



## Summary

Wonderware MES 4.0 gives manufacturers a full-featured Manufacturing Execution System (MES) to effectively manage your operations, tracking material movement, consumption, asset and resource utilization, blending both real-time and transactional systems for full plant visibility & control.

## Business Value

Using Wonderware MES, manufacturers can increase operational efficiencies, reducing production errors, quality losses and increasing product yields. Productivity can be increased through faster inventory turns, reduced production lead times and faster new product introductions for fast ROI. As a configurable, standard software platform, Wonderware MES offers a low risk, step by step implementation approach.



# Wonderware MES 4.0/Operations and Performance Software

## IMPROVE YOUR PRODUCTION EXECUTION CONSISTENCY, VISIBILITY, AGILITY AND PERFORMANCE

Wonderware MES 4.0/Operations and Performance Software provides a configurable and highly scalable Manufacturing Execution System (MES) which can be applied to essentially any industrial manufacturing or production process.

Using real-time production information, decision makers and operators can effectively manage the order flow and production execution, tracking the transformation of products from raw materials through finished goods, and gathering real-time information on yields, quality, resource and asset management.

- Reduce production order lead time for rapid responses to changes in demand by dynamic allocation of production assets and more granular production planning.
- Improve asset utilization by identifying production bottlenecks, unplanned/planned downtime reasons and leverage best practices by comparing line-to-line and plant-to-plant performance
- Improve inventory velocity through increased visibility into actual material consumptions, movements and inventory levels.
- Improve predictability of order fulfillment by monitoring accurate 'planned vs. actual' production quantities.
- Reduce time-to-volume for new product introductions with quick 'change-overs' between products and lines.
- Lower variance in production results by improved consistency in operational activities.
- Improve compliance and governance through complete electronic system records for 'as planned' and 'as built' information.

## FITS YOUR MES NEEDS TODAY, TOMORROW AND IN THE FUTURE

Wonderware MES 4.0 is flexible enough to be used in any scale and scope to satisfy different approaches to MES, either growing from equipment-focused MES for work order execution, traceability, overall equipment effectiveness or from a real-time enterprise strategy, integrating more and more of the production process into the business process information flow.

Wonderware MES scalability is not limited to its initial implementation in scope and size. What may start as traceability solution or performance tracking can grow in functional capabilities over time as your requirements evolve. This expanded use increases your return of investment over time and limits project risks and budget with a reasonable step by step implementation.

## WONDERWARE MES 4.0—TWO MODULES TO MEET YOUR MES NEEDS

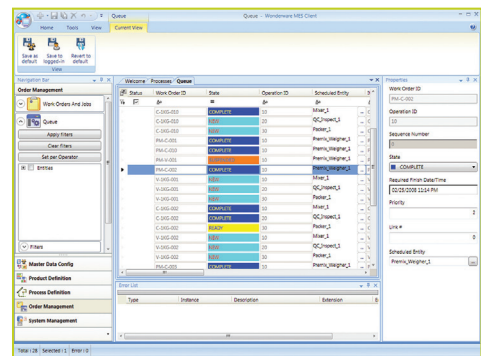
Wonderware MES 4.0 offers two modules, Operations and Performance, for complete MES functionality.

## WONDERWARE MES 4.0/OPERATIONS MANAGEMENT CAPABILITIES

Wonderware MES 4.0/Operations helps manufacturing companies manage, execute and document production operations, capturing, monitoring and managing processes such as material consumption, specification management and procedures for both automated and manual operations.

Using this real-time plant operations information decision makers and operators can help:

- Reduce production costs by optimizing product runs and work schedules with less changeover time
- Improve profitability by increasing throughput, reducing scrap and rework, and providing higher quality products
- Secure brand equity with fast and effective responses to unforeseen events or product quarantine/recalls
- Increase customer satisfaction by increasing transparency in order fulfillment, effective quality documentation, and reducing variance in products built to customer specifications/orders.



