



# Asset Performance Management

For Oil & Gas





# Your Assets Speak Volumes

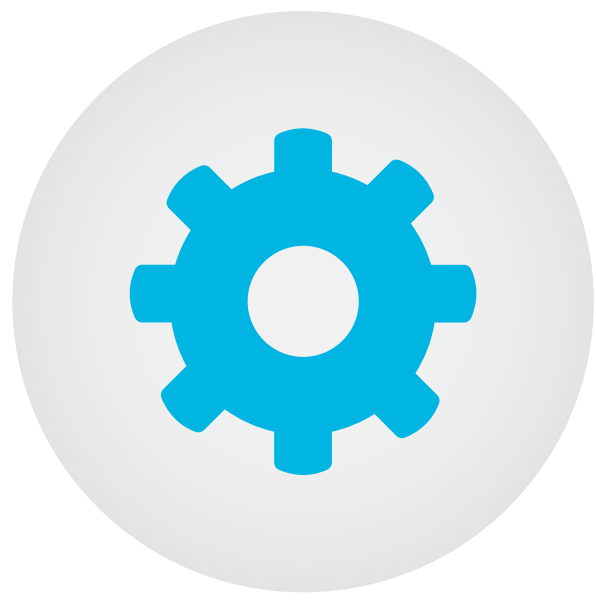
## Are you listening?

You've invested in assets, processes, and systems on a massive scale to meet your business objectives and manage your risk around safety, financial, and environmental events. Hundreds of thousands of assets produce enormous amounts of data every day—all with their own specific purpose. Data from sensors, recommendations from people, and information from a multitude of systems produce a relentless stream of asset data that can either keep you informed to help make smarter decisions or leave you vulnerable to blind spots and risk.

You need the ability to know what all that data means in order to determine which information is key to the health of your assets. Then you need to decide which assets are most critical to your business. Most importantly, you need an asset strategy to manage it all for you, automatically.

### Typical Value Drivers from APM Program Implementation:

- 5- 10% reduction in reactive maintenance
- 5- 25% reduction in IT total cost of ownership
- 2-6% increase in asset utilization
- Reduced safety and environmental incidents



Predix Asset Performance Management (Predix APM) enables holistic and real-time views of how people, systems, and physical assets are performing and help to improve safety and performance, increase asset availability, and optimize costs—all while mitigating operational risk. Predix APM answers essential questions that spreadsheets, ERP systems, and historians cannot.

20  
MILLION

*Avoided in unplanned  
maintenance & downtime*

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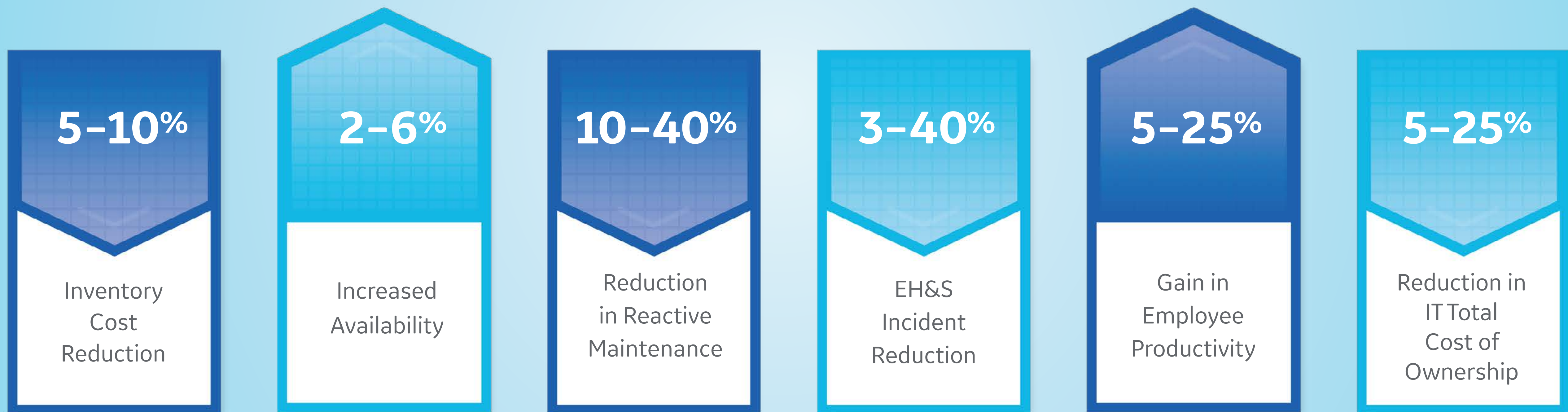
01	<b>How critical is this asset?</b>
02	<b>What is the history of this asset, and what is its current health?</b>
03	<b>In what ways could this asset fail, how could I mitigate risk of failure, and what would it cost?</b>
04	<b>What would be the consequences of this asset's failure on my business?</b>
05	<b>What action should be taken now, and what should be our overall strategy to optimize business objectives?</b>

