

AHEAD

Delivering AI Edge Computing Devices

for *Industrial and Medical Environments*



Architected with NVIDIA IGX Orin™ Industrial-Grade Edge AI

Advances in both hardware and software technologies will likely enable AI to become a foundational technology across all industries in the next decade. Industrial and manufacturing companies, in particular, are adopting AI-driven solutions to automate many mundane and potentially error-prone tasks. This includes AI applications to power industrial automation, smart cities, retail, telecommunications, smart hospitals, agriculture, oil and gas, and more.

While demand is growing for AI-powered solutions at the edge, companies have previously faced many technological constraints. AI applications are resource-intensive, and until now, the hardware costs and limited processing capabilities of most hardware prevented widespread deployment of AI devices at the edge. In short, the performance-per-dollar of edge devices wasn't practical for most industrial or medical use cases.

There have also been other obstacles to AI adoption, such as edge devices requiring large footprints and high power consumption to meet computing requirements. This often limited AI applications to cloud inferencing or on-premise rack hosted hardware because there wasn't an economical and realistic way to put the technology at the edge and make it powerful enough to handle AI inference demands.

Read on to learn about how AHEAD is bringing industrial and medical grade AI platforms to market built on a foundation of NVIDIA IGX advanced technology.



The Building Blocks Approach to AI Device Manufacturing

When companies decide to deliver an AI device to market, they often design a custom solution from the ground up. This approach might offer the most flexibility, but it's also complicated, time-consuming, and expensive. Instead, industrial and medical application developers should consider using predefined software models and pre-designed modular hardware as a starting point.

There are a number of machine learning platforms to choose from, including [options from NVIDIA for a variety of use cases](#). These software building blocks provide pre-trained models, transfer learning toolkits, deployment SDKs, analytics tools, and other capabilities to accelerate time to market. In fact, pre-defined software building blocks with pre-trained machine learning models can get you [80% of the way to your functioning application](#), providing a competitive advantage by reducing development times from over a year to just two months.

Similarly, hardware building blocks can make AI device manufacturing faster, easier, and less expensive than starting from scratch. AHEAD's hardware building blocks have a base level of pre-certification and pre-testing, which accelerates time to revenue for new products.

In addition, the hardware building blocks are designed to be compatible with and optimized for certain ML platforms. Developing an optimal hardware and software combination is crucial because there's always a tradeoff between cost and performance when deploying resource-intensive AI applications.

AHEAD Building Blocks for Industrial-Grade Edge Inferencing

NVIDIA is launching an industrial-grade edge AI computing platform called NVIDIA IGX. This new platform will combine hardware and software to deliver high-performance edge devices optimized for AI use cases. More importantly, IGX will achieve a new level of performance per dollar that makes large-scale edge inferencing a reality.

AHEAD has worked with NVIDIA to create several IGX-powered hardware building blocks that are pretested, pre-certified, and optimized for edge AI with NVIDIA Metropolis and NVIDIA Clara™ Holoscan. These AHEAD hardware building blocks are built from the ground up for different computing and cost requirements, but they're all based on NVIDIA IGX Orin™.



01 Large-Scale Performance

For large-scale use cases, there are huge cost savings when processing massive amounts of data at the edge with an IGX Orin powered edge server platform that has several graphics cards and low latency 100g networking rather than numerous individual servers.

- NVIDIA Metropolis can be combined with a high-performance, IGX powered solution to bring AI to entire traffic systems, smart cities, surveillance systems, autonomous factories, and more.
- In the medical industry, a high-performance IGX powered solution can handle the resource-intensive processing of genomics data or other massive data sets.

02 Mid-Tier Performance

For use cases with slightly less data processing requirements, a single device with only one accelerated graphics card could be sufficient.

- An AGX or IGX powered device with NVIDIA Metropolis can enable AI solutions for retail inventory management, analytics, robotics, LiDAR cameras, factory safety sensors, smaller-scale surveillance systems, and other industrial use cases.
- NVIDIA Clara Holoscan can be combined with an AGX or IGX powered device for simulation, robotics including surgical, endoscopy, ultrasound, diagnostic imaging, radiation therapy, microscopy and other AI use cases that are less data-intensive, but still require multiple sensors and low-latency processing.

03 Small-Scale Performance

For use cases with much lower performance requirements, a device with an embedded graphics card could be enough. These devices can be powered by the latest Orin NX and AGX line up with an embedded graphics card that is still 8x faster than NVIDIA Jetson Xavier, the last generation of NVIDIA's chipset.

- NVIDIA Metropolis can be combined with an IGX-powered device to handle smart building control or other use cases where sensors are simple and limited in number.
- For medical use cases, NVIDIA Clara Holoscan and IGX can bring AI to patient monitoring and other solutions with only a few audiovisual feeds.

AHEAD Logistics for Edge Devices

AHEAD has decades of experience handling the logistics needs of its manufacturing customers, and is now offering its global logistics services for non-AHEAD manufactured products. These logistic services offer supply chain consolidation and management through a combination of procurement, integration, kitting, distribution, warehousing, support services, global and reverse logistics services, along with the software to bring it all together with a level of transparency few logistics partners can provide.

For example, if you have a camera or another sensor deployed to a site, AHEAD Logistics can help you manage the supply chain for these edge devices. This would include storing and distributing the edge devices to customers globally as well as handling any last-minute technical integrations. End-users would also be able to use AHEAD Hatch Connect to see device deployment insights in real time.

How AHEAD Can Help Bring IGX-Powered Devices to Market

AHEAD is a hardware consultant that specializes in complex industrial-grade solutions, and has worked with NVIDIA to develop IGX powered edge computing devices for industrial AI. By partnering with AHEAD, you can take advantage of comprehensive services to streamline the full deployment of an AI edge computing solution.

The AHEAD approach combines pre-configured hardware building blocks with customization to meet specific requirements. This saves time and money because our hardware building blocks are pre- certified with baseline technical product safety standards and pre-tested for reliable performance with the IGX platform.

AHEAD Hatch — our innovative hardware orchestration software — can also deliver a level of visibility to the supply chain and order-to-fulfillment workflow few manufacturing and logistics partners can offer. With AHEAD managing manufacturing and distribution, you can more efficiently deliver an innovative AI solution to the industrial edge.



AHEAD builds and manages digital platforms that power the most successful organizations in the world. Our consultative approach, unmatched engineering, and innovative solutions combine to accelerate the impact of technology for every client we serve.

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