

SOLUTION BRIEF

Predictive Maintenance
Industrial Internet of Things



How Edge to Cloud Machine Learning is Transforming Predictive Maintenance

Anticipate equipment problems before they occur with predictive analytics.

The Challenge

Unexpected downtime from critical equipment in factory, utilities or oil and gas environments is extremely costly.

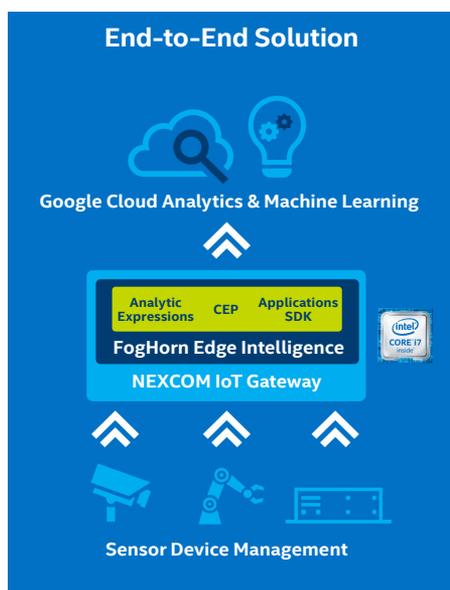


Figure 1. FogHorn's Lightning* data insight solution

The True Cost of Downtime – By the Numbers

- Offshore oil and gas operators experience an average of **\$49 million** annually in financial impact due to unplanned downtime.¹
- Unplanned downtime can cost automobile OEMs over **\$21,000 per minute, or \$1.3 million per hour.**²

The Solution

Starting at the edge, FogHorn's Lightning* solution combines real-time analytics, powerful machine learning and real-time data stream processing into a high-performance edge intelligence platform. The platform transforms raw data into knowledge and insight, enabling organizations to predict equipment problems before they actually happen and proactively resolve them in a scheduled, cost-effective manner.

The solution works by continuously monitoring key operational and environmental conditions in the field, such as pressure, vibration and more. This data is collected and analyzed at the edge using FogHorn's Lightning EdgeML* software, running on NEXCOM IoT Gateways, powered by Intel® Core™ processors.

The gateway then filters and transforms data, transmitting it to the Google Cloud, where it is aggregated with data from other equipment across multiple sites into a management dashboard.

In Google Cloud, BigQuery and Cloud ML Engine can perform additional analytics and machine learning to identify new correlations, trends, anomalies and other valuable operational insights (see Figure 1).

Benefits

The solution can deliver cost savings and increase operational efficiency.

- Maintenance can be scheduled at more cost-efficient times with the right technicians and parts.
- Edge analytics enables real-time decisions, while machine learning in the cloud ensures actionable intelligence continuously expands over time.
- Using the cloud simplifies operations, helps secure data end-to-end and delivers the high performance and low latency to effectively handle IoT solutions at scale.

Key Features

The solution is designed to reduce downtime and costs, while delivering business advantage from the edge to the cloud.

1. NEXCOM Predictive Maintenance Kit

The kit includes software, sensors and gateways, powered by Intel® Core™ processors to maximize compute performance at the edge. Components are ruggedized to industry standards and designed to tolerate intermittent connectivity.

2. FogHorn Lightning* Portfolio

Monitors conditions and behaviors in real-time to assess operational status and detect anomalies, pushing only relevant data and findings to the Google Cloud to reduce bandwidth utilization and enhance security. By predicting failures in advance, problems can be resolved in a more proactive, cost-efficient manner.

3. Visual Analytics

Beyond the predictive maintenance advantages, object recognition models trained in Google Cloud can be pushed down to the gateway to improve environmental monitoring, automation and asset tracking.

4. Google Cloud IoT platform

Provides a highly scalable, fully managed via Cloud IoT Core, enabling customers to aggregate IoT data from globally dispersed industrial devices with high throughput and low latency. Using Google's advanced analytics and machine learning tools, data can be analyzed and visualized in real-time to drive faster operational decisions and actions.



Next Steps

Embrace the power and possibilities of Industry 4.0 by tapping into FogHorn's Lightning* portfolio, combined with the agility and scale of Google Cloud.

Visit the links below to get more information about this solution and other Intel® IoT solutions for Google Cloud.

[Intel & Google Cloud Partner Site](#)

[Google Cloud IoT](#)

[Intel® IoT RFP Ready Kits](#)

[NEXCOM](#)

[FogHorn](#)

[Cloud Technology Partners](#)

Or, get started on a solution pilot by contacting your Intel sales representative via our partner link here.



¹ "The Impact of Digital on Unplanned Downtime", a Kimberlite study, 2016. <https://www.gemeasurement.com/download/impact-digital-unplanned-downtime>

² "Hirotec: From smart manufacturing, to smart factory—to smart enterprise", a00003335ENW, Hewlett Packard Enterprise Development LP, 2017, <https://h20195.www2.hp.com/v2/GetPDF.aspx/a00003335ENW>

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