Innovative Big Data Platform Revolutionizes Maritime Fleet Management

Overview

Country or Region: Norway/Bulgaria
Industry: Professional Services

Customer Profile

As part of the 200 year-old Norway-based Kongsberg Gruppen, Kongsberg Maritime delivers products and systems for dynamic positioning, navigation and automation to merchant vessels and offshore installations. InterConsult Bulgaria is a software and consulting company, providing innovative products and professional services.

Business Situation

Kongsberg Maritime, in cooperation with ICB, developed a big data platform for near real-time monitoring of maritime fleet and rigs.

Solution

Using Microsoft technologies ICB assisted Kongsberg Maritime to create a solution that monitors over 10,000 measuring points in near real-time. The data is transmitted via satellite to multiple devices; from PCs to mobile devices.

Benefits

- World-class, innovative service
- Low total cost of ownership
- Developed in 18 months
- Over 5,000 on-demand reports
- Service available on multiple devices

"The Microsoft stack ensured high levels of availability and performance for our solution."

Stein Arne Riis, K-IMS Product Manager, Kongsberg Maritime

Kongsberg Maritime, the leading provider of technology solutions for the global maritime market, in cooperation with InterConsult Bulgaria (ICB), an established software and services company well versed in developing innovative projects using Microsoft technologies, developed a big data platform to serve oil, gas, offshore and maritime companies with near real-time information for vessel systems and controls. The communications platform named K-IMS (Kongsberg Information Management System) is designed to enable continuous access to data both onboard and ashore. An interactive web based solution, K-IMS provides efficient information flow to create a full and detailed picture of fleet operations at any moment in time.

Situation

Established in 1996, InterConsult Bulgaria (ICB) has carved out an enviable reputation for providing industry-leading services in software consultancy. In 2012 ICB was awarded the Silver European Seal of e-Excellence Awards and Microsoft partner of the Year for Bulgaria in 2013. ICB has a raft of further accolades to its name and over 250 Bulgarian and pan-European projects under its belt, including projects for the Bulgarian Kozloduy nuclear plant and major Bulgarian and Greek financial services organizations.

Kongsberg Maritime (KM) delivers products and systems for dynamic positioning, navigation and automation to merchant vessels and offshore installations. It also supplies products and systems for seabed surveying, surveillance, training simulators, and for fishing vessels and fisheries research. The company has more than 10 years of successful collaboration with ICB in developing simulation and training systems, tools for automation testing and marine navigation controls. Based on this extensive experience, KM chose ICB for the K-IMS project development.

Kongsberg Maritime's objective was to develop a communications platform that could take advantage of big data in the maritime sector in order to maximize vessel, fleet and operational performance. The system would ensure the seamless flow of data and its straightforward interpretation, resulting in enhanced operational knowledge and decision support. It would deliver shared situational awareness and the ability to provide the right information in the right format, at the right time, to the right users.

By collecting data from systems and sensors onboard, distributing them to fleet management offices and/or suppliers'

support systems, a full picture of ongoing operations would be available. This would improve decision making and operational support, enhance safety, support troubleshooting and reduce the need for service personnel onboard vessels.

Much of the information is already gathered and stored on ship and rig onboard servers. However, an integrated platform that is able to collect, manage and present the data from the various systems and devices was not available on the market. The onshore command centers that control the movement of ships and the operation of rigs also couldn't access the data in real time. KM understood that if it could find a partner to develop an integrated platform to transmit the data in near real-time between onshore command centers and vessels at sea, it could introduce a step-change in ship management capabilities for the industry.

Based on the evaluation of possible technologies, including functionality, performance and TCO (total cost of ownership), KM selected the Microsoft technology platform and tools. The most challenging task was to develop a platform that could process more than 10,000 measuring points a second, transmit it through a satellite connection to the onshore command centers and mobile devices, and present the data in an easy-to-use format.

Solution

Kongsberg Maritime's solution architects in cooperation with ICB designed the framework. The communication foundation was the satellite connection and transmission to multiple devices, including Windows 8 mobile devices, Surface tablets, Surface table, large-screen monitors and PCs. Overall it required big data

"One of the powerful features is the ability of users to actually define their own parameters and create their own dashboard."

Neda Hitsova, Marketing Manager,
InterConsult Bulgaria

management, extensive business intelligence capabilities, multi-device interface support, platform scalability and low total cost of ownership for development and support.

