

Oracle Cloud Manufacturing

The Oracle Cloud Manufacturing, a key component of the integrated Oracle Cloud Supply Chain Management, helps firms compete in today's global market by providing the latest tools to run their shop floor. With margins for products eroding and customer demands increasing, manufacturers must adopt **modern best practices** including **Internet of Things (IoT) and Adaptive Intelligence (AI)** to increase business agility and sustainability, enable insightful decision-making, and achieve more, with fewer resources. Built on a **modern cloud platform**, Manufacturing Cloud provides manufacturing and supply chain materials management with integrated and innovative cost management, embedded enterprise quality management, analytics, and '2-click' ease of use, enabling outstanding user productivity and excellent return on investment. Cloud, desktop, tablet, mobile, scanning and social technologies are combined to provide a state of the art solution for manufacturing companies, fully integrated with the rest of the Oracle Cloud Supply Chain and Financials products. Whether you execute **mixed-mode in-house manufacturing or contract manufacturing** – it can transform your business to Manufacturing 4.0.

Execute mixed-mode manufacturing in the cloud

With Oracle's mixed-mode manufacturing in the cloud, you can execute both discrete and process manufacturing in the same plant, the same work center, or even the same item. Which method you use is driven by the work definitions defined for the product. This flexibility allows you to determine the best manufacturing method for each stage of production, such as using process manufacturing for bulk processing and using discrete manufacturing for final packaging.

Visually design your production process

Does your company struggle to allocate the bill of material (BOM) across multiple operations? Can you easily collaborate within your organization on manufacturing process changes that are required? Are quality checkpoints defined as part of your manufacturing process?

In Oracle Cloud Manufacturing, your engineers can quickly define the necessary data to setup the plant. They can visually design the production process for



Key features:

- Optimized end-to-end supply chain business flows
- Discrete manufacturing on the cloud, including contract manufacturing, configure to order, and drop shipment
- Process manufacturing on the cloud, including batch production with co-products and by-products
- Ease of use with 2-click work order execution
- Flexible work order costing
- Embedded analytics driven navigation and real-time views into work orders with serialized enabled manufacturing
- Advanced graphical editing tool-visually design the work definition
- Embedded social collaboration

discrete or process manufacturing using a common object called a work definition (i.e., a template for execution or recipe) – which combines the equivalent of the item structure or formula and routing into a single view. They create their operations, and then can drag and drop resources, materials, and co-products and by-products to the process to complete the flow – determining shop floor controls on the way (such as which materials must be manually issued, vs automatically backflushed). In addition, they can collaborate with colleagues through real-time conversations and stay connected with updates to work definitions using Oracle Social Network.

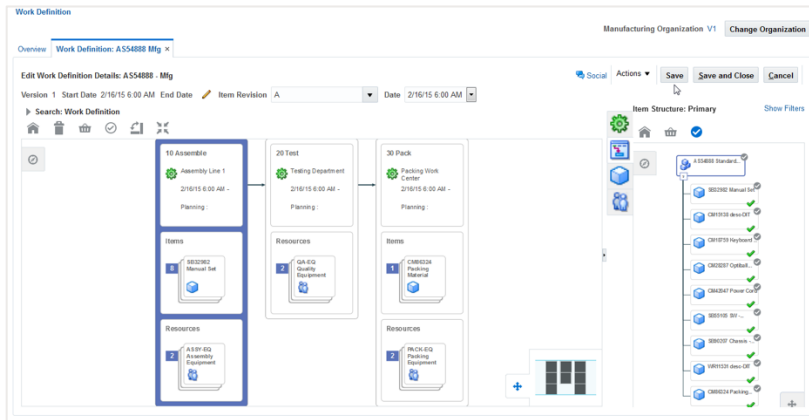


Figure 1. Visually design a work definition with the requirements to make a product

Key business benefits

- Maximize productivity and efficiency and minimize risk in your mixed-mode production process, for both internal and contract manufacturing.
- Reduce cost of ownership
- Rapidly implement using quick set up
- Reduce inventory, drive down costs, improve on-time deliveries
- Increase margin/revenue

Efficiently manage your shop floor while on the go

Do your Production Supervisors have the information they need at their fingertips? Can they easily review all potential problems that are occurring in their plants? Are your operators prompted to perform quality tests as part of your work order execution process?

