Oracle® Flow Manufacturing

Implementation Manual, Release 11i

March 2000

Part No. A69397-01

ORACLE

Oracle Flow Manufacturing Implementation Manual, Release 11i for Platform

Comment - **What Platform?**

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Preface

Welcome to *Oracle® Flow Manufacturing Implementation Manual, Release 11i.*

This implementation manual assumes that you are using installation notes provided with the media to perform the installation. It does not contain information regarding the installation steps necessary to transfer the Applications from the disbursement media to the computer system.

Once the installation has been completed, this manual may be used to step through the setup and implementation steps required to get Flow Manufacturing functional.

This preface also explains how this implementation manual is organized and introduces other sources of information that can help you.

Intended Audience

This manual is intended for anyone who is interested in Oracle Flow Manufacturing.

About This Manual

This manual contain overviews, as well as task and reference information, for implementing Oracle Flow Manufacturing. This manual contains the following chapters:

Chapter 1 provides an overview of the Oracle Flow Manufacturing product and its integration with other Oracle Applications.

Chapter 2 describes the setup steps required to setup Oracle Flow Manufacturing

Chapter 3 discusses demand management in a flow environment

Chapter **4** discusses line design and balancing

Chapter **5** discusses line scheduling

Chapter **6** discusses production execution

Chapter **7** discusses kanban planning and execution

Chapter **8** discusses mass customization considerations

Assumptions

This implementation manual, combined with the user's guides listed in the section *Other Information Sources*, should provide you with all the information needed to implement Oracle Flow Manufacturing.

It also assumes you are familiar with the following Oracle Applications:

- Oracle Inventory
- Oracle BOM/ENG
- Oracle Order Management
- Oracle Planning
- Oracle Purchasing
- Oracle Work In Process

If you have never used these products, we suggest you attend one or more of the Oracle training classes, including Flow Manufacturing, available through World Wide Education. For more information about Oracle Flow Manufacturing and Oracle training, see: Other Information Sources.

Do Not Use Database Tools to Modify Oracle Applications Data

Because Oracle Applications tables are interrelated, any change you make using Oracle Applications can update many tables at once. But when you modify Oracle Applications data using anything other than Oracle Applications, you may change a row in one table without making corresponding changes in related tables. If your tables get out of synchronization with each other, you risk retrieving erroneous information and you risk unpredictable results throughout Oracle Applications.

When you use Oracle Applications to modify your data, Oracle Applications automatically checks that your changes are valid. Oracle Applications also keeps track of who changes information. If you enter information into database tables using database tools, you may store invalid information. You also lose the ability to

track who has changed your information because SQL*Plus and other database tools do not keep a record of changes.

Consequently, we STRONGLY RECOMMEND that you never use SQL*Plus or any other tool to modify Oracle Applications data unless otherwise instructed.

Other Information Sources

Here are some other ways you can increase your knowledge and understanding of Oracle Flow Manufacturing.

Online Documentation

All Oracle Applications documentation is available online on CD–ROM, except for technical reference manuals. There are two online formats, HyperText Markup Language (HTML) and Adobe Acrobat (PDF).

All user's guides are available in HTML, Acrobat, and paper. Technical reference manuals are available in paper only. Other documentation is available in Acrobat and paper.

The content of the documentation does not differ from format to format. There may be slight differences due to publication standards, but such differences do not affect content. For example, page numbers and screen shots are not included in HTML.

The HTML documentation is available from all Oracle Applications windows. Each window is programmed to start your web browser and open a specific, context–sensitive section. Once any section of the HTML documentation is open, you can navigate freely throughout all Oracle Applications documentation. The HTML documentation also ships with Oracle Information Navigator (if your national language supports this tool), which enables you to search for words and phrases throughout the documentation set.

Related User's Guides

Flow manufacturing shares business and setup information with other Oracle Applications products. Therefore, you may want to refer to other user's guides when you set up and use Oracle Flow Manufacturing.

If you do not have the hardcopy versions of these manuals, you can read them online using the Applications Library icon or Help menu command.

Oracle Applications User's Guide

This guide explains how to enter data, query, run reports, and navigate using the graphical user interface (GUI) available with this release of Flow Manufacturing (and any other Oracle Applications products). This guide also includes information on setting user profiles, as well as running and reviewing reports and concurrent processes.

You can access this user's guide online by choosing "Getting Started with Oracle Applications" from any Oracle Applications help file.

Oracle Applications Demonstration User's Guide

This guide documents the functional storyline and product flows for Global Computers, a fictional manufacturer of personal computers products and services. As well as including product overviews, the book contains detailed discussions and examples across each of the major product flows. Tables, illustrations, and charts summarize key flows and data elements.

Oracle Bills of Material User's Guide

This guide describes how to create various bills of materials to maximize efficiency, support customer requirements, improve quality and lower cost for the most sophisticated manufacturing environments. By detailing integrated product structures and processes, flexible product and process definition, and configuration management, this guide enables you to manage product details within and across multiple manufacturing sites.

Oracle Cost Management User's Guide

This guide describes how to use Oracle Cost Management in either a standard costing or average costing organization. Cost Management can be used to cost inventory, receiving, order entry, and work in process transactions. It can also be used to collect transaction costs for transfer to Oracle Projects. Cost Management supports multiple cost elements, multiple subelements, and activity–based costing. It also provides comprehensive valuation and variance reporting.

