Applying AI Vision in Pursuit of Zero Defects for Manufacturing Operations

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The Pursuit of Zero D

Zero Downtime and Zero Defects

Manufacturers are striving to achieve both continuous production operations and quality products that avoid rework, warranty repairs and recalls.

It’s an extremely challenging, high-value pursuit, and IBM® Maximo® Application Suite is uniquely positioned to deliver on both.

Challenges

Human Inspection

- 20% to 30% Error Rate[1]
- Limited Attention Span - 20 minutes[2]
- Classification judgement varies by individual

Continuous Operations

- Planned Maintenance Windows Shrink
- Unexpected Downtime Events Have a bigger Impact

[1] osti.gov ((Drury & Fox)
[2] Green, 1999

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Manufacturing Cost Impact

High cost of rework

$300 per incident - automotive

Up to $3,000 per incedent heavy equipment

Warranty work and recalls exponentially more costly

Extreme cost of downtime

$1,000–$5,000+/minute
cost of unplanned downtime in large-scale auto production line

Continuous operations amplify downtime risks and squeeze maintenance windows

Up to 30% in excess maintenance costs through unnecessary maintenance and false positives

IBM Maximo Application Suite

- Market-leading enterprise asset management, mobility, add-ons and industry models
- AI-powered monitoring, inspection and predictive maintenance
- Simplified licensing
- Multicloud deployment for greater flexibility

Manage
Asset management

Monitor
Monitor and detect anomalies

Health
360-degree view of assets

Predict
Predictive failures

Visual Inspection
Visual anomaly detection

Scheduler
Schedule work and resources

Mobile
Technician work execution

Assist
Prescriptive assistance

Safety
Actionable insights for worker safety

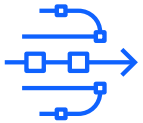
Pursuit of Zero D

Zero defects

Detect and correct

AI computer vision models catch defects before they become expensive rework.

