

A Modern Batch Solution

Rethink What You Should Expect From Your System



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Today's dynamic manufacturing climate presents multiple challenges: control costs, mitigate risks, and seize every opportunity to gain a competitive edge. For many companies, this means production areas must drive out inefficiencies that are holding them back with bold approaches. This requires informed decision making, data-driven exposure of inefficiencies, and a tremendous amount of collaboration. Indeed, organizations that embrace today's rapidly advancing technologies stand to uncover new competitive advantages.



The Need for Modern Batch

As companies tackle these challenges, they must look at new and modern approaches to established processes traditionally used in batching applications. Facilities that are constrained by rigid systems can't adapt to changing equipment conditions over time, nor can they take advantage of common workflows as they scale procedures from pilot areas to volume production. Purpose-built controls that sit on dedicated equipment struggle to perform with the manufacturing velocity that is required to meet customer-driven demands. Information that is extracted from equipment has always been crucial to driving improvement yet controlling access to connected assets, maintaining the uptime of plant networks, and the paramount protection of Intellectual Property must be addressed for this to be

effective. Lastly, the changing expectations of today's workforce with the fast-moving pace of technology presents a shift from rigid technology specialist towards operational generalists who demand the easy adoption of tools that have intuitive workflows. A modern approach must not only address these challenges with technical capabilities but do so while maintaining the security, integrity, and reliability of the production system.

A System That is Scalable

Scalability is not just about supporting technologies that possess the ability to control both small and large systems. It is about understanding the need and applying the right technology rather than starting with a product and trying to use it for all solutions.

In some instances server and network infrastructure and their associated security needs are a barrier to apply batch software on small or standalone systems. In the absence of this infrastructure, users should still be able to implement established industry standard control through integrated state model and state propagation control.

Conversely, to simply drive batch management models down to the controller, which may provide some benefit, may not be the right solution either. The benefits of a supervisory batch management system for complex architectures cannot be overstated. When complex architectures result in control being distributed among several units in multiple controllers, a centralized system can provide the most logical and consistent coordination of the platform.

Intuitive Experiences Enabled for Enterprise Systems

The expectation of any applied batch technology is to improve workflows, reduce procedural steps in a task, and simplify configuration. This approach applies to both the design and runtime environments. The reuse of code templates and software-based change management tools are no longer options or perks, but an essential part of the batch control process.

Reduced time to execute routine tasks benefits everyone in a production environment by using mobile devices. Operations must no longer be bound to control rooms or fixed terminals to execute activities such as alarm acknowledgement, manual data entry, or basic equipment operations. To truly maximize system performance, the actions and activities of people interacting with the system must also be optimized. Gains in productivity may take many forms such as through the use of scalable graphics that are device independent, simple user interfaces that reduce the number of clicks required to navigate, and the support of multiple languages a global workforce.

Faster and More Reliable Control

Control systems in a modern batch system must be designed so that the responsiveness can be maximized when the process calls for it. Making allowances for underperformance in areas such as the latency of a state transition ultimately costs time, product quality, and overall profitability. In many cases it is preferred to move the sequencing control closer to the physical equipment to better control sensitive steps, maintain security and improve the reliability of the system.

The processing power of today's controllers provide unprecedented speed and functionality compared to their early predecessors. There are many applications that try to leverage these controller characteristics for rapid response or high available performance architectures in a batch process. A modern batch solution must be able to take advantage of these capabilities for phase and state transition control without abandoning proven technologies and methods that were traditionally only available with server-class systems such as state propagation and ownership handling.



Secured Information Enabled for Enterprise Systems

The Connected Enterprise is a vision that links people, assets, and solutions in a production environment that leads to informed decision making at both the site and the enterprise. Multiple sources of data must deliver pertinent information to the right roles in a timely manner. Focus is typically placed on data collection and analytics, and the potential of productivity improvement that comes along with it. This flow of data includes the connectivity of networks, which presents a whole new challenge for the security of systems.

Traditional approaches to safeguarding a system with air-gaps and locked firewalls are being carefully compared with modern approaches that allow for a secured yet free flow of information. A modern batch system must be designed for security in a manner that secures production systems and intellectual property yet achieves uptime.

The need for security goes beyond internal and external access control, but involves protection of the data itself. A modern batch system must simultaneously make data available for informational analysis and reporting, while helping to protect the integrity of data so that it can be leveraged in regulatory and quality control evaluations.