Oracle Engineering User's Guide

This guide enables your engineers to utilize the features of Oracle Engineering to quickly introduce and manage new designs into production. Specifically, this guide details how to quickly and accurately define the resources, materials and processes necessary to implement changes in product design.

Oracle Inventory User's Guide

This guide describes how to define items and item information, perform receiving and inventory transactions, maintain cost control, plan items, perform cycle counting and physical inventories, and set up Oracle Inventory.

Oracle Master Scheduling/MRP and Oracle Supply Chain Planning User's Guide

This guide describes a variety of tools offered to manage and manipulate demand information for both design and operational phases. You can create forecasts, load these forecasts into master production schedules, and plan your end–items and their component requirements. You can also execute the plan, releasing and rescheduling planning suggestions for discrete jobs and repetitive schedules.

Oracle Order Management User's Guide

This guide describes how to enter sales orders and returns, manage spare parts, sales orders, copy existing sales orders, schedule orders, release orders, plan departures and deliveries, confirm shipments, create price lists and discounts for orders, and create reports.

Oracle Project Manufacturing User's Guide

This guide describes the unique set of features Oracle Project Manufacturing provides for a project–based manufacturing environment. Oracle Project Manufacturing can be tightly integrated with Oracle Projects; however, in addition to Oracle Projects functionality, Oracle Project Manufacturing provides a comprehensive set of new features to support project sales management, project manufacturing costing, project manufacturing planning, project manufacturing execution and project quality management.

Oracle Purchasing User's Guide

This guide describes how to create and approve purchasing documents, including requisitions, different types of purchase orders, quotations, RFQs, and receipts. This guide also describes how to manage your supply base through agreements, sourcing rules and approved supplier lists. In addition, this guide explains how you can automatically create purchasing documents based on business rules through integration with Oracle Workflow technology, which automates many of the key procurement processes.

Oracle Quality User's Guide

This guide describes how Oracle Quality can be used to meet your quality data collection and analysis needs. This guide also explains how Oracle Quality interfaces with other Oracle Manufacturing applications to provide a closed loop quality control system.

Oracle Work in Process User's Guide

This guide describes how Oracle Work in Process provides a complete production management system. Specifically this guide describes how discrete, repetitive, assemble–to–order, project, flow, and mixed manufacturing environments are supported.

Oracle HRMS User's Guide

This manual explains how to enter your employees. It also explains how to set up organizations and site locations. Even if you do not install Oracle HRMS, you can set up your employees, site locations, and organization using Oracle HRMS forms.

Oracle Projects User's Guide

This guide explains how to set up projects for use in project manufacturing and project accounting.

Reference Manuals

Oracle Technical Reference Manuals

Each technical reference manual contains database diagrams and a detailed description of database tables, forms, reports, and programs for a specific Oracle Applications product. This information helps you convert data from your existing applications, integrate Oracle Applications data with non–Oracle applications, and write custom reports for Oracle Applications products.

You can order a technical reference manual for any Oracle Applications product you have licensed.

Oracle Manufacturing, Distribution, Sales and Service Open Interfaces Manual

This manual contains up–to–date information about integrating with other Oracle Manufacturing applications and with your other systems. This documentation includes open interfaces found in Oracle Manufacturing.

Oracle Applications Message Reference Manual

This manual describes all Oracle Applications messages. This manual is available in HTML format on the documentation CD–ROM for Release 11.

Oracle Self–Service Web Applications Implementation Manual

This manual describes the setup steps for Oracle Self–Service Web Applications and the Web Applications dictionary.

Installation and System Administration

Oracle Alert User's Guide

This guide explains how to define periodic and event alerts to monitor the status of your Oracle Applications data

Oracle Applications Implementation Wizard User's Guide

If you are implementing more than one Oracle product, you can use the Oracle Applications Implementation Wizard to coordinate your setup activities. This guide describes how to use the wizard.

Oracle Applications Developer's Guide

This guide contains the coding standards followed by the Oracle Applications development staff. It describes the Oracle Application Object Library components needed to implement the Oracle Applications user interface described in the Oracle Applications User Interface Standards. It also provides information to help you build your custom Developer/2000 forms so that they integrate with Oracle Applications.

Oracle Applications Flexfields Guide

This guide provides flexfields planning, setup and reference information for the Flow Manufacturing implementation team, as well as for users responsible for the ongoing maintenance of Oracle Applications product data. This manual also provides information on creating custom reports on flexfields data.

Oracle Applications Installation Manual for Windows Clients

This guide provides information you need to successfully install Oracle Financials, Oracle Public Sector Financials, Oracle Manufacturing, or Oracle Human Resources in your specific hardware and operating system software environment.

Oracle Applications Product Update Notes

If you are upgrading your Oracle Applications, refer to the product update notes appropriate to your update and product(s) to see summaries of new features as well as changes to database objects, profile options and seed data added for each new release.

Oracle Applications Upgrade Preparation Manual

This guide explains how to prepare your Oracle Applications products for an upgrade. It also contains information on completing the upgrade procedure for each product. Refer to this manual and the Oracle Applications Installation Manual when you plan to upgrade your products.

