Democratizing Analytics and Data Science for Continuous Intelligence

Why are data and analytics so important today? Because all businesses want to transform to digital capabilities; It's the only way to survive. You have invested a lot in acquiring data — data on customers, products, services, and transactions — as well as external data like market information. You have data on nearly everything; but it's all useless unless you do something with it.

According to one analyst estimate, only 10% of data is used for a meaningful purpose. This is no longer good enough. Digital businesses need their data to inform every decision, ensure optimal outcomes, guide every interaction, and drive every process. From the front- to the back-office, from HQ to the factory floor, data needs to be continuously informing all entities throughout your organization.

To accomplish this feat, Gartner recommends organizations employ "continuous intelligence" that instantly provides the data you need to delight customers, drive innovation, and optimize operations — all faster than the competition. In this paper, we explain what continuous intelligence means, provide examples of it in action, and show you how to use analytics and data science to take advantage of this important development.

What is Continuous Intelligence?

Gartner provides this definition:

Continuous intelligence is a design pattern in which real-time analytics are [sic] integrated into business operations, processing current and historical data to prescribe actions in response to business moments and other events.[1]

---

1   Gartner: https://www.gartner.com/en/information-technology/glossary/continuous-intelligence

Continuous intelligence is enabled by technology that sifts through all of the events affecting your organization to identify those of significance so you can act on them at the right time and in the right way. Alternately, it can be set to automate actions for specific circumstances.

An analogy is a bear wading in a stream to feed on migrating salmon. Just as the bear has to process constant events (water flowing, salmon jumping) and decide if and how to act, your business has constant events (customer transactions, new hire onboarding, inventory increases/decreases) that it needs to act on. Both the bear and your company have to be aware and prepared to act optimally in real time.

Obviously, you can't act based solely on historical data. You need a system that alerts you immediately to all events you care about. In fact, analysts say that by "2022 more than half of major new business systems will incorporate continuous intelligence that uses real-time contextual data to improve decisions."[2]

Continuous Intelligence Applications

Continuous intelligence that supplies minute by minute, even sub-second, visibility into the business takes data and analytics to the next level, applying it in real time as events happen. Examples include:

1 **Predictive maintenance:** Continuous sensor monitoring identifies the potential for problems and kicks off corrective actions before the problems can materialize.

2 **IoT analytics:** Analytics for IoT-supported operations provides the connected factory and Industry 4.0 capabilities.

3 **Supply chain:** Data collection and analysis for a 360-degree view into supply chain assets provides just-in-time delivery.

4 **Next best offer:** Targeted offers and actions meet the needs of each consumer for inspired customer experiences.

5 **Transaction monitoring:** Identification and analysis of suspicious events can actually stop fraudulent transactions from executing.

6 **Fleet management:** Identification of the most efficient routes and maintenance schedule for each asset optimizes value and/or reduces cost.

PREDICTIVE MAINTENANCE

IOT ANALYTICS

SUPPLY CHAIN

NEXT BEST OFFER

TRANSACTION MONITORING

FLEET MANAGEMENT:

---

2   Gartner: https://www.gartner.com/en/newsroom/press-releases/2019-02-18-gartner-identifies-top-10-data-and-analytics-technolo

#1

SEARCH-DRIVEN ANALYTICS

Natural-language interfaces to speed up finding and delivering insights

#2

AI-POWERED INSIGHTS

Machine learning to speed up data preparation, insight discovery, analysis, and delivery of insights

#3

EMBEDDED DATA SCIENCE

Data science with the simplicity of analytics dashboards for high value use cases

#4

STREAMING ANALYTICS & DATA SCIENCE

Analytics and data science applied on streaming data at critical business moments

These examples show how businesses are applying advanced technologies to innovate, improve operations, and respond in real time. Next, we will look at how to implement continuous intelligence in your business.

Essential Elements of Continuous Intelligence

Continuous intelligence creates always-on situational awareness of what's happening right now in the moment. But how do you do this? Analytics and data science hold the keys, and one other important aspect is data democratization, enabling analytical insights to be made available to everyone in your organization. Employees from app developers and data scientists to executives and business users need to use and benefit from continuous intelligence technologies. In fact, without data democratization, you cannot have continuous intelligence.

