byte LAKE

AI Solutions for Industries

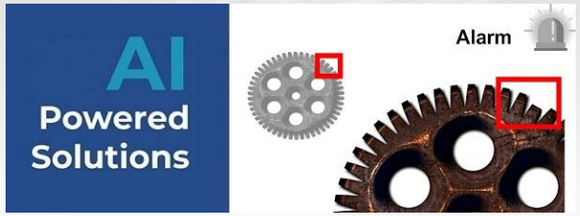
Advanced quality inspection and data insights

AI for Manufacturing, Automotive, Paper, Chemical, and Energy sectors.
AI self-checkout stations for Restaurants and object recognition Retail businesses.

byteLAKE's AI Products

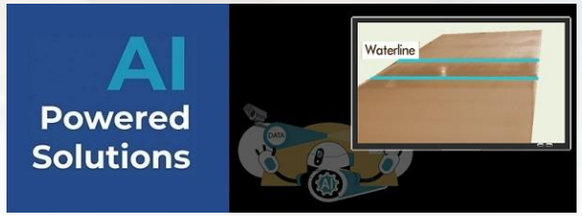
Cognitive Services

Advanced quality inspection and data insights.



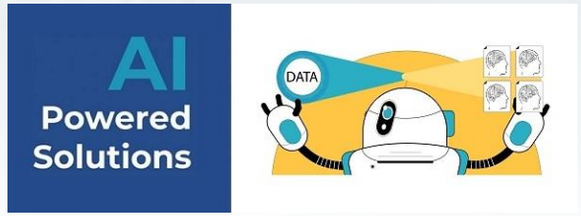
for Manufacturing

for Automotive



for Paper Industry

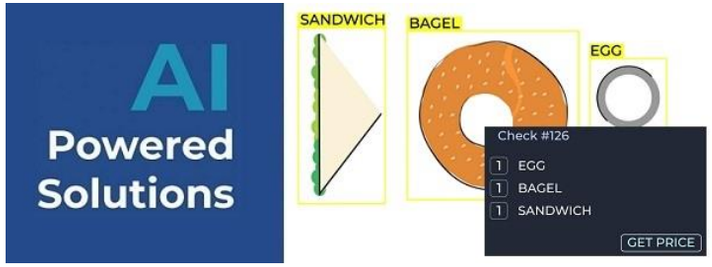
Predictive Maintenance



Data Insights

Cognitive Services for Restaurants

Self-checkout and object recognition.



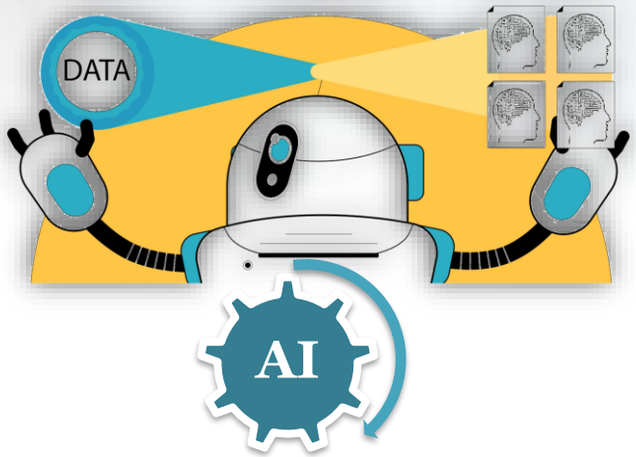
CFD Suite

AI-accelerated Computational Fluid Dynamics.

What is AI?

byte LAKE

Converting DATA into actionable INSIGHTS (information)