Oracle Applications System Administrator's Guide

This manual provides planning and reference information for the Flow Manufacturing System Administrator.

Other Sources

Training

We offer a complete set of formal training courses to help you and your staff master Oracle Flow Manufacturing and reach full productivity quickly. We organize these courses into functional learning paths, so you take only those courses appropriate to your job or area of responsibility.

You have a choice of educational environments. You can attend courses offered by Oracle Education Services at any one of our many Education Centers, or you can arrange for our trainers to teach at your facility. In addition, Oracle training professionals can tailor standard courses or develop custom courses to meet your needs. For example, you may want to use your organization structure, terminology, and data as examples in a customized training session delivered at your own facility.

Support

From on–site support to central support, our team of experienced professionals provides the help and information you need to keep Flow Manufacturing working for you. This team includes your Technical Representative, Account Manager, and Oracle's large staff of consultants and support specialists with expertise in your business area, managing an Oracle8 server, and your hardware and software environment.

About Oracle

Oracle Corporation develops and markets an integrated line of software products for database management, applications development, decision support, and office automation, as well as Oracle Applications, an integrated suite of more than 45 software modules for financial management, supply chain management, manufacturing, project systems, human resources and sales and service management.

Oracle products are available for mainframes, minicomputers, personal computers, network computers and personal digital assistants, allowing organizations to integrate different computers, different operating systems, different networks, and even different database management systems, into a single, unified computing and information resource.

Oracle is the world's leading supplier of software for information management, and the world's second largest software company. Oracle offers its database, tools, and applications products, along with related consulting, education, and support services, in over 140 countries around the world.

Thank You

Thank you for using Oracle Flow Manufacturing and this implementation guide.

We value your comments and feedback. At the end of this guide is a Reader's Comment Form you can use to explain what you like or dislike about Oracle Flow Manufacturing or this implementation manual. Mail your comments to the following address or call us directly at (650) 506–7000.

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Or, send electronic mail to appsdoc@us.oracle.com .

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Overview

Flow Manufacturing Topics

This manual contains information about the Release 11i Oracle Flow Manufacturing application and guides you through the setup.

This manual contains information on each of the following topics:

- Transformation to best business practices
- Flow characteristics
    - Build to customer demand
    - Linear manufacturing
    - Total Quality Management
    - JIT kanban replenishment
    - Mixed model production
    - Work orderless production
- Flow business process responsibilities
    - Line design and balancing
    - Demand management and production planning
    - Kanban planning and execution
    - Production execution and work orderless completions
    - Production reporting and cost management
- Flow application integration
- Summary of Oracle Flow Manufacturing

Oracle Flow Manufacturing and Best Business Practices

Total Business Strategy to Attain Market Leadership

The primary objective of flow manufacturing is to:

n   Produce a high quality product

n   In the shortest possible production time

n   At the lowest possible cost.

Flow manufacturing is a total business strategy that addresses the diverse functions of an enterprise such as product engineering, demand management, shop floor design, production line scheduling, material replenishment and supply chain management. It provides a set of processes and techniques to help streamline these activities.

The three primary benefits associated with implementing flow manufacturing are improvements in product quality, productivity (or reduction in costs), and flexibility (reductions in cycle times).

Total Quality Management

Quality is built into the production process with the use of *operator method sheets*, work validation and checking. The flow of a single product from operation to operation significantly reduces the need for rework and scrap. The tighter synchronization of your operations also leads to faster feedback. Operators learn the effects of any changes to the production process while they can still identify the changes, leading to improvements in product quality.

n   Event by event validation of work

n   Reduce cost of failure, scrap, and rework

n   Improve quality through rapid feedback

n   Use pull systems to identify improvement priorities

Reduction in Manufacturing Cycle Time

With traditional manufacturing practices, approximately 80-90% of the total manufacturing lead time for an item is queue time. Queue time increases in batch processes where inventory builds on a work order waiting for the final assembly to be completed before the work order is closed. In a flow environment, items are produced on a one by one basis as required to meet customer demand. The queue time associated with waiting for work order batches to be completed is eliminated. Inventory items are worked on continuously from the

beginning of the flow line to final assembly. The result is reduced work in process inventory and shorter cycle times.

- Decrease Time-to-Market

- Increase inventory turns

- Reduce lead times

Reduction in Product Costs

Demand analysis to induce flexibility into a line design creates a balanced and more efficient line. Cycle is reduced by the elimination of queue and by process balancing with added flexibility. Implementing kanban planning and replenishment techniques, combined with building quality into the production process, reduces inventory investment with less cost due to scrap and rework. The flow line yields greater production efficiency with a corresponding increase in inventory turns. The efficiencies and reduction in work in process inventory work to reduce cost.

- Reduce inventory costs

- Increase labor productivity

- Reduce scrap and rework

- Reduce plant space required

Flow techniques enable your enterprise to be more responsive to customer demand. Enhanced product quality through Total Quality Management (TQM), reduced manufacturing cycle times, reduced product costs, and the use of minimum inventories means you meet your objectives to produce a high quality product in the shortest possible production time at lowest possible cost.

