# Tech Talk | Industrial IoT gateway

This month, we'll be discussing a popular topic: Industrial IoT (IIoT). At ECS, we offer several IIoT hardware solutions, including an open platform option, as well as solutions from MOXA and WAGO. In this issue, we'll focus on the open platform solution.

You may have already seen a demonstration of our IoT kit from our colleagues, which highlights just how user-friendly our IIoT solution is. If you'd like a demonstration, feel free to contact our sales representative or at automation@ecsnz.com.

What IIoT can perform?

The **Industrial Internet of Things (IIoT)** is the integration of connectivity achieved by the internet of Things (IOT) to implement it in an industrial setting. In other words, it is the process of using smart technology (smart sensors) to gather data, optimize processes, and identify and offset potential problems and later store it using cloud-based analytics connected over the internet.
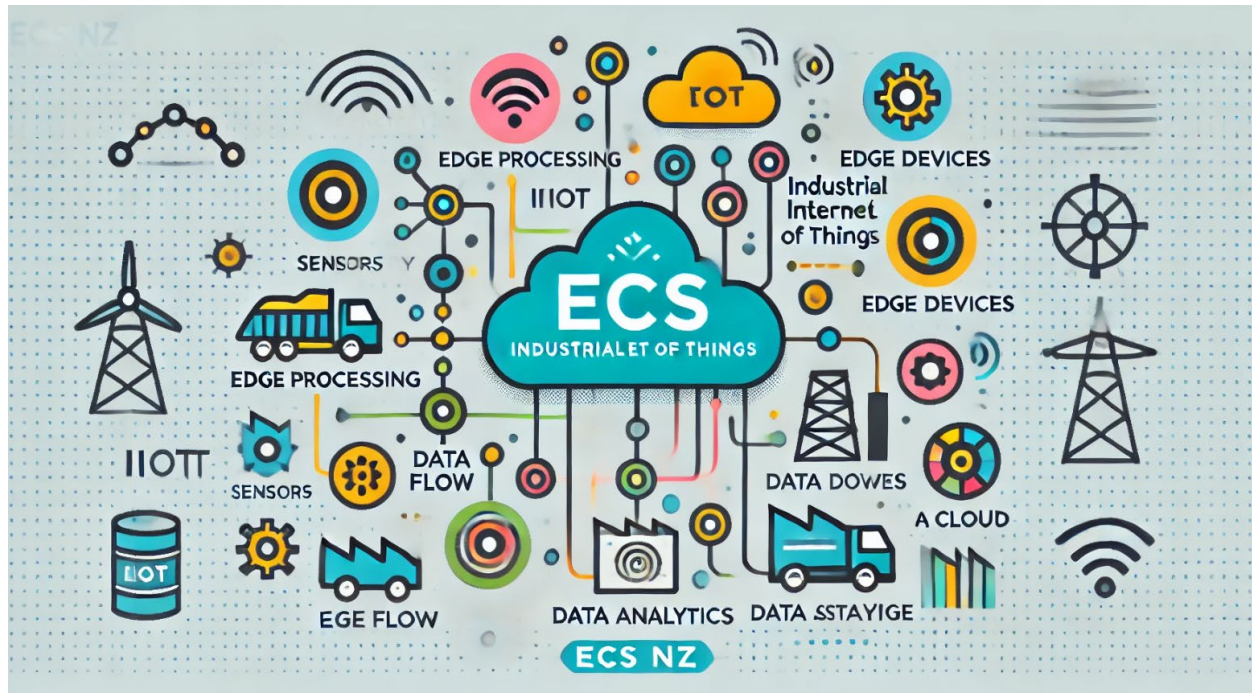
IoT vs IIoT

The Internet of Things (IoT) and Industrial Internet of Things (IIoT) both refer to networks of connected devices, but they serve different purposes and operate in distinct environments.