Cognitive Services

AI turning data into information

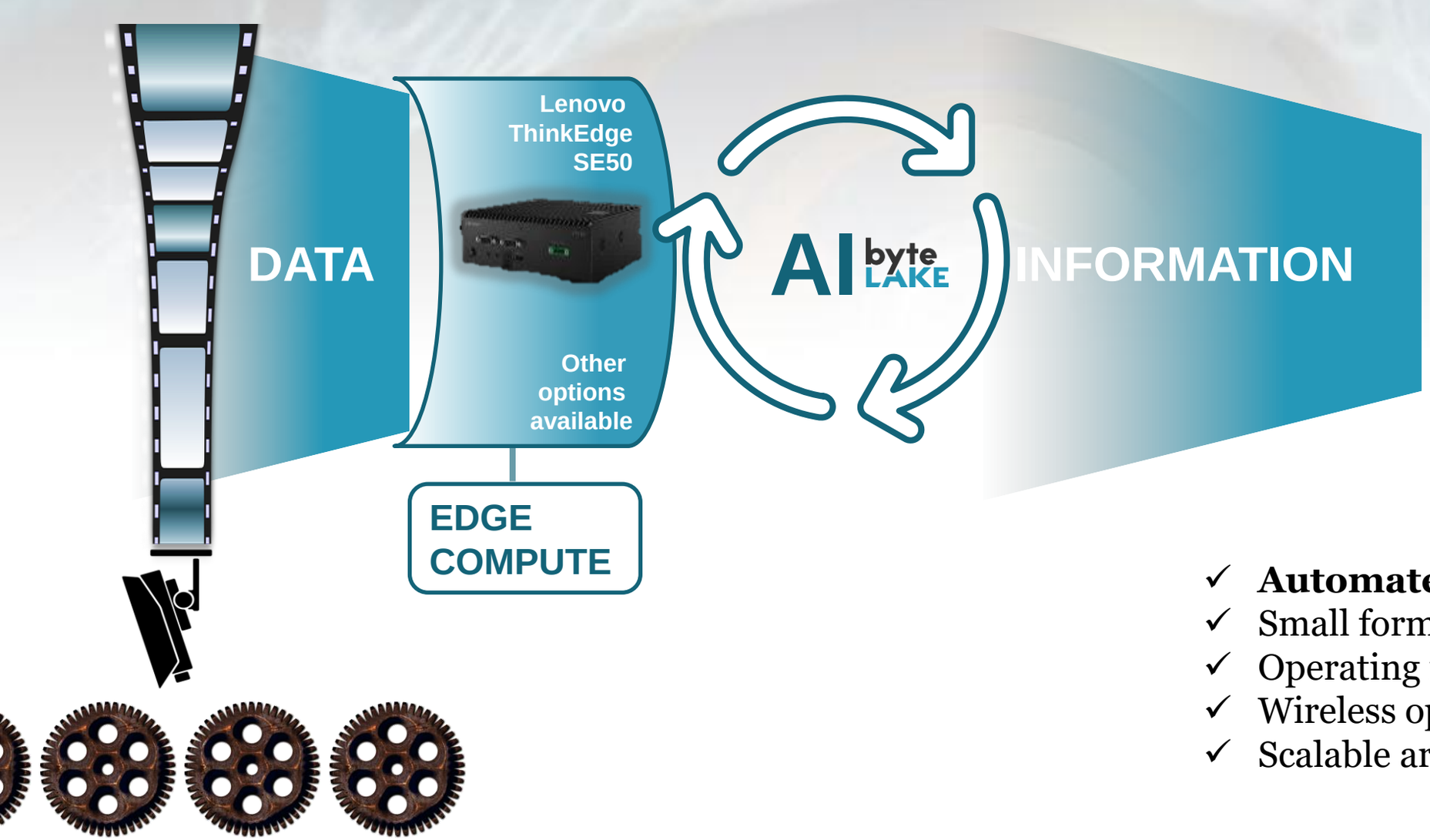
- **Visual Inspection**
  - Products, parts, components, …
  - Process monitoring
- **Sound Analytics**
  - Car engines, bearings, …
  - Assembly line inspection
- **Data Insights**
  - Predictive maintenance
  - Identify risks
  - Optimize operations
  - Find dependencies
  - Avoid downtimes