By combining real-time data with human experience, operating parameters, analytics, and connectivity, an asset strategy continuously improves over time. It's an automated loop of learning that can detect emerging threats for prevention and proper governance.

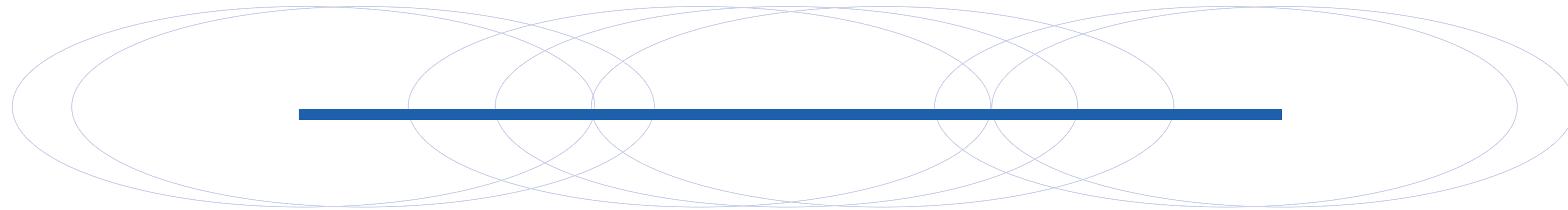


# The Benefits

Predix Asset Performance Management provides end-to-end improvements.



# Improve All Aspects of Your Company



Your people are a wealth of knowledge and experience. Can you leverage their collective knowledge to contextualize information from physical assets and systems?

Modern sensors ensure your physical assets produce a huge amount of data. Does that information help you or put you at greater risk?

It takes a mixture of unique and complex systems and work processes to keep facilities and plants running. How can you aggregate the data they produce to see the big picture?



People

# Protect Your Tribal Knowledge



People

# Your Team Has a Wealth of Knowledge That Shouldn't Go to Waste

The way companies collect and manage information has evolved over time. Early on, observers in the field collected information on clipboards before entering it into historians. They relied upon experience to decide whether the data was worth recording. Today, we depend on technology and sensors to do most of that recording with a far greater degree of accuracy. However, a sensor cannot replace the critical thinking and judgment that only comes from an experienced employee. Unfortunately, due to an aging workforce and employee turnover, their knowledge and experience is often lost forever.

By using Predix APM, you can capture the expertise and perspectives of your team by recording human recommendations. Those recommendations contribute to an overall strategy that provides a better understanding of the big picture. Recommendations are continuously collected and balanced with operating parameters, analytics, data from systems, and data from physical assets. In this way, the information an employee contributes stays with the company long after separation, providing a seamless library of tribal knowledge and technical expertise that is passed along to the new generation.

