

PROGRESS[®] APAMA[®] IN MANUFACTURING

Complex Event Processing for Driving Bottom-Line Results

The Visibility Challenge

It's impossible to imagine that any company, whose primary function is manufacturing, would not want to find ways to extract inefficiency out of their system. Even if there's no formal involvement of strategies such as Six Sigma, the essence of "doing more with less" in an effort to achieve predictable results is there, somewhere.

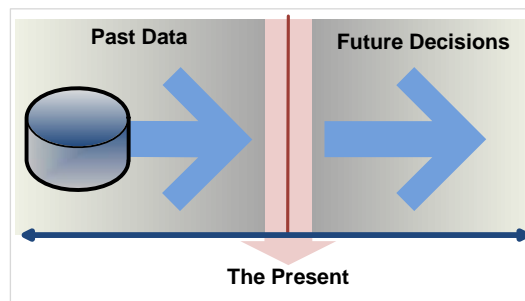
Investments in information and process control systems over the years has certainly yielded measurable results through automation, but can they keep up with the speed and precision required for doing business today? The introduction of Enterprise Manufacturing Information (EMI) systems provides some relief in the form of data visibility across systems and departments but better visibility is only part of the problem. And batch analytics, while still important, only tell you what happened yesterday. The complete package requires visibility, control and the ability to act on events that represent either opportunities or threats.

The Past/Present Intersection

Traditional business solutions found in manufacturing collect vast amounts of operational data. A lot of this information is used for resource planning by correlating forecast and actual data in an effort to determine demand. While this has become a fairly precise science with the application of Key Performance Indicators (KPI) and balanced scorecards, the results are based on information that came from the past. We're using yesterday's results to determine tomorrow's performance.

The ever-increasing speed of business has the potential to make those results so far out of date that their effect is minimal, at best a lucky guess. In essence, the time required to fulfill a manufacturing order is being compressed to a service level period that cannot be achieved with traditional decision making.

If you can't respond to conditions "in the moment" you cannot precisely influence the outcome. In effect, we're living in the (recent) past when it comes to decision making and that's probably not good enough anymore.



Operational effectiveness, as academic as that sounds, is achievable beyond just the theories and best practices that you might have in place. Management strategist Michael Porter set some examples for operational effectiveness where tasks such as delivering services faster or processes to reduce defects need to be performed better than rivals. In particular, specific inputs that can influence effectiveness need to be better utilized.

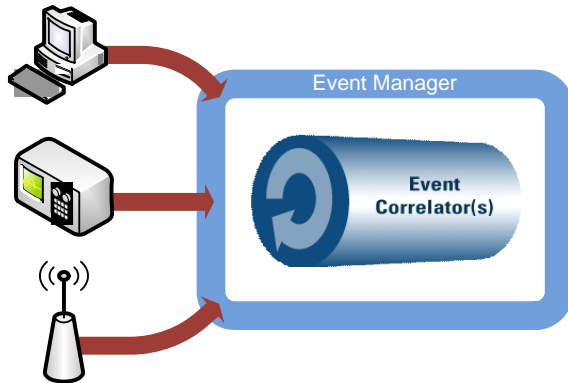
Those inputs, if captured and analyzed in real-time, have the opportunity to put theory into real practice. The problem with this theory is that gap exists between data from the past data and what processes we use to make future decisions.

This is the domain of Complex Event Processing (CEP) and where present conditions become a key factor for making decisions. The past/present intersection is where real-time events are monitored and analyzed with rules that are influenced by data from past experience. Apama, as a CEP platform, gives you the ability to visualize, control and act on events in your business as they happen – effectively bridging the gap.

Pick and Choose Your Events

Certainly, there is real time data flowing through a manufacturing operation from multiple sources. SCADA and other supporting process control systems generate large volumes of event-oriented data as well as business transactions from ERP and MES systems. All of these sources can offer up thousands of events per minute or more. The key is to pick and choose events from all the sources that can offer up the right level of input to be meaningful to your business.

Solutions that look at a single source in isolation may not be enough if business requirements state that metrics, such as overall equipment effectiveness (OEE), need input on availability, quality and performance. All three of those factors may depend on events from independent sources. Events stored in isolation, in this case, don't provide the opportunity for real-time visibility or immediate corrective action.



Apama's Event Manager is the core of a CEP solution. Its role is to capture and correlate events simultaneously from multiple sources. By doing so, any and all events have the ability to contribute to future decisions.

Events with a View

Capturing events is only part of the solution. In many cases, there are two outcomes for incoming events: take action on meaningful patterns or provide real-time event displays. Both are key to "in the moment" decision making but real-time

displays offer useful dashboards that are an important feedback function for business users.

