Lanner and Intel Enable Edge AI for Industry 4.0

Intel® xPUs and Edge Insights for Industrial (EII) software combined with Lanner's AI and Edge Computing (AIEC) Starter Kit speed the deployment of edge analytics for industrial applications.

> "So that manufacturers can successfully compete, we worked with Intel to create an intelligent edge solution that can quickly gather and analyze data to improve business performance."
>
> Geoffrey Egger
> VP & GM of Lanner Electronics
> Intelligent Edge Business Unit

Industry 4.0 is Driven by the Intelligent Edge

Driven by the promises of increased productivity, efficiency, and reduced costs, manufacturers around the world have turned to edge computing architectures as a means of reaping the benefits of the Fourth Industrial Revolution. Edge computing in manufacturing settings has quickly become a must-have, as the performance improvements that result from these distributed architectures are ideal for many manufacturing environments.

Combining edge computing with Artificial Intelligence (AI), Machine Learning (ML), and analytics to create the Intelligent Edge makes the most out of these architectures. According to leading industry analyst firm Gartner, by 2022, about 75 percent of all data will need analysis and action at the edge.[1] Placing compute resources closer to the physical location where data is being created, collected, and analyzed, rather than on a remote server or in the cloud, allows manufacturers to immediately act on the insights garnered from that data in real-time.

By locating compute at the edge, manufacturers enable new and improved ways to maximize operational efficiency, improve performance and safety, automate core business processes, and ensure always-on availability. These approaches also help reduce overall costs and security risks, both cyber and physical.

However, implementing the Intelligent Edge is easier said than done. This transformation can be extremely challenging without the right expertise and the right technologies to get these deployments up and running the first time correctly.

Manufacturers Need Resources to Implement the Intelligent Edge Quickly and Correctly

Deploying an Intelligent Edge architecture for the first time can be challenging for even the most sophisticated global organizations. The amount of data that may need to be captured is vast. Research by IDC forecasts that by 2025, more than 90 zettabytes of data will be generated by edge devices globally.[2]

Ensuring that an Intelligent Edge architecture has what it takes to cope with that flood of data effectively requires a number of key ingredients. These include:

- Pre-configured/pre-optimized systems of integrated software and hardware
- System-level support for modern and agile app development environments which means container-based microservices architecture and/or a serverless model
- The flexibility and scalability required to add new technologies
- Ongoing support to continually optimize the solution for specific applications of the individual business

Authors

Reggie Castillo
Senior Product Line Manager
Intel Corporation

Maulik Upala
AI/DL Product and
Market development Manager
Lanner Electronics Inc.

Lanner Electronics and Intel have collaborated closely on multiple successful, Intelligent Edge implementations over several years. One of the most important results of this relationship has been the seamless integration and optimization of Intel technologies with Lanner hardware and software to create a compelling solution for the Intelligent Edge: the AIEC Starter Kit.
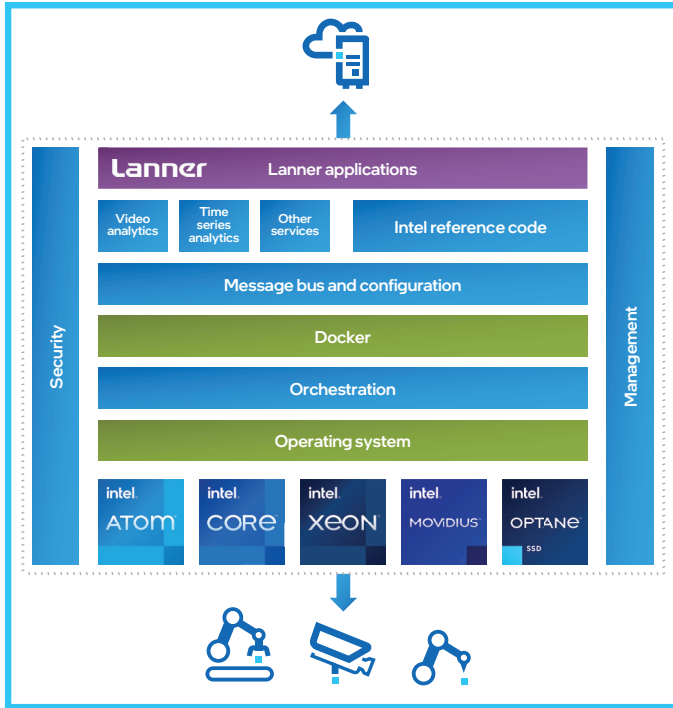

