ARE PREDICTIVE MAINTENANCE TOOLS SAVING YOUR ENTERPRISE TIME AND MONEY?

Abstract

Industrial machinery can do some impressive things. And it can be found in the farthest reaches of the earth. If you're a global mining concern, then the lifeblood of your day-to-day business is the trucks and other heavy equipment to haul wares, mine for precious metals, and construct cities out of barren landscapes.

Suppose a piece of equipment breaks down deep within an African mine. Previously, a company would either send its own technician some 8,000 miles to the mining site, or subcontract the job to local mechanics. In either case, the sheer distance and remote location made the repair a very costly proposition – both in terms of time and money.

Enter the field of predictive maintenance. Companies that employ predictive analytics – anticipating breakdowns with remotely monitored sensors – get a competitive edge.

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And it's not just manufacturing that benefits from predictive maintenance. Retail and telecommunications are relying on the explosion of big data, but just in different ways. So are the automotive, chemicals, and consumer durables industries. Together these industries make up the largest subset of the manufacturing world.

With industrial sensors, for instance, it is now possible to know ahead whether a part or machine will fail. Suppose the landing gear is defective. A sophisticated network of sensors communicates the status and so airline maintenance crew is informed of potential issues that could occur one or two flights ahead and are able to make decisions in advance. This 'insight-based foresight' is vital both to those working in the field and to those working in HQ.

This same kind of predictive maintenance is even found in financial safety products. It's possible to understand which ATM machines will fail, where they are located, and how to repair them in the most cost-effective way. In telecommunications, it's now possible to use predictive analytics to prevent network faults - either in the main network or in the last mile devices (such as modems) in customers' homes.

What all these examples have in common is that the advanced network of devices, sensors, systems and connectivity in today's world of the Internet of Things is making the invisible visible.

Making your data work for you

Servitization is changing the focus of today's manufacturer and this transformation requires significant change. Moving from the traditional world of selling just products, manufacturers are now providing the services and solutions that support these products too. The upside is in enhanced relationships and deeper access to the customer base, yet expectations are heightened too. Issues around downtime and product performance therefore become more pressing. So to stay competitive, manufacturers need to make their production plants even more efficient. They need the efficiency gains – especially in terms of time and capital – to develop and manage new services and solutions.

Product life-cycles have come down to the point where the bulk of manufacturing is becoming a local proposition. That means companies can monitor their assembly lines and supply chains as well as anticipate changes in demand in any country from the home base. The second largest subset of manufacturing is made up of regional processing industries. It's here where we also see predictive analytics at work, especially as it applies to off-site monitoring and maintenance.

Think of food processing where it pays to be close to the raw materials involved. Those types of operations often involve sophisticated machinery that is becoming increasingly automated. It pays

for companies to employ preventative measures by using predictive analytics before a true breakdown occurs. And for that you need data.

Finding the right data for your business can be like finding a needle in a haystack. Yet finding that needle becomes tougher because the haystack keeps getting larger, and getting larger faster. That's where companies face three main issues:

1. How to parse vast amounts of data? Today's platforms are usually priced on the amount of data utilized and come with the appropriate hardware required to digest and manage it. This can make the required return on investment hard to justify.

2. Determining a cost performance ratio. To truly leverage data with the best analytical tools, sharper analytics such as data science and machine learning algorithms are required.

3. Time to insight. Your company must deliver value to the consumer, and fast. Otherwise your competition will.

The majority of stored information is unstructured data and it is packed with information that businesses can leverage to learn about their products, customers and markets. There is a clear business need to process all forms of data to uncover insights that were not possible in the past; thus providing the necessary business edge.

Recent years have seen not only a staggering uptick in the volume of data produced and collected by enterprises, but

also a steady increase in the awareness of the power of data analytics. The combined effect is that users are increasingly dissatisfied with the prescriptive reports and dashboards that are handed down to them from IT. In particular, the time it takes for new reports to be issued cannot keep pace with business demands to answer questions as they arise.

The advent of powerful platforms

We stand at an interesting inflection point in modern technology. The advent of sensor price, size and resilience; machine-to-machine connectivity; affordable and scalable cloud computing; the ubiquity and falling cost of mobile devices; and open source analytics have completely changed the playing field. Open source technologies in the big data space are maturing day by day with powerful newer features; offering scalability, performance and security that is a must for industry-class solutions.