**Get the most from your asset data.**

- Only by using Predix APM can you safely and effectively reduce risk while optimizing costs
- Predix APM uses all asset related data to give you a clear picture of your organization's overall asset health





Assets

# Harness the Power of Your Asset Data

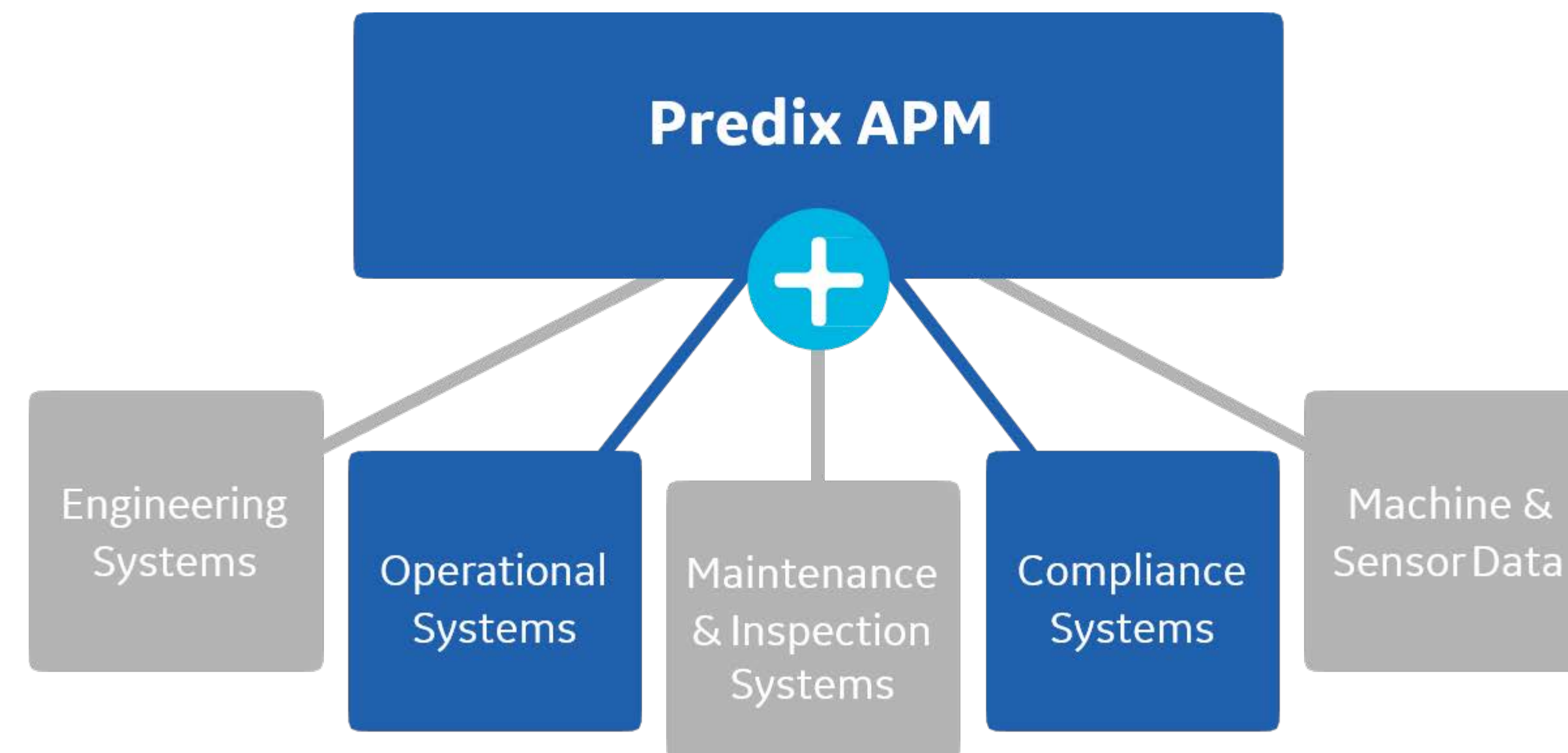






# Healthy Assets Help Alleviate Business Issues

Your company has invested heavily in monitoring physical assets that produce millions of bits of data from various sources. Successful operations depend on a complex web of systems, people, processes, and data output. Predix APM bridges the gap between systems and transforms the information into valuable insight and perspective not possible with point solutions, giving you a true picture of your overall asset health while helping to reduce downtime and equipment failures.



