

Cognitive Services for Industries

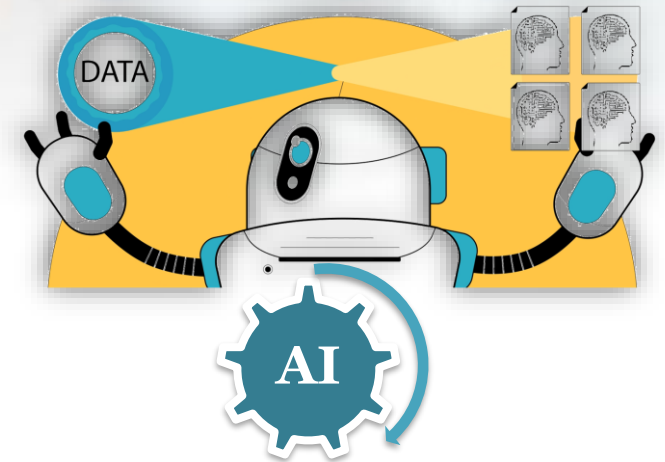
byteLAKE.com/en/CognitiveServices

Advanced quality inspection and data insights

AI for Manufacturing, Automotive, Paper, Chemical, and Energy sectors.

What is AI?

**Converting DATA
into
actionable INSIGHTS
(information)**



Streamlined AI Solution Development Process

byteLAKE's expertise in AI, byteLAKE's suite of AI products



Problem Identification and Solution Exploration



Our journey in developing AI solutions commences by meticulously examining our clients' unique challenges, listening to their problem statements, and brainstorming initial ideas. We work closely with our clients to identify areas where AI can deliver value, generating a comprehensive list of potential AI solutions.

AI Strategy Workshop



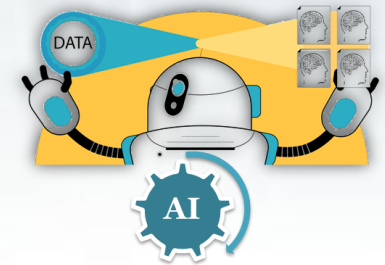
To ensure a clear path forward, we conduct AI strategy workshops, offering our clients a deeper insight into the transformative capabilities of AI solutions. During this phase, we collaboratively chart out deployment plans, meticulously assess the available data resources, and devise strategic activities aimed at guaranteeing the seamless integration of AI into their business operations.

Proof of Concept Development



At byteLAKE, we understand the importance of a gradual approach. Our AI solutions are developed in a stepwise manner, beginning with a limited functionality proof of concept. This approach allows us to validate our clients' objectives, fine-tune our algorithms, and ensure that the solution aligns perfectly with their needs before proceeding to full-scale development.

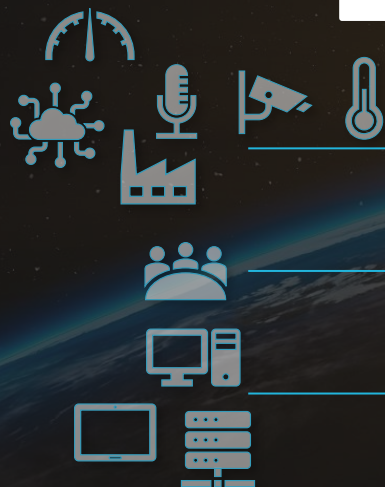
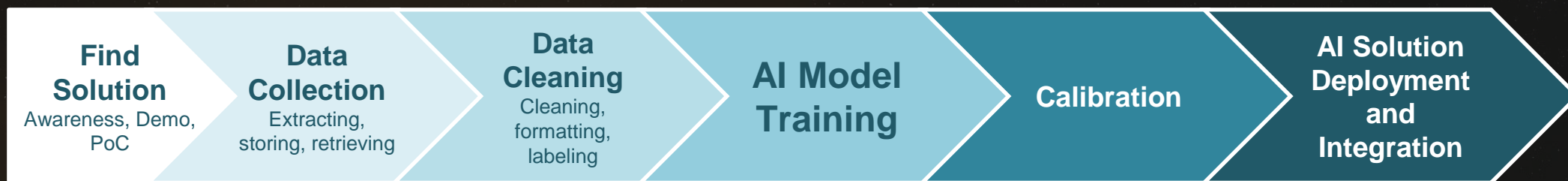
Tailored AI Solution Deployment



Upon successful completion of the proof of concept phase, we embark on the final leg of deployment. Here, our AI product, meticulously trained, calibrated, and customized to precisely fit our client's unique requirements, is primed for production deployment. This phase underscores byteLAKE's commitment to accelerating time to market, ensuring our clients swiftly realize the transformative benefits of AI within their industries.

byteLAKE's AI Solutions for Industries

Optimal Deployment with byteLAKE's AI Products



Data Collection

Data Management

byteLAKE's AI Product

DevOps

AI Consultant

Data Engineer

Data Scientist

AI Engineer

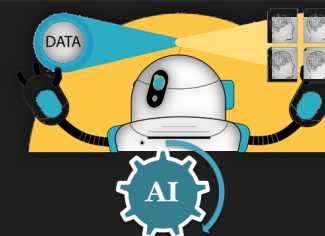
SW Engineer & AI Consultant

Data Sources

Data Storage

Hardware Acceleration

Edge Device



**Advanced
quality inspection
& data insights**

Partners & Clients

byte
LAKE

intel

intel
partner
Gold
IoT Solutions

"AI already plays a very important role in our daily lives. [...] The application of the Intel® Distribution of OpenVINO™ toolkit in byteLAKE's Cognitive Services shows that AI works efficiently as an actual tool for optimizing company operations. Moreover, such a combination reduces the barrier of necessary upgrades to IT infrastructure [...]," said Krzysztof Jonak, EMEA Territory Sales Director, Intel.

intel
RFP
READY

Tridiagonal®
Solutions
compute | innovate | develop

- [LinkedIn.com/company/byteLAKE](https://www.linkedin.com/company/byteLAKE)
- [X.com/byteLAKEGlobal](https://twitter.com/byteLAKEGlobal)
- [FB.com/byteLAKE/](https://www.facebook.com/byteLAKE/)
- byteLAKE.com/en/YouTube
- [Blog](#)



Microsoft
Partner

AB
INNOVATION
DESIGNER
AB GROUP

mondi

MixIT
The Enterprise Mixing Analysis Tool

NVIDIA
INCEPTION PROGRAM

SIMPRA

JME

Bpower2



Nicholas Borsotto Machado Monteiro • 1st
WW AI Business Lead & Head of Lenovo AI Innovators // Co-founder of M...