Four ways to democratize data, data science, and analytics to achieve continuous intelligence:

1 **Search-driven analytics.** Natural language interfaces accelerate finding and delivering insights.

2 **AI-powered insights.** Artificial intelligence (AI) and machine learning speed data prep, insight discovery, analysis, and delivery of insights.

3 **Embedded data science.** Data science embedded in analytics dashboards can simplify the user experience for higher value use cases.

4 **Streaming analytics.** Analytics and data science applied to streaming data helps you act on critical business moments in real time.

#1 Search-driven Analytics

With TIBCO technology, irrespective of analytics expertise, every employee will benefit from data-driven analytics. TIBCO Spotfire X software uses natural language query (NLQ) as a standard part of the user interface. Just as Google taught us how to search for information, and Amazon how to search for things to buy, Spotfire software is teaching us how to search for data sources, right from the search bar.

The search bar becomes the command line and gets users started with anything in seconds. NLQ search is easy for the casual user, and a fast way to accomplish analytics tasks for power users. With search-driven analytics, Spotfire software accelerates insight discovery and delivery.

#2 AI-Powered Insights

Machine learning under the hood in Spotfire analytics speeds data prep and insight analysis, discovery, and delivery. It includes a pluggable machine learning AI framework and execution engine to power these insights. Expert users love the ease with which they can find correlated variables.

In addition, the AI Recommendations engine finds non-obvious relationships faster than analysts can. It provides an intelligent way to build a visual analysis based on relationships in the data. Given a target variable, the Recommendations engine automatically identifies variables with the most predictive power and displays them in rank order. Recommendations reduces much of the mundane work that would be required for manual comparison. And as the number of variables within datasets explodes, it greatly accelerates analysis and allows users to focus on the most important (interesting) findings within the data.

The Spotfire AI Recommendations engine works by first removing any noisy or uninformative data from the dataset. It then uses statistical inference to find the strongest relationships and displays suggested charts based on the strength of those relationships. Spotfire AI Recommendations works to find relationships and deliver them.

#3 Embedded Data Science

Embedding data science into analytics dashboard and applications is also important. Spotfire software makes it easy for data scientists to package code, hide the complexity, and expose the inputs and outputs within the tool for analysts and business users. They benefit from in-depth knowledge without feeling intimidated. Spotfire software allows preparing, visualizing, and exploring data as well as deploying machine learning models using R under the hood. One-click data science enables intelligence to be easily shared.

## #4 Streaming Analytics and Data Science

One more way of democratizing continuous intelligence is by applying analytics and data science to data that is streaming into your business. In today's world, nobody needs to fly blind because they don't know what is happening on a moment-by-moment basis. A key point of digital business powered by TIBCO is speed over the competition through the ability to spot a pattern or trend faster.

Spotfire software now provides native streaming through TIBCO Spotfire Data Streams software. You can add analytics and data science to streaming data to act on critical business moments. This capability federates access to numerous real-time data sources, providing a very powerful platform upon which to build real-time analytics applications. With TIBCO, you can apply data science to real-time streaming data without having to be an app developer; you use the same drag and drop simplicity as other Spotfire features.

With modern TIBCO analytics and data science, you will democratize data, analytics, and data science enabling use by everyone in your organization. You can build a continuous intelligence system that automates straight-forward decisions for greater efficiency, and routes those needing human action to the right person or group. Your entire organization can access up-to-the-minute information for making informed decisions every time.

Customer Case Studies

Here's how some TIBCO customers are using data and analytics in real time on streaming data for continuous intelligence.
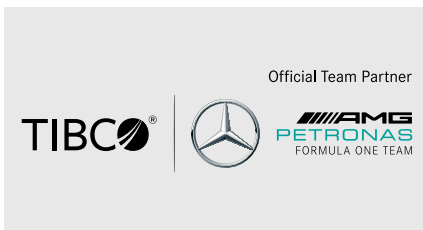
Mercedes-AMG Petronas Motorsport F1™ Team: Process optimization

The Mercedes-AMG Petronas Motorsport Formula 1™ team is one of the most successful F1 teams in recent history—and a real-life example of how TIBCO customers dominate their competition. They've won Constructors' and Drivers' championships every year since 2014, and 17 out of 21 races in 2019. The team is a great example of transformation by combining performance, teamwork, and technology.