Fast, easy, accurate



Zero downtime

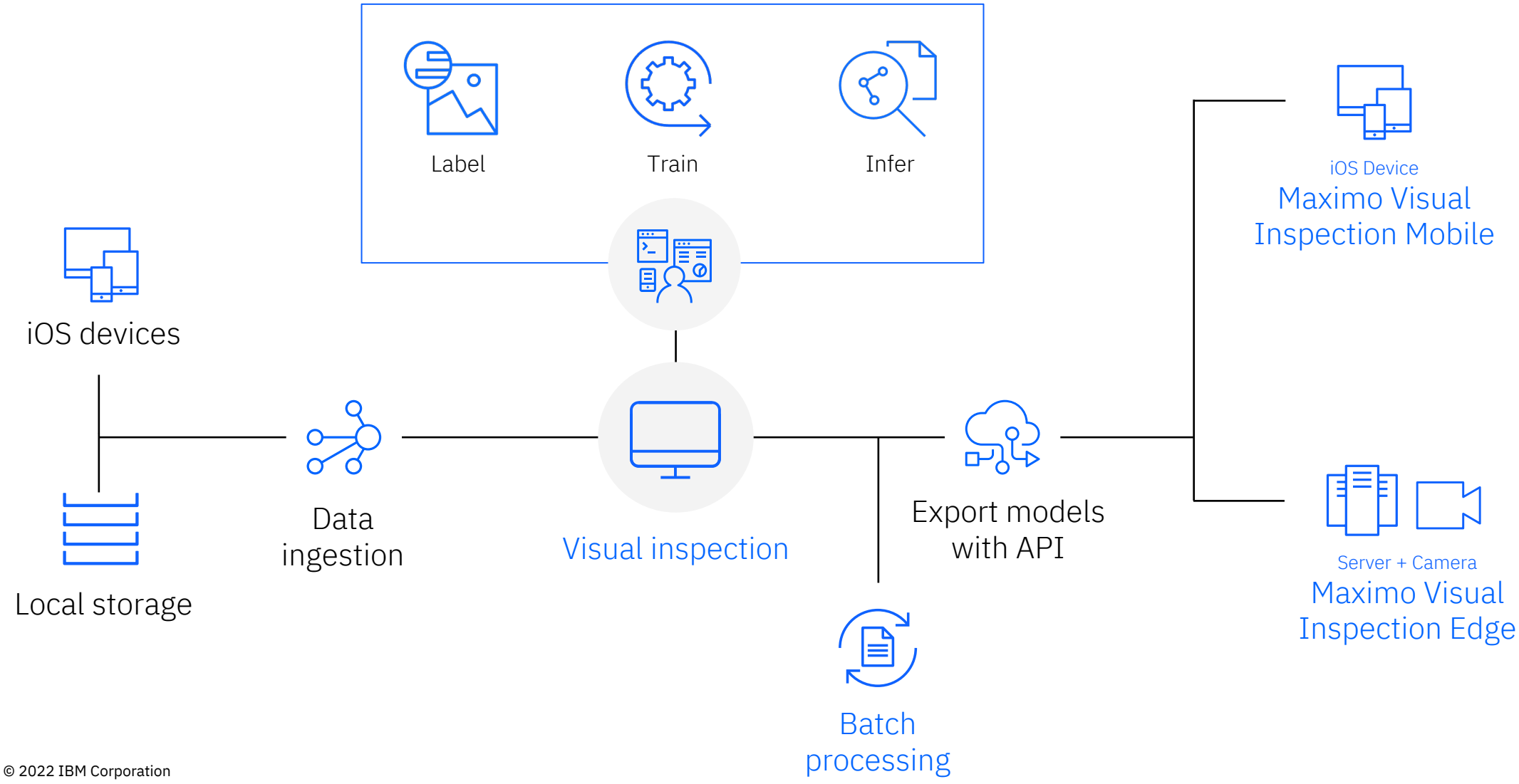
Predict and correct

AI machine learning models predict asset failures in the future, allowing for preventive maintenance before an expensive failure.

