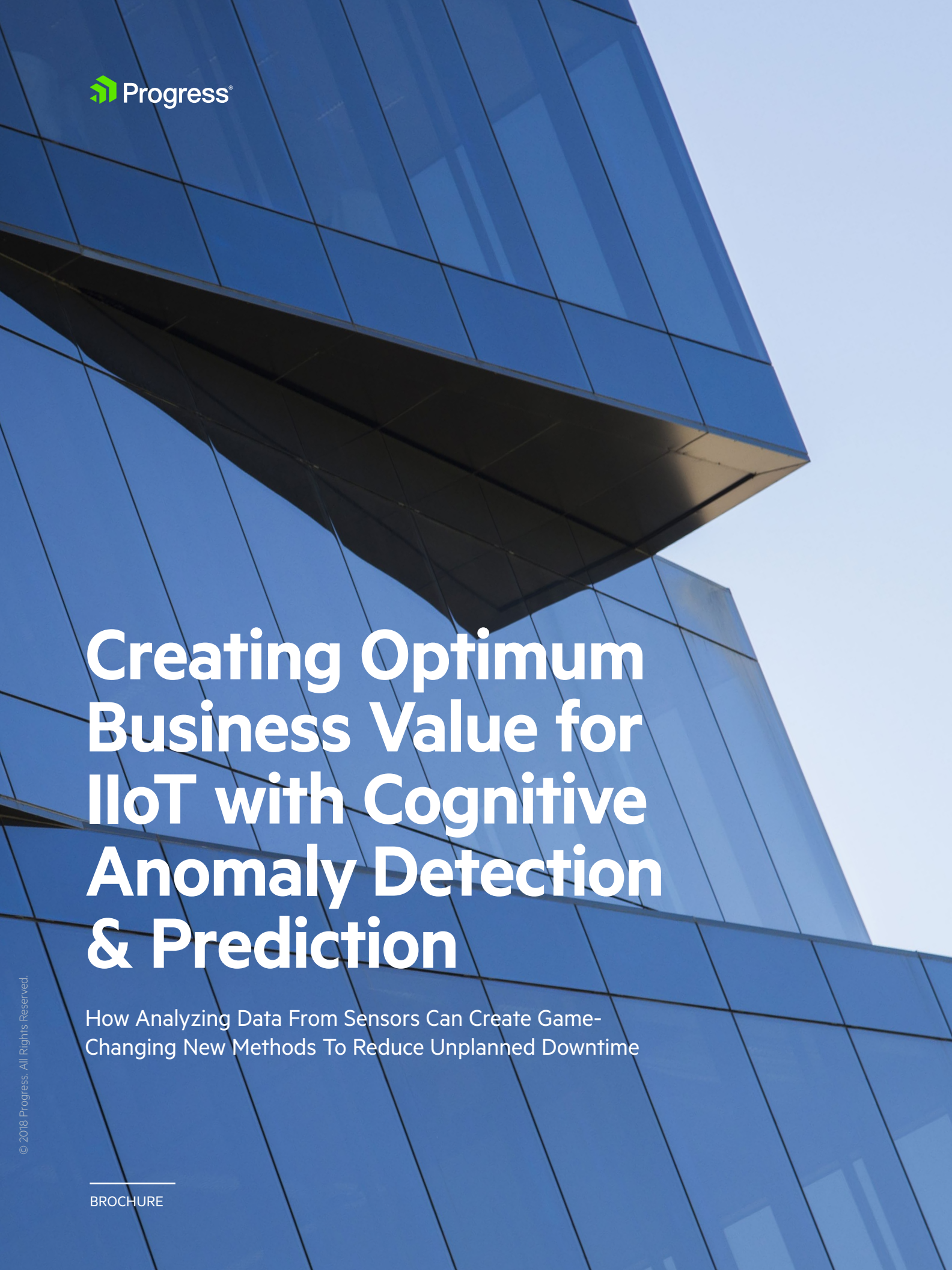


Progress®

Creating Optimum Business Value for IIoT with Cognitive Anomaly Detection & Prediction

How Analyzing Data From Sensors Can Create Game-Changing New Methods To Reduce Unplanned Downtime

BROCHURE

Increasing the Life Expectancy of Industrial Assets with Anomaly Detection & Prediction

By Achieving Remarkable Business Results from Your Sensor Data

The Industrial Internet-of-Things (IIoT) has created a series of new technological milestones that redefine the direction of leading global businesses. By leveraging sensor data from connected assets and using advanced analytics to derive actionable predictions, you can create a sea change in your organization's processes by taking preemptive corrective measures to avoid unplanned downtime and unscheduled maintenance.