A wide range of Microsoft technologies has been used to develop the platform. For example, a service-oriented architecture was based on Microsoft Windows Communication Foundation (WCF) 4.0. This enables an information highway for applications across control systems, third party systems and business systems. A role based portal was developed and views are customizable for each user. The portal is based on rich internet application technology and can be accessed by a web browser, providing an intuitive user interface.

In short, it is an ideal platform for sending messages that are as simple as a single character or word, or as complex as a stream of binary data. This was of value for a number of reasons including developing secure services that supply the vast streams of current data to both the onshore command centers and remote devices. It is also perfect for providing a foundation for the development of dashboards in which the information could be presented logically, as well as implementing workflows.

Web-based dashboard applications were developed that provide comprehensive and customizable visualization of data from a particular vessel. Customized dashboards can be created by users, even those using mobile devices. The interface has a set of user-definable instruments to represent the data required for a specific dashboard. User created dashboards can be shared with other users on the vessel and with other vessels in the fleet and onshore.

Dashboards can be viewed with near real-time data and also feature history playback for situational analysis.

This allows users in the onshore command center and on mobile devices to create their own dashboard, specific to their information needs. Some users might need alarms trends and statistical analysis information, while others may want to drill down into fuel consumption in relation to oceanic position and weather conditions.

The Microsoft .NET Framework was absolutely central to the development process by making it easy to ensure applications could access the onboard databases, web services and other communication tools in order to collect, transfer and read data.

Stoyan Boev, Managing Director of ICB says: "The advantages of Microsoft's multi-device support concept became clearly evident on this project. We mapped out the concept in terms of the data to be gathered, how it would be delivered, who would receive it and how they would receive it, and which devices it should be available on. We then built the platform using a wide range of Microsoft technologies. This was a large scale and complex project, however, thanks to the interoperability and flexibility of Microsoft products we knew we could move ahead with absolute confidence."

As part of the wide recognition of this project, ICB received the Mobile Award from the Bulgarian IT Association (BAIT) in 2013 for its work on the K-IMS solution.

Benefits

The benefits are many, but one of the most visible is the monitoring of fuel-usage in real time. K-IMS enables the quickest, most

cost-effective routes to be established and communicated to the vessel in real-time, ensuring optimal efficiency.

"Microsoft technologies, combined with Kongsberg Maritime's domain knowledge and ICB experience, proved to be the winning combination for our unique product offering, and enabled it to be on the global market before the competition. The Microsoft stack ensured high levels of availability and performance for our solution," says Stein Arne Riis, K-IMS Product Manager, Kongsberg Maritime.

Rapid development capabilities
The completed project was delivered in just 18 months thanks to KM's expertise and vision, and the agility of ICB and Microsoft technologies. The platform is truly a world-class innovation for the maritime industry. "It was a very short time frame when you consider what was required. The Microsoft stack is flexible so we could develop the platform in only 18 months," explains Boev.

Big data management support and optimized graphical representation
Neda Hitsova, Marketing Manager at ICB, says: "In developing the platform our challenge was to overcome the technical differences between the different elements such as server data, the satellite communications and presenting this data on different devices. However, thanks to Microsoft tools we could take the data streams, develop applications and determine performance optimizations for different devices."

The developers at ICB were able to optimize graphical representations and give users a very powerful tool for viewing and analyzing the data. "One of the really powerful features is the ability of users to

actually define their own parameters and create their own dashboard for the information they specifically need," Hitsova explains. "

Multi-device support
The Microsoft product stack also enabled ICB to deliver data streams to different devices. Onshore control centers needed information on large screens, with some staff also requiring data access while on the move. Delivery to mobile handsets was also important in order to enable quick decision making.

Vladimir Andonov, Project Manager at ICB and the Software Architect of the K-IMS solution, explains the benefits of this concept: "You can monitor the critical vessel infrastructure in a unified user interface across a wide range of fleet operations. For example, by analyzing shaft power against RPM you can detect gearing problems and propeller fouling or by measuring specific fuel rates against generator total power you can detect reduced generator performance. This information can then be relayed to the fleet and appropriate action taken."

Optimized maintenance resource usage
Utilizing expert resources in maritime management is expensive and time-intensive. If an 'issue' occurs, teams have to be assembled and taken to the relevant location, which could be thousands of miles away, where analysis and remediation, if possible, is carried out. The K-IMS system and its near real-time monitoring means 24-hour remote monitoring and diagnostics can be carried out. This enables operational support and guidance, inspection of onboard systems, investigations and remote updating of onboard systems.

For More Information

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For more information about InterConsult Bulgaria products and services, call +359 (2) 920 1120 or visit the website at:
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Software and Services

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