

EDGE COMPUTING AS A CATALYST FOR AI ADOPTION



Introduction

Edge intelligence is a modern approach to computing that places intelligence and processing closer to the source of data. It is a powerful way to reduce latency and improve the speed of data processing.

This ebook will provide an introduction to edge intelligence and explain how **AI-BLOX** can help you to accelerate the implementation of your edge intelligence applications. We'll explore the features and benefits of our Blox platform, its architecture, and how it is an asset for various industries.

What is Edge intelligence?

Edge Intelligence is a combination of AI and Edge Computing. It enables machines to make decisions on locally harvested data, instead of sending it to a centralized cloud server. It enables the deployment of machine learning algorithms to the edge of the device where the data is generated. Edge AI has the potential to provide artificial intelligence for every use case at any place.

Data processing

The more human tasks we transfer to computers and machines, the more abundant and pervasive the data and the wider the demand for artificial intelligence processing becomes. On top, with the proliferation of IoT & 5G data loads will further explode. This increasing demand is no longer satisfied by centralized processing in data centres. The recent availability of small and low power supercomputers makes edge intelligence attractive for a lot of applications, and this will give a boost to AI adoption in many industries with real-life use cases (and real ROI).

Application industries

Since edge computing processes data locally — on the edge of the network, instead of in the cloud or a centralized data center — it minimizes latency and data transit costs, allowing for real-time feedback and decision-making. The always-on, instantaneous feedback that edge computing offers is especially critical for applications where human safety is a factor. For example, it's crucial for self-driving cars, where saving even milliseconds of data processing and response times can be key to avoiding accidents. It's also critical in hospitals, where doctors rely on accurate, real-time data to treat patients. Other than that, edge intelligence can be used in a variety of applications such as smart logistics, industrial automation, safety & prevention, smart cities, supply chain management, surveillance, waste management, ...

Industry 4.0

While many industries can have benefits from edge intelligence, the adoption is mainly happening in an industrial context. AI will be the driving force in the realisation of many industry 4.0 projects, boosting productivity, quality & safety initiatives. With IoT initiatives & 5G, we'll however soon see a boost in other industries as well.

Different types of Edge Computing



1. **Provider edge:** The provider edge is a network of computing resources accessed by the internet. It's mainly used for delivering services from telecommunication companies, service providers, media companies and other CDN operators.
2. **Enterprise edge:** The enterprise edge is an extension of the enterprise data center, consisting of data centers at remote office sites, micro-data centers, or even racks of servers sitting in a compute closet on a factory floor. As with a traditional, centralized data center, this environment is generally owned and operated by IT. However, there may be space or power limitations at the enterprise edge that change the design of these environments.
3. **Industrial edge:** The industrial edge is also known as the far edge. It generally encompasses smaller compute instances such as one or two small, ruggedized edge servers, or even an embedded system deployed outside a data center environment. Because they run outside of a normal data center, there are a number of unique space, cooling, security, and management challenges.

AI-Blox focuses on the industrial edge

Edge vs Cloud computing

While in the last decade a huge shift towards the cloud has happened, we experienced that for specific use cases it's better to run (part of) the intelligence locally. By doing so, we can have the best of both worlds. Edge and cloud computing have distinct features, and most organizations benefit from using both. A hybrid-cloud architecture allows enterprises to take advantage of the security and manageability of on-premises systems while also using public cloud resources from a service provider.

Cloud Computing

Non-time-sensitive data processing

Reliable internet connection

Dynamic workloads

Data in cloud storage

Edge Computing

Real-time data processing

Remote locations with limited or no internet connectivity

Large datasets that are too costly to send to the cloud

Highly sensitive data and strict data laws

Edge Computing as a catalyst for AI adoption

Edge computing is a catalyst for AI adoption because it addresses some of the key challenges that organizations face when trying to deploy AI in real-world scenarios.

These challenges include:

1. Latency

Edge intelligence reduces latency and increases the speed of data processing. For cloud-based computing, the transmission delay can be prohibitively high. This is particularly important for applications that require real-time processing, such as self-driving cars or industrial automation systems.

2. Privacy

Edge computing enables data to be processed locally, reducing the need to send sensitive data to the cloud. This helps to improve data security and addresses compliance requirements.