Professionally and personally I couldn't have asked for better partners than [Marcin Rojek](#), [Mariusz Kolanko](#) and team. Thank you for being with us from the start and allowing us to be your partner for scale. Looking forward to everything that will out next.

Lenovo
AI Innovators
Partner Ecosystem

"We're also **working** with a number of partners on AI initiatives that will provide real world solutions for customers. [...] Our **collaboration** with partners such as Intel, NVIDIA, Mark III systems, and **byteLAKE** greatly expands the resources and expertise we're able to provide", said Dr. Bhushan Desam, Lenovo's AI Global Business Leader, HPC and AI Business.

"Automation and optimization of various business processes are crucial and very high on our agenda when planning future roadmap for Bpower2. We see Artificial Intelligence as the key enabler to achieve such goals. **Being impressed by byteLAKE's achievements and innovativeness in the AI space**, we are very happy to welcome them as our partners who will design and deliver AI-based microservices for Bpower2," said Jacek Rakoczy, Bpower2's CEO.



"byteLAKE saw the potential to make CFD analysis even faster and more easily accessible leveraging the flexibility and superior parallelism of Alveo accelerator cards," said Viraj Paropkari, senior manager, Data Center Marketing, Xilinx. "Our teams worked together to create finely tuned kernels for Alveo accelerators that are ready to deploy on-premise or in the cloud."

More at: byteLAKE.com

byte
LAKE

& Partners

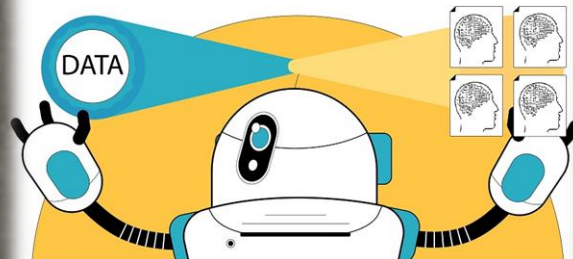


AI
Deployment
Plan

Case
Studies

Science +
business +
industry know-
how

DATA



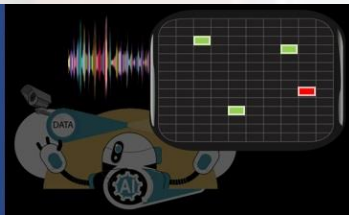
Cognitive Services

AI
Powered
Solutions



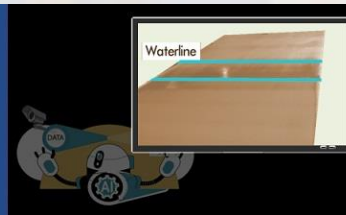
for Manufacturing

AI
Powered
Solutions



for Automotive

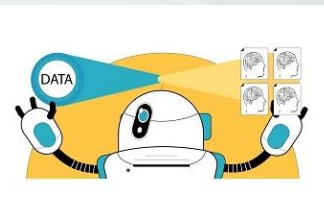
AI
Powered
Solutions



for Paper Industry

Predictive Maintenance

AI
Powered
Solutions



Data Insights

- **Image analytics** for precise visual inspection
- **Sound analytics** enabling proactive maintenance
 - **Wet line analytics**
- **Seamlessly convert data into actionable insights**, enabling advanced predictive maintenance and risk detection

Cognitive Services

AI turning data into information

- **Visual Inspection**
 - Products, parts, components, ...
 - Process monitoring
 - **Sound Analytics**
 - Car engines, bearings, ...
 - Assembly line inspection
 - **Data Insights**
 - Predictive maintenance
 - Identify risks
 - Optimize operations
 - Find dependencies
 - Avoid downtimes
- **Ensure High Quality Standards**



Watch on YouTube: youtu.be/qBtaoIMLedo

Download Tech Brief: bytelake.com/en/download/4400/

Cognitive Services – key features

1. Visual Inspection

- Inspection of products, parts, components, and more.
- Continuous process monitoring for quality assurance.

2. Sound Analytics

- Analyzing sound data for detecting issues in car engines, bearings, and across assembly lines.

3. Data Insights

- Facilitating predictive maintenance to prevent unexpected downtimes.
- Identifying and mitigating risks proactively.
- Optimizing manufacturing operations through data-driven insights.
- Discovering dependencies within your production processes.

4. High-Quality Standards Assurance

- Ensuring adherence to stringent quality standards throughout production.

5. Real-time Alerts

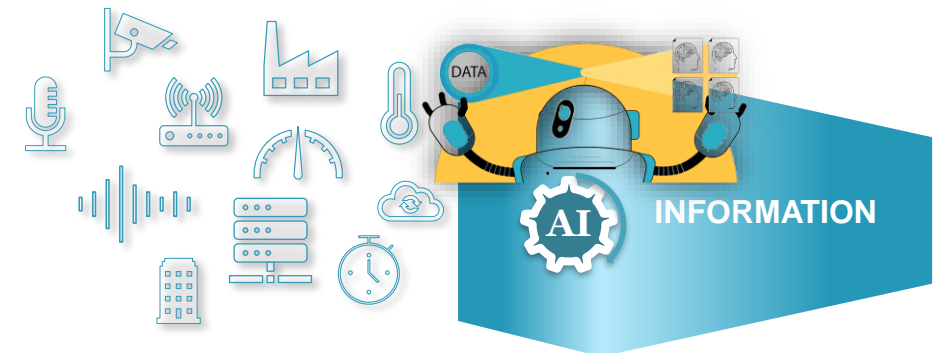
- Providing instant notifications for critical issues, enabling swift action.

6. Enhanced Efficiency

- Streamlining operations and reducing waste through data-driven optimization.

