What Do You Need to Know when Choosing an IIoT Gateway?

Answers to 10 Frequently Asked Questions

As more and more businesses are continuing to develop IIoT applications, the demand for IIoT gateways is also increasing. As a result of this trend, many types of IIoT gateway have been developed for use in industrial automation applications. Choosing the most suitable IIoT gateway to form part of your total solution is essential in order to ensure your IIoT application is efficient and profitable. In this article, we have prepared answers to ten of the most frequently asked questions (FAQs) about IIoT gateways and what needs to be considered throughout the IIoT project life cycle, which will equip you with the knowledge to choose the most suitable IIoT gateway for your IIoT application. Enjoy!

Definition of IIoT Gateways

Q1: Why Do You Need an IIoT Gateway for IIoT Applications?

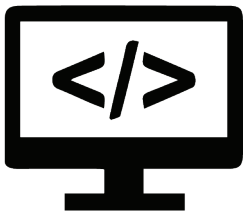
In recent years, the structure of data flow in industrial applications has changed significantly. The data flow within traditional operational technology (OT) automation systems is relatively slow and reliable in order to ensure that the communication between controllers such as a PLC or RTU and SCADA systems is stable. For IIoT applications, where data is often transmitted from OT to IT systems, there must be minimal to no latency between the devices connected on both networks. As transferring large amounts of data from OT to IT systems is time consuming, the data flow for IIoT applications requires a faster solution to ensure operators can receive data in real time that enables them to make decisions based on accurate

data. In addition, data that is transmitted in large volumes increases installation costs as it often means new wires with more throughput need to be purchased and deployed, or it can also result in an increase in carrier fees if the network is deployed using wireless technology. The most effective method to reduce the amount of data transmitted, and therefore lower costs, is to ensure that only useful data is transmitted.

IIoT gateways are the bridge between the OT and IT world. The beauty of IIoT gateways is that they combine several important elements together and filter the data so that only the useful data is extracted, processed, and transmitted which reduces the transmission effort and therefore costs. Utilizing an IIoT gateway can speed up the deployment of your IIoT application and improve your operational productivity, which is why they are becoming essential for IIoT applications. **Top**

Q2: What Are the Basic Requirements of IIoT Gateways?

In order to maximize the efficiency of IIoT applications, IIoT gateways should meet three basic requirements. First, an IIoT gateway must be able to perform data acquisition. It is essential to have an IIoT gateway that is compatible with interfaces and protocols that are found in the OT world so that data collection from field sites is quick and that the data that needs to be transmitted in real time is sent without latency. Second, by filtering the data that has been extracted and identifying the useful data, it reduces the time and cost of data transmissions and also enhances the accuracy of data analytics by only delivering the relevant data. Third, IIoT gateways must be able to transmit data into IT systems and cloud platforms automatically or with minimal effort from operators. If any of the above three requirements are missing, there is a high chance that you will not be able to reap all of the possible benefits of deploying an IIoT application. **Top**



Project Life Cycle – Development

Q3: What Features Should IIoT Gateways Have to Enable Data Acquisition?

IIoT gateways that support multiple OT communication protocols will significantly speed up data acquisition. OT devices are often designed for use on specific industrial applications and are not designed to communicate with each other or IT applications. Therefore, there are often barriers that need to be overcome when multiple OT systems need to interconnect with each other. IIoT gateways that support frequently used OT protocols such as Modbus and Ethernet/IP can significantly reduce the effort required to collect data from different field devices that use different protocols. In addition to facilitating communication among different OT protocols, users also have to ensure that the IIoT gateway is compatible with the protocols that are used in IT applications in order for data acquisition to take place as quickly as possible. Furthermore, an easy-to-use UI that simplifies data collection and transmission from OT to IT devices is one of the best methods for enabling fast data acquisition across OT and IT applications. **Top**

Q4: Do You Have the Necessary Tools to Enable Local Intelligence on IIoT Gateways?

Instead of gateways directly collecting data from edge devices and transmitting the raw data to a cloud server, local intelligence offers two major benefits during the initial data processing stage: it allows operators to respond faster to events that happen at the remote site and also minimizes latency between edge devices and the cloud server. By filtering the raw data collected

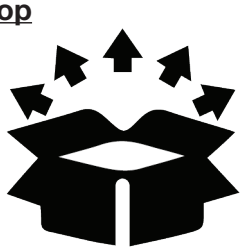
from edge devices, it is much easier for OT engineers to respond quickly to the data they are provided with, which optimizes field site operations. As the data is filtered before it is transmitted to IT applications, the transmission times are shortened and the operators only have the relevant data, which allows them to perform more accurate data analysis. To achieve this, IIoT gateways must have powerful programming capabilities to ensure smooth data processing at the edge. The IIoT gateway should include flexible application programming solutions such as C and Python APIs in order to process data using local intelligence. **Top**

Q5: Why Is It Important for IIoT Gateways to Be Able to Send Data to IT Systems?