The Production Supervisor starts on a landing page that gives them a quick look at critical information about how their work area or work centers are running.



They can view discrete manufacturing work orders and process manufacturing batches from the same dashboard, and resolve exceptions with-one click access to drill into the details and take action, print travelers, generate parts list, and view production and quality history. Work orders are also socially enabled to collaborate on problems, and Oracle Transactional Business Intelligence gives you quick and easy reporting capabilities. All designed for use on a tablet and/or smartphone, so the supervisor can take action on the go.

You can also prioritize work orders and batches for release to execution based on a material availability check. After you identify material shortages and view expected supplies to determine which work orders are ready to start, you can initiate a pick for all the materials that are required in the next few hours, schedule the pick action to run automatically, or initiate a pick as you release a work order to the shop floor. The picking list generation is based on pre-determined rules, similar to those for a shipment or other warehouse movement. When material is scarce, you can easily scale a batch based on what you have on hand.

To execute production, the operator is provided with a simple, intuitive, easy-to-use dispatch list with two clicks required to issue materials, charge resources, report products, complete the operation, log a production exception, enforce serialized or lot transactions, report orderless completions, rejections and scrap, record elapsed cycle times, and print production documents and labels—all optimized for the tablet.

Quantity	UOM	Status	Work Order	Item	Work Center	Operation Name	Completion Date	Materials	Resources
3	Each	Ready	1130 - 30	*AS54888	Packing Work ...	Pack	8:00 PM	Materials ✓	Resources ✓
2	Each	Ready	1129 - 30	*V298320	Packing Work ...	Final Pack	8:43 PM	Materials	Resources
2	Each	Ready	1133 - 30	*AS54888	Packing Work ...	Pack	9:00 PM	Materials *	Resources *
2	Each	Ready	1134 - 30	*V298320	Packing Work ...	Final Pack	9:10 PM	Materials	Resources
3	Each	Ready	1135 - 30	*AS54888	Packing Work ...	Pack	9:30 PM	Materials *	Resources *
1	Each	Ready	1136 - 30	*V298320	Packing Work ...	Final Pack	9:51 PM	Materials	Resources

Figure 2. Review dispatch list, execute and complete work orders

Get production insights with IoT Production Monitoring Cloud

Get real time insights and automatically take action by using the IOT Production Monitoring Cloud to connect your shop floor machines to the Manufacturing Cloud. Machine data is automatically correlated to work order data to give you real-time status of all factory locations, with the ability to drill down to see detailed information at the production line and machine levels, and automate work order operation completions and resource transactions the Manufacturing Cloud. When IOT Production Monitoring Cloud detects a problem or predicts a potential future problem, you can automate action in the Manufacturing or Maintenance Cloud such as putting a work order on hold, or creating a manufacturing exception, a quality issue or a maintenance work order.

Execute closed-loop quality management

In today's fast paced manufacturing environments, delays and errors in reporting quality results and detecting quality problems can lead to defective products, downstream failures, and delayed product shipments. Oracle enables quality visibility, collaboration, and execution through quality control techniques and closed-loop quality management.

When used with Oracle Cloud Quality Management, the system can require operators to perform a quality inspection at key points in the production process. If a part fails inspection, the system automatically requires both immediate disposition on the shop floor and alerts a quality engineer to review the nonconformance for possible permanent corrective action.

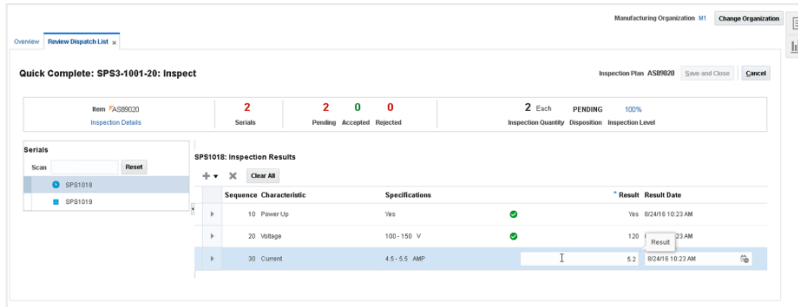


Figure 3. Enter inspection results as part of the manufacturing process

Real-time visibility into contract manufacturing

Does your company struggle to keep track of what is happening at contract manufacturers? Can you easily access the costs of the work that they are performing?

