that goal, as well as requirements for cost-effectiveness, by taking further advantage of BP's existing Microsoft-based infrastructure, rather than trying to re-create a new solution infrastructure from scratch. For example, much of the asset data that BP wanted to use already resided in the company's SQL Server databases. The developers used SQL Server Integration Services to pull continually updated asset data into the solution's SQL Server spatial data warehouse. The same technology enabled them to pull in personnel data from an Oracle PeopleSoft database, and base-map information from their ESRI Oracle database.

The solution also incorporates real-time weather feeds from external sources such as ImpactWeather and Horizon Marine through the use of Web services that easily integrate with SQL Server, thanks to that software's native support for XML. The developers estimate that using the existing infrastructure and Microsoft technologies cut their development time in half, making the three-month deadline possible.

“It was extremely helpful that we could create the solution using the SQL Server databases that we already had and understood at BP,” says Stephen Fortune, Information Management Director, Gulf of Mexico Strategic Performance Unit, BP. “That was a benefit during development, and it will mean more cost-effective maintenance of the solution on a continuing basis.”

BP chose the Web services-based Virtual Earth software to provide the geographic imagery for the solution.

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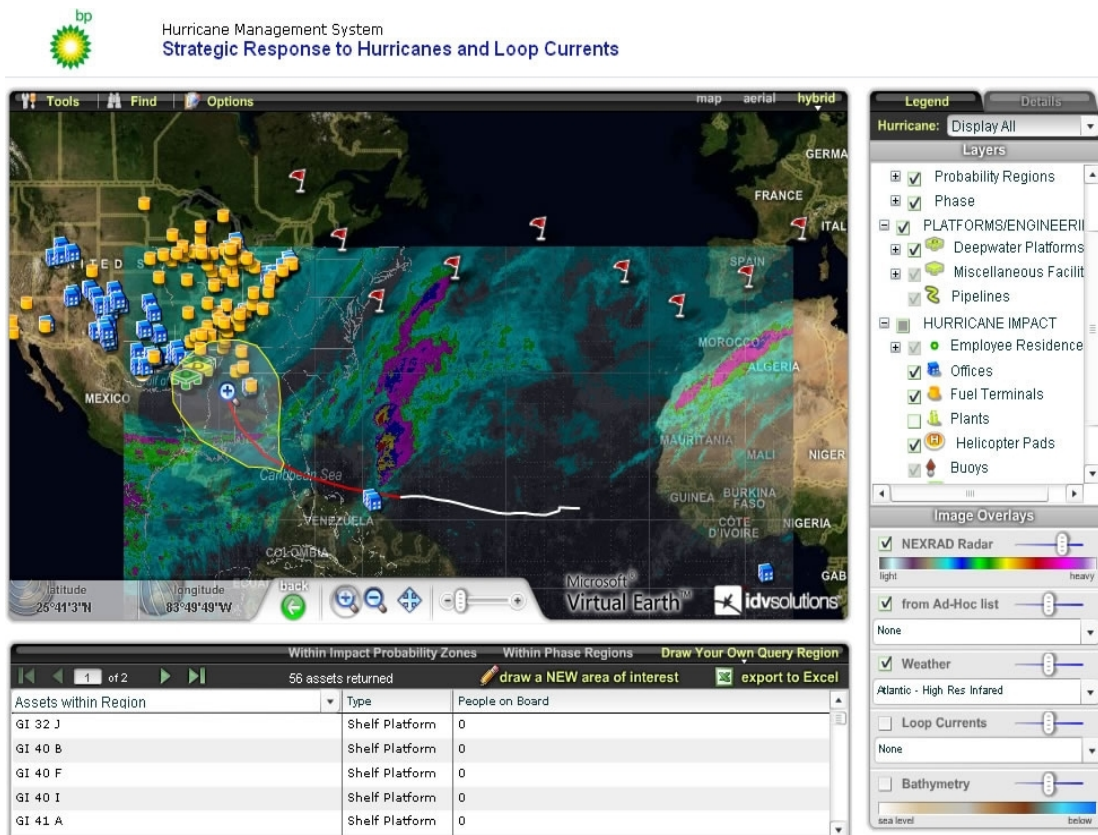
Figure 1: The BP Hurricane Management System provides a highly visual representation of weather-based threats and the BP employees and assets threatened by them, enabling people to make better and faster decisions in a crisis.

