

A large industrial facility, possibly a power plant or refinery, with a worker in the foreground. The worker is wearing a dark jacket, a plaid shirt, and a white hard hat. They are holding a hammer. The background shows large blue and yellow machinery, pipes, and a complex steel structure under a high ceiling with bright lights.

**Focus on reliability to improve  
availability, profitability and safety.**

## **Prediction and Protection for Production Assets**

Recognize business goals and achieve top-quartile reliability by implementing technologies that enhance your digital transformation journey.



# Unreliable equipment increases risk to both safety and profits.

Unscheduled downtime caused by equipment failure eats into both the maintenance budget and production goals. Routine maintenance can help, but it doesn't reveal the developing issues that result in process slowdowns or shutdowns. You simply aren't able to avoid these preventable failures.

Introducing technology to monitor these assets sounds like the solution, but where do you start? The budget won't allow you to install the same monitoring system on every asset in the plant, so how would you choose what equipment to monitor and what equipment to ignore? And with the emergence of the digital transformation age, how do you prioritize where to invest in new technologies?

Critical assets come with another key consideration - they often are required to have API-certified protection systems so the equipment is tripped under unsafe operating conditions. But sometimes those trips aren't necessary – and again your production is shutdown while you determine the nature of the problem. You need a modern approach to protecting your assets that includes predictive intelligence.

To keep your plant assets available and producing revenue, you need solutions that are custom to the criticality of the asset being monitored and that identify the assets at risk of failure.



It costs approximately **50% more to repair** a failed asset than if the problem had been addressed prior to failure.  
– U.S. National Response Center



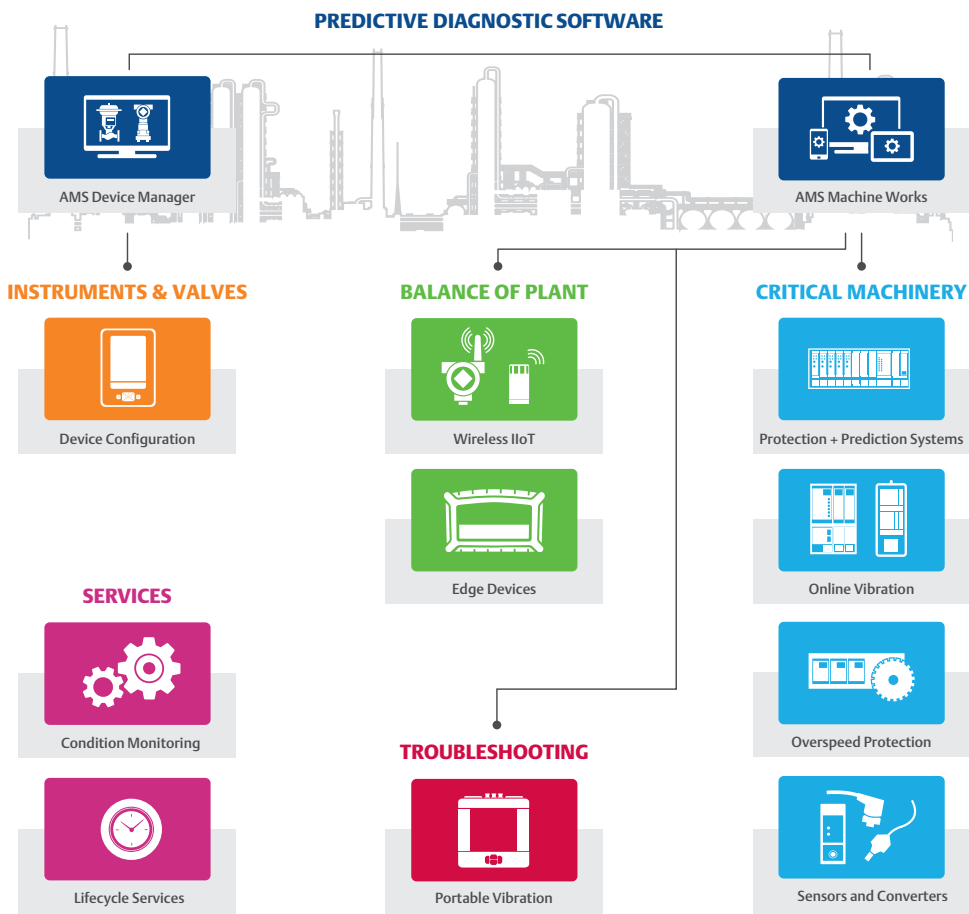
Production capacity is lost to as much as **5% every year as a result of unplanned shutdowns.**  
– Asdza Nadleeh, "Engineering & Maintenance: Prevention is Better Than Cure," Oil & Gas IQ, October 2011.