With the Oracle Contract Manufacturing solution, you can automate and orchestrate the end-to-end contract manufacturing process for both make-to-stock and make-to-order scenarios. You can enable touchless execution of your contract manufacturing process, spanning your raw material supplier, contract manufacturer, customer, and the enterprise. Contract manufacturing provides real-time visibility into the production progress that occurs at the contract manufacturer site, and can also monitor components that an original equipment manufacturer (OEM) supplies to the contract manufacturer's site. A contract manufacturing work definition defines what product will be manufactured, and the operations that require production reporting from the contract manufacturer. A contract manufacturing work order is created for each purchase, to track production progress and capture costs that are occurring at the contract manufacturing site—improving supply chain inventory and costing visibility.

- Plan for the finished goods as well as OEM-owned components at the contract manufacturer
- Create purchase requisitions and orders that instruct your contract manufacturer to direct ship the goods to your customer or back to your warehouse
- Create a tracking work order associated to the purchase order to monitor progress
- Adjust to supply and demand changes, and give your supply chain manager the ability to re-source the supply

Seamlessly integrate with your outside processing supplier

Automate the process of managing both your internal manufacturing operations and supplier operations of work order. Streamline and effectively manage your extended supply chain to reduce cost, improve on-time delivery, and improve visibility.

- Plan, execute and monitor supplier operations
- Create work orders with the supplier operation services included
- Create shipping documentation and receive the partially finished assembly
- Create and manage purchasing documents for the service
- Update demand and supply changes

Streamline configure-to-order

In today's business environment, customers are demanding products that are tailored to their unique specifications. Successful companies must provide customized versions of products with shortened lead times. With Oracle's configure-to-order features, you can streamline configuration management and deploy an efficient build-or-purchase-to-customer-demand solution with the shortest possible fulfillment cycle times. Capture a configured customer order and automatically create and reserve a work order, purchase order or transfer order, or simply reserve to a matching, on-hand configuration. The system manages changes to supply and demand automatically, and alerts you to exceptions when they occur.

If the configuration will be made, the system creates a reserved work order to build the item based on the selected options. The configured item work definition is created on demand during planning collections and work order creation, using the base Assemble-To-Order (ATO) model work definition, selected options, and transactional item attributes along with the operation applicability rules. This design reduces item proliferation and replication of data, improving item management and on-time order fulfillment.

Effectively plan and track manufacturing costs

Are you able to confidently identify the costs for your manufactured items? Do they include landed costs? Can you use alternate cost methods to view your costs?

Oracle has a robust cost management solution, supporting the planning, costing and analysis of your manufacturing costs. Flexible work order costing supports all costing methods—standard, average and actual—or even multiple simultaneous costs—one for your official external reporting, and one for your internal management reporting. There are flexible, user defined account defaulting rules and valuation policies using cost profiles. Manufacturing cost analysis is displayed through a hierarchical view of buy item standard parts, resource and overhead charges, and a very intuitive, visual reporting of cost

variances. Cost management allows tracking of cost sat a flexible level of detail, such as at organization, sub inventory, grade, lot or serial.

There is a unified view of all work order-related costs. Costing calculates the cost of work orders based on material (including landed costs), resource transactions, and overheads. Partial completion costs are calculated according to a user-defined method and entries adjusted to actual, when the work order is closed. Costing analyzes WIP balances, total cost incurred, scrap and variances for workorders.