**It's time to put your asset data to work.**

- Discover valuable insight from your physical assets in real-time
- See how siloed systems to come together into a common view
- Get continuous and consistently automated evaluation of asset performance
- Achieve a true picture of asset health and performance

# Get More From Your Existing Systems



# Just because you have different systems doesn't mean they can't support a common purpose.

It takes a complex and sophisticated web of systems, software work processes, and IT expertise to keep a facility or plant running at full capacity. Although some of these systems work well together, each system is typically dedicated to performing a specific task. They could, however, work more productively and more efficiently. When multiple systems come together through Predix APM, the data can be combined with human experience and physical asset data to provide recommendations that continually improve over time. Plus, the insight gained can be used to optimize the very systems that are providing the data.

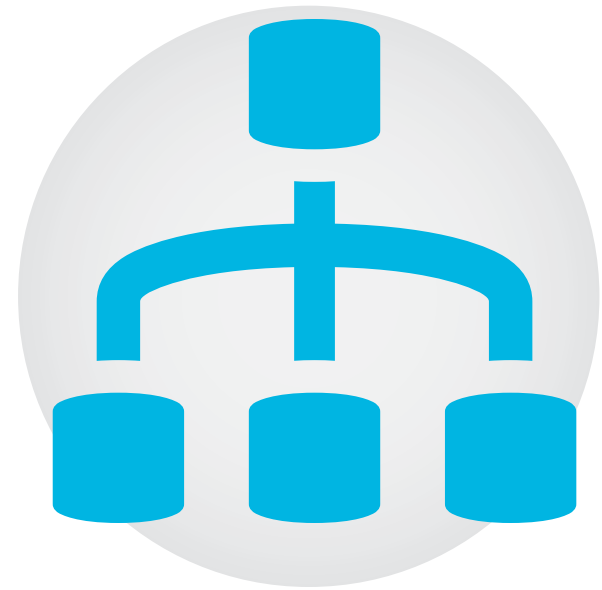
Only Predix APM can bring different data from various systems together into a single context to identify and understand the risk, enabling you to quickly derive what should be done to prevent failures. You will ultimately mitigate risks, increase asset availability, and optimize costs.

**Get more from your systems than ever before.**

- Use and direct data from multiple sources to serve a common asset strategy
- Heterogeneous platform for data and analysis

# Predix Asset Performance Management





# The Elements of an Asset Strategy

Predix APM enables holistic and risk-based asset strategies to balance performance and cost by considering design, operational procedures, and maintenance plans for all assets. With APM, you get an enterprise-wide view of the impact of asset performance management activities to help you make the best decisions.

- Physical assets, sensors, people, work streams, and systems all contribute **data, readings, and recommendations** in real-time through a predefined strategy based on business and program objectives.
- The predefined asset strategy serves as a way to **filter, evaluate, and categorize** readings and recommendations. Recommendations that do not adhere to business and program objectives are filtered and set aside, providing continuous optimization.
- An asset strategy uses sophisticated **parameters and context** to develop new recommendations and suggested actions that can be evaluated and deployed.
- Once strategies are deployed to improve processes, systems, and overall APM, additional data feeds back into the same asset strategy to create a **continuous loop of improvement**.