Here's a comparison between IoT and IIoT in table format:

Aspect	IoT (Internet of Things)	IIoT (Industrial Internet of Things)
Primary Focus	Consumer applications (smart homes, wearables)	Industrial applications (manufacturing, energy, healthcare)
Goal	Enhance convenience and automation for users	Improve efficiency, safety, and productivity at scale
Reliability	Tolerates minor disruptions	High reliability; strict safety standards
Data Use	Basic data for personalization and convenience	Advanced data analytics for real-time monitoring, predictive maintenance
Network Scale	Fewer devices, local (Wi-Fi, Bluetooth)	Thousands of devices; robust infrastructure (Ethernet, cellular, industrial protocols)
Examples	Smart thermostats, wearable fitness trackers	Smart factories, automated machinery, predictive maintenance systems

What does IIoT involve?

The successful operation of IIoT (Industrial Internet of Things) depends on four core pillars:

1. The Device

An IIoT device is a hardware tool that sends data over the internet, usually collected by built-in sensors. To connect multiple devices in one network, wireless solutions are often needed. Examples of IIoT devices include industrial machines, sensors, medical devices, vehicles, and appliances.

2. The Data

The main purpose of IIoT is to collect data to improve how applications work and the user experience. For example, industrial systems track machine performance, and environmental devices monitor things like temperature and humidity. Many businesses connect IIoT with their HVAC and security systems for easier control. The data can come in many forms, with status data being the most common. IIoT data is often analyzed to gain insights and improve efficiency.

3. Analytics

Accurately analyzing and processing data is key. Analytics help IIoT applications provide value to people and businesses. When data is properly processed, it turns into useful insights. Good analytics are crucial for improving systems, boosting operations, and offering better user experiences.

4. Connectivity

Connectivity is essential for linking devices, data, and analytics smoothly. A stable connection ensures accurate data transfer and analysis. High-bandwidth, low-latency connectivity is key to keeping real-time data flowing. Without it, live data analysis would be difficult, disrupting system performance and causing data errors.

In short, IIoT works by connecting devices, collecting data, analyzing it for insights, and ensuring strong connectivity. These four elements work together to improve efficiency and system performance.

SCADA vs IIoT

SCADA (Supervisory Control and Data Acquisition): A system designed for real-time monitoring and control of industrial processes. Commonly used in settings like factories, power plants, and other localized operations.

IIoT (Industrial Internet of Things): A broader concept focused on connecting devices, sensors, and systems via the internet. This enables extensive data collection, sharing, and analysis, offering advanced capabilities for industrial environments.

While both SCADA and IIoT serve industrial operations, they differ in their scope, architecture, and capabilities. Here's a comparison to clarify their distinctions:

| Aspect	SCADA	IIoT
Primary Focus	Process monitoring and control	Connectivity, analytics, optimization
Scalability	Limited to single facilities	Global and highly scalable
Data Usage	Real-time control data	Big data and AI-driven insights
Architecture	Centralized	Decentralized and flexible

Overall, SCADA is the right choice for real-time process control and reliability in localized industrial settings. IIoT, on the other hand, is more powerful for industries looking to achieve connectivity, scalability, and data-driven intelligence.

What ECS can offer?

At ECS, we specialize in devices and infrastructure for its own connectivity. Our offerings are categorized into four main areas:

1. **Gateway** : We can supply the hardware from Vecow, Wago and Moxa as a gateway.
2. **Network Infrastructure** : Our portfolio includes network equipment from Moxa, Tosibox, Allied Telesis, Wago, and Wieland, along with cables and accessories from LAPP to build robust networks.
3. **Edge devices and Sensors**: We supply a range of edge solutions, including Moxa IO, Wago PLCs, P&F sensors, and more.