➢ **Ensure High Quality Standards**

Watch on YouTube: youtu.be/qBtaoIMLedo

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

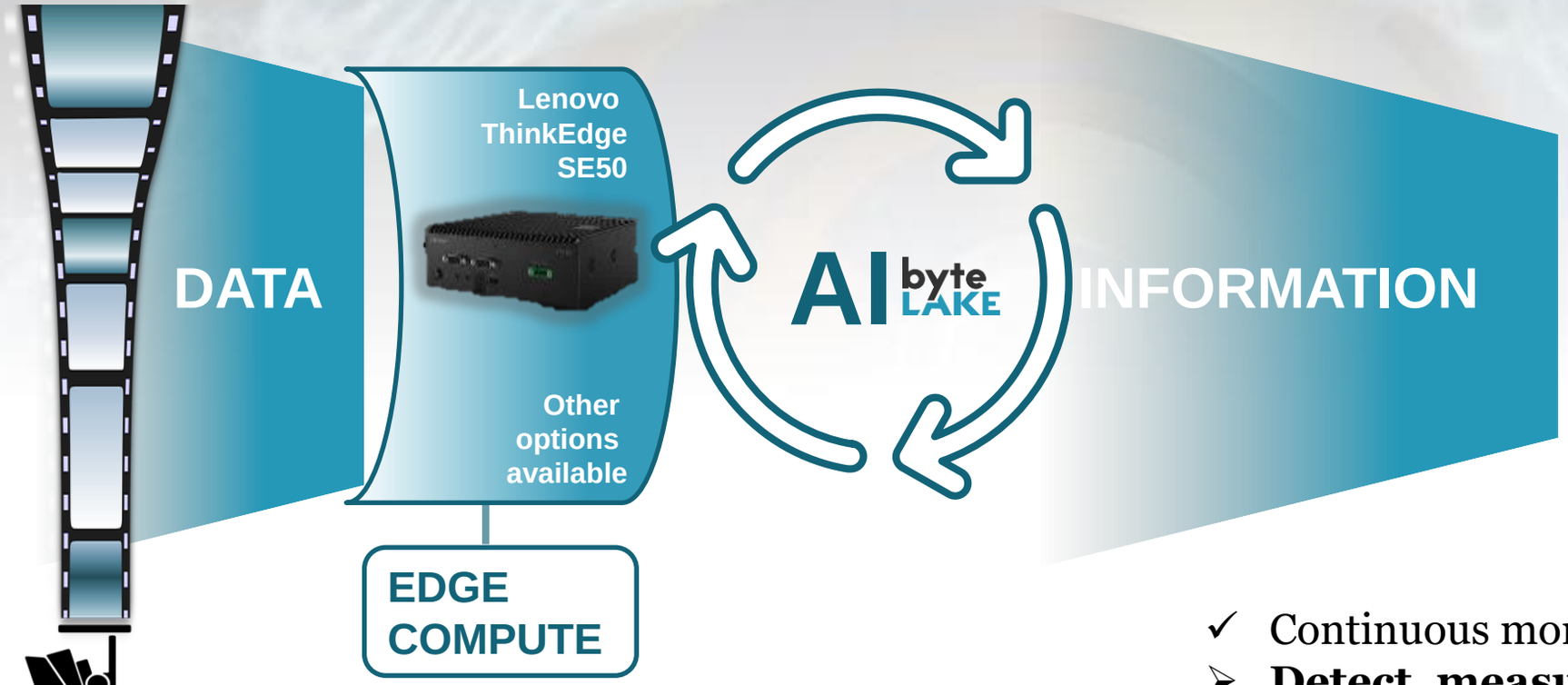
Visual Inspection - manufacturing

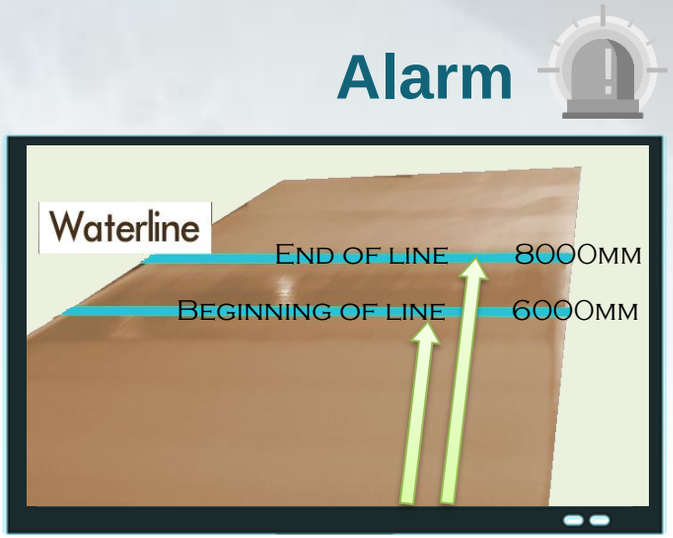


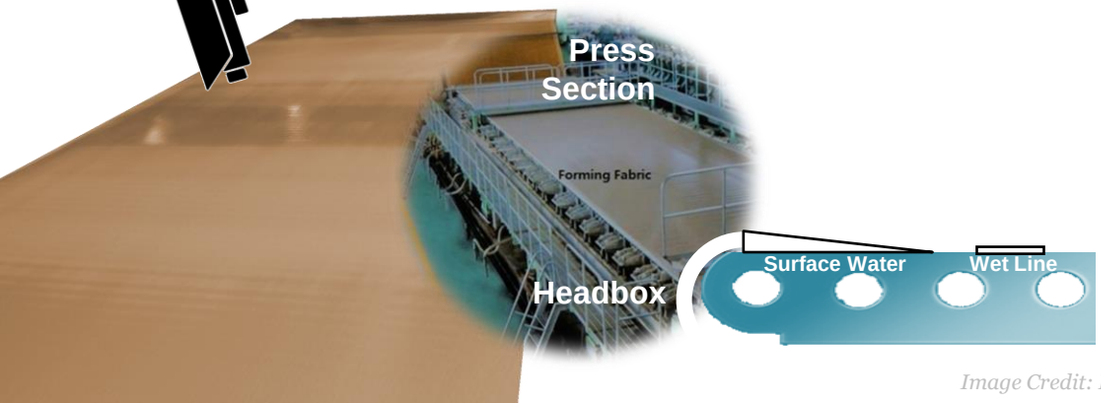
- ✓ **Automate quality inspection**
- ✓ Small form factor
- ✓ Operating in difficult environments
- ✓ Wireless options
- ✓ Scalable architecture

Learn more: insight.tech/industry/applying-industrial-ai-models-to-product-quality-inspection