7. Customization and Scalability

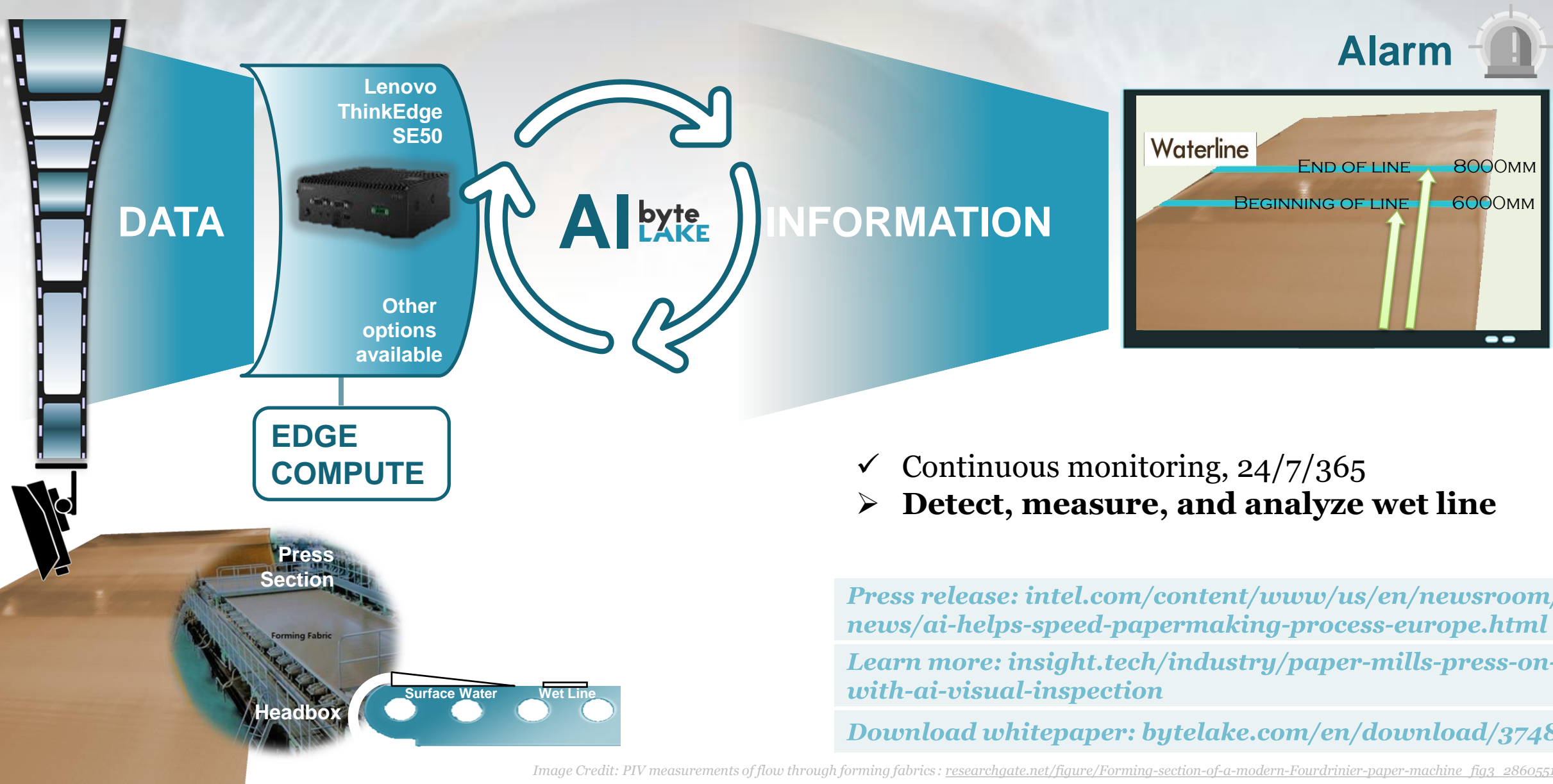
- Tailoring AI models to your specific manufacturing needs.
- Scaling the solution as your production demands grow.



Visual Inspection - manufacturing



Visual Inspection – paper industry



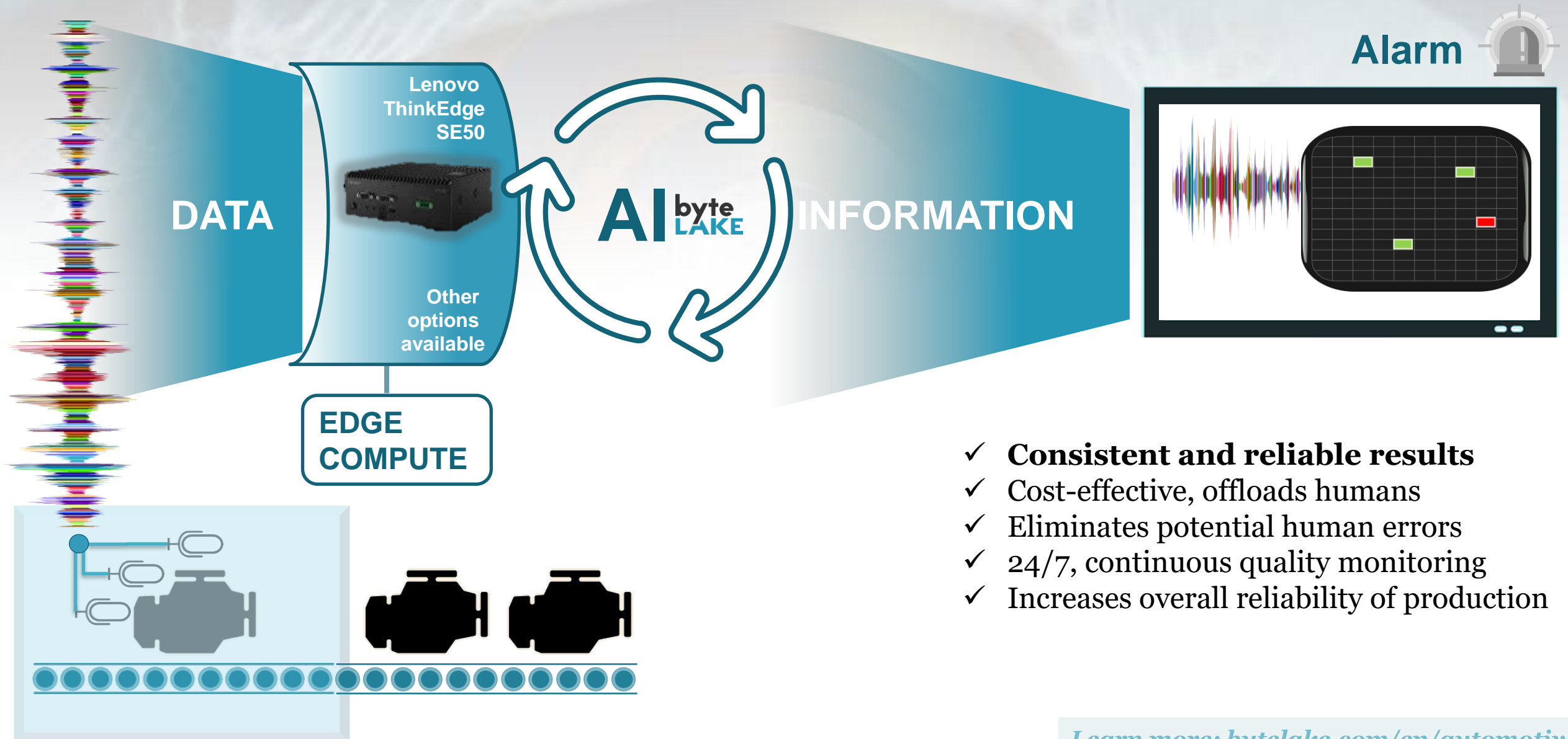
- ✓ Continuous monitoring, 24/7/365
- **Detect, measure, and analyze wet line**