Companies need to apply innovative technologies hand in hand with their relevant industry expertise to succeed and gain a competitive edge. It is this combination that makes digital transformation both meaningful and powerful.  
– IFS (Industrial and Financial Services) survey on Digital Maturity Across Industries, reported June 2017..



**Focus on reliability to improve availability, profitability, and safety.**



A key strategy to improving reliability is to monitor the condition of both production and automation assets in your plant. Emerson offers a variety of condition monitoring technologies specific to the nature and criticality of those assets – portable handheld and asset management solutions, wireless transmitters, and online continuous monitoring systems that can include protection capabilities.

- Machinery Health Management combines condition monitoring technologies with predictive intelligence to reduce both scheduled and unscheduled downtime of your rotating equipment.
- Field Device Management utilizes configuration and calibration data to confirm your automation assets are operating effectively, thereby protecting the reliability of your production assets.

**Drive equipment reliability using smart field devices.**

Proactively managing your field device assets so that they are accurately configured and calibrated is key to ensuring the value of their predictive diagnostics. With effective asset management and predictive intelligence, you can focus on driving equipment performance.

**Take advantage of modern innovations**

Advances in protection system technology and the emergence of both IIoT and edge analytics have resulted in new approaches to machinery monitoring and collaboration. Now more than ever, you can get more information and diagnostics from more machines to more people.

**Cut maintenance costs with predictive intelligence.**

It costs approximately 50% more to repair a failed asset than if the problem had been addressed prior to failure. Predictive intelligence from condition indicators improves overall plant reliability by reducing scheduled and unscheduled downtime, driving down maintenance costs and increasing safety and availability.

**Work with and learn from experts in reliability.**

Regardless of where you are on the journey to improving reliability, Emerson experts can help. They can provide guidance, impart knowledge, or make themselves part of your team to accomplish your goals. Wherever you are, and whatever industry you are in, Emerson has been there to help facilities like yours achieve success.



## Improve asset reliability using predictive field diagnostics.

In a perfect world, your process would be consistent, day in and day out. But the reality is that field device performance, like most things, can degrade over time. Variability is a natural occurrence that must be dealt with.

Predictive diagnostics from field devices help your maintenance team keep sensing devices configured, calibrated, and operating effectively. And the measurements and control from those devices protect the reliability of your production equipment. Emerson's AMS Device Manager provides real-time online access to intelligent instrument and valve diagnostics and alerts, delivering a view of device health and troubleshooting information when an issue is found. The AMS Trex Device Communicator and 475 Field Communicator allow your personnel to assess health and repair devices from the field. Whether online or offline, Emerson gives you the tools to ensure your field devices are performing as expected.



### What's your challenge?

Production capacity is lost to as much as 5% every year as a result of unplanned shutdowns.

– Asdza Nadleeh, "Engineering & Maintenance: Prevention Is Better Than Cure," Oil & Gas IQ, October 2011.



### What's your opportunity?

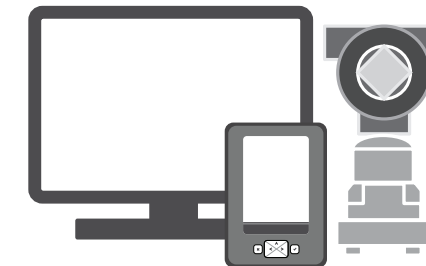
Even small fixes have big impact. While using AMS Device Manager, Braskem S.A. found a calibration error on a pressure control valve, causing the valve to open 3% when it was supposed to be closed. Fixing the calibration error saved the plant \$300,000 a year.

– Braskem S.A. in Brazil

## Improve the effectiveness of your maintenance team



**Predictive diagnostics** help personnel focus their efforts on the assets that need attention, while eliminating unnecessary work on healthy devices.