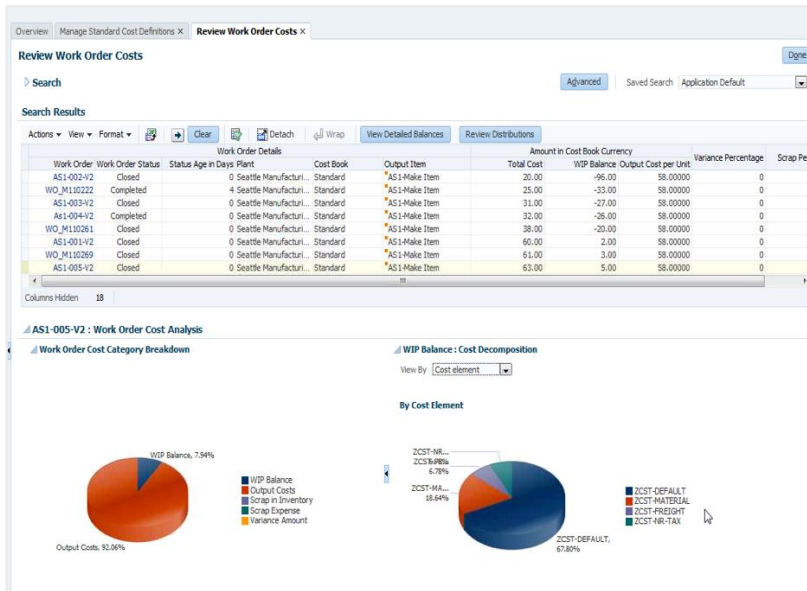


Figure 4. Review and analyze workorder costs

Graphically track and trace items throughout their lifecycle

In many industries, there is a never-increasing need to provide inclusive lot and serial tracking from supplier through production and shipment to support quality containment and recall events. If you have a product failure, the Oracle Product Genealogy solution enables you to trace the entire history of any lot or serial to determine possible sources of the failure, understand where the problem protectorate moment, where the other potentially impacted items are, and then investigate if the failure has been corrected or if it's ongoing. Quickly and easily retrieve genealogy and item information detailing manufacturing and inventory transactions and either display parent-child relationships in a graphical viewer or every transaction in the item lifecycle through a timeline view.

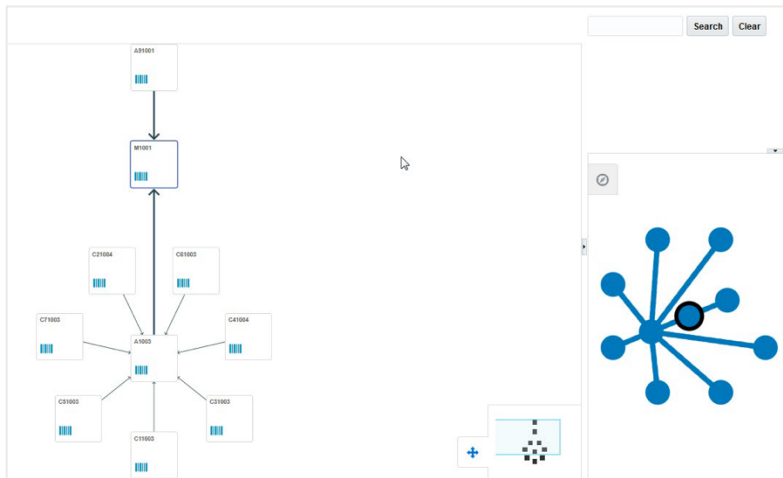


Figure 5. View item relationships in product genealogy

Comply with regulations for electronic signature and electronic records

In 1997, the United States Food and Drug Administration (FDA) enacted a regulation, called 21 CFR Part 11, describing the requirements for regulated industries to manage critical records electronically. It establishes a uniform, enforceable, baseline standard for electronic records equivalent to paper records and electronic signatures equivalent to handwritten records and signatures. Oracle Cloud Supply Chain Management has an integrated solution for Current Good Manufacturing Practices (CGMP)-critical records, enabling regulated industries to electronically comply with 21 CFR Part 11.

Figure 6. Mandatory capture of signer, password, and reason for signing

Oracle transactional business intelligence

Would you like to improve your ability to analyze transactional data from your manufacturing facilities to improve supply chain visibility? Do you struggle to

get the information in the format you want for production, inventory, quality, genealogy, and cost information?

Oracle Transactional Business Intelligence provides quick and easy access into the transactional system. Slice and analyze your data by transactions across business processes for your discrete manufacturing, process manufacturing, contract manufacturing, configure-to-order, back-to-back, drop ship and internal material transfers.

The screenshot shows the Oracle Transactional Business Intelligence (OTBI) interface. The main window displays a table titled "Today's Serial Production - Material Issues". The table has the following columns: Organization, Work Order, Item Name, Operation Sequence, Item Name, Material Issued Quantity, Transaction UOM, and Transaction Date. The data is organized into rows for different work orders and their associated operations.

