The Next-Generation of Manufacturing: Hybrid Architecture MES
Adoption of MES significantly benefits manufacturers who have realized distinct value in gaining visibility, specifically from production management, quality management, and a planning and scheduling perspective.

Today’s leading manufacturers are leveraging the Industrial Internet to implement solutions like MES on the plant floor, and industry is starting to take notice. An LNS Research survey\(^2\) shows that companies realize that some form of digital transformation is a necessity to stay competitive for the next 3-5 years.

As MES demand increases, the needs of the manufacturing market is beginning to drive the technology in several ways:

• Manufactures want a faster time-to-solution (more out-of-the-box capabilities)
• Manufacturers need new technology that is able to go beyond current efficiency gains
• Operators want better OEE visibility and management wants better enterprise visibility across all plants
• Manufacturers need easier and more cost-effective solutions to leverage factory floor data to increase their yield

The use of manufacturing execution systems (MES) is considered a best practice technology approach in manufacturing today. Manufacturing executives look to MES software as an enterprise solution to connect manufacturing and supply chain technologies. According to LNS Research\(^1\), about 41% of manufacturers have adopted MES within their plants.

What is hybrid MES?

Traditional manufacturing execution systems (MES) are technology systems used in manufacturing to track the transformation of raw materials into finished goods. MES supplies information that helps manufacturing decision makers understand how the conditions on the plant floor can be optimized to improve production output. MES works in real-time to enable the control of various elements of the manufacturing process in the space between automation systems and enterprise resource planning (ERP). Hybrid MES builds on the benefits of MES by taking a hybrid approach, with operations happening on-premises and the analytics and optimization tools in the cloud.

1 LNS Research, Analytics Really Do Matter: Driving Digital Transformation and the Smart Manufacturing Enterprise, 2018

2 LNS Research, Analytics Really Do Matter: Driving Digital Transformation and the Smart Manufacturing Enterprise, 2018
Get more from MES with faster time-to-solution

In the manufacturing industry ‘time-to-market’ is very critical. Manufacturers need to bring the product to market at the right time in a rapid manner. So, when it comes to implementing MES, time-to-solution is very important for manufacturers. After all, plant production cannot screech to a standstill for a technology project to get off the ground. This has prompted hybrid MES to become easier to implement. Manufacturers considering MES should pay close attention to the out-of-the-box capabilities of the solutions they are considering, keeping in mind the following:

• Whether you are using hybrid processes, discrete processes, or are one of the few using multi-modal processes, you should look for an MES that can cover it all

• Familiarize yourself with the interfaces for different functions (plant manager, operator, quality manager, etc.) To ensure flexibility to adjust to user’s needs

• The ease and agility of implementing a solution that’s able to be customized as needed

Use this checklist to ensure you’re evaluating all the typical functionalities available as standard and ad-hoc reporting in hybrid MES:

☐ Product flow management
☐ Schedule execution
☐ Product genealogy
☐ Real-time order execution management
☐ Holistic KPI management
☐ Real-time quality management
☐ Statistics and notifications to control quality levels
☐ Efficiency management
☐ Root cause analysis
Analytics across every level of manufacturing

Different roles in the business require different information. The Aberdeen Group reported that 68% of manufacturers suffer from excessive costs related to materials, labor, packaging, and shipping.

As such, some MES have incorporated different views for different roles out-of-the-box. For example, the supervisor needs information to optimize product flow, machine and operator efficiency, and manage safety incidents. The supply chain manager needs to optimize revenue targets and year-to-year growth while reducing costs. And the operations manager is focused on increasing monthly and quarterly manufacturing efficiency and reducing any non-value-added steps in manufacturing.

Due to all the different roles, the data they need to do their jobs solves an ongoing problem with data that plagues manufacturers: lack of data-based decision-making. Gartner reports that more than 70% of factory-generated data goes unused. Today's MES technology harnesses that invisible data and makes it easy to give each person visibility to the information they need to do their job.

Look for OEE visibility for operators and managers, and tools to make them more efficient.