3. Edge is reliable

By running AI at the edge, you ensure that your AI system continues to operate even if the network connection is lost. This is particularly important for critical applications such as healthcare, transportation or industrial settings. Intelligent services must be highly reliable, even when network connections are lost.



4. Network constraints

Edge computing helps to reduce the amount of data that needs to be transmitted to a centralized location for processing, and lowers the strain on network infrastructure to improve overall system performance.

5. Cost




By decreasing the amount of data that needs to be transmitted over the network, and reducing the need for powerful, centralized processing resources, edge computing can help to lower the overall cost of deploying and maintaining an AI system.

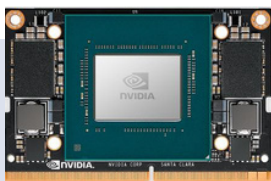
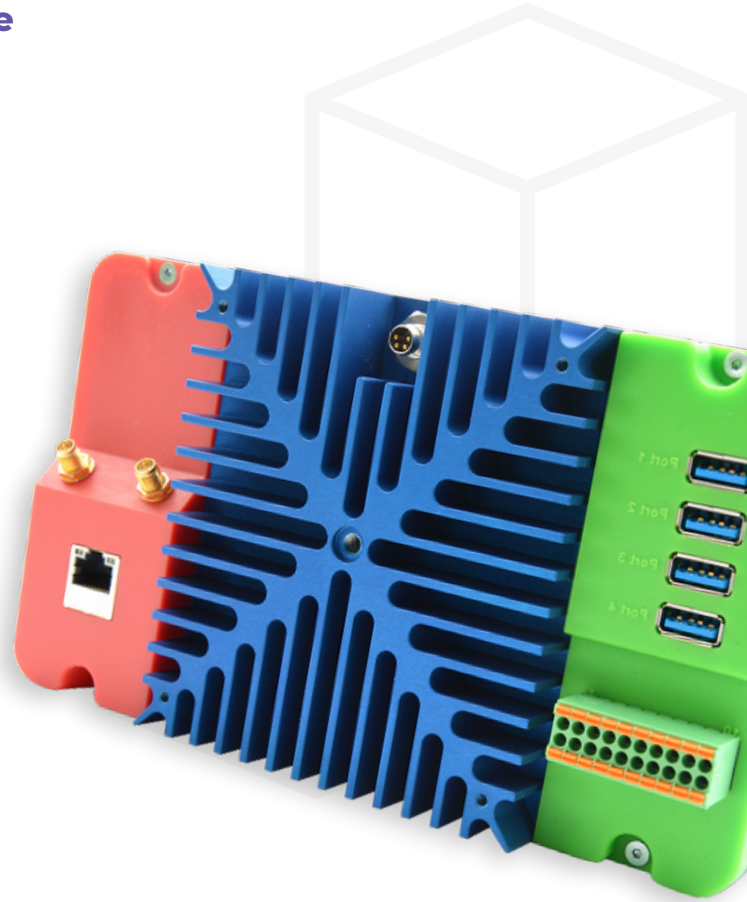
AI-BLOX: Modular Hardware for Edge Intelligence

BLOX Platform : hardware & architecture

BLOX is a modular hardware platform that is built to quickly and easily fulfil your application needs.

BLOX is modular by design :

-  NVIDIA® Jetson™ processors to unlock powerful compute requirements.
-  Customizable interfaces for connecting cameras, radars, lidars or any other type of sensor.
-  Ready to use communication modules to guarantee the best communication options for your application without any worries (4G, 5G, Wifi, Gigabit ethernet).



**NVIDIA® Jetson™
processor**



Interface modules



**Communication
modules**

**If an application requires local user interaction,
BLOX is available with a 7" display with touchscreen.**

Features & benefits



BLOX is a flexible, complete and modular system, meaning that our customers can add or remove components as needed.

Every application has different requirements. No application is the same. With our Module-X connector technology, we've made the interfaces on BLOX exchangeable & customizable to make sure it fits your application.



BLOX offers an industrial-grade solution. We offer a fanless & rugged design that proves to be reliable in harsh conditions. It's designed to be reliable and has a 10+ year lifespan.



