IoT Smart Factory Use Cases

Epicor® White Paper

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Introduction

As a manufacturer, you are likely hearing a lot of buzz around the concept of the Internet of Things (IoT). IoT refers to the billions of physical devices around the world that are connected to the internet, all collecting and sharing data. Due to the availability of inexpensive computer chips and the ubiquity of wireless networks, it is now possible to turn anything—from something as small as a button, to something as big as an airplane—into an IoT-connected solution. The benefits of IoT include greater agility and flexibility as early alerts about equipment or product issues can be dealt with much earlier, which can help keep an issue from blowing up into a crisis. However, the challenge for many companies looking to harness the power of IoT is figuring out what use cases would be best to address. This paper covers some common IoT use cases that can help your business while also achieving a real return on investment. Let's look at some common areas where IoT technology is being used:

Asset Use Cases

When we are talking about Assets, we are talking about connecting directly to machines or sensors that you use in your manufacturing facility. There are a few different types of use cases that can provide real value when we are talking about Assets.

Machine State

By connecting directly to the Programmable Logic Controller (PLC) on the machine through Open Platform Communication (OPC), or by installing a simple sensor we can get some very valuable information about when a machine is running and when it is down.

Understanding downtime can typically lead to a fast return on investment. You now have better data to help you come up with an accurate Overall Equipment Effectiveness (OEE) measurement. With the potential to alarm or notify people when a machine is down for an extended period of time you can quickly overcome problems that may have gone unnoticed before. Coupled with a continuous improvement programs this type of initiative can quickly translate into real money.

Pre-Emptive Maintenance

By using sensors to connect to equipment and tooling in your facility we can get an understanding of when something is going to fail or breakdown before it happens. We might use something like a vibration sensor or a fluid level sensor in this scenario. When a sensor goes outside predetermined thresholds we can potentially set off an alarm or notify maintenance of a pending issue.

Equipment or tool breakdown can be very costly not only in terms of the cost of the breakdown itself but as far as lost production time and the possibility of missing shipments due to reduced capacity. This can lead to high costs with expedited shipments, low vendor ratings and ultimately lost business.

Condition Monitoring

By using sensors to gather information like vibration, temperature and pressure, we can be in a position to compare that to process parameters for a specific part, and when a value goes outside of the acceptable parameters for a part, we can set off alarms.

The value here is all about quality. By collecting process parameters and setting limits you can be alerted to an issue before it becomes a costly problem. Today, you may be producing poor quality parts and don't catch this until later down the production stream, or even worse it is not caught until it reaches a customer. High scrap, rework and even expedited shipment costs to make up for the issue can lead to extreme costs and potentially lost business.

System Optimization

Using sensors to understand how long a process is taking can help us better understand where we can gain efficiencies.

By analyzing the data and implementing some continuous improvement programs we can see some real positive gains as far as efficiency is concerned. For example, we may determine that there is a bottleneck slowing everything down at the material loading stage. If we can reduce the amount of time it takes to produce a part from start to finish then we have reduced our costs and have more capacity to take on other projects.

Infrastructure Use Cases

Storage Conditions

Some goods like food and chemicals need to be stored in ideal conditions. IoT devices can be set up in a room and monitor parameters like temperature, light intensity, humidity and other environmental factors. These devices can even trigger alarms if certain thresholds are breached.

This makes it much easier to track the quality of the goods through the supply chain and to reduce spoilage. This ultimately leads to better quality and management due to keeping raw materials and processed goods in optimal conditions.

Server Room Conditions

If you have a server room in your facility, then setting up some sensors to make sure the server environment is ideal can be a very simple IoT project. Sensors can be setup to monitor temperature and humidity and be set to alert key personnel if thresholds are breached.

Servers generate a substantial amount of heat which if left unchecked can damage their internal components. If damaged, this can be something relatively minor or it can be a serious issue where you are shut out of a key system while repairs or replacement parts are being ordered.

Facility Management

IoT sensors can be placed throughout the facility to measure key environmental factors. These sensors can then monitor for things like condition-based maintenance alerts or other factors.

Alerts can be sent, and you can ensure that the facility is working to optimal efficiency.

Environment Health & Safety

IoT sensors can be used to geofence dangerous equipment from operating in close proximity to your employees. Potentially you can even have sensors on your employees that track environmental factors or other potential threats.

Reducing injuries and operating a safe environment for your employees is the ultimate goal here.

Supply Chain Use Cases

Remote Asset Monitoring

If you manufacture machines, equipment or electronics then you might be very interested in applying sensors to your products that can return valuable information to you about the state of the asset. This will be especially valuable to you if you sell maintenance contracts. Some common sensors that you might apply here could be temperature sensors, fluid level/quality sensors and vibration sensors. If your product is operating outside acceptable parameters, you can be notified about the issue.

The values around this can include things like improved customer services, increased uptime of your products (because you catch problems before they become issues) and ultimately a better reputation in the marketplace and more business.

Inventory Tracking

There may be some items like tooling that you may wish to track with location sensors. These sensors can be accurate in your building to within a few feet or less and can help you find and locate items quickly.

By finding the items quickly you can save time and potentially decrease the cost of changeovers.

Shipping Container Tracking

Do you ship anything from overseas? Do you lack visibility into where your products are? GPS IoT tracking devices can be placed on shipping containers to give you valuable information about where your parts are. Visibility into if they are at sea or stuck in a port at customs can be very valuable information.

This information provides you with better visibility and can help you make better decisions.

Vendor Machine Monitoring

Many of us have vending machines with supplies in them like gloves, tool bits etc. When something is taken out of the machine, we can have a simple IoT device that sends us information about what was taken.

The value of this is that by receiving the information electronically we can potentially trigger an inventory transaction to occur automatically in our business system and perhaps even a payable if the item is consignment of some sort.

Automatic Re-Ordering of Products

Perhaps you supply items to an end customer and you want to make sure that end customer continues to do business with you and never runs out of inventory of key parts. Installing manual IoT push buttons can help with this. If you install the buttons in their warehouse where your parts are kept and all they have to do to order more parts is press the button than their life can't get much simpler. You in turn receive an electronic order to ship new parts. This concept can be applied to items in your own warehouse as well as a kind of electronic Kanban solution.

The value here is that you have implemented something easy that improves customer satisfaction, ensures you keep their business and protects the customer from running out of parts.

Transportation Use Cases

Truck Monitoring

Your customers are constantly asking about where their products are or perhaps even claiming the truck never arrived. By implementing an IoT device like a GPS tracking device on your fleet you can better understand at any time where the truck is and when it arrives at your customers location.

This leads to better customer service and potentially more business in the future.

About Epicor

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