Visual Inspection – paper industry







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

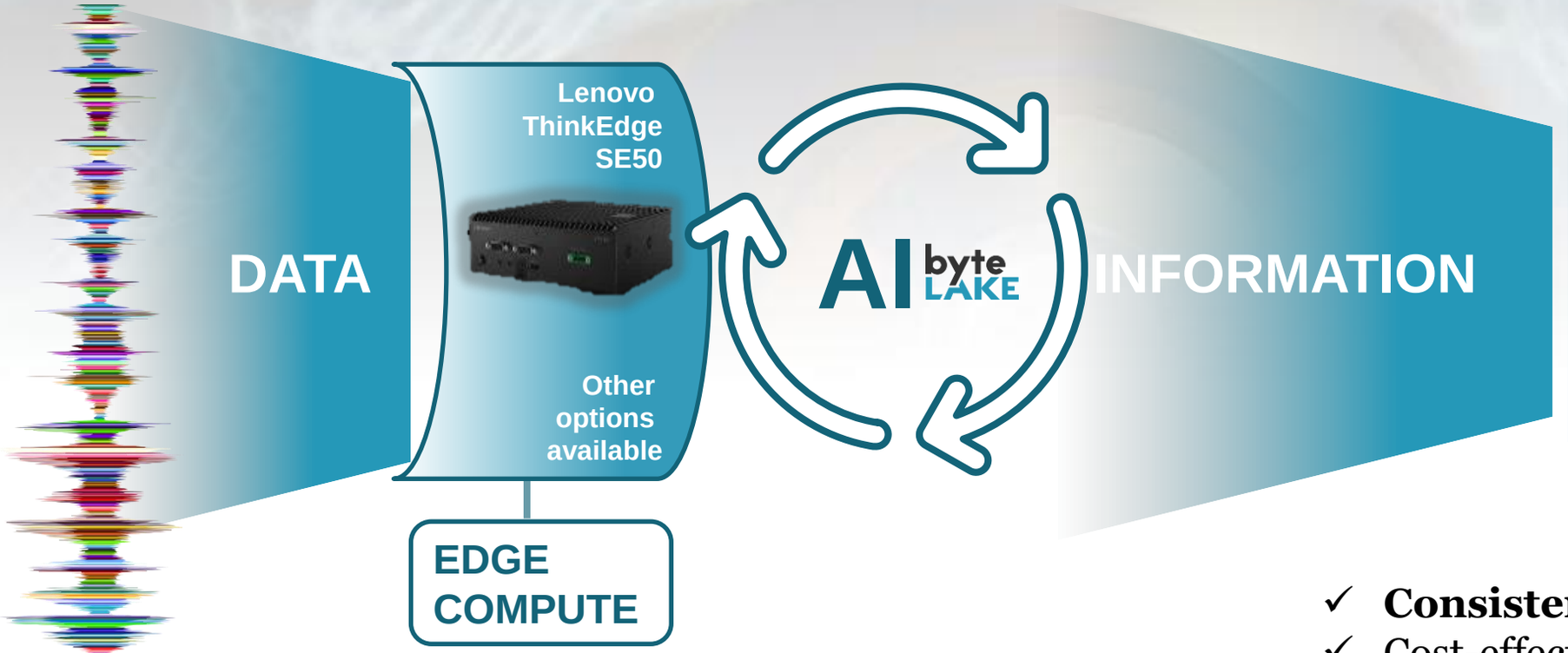
Press release: intel.com/content/www/us/en/newsroom/news/ai-helps-speed-papermaking-process-europe.html

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

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

Image Credit: PIV measurements of flow through forming fabrics : researchgate.net/figure/Forming-section-of-a-modern-Fourdrinier-paper-machine_fig3_286055124

