You've Collected Your Plant Data. Now What?

By NATE OOSTENDORP

Every year, NASA's Hubble space telescope creates 10 TB of data. By comparison, the average factory creates 1 TB of data every day. You have plenty of data to aggregate, but this is just the beginning. Collecting your data is just a single link in becoming analytics-ready.

Looking at the landscape of your plant data, there are three main types of digital payloads:

1. **Sensor data:** Time-series data, also called tag data and often considered IoT (Internet of Things) data.
2. **Application data:** Data from data-driven systems that are function-specific — such as tracking downtimes, or keeping maintenance records — and usually running within your plant's four walls.
3. **Report data:** Data from systems that regularly export data on a batch interval. These can live in many different formats and usually wind up in file systems or data lakes.

For many IT landscapes, centralization of this data is usually via SQL-based data warehousing, and then it is accessed with traditional business intelligence (BI) tools. Many of these sources require significant effort to extract, though, and represent a blind spot in the industrial IoT (IIoT) landscape.

With this context on the manufacturing data landscape, let's consider the full path towards using that data for value creation. Even once you have collected data that was formerly siloed, you still have hundreds of thousands — or more — of different metadata labels, or "tags," identifying each component of each data stream. Before you can glean any data-driven learnings, you need to decipher the meaning of these tags and what they represent. Some protocol standards, such as OPC UA and MQTT, solve only one more link in the chain: both can help move data between repositories, but won't be able to unlock analytic value by themselves.

In Industry 4.0, success means your data creates value. But the digital payloads outlined so far are not enough to get you there by themselves. While there is no magic wand to wave and make your data analysis-ready, looking at your overall data framework, assets, and existing digital payloads is a key starting point.

Further, many modern manufacturing organizations have better data infrastructure already in place than they may realize — all the better to jump-start their analytics programs and improve productivity, sustainability, quality and efficiency.

Manufacturing Data Collection

Here are two common data infrastructure elements that are basic building blocks to preparing your plant data for analysis:

1. **Connected Factories:** Many manufacturers today do have — at a minimum — on-prem networks. The systems are talking to each other in some fashion, although it likely involves different networks, administrators, and IT organizations, and may require technology to fully enable data flow.
2. **Automation and Access:** If your data is available on a computer system, then automation of access is an option. This can still lead to complications, especially if your system wasn't designed with data portability as a top priority.

One area where being unable to continue evolving your data infrastructure beyond these basics causes problems is when a quality or process engineer needs to access data for a specific project. Suppose there is a production issue; while the engineer may be able to access the data on a screen, they might not be able to easily export it to Excel in a workable format, making it impossible to complete a root cause analysis and resolve the quality issue.

Or, perhaps there is an issue with output quality. Today, the engineer tasked with identifying a root cause for this quality issue may first develop a continuous reporting process, which could be as manual as a spreadsheet being emailed monthly.

Data Foundation and Analytics for Manufacturing

These basic building blocks are just that: a starting point. **To leverage analytics efficiently and effectively, you need a single data foundation for both operations data and analysis.** With a single data foundation in place you will be able to make your vast amount of data useful through automated data transformation.

An architecture might consist of a single stream-processing pipeline that automates transformation for all data. From there, out-of-the-box analytic applications can harness this data for hundreds of use cases, from root cause analyses to optimizing preventative maintenance. Further, transformed data can be shared across other critical enterprise applications, linking production to other key functions.

Here are some of the benefits of this approach:

- With a platform that can stream plant data from all systems and sources at once, you can intuitively organize the data after you've collected it — relating the data sources to each other, in a manner that complements how you and your team work.
- For example, you won't need to seek out quality data for your process. It will all be part of the production data: **a single, atomic unit of data for a single, atomic unit of production**.
- Otherwise, engineers will be forced to rely on database forensics for a continuous view of what's going on and might make errors in their joining of the data.
- Plus, dynamic insights in the moment will help you make better, faster decisions to improve your production outcomes.

Unlocking Value with the Manufacturing Data Foundation

Once you have effectively transformed your factory data and developed a data foundation, you can analyze it, share it across your connected systems, and bring analytic insights to life in a meaningful way — for all stakeholders.

Curious what digitally transforming your plant data looks like in action? Learn how one manufacturer successfully reduced cycle time in just 60 days.

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