What Every Operations Executive Should Know About the Power of Continuous Intelligence

Data analytics and data science are now part of many business operations. However, in practice, they have tended to be confined to the domains of the quants—analysts and data scientists—who put together historic data to detect trends and patterns. Now it's time to take things up to the next level—for intelligence everywhere, at all times. It's time to embed real-time intelligence into the very fabric of the organization, running in the background of every key process, augmented by advanced analytics, artificial intelligence, and machine learning.

For chief operating officers and operations managers, this powerful flow of continuous intelligence for operational excellence will provide significant competitive advantage, cost savings, and productivity within both connected production and transactional environments. With Internet of Things (IoT) attached devices and sensors, managers can gain more insight into the location and condition of key pieces of equipment. Continuous intelligence from IoT can enable monitoring of alert thresholds for sensitive equipment in remote areas, such as mines or oil fields. With IoT and continuous intelligence, enterprises also have greater access to customer preferences and usage of their products or services.

Within the next two years, Gartner predicts more than half of major new business systems will incorporate continuous intelligence that uses real-time context data to improve decisions.[1] Continuous intelligence is real-time analytics, derived from an organization's many sources of data, providing leading indicators for events that can impact the business, and can even prescribe best actions to respond to those events.

Continuous intelligence for operational excellence integrates operational and information systems into powerful networks that stream data where and when it is needed. Organizations have been collecting data from all corners of their enterprises for decades, from production machinery to customer profiles. They now need to put this data to work—to analyze data as it is moving, augmenting, or amplifying human decision-making, monitoring, and responding to events.

The Vital Components of Continuous Intelligence

Organizations that are slow to adopt powerful, pervasive analytics may be inhibited by embedded, calcified processes, batch-oriented legacy technologies, siloed data, and cultures averse to innovation. At the same time, they face disruptive or more efficient competitors who are grabbing market share across all industries. Events from supply-chain bottlenecks to shifts in consumer preferences can impact market share overnight. This calls for bold new approaches to managing and leveraging information flow that enable decision-makers and decision-making systems to sense and respond as things change, if not before.

Achieving continuous intelligence requires an enterprise architecture that combines streaming technology with analytics and data science, and thus, delivers data to the applications, systems, or decision-makers as needed.

> **Achieving continuous intelligence requires an enterprise architecture that combines streaming technology with analytics and data science, and thus, delivers data to the applications, systems, or decision-makers as needed.**

"Businesses are awash in data that come from numerous and diverse internal and external sources, including manufacturing processes, supply chain pipelines, online and traditional transactions, sensors, social media, company and product reviews, government and trade association reports," according to *Reporting, Predictive Analytics and Everything In Between*. "Management's problem is how to extract from all this data the actionable, insightful, and useful information it needs for their many and varied decisions—decisions that are often made in real time, on the spot when an issue arises, and that are frequently mission critical."[2]

---

[1] Gartner Identifies Top 10 Data and Analytics Technology Trends for 2019

[2] Reporting, Predictive Analytics, and Everything in Between, Shane Swiderek, David Sweenor and Brett Stupakevich, O'Reilly Media, Inc. November 2019.

Employing continuous intelligence, organizations exponentially increase their abilities to **discover** by enabling users to find data on their own; to **predict** by finding patterns in data to anticipate future possibilities; and to **present** by distributing information to help users answer questions. With today's emerging generation of technologies, such capabilities are available and can be cost-effectively deployed. Data analytics can be leveraged to spot issues or opportunities before they take form, paving the way for proactive as well as prescriptive actions, shortening response times.

Continuous intelligence is made possible through streaming data, in which data is employed either as it is created or as it is requested, updating models and continuously improving them as business conditions change. This data is also integrated with historical information, enabling real-time decision making within the context of overall value to the organization.

As new data arrives in the enterprise, it is continually analyzed, proactively alerting users or triggering responses to events. For example, a customer care representative will be able to provide on-the-spot service remedies to a customer, such as reticketing to a first-class airline seat based on that customer's lifetime value to the company, with insights based on blending both current offers with purchasing history. Or, in a production-line setting, a real-time forecast of a shortage of a raw material may require shifts in production priorities, and a historical analysis of multi-product demand may demonstrate how to optimally rearrange shipping schedules.