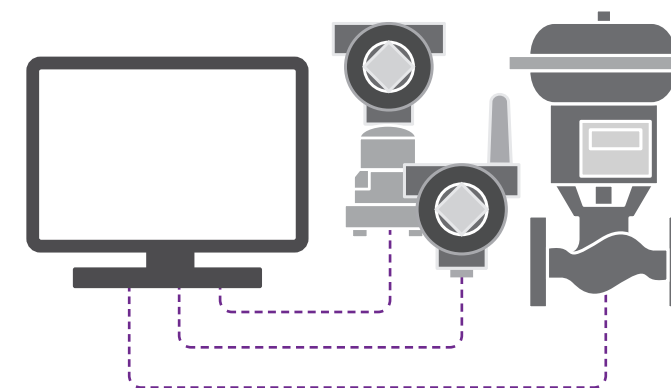


**Troubleshoot problems** directly from the maintenance shop or in the field. Troubleshooting advice helps technicians solve the problem quickly.

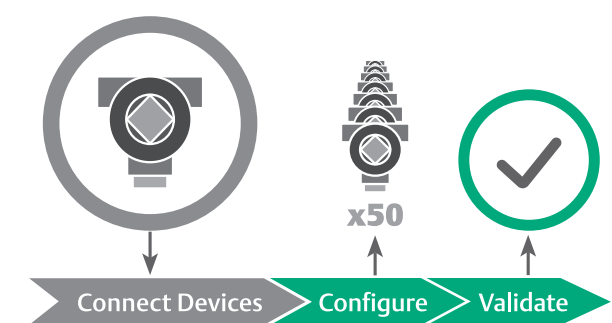


**Easily prioritize work** based on the criticality of the asset and the urgency of the alert. Ensure technicians are spending time on the production critical issues.

## Reduce configuration/commissioning time



**Use device templates** to set up once and configure many, reducing set up errors and improving commissioning efficiency.

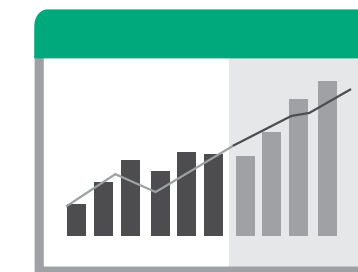


**Configure in bulk** to reduce commissioning time by up to 80%. Once device templates are complete, apply to common devices simultaneously. Then validate configurations quickly with a discrepancies report.

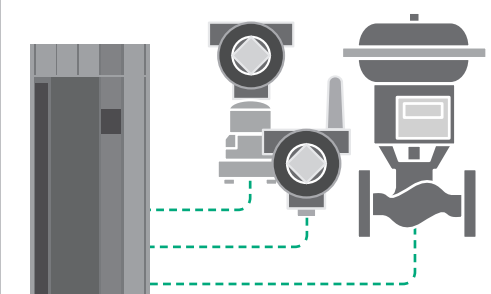
## Streamline calibration work processes and reduce errors



**Eliminate paper-based calibration** by electronically managing routes with AMS Device Manager to reduce calculation and documentation errors.



**Extend calibration intervals** while remaining compliant using historical drift trends in AMS Device Manager. Eliminate the unnecessary effort of scheduled-based calibration.



**Centralize device data** in a single database to enable better analysis of health and performance and improved resource planning and scheduling.



## Drive success by aligning monitoring technology with asset criticality.

When your assets aren't reliable, you can't maintain your schedule or operate within budget. Your assets become the drivers of your success. But by applying predictive intelligence, you gain the insight necessary to schedule maintenance that supports your production goals and puts you back in the driver's seat.

Vibration data is the cornerstone of predictive intelligence. Emerson offers accurate industry-proven technology for data collection and field analysis on a wide range of rotating assets. Asset criticality to production determines the right monitoring application, and if you'll also require protection capabilities. For the most critical assets, data can be routed back to the control room where operators can easily leverage both asset condition and process data to make educated production decisions. For the larger number of Balance of Plant (BOP) assets, data can be processed through embedded, prescriptive analytics to deliver immediate identification of the developing problem.

Emerson's vibration data collection technologies feature a unique methodology – PeakVue Plus technology – to cut through the complexity of machinery analysis and determine both the nature of the problem (lubrication or mechanical) and its severity.