Press release: [intel.com/content/www/us/en/newsroom/news/ai-helps-speed-papermaking-process-europe.html](https://www.intel.com/content/www/us/en/newsroom/news/ai-helps-speed-papermaking-process-europe.html)

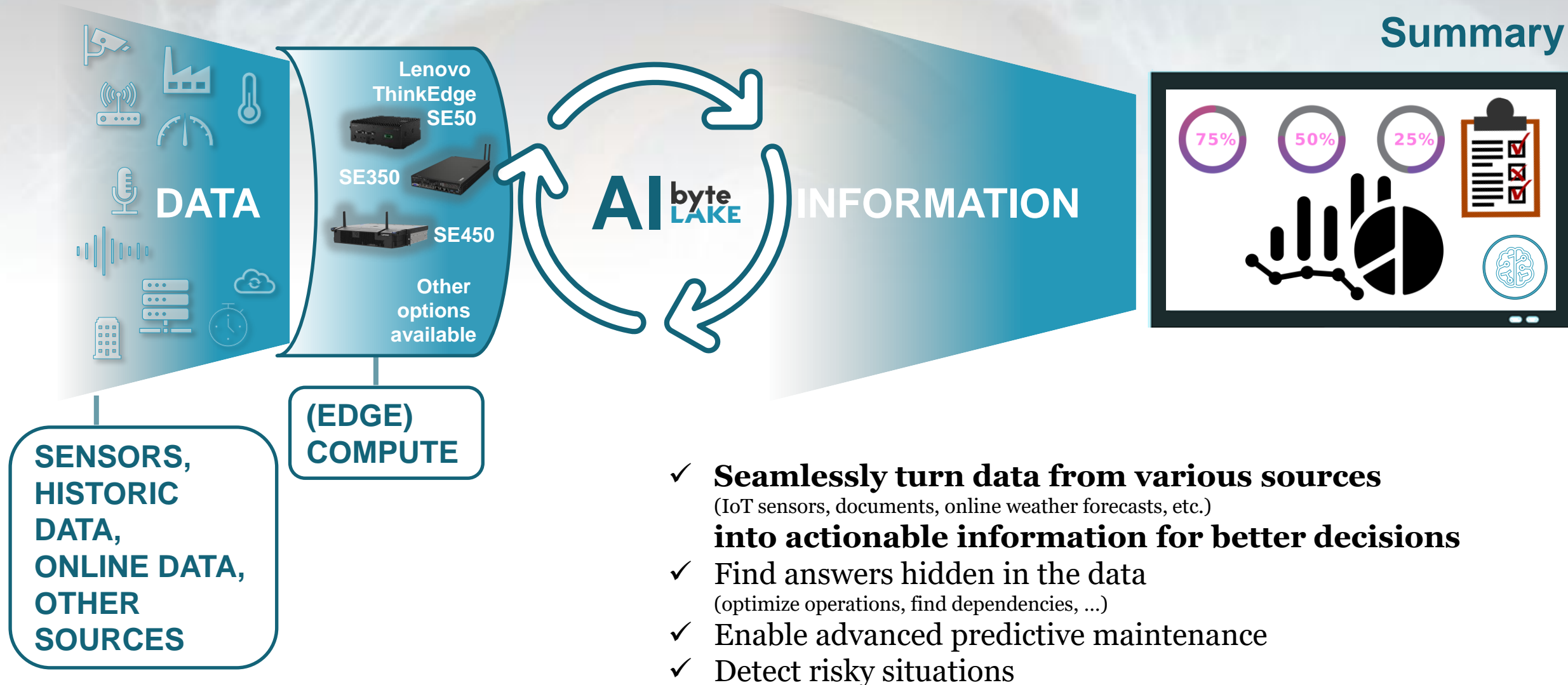
Learn more: insight.tech/industry/paper-mills-press-on-with-ai-visual-inspection