Infosys is helping to resolve critical business problems by making use of open source frameworks and technologies that run on commodity hardware. The Infosys Information Platform (IIP, Figure 1) is a framework that combines the capabilities of real-time data processing and analytics with a set of open source technology components. This is integrated with specific intellectual property components, also developed by Infosys, which remove the complexity of working directly with open source components. The open source components can be enhanced with additional custom elements along with tools, algorithms and packages to address specific business scenarios.
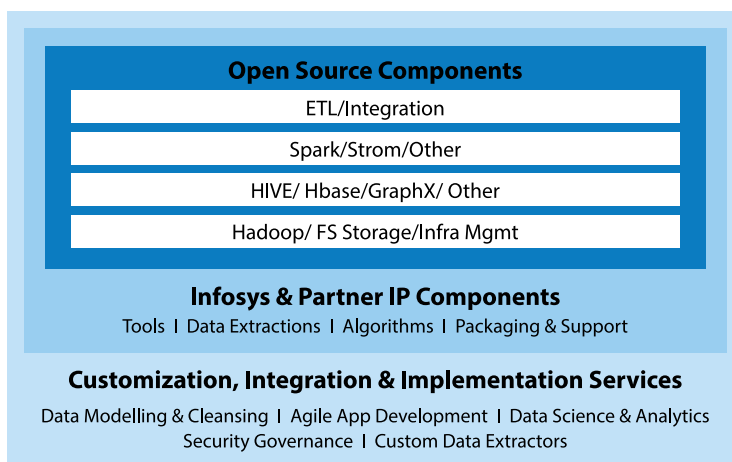

Figure 1: The Infosys Information Platform Layers

The IIP uses readily available machine data and sophisticated analytics to improve how companies can derive real-time analytics from huge amounts of structured and unstructured data at an incredible price point. Large databases can decipher and parse anything from online chatter about a brand to real-time feeds from machine tools and robots – all increasingly common in today's connected world. Real-time feeds hold great promise for manufacturers looking to control costs in a belt-tightening global economy. Analyzing data remotely allows an enterprise to anticipate issues with machinery or even processes. Turning data into actionable insights means that an ounce of prevention is worth a pound of cure.

Using open source technologies reduces total cost of ownership and enables flexibility for the future. Focusing on solutions that use commodity hardware and live in the cloud reduces the infrastructure cost and can be switched on and off as required. The performance to price ratio is attractive owing to in-memory computing. And Infosys' tools, agile applications and a rich community of skilled data scientists can provide end-to-end solutions therefore reducing time-to-market.

Here are some of the ways we've helped our customers:

A large mining company approached Infosys with a unique problem. The company, which operates thousands of sophisticated trucks, needed a predictive maintenance platform to avoid the loss it incurred when those vehicles broke down. Because the trucks were fitted with sensors and other technologies, they sent lots of data. However, the data was hardly of any use because of the lack of a mechanism to analyze those in real-time. Infosys built a proof-of-concept using open source tools and technologies such as Hadoop, Spark, and other cloud-based hardware, which helped the company process a huge amount of data and obtain meaningful insights. It was also significantly cheaper – nearly 1/1000th of the traditional cost.

A leading global bank needed to report on the various trades that happen to the regulatory authorities based on certain criteria. There are 6 million trades that happen each day, and on average a trade that needs to be reported as suspicious takes 10 minutes to process. The regulatory body requires the reporting of such suspicious trades in a particular format within a 15-minute window from the time the trade happened. If this does not happen, there are certain penalties. Currently the bank has the probability of overshooting this time window 15 percent of the time. Infosys conducted a proof-of-concept leveraging an open source Hadoop stack on a 100-node AWS cluster. Trade data from Oracle was ingested in near real-time into the IIP and processed in terms of data de-duplication, data validation, data enrichment, and data derivation. A regulatory report was generated and the report data was saved back to the database. It took only 35 seconds for the end-to-end processing of 596 million pieces of trade data. Infosys demonstrated that the IIP could enable significant improvement in the banks' ability to meet regulatory authority compliance requirements for trade reporting and minimized the probability of non-compliance and related fines.

Towards the modern manufacturer

As manufacturers look to diversify ever more into services and solutions, they need to create the time and capital to differentiate themselves in the market. Industrial firms, online retailers, and even

telecoms are finding that they devote a larger percentage of their time and business focus to things like research and design, marketing and sales, and customer support, than they do to assembly of their core products.

Although the global economy is steadily improving, it's not out of the woods yet.

Global firms know that to expand and become profitable in the decade to come, they must look to predictive analytics to help spend even less on each output dollar. Doing so will allow them to allocate more resources to R&D, the lifeblood of the modern, competitive manufacturer.

For more information, contact askus@infosys.com

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