**50% MORE** Repair Costs

**What's your challenge?**

It costs approximately 50% more to repair a failed asset than if the problem had been addressed prior to failure.

– U.S. National Response Center

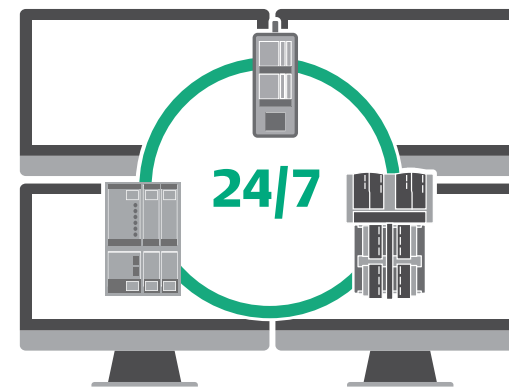
**5%** Reduction in maintenance cost

### What's your opportunity?

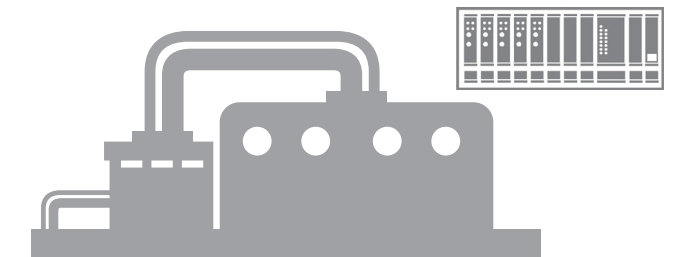
Reduce repair expense. By making use of predictive data to improve the reliability of their rotating equipment, Saudi Aramco, Ras Tanura refinery, reported a total program savings of over \$10 million annually and a 9% reduction in maintenance costs.

– Saudi Aramco, Winner  
– Reliability Program of the Year 2015.

## Safeguard critical assets 24/7



**Continuous monitoring of critical assets** provides real-time machinery health feedback to the DCS – either integrated via AMS 6500 to DeltaV, or embedded as an Ovation Machinery Health Monitor.

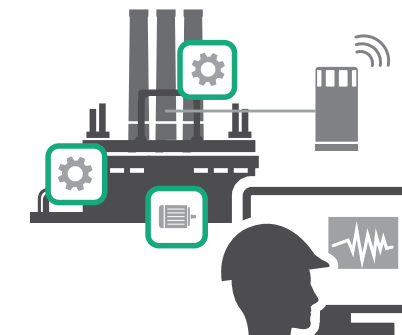


**Protection capabilities** are a requirement when safety regulations necessitate a shutdown system on expensive assets to protect both lives and investments. With the AMS 6500 ATG, protection and prediction are integrated, allowing you to be safe while avoiding false or missed trips.

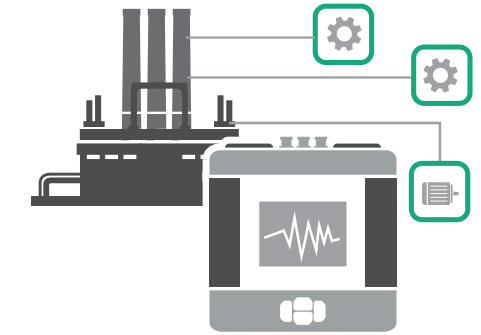
## Simplify data collection and analysis



**Edge analytic devices** move diagnostic expertise out of the office to the site of the asset itself. The combination of embedded analytics with the benefits on continuous monitoring and easy, low cost installation make the AMS Asset Monitor the right monitoring solution for many of the essential assets in the plant.



**Wireless IIoT** is ideal for monitoring in remote or hazardous locations. But the minimal installation cost of the AMS Wireless Vibration Monitor makes it ideal for the largest number of BOP assets - monitor more assets in fewer man hours.

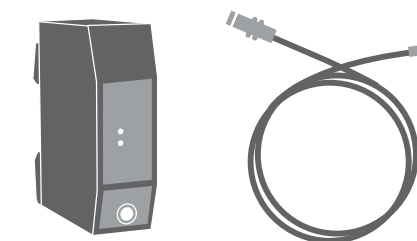


**Portable vibration monitoring** using the AMS 2140 maintains allows for troubleshooting and sophisticated diagnostic testing while in the field.