A smart IIoT gateway should be able to bridge OT, IT, edge devices, and cloud servers. In order to transmit a large amount of data from multiple field sites into IT systems, it is recommended to use a cellular connection utilizing the 4G LTE standard. It is essential that IIoT gateways support IT protocols, such as MQTT, to allow data to be transmitted into IT systems effortlessly. Furthermore, each IIoT cloud platform or SCADA system often requires users to apply their own SDK/Client. In order to simplify this process, a configurable UI that allows the operators to collect data and transmit it without having to spend time on programming is very beneficial. In conclusion, the IIoT gateway should simplify transmission of data from edge to IIoT applications. **Top**

Q6: Should IIoT Gateways Be Compatible with Third-Party Cloud Platforms?

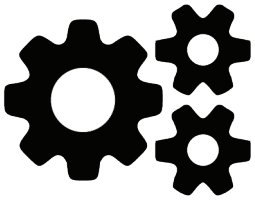
The answer to this question depends on the purpose of the IIoT application and what the gateway is being used for. Even though some large companies have developed their own private cloud server and therefore do not require compatibility with third-party cloud platforms, most companies tend to use public cloud platforms as part of their total IIoT solution. If the IIoT gateway is not compatible with third-party cloud platforms, then the gateway provider will have to utilize an SDK to ensure that data from the gateway can be sent to the cloud, which will often prolong the development stage of the project. Currently, there are several cloud platforms that are available for IIoT applications including Amazon Web Services (AWS), Microsoft Azure, and Google Cloud. Choosing an IIoT gateway that is compatible with one of these platforms is a good way to ensure your IIoT application is up and running quickly. **Top**



Project Life Cycle – Deployment

Q7: What Features Should IIoT Gateways Have to Make Deployment Easier?

As IIoT projects often involve hundreds of gateways being deployed at multiple field sites across a large area, choosing an IIoT gateway that can simplify mass device deployment has numerous advantages. IIoT gateways are the middleware between edge devices and cloud servers, which means they are required to support functions such as IP settings, data acquisition settings, and cloud server connection settings. It is a daunting task for OT engineers to finish hundreds or even thousands of IIoT gateway settings and an easy-to-use gateway that enables mass configuration will make the deployment significantly faster than manually inputting the data as well as removing the risk of human error, which will almost certainly occur when inputting data manually on hundreds of IIoT gateways. **Top**



Project Life Cycle – Operation

Q8: Is Your IIoT Gateway Solution Secure Enough to Protect Your Data?

Since IIoT gateways play an essential role in most modern IIoT applications, it is crucial to choose an IIoT gateway that is able to protect your data from the edge to the cloud. The first thing to ensure is that the device itself has sufficient protection. IIoT gateways that support the Trusted Platform Module (TPM) standard comply with EAL4+, which offers an acceptable level of system security for IIoT applications. Second, data must be secure during transmission. It is suggested to use a VPN when the IIoT gateway is transmitting data through the Internet. Third, when developing applications that utilize RESTful API on IIoT gateways, it is vital to have an access control mechanism to ensure data is protected. It is advised to use an authentication system such as API token management, which ensures that only users or external systems that are authorized are able to utilize the IIoT gateway's API. In order for IIoT gateways to be suitable for deployment on industrial networks, they must have reliable data protection during every stage of the project life cycle. **Top**

Q9: Are the IIoT Gateways Rugged Enough to Operate in Harsh Environments?

To ensure suitability for deployment in harsh environments, IIoT gateways must be built to withstand harsh conditions such as extreme temperatures and electrical interference. In order to ensure their suitability for these environments they must comply with the relevant industrial standards. As no deployment is the same, the specifications will differ depending on the location and application. For example, if the IIoT gateway needs to be installed outdoors, it is suggested to have an operating temperature range of -40 to 75°C to ensure that it can withstand all temperature extremes. Furthermore, industrial applications usually require reliability over deployment periods that stretch into years. Therefore, it will be beneficial if the companies that supply IIoT gateways can provide ongoing technical support as well as guarantees for the hardware and software. **Top**

Project Life Cycle – Maintenance

Q10: Can IIoT Gateway Solutions Simplify Remote Management?

In order to simplify management of multiple IIoT gateways located at different field sites, a tailor-made management server can reduce the amount of time and effort operators need to spend completing their tasks. For example, one of the ideal features of a management server is to be able to indicate the location of IIoT gateways. The ability to display the exact location of an IIoT gateway on a map helps operators determine which specific gateway is experiencing a problem when there are hundreds of gateways deployed at multiple field sites around the world. After the correct device has been located, the ability to perform actions remotely is also very beneficial. If a management server can perform actions remotely such as firmware upgrades on multiple IIoT gateways, a large amount of onsite troubleshooting can be eliminated. It is generally agreed that an IIoT gateway that supports remote management is one of the most effective ways to simplify ongoing maintenance. **Top**

If you are interested in learning more about IIoT gateway solutions please visit our website.