Cloud: We can help to implement IoT infrastructure to Microsoft Azure or AWS.
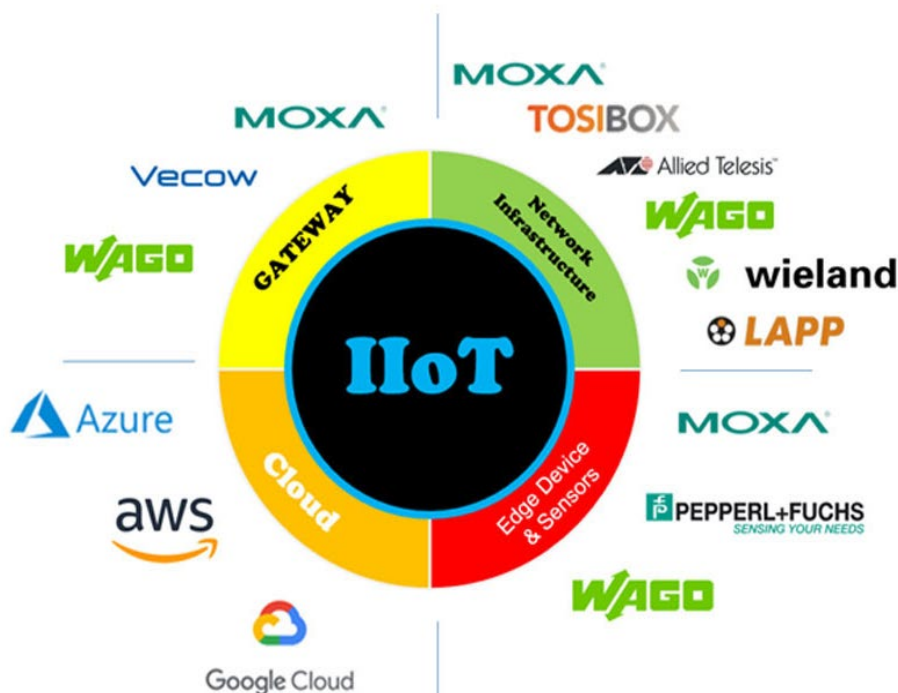
What is our open platform option for the IIoT Gateway?

If a customer seeks greater flexibility in selecting their preferred platform without being tied to a specific supplier, this approach is ideal.

The choice of hardware depends on factors such as the volume of data to be collected, the polling frequency, and cloud upload intervals. For large sites requiring real-time visualization, a powerful PC is essential. However, for smaller, remote sites where data is collected hourly, a high-powered PC is unnecessary.

Memory and storage requirements are determined by the volume of data, the number of devices to store or process, and the needs of the operating system. Both Windows and Linux (Debian, Ubuntu, or RHEL) are viable options.

With this open-platform approach, you have the freedom to design your system as desired. Our strategy adopts a bottom-up method, keeping the data logger local. After filtering essential data, it is then published to the cloud. Additionally, we have implemented a PC-based dashboard for monitoring, which makes this solution more efficient and cost-effective than sending all data directly to the cloud.

However, for scenarios involving multiple sites, consolidating data in the cloud and building a centralized dashboard there would be a better solution.

What IIoT software should you use?

The market offers a wide range of IIoT applications, including flow-based programming and code-based programming solutions. ECS primarily focuses on driving hardware and infrastructure. If needed, we can recommend developers to assist with your requirements.

Here is our demo highlight: -

Our IIoT demo showcases how an Industrial PC (IPC) works alongside the Moxa IOs and smart sensors to collect data and publish it to the Azure cloud. It includes a dashboard for real-time monitoring. The setup includes a compact Industrial PC (PBC-1000) equipped with dual network ports, dual serial ports, a 4G module, and GNSS support, making it an excellent choice for remote locations. For enhanced security, we also provide the option to incorporate a 5G or 4G Tosibox VPN.

This solution is purpose-built for distributed and unmanned sites operating in harsh environments. It offers seamless integration with any vendor's equipment, supporting both on-premises hosting and communication with industrial devices via control networks (LAN, Wi-Fi, or Serial Port). Data is securely

uploaded to the Cloud (Azure or AWS) using broadband or mobile networks. The system supports widely used industrial protocols, including Modbus TCP/RTU, Ethernet/IP, and OPC-UA.