Microsoft infrastructure, including our intranet portal,” says Fortune. “It’s architected to support rapid application development, which contributed to the rapid development of our POC [proof of concept] and our ultimate solution. It also provided better imagery than the alternative we considered.”

IDV Solutions’ Visual Fusion Suite, consisting of Visual Fusion Server and Visual Fusion Client, was another crucial component of the solution. IDV’s Visual Fusion Server uses Microsoft ADO.NET technology to pull asset information from the SQL Server 2005 warehouse, convert it to spatially formatted data, and send it to an Office SharePoint Portal Server collaboration portal in XML format, where it is layered onto Virtual Earth mapping data.

All this information—the integrated asset and mapping imagery—is housed in IDV’s Visual Fusion Client interface components, which are contained in a SharePoint site through which BP personnel access the information. (See Figure 1.)

“We’ve always faced the challenge of integrating data from multiple sources so people could do their jobs more efficiently,” says Fortune. “We’d been working for some time with SharePoint Portal Server, an important part of our Microsoft application platform, as the place to bring together information. So it was key for us that the Hurricane Management System took advantage of this work, that it brought together everything in the SharePoint site. It was based on a tight integration of SharePoint Portal Server, Virtual Earth, and SQL Server.”



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The use of a Web portal eliminates the need to install special desktop software. This cuts client deployment time and costs to zero, and enables any authorized user to immediately access the solution from anywhere in the world. Similarly, as the solution is updated and extended, there is no need to deploy additional software across BP's global enterprise network. The use of other solutions would have required client software to be installed on every workstation.

BP personnel immediately and fully embraced the Hurricane Management System. Every BP group that has seen the solution has expressed strong interest in contributing to it or adapting it for additional applications. Management, which had responded positively to the prototype, was equally enthusiastic. The solution was ready on June 1, 2006, for the start of the hurricane season and was immediately put into use by the Hurricane Management team, replacing all previous methods.

The 27,000 employees of BP in North America can all be identified and aided by this solution in the event of any type of crisis. Plans are in place to expand the solution to include all 96,000 employees of BP worldwide.

In March 2007, *Computerworld* honored the BP Hurricane Management System with its *Computerworld* Honors Laureate award.

Benefits

With the Hurricane Management System solution, BP personnel have a better, faster understanding of weather threats, enabling faster and more effective responses. And because the solution is built on the Microsoft application environment, it can be readily extended and reused for other purposes.

Visualization of Data Enables Better Understanding, Decision Making

“This data visualization solution is changing the way we do business,” says Fortune. “When the data is presented through a map-based interface, it's amazing. It gives you a richer, bigger, more intelligent picture of what's going on. And that picture is one to which you can respond more effectively.”

For example, hurricanes can have a multilevel impact—affecting production and drilling platforms on the surface of the water as well as pipelines along the ocean floor. For the first time, the Hurricane Management team can see how various weather factors—hurricanes on the surface and the Loop Current underwater—affect different assets at the same location, enabling a more comprehensive response.

The solution enables more BP people to monitor the crisis and the crisis team's response, and to collaborate in shaping that response. All authorized BP personnel, anywhere in the world, can view the same data and crisis response in real time over the global intranet. The information is not only better and more useful, but also available hours earlier than before, because the mapping lead doesn't spend hours accessing and processing data from disparate sources. The solution does that automatically.

“Data visualization is the future at BP,” says Autio. “It has totally freed us to look at the data and process the data, rather than spend time locating the data. And that means we can do a better job of protecting our people.”

Solution Cuts Hours Off Emergency Response

Another exceptional aspect of the solution, according to Fortune, is speed. The use of Web services to integrate weather data feeds means the solution is always displaying real-time information. Moreover, BP crisis team

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members don’t have to wait for the screen to catch up with their actions.