We love to work on OEM partnerships, to provide best value for money, also for smaller volumes



Ease of use is important. We're working on a BLOX Operating System to provide a robust & performant low-level software layer dedicated to our platform



Being an NVIDIA preferred partner, our BLOX platform offers the most powerful edge ai compute units in the market

"AI-Blox wants to take away the friction points in the AI value chain and speed up the implementation of edge AI applications for our clients"



Technical specs (1)





Technical data	MX1010	MX1020	MX1030 - 1/2	MX1030 - 3/4
GPU Module	Jetson Nano	Jetson TX2 NX	Jetson Xavier NX 8Gb	Jetson Xavier NX 16Gb
AI performance	0.5 TOPS	1.33 TOPS	21 TOPS	21 TOPS
GPU	128-core Nvidia Cuda GPU	256-core Nvidia Pascal GPU	384-core NVIDIA Volta GPU with 48 Tensor Core	384-core NVIDIA Volta GPU with 48 Tensor Core
CPU	Quad-core ARM Cortex-A57 MPCore Processor	Dual core Denver 2 64-bit + Quad-core ARM Cortex-57 MP - Core	6-core NVIDIA Camel ARMv8.2 64-bit 6MB L2 + 4MB L3	6-core NVIDIA Camel ARMv8.2 64-bit 6MB L2 + 4MB L3
Memory	4GB 64-bit LPDDR4 25.6 GB/s	4GB 128-bit LPDDR4 51.2 GB/s	8GB 128-bit LPDDR4 51.2 GB/s	16GB 128-bit LPDDR4 59.7 GB/s
Storage	16GB eMMC 5.1	16 GB eMMC 5.1	16 GB eMMC 5.1	16 GB eMMC 5.1
Display	Optional: 7" with integrated capacitive touch screen			
Power Supply	10 V DC - 48 V DC			
Dimensions	Headless: 115 mm x 41mm x 227,2 mm With 7" display: 115 mm x 38,8 mm x 197,2 mm			
Weight	700g			
Operation temperature	-25°C ... +60°C			
Storage temperature	-40°C ... +80°C			
Protection Class	Max IP67, depends on interface blox			
Approvals / Marking	CE			
Vibration / Shock Resistance	conforms to EN 60068-2-6/EN 60068-2-27			
EMC immunity / emission	conforms to EN 60068-2-6/EN 60068-2-27			

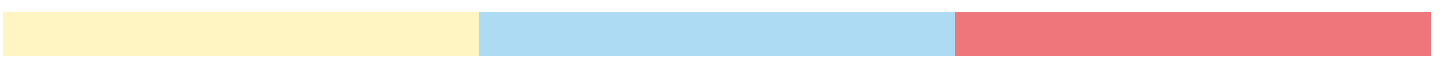
Technical specs (2)

Technical data	MX1011-01/02	MX1011-03/04	MX1031-01/02	MX1031-02/03
GPU Module	Jetson Nano Orin 4Gb	Jetson Nano Orin 8Gb	Jetson Orin NX 8Gb	Jetson Orin NX 16Gb
AI performance	20 TOPs	40 TOPs	70 TOPs	100 TOPs
GPU	512-core Nvidia Ampere Architecture GPU with 16 Tensor cores	1024-core Nvidia Ampere Architecture GPU with 32 tensor cores	1024-core Nvidia Ampere Architecture GPU with 32 tensor cores	1024-core Nvidia Ampere Architecture GPU with 32 tensor cores
CPU	6-core Arm Cortex-A78AE v8.2 64bit CPU 1.5 MB L2 + 4 MBL3	6-core Arm Cortex-A78AE v8.2 64bit CPU 1.5 MB L2 + 4 MBL3	8-core Arm Cortex-A78AE v8.2 64bit CPU 2 MB L2 + 4 MBL3	8-core Arm Cortex-A78AE v8.2 64bit CPU 2 MB L2 + 4 MBL3
Memory	4GB 64-bit LPDDR5 34 GB/s	8GB 128-bit LPDDR5 68 GB/s	8GB 128-bit LPDDR5 102.4 GB/s	16GB 128-bit LPDDR5 102.4 GB/s
Power	5W-10W	7W-15W	10W-20W	10W-25W
Storage	Supports external NVMe			
Display	Headless : comes with Displayport Optional: 7" integrated capacitive touch screen			
Power Supply	10 V DC - 48 V DC			
Weight	700g			
Operation temperature	-25°C ... +60°C			
Storage temperature	-40°C ... +80°C			
Protection Class	Max IP67, depends on interface blox			
Approvals / Marking	CE			
Vibration / Shock Resistance	conforms to EN 60068-2-6/EN 60068-2-27			
EMC immunity / emission	conforms to EN 60068-2-6/EN 60068-2-27			
Dimensions	Headless: 115 mm x 41mm x 227,2 mm With 7" display: 115 mm x 38,8 mm x 197,2 mm			

