

Breaking Down the Walls of Data Silos

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Understanding the benefits of a hosted predictive maintenance program

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Predictive maintenance (PdM) programs took off in the 80's when computers went mainstream and technical analysts had the ability to take this sophistication to the plant floor to thoroughly troubleshoot and analyze machinery conditions. Plant staff and maintenance departments were filled with highly skilled engineers and technicians who could spend quality time deciphering the analytical data that these instruments produced, turning that data into meaningful action items to prescribe repairs.

A lot has changed since the 80's. Maintenance departments are leaner, machinery and other assets have become more complex, and analytical hardware and software is far more sophisticated. With programs today there is a wealth of information to be had to understand the condition of machinery, the overall health of the plant, the risk to operations and productivity, and the financial impacts of shutdowns and repairs. The burden to obtain and decipher this information generally falls onto a very small staff of maintenance personnel who get little training and too little time to perform their tasks adequately.

The maintenance department cannot be faulted for the challenges they face. The technology for gathering technical data is often changing and requires continuous learning. Most maintenance departments do not have the luxury of bringing in new data collection instruments, keeping their staff trained and certified, or the hours to fully understand the depth and severity of faults.

General knowledge about predictive maintenance has taken a drastic turn for the worse as of late. As opposed to building on the legacy knowledge of experts, data quality and collection tools have been dumbed down to acquire the bare minimum to prevent catastrophic failures. Where more sophisticated data was once gathered, plants have implemented low-end collection devices which overly simplified diagnostics. These devices may identify a machine failure prior to its failing, but they do not contribute to understanding the trend of the failure, the planning for downtime or repair, nor the full understanding of the risk financially or otherwise.

So how did we get here? You would think that with advancing technology the PdM world of the past three decades would be intuitive and data rich; and the potential for being so certainly exist.

There are data collection devices, software applications, and web-based portals out there that can provide a wealth of information to many constituents who can contribute to and understand the information available about the machines and plants as a whole. The challenge is getting past the idea that all data and information must reside inside the four walls of the plant.

Moving outside the four walls of a data silo

Don't get me wrong here; there are a lot of bright minds and highly skilled analysts working at plants around the world. There are many programs that are highly successful with engineers and technicians fully capable of deciphering technical data. Many companies have reporting systems that include managers in the information flow associated with planning and repair. The shortage is never information, but rather redundancy, bench depth, cross-training, and outages like sick time, vacation, and retirement? These are the challenges to sustainability.

As you might know, predictive analytics based on technologies like vibration or thermography is not an exact science. Understanding the patterns and data values takes years of experience and training to interpret. Data is data, it really does not matter what acquisition device is used to gather it, but how you handle and process the data is what makes all the difference. Lower end devices do not provide enough information to make fully informed decisions and higher end collection devices require significantly more training and skill. Maintenance departments almost always depend on assistance to make accurate diagnoses; even the most seasoned analysts depend on second opinions before making costly repair decisions.

As a plant expands, the traditional process for building up their programs generally relies on adding new staff, developing new acceptance criteria, and a lot of manual analysis. This is costly and requires a long learning and implementation curve. Enterprises corporations need to be able to understand the health of each plant comparatively - which plants perform well, which need attention, and how they affect the bottom line. Adding to this complexity is the multiple types of technology that get applied to understand machine faults, the balance of reports from various contributors, and the importance of getting actionable, decipherable information to all key decision makers.

Decisions are not handled alone. However, in the predictive maintenance world it is very hard to get decision makers involved in understanding plant risks and repair needs when the data that is driving these decisions is extremely technical. Again, we are back to dumbing down the data gathered so we just prevent a catastrophic machine failure. There is a better solution.

Our first challenge in building a better program is to get more people involved and presenting data that makes sense to all decision makers, not just the analysts. To do this, the data will need to be made available outside the four walls of the plant.

Taking advantage of cloud solutions

Web-based infrastructures are not new in today's world. Many companies have turned to cloud hosted solutions for a variety of other business challenges now that the ability to connect to managed-servers is affordable, fast and secure. Companies like Microsoft® have proven the capabilities of cloud infrastructures like Office® 360, removing the burden for a company to purchase and locally manage mail exchange servers. Added to this capability are office tools like Word™ and Excel™ which are accessible through a web-based application which gives users freedom to work anywhere and without needing to purchase and manage locally installed software. These same capabilities are available to the maintenance departments for their predictive maintenance programs.