Download whitepaper: bytelake.com/en/download/3748/

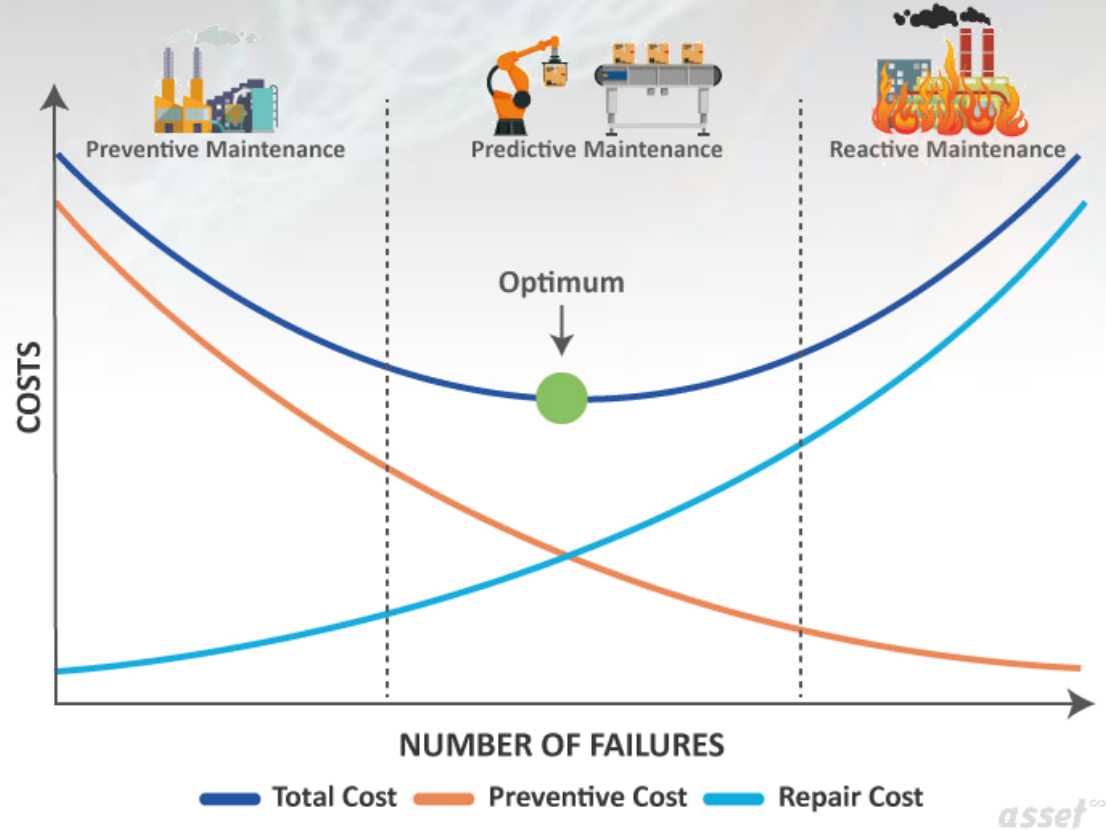
Sound analytics – automotive



Data Insights



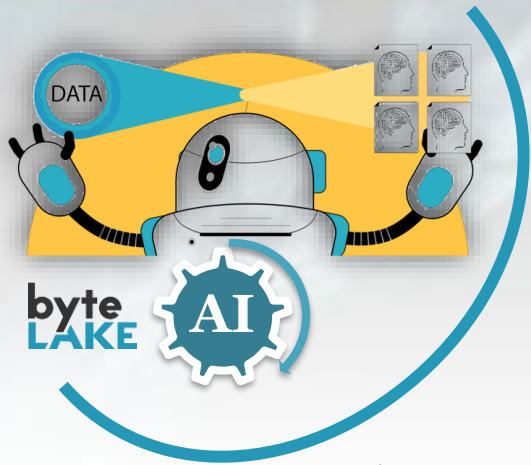
Optimized Maintenance



	Predictive	Reactive	Preventive
Timing	When required	After breakdown	At predefined intervals
Pros	Lowest risk of breakdown	No fixed costs	Lower risk of breakdown than reactive
Cons	High fixed cost	Higher risk of breakdown	Unnecessary maintenance

Performance & Scalability

byte
LAKE



Maximum
Performance

Edge AI



Up to 25x faster

Always optimized for the latest hardware available.

(*) Performance enhancement achieved through the optimization of byteLAKE's Cognitive Services with Intel® OpenVINO™, Intel® DL Boost Vector Neural Network Instructions (VNNI), and others.

*Performance benchmark (Intel® CPUs & GPUs 2024):
(soon)*

*Performance benchmark (Intel® CPUs, 2024):
bytelake.com/en/download/4395/*

*OpenVINO™ benchmark:
bytelake.com/en/download/4067/*

Cost
Efficient

On-premises

Quick deployment
& no external dependencies.

Scalable
Solution



ThinkEdge SE50

ThinkEdge SE350

ThinkEdge SE450

ThinkSystem SR650V2

ThinkSystem SR670V2

Hardware

Example configurations.
Other options available.

camera feeds

1-5

5-20

10-100

50-150

150+

AI solving problems



Visual Inspection

Automated visual inspection & objects recognition

- scratches
- cracks
- dents
- wrong color
- paint chips/peeling
- wrong shape
- fractures
- count objects
- read and analyze labels
- monitor production processes and visually detect anomalies
- etc.

Sound Analytics

Automated quality inspection based on sound analysis

- enable proactive maintenance
- car engines quality check
- monitor bearings performance
- inspect assembly lines
- analyze sound samples, filter out noise, identify characteristic parts
- detect anomalies
- etc.

Data Insights

Converting DATA into actionable INSIGHTS

- understand why something happens
- what will likely happen and when?
- find optimal configuration
- explore dependencies
- etc.

Watch on YouTube: youtu.be/qBtaoIMLedo

Download Tech Brief: bytelake.com/en/download/4400/

Unlocking Opportunities with AI

Anomaly Detection, Reduced Downtime, Increased Productivity

\$200K

Average cost of unexpected
downtime per hour

~4 Hrs

Average equipment
breakdown time.
Average loss: \$1,040,000.

~80%

Companies affected by
unexpected downtime
in the past 3-4 years.

25% ↓

Lower
maintenance costs

70% ↓

Less
breakdowns

35% ↓

Less
downtime



Too Early / Too Late
Maintenance

>75%

Zero unexpected downtime
as a top priority
for most organizations.

+20% improving
over time

Increased
productivity



Unexpected
Downtime

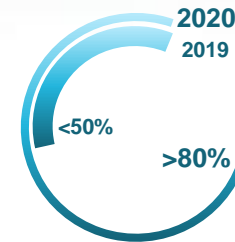
The average cost of an unplanned downtime is USD \$220,000 a day for a paper or pulp plant.

