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Cloud-Based Manufacturing Operations Management:

The Key to Visibility and Competitiveness in a Global Age

Cloud computing is making its way to manufacturing, as leading industry suppliers of control and automation systems rally around the technology and collaborate to agree on a framework for its architecture. We thought it timely to answer: What is the 'cloud' and how does it benefit Manufacturing Operations Management (MOM)?

'Cloud' is a metaphor for the Internet. Applications are access via web browsers. As such, cloud-based applications are available 24x7 from anywhere in the world on any device that supports a web browser.

Cloud-based computing is an extension of the Software-as-a-Service (SaaS) hosting concept. As with hosting, a dedicated hosting service provides the infrastructure and platform required to host your applications, sometimes called Infrastructure-as-a-Service (IaaS) and Platform-as-a-Service (PaaS). Cloud providers can offer public, private or virtual private clouds, depending on the the level of accessibility and security required by the application.

A key difference is that cloud-based computing is pay-per-usage computing. Instead of monthly hosting charges, you pay only for what you use, and this scalability and flexibility can offer significant cost benefit for manufacturers with seasonal or fluctuating demand.

IT cost savings are typically the reason cited for cloud-based computing, as outsourcing IT tends to be less expensive than having personnel on staff to maintain IT equipment. Moreover, there's no capital outlay for IT equipment or upfront costs for software. As IT budgets shrink, cloud computing enables IT professionals to do more with less. Virtualization, standardization and other fundamental features of cloud present opportunities for lower IT costs, simplified IT service management and accelerating service delivery.

However, the more important reason to implement cloud-based MOM is that the technology platform presents opportunities for unprecedented information sharing, which sets the foundation for a manufacturer to achieve better collaboration, compliance and competitiveness.

"The Cloud will not be controlling processes," says Stephanie Neil, senior editor at Managing Automation. "It will be delivering services around application version control, workflow management, or standardized best practices for global operations."

The cloud offers an expanded pathway for our manufacturing clients to distribute shop floor data, workflow and process instructions, parts and labor tracking, and demand and supply information. Here's how:

1. Global manufacturing collaboration and supply chain management

As manufacturers mobilize to compete globally, many companies are setting up or acquiring manufacturing facilities around the world. They are manufacturing off-shore and outsourcing the supply of subcomponents in order to reduce costs, ensure continued supply and to remain competitive.

As a result, the manufacturer's value chain is fragmented and more complex. Its information systems and production processes are often not standardized. These 'silos' of information make it more difficult to respond to customer and supply changes, to meet demand for shorter product life cycles, and to provide regulators and customers with traceability information.

For many companies, the Cloud offers them the opportunity to rapidly deploy MES and MOM systems. Operations managers can quickly replicate shop floor data collection and monitoring systems to standardize processes, relay production demands, and collect critical information from remote facilities about schedules, parts movement or quality throughout the value chain — without having to worry about local IT system setup and maintenance.

2. Engineering-to-operations collaboration

In his keynote address at the ARC World Industry Forum, ARC President Andy Chanta highlighted the importance of building cloud-based, companywide 'collaboration' networks to bridge the gap between the various departments within a manufacturing operation. He said "manufacturers have done a good job over the past decade of optimizing and automating their supply chains. Now the focus needs to be on end-to-end integration that fosters collaboration between R&D, engineering, operations and functions." He suggested they need to use technology to "become more innovation centric to increase their global competitiveness."

Cloud-based computing enables engineering-to-operations collaboration like never before. Cloud-based deployment of a comprehensive MOM system that incorporates process management and statistical process control (SPC), document control and traceability functionality, makes it easy for staff in remote facilities to collaborate, and to share documents and data. More data means better process standardization, SPC, continuous improvement and propagation of best practices. When less time is spent tracking quality issues, more time can be spent improving and innovating.

3. Cross-enterprise and user-community collaboration

Increasingly, manufacturers are turning to cloud-based forums to open up channels of communication with their users, directly or indirectly. Whether in response to regulators that demand as-built, as-maintained and as-disposed product genealogy, or in recognition of the importance of standardization for widespread adoption — manufacturers are inviting users and trade partners to access and share their information.
User communities and discussion groups increasingly tie into a manufacturer's customer support strategy. Similarly,

some trade organizations representing manufacturing members for whom consumer safety is an issue, such as pharmaceuticals or food processors, facilitate collaboration amongst members and their supply chain to speed communication about recalls or adverse effects in order to improve safety and reduce costs.

The social networking model serves as an example of the platforms and applications required for much of this external communication, which requires structured and unstructured data, synchronous and asynchronous communication.

4. Knowledge Management & Distribution

They say knowledge is power. Cloud-computing can be a cost-effective and high-performance method of using MOM systems to distribute knowledge about manufacturing operations worldwide so that more people in the organization have the power to act on the insights contained within the information.

MOM systems make accurate real-time and historical data visible to the people who need it, when they need it — and the cloud can help get the information to them wherever they are.

Effective data capture and distribution holds the key to the audit trails, product genealogy and parts traceability, quality and statistical process control data that help you solve problems quickly. It provides the real-time demand, production and supply chain delivery information at the fingertips of the managers who can optimize productivity and response times. Its use for document management and version control means that your engineering and continuous improvement teams have all your facilities running at peak efficiency and quality levels.

Lastly, MOM systems capturing remote data from facilities on the cloud are capable of generating the customer and regulatory compliance reports, such as those required for WEEE and UID registry, saving tremendous amounts of time and associated costs.

Summary of the Benefits of Cloud-based MOM

For many companies, cloud-based MOM may offer significant IT cost savings. Whether set up on a public, virtual private or private cloud, outsourcing to a cloud-provider can defray capital cost and costs associated with network security, redundancy and backup, disaster recovery and scaling to peak demands.

In a recent paper published by Forrester Research, their analysts say that the goal of a company employing a cloud-based computing strategy will be "completely automating the deployment, monitoring, and management of applications and the infrastructure on which they run." They describe an evolving, and diminishing, need for operations staff to interact with IT staff: "For applications deployed in the cloud, getting more capacity does not need to involve IT professionals in the traditional manner."

A summary of the IT cost and operational benefits are:

- No capital outlay for IT infrastructure equipment and software

- IT staffing cost savings

- Rapid scalability

- High levels of service availability

- Expert network and data management

- Security, disaster recovery and other risk management

Furthermore, there are significant additional benefits to cloud-based MOM in terms of the collaboration amongst facilitates and departments, and the resulting insight provided by widely-available real-time and historical data.

Some of the benefits of better collaboration and insight include:

- Better, faster decision-making

- Faster time-to-market

- Faster responsiveness for better customer service and safety

- Higher levels of customer confidence and satisfaction

- Standardization of best practices leading to higher quality and efficiency

All lead to more profitable, globally competitive operations.

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