Enables continuous operations

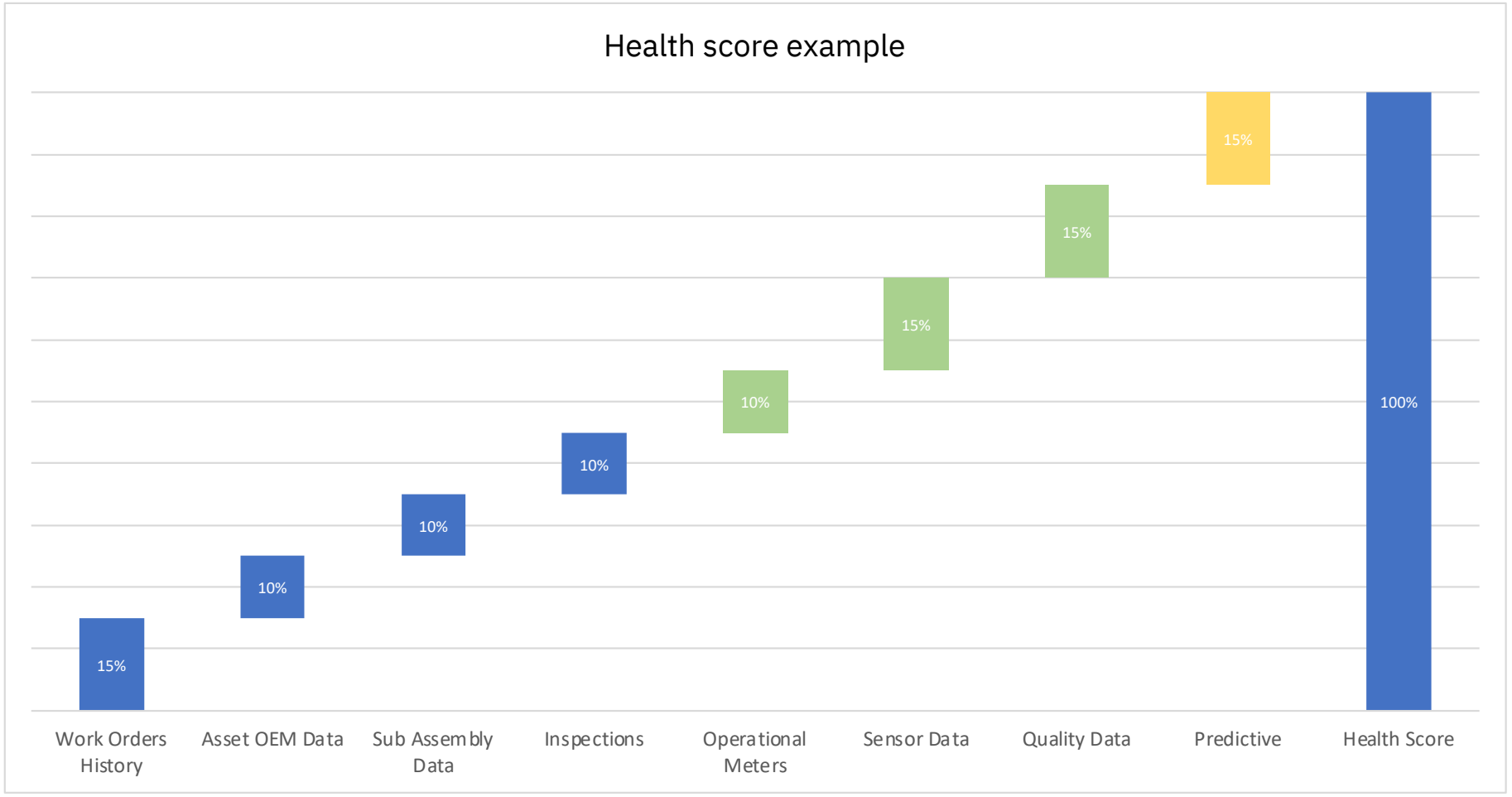
Maximo Visual Inspection

Fast, easy, accurate



Crankshaft Position Sensor Connections

