

Solution Brief

Smart AI Solutions for Quality Control, Predictive Maintenance, and Energy Optimization
Artificial Intelligence



Automating Utility Management and Optimizing Resource Allocation with byteLAKE Cognitive Services Solution

byteLAKE Cognitive Services, powered by Intel® processors and enhanced by the Intel® Distribution of OpenVINO™ toolkit, empowers energy and manufacturing industries to optimize operations, reduce costs, and enact predictive maintenance.

accelerated by intel.

About byteLAKE

Founded in 2016, byteLAKE's team empowers industries through innovative AI solutions. Leveraging their extensive expertise, byteLAKE addresses the unique challenges and goals of each client, ensuring tailored solutions that meet individual needs. Within industrial verticals, their Cognitive Services Solution can process image, video, sound, and time-series data to provide sophisticated business intelligence and data automation. This unlocks many use cases, such as automated trend analysis, predictive maintenance, error root cause analysis, and optimal energy-saving suggestions. Beyond these solutions, byteLAKE offers Custom AI Development services to meet unique customer needs.

The Imperative for AI Solutions

Decision-makers in industries like energy and manufacturing are under pressure to enhance efficiency and productivity through the adoption of connected technologies. This means tackling significant challenges:

- 1 Modernizing aging infrastructure:** Modernizing aging equipment, especially for utilities that provide essential services such as heating and energy, can be expensive and time-consuming. But outdated infrastructure can lead to operational inefficiencies, higher maintenance costs, and increased susceptibility to failures—disrupting vital services and negatively impacting customer satisfaction.¹
- 2 Meeting compliance standards:** Companies are under immense pressure to boost productivity to meet growing consumer and industry-specific demands while simultaneously reducing energy loss and carbon footprint to comply with strict environmental regulations.
- 3 Addressing labor shortages:** Across all industries, there is an increasing shortage of skilled labor, with 30.5 million workers who resigned as of August 2023.² This gap between the demand for skilled workers and the available workforce can compromise the quality and consistency of work, as overburdened employees are prone to burnout.²

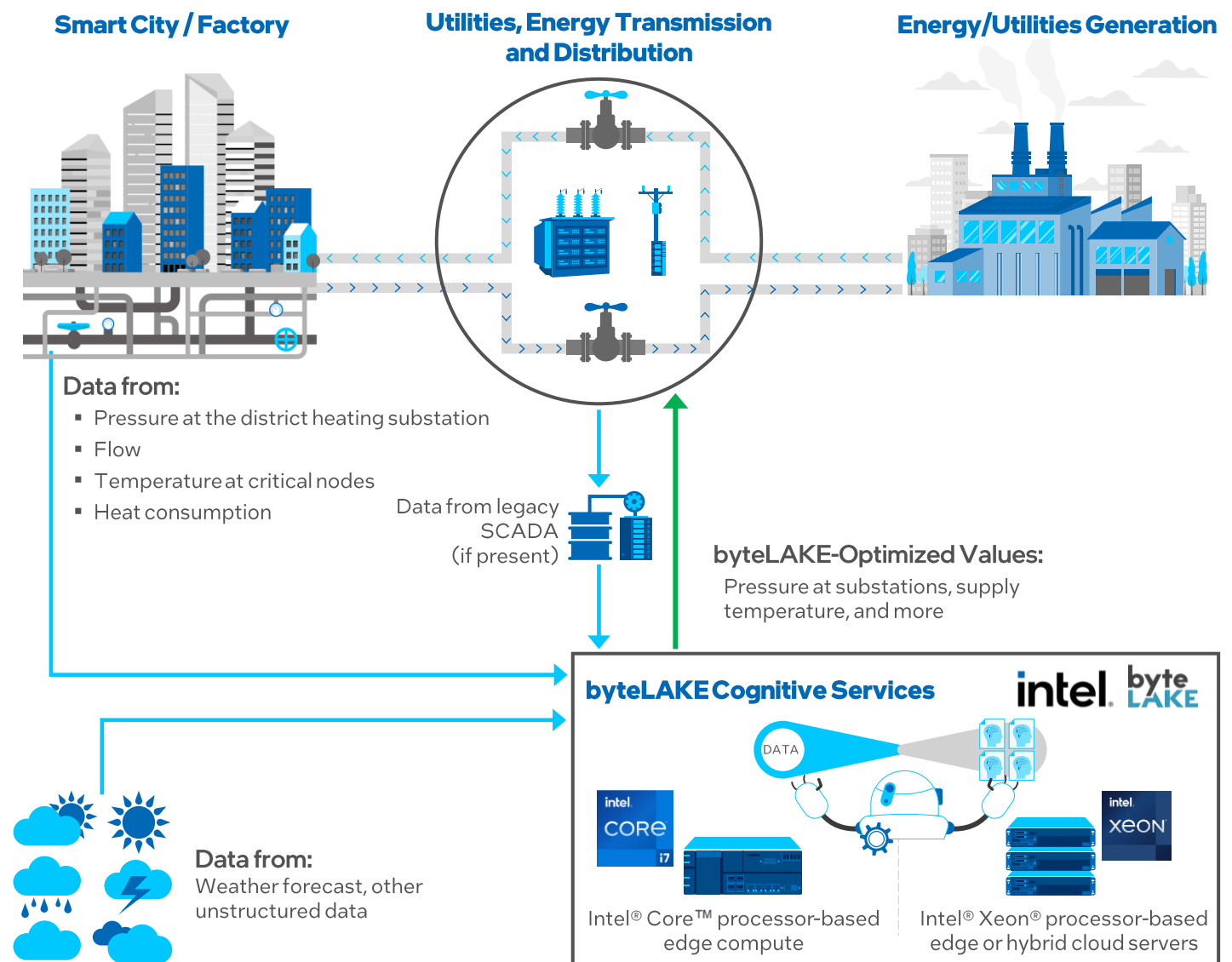
To address these challenges, utility companies and manufacturers are turning to artificial intelligence (AI) solutions, which can offer powerful capabilities to enhance efficiency, reliability, and sustainability without requiring a complete infrastructure overhaul. byteLAKE Cognitive Services is one such intelligent AI solution that extracts critical insights from edge devices, including legacy systems, enabling enterprises to optimize processes through deeper operational insights. For instance, byteLAKE Cognitive Services can automate utility data analysis related to infrastructure performance, energy distribution, and temperature and grid performance, helping frontline workers deliver improved service.