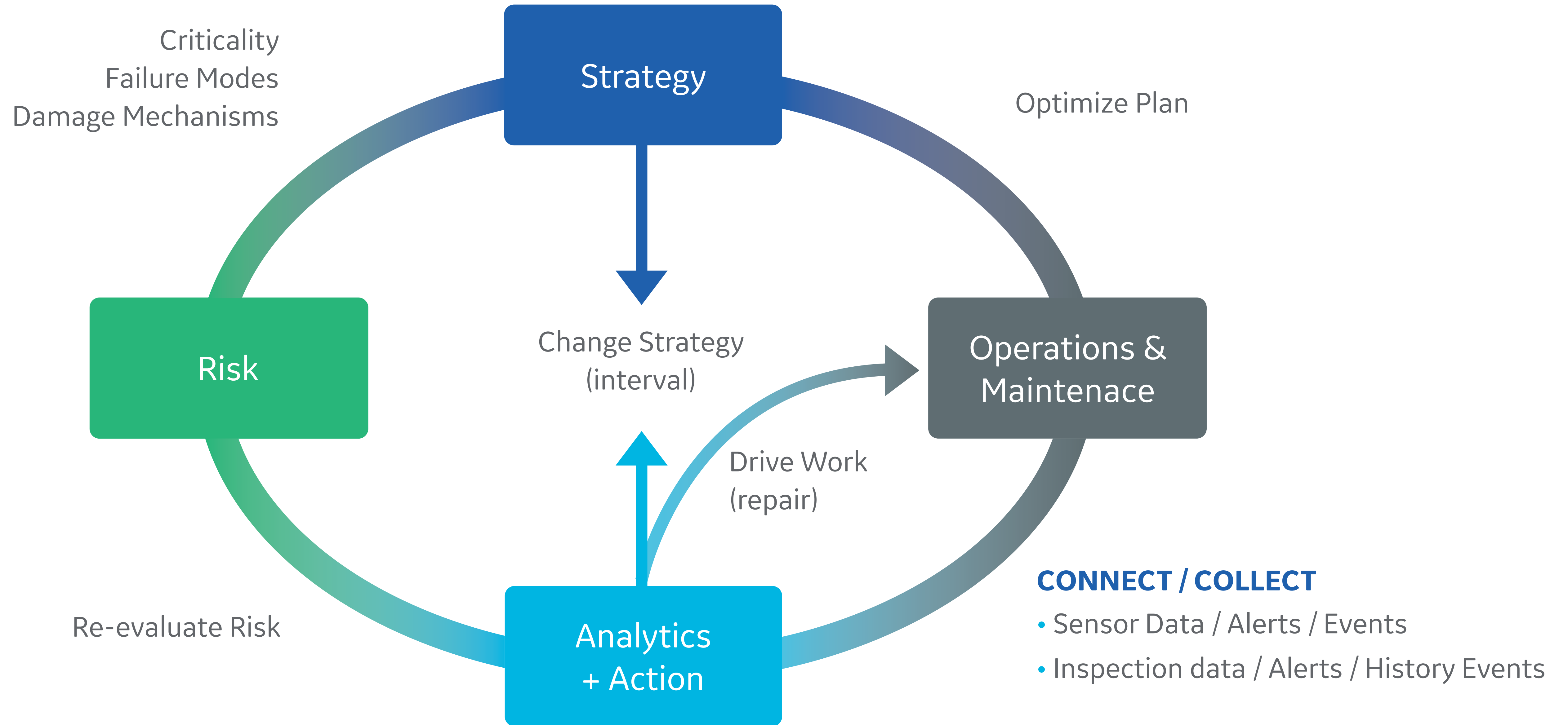
CUSTOMER RESULT

# 55

Reoccurring bad actors identified with in a single plant

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# Predix APM Continuous Improvement Framework