Maximo Application Suite: Asset performance management



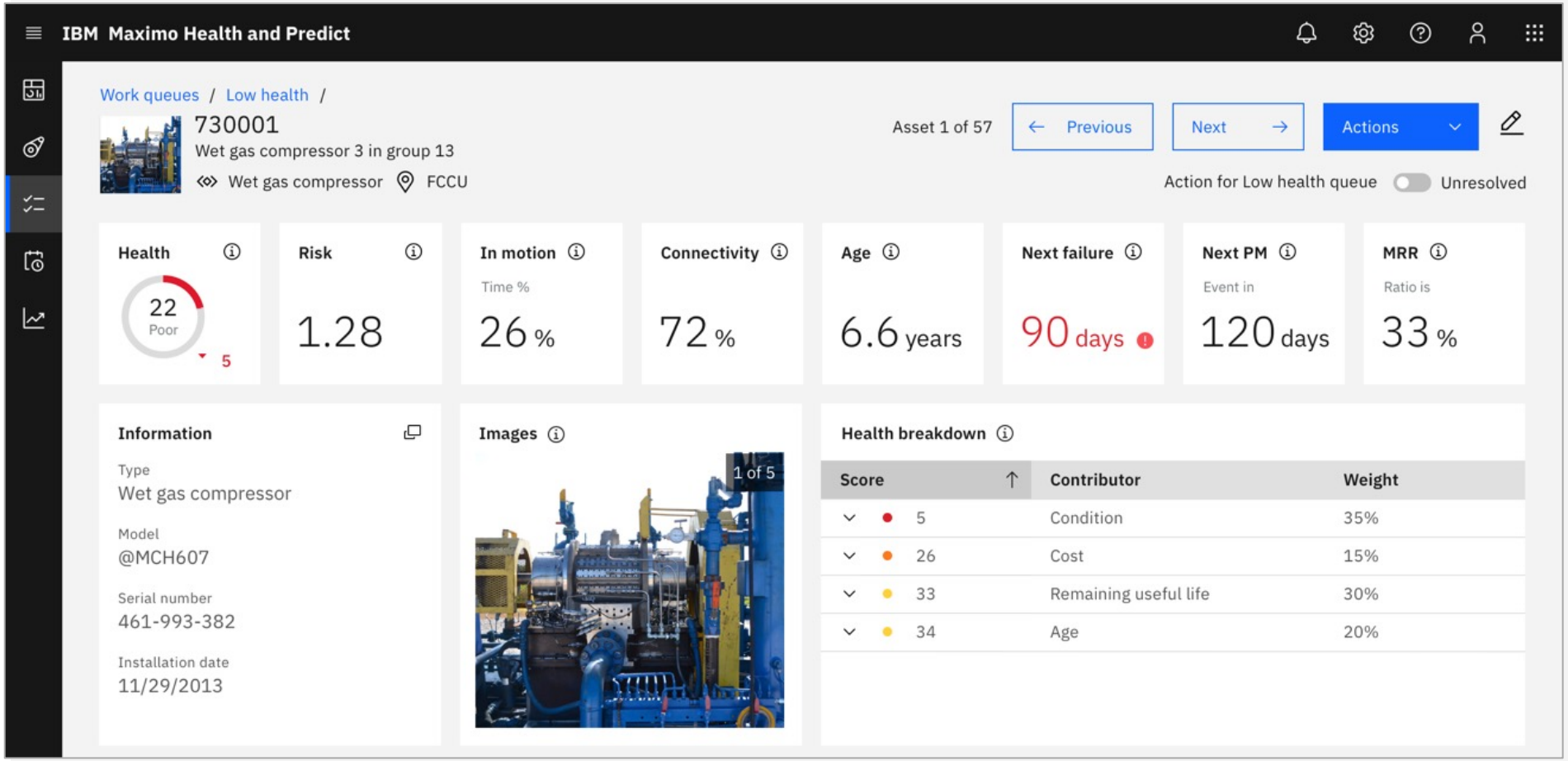
Maximo Application Suite
Manage and health