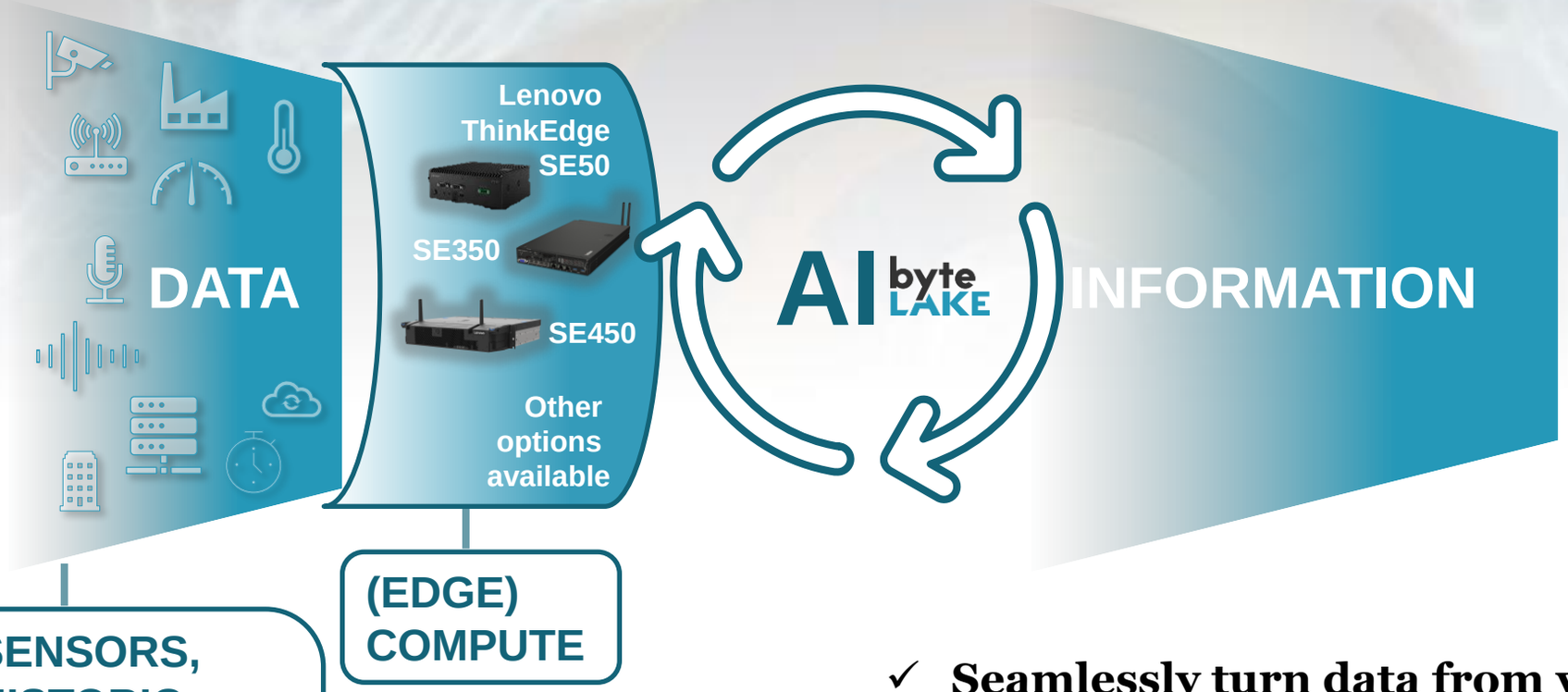
Sound analytics – automotive



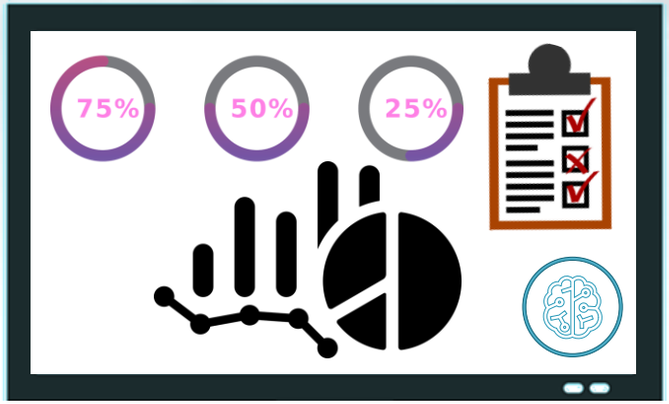
- ✓ **Consistent and reliable results**
- ✓ Cost-effective, offloads humans
- ✓ Eliminates potential human errors
- ✓ 24/7, continuous quality monitoring
- ✓ Increases overall reliability of production

Learn more: bytelake.com/en/automotive

Data Insights



Summary



- ✓ **Seamlessly turn data from various sources**
  (IoT sensors, documents, online weather forecasts, etc.)
  into actionable information for better decisions
- ✓ Find answers hidden in the data
  (optimize operations, find dependencies, ...)
- ✓ Enable advanced predictive maintenance
- ✓ Detect risky situations

Learn more: byteLAKE.com/en/DataInsights

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.

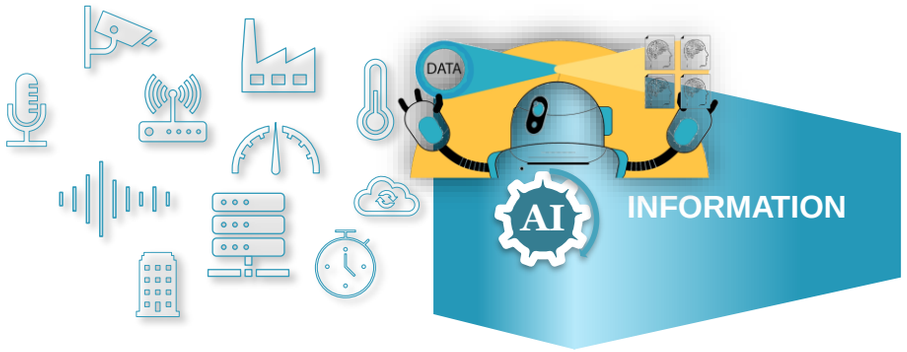
3. **Data Insights**
   - Facilitating predictive maintenance to prevent unexpected downtimes.
   - Identifying and mitigating risks proactively.
   - Optimizing manufacturing operations through data-driven insights.
   - Discovering dependencies within your production processes.

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.



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

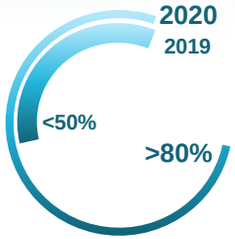
- understand why something happens
- what will likely happen and when?
- find optimal configuration
- explore dependencies
- etc.

Watch on YouTube: youtu.be/qBtaoIMLedo

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

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.



