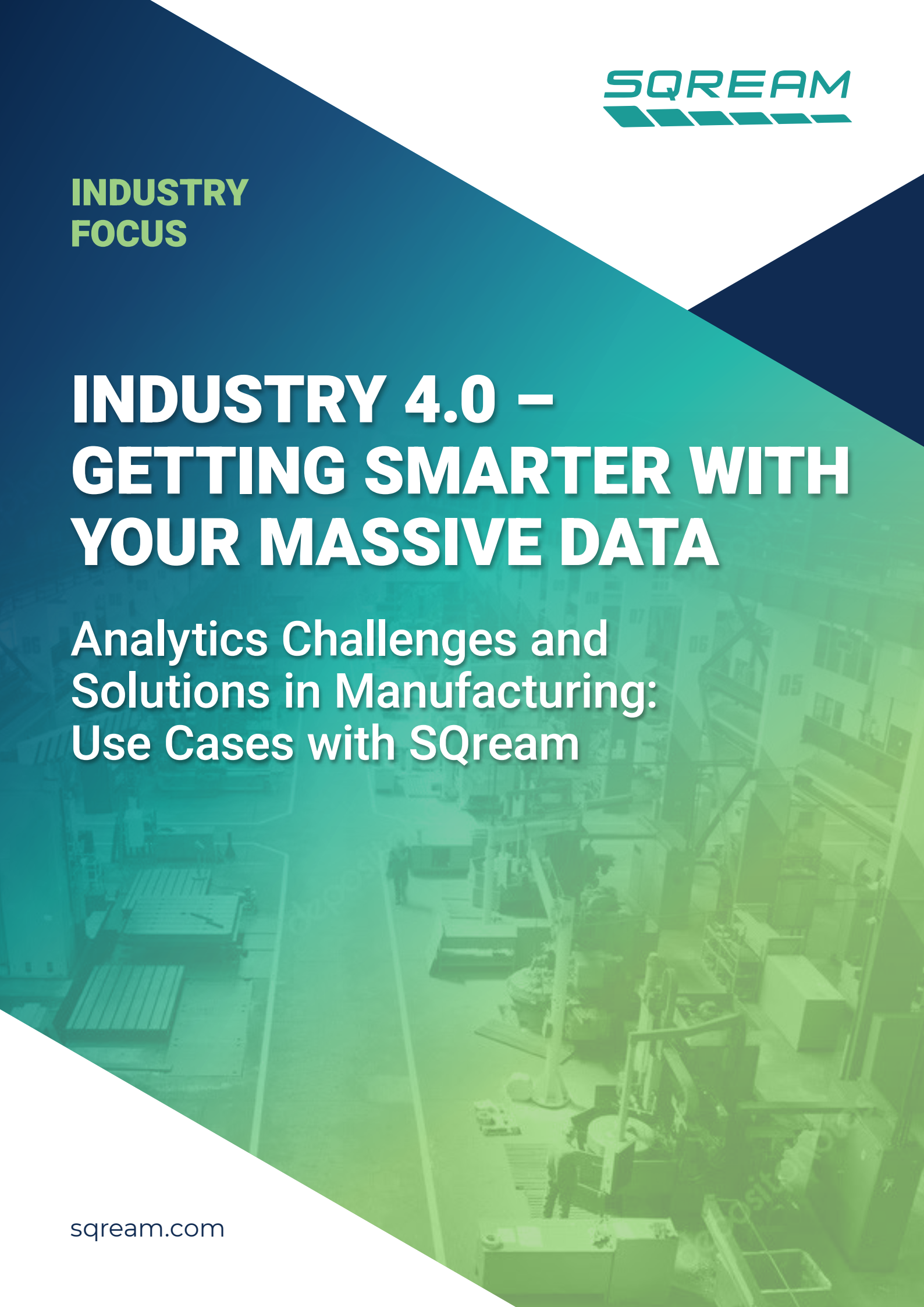
SQREAM

INDUSTRY FOCUS

INDUSTRY 4.0 – GETTING SMARTER WITH YOUR MASSIVE DATA

Analytics Challenges and Solutions in Manufacturing: Use Cases with SQream



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THE MOVE TO SMART MANUFACTURING

As the world moves into a new age of digitalization, industries across the board are undergoing major change. In finance and banking, healthcare, mining, retail, advertising and virtually every other niche, data has become the most important asset and the main driver of business. IoT has become a mainstay of daily life, sensors are everywhere, and everything has gone 'smart,' including manufacturing.

Both production and business processes within manufacturing have benefitted from Industrial IoT. Machine Learning, Artificial Intelligence, automation and even robotics have all helped take the world of manufacturing to the next connected level. The ability to respond in real-time to changing conditions – even those barely discernible to the human eye – on the line and on the floor, means that manufacturers who have embraced the smart approach can optimize and get a better view into processes. Mass cloud computing power for rapid analytics and fast insights, even over massive and growing data, allows manufacturers to stay on top of developments as they happen.

The implementation of smart manufacturing methodologies means that every aspect of the ecosystem – from product manufacturing to delivery and all the way through to the end-customer – is an integral part of the whole. Through the utilization of interconnected machines, an organization can deliver a better use of workforce and energy. This translates into greater overall efficiency, better quality, and lowered cost.

THE SQREAM TRIBRID ANALYTICS PLATFORM HELPS MAKE MANUFACTURING 'SMARTER'

As manufacturing processes grow in complexity and become increasingly reliant on machines, even the smallest mistake – from production itself to the supply chain – comes at great cost. System errors, machine failures, and other anomalies that cause downtime are not an option. Legacy systems, siloed data sources, and massive and growing data stores introduce another set of challenges that must be addressed. Most manufacturers have come to realize that the smart approach empowers, and utilizing the data that smart processes create is priority to making better business decisions. Because what good is data if you can't access the insights it provides?