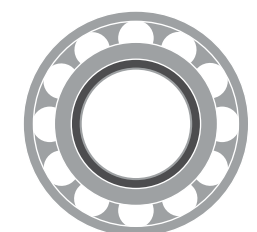
## Simplify data collection and analysis



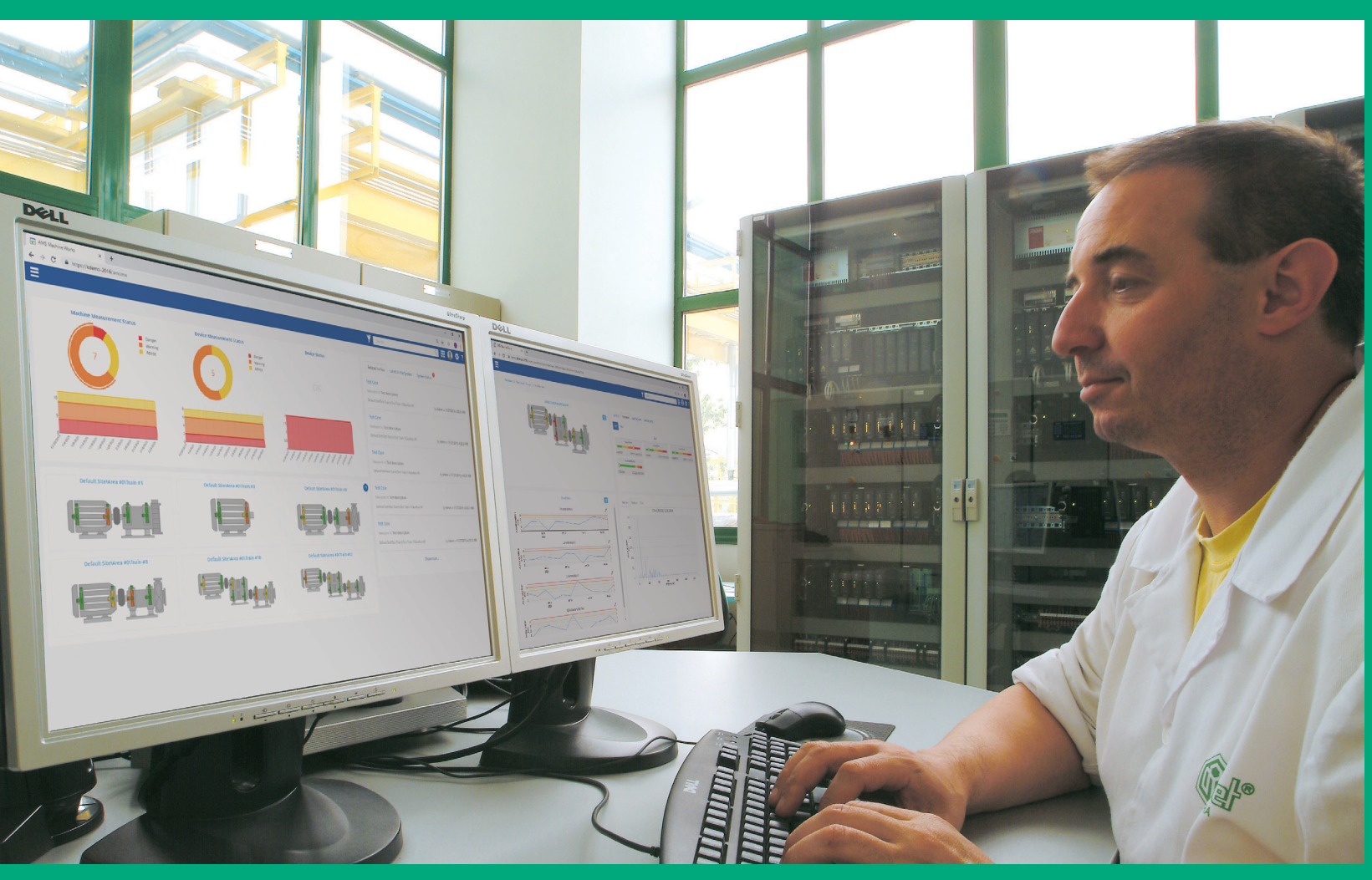
**One source of responsibility for the entire measurement chain** streamlines troubleshooting of monitoring issues. Emerson offers a full portfolio of accelerometers, sensors, and specialized measurement instrumentation.



