



Digital Manufacturing at Wipro

Digital representation of entire life cycle
of assets, processes and systems



Typical manufacturing plants are plagued by multiple inefficiencies such as:

- Non-optimal layout and unbalanced processes
- Zero visibility into operational efficiency, productivity and utilization of facility, resources and processes
- Ubiquitous legacy systems leading to frequent machine failures, inaccurate asset tracking process, manual operations, and asset performance issues
- Delayed go-to-market strategy for new or existing products
- Limited information available to take data driven decisions

Wipro's Digital Manufacturing offerings address such issues by leveraging digital simulation for process and plant optimization, reduced cost of failure, optimized business processes, and support future CapEx initiatives. Further, it extends the digital simulation with physical automation and integration.

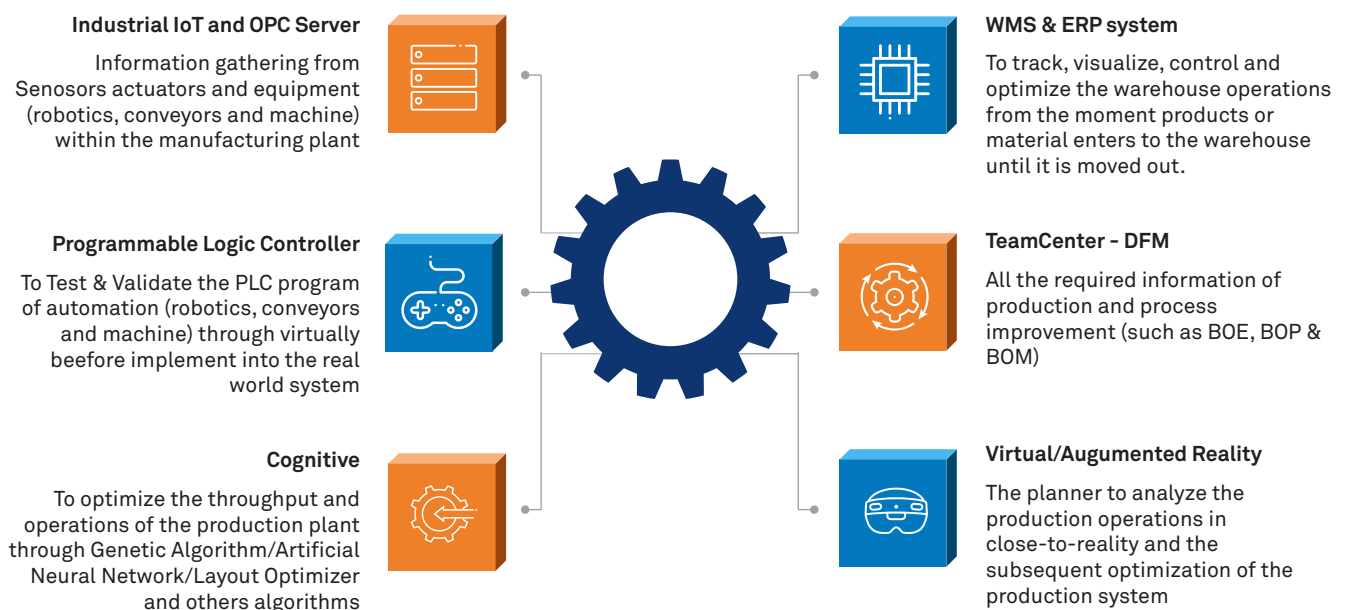
Setting up such an event platform to start reaping the benefits of event-driven architecture can be simple, but like every journey, it helps to have a map to reach the destination. The following guide outlines what an organization should consider and deliberate, the actions it should take to set up a solid EDA which can cater to a plethora of patterns and business requirements.

The solution

Wipro's Digital Manufacturing offerings cover end-to-end life cycle of the product, system, production line or plant from layout and process planning, plant simulation, logistics planning, ergonomics to virtual commissioning, and physical automation. This enables insights into the past, present and future performance of the manufacturing plant and recommendations on how to improve outcomes.