The SQream Tribrid analytics platform makes data-driven operations achievable for any manufacturing organization. It does so by providing them with a powerful solution that enables the rapid analysis of terabytes to hundreds of petabytes – at the source: on edge sensors and IIoT devices across the factory floor. SQream does this without the need to move massive data sets over the network – saving resources, infrastructure, and computing power.

Typically, data preparation, ingestion, and queries on data taken from these sensors and devices can result in significant delay and cost for organizations, especially when it comes to Quality Assurance managed via AI/ML processes run on that data. From cutting downtime and waste while optimizing asset performance through Predictive Maintenance; to better tracking, monitoring and supply chain visibility for improved Traceability; SQream's deep-dive analytics on massive data empowers manufacturers with business-critical insights when and where they matter. Added to that is SQream's rapid Total Time to Insights (TTTI), which helps organizations quickly home in on problems before they cause damage – as in cases like Data Driven Warranties, where delayed flagging and repair of an issue can have significant affect on product quality and reliability.

Below are two additional use case examples showing how SQream can be utilized by manufacturers to achieve deeper critical insights for more informed decision making.

SQream - Built for Peta-Scale Analytics

Analyze 100x More Data

Queries 20x Faster

Cost 10% Of Resources

OPTIMIZING MANUFACTURING PROCESSES WITH SQREAM FOR DATA PIPELINE MONITORING AND SENSOR ANOMALY DETECTION

Manufacturing machines and their related components must be built, run, and continually maintained. A typical use case within the manufacturing and production environment is the feeding of massive-scale sensor data from these machines and devices into downstream data processors. This data can then be analyzed to identify anomalies that can have a negative effect on the manufacturing process. Sensor data can be used to monitor turbines, motors, pipeline oil flow and others.

Industrial use cases have consistently shown that the detection and correction of anomalies (also known as outlier detection) plays a critical role in providing efficient support to manufacturing environments. This is done by flagging data points that deviate from the statistical properties in otherwise homogeneous data sets such as mean, mode, quantile and others. Measured data can include temperature, humidity, pressure, velocity, acceleration and more. This information can provide manufacturing operators with significant insight into machine health and environmental conditions, automation logistics and energy expenditure, among others. Manufacturers can then, for example, use this data to enact a plan of predictive and prescriptive maintenance, thus allowing them to avoid, correct or react to situations.

By enabling the rapid preparation, ingestion and analysis of data at-the-edge, on the cloud, and on premises, SQream provides manufacturers with a game-changing tool for fast insights. The SQream platform enables ad-hoc querying on terabytes to hundreds of petabytes of retained and enriched data. Even on the most complex of queries, SQream's Total Time to Insight (TTTI) cuts days down to hours, and hours down to minutes, helping manufacturers put context to their sensor data, rating relevance and making smarter decisions across the board.

KEY BENEFITS

1. Full-picture analytics over massive amounts of sensor data.
2. Raw data ingestion on terabytes to hundreds of petabytes, significantly shortening preparation.
3. Shortened query time through analytics run at the source and rapid reporting means critical incidents and process anomalies can be identified and rectified.
4. Carry out complex joins on any table, without the need for precomputation.
5. Ability to create ad-hoc queries and execute ad-hoc analytics as needed.

PRE-EMPTING BEHAVIOR DEVIATIONS WITH SQREAM FOR FAULT DETECTION AND DIAGNOSIS

Fault detection and diagnosis systems are used in manufacturing to monitor and identify faulty statuses of a process. This data is then used to guide manufacturing operators on appropriate action to take, and pre-failure changes that can be implemented to guard against future failures. Diagnosis of manufacturing processes is frequently a challenging endeavor, with terabytes to petabytes of data coming in from sensors for analysis. Typical faulty situations that fault detection and diagnosis can help manage are the identification of worn tools, process degradation, abrupt changes in work conditions, unstable electric consumption and others.

Fault detection and diagnosis begins with the creation of a control model of fault-free system activity, from which deviations of behavior can be easily observed. The next stage is data acquisition – sensors collect the data from the system, and a signal is transmitted to a device, sometimes after filtering to eliminate noise. At this point, the data can be scanned for pre-defined behaviors within the signals (the fault zone), which enables the identification of faulty or pre-faulty statuses. These are critical junctures in predictive maintenance, analyzing and diagnosing processes before problems arise, and enabling the manufacturer to rapidly take better decisions on the manufacturing floor, without losing valuable time and resources.

For industrial organizations, it is crucial to have the ability to monitor the massive amounts of data generated by IIoT devices and sensors, while responding in near real-time to anomalies which might occur. The scalable SQream tribrid analytics platform empowers manufacturers to optimize and improve system performance by quickly ingesting and analyzing terabytes to hundreds of petabytes for detection of faulty behaviors, before the damage is done. Total Time to Insights (TTTI) is reduced to hours, minutes or even seconds, allowing manufacturers to optimize operations and utilize resources more efficiently, growing productivity.

KEY BENEFITS

1
Analysis of terabytes to petabytes of data across complex systems for predictive maintenance.

2
Queries run on massively scalable GPU-based data analytics acceleration platform especially built for peta-scale analytics.

3
No more complex data pre-processing – fast ingestion, correlation, and analysis of data from IIOT devices and sensors from across the manufacturing floor.

4
Total Time to Insights goes down from days to hours and hours to minutes.

5
On-premise, on the cloud and at-the-edge.

ABOUT SQREAM

Visit sqream.com to learn more about how manufacturers around the globe turn their data analytics challenges into increased productivity.

Bring the power of SQream to your business:

info@sqream.com

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