**Reduce spares and order lead times** with the AMS EZ 1000 eddy current measurement chain. Sensors are field-calibrated with a single button push. Converter calibration is a simple three-step process using the USB interface to Emerson's Machine Studio software.



**Cut through the complexity of machinery analysis** using Emerson's patented PeakVue technology, embedded in all vibration monitoring equipment. New PeakVue Plus functionality delivers quick, easy-to-read reporting of the cause and severity of developing problems.



### AMS software applications include:

AMS Machine Works is a comprehensive software solution that greatly simplifies the fault diagnosis and analysis process by combining predictive maintenance techniques with comprehensive analysis tools to provide easy and accurate assessment of machinery health in your facility. AMS Machine Works is a scalable application with flexible deployment options that is easy to use yet offers sophisticated analytics for expert users. Cloud-based installation and support for mobile devices means you are never without the information you need.

AMS Device Manager provides real-time online access to intelligent instrument and valve diagnostics and alerts, delivering a view of device health and troubleshooting information when an issue is found. Based on real-time condition data, maintenance and operations personnel can respond quickly and make informed decisions. AMS Device Manager enables digital transformation by providing an application that embraces open standards and protocols that allow connectivity to a wide range of devices. It also enables predictive maintenance to reduce unplanned shutdowns, increase productivity, and improve safety.

## Unlock the potential in your data.

In the age of digital transformation and edge analytics, the emphasis is often on the role of smarter technology to drive reliability improvements. But modern sensors and analytical devices need software to assist data in realizing its full potential.

- Software is the tool for providing enterprise-wide access to information necessary to make better business decisions.
- Software delivers the focus and clarity necessary to achieve the plant's vision of peak performance.
- Software integrates data from multiple sources to create a holistic picture of asset health in the plant.

Emerson's AMS software applications deliver predictive intelligence on rotating equipment, instruments, and valves. They feature intuitive dashboards and mobile or web-based options for increased visibility to developing problems and overall device or asset health.



### Growth in Cloud Adoption

81% of organizations already use cloud computing or have applications in the cloud - up from 73% in 2018.  
 - Executive Summary: 2020 IDG Cloud Computing Survey.



### What's your opportunity?

Operate safely during typically dangerous conditions. The startup and coastdown of turbo machinery is potentially the most dangerous operating state due to the rapidly changing conditions. Rather than just snapshots of data, Emerson delivers real-time data on multiple channels simultaneously for the most powerful, accurate diagnostics and safer operating conditions.

## Modern software available anywhere, communicating everywhere



**Mobile-friendly software and applications** means you stay on top of asset health 24/7, from wherever you are.



**Dashboards** provide graphical, intuitive views of overall and asset-specific health.



**Cloud Hosted Solutions** mean you access powerful software safely from anywhere you work. Scalable subscription models take the burden of software expense and maintenance off your IT department.



## Implement IIoT in your reliability program.

The Industrial Internet of Things (IIoT) has arrived. Technology advances make it easier than ever to stay on top of asset health and stay in touch with the personnel who care about their performance – no matter where they are. But implementing IIoT can be a daunting task – where do you start? How do you bring together the silos of data in your plant without inundating the team with hundreds of alerts? You need a solution that promotes collaboration while still streamlining decision-making when problem calls for quick action.