Dashboards are not uncommon in performing business intelligence activities. Your BI solutions, SCADA, EMI and MES systems often come with attached dashboards. Dashboards that are sourced through CEP do offer a similar representation of data but, unlike other systems, CEP dashboards are supported by events that can come from a variety of sources. In effect, a needle that is moving on a dial that represents material flow can be sourced from events that are coming from process control data as well as events from inventory management and order entry systems.

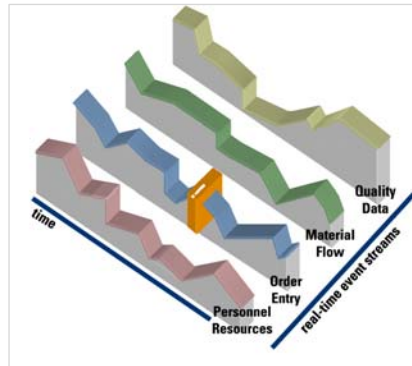
The Apama Dashboard Studio is easily connected to the Event Manager where incoming events can be viewed through over 100 different display controls with 72 built-in functions. Dials, meters, graphs and counters can be graphically coordinated to represent the best view of your operation giving you exactly what you need to see from your events.



Rules to Live By

Capturing events, while important, isn't enough. Once events are captured, you need to isolate patterns for which decisions or actions can be made. In essence, you want to model scenarios that align with the business events you wish to monitor. For example, if events streaming from SCADA or process control devices, quality measurement systems, and personnel resources can be captured in real-time, scenarios can be created that look for meaningful patterns in those events. By correlating process events with quality data and analyzing it over a specified time period, factors such as performance or quality rates can be acted on in real-time.

The rules you put in place are your rules, analyzing your events offering up actions that make sense for you. By modeling state-oriented processes, the Apama Event Modeler lets business analysts design comprehensive scenarios that go beyond needles and dials on a dashboard. You get scenarios with actionable rules to run your business your way.





Time as a Factor

Analyzing static data has long been the domain of spreadsheets and business intelligence tools. But the problem with those solutions is that, as mentioned before, their results are based on past information. If you've now moved point where events are captured in real-time and scenario rules are determining a course of action, how can time be used to your advantage? A unique component to CEP is its ability to do time-based analysis. That is, scenario rules can go beyond simple pattern recognition and instead watch for patterns of events that occur within a defined time period – a truly powerful capability that cannot be easily performed outside of CEP.

Time-based correlation has the ability to dramatically change decision-making strategies. If we go back to the idea of visualizing and managing OEE in real-time and we take quality measurement events, we could develop a scenario rule that states: "if more than 3 quality rejections occur within a 3 minute period and the tolerance of machine B is more than +/- 5% out of bounds, alert the supervisor."

In a manufacturing process, time is everything where speeds and feeds are concerned. Apama's Event Modeler uses time factors as an additional option to your scenario rules – there is no need for complicated formulas or coding. By being able to identify patterns within a certain timeframe, critical factors such as quality control or material flow can be optimized now, instead of waiting for tomorrow to determine what should have happened today.


Analysis of the Past

The cycle is nearly complete: Capture events, visualize real-time event streams and define rules to take action on threats or opportunities. While those three components have enough power to make a difference, the ability to go back in time and effectively "try again" a series of events could greatly enhance future decisions. An important feature in an Apama CEP solution is the ability to store events in their captured order and replay them for further analysis.

In the Apama Research Studio, you can go back to a point in time – like yesterday at 8:17, and re-play the events *in order*. You can choose how fast to replay, much like a fast-forward, and see how your dashboards, scenarios and rules acted on those events. The idea is to be able to catch something that might have been missed or refine a scenario to see if you'd get a better result. With this approach, events, past and present, are always available to for you to gain the upper hand when it comes to improving operational effectiveness.

Driving Bottom-Line Results

Finding new revenue opportunities in challenging times is tough, and in these times taking action on opportunities for cost savings is time well spent. There is a technology advantage to support activities to drive efficiencies and improve effectiveness – Complex Event Processing. CEP can significantly reshape your



business decision-making process through real-time analysis. Apama, as an industry leader in CEP, will enable you to see through all business processes, control devices and data sources to give you the ability to monitor, analyze and act in real-time.



Worldwide Headquarters

Progress Software Corporation, 14 Oak Park, Bedford, MA 01730 USA

Tel: +1 781 280-4000 Fax: +1 781 280-4095

www.progress.com

For regional international office locations and contact information, please refer to www.progress.com/worldwide

Copyright © 2009 Progress Software Corporation and/or its subsidiaries or affiliates. All rights reserved. Progress is a trademarks or registered trademarks of Progress Software Corporation or one of its affiliates or subsidiaries in the U.S. and other countries. Any other trademarks contained herein are the property of their respective owners. Specifications subject to change without notice.