Globally, leading organizations are making use of their existing assets in synchrony with the power of machine learning to harness data insights and create new avenues to increase business value. These newly empowered assets have the capability to generate new data streams which can be tapped and analyzed automatically to unleash new revenue opportunities, reduce costs dramatically, increase efficiencies and unearth new productivity and growth trajectories.

Therefore, it becomes imperative to judiciously utilize these assets in the best possible manner to derive maximum gains from an organization's diverse assets and infrastructure. Asset performance management is a complex, yet extremely fruitful exercise. More so as losses that occur from existing asset failures can be significant, even fatalistic, to growing organizations.

Asset Failure Management: Predict. Plan. Prepare.

Smart asset management is a double-edged sword. On one hand, it involves minimizing asset lifecycle costs across all phases. On the other, it focuses on deriving maximum efficiencies by meaningfully minimizing failures, unplanned downtime and unscheduled maintenance.

Dealing with unexpected asset failures often requires an intensive effort to remediate quickly and without notable monetary, reputational or brand damage. For example, did you know that:

Only **20%** of asset failures on average are actually predictable and a whopping **80%** are erroneously miscategorized as random failures, occasionally at great expense or danger.

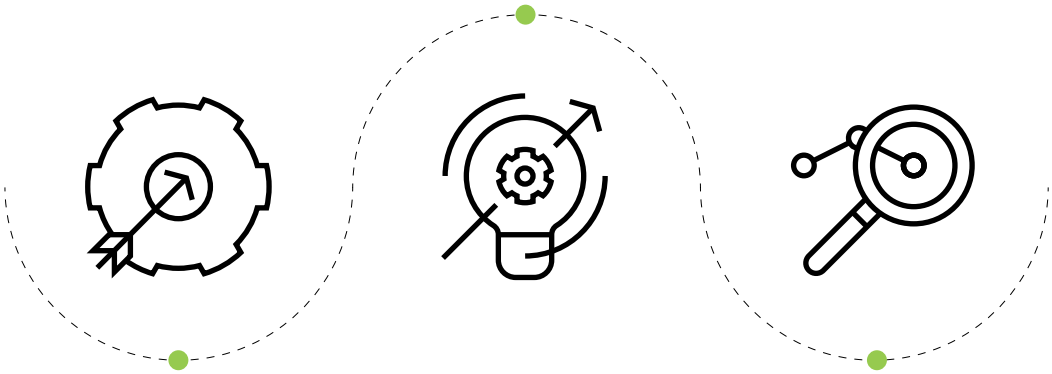
Asset failures are rare events caused by dynamic changes in manufacturing, operational and environmental conditions. **Traditional static modeling becomes obsolete very fast**, thus resulting in the ever-poorer predictions of asset failures.

Combating asset failures requires accurate predictions well in advance of the actual occurrence of the event, thus allowing corrective actions to be taken in the first place. Thus unplanned downtime can be avoided altogether, and the consequential cascade of otherwise expensive and inefficient outcomes, such as unplanned maintenance, breached SLAs, warranty exposure and other unforeseen liabilities. But the massive and exponentially-growing amount of **unlabeled Industrial IOT data makes these predictions extremely difficult** to do, and impossible to scale, with traditional manual modeling methods.

According to McKinsey, the IIoT will create $7.5 trillion in value by 2025 with $630 billion in savings along from implementing predictive maintenance. With the IIoT becoming an indispensable force of change in the whirlwind of technological (r)evolution, it's imperative that organizations demonstrate leadership, or at the very least keep pace, in order to enjoy long lasting competitive benefits. And the **ability to successfully and repeatedly predict asset failures at mass-scale** is one of the first critical steps towards embracing this sea of change.

Asset-intensive industries such as discrete manufacturing, automotive & transportation, aviation & aerospace, oil & gas and power & utilities should consider making the following strategic objectives their priorities.