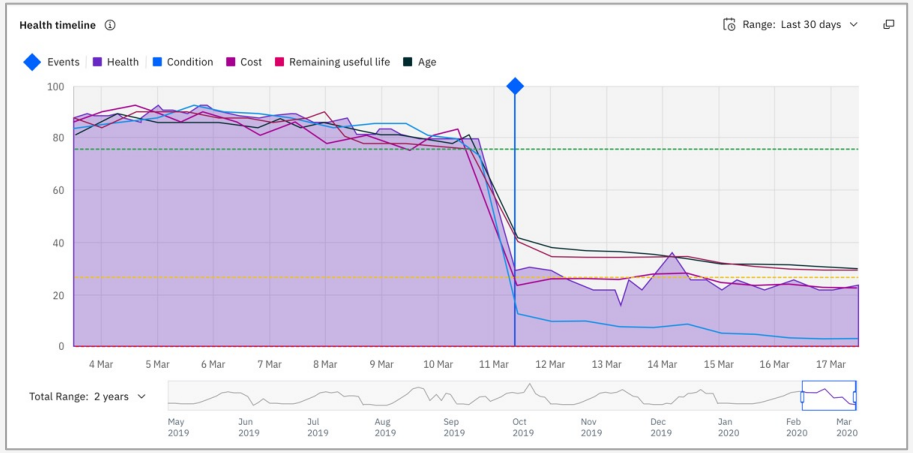
Maximo Application Suite
Monitor

Maximo Application Suite
Predict

Health

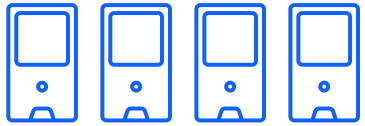
Condition Based Maintenance





Easy integration

1 Real-time data from low-cost add-on sensors

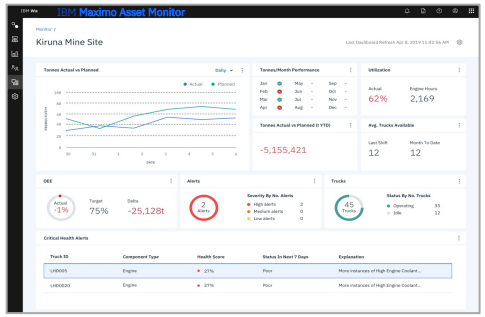


2 Real-time filtered data from automation systems

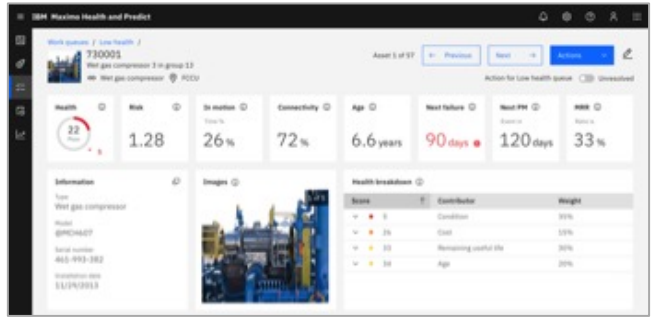
Schad Engineering
Mobility
Accelix

3 Historical sensor and weather data

4 Monitor



Health



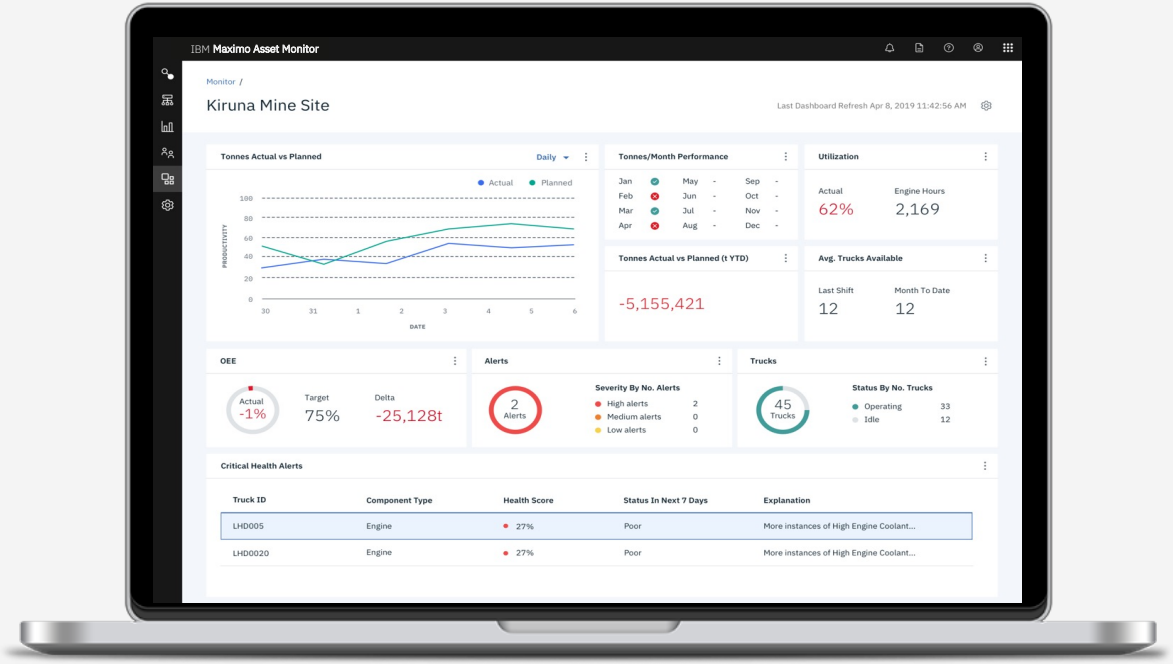
Monitor

The process: Visualize

Build customized dashboards based on use case with prebuilt drag-and-drop widgets

Show outputs of AI-based anomaly detection and analytics, highlighting meaningful alerts within the widgets

Monitor your operations and KPIs, including key drivers for metrics such as overall equipment effectiveness (OEE), availability, uptime and others



Easy integration

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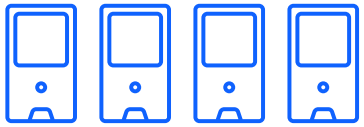