Here are the essential components that form the backbone of continuous intelligence for operational excellence:

Streaming analytics. Continuous intelligence is delivered through streaming analytics, logic, and machine learning models that can be applied to data to enable real-time views into business operations, providing insights for decision-makers and automated systems, as well as continuous updates.

Embedded analytics. Continuous intelligence isn't limited to a specific job role or a single part of the enterprise; rather, it is pervasive and highly accessible at all levels. Continuous intelligence employs analytics embedded with systems, applications, and devices that provides analysts and managers with more detailed insights specific to the tasks on which they are focused.

Continuous queries. Continuous intelligence paves the way to continuous queries, which enable decision-makers to visualize queries about future live conditions. This supplants the "snapshot queries" that have defined data queries until now. Imagine a slow-motion video of a waterfall. Rather than a static, still picture of the elements in one place, the viewer can see the unfolding pattern and flow, much the way in which decision-makers can view the momentum of unfolding trends in data. In continuous queries, computers ask and answer questions about data as it's moving—looking at every incremental change as it takes place.

Self-service. Continuous intelligence enables self-service capabilities that allow business users outside the IT or data departments to quickly access data and generate reports on demand.

Visualization. Continuous intelligence yields strategic insights through visual analytics and data visualization. Visualization enables managers and analysts to quickly spot patterns and anomalies. "It enables a flexible analytics deployment across the enterprise because it can handle any type of data from data warehouses, data stores, departmental data marts, and external data sources, as well as structured and unstructured data," according to *Reporting, Predictive Analytics and Everything In Between*.[3]

Artificial intelligence-powered, search-driven analytics. Continuous intelligence is enhanced through natural language processing that understands a broad range of user queries, offering instant, on-demand responses and insights all across the business.

Machine learning. A continuous intelligence environment that can leverage machine learning is constantly improving itself, building on new data that refreshes algorithms and applications.

Augmented analytics. Continuous intelligence enhances decision-makers' jobs and performance. Decisions can be more rapid and accurate, as the introduction of AI, natural language processing, and machine learning automates many of the time- and resource-consuming tasks associated with data analytics. This frees up end-users to more deeply explore patterns and insights that will advance their businesses.

Intelligent equipment monitoring. Continuous intelligence enables high levels of visibility into the performance of equipment across the enterprise, from production floors to vehicles.

Anomaly detection. Continuous intelligence enables the immediate detection and remediation of anomalies that are spotted in the data. This includes coverage of IoT and engineering functions, production surveillance, predictive maintenance, and yield optimization.

---

[3] Reporting, Predictive Analytics, and Everything in Between

Continuous Intelligence in Action

Leading organizations are employing continuous intelligence for operational excellence in many facets of their operations. The following are two prominent examples of how data is helping to transform enterprises.

CyberLogitec: Intelligent Ports
Shipping terminals are perhaps the busiest pieces of real estate on the planet, so it may be surprising to learn that most still rely on manual, visual inspections to ensure that equipment is situated and performing correctly. For CyberLogitec, a leader in the maritime, port, and logistics industry, 91 percent of its monitoring was still conducted manually, with the assistance of closed-circuit television and radios. That was problematic for managers, who needed greater visibility into the status of their equipment, but also for customers needing updated data views, who often had to wait up to 10 months for new applications.

To address these challenges, CyberLogitec turned to continuous intelligence technology for workflow programming and processing of streaming data from around the world. To gain greater visibility into its operations, CyberLogitec leveraged the IoT to connect edge devices, including those that collect readings such as fuel, speed, engine temperature, and movement from trucks and cranes.

This provided the company with full visibility into its data from all terminals in real time, including equipment status and operational conditions. The company is better able to respond more rapidly to fast-changing market conditions. Its developers can set up an entire solution in two months, and offer more options, in both infrastructure and functionality. For instance, CyberLogitec's "Smart Port" brings all types of data—from devices, third parties, and stakeholders—into a specialized data storage system for analysis. This big data can then be analyzed in real time to make faster, better decisions.

