Process Control in Manufacturing
TIBCO for Manufacturing

For the modern factory, success relies on transforming from reactive to proactive management. The TIBCO Connected Intelligence platform seamlessly connects data across processes, equipment, and IoT devices, intelligently unifying data for greater access and control. Using real-time monitoring, TIBCO’s digital manufacturing intelligence allows you and your team to proactively respond to dynamic conditions with AI-infused process control methodologies that predict the future and help you solve potential issues before they become problems.

Learn More »
TIBCO Connected Intelligence unlocks the value of real-time data, creating a strategic, competitive, asset for smarter, faster decision-making.

- **Connect** seamlessly any application, device, or data source.
- **Unify** intelligently for better access, trust, and control.
- **Predict** confidently with real-time data-driven intelligence.

Learn more »  
Learn more »  
Learn more »
Manufacturing *Evolved*

The “Digital Factory” is transforming manufacturing. It is powered by new capabilities for processing sensor data—along with big data, machine learning, artificial intelligence, cloud, streaming, and edge technologies. These capabilities facilitate an evolution from reactive problem-solving towards increasingly proactive, predictive, and adaptive management of processes, products, and factories.

This ebook explores process control solutions you can implement, and examples of industry leaders who are already succeeding with these solutions.
What is Process Control?

Process control is the ability to monitor and adjust processes based on performance. When a process is continuously monitored and controlled, managers can ensure that it works at its full potential, resulting in consistent, quality manufacturing. Organizations transform operations by shifting from detection to prevention.

Often, manufacturers deal with siloed systems that do not connect or leverage key data sources. This means they struggle to use end-to-end enterprise touchpoints and end up reacting to problems after they have significantly impacted product and process quality.

By constantly monitoring process performance, operators can detect changing trends or processes before performance is affected. Indeed, process control has a range of benefits:

- Reduces waste and warranty claims
- Maximizes productivity in a manufacturing unit
- Increases operational efficiency
- Reduces the need for manual inspections
- Enhances customer satisfaction
- Controls costs
- Improves analytics and reporting
Manufacturing Process Control, Made Possible by TIBCO

TIBCO unlocks the potential of real-time data for making faster, smarter decisions. Our Connected Intelligence Platform seamlessly connects any application or data source; intelligently unifies data for greater access, trust, and control; and confidently predicts outcomes in real time and at scale.

For manufacturers, TIBCO delivers proactive intelligence to detect early warning signs of abnormal events and failures. Smart data supports the design, implementation, and continuous optimization of key control systems and processes to ensure safe, efficient, and cost-effective production. Digital twins provide anomaly detection and advanced process control to intervene, optimize, and monitor in-flight processes in real time.

TIBCO’s Connected Intelligence Solution allows you to:

- Ensure fit-for-purpose processes that support product quality and uniformity
- Reduce safety and major accident hazard (MAH) events, near-misses, and risks to people, assets, and the environment
- Maximize profit and efficiency while reducing the necessary amount of working capital
- Improve sustainability (decrease waste, emissions, water, and energy use)
- Improve reliability and process capability (CPK)
- Deliver predefined data models to build a single source of truth

Additionally, TIBCO supports your project success, offering white glove implementation or partnerships with leading service providers.
Western Digital

- **Industry:** Computer Storage
- **Revenue:** $17 billion
- **Headquarters:** San Jose, California, USA

"With Spotfire dashboards, we could see very fast development cycles from prototype to production, and we saw a significant return on investment through insights into data, which allowed end users to understand problems and be proactive about addressing issues."

—Andrew Choo, Data Management Engineering Technologist

### Challenges/Objectives

1. Rising wafer production costs due to scaling complex algorithms, and degradation of model predictability over time.
2. The company wanted to optimize its manufacturing processes to lower costs and support continuous adaptation in the ever-growing and highly competitive data storage market by eliminating manual, time-consuming feedback processes between data scientists and the factory floor.

### Transformation

1. TIBCO’s advanced analytics platform helps Western Digital gain insights into product yield and equipment efficiency, and surfaces insights into factory operations worldwide.
2. Complex models allow engineers to classify, score, and refine wafer production in minutes or seconds, reducing misprocessing and cycle times.
3. The platform can pinpoint defects across as many as 300 wafers in only 10 seconds.
4. Real-time equipment monitoring and predictive insights improve efficiency and lower operational costs by spotting potential failures before they occur.

### Solution

- TIBCO Data Virtualization
- TIBCO Spotfire
- TIBCO Data Science

35% YOY exabyte shipment growth through analytics-driven automation

[read the full success story »](#)
Hemlock Semiconductor

- **Industry:** Semiconductors
- **Revenue:** $407 million
- **Headquarters:** Hemlock, Michigan, USA

“"We’ve pulled years of testing data to see trends that allowed us to ask a lot of questions about our processes. From those questions, we put together an impressive portfolio of cost savings opportunities. We really couldn’t do that before, because of the amount of data involved.”

—Kevin Britton, Program Manager

**Challenges/Objectives**

1. Increase profits through cost and waste reduction, improve process reliability, and achieve sustainable energy efficiency.
2. Extreme polysilicon purity is essential to guaranteeing the longevity of the it, and process variabilities can lead to higher impurity levels and lower yields.