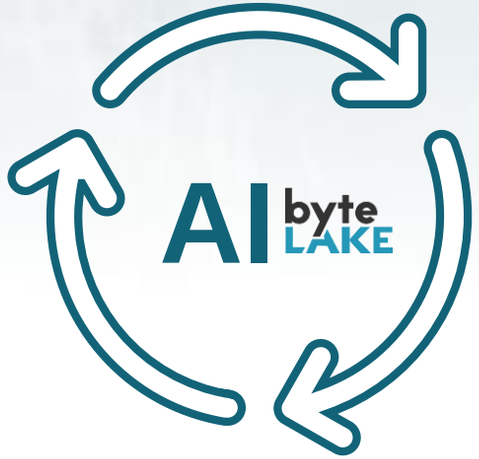
Growing AI adoption

~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.

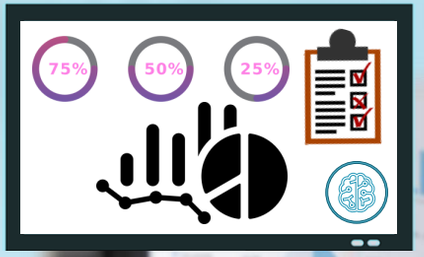


Cognitive Services

AI Quality Inspection System / Data Insights

EDGE AI

FRONT-END



Data

Information

- Production Line
- Assembly Line
- Infrastructure

- Quality Analytics
- Data Analytics

- Dashboard
- Actions & Decisions

Cognitive Services for Restaurants

Self-checkout & Object Recognition

- **Self-Checkout:**
  - Camera recognizes meals and groceries
  - Recognized items are sent to the POS terminal
- **Complete Solution:**
  - Integration with Simpra
  - Includes POS, payment functionalities, and more
- **Easy Installation:**
  - Requires PC or active online subscription and camera
  - Simpra + POS / integration

➢ **Enhances Customer Satisfaction**

Watch on YouTube: youtu.be/FZmfGUyvZtk

Learn more: bytelake.com/en/AI4Restaurants

Self-checkout for Restaurants

Local AI Installation or Online Subscription AI Installation

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LIST OF ITEMS

Check created automatically

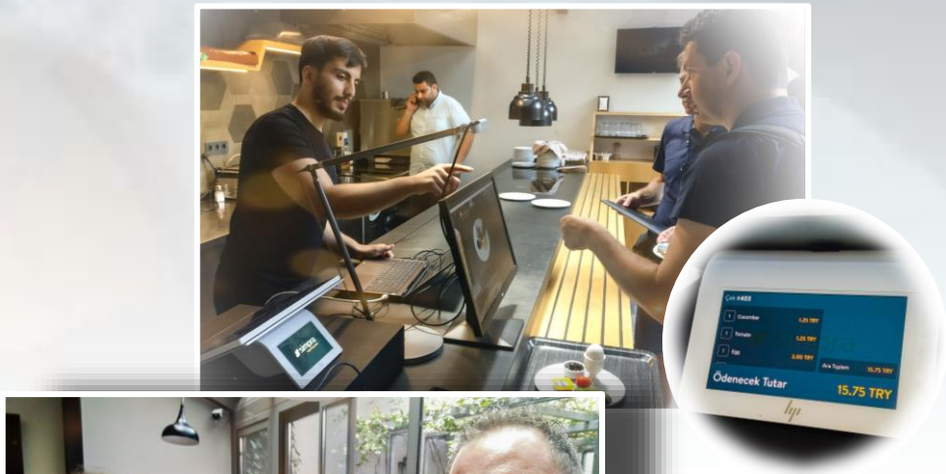
PAYMENT

SIMPRA

1. Place items on a tray
2. Approach the cashier
3. The cashier taps on "Check Create with AI"
4. A picture is taken, and AI recognizes the items
5. The list of items is sent to the POS
6. List can be reviewed / updated
7. Payment

See Live Demo: youtu.be/-9tcxRfhrOA

Case Study



- ✓ **Enabled efficient self-checkout**
- ✓ **Reduced queues and wait times**
- ✓ **Improved customer satisfaction**

Watch on YouTube: youtu.be/t6sHCjMwmNw

AI for Computational Fluid Dynamics
Why do we need it?

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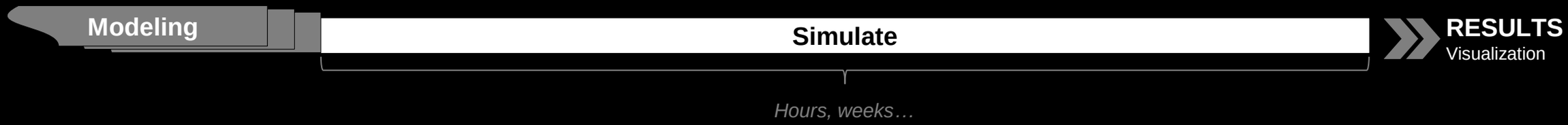
Simulations take days to complete.

