Gartner calls it a game-changer, Forbes named it manufacturing’s most significant development for the coming decade, and others believe it will increase the value of the global economy by 10%. This is the Industrial internet of things (IIoT), and everywhere you turn, references to it are being made.

These industry watchdogs also put the rise of the Industrial IoT and its diverse applications at the top of their 2020 trends list. Industrial IoT makes this list because of the benefits it brings to manufacturing and the integration of Industry 4.0 concepts in today’s factories.

Interconnectivity, data analytics, and process monitoring are IoT’s most important benefits. To reap the benefits of a connected environment, a centralized platform is needed to manage the multiple IIoT devices being deployed across manufacturing facilities. This is where IIoT platforms come into the picture.

If you intend to integrate IIoT in your industrial facilities, then you will likely have heard of different IIoT platforms and read through hundreds of pamphlets spelling out their benefits.

In this comprehensive guide, we will provide a holistic analysis of the choices available. The guide will discuss:

- The differences between a cloud platform and an edge platform
- The pros and cons of building versus subscribing to an IIoT platform
- The key considerations to note when purchasing or subscribing to an IIoT platform

At the end of this guide, you will be in an excellent position to decide which IoT platform best meets your needs.
What is an IoT Platform?

It is only natural to start this chapter with a definition. As with most emerging technologies, many brands and stakeholders define IoT platforms using terms that favor the features built into their solutions. Here is one comprehensive definition that is making the rounds:

‘An IoT platform is a multi-layered technology consisting of software and hardware which includes an operating environment, storage, computing resources, security, and development tools that support the management of smaller applications and IoT devices’

With this definition, it becomes easy to see why there are more than 500 solutions, both small and large, that define themselves as IoT platforms. In reality, these platforms fall into one of four broad categories which include:

1. **Manufacturing Application Platforms**
   These platforms connect shop floor operators and manufacturing processes through the use of applications. They support the development and use of manufacturing applications for scheduling, inventory management, etc.

2. **Manufacturing Operations and Analytics Platforms**
   This type of solution provides a platform for managing manufacturing projects through the use of analytical software applications. They support both post-production and pre-production activities.

3. **Building Information Modeling or Connected Worker Platforms**
   These platforms are built with the idea of connecting all parties involved in a manufacturing process to enable effective collaboration. This includes the product designer, the material supplier, the operator, etc.

4. **IoT Platforms**
   These solutions provide computing support for the sensors, machines, smart devices, and edge devices within a facility. The aim is to provide stakeholders and operators with visibility into machines and operational performance.

With this in mind, a more specific definition of what exactly is an IoT platform is required. This definition must set it apart from other contesting solutions while taking into account its uses. Thus, our definition of an IoT platform is:

‘A set of technologies and tools that support the collection, monitoring, and analysis of machine data, smart devices, edge devices, and shop floor equipment data in real-time to optimize machine performance and productivity.’

This definition highlights the fact that the impact of an IoT platform is felt at diverse levels which include the machine level, facility level, and organizational level. The ability to monitor and optimize machine performance also brings the benefits of an IoT platform to original equipment manufacturers (OEM).
GENERIC IOT PLATFORMS VS. INDUSTRIAL IoT PLATFORMS

As you have probably discerned, the answer is in the name. Generic IoT platforms offer technologies and tools that support the management of IoT devices not used in industrial settings. In this regard, a home automation platform which manages domestic smart devices such as refrigerators, smart windows, temperature, etc. can be referred to as a generic IoT platform.

On the other hand, industrial IoT platforms offer support for the machines and smart devices used within an industrial setting. The IIoT platform provides custom software built for industrial applications and analytics.

Thus, while a generic IoT solution could be tweaked to receive data from industrial equipment, it does not have the tools needed to analyze machine data to provide the insight needed to optimize industrial operations.

CLOUD PLATFORMS VS. EDGE PLATFORMS

Manufacturing equipment and the IIoT devices used across a facility have the capacity of producing large data sets that require scalable computing resources to process. The cloud provides the centralized platform, but when applied to processing machine and IoT data it has its limitations.

These limitations are the latency and bandwidth issues that come with transferring large data sets to the cloud and the receiving of information from the cloud by IoT devices. Network connectivity issues will lead to lags that affect the ability of an IoT device or system to take action in real-time. This limits low latency processing.

On the other hand, edge platforms are built to deliver processing capabilities closer to the IoT or edge device producing the data. This ensures important data analytics are done within the platform and data transfers occur in real-time without time lags. This means that, although cloud platforms have the capacity to collect and process data, edge platforms are more attuned to providing real-time feedback to edge devices.

By incorporating edge computing with cloud computing capabilities, manufacturers can maximize the potential of both solutions.
The use of a real-time scenario explains these differences better. Let’s use the example of a facility with 20 functional edge devices tracking machine health across the shop floor.

In this scenario, the edge devices will send large data sets to the cloud for in-depth analysis. Once this analysis occurs, the information that the edge device needs in order to take specific actions will have to be sent back from the cloud to the edge device. If the machine needs that information to make decisions in real-time, the time lag and potential connectivity issues during transfers will affect real-time implementation.

Edge platforms reduce the connectivity issues by bringing data processing closer to the edge device. In the above example, the edge platform will transfer processed data through MQTT protocols or an IoT gateway back to the edge device in real-time. This ensures the edge device receives the needed information and acts on it in real-time without the lags associated with a centralized cloud platform.

It is also important to note that edge platforms also leverage the cloud for scalability and extensibility. In situations where more computing resources are needed to process big data from multiple devices, the cloud handles the processing task and its results are made available through an edge platform.
Why IIoT Platform Implementations Fail

In 2017, a Cisco study showed that approximately 74% of enterprises that attempted an IIoT implementation failed. A more recent study from Gartner, showed that manufacturing enterprises still struggle with IIoT implementations.