2 **Real-time** filtered data from automation systems

Schad Engineering
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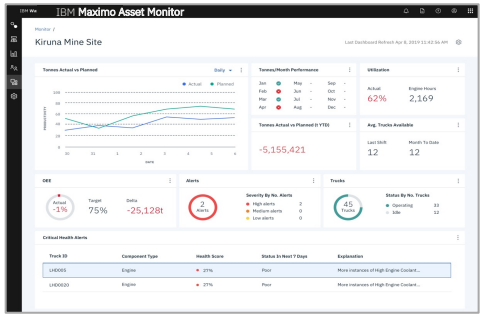
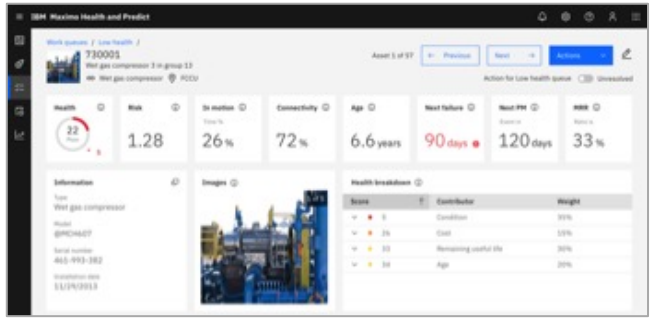
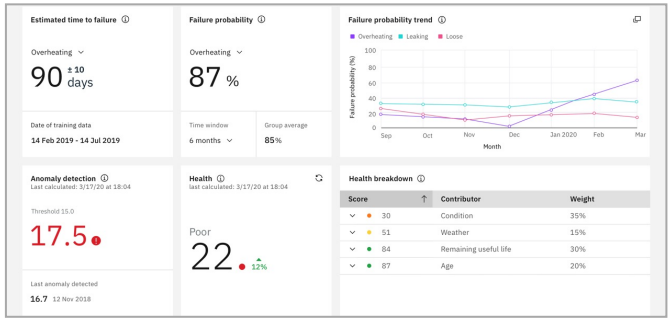


5 IBM Watson® Studio and IBM Watson Machine Learning

Health



Predict



Predict

Train models: Probability of failure

Model description

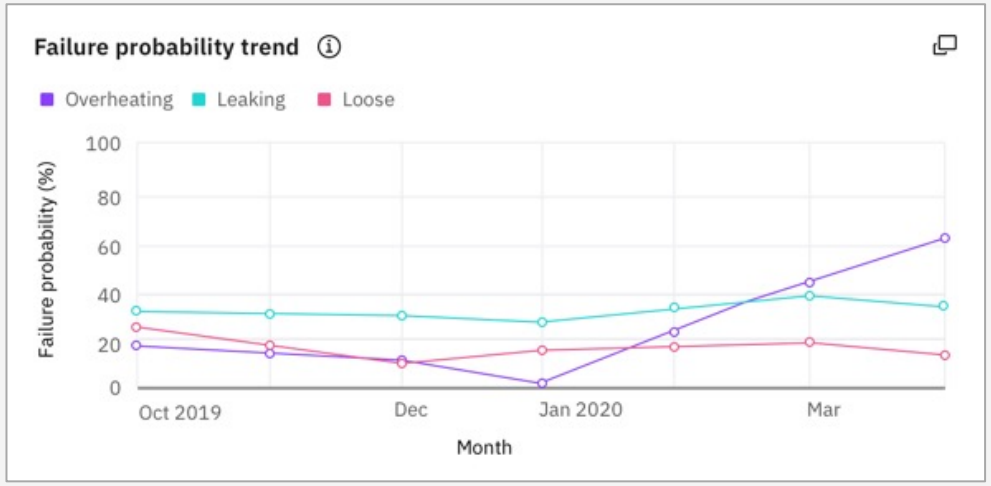
- Predicts imminent failures
- Forecasts failure window with probability

Inputs required

- Timestamped IoT sensor data
- Other process variable as a discrete time variable
- Timestamped failure data

Questions answered

- What are the assets that have the propensity to fail in the next N days?