INCREASE
the Availability of Assets to Reduce Costs



OPTIMIZE
Asset Performance

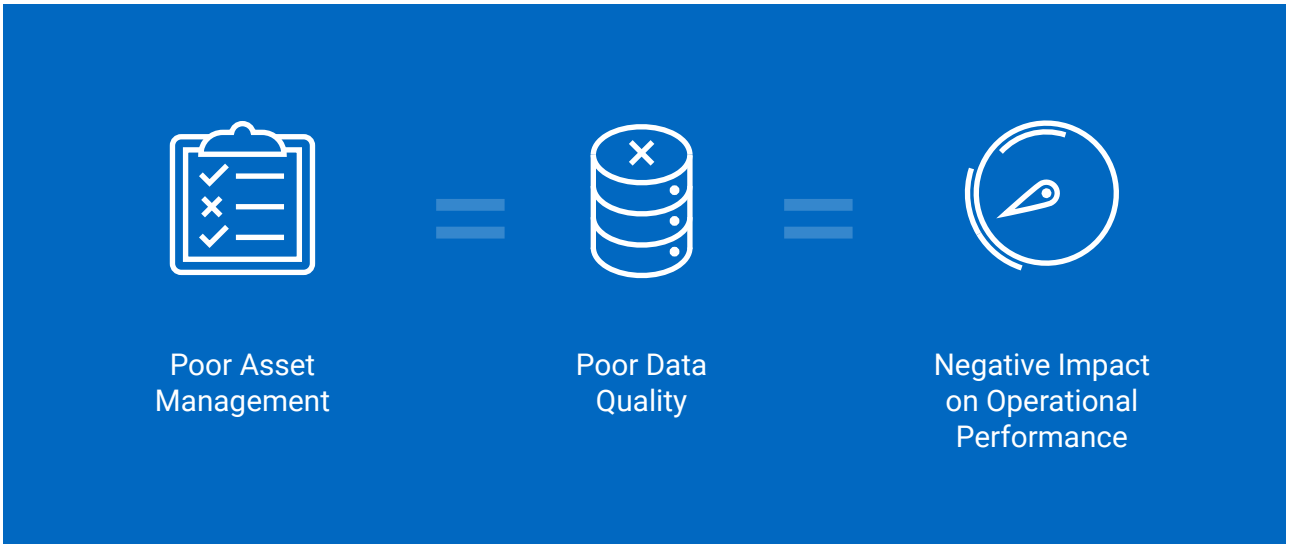
REDUCE
Operational Risk

Asset failure management is a natural outcome of these strategic objectives. **Why?**

Because even in today's transformative Digital Age, physical infrastructure and equipment are still the strong foundations of numerous critical industries.

For asset-intensive industries, the cost of unplanned downtime can be significant. The actual cost of a machine breakdown can be 4x to 15x the maintenance costs.

Consequences of Poor Asset Management



Ineffective asset failure management strategies can result in:

- Industrial Compliance & Security Issues
- Uncontrollable Capital and/or Expense Budgets
- Abrupt Equipment Downtime & Poor Performance
- Inadequate Asset Utilization
- Mounting Operational Costs
- Health & Safety

Resolving Complex Asset Performance Issues

Asset-intensive industries are in dire need of the right expertise to tackle complex asset performance and operational challenges

Monitoring of Asset Health
Lack of clear distinction between the minute signal vs. the massive noise

Limited Scope to Schedule Maintenance
Lack of clear distinction between the minute signal vs. the massive noise

Zero Predictive Capabilities
Erratic asset downtime episodes due to limited forecasting abilities

Absence of Integrated Automated Systems
Extensive dependency on manual processes across all industries

Cognitive Anomaly Detection & Prediction to the Rescue

By harnessing the power of IIoT, Progress® DataRPM® Cognitive Anomaly Detection and Prediction (CADP) taps automated machine learning and autonomous AI to analyze historic, current and new datasets as well as creating unique predictive models for each asset. This empowers enterprises to accurately predict future normal, anomalous and end-failure events.

"Advances in sensor technology, communications technology, information management and analytics are now making it possible to predict when a piece of mission-critical equipment will fail"

Kristian Steenstrup
Vice President and Gartner Fellow

4 Ways Using Cognitive Anomaly Detection & Prediction in Asset Failure Management can Significantly Impact Your Bottom Line:

1. **Becoming More Agile**
Using Progress DataRPM, your organization can become more proactive in responding to maintenance needs rather than waiting until equipment actually fails. By leveraging the benefits of automated machine learning, autonomous AI and advanced cognitive analytics on large datasets, your organization can predict anomalies and prescribe the necessary solutions in advance with early lead times, minimal intervention and little repercussions.