Combining our Hardware with your Software

AI-Blox is a hardware device that is designed to accelerate the execution of AI algorithms. Let us tell you how your software can benefit our hardware?

1.  **Improved performance:** By using AI-Blox hardware, AI software companies can execute their algorithms faster, which can improve the overall performance of their products.
2.  **Reduced costs:** AI-Blox hardware is optimized for AI computation, which means it can potentially reduce the cost of running AI algorithms.
3.  **Enhanced capabilities:** AI-Blox hardware can enable AI software companies to build more powerful and sophisticated products by allowing them to run more complex algorithms on the edge.
4.  **Faster time to market:** By leveraging the benefits of AI Blox hardware, AI software companies can focus on the software part of their AI projects, and leverage the expertise of AI-Blox on the hardware elements



Industries

The BLOX platform can be used in a variety of edge intelligence applications.



Industrial & Manufacturing

- Industrial inspection
- Material handling
- Factory floor video analytics
- Preventive maintenance
- Digital twin & Sensor Fusion



Agriculture

- Intelligent Robot Assistant for harvesting
- Livestock health management
- Selective spraying systems
- Smart Farm Machines
- Autonomous vehicles



Smart cities

- Traffic analysis
- Vehicle counting
- Number plate detection
- Surveillance & public safety
- Smart Parking system



Smart retail

- Automated checkout
- Store Traffic analysis
- Shopper analytics
- Digital signage
- Inventory management



Transportation & logistics

- Digital signage
- Warehouse automation
- Safety features
- Traffic flow management

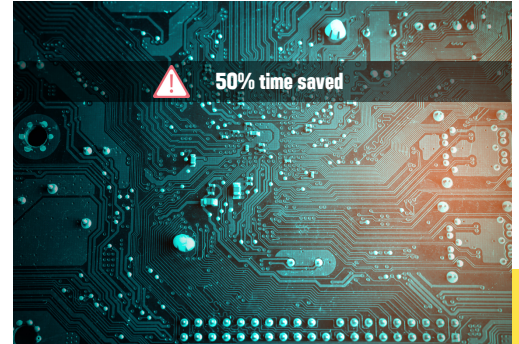
AI-BLOX Customers

AI-BLOX has already been tested & used in several industries.
We would like to tell you more about our solution
within these specific industries.

Quality Control

AI software company

Our client, an AI software company responsible for implementing a project, was able to reduce the time spent selecting, configuring and implementing hardware by 50% compared to their previous project. The modular design of AI BLOX allowed them to start with one of our off-the-shelf platforms and get a head start.



Safety features

Manufacturing company

A factory floor can be very hectic with forklifts driving around everywhere. A manufacturing company installed BLOX platforms with integrated touchscreens on forklifts to continuously scan their surroundings as a safety measure. They had the expertise to build a similar solution themselves, but decided to partner with AI-Blox to accelerate the implementation & market introduction and leverage our deep hardware knowledge. In addition, they will use the same hardware platform to perform other smart logistics functions in the future.



Person detection

Surveillance company

A surveillance company launched an innovative AI-based solution for person detection supported by a Proof-Of-Concept hardware solution. Based on our experience with Nvidia-based solutions, we created a reliable and scalable custom hardware solution to support their future growth.



Edge intelligence is becoming increasingly important for businesses that need to make decisions in real-time or process large amounts of data quickly. It's the solution for real-life AI applications, and will accelerate the adoption of AI.

AI-BLOX provides a powerful, modular, secure, and reliable hardware to accelerate the rollout of edge-ai applications in your business.

Want to know more about AI-BLOX?

[Schedule an appointment](#)