Predict

Train models: Predicted failure date

Model description

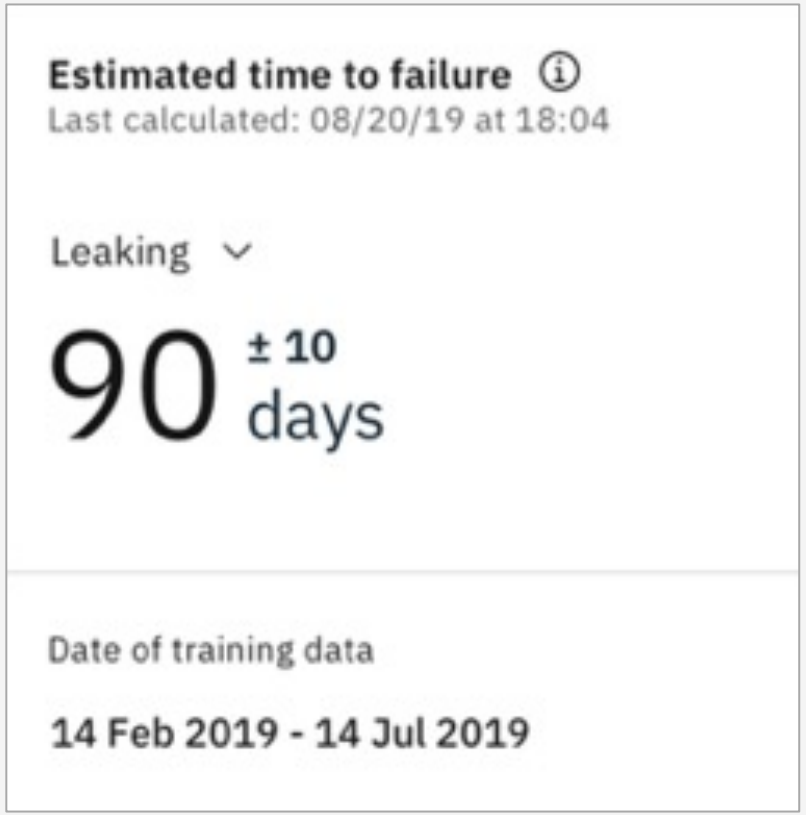
- Predicts when next failures will occur
- Determine if an asset is well-maintained
- Adjust maintenance schedule

Inputs required

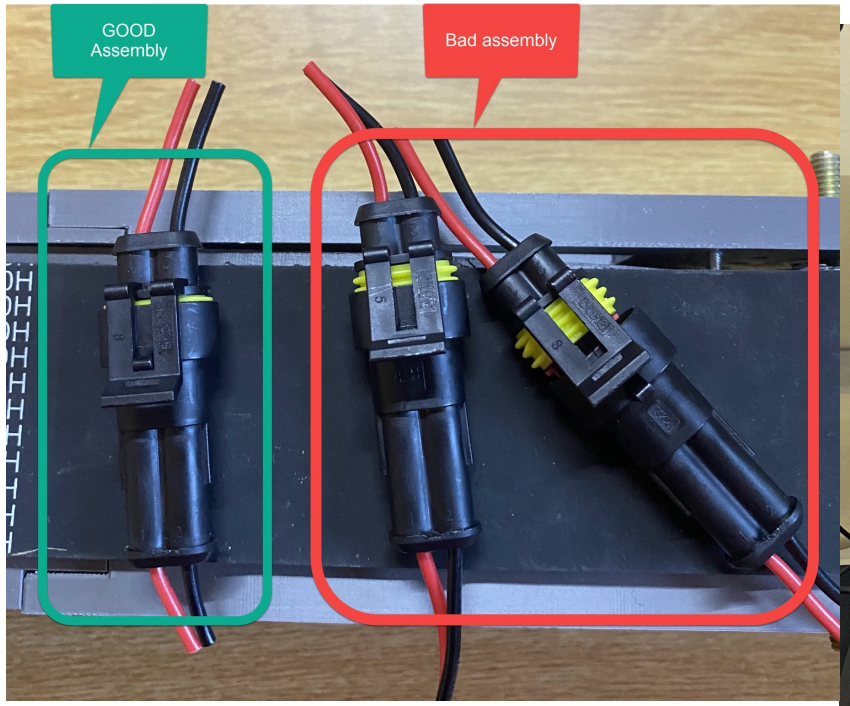
- Timestamped IoT sensor data
- Other process variable as a discrete time variable
- Timestamped failure data