The IIoT demo kit specifically showcases **Temperature Monitoring** and **Distance Monitoring**, offering practical insights into real-world applications.
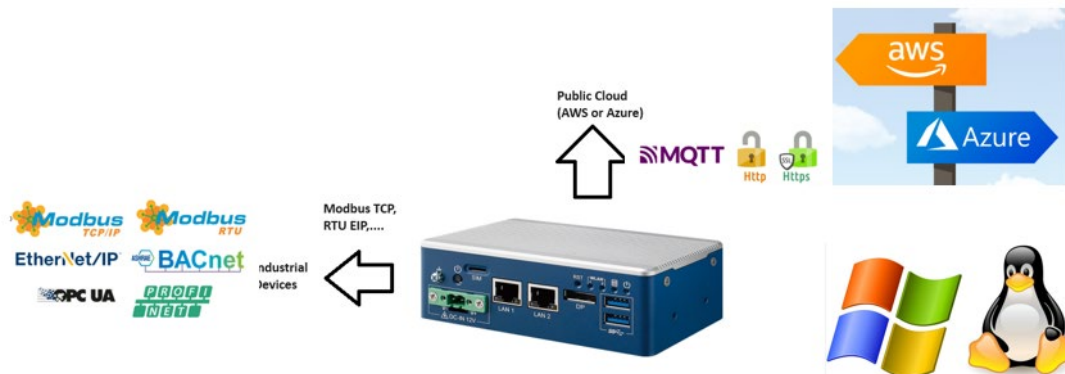
Using a PC as the gateway provides exceptional flexibility, enabling customized solutions. Our setup runs on Linux OS with Node-RED for software, but it's also compatible with Windows.