The combination of flexibility of use and security require that the system design focus not only on the architectures intrinsic protection, but it also must account for integration into enterprise security policies. The IT managed systems and the goals of operations must converge and no longer can be viewed as separate disciplines with mutually exclusive goals.



Modern Batch as Part of The Connected Enterprise

Advancements in technology can add opportunity and risks from both internal and external sources that expand with each new connection of smart things. With each opportunity comes added threats capable of disrupting batch operations, safety, productivity, and the ability to help protect assets, machinery, and information. A modern batch system must utilize a design for security approach that secures production systems and intellectual property yet helps the plant meet uptime expectations. The system must simultaneously make data available for continuous improvement analysis while protecting the integrity of data so that it can be leveraged in regulatory and quality control reporting. The Connected Enterprise fully incorporates the ability to both capitalize on opportunities and protect against risks through a modern batch system.

Traditional Batch	Modern Batch
Fixed A traditional batch system features one size for all applications. Vendor provided skids are difficult to integrate and control is often duplicated in the batch server, which adds risk to the project schedule and makes it hard to support.	Scalable and Distributed Integration of the batch management system with local skids and controllers utilizing a distributed ISA-88 model results in a more responsive and highly reliable system that is focused on improving operator effectiveness and higher throughput. Systems can easily grow from single unit instances into larger enterprise-wide deployments.
Rigid and Unadaptable Structures Users in a traditional system have to master several systems and multiple procedural flows in order to keep operations running. Extension to mobile devices is either limited to custom web services or emulated HMI clients with limited functionality. Acknowledgements and workarounds for non-standard conditions are timely to address and cause production delays.	Intuitive Operations Modern interfaces, workflows, and accessibility features enable operators to focus on production needs instead of navigation of the system. Flexible yet secured access to the system eases adoption of a batch system in applications that require manual additions, material tracking, and version control of recipes. Mobile technology enables operators, engineers, and supervisors to quickly address workflow deviations and approvals.
Slow and Limited Traditional batch applications require tight control of the equipment and emphasize enhanced data collection, but were never intended to be fast. Isolating procedural control in the batch server exposes the network as a critical path to the automated equipment. This results in either costly infrastructures or requires custom control for critical processes. In addition, applications with fast state transitions were rarely considered as candidates for batch sequencing.	Fast and Excellent Reliability A modern batch solution must be able to take advantage of the unprecedented speed and functionality of today's processing power provided with equipment. Responsive control of sensitive steps which maintains security and logs critical information improves the overall reliability of the system. This means that phase and state transition control can be used without abandoning proven technologies and methods that were traditionally only available with server-class systems such as state propagation or ownership handling.
Unsecured and Isolated Data Systems are isolated for security purposes, which makes extraction of data difficult and usually involves gateways, OPC servers, or custom tools. Only proprietary, vendor-specific batching equipment is permitted on the plant network. Servers, workstations, and network switches are limited to a single vendor-provided option, making it difficult to manage IT support and integrate with business ERP systems.	A Connected Enterprise with Secured Information A modern batch system must utilize a design for security approach that secures production systems and intellectual property yet helps the plant meet uptime expectations. The system must simultaneously make data available for continuous improvement analysis while protecting the integrity of data so that it can be leveraged in regulatory and quality control reporting.



Flexible Equipment Utilization

Maximizing the potential of a process also requires optimized equipment and material utilization. Complex process trains and plant configurations allow for flexibility in the process flow. A modern batch system must be able to intelligently make decisions on when and how to best use that equipment. It must not only be able to allow for various vessels to be able to be used for a step in a recipe, but must be able to decide which vessel to use base on various characteristics. For example, when raw materials are needed, the system should be able to choose a supply vessel base on FIFO, process characteristics, or simple prioritization based on the sites preference. By having a more detailed understanding of the equipment requirements, a modern system can leverage dynamic expressions to add intelligence into the batch management system.

A Modern Batch Solution from Rockwell Automation

In today's competitive world, manufacturers need to rethink what to expect from their system. They need to choose a batch system that:

- Provides system scalability that focuses on improving operator effectiveness and higher throughput
- Improves workflow while reducing procedural steps and simplifying configurations
- Maximizes responsiveness and provides control during under performances to reach overall profitability
- Optimizes equipment and material utilization to maximize process potential
- Maintains advanced security while enhancing The Connected Enterprise

A modern batch solution from Rockwell Automation delivers all of these capabilities.

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