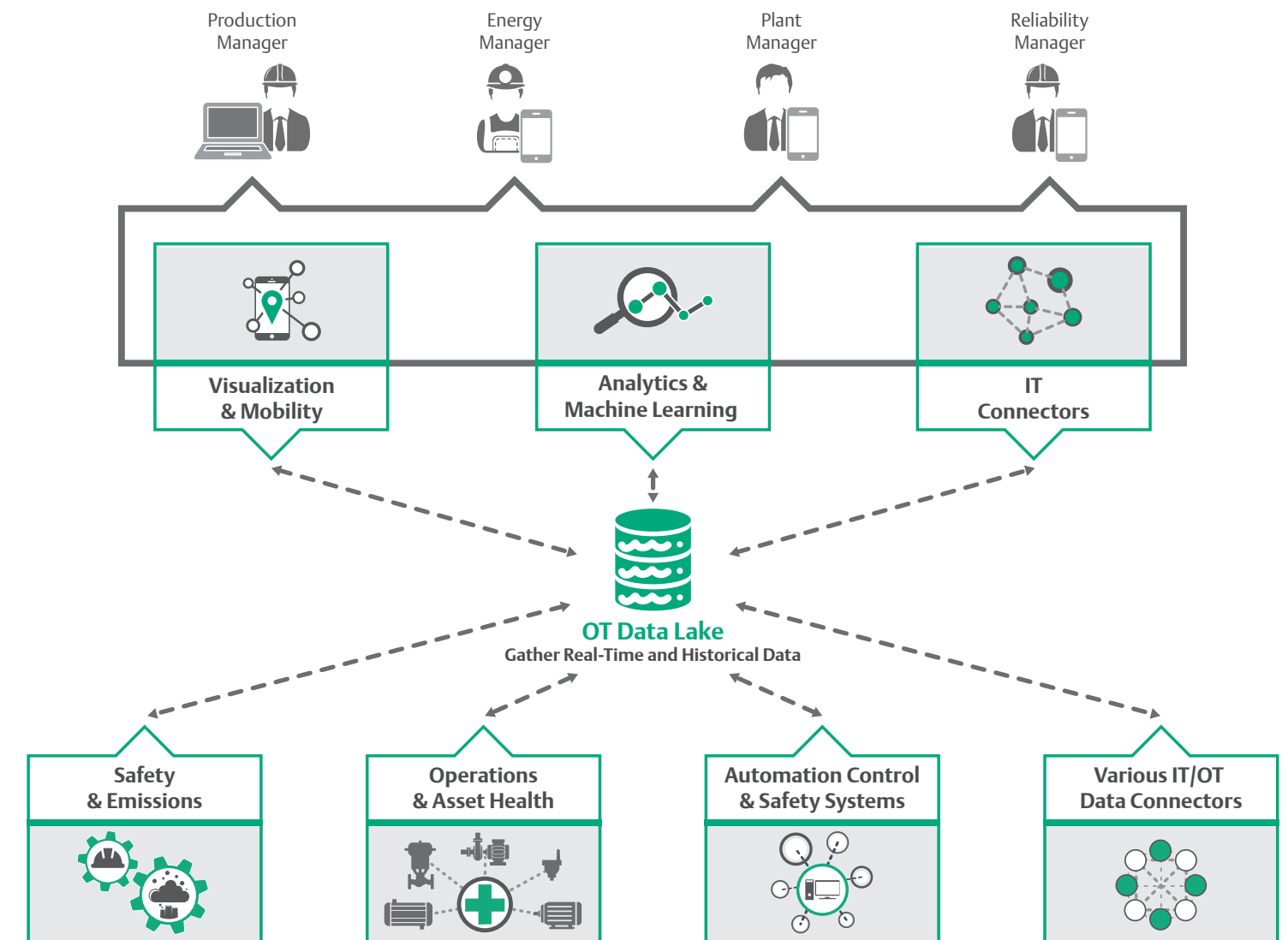
Plantweb Optics is a software application that aggregates data from multiple sources, but delivers persona-based alerts and KPIs for improving reliability of your rotating equipment, instruments and valves. With additional connectivity to CMMS, advanced analytical tools, and other predictive intelligence programs, you'll stay on top of developing issues that could impact production. Anywhere, anytime.

**60%** of global manufacturers used analytics data recorded from connected devices to analyze processes and identify optimization possibilities\*

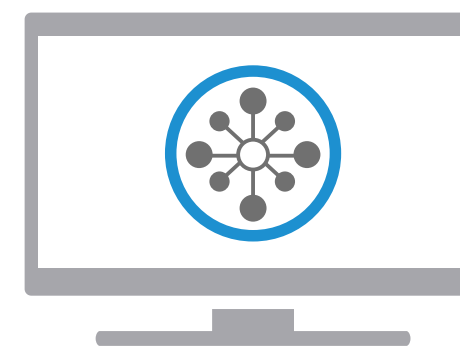
\*Source: IDC and SAP, as reported By Kelvin Claveria, 13 Stunning stats on the Internet of Things, Vision Critical blog, April 2017