Vecow provides a comprehensive range of IPCs with various sizes and CPU configurations to meet your specific needs, all designed for industrial-grade environments. Additionally, Moxa offers a wide range of I/O solutions compatible with Modbus protocols to suit different applications.
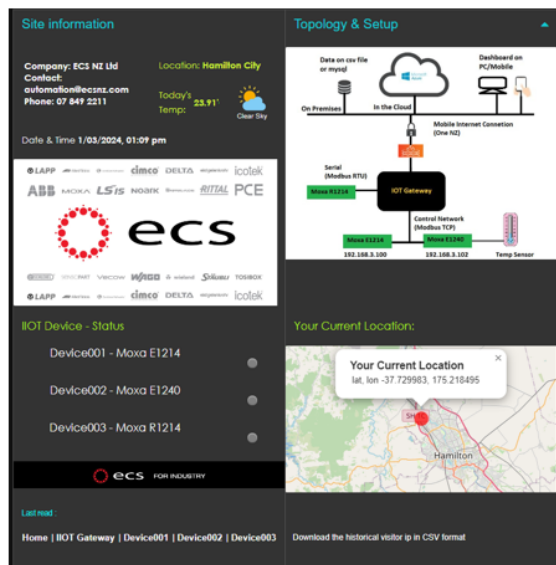
Our demo setup is the compact design one, but we can change it to High secure access design by adding the Tosibox VPN router.
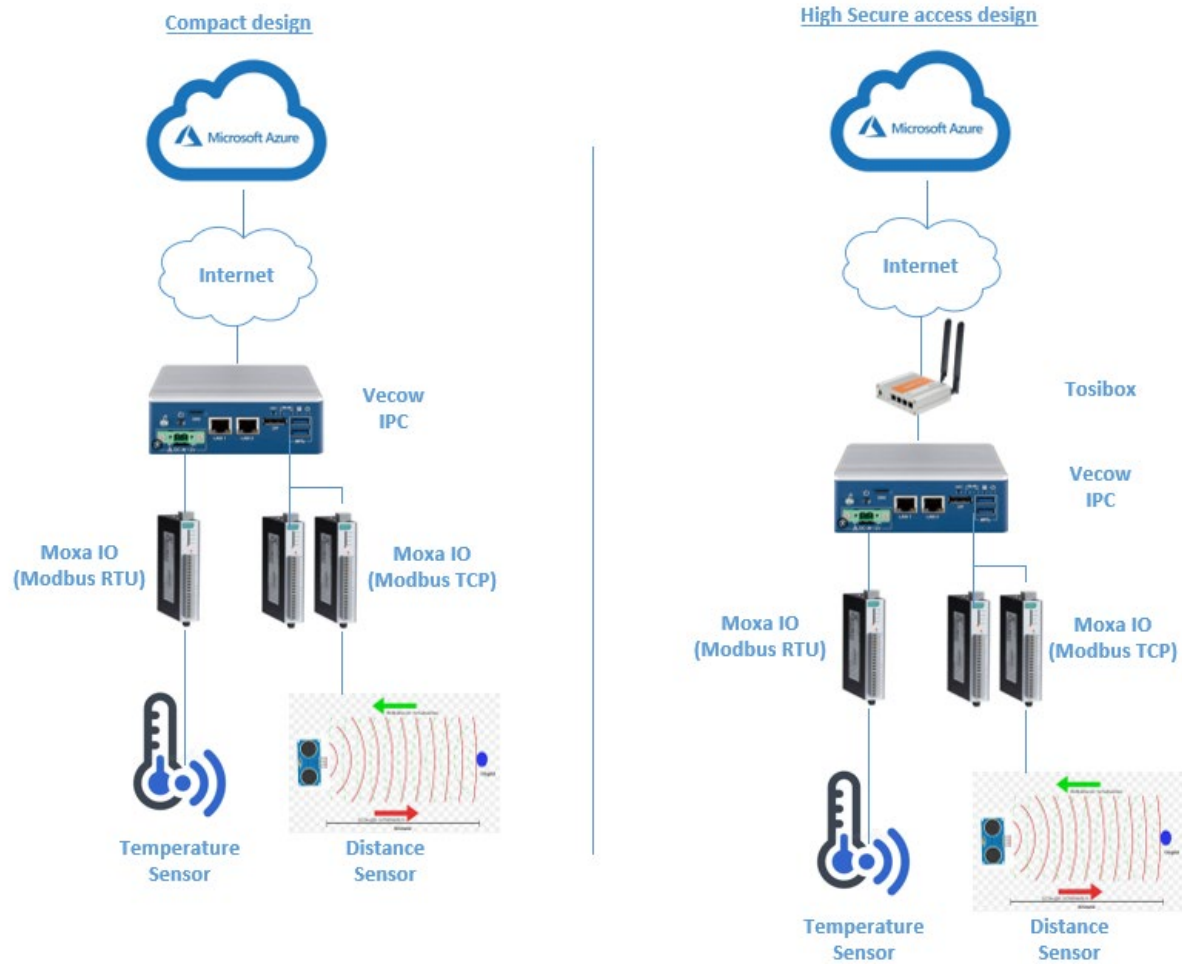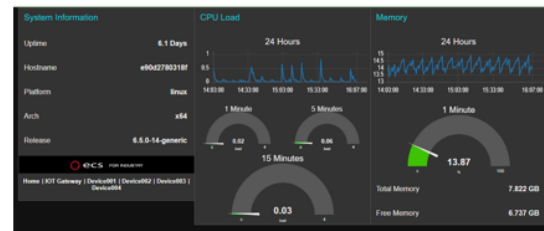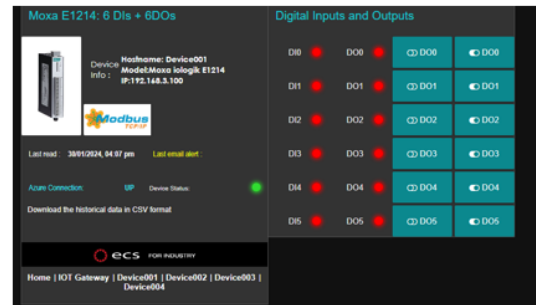
Here is our IIoT demo kit: -