Transformation to Best Business Practices

Flow manufacturing differs significantly from discrete and repetitive manufacturing methods. In a traditional discrete environment, the Master Production Schedule and MRP are used to explode requirements and create planned orders for standard lot sizes that are *pushed* into production and purchasing. The traditional MRP approach is often characterized by large quantities of an item being processed and tracked using work orders that move in batches from one operation to the next.

Flow manufacturing is a Just-In-Time system with production lines and processes designed to produce a constantly changing mix of products at a steady rate (takt time). Flow manufacturing uses schedules for mixed model production instead of work orders to drive production. The mixed model schedules are sequenced based on scheduling rules and

material is replenished, or pulled through the sequence, using kanbans. The role of MRP in flow manufacturing is primarily only for long term planning of material and capacity requirements.

Flow techniques transform your business to a more customer responsive environment and implement best business practices.

From	To
Build to Forecast	Build to Customer Demand
Batch Manufacturing	Linear Manufacturing
Repetitive Production	Mixed Model Production
Batch Inspection	Total Quality Management
MRP	JIT kanban Replenishment
Work Orders	Work Orderless Production
Labor Specialization	Labor Flexibility

Build to Customer Demand

In a flow environment, products are made to customer demand. Production is based on daily schedules of sales orders that identify the product mix for the day. The product mix is sequenced to the balanced lines and component material is pulled as needed to make the product mix. Since production is based on actual orders, finished goods and work in process inventory is minimized, allowing production to better respond to engineering changes and customer demand variations.

Benefits

- Production is responsive to customer demand.

- The entire supply chain can be synchronized.

- Manufacturing flexibility to manage demand variation is increased.

Linear Manufacturing

In a flow environment, products are grouped into product families based on shared processes. Production lines are designed using a product layout to make one or more product families. Products flow through the line with each process working on one unit at a time. This assists in creating a balanced line with consistent production rates (takt time). Daily production rates reduce variability, promote consistency, and can be used to manage the

demand and determine lead times. Linear manufacturing also helps implement a total quality process and minimize in-process inventory.

While in discrete manufacturing, there are size quantities between operations to buffer imbalances, in flow the operations are balanced against the takt time by distributing events and introducing calculated In-Process-Kanbans (IPK), between any imbalanced processes.

Benefits

- Increased quality

- Reduced In-Process-Kanbans, bottlenecks

- Smoothes demand fluctuations to prevent expediting, shortages and overtime costs

Mixed Model Production

Flow manufacturing uses visual management. Oracle Flow Manufacturing provides the Mixed Model Map that is a graphical tool that displays the processes and products for a given line and the associated weighted times to complete the process. The Mixed Model Map displays the resources and the In-Process-Kanbans (IPK) needed to support any specified demand on a flow line. The Mixed Model Map can save the balanced line information and compare it with the requirements for daily demand, providing the information to adjust resources on the line to balance manufacturing flow and meet customer demand.

Benefits

- Increases manufacturing flexibility

- Reduces time to market

- Increased customer responsiveness

Total Quality Management

In a flow environment, Total Quality Management (TQM) is critical. TQM is implemented as part of each process in the line. Inspection is performed at the operation level by production personnel allowing problems are identified as they occur. This enables the identification and resolution of problems at the source. Since products are made in a linear fashion and quality is implemented into each process, scrap and rework are minimized. This reduces product costs, keeps the line flowing, and improves the quality of the product.

Benefits

- Significantly reduces scrap and rework

- Ensures high quality product at lowest possible cost

- Rapid awareness of problems and instant feedback

JIT Kanban Replenishment

In the JIT manufacturing processes, a kanban signal drives material replenishment at a point of use. In a flow environment, material is pulled into the production process only as needed to meet demand. Kanban bins are used to maintain the optimal amount of raw material at the production line and to signal replenishment as the material is consumed. Material is often delivered directly to either the point-of-use (kanban location) or to Raw-In-Process (RIP), by both internal and external suppliers. These techniques minimize inventory costs and increase inventory turns.

Benefits

- Reduces investment in raw materials

- Reduces in process material and queues

- Enables long term supplier relationships, higher quality, lower cost

- Dramatically increases inventory turns

Work Orderless Production

A key objective of flow manufacturing and JIT production is to keep the line flowing. The flow line is never stopped to make an inventory transaction. Flexible use of labor along the flow line avoids bottlenecks and ensures quick response to customer demand. Therefore, costs are recognized when the product is complete, not during the production flow.

In a flow environment, work orders are not used and shop floor management is primarily a visual management process. Detailed tracking of Work-In-Process and material supply is eliminated because production is rate based and material is consumed from Raw-In-Process. Product completion is recorded after the final operation, then the consumed material is backflushed and transactions effecting labor, machines, overhead, and other resources are performed. This simplifies shop floor activities and eliminates non-value added tasks. Consequently, product cycle times are reduced and responsiveness to customer demand increased.

Benefits

- Simplifies shop floor activities and eliminates non-value added tasks

- Reduces product cycle times

- Increases responsiveness to customer demand

Oracle Flow Manufacturing Business Process Responsibilities

Responsibilities can be assigned to team members responsible for the flow manufacturing business processes. Processes to define, implement and maintain flow manufacturing can be divided into natural business processes. The business processes must be a joint responsibility of operations and sales in order to succeed as designed.