All the team's groups use data to inform car design, strategy, and real-time decision-making. TIBCO technology provides the ability to access and visualize gigabytes of historical data as well as streaming data from the world's fastest IoT connected device network, the F1 car. In each race, over 300 sensors and 50,000 channels of sub-second data is used to make crucial decisions. The TIBCO Connected Intelligence platform, of which TIBCO Spotfire and TIBCO Data Science software are part, is used to glean insights from data visualizations that

Official Team Partner

TIBCO | Mercedes AMG PETRONAS FORMULA ONE TEAM

Continuous Intelligence

Just like the Mercedes-AMG Petronas F1 team, operationally intensive businesses can address their biggest data challenges through process optimization and get insights for predictive and condition-based maintenance and optimal business action. You can take vast amounts of data, visualize it, and run machine learning algorithms to derive insights and patterns that can enable better and faster decision-making.

underpin decisions made both at the factory and during the race. TIBCO Analytics is used for devising overtake strategies, for examining simulations supporting car design, and for monitoring performance of gearboxes, brakes, and tires in real time.

Continuous intelligence is used to sift through millions of possible car set-up combinations to find the fastest one for the particular race track, track conditions, weather, car, and driver. The data science toolset is used to monitor ever-changing conditions. Data is widely accessible and easily shareable. With Spotfire and TIBCO Data Science software, previous race data, previous circuits, and simulations are analyzed using predictive algorithms to determine the optimum car setup and performance improvements. The team receives data faster and leverages the expertise of all individuals to find the fastest possible combination. It's a fail-fast digital transformation culture that translates directly to other businesses.

Hemlock Semiconductor: Closed-loop continuous learning

Hemlock Semiconductor's legacy systems were not keeping pace with analytic innovation. Decision-making was slow, and the basis was historical data, providing only a rear-view mirror approach to operations. Bottlenecks from lack of visibility into manufacturing processes and how process changes affected production were a problem. And, there was heavy reliance on IT for reports, with no real-time or near real-time reporting. All this was adding up to high variability in process and production outcomes.

To figure this out, Hemlock chose the TIBCO Spotfire enterprise analytics platform. It helped the company centralize, unify, and govern reporting, reduce reliance on IT, and enable self-service. TIBCO Streaming technology provides real-time monitoring and data-driven proactive decision-making for production, process, and finance. In addition, TIBCO Data Science is providing the backbone supporting a predictive approach to managing maintenance, production costs, and quality.

By applying TIBCO for intuitive analytics and key use cases, Hemlock can now identify variables, develop models, and deploy them to real-time environments for closed-loop continuous learning.

Rear-view Mirror vs. the Windshield

You don't want to drive your business looking only at the past; You want to see what's happening now, use streaming data and predictive tools to tell you what will likely happen, and adjust.

Hunt Oil gains a single real-time view of its business with continuous intelligence

Hunt Oil Company suffered from out of date analytics, inflexible vendor applications, and a lack of agility. The oil and gas giant needed a faster solution for extracting information from applications and gaining insight.

Hunt turned to TIBCO drilling accelerators for a smart IoT drilling system that incorporates TIBCO Spotfire, Spotfire Data Streams, TIBCO Streaming, and TIBCO Messaging solutions to provide a single real-time view of analytics. With these tools, the company analyzes downhole, bit assembly, and hydraulic and pump data streams to query the future for conditions that could lead to failure. In addition, Hunt uses predictive analytics to enable the engineering team to go from an idea, to testing that idea in its smart IoT drilling system, in about six weeks.

Conclusion

To be competitive, your organization must adopt continuous intelligence, and to do so, you need a combination of analytics, data science, and data democratization.

Give everyone access to the advanced insights you're gaining so everyone in the organization can make informed decisions. Insight discovery must be extremely fast and easy, and you do this by automating AI and machine learning so you can analyze streaming data.

TIBCO has a broad range of capabilities that can address any data and analytics use case. TIBCO technology, required to make continuous intelligence a reality in your business, is declared a leader by Forrester and Gartner, Inc. From data prep to MDM, data science, data visualization, data virtualization, and streaming analytics, TIBCO can help whether your environment is on-premises, in the cloud, or both.

TIBCO Software Inc. 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. Learn how solutions to our customers' most critical business challenges are made possible by TIBCO at www.tibco.com.