Here is our dashboard on PC/Mobile phone: -

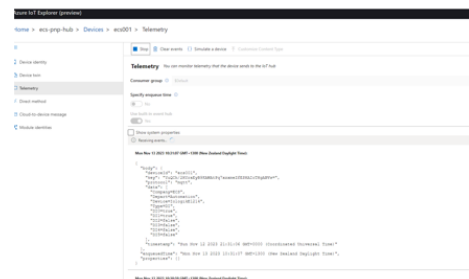### System information

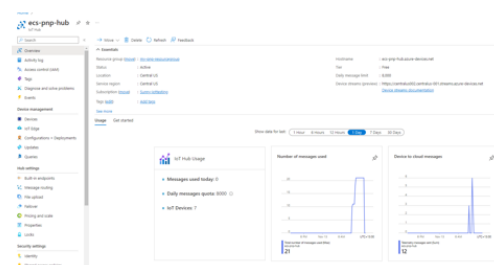### Device information

Email Notification:

Our IIoT gateway will send out the email notification once the temperature reaches to the threshold, and we can extend it to SMS or instant messaging like WhatsApp or Telegram.

Data log in the Cloud: -

Data log from Azure IOT Explorer

Usage from Azure IOT hub

Once the data is in the cloud, you can create a database to store it. However, we do not demonstrate cloud-based analytics here.

Here are the links of our IIoT devices: -

Vecow IPC: https://express.ecsnz.com/en/industrial-pcs

Moxa IO: https://express.ecsnz.com/en/moxa-io

Smart Sensors: https://express.ecsnz.com/en/sensors?srsltid=AfmBOooAXuFobvs71-jzMW594siVymF2a4h3MexF9C1GE5V2YQJYEWS9

Tosibox VPN: https://express.ecsnz.com/en/tosibox-secure-remote-access-solutions?gad_source=1&gclid=CjwKCAiAxea5BhBeEiwAh4t5K568L1UJ8i5n_Y_JigUS4DrVwN4f059vJEpJtfF7E1sRGUFdDC_nWhoC8QMQAvD_BwE

Industrial IoT Application and Examples: -

Industrial IoT (IIoT) technology, combined with AI-driven analytics, automation, and ERP systems, offers a wide range of applications across industries:

- **Smart Manufacturing**: AI-powered systems gather data from various sources to improve product development and quality control. IIoT-enabled machines and robots automate processes to optimize production in smart factories.
- **Resilient Supply Chains**: IIoT helps supply chain managers track products, stock levels, and suppliers. It allows machinery to adjust to real-time changes, making supply chains more flexible and reliable.
- **Intelligent Logistics**: Logistics providers use IIoT to track vehicles, from cargo ships to e-bikes, optimizing deliveries, reducing waste, and speeding up transportation.
- **Healthcare**: IoT devices and wearables give patients better control over their care while helping healthcare providers with diagnostics and treatment. Advanced IIoT surgical tools are even enabling remote surgeries.
- **Agriculture**: IIoT helps in precision farming by efficiently managing water and resources, while sensors in vertical farms optimize environmental conditions for better crop growth.
- **Smart Building Management**: IIoT devices give facility managers real-time insights, helping save costs, improve energy efficiency, and maintain building health by monitoring systems like HVAC and detecting potential issues.
- **Sustainable Utilities and Energy Management**: IIoT optimizes energy use in utilities and microgrids, allowing consumers with solar panels to track and manage their energy, potentially selling surplus power back to the grid.

We hope this Tech Talk provides you with fresh insights into the IoT era. In the next few releases, we will be discussing about the Moxa IIoT or WAGO IIoT. Stay tuned! 😊

Please contact automation@ecsnz.com if you have any questions or comments.

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