Parent/Produced	Event Date	Location	Lot	S/B/M	Serial Number	Segment	Quantity	Unit of Measure
Produced Production Item	2/18/2018 10:45:00 AM	LOT C				Process (Segment)	15	Operation Quantity
Consolidated Production Item	2/18/2018 10:45:00 AM	LOT C				Process (Segment)	15	Operation Quantity
Production Item	2/18/2018 10:45:00 AM	LOT D				Process (Segment)	20	Operation Quantity

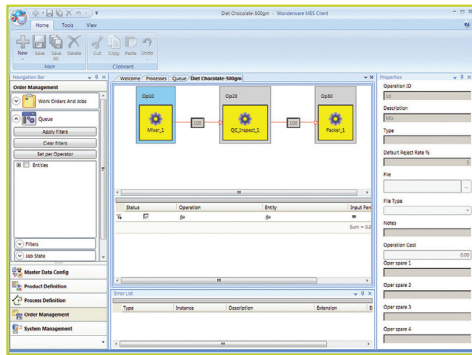
## COMPLETE TRACK AND TRACE CAPABILITIES PROVIDES IMMEDIATE VISIBILITY

Wonderware MES provides real-time visibility into the full range of production processes, from production planning and setup to actual execution of operational activities. Production managers and planners can build and view material specifications and grades, bills of materials, manufacturing procedures or steps; define production routing; define shifts and adopt downloaded production schedules received from the ERP or scheduling system.

During production, you can track real-time and historical material and labor consumption, lots, WIP inventory, waste, yield and finished good totals, along with other important production events. A complete genealogy tree for all of your production activities can be built and exposed to operators and other plant personnel. This is particularly important during a product recall or if a serious production problem occurs. Wonderware MES provides visibility to all of your production information so you can focus on operating your manufacturing facility in the most efficient and productive manner possible.

## IMPROVE YOUR MANUFACTURING AGILITY

In today's volatile market it is vital to be able to capitalize on opportunities when they arise. Having agility in your manufacturing processes is key—but improving agility requires the ability to precisely understand your manufacturing processes and anticipate what is occurring now in your production facility. Wonderware MES gives you the real-time production information you need to increase agility and provide this real-time status information at the right time to the right people. Using current process information and reports from Wonderware MES, your manufacturing team can study—with hard data—what your process capabilities truly are and can help determine ways to improve them, increasing your flexibility and responsiveness, to change product runs or lines on demand.



## MORE CONSISTENT PRODUCTION EXECUTION REDUCES PRODUCTION ERRORS AND VARIATIONS

A key challenge for many manufacturers is how to execute production runs more consistently. It starts with a consistent interpretation of operating guidelines and procedures—everyone reading the same script. Next, centralized bill of materials and material specifications help eliminate variations in production execution. Lastly, detailed user roles with standardized user privileges help ensure that the right people are involved.

Wonderware MES 4.0/Operations Software provides centralized configuration and maintenance of manufacturing steps and procedures, bills of materials and material specifications. It helps ensure more consistent production results, using a template-driven approach. Base templates can be created by a central engineering group and reused by plant engineers to quickly build a production process.

## DEVELOP AND LEVERAGE BEST PRACTICES

To sustain top performance plant managers need to be able to develop and implement best practices. Timely and detailed production information delivered by the Wonderware MES 4.0/Operations Software allows production teams to measure the performance of their production processes and reuse what works best. Armed with this information plant managers can steer their team towards more productive, best operating practices to drive higher levels of plant performance.

Wonderware MES 4.0/Operations Software allows managers and engineers to view and compare the production processes used across their plant or across sister plants to determine what combination of materials, labor, equipment and procedures deliver the best results. There is no guessing, just detailed production information that can be leveraged to develop best manufacturing practices.

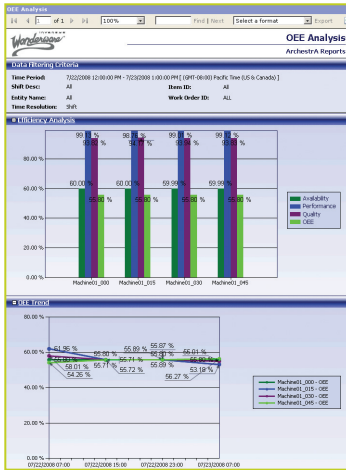
## PLANT TO ENTERPRISE INTEGRATION FOR SEAMLESS INFORMATION EXCHANGE AND COLLABORATION

Wonderware offers extended capabilities to complete the manufacturing supply chain by linking Wonderware MES Software and other plant floor and manufacturing systems to business applications like ERP, PLM, SCM or LIMS systems.