\*IIoT will lead to a **15%** productivity increase in delivery and supply chain performance

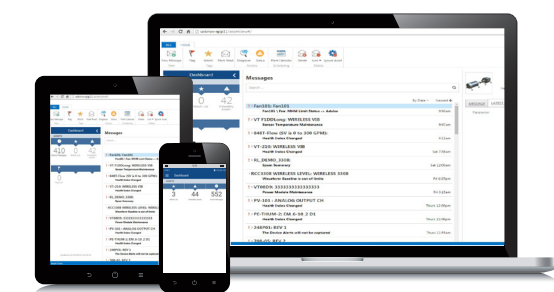
## The platform for integrating and communication asset health information



## Easy to setup, easy to use



The **Asset Explorer** utility features an intuitive user interface for performing a wide range of setup and configuration activities, such as added machine trains, assigning roles and responsibilities, and much more.



The **Asset Viewer** utility runs on laptops, tablets and smart phones to deliver the right information at the right time.

## Achieve performance goals with ala carte service options.

Increasing visibility to asset health isn't a one-size-fits-all approach. When it comes to knowing the health of assets in your plant, you need more than just an off-the-shelf solution. You need options that fit the unique needs of your monitoring program.

Emerson's AMS Asset Performance Services are based on an ala carte approach so you can choose only what makes the most sense for you. These services are designed to increase awareness and visibility to asset health while addressing the common challenges of a limited capital budget or insufficient staff and experience.

### Combine individual services for maximum results



**Cloud Hosted Solutions** mean you access powerful software safely from anywhere you work. Scalable subscription models take the burden of software expense and maintenance off your IT department.



**AMS Condition Monitoring Services** allows our experts to be your experts too. They fill the resources and expertise gap that can occur when plants are running lean.

## Implement a top-down reliability strategy.

A proactive, management-led reliability strategy is the secret weapon against declining operational performance, reduced production availability and rising operating costs. Emerson's Professional Services help clients quantify their business improvement opportunity and create a scalable, achievable roadmap to achieving operational excellence. Discover how to integrate IIoT technologies and update work practices that further you on the path to digital transformation.



## Protect and expand the value of your technology investment.

While many companies recognize a significant ROI following their technology implementation, companies that commit to maintaining their technology advantage reap the benefits for years to come.

### Guardian Support Services

Improving reliability in the plant requires more than just acquiring the right monitoring and analysis technologies. You need to actively manage those investments and their lifecycle costs. Emerson offers Guardian Support services designed to optimize the reliability and performance of your machinery health products. Specific, critical information is matched to your system and proactively delivered to you through a secure dashboard portal available 24x7x365. Guardian Support also delivers incident management with access to experts to help you through critical issues. An accurate inventory of all system components and licensing combined with in-depth documentation and resources aids in your troubleshooting.

### Educational Services

Companies today rely on fewer people to do more work. The need for training is more critical than ever to achieve and maintain cost effective maintenance programs. Emerson helps maximize the return on your investment in technology and people. Our goal is to provide you with the knowledge to keep your plant running smoothly.



# Improve availability, profitability and safety with Emerson's reliability solutions.

## AMS

**Emerson – Reliability Solutions  
North America**  
835 Innovation Drive  
Knoxville, TN 37932 USA  
☎ +1 865 675-2400

**Emerson – Reliability Solutions  
South America**  
Av. del Valle 601, 4to piso,  
Ciudad Empresarial,  
Santiago Chile  
☎ +56 2 4310-7432

**Emerson – Reliability Solutions  
Europe**  
Katzbergstr. 1  
40764 Langenfeld (Rhld.)  
☎ +49 0 2173 3348 0  
☎ +49 0 2173 3348 100

**Emerson – Reliability Solutions  
Asia/Australia**  
1 Pandan Crescent  
Singapore 128461  
☎ +65 6777 8211  
☎ +65 6777 0947

**Emerson – Reliability Solutions  
Middle East/Africa**  
PO Box 17033  
Dubai - United Arab Emirates  
☎ +971 4 811 8100  
☎ +971 4 886 5465

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