• Personalized views based on the role of the user (operator, supervisor, etc.)
• UX with configurable out-of-the-box views to make users more productive and provides the ability to create their own personal experiences
• Built-in and ad-hoc reporting by role
• Extensibility to create highly customized interface, if desired
Manufacturers have hit a wall when it comes to operational efficiency. They have made all the obvious changes and squeezed the last incremental improvements out of their systems. In fact, manufacturing processes have become so fast, for some organizations, the rest of the business can’t keep up with product lines. This has prompted manufacturers’ increasing interest in the Industrial Internet of Things (IIoT), causing them to invest in Industry 4.0 and advanced analytics.

To get to the next level of operational efficiency, manufacturers need to leverage technology to discover what the human eyes cannot see. Manufacturing are faced with various information every day, making it challenging to filter information in a way that is actionable.

Technology is a natural fit to surface actionable information, and hybrid MES is answering the call with advanced analytics that lend manufacturing intelligence. These advanced technologies, such as artificial intelligence (AI), can help transform and contextualize time-series and transactional data into actionable insights and uncover improvement potential that isn’t easily seen by the human eye.

For example, data-driven predictive asset maintenance can save up to 12% of scheduled repairs, reducing overall maintenance costs up to 30%, and breakdowns up to 70%.

And, one performance chemical company reports increasing capacity by nearly 20% after adopting a predictive analytics model.

Manufacturers are starting look at predictive analytics to improve operational efficiency and to get the competitive edge. Forward-leaning manufacturers are getting more and more sophisticated about putting these analytics to work.

Select MES that can grow with you and is proving analysis, not just trending. This will help to find opportunities for improvement.

Analysis should include:

- Golden batch comparative analysis
- KPIs and variable
- Batches, orders, and Historian tags
- Overlay or stack analysis
- Search by data point, batch, or product
Connecting the manufacturing enterprise

One of the biggest benefits of MES is the visibility it provides into manufacturing performance and capabilities across the organization. MES enables new digital connectivity to data sources, adding valuable context to existing data and information. This allows manufacturers to look across their locations and equipment and implement best practices at a holistic level.

For many manufacturers, their current environment of siloed data prevents them from the visibility they need. They’ve attempted to solve for this manually, but consolidating the data from several plants or assembly lines manually doesn’t allow for quick enough reaction time.

Yet, because manufacturers don’t have the appetite for the time and expense involved in a large enterprise data integration and BI project, adoption has been slow. There is no doubt that manufacturers need the advantages technology can bring, but they are concerned about costs of infrastructure. For 23% of executives, quality and cost of collecting machine data are a top-three barrier to implementing big data initiatives.

And, rightfully so, when efficiency gains are narrow, costs become an area of scrutiny, causing manufacturers to look to reduce their costs related to technology.

Hybrid MES has now evolved to answer for these cost concerns with cloud-based information aggregation and visibility. Early in cloud technology, manufacturers were reluctant to move critical operations to the cloud and hybrid MES answered that concern by taking a hybrid approach, with operations happening on-premises and the analytics and optimization tools in the cloud.

This is an excellent use of the cloud because it does not pose risk to production, but leverages the cloud to help to reduce the hardware footprint. This also offers cost reduction related to resources to maintain huge databases, such as day to day staff as well as the costs of downtime incurred with software upgrades.
Predix Manufacturing Execution Systems (Predix MES) is a suite of solutions that can transform your manufacturing business through insights and intelligence powered by data integration, the Industrial Internet of Things (IIoT), machine learning, and predictive analytics. By bringing together the digital world with the physical world of manufacturing, it can deliver holistic performance management for today’s connected enterprise.

Predix MES has made it simple to create a holistic, enterprise data set that offers benefits such as:
- Improved procedural execution enables agility for high-SKU-mix production
- Up to 20% of production capacity is recovered as equipment is pro-actively tuned for reliability
- Increased production capacity without large capital investment
- Material inventory is balanced to demand and production capability
- Supplier quality is validated, reducing operational variability and product risk
- Reliable, predictable production capacity reduces finished goods buffers 30% or more

To become a truly digital company, manufacturers need the ability to deliver data from the source to where it can be shared and analyzed at the enterprise level. The resulting insights minimize production losses and drive additional efficiency that were not before realized.

To learn more about how Predix MES can help you overcome your operational plateau and gain higher efficiency from your operations, visit our Predix Manufacturing Execution Systems page.