The natural flow manufacturing business processes are:

- Demand management
- Line design and balancing
- Line scheduling and sequencing
- Production execution
- Kanban planning and execution

Oracle Flow Manufacturing implementation requires the expertise and commitment of the entire operations and sales team to succeed. All team members should understand their respective roles and functions to implement and maintain your flow manufacturing system.

Responsibility	Demand Management	Line Design and Balancing	Line Scheduling and Sequencing	Production Execution	Kanban Planning and Execution
Shop Floor Design	■	■	■	■	■
Engineering	■	■			
Inventory Management	■	■		■	■
Production Planning	■	■	■	■	■
Sales	■	■	■		■
Quality Assurance		■		■	
Procurement					■
Cost Accounting				■	

Demand Management

Objectives

Demand management is a critical factor during both the initial design of flow production lines and the daily execution of the rate based schedules. Effective demand management using flow manufacturing applies the right materials and resources required to meet customer demand, not to accumulate inventory. Demand management harmonizes demand forecasts with daily customer demand, and orchestrates the mix of resources, events and processes during line design to meet the production requirements of the day. Your team uses Oracle Flow Manufacturing forecasts tools, Master Demand Schedules, and Master Production Schedules with integrated Supply Chain Planning technology to manage demand.

During the design phase, the objectives of demand management are to group similar products into families to allow for planning at an aggregate level and to develop peak daily volumes for all products that will be used for line design and kanban planning. During production execution, the objectives are to increase responsiveness to customer demand and to increase resource utilization. Your team works together to anticipate daily demand and drive production plans to minimize inventory investment, increase inventory turns, eliminate raw material obsolescence, and reduce expensive scrap and rework from returns.

Line Design Line design is based upon the anticipated demand for a product or product family. This anticipated demand represents the peak daily volume. All production resources, machines, and labor are calculated based on these volumes. Additionally demand figures and factory schedule hours are used to derive the takt time, the operational cycle time. Takt time determines the rate that products must leave the end of the line to meet customer demand.

Kanban Planning Oracle Flow Manufacturing uses a kanban pull replenishment system to signal material requirements and pull material from its defined source as needed to meet daily customer demand. The objectives of the kanban replenishment system are to improve the production continuously with zero stock outs, shorter lead times, reduced inventory, and minimal manual supervision. The statement of demand used to balance flow lines to peak daily demand is generally used to determine the size of kanbans of components. The use of an MPS or MRP plan for kanban items gives visibility to the long term plan. This plan is then communicated to trading partners, including Marketing and Suppliers.

Production Execution Daily production rates tend to be based on customer demand, including marketing orders. Flow lines have been balanced with machines and resources to produce at the takt needed to meet the peak daily volume. By design, the daily customer demand should be less than that peak, ensuring that customer demand will be met. However, the mixed and demand represented in daily customers orders will seldom occur in the same

ratios as the peak daily volumes for which the line was designed. To manage the demand fluctuations, flow manufacturing uses flow schedules to schedule and sequence sales orders.

The Team

The demand management team is typically composed of:

n   Sales

n   Engineering

n   Production planning

n   Shop floor design

n   Inventory Management

In Oracle Flow Manufacturing, the demand management team defines sales forecasts that are used to design production lines and establish kanban sizes. Forecasts may be consumed and monitored daily for fluctuations in actual customer demand. Your Sales, Engineering, Inventory Management, and production planning team defines family members and their product families to facilitate the needs of each responsibility:

n   Sales to forecast demand

n   Engineering to define Bills Of Material

n   Inventory management to know what parts to build

n   Production planning to plan how many parts to build

Responsibilities

Sales Sales is responsible for generating demand forecasts that are the foundation for Master Demand Schedules (MDS) and Master Production Schedules (MPS).

Sales, Engineering, and Shop Floor Design Demand management and production planning are a team effort that starts with the definition of product families and product family members. The sales staff works with engineering staff to design product families and family members, balancing the requirements of sales to create meaningful demand forecasts. Team engineers design products which can be manufactured the easily on the flow line.

Sales, Production Planning, and Inventory Management The production planning staff contributes to anticipating the future demand through sales forecasts, Master Demand Schedules, and Master Production Schedules. Customer demand consumes the forecast because daily production is scheduled to meet orders. Production planning uses planning

demand fences to smooth demand fluctuations. The mixed model map relates the daily product mix demand to the flow processes required each day and calculates the takt times. Based on the mixed model map information line utilization is optimized by assigning flexible resources and sequencing production. Kanbans are calculated for the demand forecast during this phase.

Tasks, Activities and Tools

Products and Parts Setup

The objectives of products and parts setup is to create both the finished good and component items and to group the products and parts in logical product families which facilitates demand forecasting and production assembly. To implement Oracle Flow Manufacturing it is necessary to set up:

- Items
- Product families
- Product family members
- Categories and category sets

Bills Setup

The objectives of Bills setup is to create a bill of materials for the products and parts, and, to assign to each item in the BOM a subinventory for later use by kanban planning.