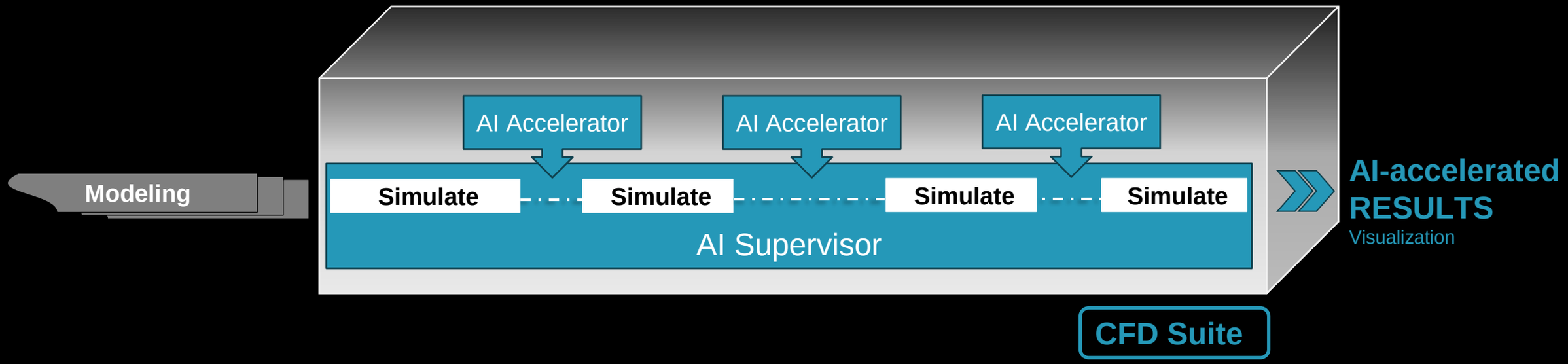
Customers need faster time to insights.

AI-accelerated CFD

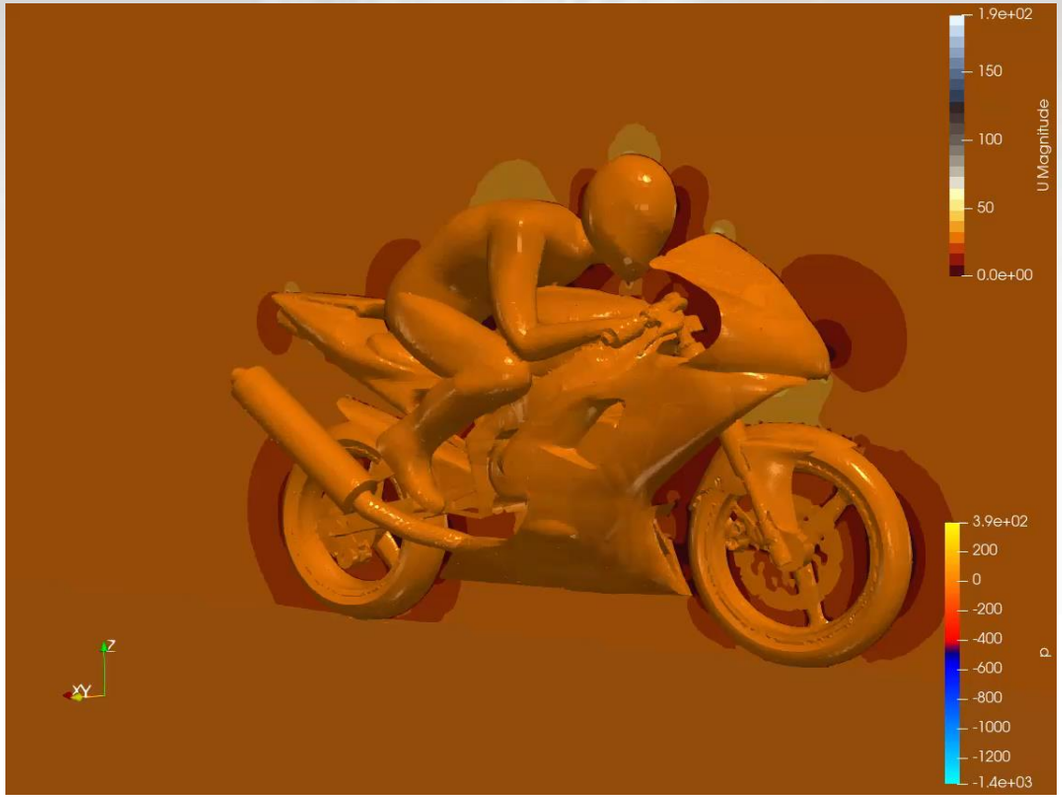
- **Traditional workflow**



- **byteLAKE's CFD Suite**



Results: MotorBike Steady



CFD Suite

AI byte LAKE

AI-ACCELERATED CFD

10x
Speedup
Faster Time to Insights

99%
Accuracy with AI

43x
Speedup
Faster Time to Insights

90%
Accuracy with AI

Benefits
offered by byteLAKE's CFD Suite

Faster Time to Insights
- Swift simulation results enable quicker decision-making and problem-solving.

Cost Reduction
- Lower costs associated with reduced trial and error experimentation.

Rapid Design Iteration
- Accelerated simulations allow for faster prototype design and testing

Improved Productivity
- Enhanced efficiency in research and development processes.

Enhanced Safety Measures
- Quick assessments of safety protocols and potential risks.

Energy Efficiency Optimization
- Faster insights into optimizing energy consumption and resource utilization.