# See The Big Picture In a Whole New Way

360°



# Different Views of Asset Data Provide a 360° View of Performance



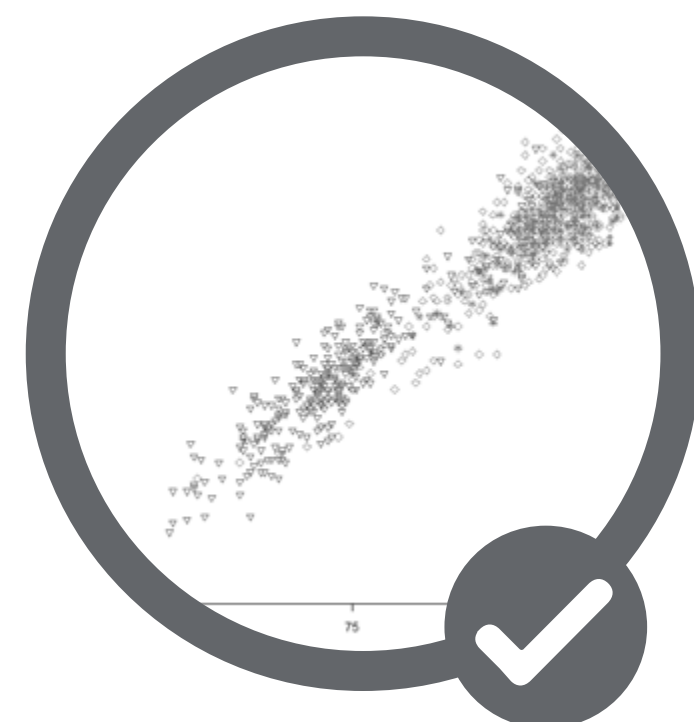
## Transaction View

Bring your EAM or ERP system to life. Predix APM takes advantage of enterprise asset management systems like SAP, IBM, and Oracle in new and sophisticated ways to strategically manage it all for you, automatically.



## Strategy View

Only GE Digital offers a complete range of perspectives from its Predix APM system while combining data from other data sources.



## Trend View

Condition monitoring and process historians systems, like our own GE Historian, can feed data into Predix APM that converts time series data into valuable insights and recommendations.

360°





## Control View

GE, Siemens, Rockwell, and many other control systems all integrate flawlessly with Predix APM and their data is leveraged to understand operating conditions that impact assets.



## Picture View

Predix APM pulls key engineering data from 2D/3D CAD and GIS systems to display information of drawings and maps providing a unique visual perspective.



## Regulation View

Global governmental regulations and standards bodies create requirements that dictate the way you conduct your business. Predix APM has the flexibility to configure your work processes to assure compliance with local regulations and global standards.

360°

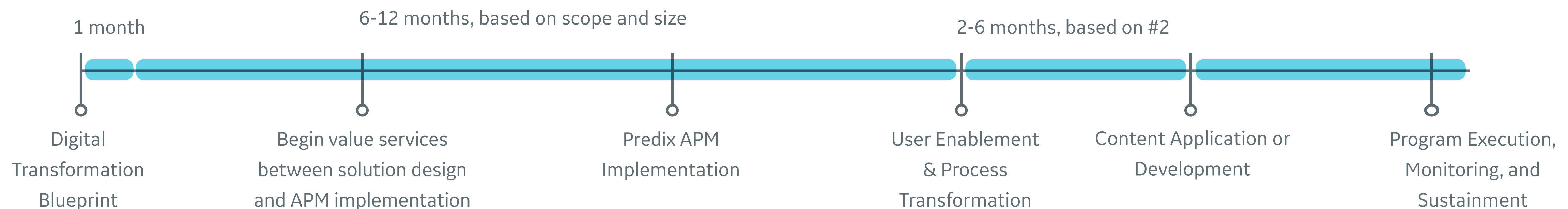
# Different Views of Asset Data Mean You Are Always One Step Ahead

- 1 Align the APM program definitions with corporate business objectives.**
- 2 Assess key business risks and determine which assets should be the primary focus.**
- 3 Define and implement asset strategies to ensure appropriate risk mitigation.**

APM initiatives typically drive core value levers for organizations looking to maximize production, optimize opex/capex spend, or minimize operational safety and environmental risks. The initial APM program definition will establish the business case, APM tactics to be implemented, and describe the measurement program. High ROI projects are identified in GE's Digital Transformation Blueprint workshop .