Planning Setup

The setup objectives of Planning are to identify and create the appropriate planning tools that apply expected demand to the product family structures, item demand locations, and item supply locations to calculate the flow line capacity and rates. To implement Oracle Flow Manufacturing it necessary to set up planning capabilities:

- Forecasting
- Master Demand Schedules

Oracle Flow Manufacturing uses the demand management tools provided in Oracle MPS/MRP, or Supply Chain Planning, to plan production volumes.

Line Design and Balancing

Objectives

Line design and balancing is the foundation in achieving an efficient flow production line. The objective is to balance lines for mixed model production at the expected peak demand that take the least possible time to execute. This is accomplished through flat product structures and simple processes which can be communicated visually to meet customer demand daily. Line design includes grouping products into product families, defining the processes and events required to produce each product, and re-grouping events into line operations to approximate takt time.

Effective flow line design and balanced production smoothes production and eliminates bottlenecks. Flow lines are designed to reduce your production time and resource costs by identifying value-add events and eliminating non-value events. Simplified processes are designed to reduce your overhead costs by optimizing floor space utilization. This simplified design will also help you to increase communication on your production floor through visual management tools.

The Team

The line design and balancing team is typically composed of:

n   Shop floor design

n   Engineering

n   Inventory management

n   Production planning

n   Sales

n   Quality assurance

In Oracle Flow Manufacturing the line design and balancing team defines dedicated flow lines that support the manufacture of product families. Your team designs your flow lines, resources, events, and processes and assigns them to a flow line. The roots of the flow line are the items and product family members that will be produced. Product design is as critical as line design and must be considered together in flow manufacturing.

Your shop floor design, engineering, inventory management, production planning, sales, and quality assurance teams work together to create flow routings to be identified with specific items and product family members, to document operation method sheets and to generate mixed model maps to manage daily production rates and shop floor activities. Mixed model production enables you to produce any item in the family in any sequence in a lot size of

one. Once the flow line is defined, the Mixed Model Map is a tool the team uses to balance the line to ensure optimum resource allocation and smooth flow of materials.

Sales works with the manufacturing team to design and create product families, family members and items in ways that facilitate production on the flow line. Quality assurance staff work with the team to insert quality processes into the flow line design as resources, events, and processes are implemented.

Responsibilities

Engineering   The engineering responsibility changes in a flow line because products are designed under concurrent engineering practices to support operation method sheets. The design engineer must design around the process capacities for the flow line. Engineering contributes to the design of quality products through the most efficient processes at the optimum cost. Flow manufacturing requires that the design of items and product family members is closely associated with line design. Products design is integrated with line design. In flow manufacturing, engineering uses flat product structures to facilitate flow production.

Quality Assurance   Quality Assurance contributes to the design product quality, inserting total quality control (TQC) into each flow line at critical events throughout the flow process and guaranteeing parts per million quality levels through built in quality checks indicated in the operation method sheets. Quality inspection is built into the process instead of being a single final inspection.

Shop Floor Design   Shop floor design is interested in reducing production times to reduce cost. Profits and productivity are improved with smooth daily production flow utilizing simple processes which can be communicated visually to the labor force to prevent inefficient expediting, material shortages and overtime costs. Operation method sheets document and communicate product routings, processes, and the sequence of events visually.

Shop Floor Design and Engineering   Shop floor design and engineering teams work together to design flow production lines that support mixed model production. Line design includes grouping products into product families, defining the processes and events required to produce each product, and re-grouping events into line operations to approximate takt time for each operation.

Shop floor design and engineering teams use the Mixed Model Map to calculate measurements for the most efficient and cost effective operations. Through the Mixed Model Map, operation times are calculated for the flow routing, total product cycle times are

calculated for the family routings, and operation yields are calculated or input for each of the standard processes in the flow routings.

In order to eliminate bottlenecks and work flow imbalances, shop floor design and engineering teams reorganize resources and events into groups to optimize takt time throughout the flow line. Managing the imbalances often leads to analysis that includes the questions:

- Can non-value-added work be reduced or eliminated?
- Can the work be broken into smaller units?
- Can the work be grouped into larger units?
- Can in-process inventory be decreased?
- Are additional resources needed?

Oracle Flow Manufacturing provides the tools and techniques to help answer these questions and assist in the line balancing process.

Tasks, Activities and Tools

Product Synchronization

Product synchronization is the process of defining the processes used by the product and the sequence of events within each process. Events are granular tasks within the process that define the physical activities on the line. Each event is assigned the machine and labor times used to perform the event.

You perform product synchronization in Oracle Flow Manufacturing using Flow Routings. Flow routings support both processes and sequence of events. In addition, you can use flow routings to define the network of processes including feeder lines, rework loops and primary/alternate processes required to produce a product family or standard item. This will help you model the line as-is to the system.

You assign planning percentages to each of the operations, including primary/alternate operations and rework loops, used in the calculation of required material and resources to balance a production line. You can also use flow routings and the routing network to calculate the total product cycle time. The total product cycle time is longest time path on the production line, including feeder lines, in making the product.

Mixed Model Map

The Mixed Model Map graphically presents the family members required for production each day, the production processes required, and the weighted times to complete the process. Labor and sequence of events can then be modified to balance the line and meet demand.