**Transformation**

1. TIBCO’s Connected Intelligence software lowered HSC’s costs by analyzing data from the manufacturing processes to better quantify the impacts of temperature, pressure, and energy use.
2. HSC implemented real-time process monitoring and control, maximizing output, efficiency, and quality—while lowering the company’s demand on the electric grid, saving approximately $300,000 per month.
3. The company can analyze machine sensor data while a batch is still in-flight—using this data to perform process control and predictive calculations and feeding the results forward to adjust process parameters for the remainder of the current run.

**Solution**

- TIBCO BusinessWorks
- TIBCO Data Virtualization
- TIBCO Spotfire
- TIBCO Data Science
- TIBCO Streaming

$300,000
Monthly savings via optimized electricity consumption
STMicroelectronics

- **Industry:** Semiconductors
- **Revenue:** €12.8 billion
- **Headquarters:** Geneva, Switzerland

**1,500+ Reports in production supporting analytic-informed processes**

“With Spotfire analytics, engineering teams can now develop their own field-level analyses. This improves operational efficiency, enabling teams to be more reactive when facing manufacturing issues.”

—Franck Dupont, Data Analytics Solutions Manager

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### Challenges/Objectives

1. STMicroelectronics sought an industrial-scale deployment of advanced analytics to increase operational performance by industrializing interactive reports, improving data governance, and supporting the company’s goals for data-driven semiconductor production.

2. The company initially developed a solution in-house, but this led to performance, maintenance, usability, scalability, and data governance issues.

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### Transformation

1. With TIBCO, STMicroelectronics gained interactive visual performance monitoring (iVPM), delivering immediate insight and actionable guidance with historical and real-time data.

2. Inside manufacturing clean rooms, large analytic-fueled touchscreens display updated safety information, equipment updates, and production priorities for the coming shift.

3. Sharing across sites and organizations is easier, leading to faster decision-making and a higher service level for end users.

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### Solution

- **TIBCO Spotfire**
The solution will enable consistent automated investigations and efficient maintenance scheduling, so we can decrease batch failures and eliminate them down the road and decrease the unplanned downtime for this important operation, which will save millions of dollars.”

—Director of Digital Manufacturing Intelligence

### Challenges/Objectives

1. Struggled with digital silos that limited transparency of massive global operations that included core solutions needed for manufacture of different types of pharmaceutical products.
2. Just a few hours of unplanned vital-equipment downtime could spoil millions of dollars worth of medicine from just one production batch. Globally, the manufacturer was experiencing almost 1,000 hours per year of unplanned downtime.
3. Manufacturing process monitoring and automation were reactive and limited with laborious investigative processes.

### Transformation

1. TIBCO solutions enable a world-class manufacturing and supply chain ecosystem that is fully interconnected, increases visibility across diverse systems and processes, reduces waste, and provides new predictive capabilities.
2. The company now conducts automated process failure investigations and optimizes equipment maintenance scheduling—resulting in fewer batch failures and millions of dollars in savings.
3. Employees can monitor products at multiple points of the manufacturing process in real time, identify issues on the fly, and sound smart alarms that trigger more in-depth analysis and help keep processes on track.

### Solution

- TIBCO BusinessWorks
- TIBCO BusinessEvents
- TIBCO Data Virtualization
- TIBCO Spotfire
- TIBCO Data Science
- TIBCO Streaming

### Revenue

$3 million

Revenue losses prevented in pilot, now scaling globally
Genware and Data-Shack

- Independent implementation consultants
- Featured TIBCO Partners

Challenges/Objectives
1. Without timely and accurate data, manufacturers can miss opportunities to improve quality and reduce costs.
2. Manufacturers and producers aiming for process improvement need real-time data from a variety of systems in order to apply process control algorithms.

Transformation
1. The Genware Computer Systems and Data Shack’s Connected Production Platform provides manufacturers with a blueprint for how to process source data and apply predefined machine learning models and advanced analytics.
2. The Platform supports predictive metrics such as process capability indices (CPKs) and use cases like process optimization, quality control, predictive maintenance, and continuous improvement.
3. The Platform quickly showcases metrics and continuous improvement models analyze what-if scenarios to identify immediate intervention actions.

Solution
- TIBCO Data Virtualization
- TIBCO Spotfire
- TIBCO Data Science
- TIBCO Streaming

“TIBCO’s Hyperconverged analytics platform – on which our own Connected Production Platform is built – integrates data in real time from the various operational systems used by our manufacturing customers. Leveraging Streaming and Visual Analytics in combination with AI algorithms, our clients can analyze their manufacturing process data, raw materials testing, and finished goods testing from a quality perspective all within a single integrated platform.”

—Sherlock Holmes, President, Genware Computer Systems Inc.
Transform Your Factory Today

Start on your transformation journey to become a data-centric, digital enterprise now. TIBCO can help you unlock your data’s potential to make faster, smarter decisions, adapt to changing customer preferences, and gain and maintain a competitive advantage.

Visit tibco.com/solutions/manufacturing-intelligence to learn more about how TIBCO can help you:

- Seamlessly connect any application or data source
- Intelligently unify all your data for greater access, trust, and control
- Confidently predict outcomes in real-time and at scale