Most of your business risk will reside within a subset of your total asset base. Quantifying the risk an asset presents to the business and focusing APM efforts accordingly allows you to ensure that assets with significant consequences for failure scenarios or those assets subject to legal and statutory requirements have a complete and optimized management strategy.

Asset strategies are targeted, holistic and optimized activities which mitigate potential risks of asset failure through predictive and preventative maintenance, inspection, monitoring, engineering and analytical methodologies. Integration with your broader asset management and operational systems, along with embedded optimization methods, ensure you are fully managing failure risk at an optimized cost profile.



*Payback can be achieved in less than 12 months*



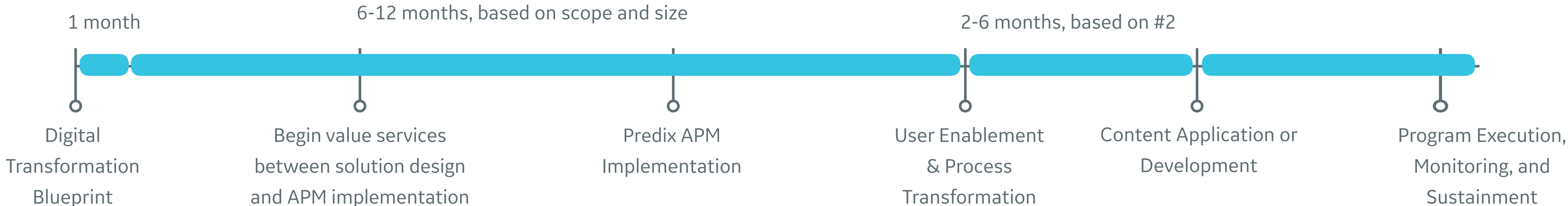
# Different Views of Asset Data Mean You Are Always One Step Ahead

**4 Execute APM program elements and establish dynamic monitoring to detect and actively mitigate emerging threats.**

As asset strategies are executed, there are many emerging threats to an optimized strategy. Equipment ages, business and compliance requirements change, process conditions are altered, and asset health can deteriorate. The implementation of asset strategies can dynamically monitor threats and automatically adjust the strategy through managed recommendations to ensure risk is controlled.

**5 Deploy APM governance activities to ensure program effectiveness and continuous improvement.**

APM programs provide key metrics and indicators to measure the implementation and effectiveness of any value delivered through asset strategies. Boardroom to asset-level analytics and alerts provide clear visibility to strategy implementation, performance, and emerging threats across the enterprise.



*Payback can be achieved in less than 12 months*



GE Digital ge.com/digital/apm

Intelligent Asset Strategies

How a Major Oil & Gas Company  
**AVOIDED \$20 MILLION IN COSTS**  
 { In Unplanned Maintenance and Downtime }

**Challenges:**

**\$4 Million**  
 The loss each day from production stoppage

If any asset fails (even a small component, such as a flow transmitter), all production stops. And that becomes very costly, very quickly.

- Needed to identify the most critical assets
- Inability to discover which assets were the bad actors
- Needed to change from a spreadsheet mentality to one of knowledge capture and sharing
- With a shortage of skilled labor and a very mobile workforce, it was important to put operating data in a location and in a format usable by all

**Solution:**

**Context & Priorities**

- Essential to lengthen trending analysis and integrate that data across functions
- Essential to consolidate reporting
- Use the bad actor information along with downtime data from PLA to determine criticality ratings for their assets

ASSETS & SENSORS | PEOPLE | SYSTEMS & PROCESSES

End-to-End: Connect Assets, People, and Systems

- Engineering
- HSEQ
- ERP
- Maintenance
- Operations

Define & Evaluate Asset Strategy

data  
 readings and recommendations

Continual Improvement Loop

New Intelligent Strategies

Informed Decisions

With the integration of data from the SAP EAM system, the control system, and Matrikon, the company was able to calculate Overall Equipment Effectiveness (OEE) of every unit—including metrics for availability, performance, and quality.

GE Digital

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# Take the Next Step

## More About APM