International Journal of Strategic Engineering Asset Management

Benefits offered by byteLAKE's Cognitive Services



- **Accelerate Data Analytics**
 - Processing data from various sources, including images, videos, and sensors.
- **Automate Quality Inspection**
 - Ensuring high accuracy in inspecting products and processes.
 - Eliminating potential human errors for consistent and reliable results.
 - Increasing overall quality and reliability.
- **Optimize Operations and Maintenance**
 - Reducing unnecessary inspections and lowering maintenance costs.
 - Predicting potential failures and downtimes.
- **Continuous Monitoring**
 - Offering 24/7/365 monitoring without boredom or distraction.
 - Offloading and supporting human operators.
- **Easy Replication**
 - Enabling quick deployment.
 - Functioning offline without an internet connection.
- **Continuous Improvement**
 - The solution can learn and improve over time.



**Growing AI
adoption**

~80%
Human quality control's
average accuracy

99%
Accuracy with AI

AI in Manufacturing - benefits

- **Enhanced Productivity**

- Streamlining processes for increased productivity.
- Efficient resource allocation based on real-time data.

- **Customization and Adaptability**

- Tailoring AI models to specific manufacturing requirements.
- Adapting to changing production needs seamlessly.

- **Reduced Downtime**

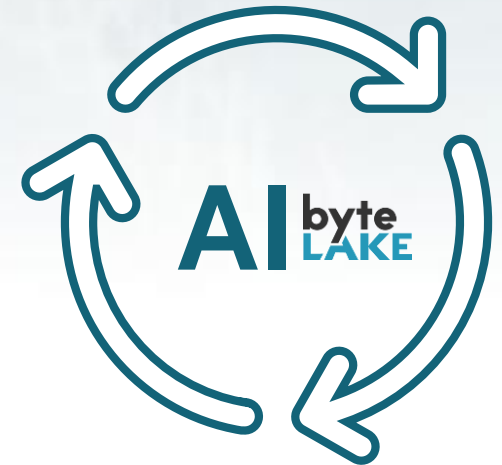
- Minimizing production downtime through predictive maintenance.
- Optimizing machine uptime and reliability.

- **Data-Driven Decision-Making**

- Empowering decision-makers with actionable insights.
- Enabling data-driven strategies for process improvement.

- **Consistent Quality Control Across the Organization**

- Ensuring consistent product quality throughout the production process.
- Meeting industry standards and regulations effortlessly.



Evolution of Industry: 4.0 and beyond

2020 - ????

Industry 5.0

Human-centric
and resilient
European
industry.
Reinforces the role
and the
contribution of
industry to society



2011 - Today

Industry 4.0

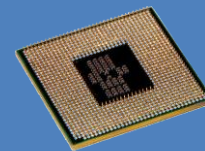
Cyber Physical
Systems
Internet of things,
Networking,
Big Data,
Artificial
Intelligence



1960-2010

Industry 3.0

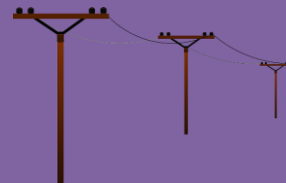
Computers and
electronics
Automation



1830s-1915

Industry 2.0

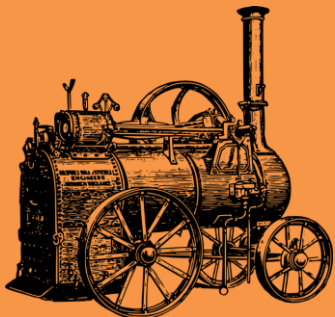
Electricity
Mass production
Assembly line



1760-1840

Industry 1.0

Mechanization
Steam power
Weaving loom



Case Study – AI for Industry 4.0



A Business Value Case Study, sponsored by Intel



INTEL OPTIMIZED CASE STUDY SERIES

How byteLAKE Creates AI-Driven Industrial Solutions Using Intel Xeon Scalable Processors

- ✓ **High Performance and Accuracy**
- ✓ **Edge AI Optimized Solution**
- ✓ **Continuous Monitoring**
- ✓ **Industry 4.0 Automation**