“One of the things that differentiates this application from a lot of what we’ve seen is the lack of screen recovery time,” says Fortune. “You pan in and look at your data, and it just happens. Other mapping applications can stall or take a long time for screens to update. When we’re in crisis mode, people can’t wait for the technology to catch up with them. Even a delay of 30 seconds for the screen to refresh represents the loss of valuable time during a crisis.”

This greater speed, combined with the intuitive, visual user interface, also reduces the time that it takes to get BP personnel trained to use the solution. “We wanted to make it easy for the users, so all they had to do was pan, zoom, and hover to get information,” says Autio. “They can access all this data very simply, without much training. They can immediately get into the solution and access all that depth of information.”

Real people are benefiting from this speed today. When tornados struck central Florida in February 2007, the BP Hurricane Management team used the solution to identify employees in harm’s way. The information was exported to a Microsoft Office Excel® 2003 spreadsheet and sent by e-mail to the humanitarian aid team.

Team members there could open the spreadsheet and click an employee’s name to bring up a Web page with a map of the person’s location, real-time status of roads and weather, and relevant details on the employee. The team then used that information to contact the employees as quickly as possible to ascertain their status and deliver aid as needed.

Extensibility Enables Broader Use for Other Needs

The Hurricane Management System was originally conceived to respond to the narrow threat of hurricanes. However, two factors have combined to extend the solution to communities throughout BP. First, individuals and groups at BP who see the data visualization solution are excited by it and conceive new uses for it.

Second, the architecture of the solution readily lends itself to extensibility. That’s because the components of the Microsoft application environment can be integrated as needed for extensions and new uses, and because there is a ready supply of developers skilled in Microsoft software to create those extensions and new applications.

BP is already at work enhancing the data visualization solution by extending the types of assets that it can include, for ever more comprehensive understandings of how hurricanes and other disasters can affect the company. Supply chain data, for example, is being imported into the solution to identify what parts are stored in the company’s various warehouses, which will expedite the retrieval of parts needed to start repairs after an incident. The real-time locations of ships and helicopters are being added to accelerate the dispatch of supplies to production and drilling platforms as part of rescue and aid efforts. All these assets are data sets that can be easily imported and displayed in exactly the same manner as the original data sets.

Beyond enriching the original Hurricane Management System, BP audiences are interested in creating new applications that take advantage of the solution’s data visualization and mapping intelligence capabilities. For example, a drilling unit could use the Microsoft application environment to overlay deep-water current data with drilling

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For more information about BP products and services, visit the Web site at: www.bp.com

platform locations to identify when currents will hinder drilling operations. The Web portal and Web parts make it easy to replicate the solution's base functionality in such an application.

"The full, intuitive picture you get from data visualization makes you more proactive in your work, and this isn't unique to crisis response," says Fortune. "We're only beginning to understand the range of uses to which we can put this technology."

A powerful aspect of the solution is its ability to be used for crises unimagined when the solution was conceived and designed. For example, BP used the solution during a bombing incident in Philadelphia in 2006—unrelated to BP and not directed at the company—to identify employees at risk and to deliver aid. While the solution was created for the Gulf States region, the worldwide coverage provided by the Virtual Earth service enables it to be used for any crisis or situation, anywhere in the world.

Microsoft Solutions for the Manufacturing Industry

Manufacturing enterprises must compete in an increasingly global environment. Success depends on finding ever-greater efficiencies throughout the enterprise, while developing a greater agility to react to local and global market opportunities. These challenges are best answered with technology from Microsoft and its partners. Microsoft-based solutions offer much needed value to manufacturers who are under increasing pressure to generate greater returns on the assets that they have employed. This focus on efficiency scales across all the critical functional areas—from getting products to market faster, to streamlining the supply chain, optimizing the manufacturing operations, and generating new revenue streams.

For more information about Microsoft solutions for the manufacturing industry, go to: www.microsoft.com/resources/manufacturing

Software and Services

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