Wonderware Enterprise Integrator software provides an extensible framework for reliable information exchange supporting industry standards such as ISA-95 and B2MML. The integration approach enables existing business and manufacturing systems to work in a complementary fashion that are loosely coupled yet extremely reliable, to ensure business continuity on the shop floor.

Wonderware Intelligence software for Enterprise Manufacturing Intelligence (EMI) complements Wonderware MES to easily contribute to site and enterprise-wide intelligence analysis for holistic production improvement collaboration. Wonderware Intelligence creates Key Performance Indicators (KPI's), viewable in a web-based dashboard, for operations and IT enablement.

Invensys Skelta BPM Workflow software drives collaborative work processes by joining Wonderware MES, Intelligence, and legacy systems in the enterprise with people-driven operations into a advanced business process management and workflow solution.



## WONDERWARE MES 4.0/PERFORMANCE MANAGEMENT CAPABILITIES

Wonderware MES 4.0/ Performance Software helps manufacturing companies accurately capture all of the critical equipment performance data they need to improve the capabilities of their productive assets to reinforce and drive lean manufacturing initiatives.

Using real-time plant performance information, decision makers and operators can help;

- **Reduce capital expenditures** by identifying the most productive assets for uninterrupted operation
- **Improve asset utilization** by identifying production bottlenecks more quickly
- **Increase the capacity** of your existing assets by pinpointing the causes of unplanned downtime to improve operational efficiencies
- **Leverage best practices**, comparing line-to-line and plant-to-plant performance, including real-time OEE (Overall Equipment Effectiveness) measures

## REAL-TIME EQUIPMENT DOWNTIME AND PERFORMANCE TRACKING

Wonderware MES 4.0/Performance Software helps manufacturing companies accurately capture all of the critical equipment performance data they need to improve the capabilities of their productive assets to reinforce and drive lean manufacturing initiatives.

## DRIVE MORE VALUE FROM YOUR PLANT ASSETS

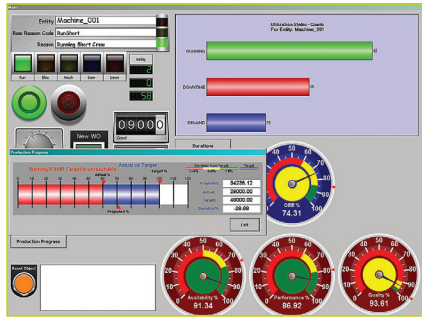
Operating your production equipment most productively starts with high quality, real-time plant equipment downtime and efficiency data. Many companies use paper-based methods (or nothing at all) to track equipment downtime, efficiency, or assess the main reasons for production losses. Wonderware MES 4.0/Performance Software integrates with your existing automation systems to generate highly accurate and timely views of equipment performance. Short duration events which typically never get recorded using paper systems can now be ranked in order of importance. These short duration events can add a significant amount of downtime—but tracked by Wonderware MES 4.0, you now see the downtime affected and have a path for improvement. Automated equipment efficiency tracking quickly shows what plant assets are pulling their weight and which ones are not. No more personal opinions or “guesstimates,” just hard data to base decisions on. With this higher level of insight, you and your staff can quickly identify efficiencies and attack problem areas—unlocking more value from your existing plant assets.

## IMPROVE EQUIPMENT EFFECTIVENESS AND GROW YOUR COMPETITIVE ADVANTAGE

The more efficient your production processes are the more competitive you become. Knowing the efficiency or effectiveness of your equipment is vital. Ignoring equipment effectiveness is not a viable option today if you want to keep your competitive advantage.

Wonderware MES 4.0/Performance Software allows you to track an unlimited number of reason codes for equipment downtime, and to deploy an unlimited number of OEE calculations—one of the most common metrics for tracking equipment efficiency. Providing visibility to real-time asset performance KPIs empowers operators to “take action” and creates a baseline of performance that you can use to drive improvements.





## WONDERWARE MES 4.0 OFFERS MINIMIZED SETUP AND MAINTENANCE COSTS

Wonderware MES 4.0/Operations and Performance software is configurable software that can be used to build standard applications, allowing you to lower the cost to design, deploy, maintain and extend your MES system.

Easily upgrade or add Operations or Performance capabilities to your existing installation—flexible licensing enables you to increase capabilities using the same software. The out of the

box functionality, “one click” clients and system configuration make it easier to deploy, and less time-consuming and costly to manage your MES applications in a small or large scale deployment, to reduce the need for highly specialized IT skills. Also, the software offers well-documented extensibility to effectively address customer specific requirements in business logic, client, and reporting needs.