Across industries, digital simulation is being used to improve the performance, effectiveness and quality of the manufacturing assets. The 3D digital environment interfaces with PLCs, OPC server, Industrial IoT, ERP, WMS, PLM, and other manufacturing systems to refine production cycles, stay ahead of potential obstacles, boost efficiency, and improve product designs.

Industries: Automobiles, manufacturing, aerospace, retail stores, FMCG, pharmaceutical, airlines and healthcare



Benefits

- Enhance process and plant efficiency
 - Dynamic traceability of facility and resources to enable the productivity
 - By improving the material flow movement, we can optimize the layout and enhance the productivity and operational efficiencies within the plant
 - Virtually validate the end-to-end resources and operations within the manufacturing plant before implementing into the real-world system
- Improve asset performance, reduce costs and downtime
 - Reduce assets and resources investment in planning of new facilities
 - Improve OEE through reduced downtime and improve performance of assets
 - Enhance reliability of production and equipment
- Improve storage performance
 - ABC storage, zone wise, random storage and cross-docking are the warehouse operations to control and optimize the inventory level.
- Enhance efficiency of an operators by maintaining social distance
 - Model the current scenario and analyze when 2 or more workers are come within a defined distance and then raise a flag with a red circle. The planners can analyze these violations and provide protective partitions between the workers.

Features

3D animation and visualization of assets and resources

Built-in distribution functions: To calculate confidence intervals of parameter (Uniform, Triangular, Weibull, Poisson, NegExp, and some other distribution)

Out of the box graphical analysis: Representation of graphs – Analysis of assets, resources, throughput, bottleneck detection, Sankey diagrams, Gantt charts, and sequential sampler

Built-in energy analyzer: To analyze the energy consumption of machines within the plant

Reusable libraries: Object-oriented, hierarchical modeling based on dedicated object libraries for fast and efficient modeling of discrete process – Resources activity log, import & export of data to the simulation, junction cross over, traffic congestion on aisles

Cyber physical integration: Integrate the simulation with other external applications by using internal applications such as OPC, Socket, ActiveX, Oracle SQL, XML, ODBC, and PLCSim Advanced

Artificial intelligence: There are certain algorithms that will be used to generate several scenarios and provide the best optimized results (artificial neural network, genetic algorithm, layout optimizer, and experiment manager)

Social distancing: Maintain social distancing guidelines and alert operators when the guidelines are breached

“ Leveraging digital simulation for process and plant optimization ”



Success stories



1. Client: An automotive components manufacturer

• Challenges:

- To improve shop floor productivity of the manufacturing operations
- To improve the space availability for adding new machines / equipment
- Optimize the material movement within the shop floor and improve the process flow

• Wipro's solution

- Grouping of products and variants based on the processing and routing
- Materials are transferred to the shop floor based on FIFO strategy
- Identify and reduce the gap between the work station/machines
- MHEs are controlled and transported in a shortest distance to reach their destination

• Customer benefits

- 30-35 % increase in space utilization
- 20-25 % savings in material movement and reduces the MHEs
- 15-20% overall cost savings



2. Client: World's largest retailer

• Challenges:

- No effective way of measuring the warehouse efficiency through legacy environment
- Slow performing applications with lack of testing models
- Unavailability of tools to model the distribution process virtually

• Wipro's solution

- Understand warehouse operations and interaction of users with key WMS applications
- Integrate digital simulation with WMS system through interface layer
- Test performance of applications through digital simulation model
- Derive all the performance and error issues of applications

• Customer benefits

- Identification of application gaps and process efficiency improvement pointers
- Ability to model different combination of warehouse / distribution system components and simulate process



3. Client: A leading aircraft OEM

• Challenges:

- Simulate material movement from storage area to the production line through tuggers
- Tugger route optimization and their frequency of supply to the production line
- To verify & validate whether 2 tuggers are sufficient to meet the delivery and empty pick up


• Wipro's Solution

- Identify the re-order level for each parts and group those parts and transfer to the production line
- Identify the shortest and optimized tugger route and its frequency
- Generate trip charts from delivery schedule

• Customer Benefits

- 15% reduction in tugger delivery time
- Optimized tugger route and its frequency



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