Operation Method Sheets

Operation Method Sheets (OMS) provide the needed information to the shop floor personnel for performing an operation on the line. This information often includes pictures of the assembly process, required materials, and written work instructions. These are the primary tools used by personnel to perform the operations and are especially critical on lines making many models. Often, one OMS is created for each assembly/operation and posted on the line for use.

Line Scheduling and Sequencing

Objectives

The objective of the line scheduling and sequencing team is to manage the flow line as defined and implemented to fill customer orders daily, while attempting to maximize resource utilization and minimize delays. If you design your line perfectly to your average daily demand mix, but schedule it improperly, you could cause excessive change-overs, large peaks in demand to your kanbans, or unbalanced demand on resources. Each of these will undermine the line's ability to perform to takt. Oracle Flow Manufacturing enables you to create and use scheduling rules to schedule either sales or planned orders.

The Team

The line scheduling and sequencing team is typically composed of

- Inventory management

- Production planning

- Shop floor design

In Oracle Flow Manufacturing the line scheduling and sequencing team monitors and regulates material flow through the line. Inventory management, production planning, and shop floor design execute and maintain the flow line as implemented in the previous flow manufacturing business processes.

Line Scheduling provides inventory management and production planning staff the ability to plan, simulate, and schedule the flow line. Inventory management and production planning, and shop floor design staff define scheduling rules to implement work orderless completions.

Responsibilities

Production Planning, Inventory Management, and Shop Floor Design Shop floor design, inventory management, and production planning teams manage the flow line to calculated operation times, total product cycle times, yields, cumulative yields, and reverse cumulative yields to set the proper takt time.

Production Planning Unlike traditional MRP environments, flow manufacturing uses flow schedules to schedule and sequence sales orders. The schedules are usually communicated to the production line on a daily or weekly basis. This starts the pull process on the line as it pulls the raw material and other sub-assemblies from the feeder lines. Since schedules are communicated only to the main line and other sources of material are synchronized to the main line through the production pull process, any changes to the demand or production process can be easily managed.

Production planning uses line scheduling to:

n   Create, manage, and maintain flow schedules.

n   Sequence and schedule the flow schedules

Production planning is typically responsible for line scheduling. Using the Line Scheduling Workbench the production planners view all scheduled and unscheduled orders to create and sequence flow schedules. If subassemblies are produced on secondary flow lines, production planning will also generate synchronized flow schedules for those lines.

Scheduling rules determine the logic used to create flow schedules from orders. They are a combination of sequencing criteria and scheduling algorithms that can help you pull demand forward or backward in time, in order to meet takt for each day.

Flow Schedules Oracle Flow Manufacturing supports flow schedules to help with line scheduling. Flow schedules can include sales orders, forecast and even MDS/MPS for hybrid manufacturing environments. The system provides a number of algorithms to sequence the mix of products for the line along with a flexible API architecture to allow customer defined sequencing algorithms.

Tasks, Activities, and Tools

Oracle Flow Manufacturing supports the following:

n   Create a scheduling rule based on pre-defined sequencing criteria and scheduling algorithms, or create your own rules and assign them to the application.

n   View all unscheduled orders for your line and choose which orders you want to schedule.

n   Schedule the line and view the final flow schedule.

Production Execution

Objectives

A primary objective of flow manufacturing is the elimination of nonvalue-added activities. Non-value added activities are steps that add cost to the process without adding value to the customer. Eliminating these steps reduces costs while maintaining a consistent level of value and quality. Production execution is accomplished by minimizing the number of steps or transactions necessary to record, inspect, and manage production. Each transaction performed represents costs in the form of paperwork and data entry. Each transaction also represents a potential quality problem or failure point, as every data entry step is an opportunity to make a typographical error. The costs and risks of transactions must be balanced against the value of the information collected. Transactions should be eliminated wherever possible and streamlined or automated when they are determined to be necessary.

The production execution team is responsible for:

n   Visual management

n   Certification of quality program from the operation method sheets

n   Employee training and certification

n   Definition of flexing for different demand scenarios

n   Pay scale definition and implementation

The Team

The production execution team is typically composed of:

n   Inventory management

n   Production planning

n   Shop floor design

n   Quality Assurance

n   Cost Accounting

Inventory management, production planning and shop floor design teams implement work orderless completions. Since work-in-process work orders are eliminated and replaced by raw-in-process, inventory transactions are not recorded until the final assembly is moved to a sub-inventory. As materials move from RIP to sub-inventory, all components are

back-flushed when production is complete. Simultaneously, at completion, costs associated with labor, material, and overhead resources are applied to inventory based on the assembly's routing. When the final assembly is completed and moved to sub-inventory, the inventory transfer is transacted and costs are recognized.

The Mixed Model Map is the tool that Oracle Flow Manufacturing uses to achieve balanced flow lines. After lines have been designed and during the production cycle, the Mixed Model Map becomes a tool to evaluate the impact of the current production schedule on the resources, operational times and in-process kanbans. In this mode, the summary portion of the Mixed Model Map displays the machine and labor resources needed to meet the takt time for the current production load. The baseline comparison highlights where labor resources can be removed to allow for flexing or where extra resources or overtime may be needed to produce to demand.

