

MOM: Orchestrating the convergence of automation, Industrial Internet of Things (IIoT), and enterprise systems

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MOM's impact on the Industrial IoT vision

Along with Cloud/SaaS platforms and smart devices, the Industrial Internet of Things (IIoT) – the IoT for manufacturing – promises unprecedented connectivity, intelligence, and responsiveness. Just as we have with so many other technology innovations, we want to harness the power of the IIoT vision, while leveraging the collective power and experience of decades of manufacturing know how.

In 2018, I was interviewed about how [Manufacturing Operations Management \(MOM\) is making Cloud, Automation and the IIoT work together](#). During this time, I had the opportunity to interact with various manufacturers across industries bringing our experiences, having specific challenges and – of course – expectations towards MOM in context of the digitalization process. Some of these discussions were very inspiring, some others brought up already good practices that helped validate or calibrate some of our assumptions. Among all that, I clearly see that we have gained common ground about the critical role of MOM functions and how this is strengthening further in the convergence of these technologies. This seems to have become indisputable.

The real value in bringing IIoT into the manufacturing IT landscape (MOM)

MOM provides vertical and horizontal integration, as well as data orchestration across automation, IIoT, manufacturing, cloud platforms and enterprise PLM and ERP systems.

MOM horizontal integration brings noticeable advantages in terms of New Product Introduction (NPI), especially when we look at the “feedforward” flow of information. MOM collects Bill of Material (BOM) and Bill of Process (BoP) from PLM and customer orders from ERP and transforms them into executable manufacturing orders – keeping change management workflows synchronized with closed-loop information flows. This drives traditional siloed departments towards continuous quality and efficiency improvements – irrespective of industry.

MOM vertical integration is crucial for end-to-end visibility, performance improvements and rapid, effective decision making. It is realized by unlocking the power of production data and manufacturing analytics through what we call the concept of the 5Cs:

- **Coordinate** manufacturing and quality operations: implement the digital twin into production, standardize manufacturing and quality operations, orchestrate production processes by activating the right resources at the right time.
- **Control** production processes: enforce all manufacturing resources (material, operators and equipment), monitor execution timelines in real time, manage scheduling changes, and track resource-specific history records.

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- **Collect (and connect)** raw production data from shop floor and IIoT.
- **Contextualize** raw production data by adding detailed context information (engineering/design, equipment, material, person and production order) and transform them into actionable analytics.
- **Comprehend** manufacturing analytics through reports, dashboards and KPIs.



IIoT technologies not only supply rich data to these feedback loops but have a broader application beyond the shop floor. IIoT enables real-time data gathering from the direct utilization of final products, which is crucial for the continuous improvement of product performance. Data and performance information from the field can enrich the “Holistic Digital Twin,” adding “as-used” data to as-designed and as-built data, creating an even more powerful closed-loop for engineers and designers.

Having all these capabilities in a solution doesn’t ensure that they can be properly leveraged by the manufacturer. It is critical to implement the capabilities in the right way, the right order – keeping into consideration current landscape, and correctly deployed with a sustainable architecture to move beyond pilot purgatory.

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