2. **Cutting Maintenance Costs**
By predicting asset failures, Progress DataRPM enables companies to reduce maintenance costs as only the truly necessary maintenance actions are flagged.

3. **Streamlining Business Processes**
It becomes much easier to establish business process guidelines with the realization of the above efficiencies, which ultimately increases productivity.

4. **Optimizing Resource Utilization**
By ensuring better utilization of assets and resources, your organization can maximize return on investment. This enables enterprises to boost overall asset utilization levels and elevate the bottom line.

The Power of Cognitive Intelligence

- **Savings of up to 40 %**
- **Maintenance Cost Reduction of up to 30 %**
- **Reduction in Downtime of up to 45 %**
- **Over a 100x Return-On-Investment (ROI)**
- **Breakdown Elimination of up to 75 %**
- **Increase in Production of up to 25 %**

66x Increase in Predictive Accuracy over previous Manual Models

En Route to Reducing Asset Failures

Seek Out Answers to these Questions to Reduce Impending Asset Failures

What
is the root cause of recurring asset failures?

Why
is there a history of asset failures and does a failure plan exist?

How
can you predict the actual cause of failures?

Who
are the asset operators responsible for performing maintenance tasks?

When
can you achieve optimum asset efficiency?

How Often
is a maintenance intervention required?

Why choose Progress DataRPM?

Progress DataRPM Cognitive Anomaly Detection and Prediction uses meta learning to automate predictions and recommendations of asset failures. By providing accurate IIoT insight and recommendations, CADP enables decision makers at all levels within your organization to spend less time analyzing visual dashbhoards and more time implementing predictions and recommendations to create fail-safe environments. This leads to cost saving, revenue increases, greater safety, productivity gains and improved efficiencies all around.

By harnessing hyper-intercorrelated machine signals from sensor data and differentiating these minute signals from massive noise across long periods of time, you can surface predictions in a way that simply isn't possible with manual modeling techniques. This enables you to achieve smooth, seamless factory production line operations.

CADP enables you to conserve your assets, improve equipment life and prevent premature replacement of machinery. This can help you realize significant savings on maintenance costs.

A TRUE Paradigm Shift Affecting all Industries

Progress is a pioneer in cognitive technologies for IIoT. With CADP, asset-intensive organizations can transform the way they operate and achieve fail-proof IIoT environments.

By leveraging timely predictions and recommendations, businesses can avoid costly unplanned asset failures and ensure the uptime of their mission-critical assets.

CADP enables you to make the process of data ingestion and autonomous analytics faster, easier and more scalable while also eliminating many of the errors that stem from manual approaches.

Here is how we are impacting a wide spectrum of industries:

Industry	Absolute Value Delivered			
Manufacturing	Enhancing Assembly Line Uptime	Increasing Operational Productivity	Meeting Service Level Agreements (SLA) & Warranties	Providing Exceptional Ancillary Customer Services
Automotive	Production Quality &Service Enhancement	Reducing Warranty Risks, Claims & Liabilities	Greater safety with Connected Cars & Autonomous Vehicles	
Oil & Gas	Maintenance & Fault Detection	Enhancing Performance of Rigs, Turbines &Pipeline	Reducing Capital Costs & Inventory Risks	
Energy & Utilities	Dynamic Forecasting & Load Management	Optimizing Expensive or Critical Assets	Fraud & Loss Prevention	
Travel & Transportation	More Effective Fleet Management	Greater Fuel Efficiency	Increased Passenger & Equipment Safety	
Aviation & Aerospace	Increasing Flight Readiness	Preventing premature Component Replacement	Reducing Aircraft Downtime	

About Progress

Progress (NASDAQ: PRGS) offers the leading platform for developing and deploying mission-critical business applications. Progress empowers enterprises and ISVs to build and deliver cognitive-first applications that harness big data to derive business insights and competitive advantage. Progress offers leading technologies for easily building powerful user interfaces across any type of device, a reliable, scalable and secure backend platform to deploy modern applications, leading data connectivity to all sources, and award-winning predictive analytics that brings the power of machine learning to any organization. Over 1,700 independent software vendors, 100,000 enterprise customers, and two million developers rely on Progress to power their applications. Learn about Progress at www.progress.com or +1-800-477-6473.

Discover cognitive-driven business value.

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