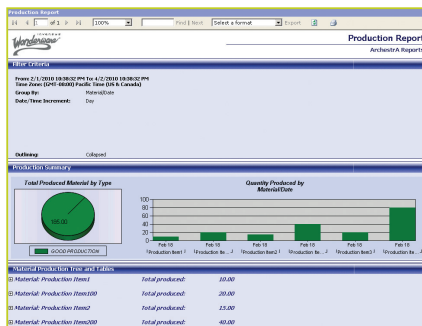
For system performance, Wonderware MES 4.0 software includes several high availability and application performance scalability options out of the box.

## REAL-TIME DATA PROCESSING INTEGRATION

Wonderware MES Software is fully integrated with the InFusion Enterprise Control system (ECS), Wonderware System Platform and InTouch HMI Software to collect control system data. A Utilization Capability Object and a Operations Capability Object can be added to the real-time data processing plant model of InFusion and Wonderware System Platform to access MES data and methods, to connect with real-time information from control systems or to plant automation devices, enabling automatic/ semi-automatic information exchange and data collection. These configurable and extensible core object templates can be copied and altered to form a set of monitoring, data download and data collection objects, tailored to specific types of production equipment or operations. These sets of objects can be deployed as a reusable, standard library of MES functions to quickly build or expand your systems with a minimum of effort.

## OPEN DATA SOURCE CONNECTIVITY TO SEE ALL OF YOUR PLANT DATA

Wonderware is a leader in open data source connectivity for over 20 years. This broad connectivity to your plant data provides the real-time data collection to ensure that you have all of the accurate and current production data you need to better visualize and manage your operations processes.



## WEB-BASED PRODUCTION REPORTING FOR OPERATIONS COLLABORATION

The entire manufacturing facility operates better when plant personnel at all levels have real-time production information at their fingertips. Our integration strategy for data collection is extended for reporting; Wonderware MES 4.0/Operations Software is integrated with Wonderware InTouch and Wonderware System Platform so a complete array of production information can be captured and presented to operations personnel and others via intuitive user interface screens. Wonderware Information Server

also is integrated with Wonderware Operations Software so web-based production reports are available to anyone with Internet access and a need to know. Wonderware Information Server can be tailored to individual information needs so each user can see only the plant information they need, allowing them to work at higher performance levels, enabled with real-time information on demand.

## WONDERWARE MES 4.0/OPERATIONS SOFTWARE FEATURES

### Product Definition

- Ability to define raw, semi-finished or finished goods
- Attach multiple BOM definitions (versions) and multiple specifications (versions) to a product

### Bill of Material (BOM) Definition

- Multi-level BOM (n-tier)
- Define multiple substitutes per BOM item
- Define co-products / by-products
- Configure specific material processing and tracking business rules per BOM Item

### Production Management & WIP Execution

- Define and execute product-specific production routings
- Record and track production, consumption and labor
- WIP status and ability to estimate expected completion date and time

### Production Event Tracking

- Ability to capture production events for report and drill through history, enabling genealogy, traceability

### Inventory and Storage Management

- Configure business rules for tracking inventory on the plant floor (e.g. maintain composite lots, etc.)
- Ability to transfer, split, combine, receive, ship and reclassify inventory items
- Ability to define, monitor and track the state of fixed or mobile inventory locations /devices

### Procedural Steps, Work Instructions & Document Management

- Guide an operator through a manual or semi-automatic step procedure at a particular operation
- Link work instructions and documents (e.g. PDFs, MS Documents, web pages, etc.) to products, production orders, operations, work centers or procedural steps

## WONDERWARE MES 4.0/PERFORMANCE SOFTWARE FEATURES

### Equipment Utilization

- Ability to detect and capture utilization events and automatically or manually assign reason codes
- Ability to view equipment events
- Ability to monitor and record equipment state

### Equipment Performance

- Ability to calculate OEE by equipment/line
- Ability to trigger events and display results
- Ability to analyze event frequency and duration
- Ability to assign what states affect the OEE calculation

### Production Progress

- Provides a clear indication of job or production order progress to the operator in real-time
- Ability to calculate OEE other key parameters
- Ability to estimate expected completion date and time



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