Mercedes AMG Petronas Motorsport: Winning Formula
Few things demand faster and more responsive actions than Formula One racing events, and as today's race cars now produce terabytes of data, there are opportunities to make adjustments and modifications as needed. For managers of the Mercedes-AMG Petronas Formula One Team, a six-time FIA Formula One World Constructors' champion with more than 50 race wins, it was a matter of identifying and acting on the right data at the right time. Teams sift through billions of parameter combinations to find the fastest possible setup combination for tracks, cars, and drivers.

Mercedes-AMG Petronas Formula One Team needed a strategy to continuously innovate to create a better car design, improve agility in adapting to race conditions, and find the best car setup for each race. The team turned to continuous intelligence—through data visualization, predictive analytics, and AI—to deliver on their objectives.

The team employs digital-twin simulation to model with aerodynamics and engine data while the virtual car is going through its motions. This provides visualization in a way that engineers or other team members can digest and act on the streaming data. The team employed this data-driven approach in the 2019 season, first testing and developing concepts in the simulator before presenting them to the racing team. The team has run millions of race simulations, examining different variables to assess the results of minor changes.

The solution empowers the team with easy access to various data types and advanced visualizations, while real-time streaming analytics offer instant visibility on metrics during critical phases, plus instant notifications of threats. Data scientists work with the team to create and validate data science models used in analytics and applications, all run at a speed compatible with F1 requirements. With continuous intelligence, the team can connect its data and enhance its intelligence, and is able to extract and visualize data that allows team managers to track and predict the performance of their vehicles.

Getting Started with Continuous Intelligence for Operational Excellence

Every company, regardless of size and industry, stands to reap significant benefits and competitive advantage from continuous intelligence, which will increase an enterprise's responsiveness and ability to compete in today's fast-paced business environments. Here are ways to get started in this journey:

✔ **Get the business on board.** The foundation for continuous intelligence for operational excellence is built on bringing in data from across the enterprise and providing insights as everyone needs them. Every part of the enterprise will eventually benefit as their ability to respond to events and opportunities increases. Perhaps the most impactful way to gain business support is to identify high-value use cases that are initially narrow in scope, then identify and recruit executive-level sponsors to promote the effort.

✔ **Emphasize teamwork.** It's important to understand the relationships of the various roles in continuous analytics initiatives. Continuous intelligence is a team activity. Important roles in the process include operations leaders, engineers, analytics leaders, data scientists, and business analysts.

✔ **Introduce a self-service environment.** IT and data analysts are busy, resources are limited, and business users need insights on a moment's notice. That's why self-service capabilities are so important, as they enable business users to directly access data sources to conduct their own analysis and generate their own customized reports. The key is ensuring that the self-service environment is easy to use, with highly intuitive interfaces. This also requires highly visual data discovery that enables analysis of patterns and relationships in data sets.

✔ **Select the right tools/cloud services.** There is a new generation of solutions and tools—available from the cloud as well as for on-premises computing—that can capture and leverage the data streaming through enterprises to provide continual insights. Technology needs to be flexible and adaptable for growth, covering both structured and unstructured data and content. Solutions should include the types of front-end dashboards available to business users.

✔ **Identify key use cases for pilots/proofs of concept.** To gain business acceptance and enthusiasm for continuous intelligence initiatives, it's important to select specific pain points for quick wins that can be demonstrated.

✔ **Measure results.** Establishing metrics is key to understanding progress made with continuous intelligence. These initiatives should start with a baseline of key performance indicators that will show the business progress made in various areas, from operational performance to product and service delivery.

Continuous intelligence for operational excellence is an ongoing journey that will enrich the performance and capabilities of organizations. The technologies and solutions are available, and the time to start is now.

To learn more, visit https://www.tibco.com/predict

RTInsights is an independent, expert-driven web resource for senior business and IT enterprise professionals in vertical industries. We help our readers understand how they can transform their businesses to higher-value outcomes and new business models with AI, real-time analytics, and IoT. We provide clarity and direction amid the often confusing array of approaches and vendor solutions. We provide our partners with a unique combination of services and deep domain expertise to improve their product marketing, lead generation, and thought leadership activity.

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.