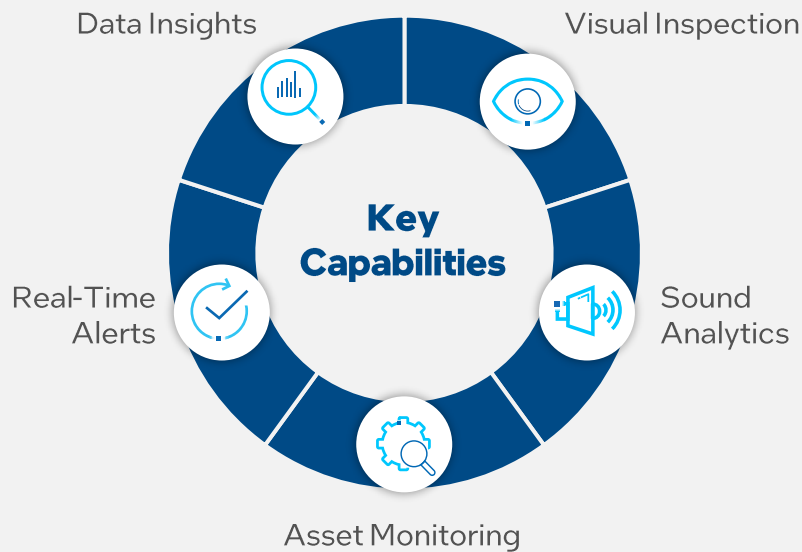
byteLAKE Cognitive Services Solution

Originally developed as a computer vision and sound analytics quality control solution for manufacturing, byteLAKE Cognitive Services has evolved to also address unique challenges faced by the energy and broader utility sectors. Once integrated and customized for a customer's operational environment, byteLAKE Cognitive Services collects data from existing operational endpoints and other relevant sources, such as weather forecasting services and external systems, and processes this data at the edge near operational devices.

With Data Insights, a component of byteLAKE Cognitive Services, operators and decision-makers gain valuable insights into trends and patterns within their operations, enabling adjustments and prioritization to streamline factory production or energy generation, transmission, and distribution.

By leveraging data from microphones, cameras, sensors, and more, byteLAKE Cognitive Services can detect temperature fluctuations and potential equipment failures in energy and manufacturing facilities. These insights can be used to optimize resource allocation, identify the root causes of errors and avoid unnecessary downtime. byteLAKE Cognitive Services also uses this data to continuously adapt and adjust configurations, providing real-time optimization suggestions for water, heating and cooling, and energy generation, transmission, and distribution.