A hosted database allows for the analysis of machinery faults by comparing multiple technology reports in context with each other. This allows analyst and plant managers to confirm the necessary repair actions and set priorities more effectively. This data can be then be presented to multiple decision makers through a web interface as opposed to technical software.

Removing the software from the data opens a realm of possibilities for understanding the impact of machine failures. Looking beyond amplitudes and frequencies, we can now add more details through a wider range of contributors. What is the operational significance of the machinery? What is the financial impact of failures? What are most problematic machines or common root causes of failures? These questions can be answered by the departments which are responsible for this information independent of the technical analyst.

With a cloud infrastructure, corporations could leverage the knowledge and machinery information that is gained from multiple locations to quickly deploy new programs. With a centrally managed database each plant could have access to historical information and baselines for comparison of like machinery. New programs can be up and running in weeks as opposed to months or years. Baselines for comparison of healthy machines can be immediately understood allowing program managers to ensure plants are ready for optimal performance.

Analytical expertise can also be leveraged across multiple locations. With a hosted solution, analysts have a means to collaborate and share information to ensure their respective plants are healthy. If analysts are on vacation or retire, coverage for those plants can still be had. More people can contribute as needed; companies can lessen their labor rates by maximizing their collective staff or simply outsource the areas that are needed. As mentioned earlier, predictive data analytics requires years of experience and practice to be effective. Analysts external to the company can be engaged to perform this highly technical task.

One of the most substantial benefits of a hosted solution is the cost saving of capital expenditures and IT overhead. Companies wouldn't need to purchase and manage dedicated servers. This significantly lessens the burden on IT and lowers operating expenses as servers require resources to be maintained and kept up to date. Local IT staff often becomes the middleman in a predictive maintenance program trying to get lots of data available to multiple personnel.

Why aren't you there?

When presented with a program which includes a hosted database the initial response is usually "our IT won't allow it." This is common and easy for IT to make this general statement. But if asked if they get email the

answer is always “of course”. So where does the email come from? Data is allowed to flow in and out of a corporation, but it just has to be allowed. With cloud solutions there are always concerns but there are a variety of misunderstandings about working in the cloud that should be understood.

First and foremost is security. It is generally thought that only locally managed servers are safe and secure. This is not true. Many companies are routinely hacked and are simply unaware. Company servers can sometimes be less secure given a plant is generally more focused on their production costs as opposed to IT expenses. Cloud hosted solutions have dedicated IT systems and security protocols to detect and prevent breaches. The flow of data is closely monitored and systems are secure and redundant to ensure a greater uptime. Local IT departments generally do not have the same amount of resources to manage specific data driven tasks for large programs.

Often it is assumed that hosted data is shared and available outside of the company’s control. This also is untrue. Large program databases like those from Microsoft or those in a PdM program are owned by the company, not the host. The company retains the rights to the data and has say in the ability for others to mine, advertise, or otherwise share. A database can be pulled from the cloud and delivered back to a client at any time. Privacy and security are benchmarks of any major hosting company.

Another misconception is that cloud systems can only be accessible while online. Though it is true that internet access is going to be required, hosted solutions can be configured so users can work both online or offline. Data can be synchronized for offline work which is essential for plant workers. Internet access is generally only required to merge any newly collected data back into the cloud host.

Resistance to moving to the cloud is often a result of the idea that it is too hard to make the migration. Though there are steps that need to be done, generally the hardest obstacle is getting acceptance from IT. Once IT gives the green light to make it happen, IT can work with the hosting company to make the proper settings to the security protocols and programs can be up and running. Even long established PdM programs can be converted to a hosted solution without losing any data.

About the Author



Michael DeMaria, director of product management, works to drive the vision of hardware, software, and service offerings from Azima DLI. Having spent several years in the field as an operations and maintenance engineer, along with his administrative and program management roles for some key customer accounts, he understands the value of the right technologies and products to support customers.

About Azima DLI

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