Figure 1. Intel® Edge Insights for Industrial with Lanner Systems Architecture

AIEC Starter Kit from Lanner and Intel

To accelerate the time to market of AI deployments at the industrial edge, Lanner has optimized and incorporated Intel software technologies into its hardware to provide a consolidated AI kit for industrial edge AI solutions. This starter kit includes three key elements:

- **Vision and Analytics Suite:** This element leverages two of Intel's most advanced software technologies for Edge AI and computer vision: Edge Insights for Industrial (EII) and Intel® OpenVINO™ toolkit with an AIoT reference application. EII is an open and modular product-validated software that helps enable more secure ingestion, storage, and analytics processing at the edge of both time series and image/video data. In conjunction with the Intel® Distribution of OpenVINO™ toolkit, EII accelerates development and enables quick integration of pre-trained models (e.g., Tensorflow, Caffe, etc.) for object recognition, classification, and facial recognition in vision-based solutions.

- **Edge AI Inference System**: Based on and optimized for Intel® Core™ processors, Lanner's LEC-2290 has the computational performance to deliver real-time AI inference at the edge. Lanner builds an extensive range of industrial embedded and enterprise networking hardware, from x86 rackmount systems to wide-operating, temperature-rugged industrial hardware. By designing and

building hardware platforms on flexible x86 architectures, a wide range of available software allows for nearly limitless inter-connected solutions.

Figure 2. Lanner's LEC-2290

- **Edge AI Devices**: Lanner will curate the appropriate combination of embedded connectivity modules, cameras, AI accelerator cards, and other devices tailored for the individual needs of a specific organization.

AIEC Starter Kit Use Cases

The AIEC Starter Kit, combined with Lanner's extensive portfolio of support and implementation services, enables a broad set of applications and use cases.

- **Predictive Maintenance:** One of a manufacturer's biggest concerns, predictive maintenance, is easily automated with the AIEC solution set, enabling organizations to keep a non-stop monitor on their most valuable physical assets and proactively determine when they require adjustment.

- **Asset Management:** Using AI and edge compute to oversee a wide array of assets, such as monitoring temperature optimization to ensure systems operate smoothly or using vision systems to monitor and control processes on factory floors, allows organizations to maximize resources while optimizing for process efficiency.

- **Physical Safety:** AIEC-based solutions can assist in guaranteeing the physical safety of workers in industrial settings from monitoring to ensure all employees are wearing the correct Personal Protective Equipment (PPE) to enabling notification systems that ensure restricted zones are not violated.

- **Defect Detection:** Edge AI and computer vision technology are able to target product defects, thus reducing production costs and the number of customer returns.

