



# IoT in Manufacturing – Three Initial Use Cases

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## Introduction

Getting started with IoT is often described as a major company ‘strategic’ decision involving executives, suppliers, consultants and requiring large initial investments and expenses – all with the promise that IoT will dramatically improve the company bottom line and make it a competitive star. Seldom mentioned are the millions that have to be spent with consultants, new & existing suppliers and other IoT associated initial and ongoing expenses.

Question to be asked, is this the only way to ‘get into IoT’? The answer is not only NO but also includes the comment that IoT particularly lends itself to gradual implementations, agile to use a popular term. The reason is that IoT has a lot in common with the Internet in that it can easily solve specific tasks and problems using ‘point solutions. But just like the Internet, they can be implemented in a ‘bigger picture’. In IoT this means making sure that these point solutions do not remain islands but are implemented with the bigger IoT picture in mind. The good news is that the bigger IoT picture is now available with the arrival of IoT cloud solutions from many vendors, especially from Amazon (AWS) and Microsoft (Azure). These solutions are not only integrated with the same cloud as the Internet, but also make it easier to connect to standard access platforms and in many cases certified IoT devices.

## IoT in Manufacturing

Manufacturing and production operations today utilize a large number of industrial control and production systems implemented over the years but many dating back to the 1980's. There are also major efforts underway to modernize these systems led by the Industrial Internet Consortium and various Industry 4.0 initiatives led by trade groups and government. This is all good, and these efforts truly help companies to plan their next upgrades and investments. Great as these efforts are, they do not address the day to day questions of normal factory owners or production managers.

- How do I get more data from my production processes?
- What is it I don't know about my manufacturing?
- How do I improve quality?
- How do I improve productivity?
- How do I give my customers better insight into my production and deliveries?
- I need to increase output, but I don't know how?

These are obviously only a sample of questions and issues that arise on a daily basis. The good news is that IoT can help! But how?

## Building Overlay IoT Solutions in Manufacturing

One of the advantages of IoT is that it does not have to be integrated with existing manufacturing solutions or connected using existing industrial or data communication networks. With IoT it is possible to install sensors and gateways throughout a manufacturing process and connect these using a separate wireless or cellular network to premise or cloud based IoT servers. There are several advantages of this:

- No need to touch existing production equipment and systems and pay for expensive integration with these. Instead an overlay solution can be built. At a later stage, this IoT solution can be expanded and integrated in a gradual way using either industrial network interfaces or access to production control and IT systems.

- No need to use existing internal LAN or connectivity systems eliminating security issues associated with external breaches. IoT solutions can be built using its own connectivity infrastructure with connections to premise or cloud based IoT servers using dedicated wired, wireless or cellular connections.

In short, overlay IoT solutions offer a secure and cost-effective way to implement new data driven solutions to address existing and new manufacturing issues.

## Three initial use cases for IoT in Manufacturing

A question often asked are if, how and where to start with IoT. The answer is to start with an existing problem, design an overlay IoT solution and use and enhance this solution to become the foundation for the data driven manufacturing and production business. A couple of use cases will illustrate how to start:

**Data Collection and Information about Existing Production Processes** by developing stand-alone solutions to monitor and control these. An example of this is manual post-assembly functions in a production process where outputs are manually inspected, adjusted or assembled and then fed to finished goods inventory. IoT based work station solutions integrated with local sensors can operationalize currently manual functions and bring them into the QA and production environment IT systems eliminating manual record keeping.

**New information needs from existing Production Processes** using data collection from existing systems and processes and new sensors and input systems. An example of this is giving customer access to where their products are in the production process and tracking specialized product attributes as well as physical motion information. IoT solutions can combine exiting information with new sensors and even trackers in order to provide customer operations with exact information about the what and where of their products. An IoT overlay using dedicated wireless and cellular connectivity makes this possible without having to interfere with existing production systems of risk compromising current IT and communication systems.

**Create a uniform data and information flow from a non-integrated station-based production processes** by connecting each production station to an overlay

IoT infrastructure and create an end-to-end view. An example of this is a pharmaceutical production process involving multiple steps with precise coordination between each step required. IoT solutions can be designed to collect exact information about each production step in the form of physical, mechanical and chemical/biological data that is fed into a common IoT-based application which integrates information from each production step. Eventually this data can be provided to the systems that control each production station allowing for optimization of production results reducing quality issues only caught at the end of the process.

In each of these use cases, IoT is used to address a specific problem and solves it with an IoT overlay solution without interfering with existing production processes and systems using an agile approach. When designed right, these IoT solutions can be expanded and integrated with existing systems and form the foundation for a data driven manufacturing business.

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