Use Case Specific Capabilities:

- **Forecasting and Optimization:** Analyze data to set optimal temperatures and reduce costs while ensuring a reliable heating supply.
- **Predictive Maintenance:** Predict failures to avoid downtime in energy supply.
- **Monitoring and Management:** Monitor networks, detect errors and enhance remote management.
- **Quality Inspection Automation for Industrial Processes:** Visual inspection, sound analytics, and more.

Intel® Technology helps byteLAKE Cognitive Services Enhance Performance

byteLAKE Cognitive Services is powered by Intel® Xeon® processors and Intel® Core™ processors to enhance performance and scalability for power-intensive AI workloads, and feature model performance optimized with the OpenVINO™ toolkit.



Intel Core Processors: AI processes can be expensive and power-intensive, requiring high-performance computing power to handle vast amounts of data. Purpose-built for AI, Intel Core processors are optimized for running intensive workloads. Hardware optimizations allow byteLAKE Cognitive Services to boost performance for complex computational tasks such as machine learning to help improve AI models and identify opportunities for operational efficiencies over time.

Intel Xeon Processors: Featuring built-in accelerators, Intel Xeon processors enable high-demand and complex workload requirements at the edge. byteLAKE utilizes these processors for large-scale deployments, adapting the solution with optimal hardware to help ensure fast performance across workloads.

OpenVINO Toolkit: byteLAKE Cognitive Services leverages OpenVINO toolkit, which provides development and deployment tools that include open visual inference and neural network optimization capabilities. These tools enable developers to optimize and deploy deep learning models across a variety of platforms, including Intel® hardware, to enable a range of use cases. For example, a utility plant leveraging visual inspection to support machine maintenance can benefit from the OpenVINO toolkit, which can help increase image analysis performance without requiring additional hardware upgrades. Faster analysis provides facility managers the data they need to intervene before performance irregularities turn into machine downtime.

byteLAKE Cognitive Services Key Customer Benefits



Reduce energy consumption and carbon emissions

with dynamic energy distribution based on real-time data analysis of conditions, lowering overall energy consumption, and supporting more sustainable operations.



Reduce operational costs

by streamlining maintenance processes, reducing equipment downtime while optimizing resource use for enhanced profitability.



Enhance efficiency

by automating repetitive tasks such as condition monitoring and visual inspection.

byteLAKE Cognitive Services in Action



Challenge: A utility company serving a European city faces two conflicting key challenges. First, they must reduce unnecessary energy consumption. Second, they must maintain strong uptime and service quality amid industry-wide labor shortages. With experienced engineers retiring and skilled workers becoming harder to find, the company seeks to leverage AI to alleviate the pressure on their employees while maximizing data insights for improved operations.



Scenario: In collaboration with byteLAKE, the company installed additional sensors throughout one of their facilities to collect data on temperature and uptime to support their operations. Once data patterns were established, byteLAKE used this initial data sample to customize an AI algorithm that integrates sensors and servers, providing more insights into supply temperature.



Predicted Outcome: byteLAKE Cognitive Services and byteLAKE Cognitive Services Data Insights utilize their AI algorithm to reduce unnecessary peaks in energy consumption caused by human error. By reducing the overall supply temperature of the city's heating infrastructure by just 1-2 degrees, the company can dramatically reduce the amount of required energy and save millions of dollars per year.³

Conclusion

byteLAKE Cognitive Services offers a solution for businesses seeking to leverage powerful insights from all of their data. With its advanced AI capabilities powered by Intel® Core™ and Intel® Xeon® processors, Cognitive Services can quickly sift through data and extract valuable insights for companies for better forecasting, predictive maintenance, monitoring, and quality inspection. By leveraging the power of byteLAKE Cognitive Services, businesses can stay competitive in the utility and manufacturing sectors.



3. Internal estimates of byteLAKE. Intel does not control or audit third-party data. You should consult other sources to evaluate accuracy.

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- [Contact: CognitiveServices@byteLAKE.com](mailto:CognitiveServices@byteLAKE.com)
- [Intel® Distribution of OpenVINO™ Toolkit Page](#)
- [Intel® Core™ Processors Product Page](#)
- [Intel® Xeon® Processors Product Page](#)



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With Intel technologies and capabilities, a vendor's optimized offering can go beyond the traditional compute and extend to accelerated networking, storage, edge, and cloud. It's all part of helping customers build an optimized infrastructure across the company.

Sources

1. [How AI Is Shaping The World Of Utilities](#), Forbes, May 2024.
2. [Understanding America's Labor Shortage: The Most Impacted Industries](#), U.S. Chamber of Commerce, May 2024.

Notices & Disclaimers

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