Resource Conservation
- Reduced resource consumption in experimental setups.
- Leverage data generated by past simulations

Competitive Advantage
- Faster product development and innovation lead to a competitive edge.

Real-time Monitoring
- Possibility of real-time monitoring for immediate adjustments.

byteLAKE's CFD Suite:
Beyond Acceleration

- **Multi-Purpose Training:**
  - Selection and prioritization of geometries based on AI-predicted efficiency
  - Optimization of configurations and meshing operations

- **Comprehensive Process Optimization:**
  - AI-driven enhancements across a wide range of CFD simulation processes

Outcome:

- Faster time to insights
- Lower costs
- Enhanced efficiency in CFD simulations

Successful AI strategy

AI use cases

- **Visual inspection (products, processes) for better quality.**
- **Analyze data from various sources for better decisions, optimal results, improved quality and reliability.**
- **Automate complex tasks for better performance.**

We need AI!

"I read an article in Forbes and if we don't have an AI strategy, we're going to fall behind the competition!"

AI Solution

byte LAKE

- **Data Sources**
- **Big Data**
- **AI Training**
- **AI Solution**

AI for Industry 4.0 – blog post series
www.bytelake.com/en/CognitiveServices-toc

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.

Contact us to learn more!

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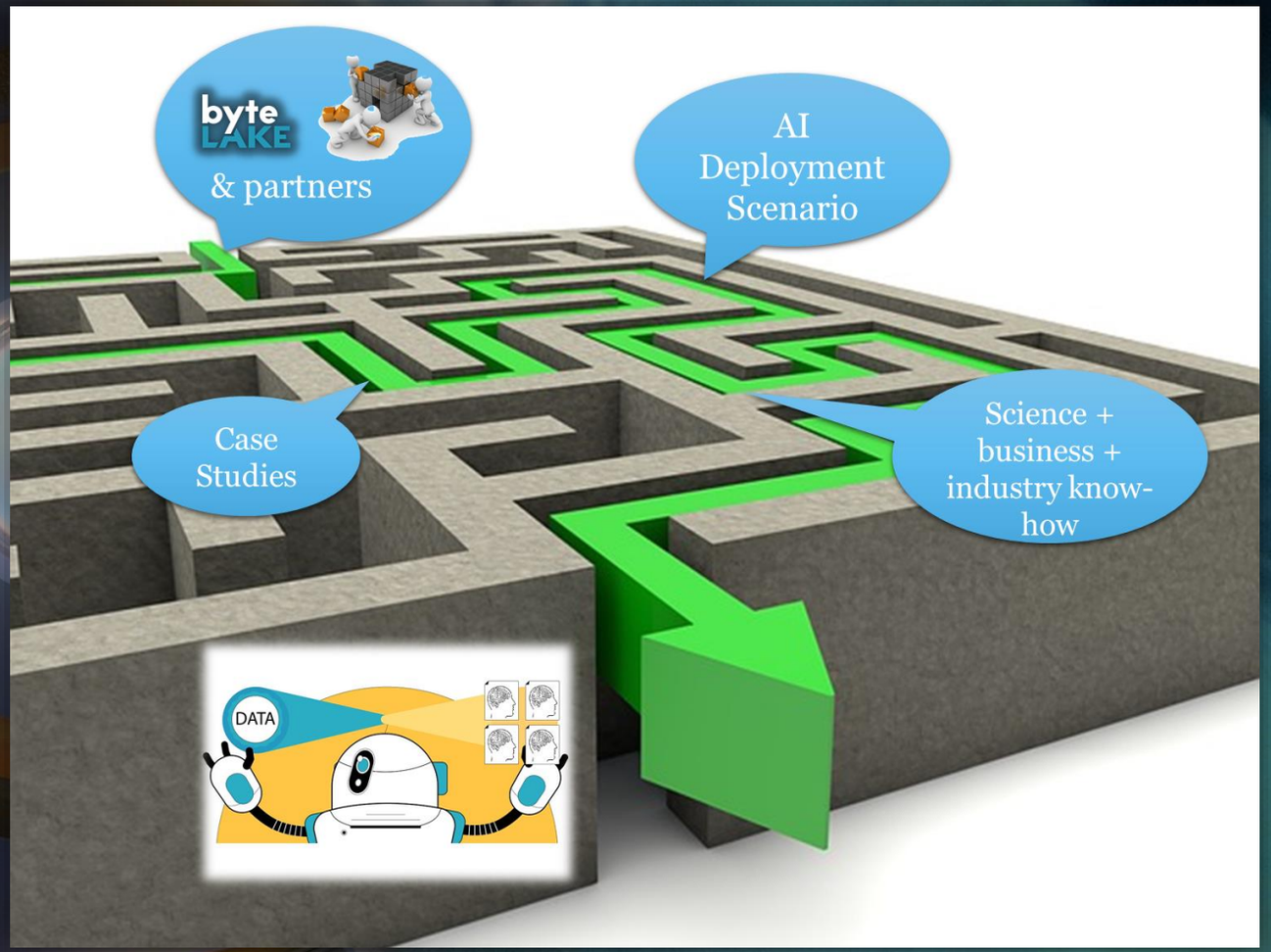
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