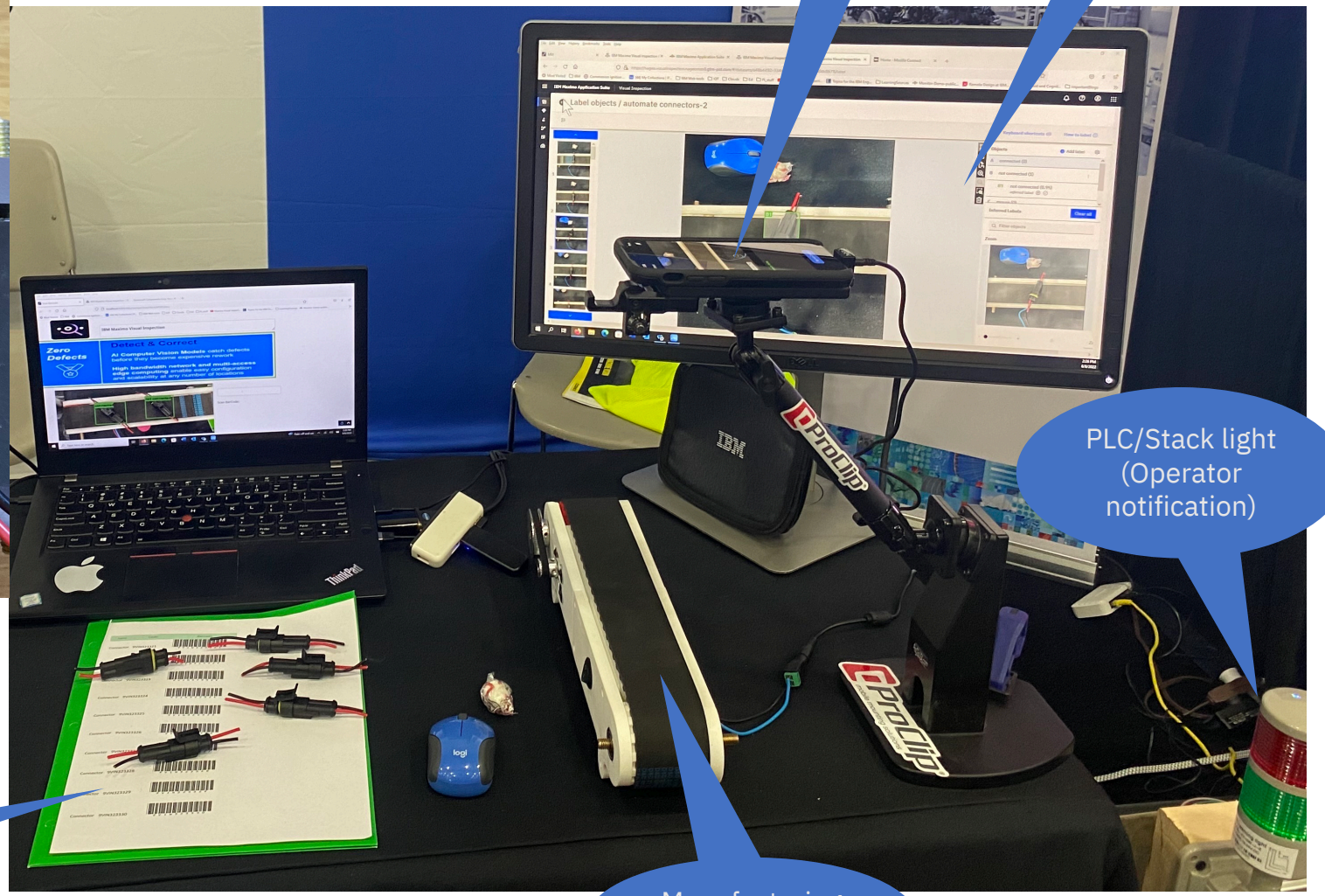
Questions answered

- How many days until the system fails?
- How do particular circumstances, characteristics or causes increase or decrease the probability of survival or failure?



Maximo Visual Inspection Mobile- Demo





Cross-industry

Consumer products

Industrial

Electronics

Automotive

Civil Infrastructure

Oil & Gas

Energy & Utilities

Travel & Transportation

Thank you

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