Organization	Work Order	Item Name	Operation Sequence	Item Name	Material Issued Quantity	Transaction UOM	Transaction Date
V1	1008R118FG_1097	F3-LPTR-1000	10	DBCC	5	Ea	7/6/2015
			20	HA2	4	Ea	7/6/2015
			30	HA3	4	Ea	7/6/2015
			40	RRL_RP_Item23	4	Ea	7/6/2015
			50	RRL_RP_Item24	4	Ea	7/6/2015
	1008R118FG_1099	MD40001	10	DBCC	5	Ea	7/6/2015
			20	HA2	5	Ea	7/6/2015
			30	HA3	5	Ea	7/6/2015
			40	RRL_RP_Item23	5	Ea	7/6/2015
			50	RRL_RP_Item24	5	Ea	7/6/2015
	1008R118FG_1100	MD50001	10	DBCC	5	Ea	7/6/2015
			20	HA2	5	Ea	7/6/2015
			30	HA3	5	Ea	7/6/2015
			40	RRL_RP_Item23	5	Ea	7/6/2015
			50	RRL_RP_Item24	5	Ea	7/6/2015
	1008R118FG_1101	CM22336	10	DBCC	5	Ea	7/6/2015
			20	HA2	5	Ea	7/6/2015
			30	HA3	5	Ea	7/6/2015
			40	RRL_RP_Item23	5	Ea	7/6/2015
			50	RRL_RP_Item24	5	Ea	7/6/2015
	1008R118FG_1102	F3-LPTR-1000	10	DBCC	5	Ea	7/6/2015
			20	HA2	5	Ea	7/6/2015

Figure 7. Oracle Transactional Business Intelligence for real time, self-service reporting

Users can view and analyze four manufacturing areas—workorder performance, material usage, purchased item usage, resource usage, actual production, and production exceptions. Reports and charts can be embedded into the Oracle Cloud Applications.

Seamlessly integrate between external systems

You can integrate the Oracle Cloud Manufacturing application with other enterprise systems and extensions running on Oracle's Platform as a Service (PaaS) using REST services. From any external application, you can use the REST services to make requests to view, create, update, or delete a work area, work center, work order header, work order details, material/resource/output/operation transactions, quality inspections and the dispatch list. There are also inventory REST services, such as reserve, replenish, internal transfer, and receipt advice to support your supply chain management flows.

Standards-based architecture

Oracle Cloud Manufacturing is built on a best-in-class, internet-based architecture that provides maximum flexibility and lowest total cost of ownership.

- **Internet application:** All Oracle Cloud Manufacturing functionality is accessible via standard web browsers, enabling organizations to deploy globally with minimal effort.

Related products

The following services support Oracle Cloud Manufacturing:

Oracle Cloud Supply Planning minimizes inventory risk and cost through review of supply and demand changes and simulated actions.

Oracle Cloud Inventory manages the inbound, outbound, and internal flow of goods.

Oracle Cloud Cost Management manages planning, tracking, accounting and reporting of production costs.

Oracle Cloud Quality Management enables you to define, test and analyze the quality of your items and resources.

Oracle Cloud IoT Production Monitoring enables the streaming and analysis of data from the production floor.

Adaptive Intelligent Apps for Manufacturing contextualizes historical data from multiple systems for pattern analysis with predictive models.

- **Secure collaboration:** Oracle Cloud Manufacturing’s security model enables companies to collaborate with contract manufacturers—by enabling these parties to access relevant information and business functions in Oracle Cloud Manufacturing. For example, contract manufacturer scan enter work order and quality information directly to reduce the burden on the OEM organization.
- **Service oriented architecture:** Oracle Cloud Manufacturing fully supports a Service-Oriented Architecture (SOA) for maximum business process flexibility. Companies can support their specific business process requirements by leveraging the solution’s web services.
- **Scalability:** Oracle Cloud Manufacturing’s flexible architecture enables companies to start small and expand as necessary to support growth in users, transaction volume and business processes while maintaining high performance service levels.

Oracle Cloud Applications

The Oracle Cloud offers self-service business applications delivered on an integrated development and deployment platform with tools to rapidly extend and create new services. The Oracle Cloud is ideal for customers seeking subscription-based access to leading Oracle applications, middleware and database services, all hosted and expertly managed by Oracle. The application services are designed for ease-of-use, enabling business users to manage the solution directly with no IT involvement.

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