According to Gartner, although the adoption rate for IoT is increasing, execution and the returns on investments made on IIoT is low. The reasons for this can be attributed to three major challenges:
• **Approach to Choosing an IIoT Platform**
Many enterprises still struggle with understanding the differences in features and services the different IIoT platforms offer. Thus, they end up choosing solutions that do not fit business needs or choosing to build a custom IIoT platform for themselves and end up being bogged down by technicalities.

• **Integration with Existing Systems**
An IIoT platform functions with the data collected from shop floor machines. In situations where the IIoT hardware or legacy equipment cannot be connected to a platform, implementation is affected.

• **The Applications Environment**
IoT platforms without robust environments and tools for developing applications limit what you can do with them. This also applies to IIoT platforms that do not offer core applications out of the box. This has led to many enterprises collecting machine data without knowing what to do with it.

**BUILDING VS. BUYING/ SUBSCRIBING TO AN IIoT PLATFORM**

The first reason for IIoT implementation failures takes into consideration the challenges of building an IIoT platform from scratch. Approximately 50% of DIY IoT platform-building initiatives fail for the following reasons. These include:

• **Technical Limitations**
Building an IoT platform requires technical expertise which most manufacturers do not have. This is why most DIY initiatives do not scale out of the purgatory stage and end up becoming uncompleted projects.

• **Time and Resources**
The core business of IIoT platform end-users is manufacturing or facility management. Building an IIoT platform from scratch means diverting human and capital resources to a time-intensive venture. It takes approximately 30 months to build a functional IIoT platform. Dedicating this time to the pursuits of building one leaves the core business of manufacturing neglected.

• **Competitive Pressure**
75% of industrial enterprises intend to integrate the use of IIoT in 2020. If first-mover advantage is applied, this means that competing firms will have a 30-month head-start against anyone who intends to build an IoT platform from scratch.

The cons attached to building an IIoT platform and the challenges with implementation, makes leaving IIoT platform building and implementation to the experts the more viable option. But before doing that, enterprises must first identify which solution provides the best fit for their business cases. The next chapter will outline the process for picking the right IIoT platform.
How to Choose the Best IIoT Platform for You

The diverse IIoT platform options available to you make choosing the perfect fit a task that must be approached scientifically. This scientific approach starts with asking the right questions. Here, the ten most important questions to ask have been outlined to help you develop a customized strategy for your IIoT platform search.

• **What is Your IIoT Strategy?**
The first step to making a choice starts with outlining the problems you intend to solve with an IIoT platform. With this information, you can quickly draw up a shortlist and move to answer the next questions.

• **Who will Make Use of it?**
An important aspect of creating an IIoT implementation strategy is deciding who will be in charge of the program and the analytics required for process optimization.

• **Does the Platform Support Third-party Applications?**
An IIoT platform should provide you with the option of developing applications that fit your business needs. Thus, the facility for developing, testing, and deploying apps is a key consideration.

• **Does it Guarantee Ease of Use?**
Integrating an IIoT platform with existing systems should be an intuitive process. A plug and play IIoT platform ensures you receive returns on the investment made in record time.

• **Compatibility with Management Software**
If you intend to use HR software or enterprise resource management software within your enterprise, then compatibility with existing applications must be considered.

• **How Extensible is the Platform?**
Industrial processes produce large data sets and an IIoT platform must be able to ingest high-velocity data streams.

• **How does the Vendor Handle Data Storage?**
In many cases machine data should be securely kept and easily accessible. Knowledge about if a vendor has its own datacenter, uses a cloud service, and what service it uses is important.

• **Does the Vendor offer Edge Computing Support?**
Support for edge computing is an important consideration for choosing an IoT platform. This ensures you’re prepared to integrate edge computing concepts alongside IIoT within your facilities.

• **What in-built Security Measures are in Place?**
The prevalence of cyber-attacks means special attention must be placed on the authentication processes and security information and event management tools protecting the IIoT platform from threats.

• **What is the After-sales Support Like?**
It is more than likely that additional support will be needed during system upgrades or throughout the continuous use of the IIoT platform. This is why knowledge of their response timelines and its effectiveness is required.

The ten questions outlined here can serve as a template for your search for the IIoT platform that fits your operational requirements.
Conclusion
Throughout this guide, we have attempted to answer all the questions you are more than likely to have about IIoT platforms and choosing the right fit.

The MachineMetrics IoT Platform addresses the concerns raised with implementation and the questions asked in the third chapter. MachineMetrics provides you with a robust platform for developing your applications and bringing both legacy and new equipment under one responsive environment.

Our IoT platform has been used by manufacturers across every industrial niche. This includes the aviation industry, medical technology, discrete manufacturing, Oil & Gas, machining shops, among others.

One example is a medical device manufacturer who used the MachineMetrics IoT Platform to optimize industrial operations by monitoring the performance of its grinding machines.

With the aid of MachineMetrics, the enterprise was able to cut down on downtime and increase its machine performance rate by 50%. The analytical support MachineMetrics provided also led to large scale changes in operational scheduling and staff training within the organization.
ABOUT MACHINEMETRICS
MachineMetrics is accelerating industrial digital transformation by providing an intuitive and flexible platform to easily collect and transform data from any piece of manufacturing equipment into powerful, actionable applications that reduce machine downtime, optimize capacity, and drive increased throughput and profitability for factories. Right now, hundreds of manufacturers have connected thousands of machines to MachineMetrics across global factories.