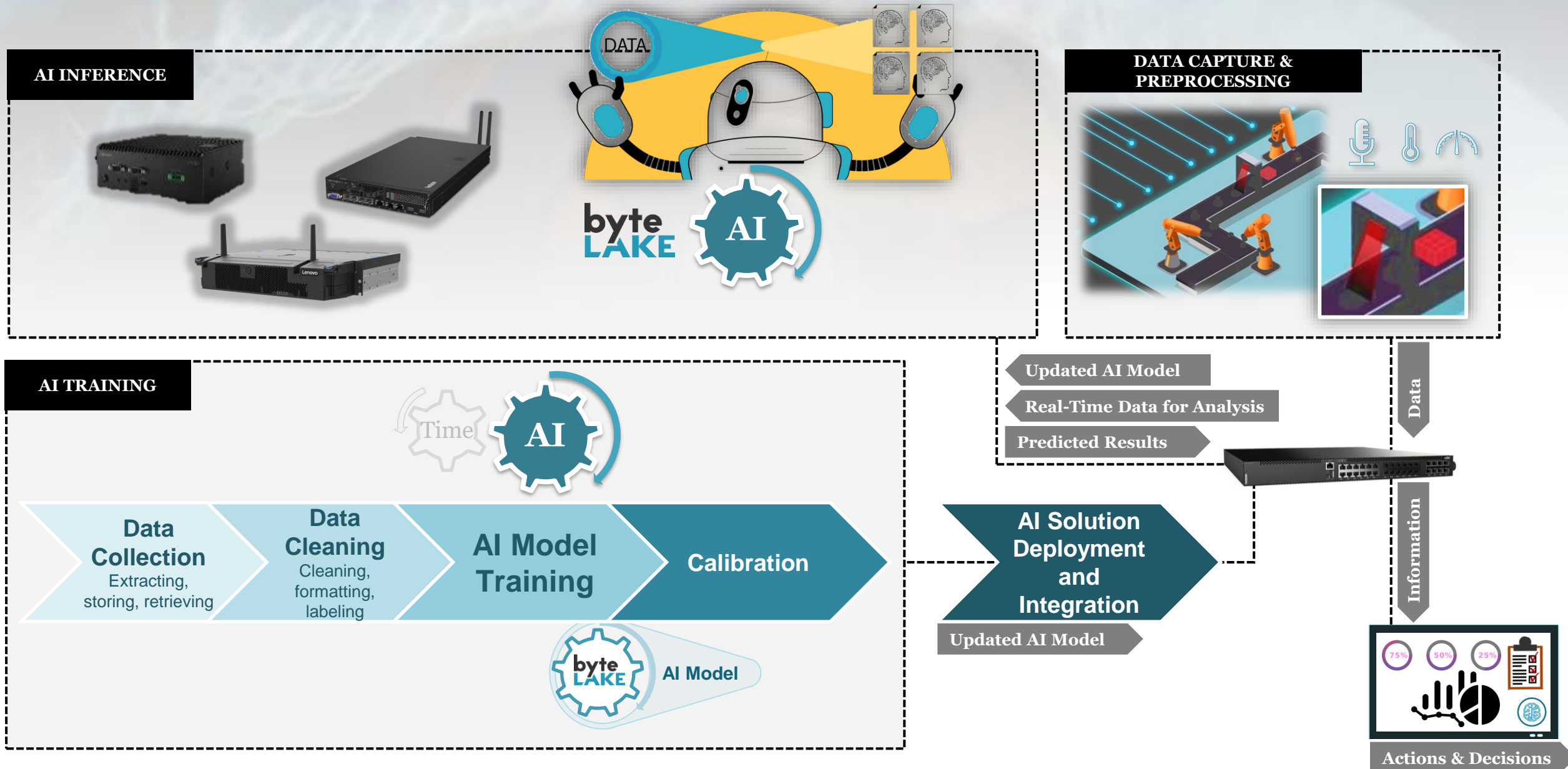


Automated Quality Inspection

Deployment & Licensing

byteLAKE's Cognitive Services

Cognitive Services Deployment Architecture

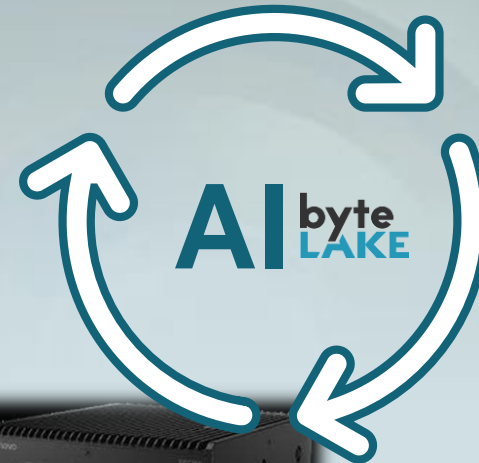


Cognitive Services

AI Quality Inspection System / Data Insights



EDGE AI

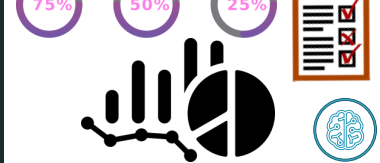
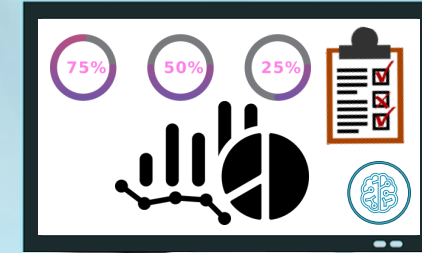


AI Model

Data

Information

FRONT-END



- Quality Analytics
- Data Analytics

- Dashboard
- Actions & Decisions

- Production Line
- Assembly Line
- Infrastructure

Edge AI

Data processed close to where it is produced, on-premises

AI on Edge: limitless possibilities

Bringing
Artificial
Intelligence
to the Edge



- **Real-time Decision-Making**

- Immediate AI analysis at the edge enables rapid decision-making without relying on external services, critical for industrial applications.

- **Energy Efficiency**

- Edge AI can optimize energy consumption by processing data locally and reducing the need for constant data transmission.

- **Offline Operation**

- Edge AI allows devices to continue functioning and making decisions even when there is no internet connectivity.

- **Redundancy and Reliability**

- Distributed edge AI systems can offer redundancy and fault tolerance, ensuring continued operation in case of device or network failures.

- **Enhanced Privacy and Security**

- AI processing on the edge device reduces the need to transmit sensitive data to external servers, enhancing data privacy and security.

- **Low Bandwidth Requirements**

- Edge AI minimizes the need for continuous high-bandwidth data transfer, reducing network congestion and associated costs.

- **Customization and Adaptation**

- Edge AI models can be tailored to specific device requirements and updated easily to adapt to changing conditions.

How to Start - preparations

Cognitive Services

1. Define the Scenario

- Determine the purpose of AI analytics, such as detecting surface anomalies, monitoring assembly lines, automating operations, accelerating processes (e.g., production, purchasing), automating repetitive and dangerous tasks, improving analytics for better decision-making, and enabling predictive maintenance. Are there any other specific objectives?

2. Explain Expectations

- Discuss the placement and quantity of cameras or sensors to be used if known.
- Describe existing and potential data sources, including future ones if known.
- Specify the desired level of accuracy.
- Provide information about production rates and expected system performance, considering future growth.
- Define uptime requirements and any other specific system requirements.



How to Start - first steps in the project

Cognitive Services

1. Scenario Explanation

- Provide example pictures, videos, or other relevant data.
- Conduct online consultations or arrange in-person meetings as needed.

2. Initial Data Insights

- Explain your data, including types, ranges, and dependencies.
- Identify unusual scenarios or exceptions.
- Determine if historic data is available and note any gaps.
- Discuss data storage methods and assess the need for changes or improvements.
- Share sample data with us.

3. Online Q&A Session

- Conduct an online Q&A session to address questions about the presented data and scenario.

4. Deployment Plan and Schedule

- Present a detailed deployment plan and schedule prepared by byteLAKE.