Lanner

Enter Lanner Electronics, a world-leading hardware provider with design, engineering, and manufacturing services for advanced network appliances, ruggedized in-vehicle, industrial computers, power substation computers and edge AI appliances. Headquartered in Taiwan, Lanner has a large and dynamic expert staff of over 1,000 well-experienced employees worldwide with strategic locations in North America, the EU, and China. For over 35 years, Lanner has built trendsetting network edge hardware for a wide range of demanding industries, from enterprise branch connectivity to in-vehicle and industrial communication systems. Lanner creates fully customized appliances for myriad client applications with managed manufacturing process thanks to their in-house design and manufacturing service.
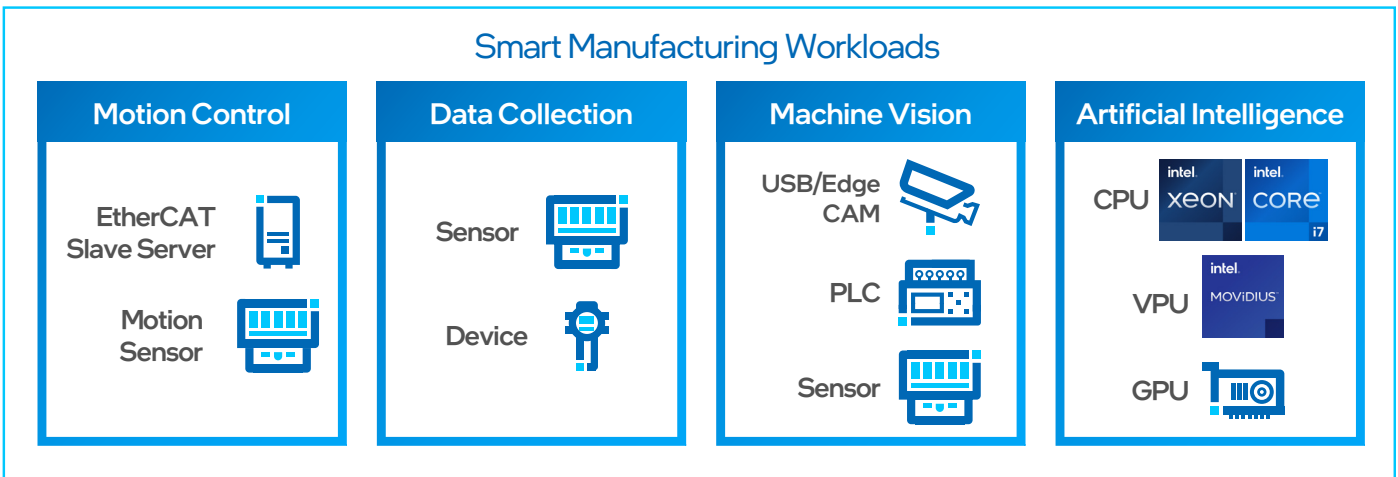
Smart Manufacturing Workloads

Motion Control

EtherCAT Slave Server

Motion Sensor

Data Collection

Sensor

Device

Machine Vision

USB/Edge CAM

PLC

Sensor

Artificial Intelligence

CPU — intel XEON | intel CORE i7

VPU — intel MOVIDIUS

GPU

Figure 3. Consolidating Workloads for Smart Manufacturing

How Lanner and Intel Work Together

Lanner and Intel work closely together to ensure their technologies integrate seamlessly. Lanner is an Intel Titanium Partner and actively participates in the Intel IoT Solutions Alliance, a group committed to developing modular, standards-based solutions based on technologies, processors, products, and services from Intel. Lanner has also been the recipient of Intel Network Builders Winner Circle awards. This program drives greater technical enablement in testing and benchmarking solutions and recognizes industry leaders with go-to-market planning.

Conclusion

For manufacturers to reap the full potential of Industry 4.0, implementing AI-based industrial automation at the edge is crucial to enable mission-critical applications and the real-time data processing with a low-latency response that powers these applications. Intel and Lanner have created an end-to-end solution suite combined with expert implementation and optimization services to meet individual organizations' unique needs.

Learn More:

Intel technologies that enable edge solutions:

- Intel® Edge Insights for Industrial
- Intel® Distribution of OpenVINO™ toolkit

Lanner solutions and services:

- Artificial Intelligence & Edge Computing (AIEC) Starter Kit
- Edge AI Appliances
- Lanner Design and Manufacturing Services

Contact:

Lanner Americas

- contact@lanner-america.com
- +1 877-813-2132

Lanner Worldwide

- contact@lannerinc.com
- +886-2-8692-6060

intel.

[1] Gartner (2018). https://www.gartner.com/smarterwithgartner/what-edge-computing-means-for-infrastructure-and-operations-leaders/
[2] IDC 2021. https://www.seagate.com/files/www-content/our-story/trends/files/idc-seagate-dataage-whitepaper.pdf