Licensing & Cost of Deployment

Cognitive Services

- **Licensing**

- Annual/monthly licensing plans for Cognitive Services, including upgrades, customer care, and support.

- **AI Model Development**

- Costs for AI model training and calibration.

- **Data Management**

- Expenses related to data collection and cleaning.

- **Hardware and Software**

- Hardware costs, including PCs and sensors, as well as any associated licenses.
- Installation expenses.

- **Integration and Deployment**

- Integration efforts as required for successful deployment.



Learn more

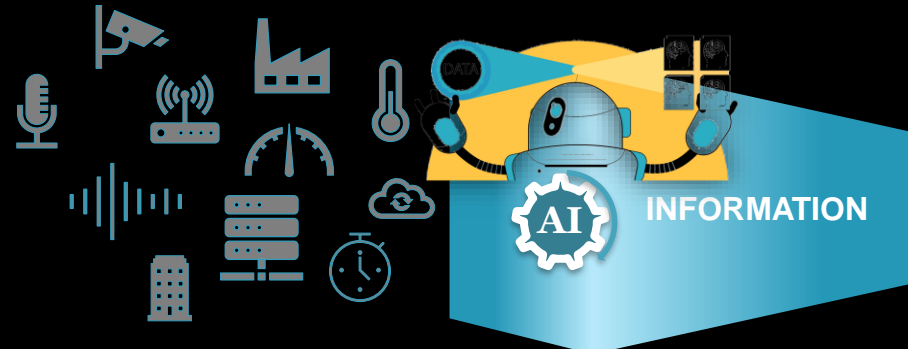
byteLAKE's Cognitive Services

Blog post series

byteLAKE.com/en/CognitiveServices-toc

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 - [Direct link to a video](#)
4. [Revolution in factories: Industry 4.0. \(conference: Made in Wroclaw 2020\) \(translation\)](#)
 - [Video recording \(in Polish, English subtitles\)](#)
 - [Presentation in English, in Polish](#)
5. [AI-accelerated Computational Fluid Dynamics \(CFD\) simulations \(blog post series\)](#)
6. [Backoffice tasks automation: AI for document processing](#)



Website:

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Contact us

CognitiveServices@byteLAKE.com

Meet byteLAKE

AI Solutions for Industries |
Quality Inspection |
Data Insights |
Predictive Maintenance |
AI-accelerated CFD |
Self-Checkout

Empowering Industries with Artificial Intelligence Solutions.

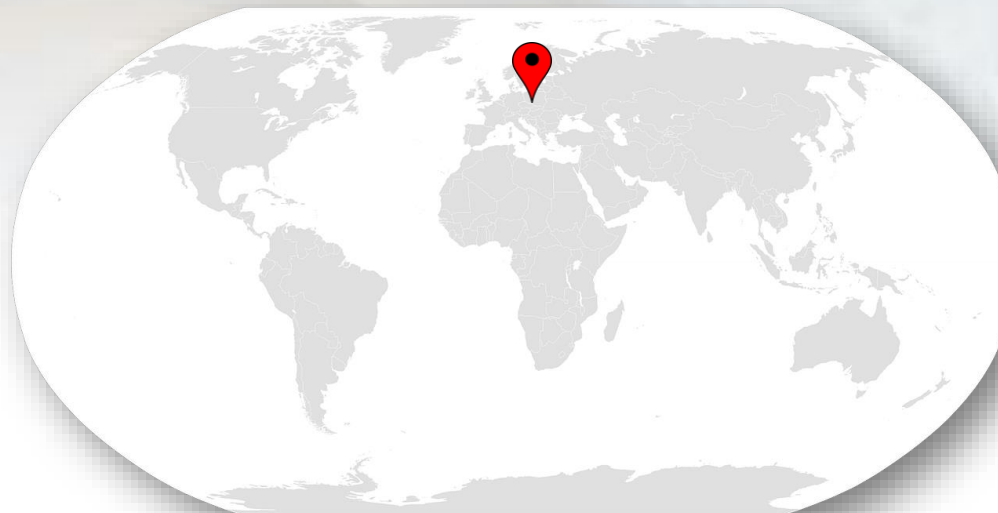
At byteLAKE, we harness cutting-edge technology to provide advanced quality inspection and data insights tailored for the Manufacturing, Automotive, Paper, Chemical, and Energy sectors.

Additionally, we offer self-checkout stations for Restaurants and object recognition solutions for Retail businesses.

www.byteLAKE.com

byte
LAKE

Headquartered in Poland

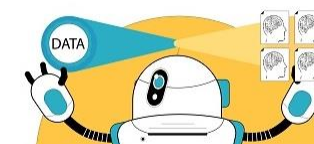


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+48 505 322 282
welcome@byteLAKE.com

Products:



CFD Suite



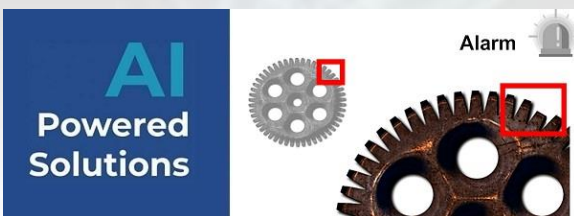
Cognitive Services

byteLAKE's AI Products



Cognitive Services

Advanced quality inspection and data insights.



for Manufacturing



for Automotive



for Paper Industry

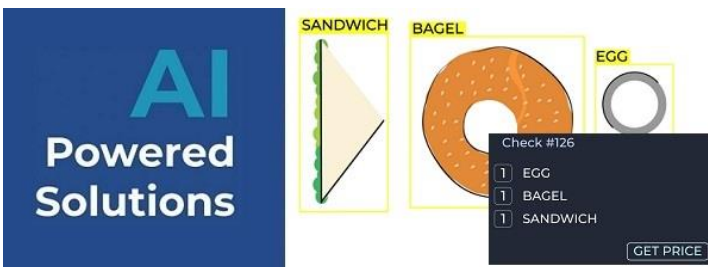
Predictive Maintenance



Data Insights

Cognitive Services for Restaurants

Self-checkout and object recognition.



CFD Suite

AI-accelerated Computational Fluid Dynamics.