Quality is built into the product by making it an inherent part of the process through the operational method sheets. The execution of quality in a flow line is part of the event instruction to be followed by the primary operator and reviewed by the following operation so that scrap is either not created or is quickly deleted.

Mixed model production capacity is executed by respecting the demand levels used for design and by flexing operators to account for mixed product shifts or last minute day-to-day down time.

You can record production with the Work Order-less Completion Transaction window against flow schedules created with the Line Scheduling Workbench. Completions can be either unscheduled or against a flow schedule. The system will backflush all components and perform resource and overhead transactions upon recording completion of the finished product. Additionally, Oracle Flow Manufacturing allows you to record completions of assemblies without having to create work orders, a job or repetitive schedule or flow schedule. If you require quality collection plans for work order-less completions, they will be set up at this time.

The costing method of the organization in which you are operating determines whether you can use mixed manufacturing methods. Costing in a flow environment is usually done using standard costing methods, although average costing is also used, particularly when used in conjunction with project manufacturing. Cost variances are collected and posted during the Work Order-less Completion Transaction.

Responsibilities

The inventory management team sets up component supply types. Supply types control how component materials are supplied to the flow line. Identical to current Oracle Work-In-Process functionality for discrete and repetitive production, supply types define how materials are costed in Oracle Cost Management. Inventory management must assign

flow routing events to BOM components to assure that material and resources are applied at the correct location on the manufacturing line. Any component that you do not assign to a routing event will be assumed to be consumed at the beginning of the line. If you assign an event to each routing component, the material will be applied to the appropriate event in the line. This may be useful for reporting or costing information, specifically since you are able to scrap an assembly at any operation in the production line using the work order-less completion form. In the execution mode, production planning and shop floor design will review the Mixed Model Map and determine daily flexing requirements.

Cost Accounting determines the costing method of the organization you are operating in. Costing in a flow environment is usually done using standard costing methods, although average costing is also used sometimes, particularly when used in conjunction with project manufacturing. Cost variances are collected and posted during the work order-less completion transaction.

Quality Assurance is responsible for establishing required collection plans for the work order-less completion transactions, monitoring CTQ points in the operational method sheets and certifying operators to operations.

Tasks, Activities and Tools

- Setup and establish supply types on BOM component items.
- Assign routing sequences to BOM component items.
- Establish Quality collection plans.
- Perform Work Order-less completions.

Kanban Planning and Execution

Objectives

A key objective of kanban planning and execution is to meet customer demand while minimizing inventory investment and increasing inventory turns with JIT production. To accomplish this, raw material is pulled into production as needed to meet demand and the pulled material is replenished using a kanban signal. The minimum amount of material possible, based on replenishment time, is held at the line in kanban bins. As each bin is used up, a signal is issued to replenish the bin and the next bin is used to pull the material.

The Team

The kanban planning and execution team is typically composed of

- Procurement

n   Inventory management

n   Production planning

n   Sales

n   Shop floor design

In Oracle Flow Manufacturing the kanban planning and execution team manages production as assemblies are pulled through the flow processes, starting with the final assembly operation. Materials are planned, managed, and replenished at point of use by kanban bins and signals.

To implement kanban planning and execution, procurement, and inventory management define sourcing rules and groups them in assignment sets. Sourcing rules define from where material is to be pulled or replenished. Once material sources are determined, inventory management and production planning teams calculate item characteristics to create optimal pull sequences:

n   Replenishment lead times

n   Minimum order quantities

n   Fixed lot multipliers

n   Days safety stock supply

Sourcing rules and item characteristics lay the foundation to calculate the size and number of kanban cards required in the pull sequence. Once the kanban cards are defined in the pull sequence, they are generated to drive the material pulled through the flow line. Kanban planning and execution is critical to the success of sales and operations:

n   Procurement relies on kanban signals to create supplier and inter-organization purchase requisitions to generate purchase requisitions and replenish material on the flow line.

n   Inventory Management relies on accurate kanban numbers and sizes in order to manage the frequency (queue and lead times) and size (inventory shortages or buildup) of replenishment orders through the line.

n   Production planning relies on kanban cards to communicate visually the right thing to produce, at the right time, and to deliver it to the right place.

n   Sales relies on kanban cards to pull material through the flow line to fill each customer's order for the requested number of items, with the correct features, functions, and options on time.

Responsibilities

Shop Floor Design, Procurement, and Production Planning The shop floor control, production planning and inventory management teams define the pull sequences and determine the kanban size and number. This team defines sourcing rules and groups them in assignment sets which lays the foundation for generating kanban cards, creating purchase requisitions for procurement and pulling material through the flow line to meet customer demand.

Sales In kanban planning and execution, the sales team is interested in meeting customer demand and ensuring shipments are delivered in a timely basis to the right customer.

Inventory Management Inventory management calculates replenishment lead times, minimum order quantities, fixed lot multipliers, and days of supply desired for safety stock in order to generate optimal pull sequences. Inventory management executes the kanban replenishment signals to generate requisitions and moves the material on the flow line.

Inventory management is responsible for sizing and weighing both parts and containers to select the correct size container, rack, space, location, design, and colors.

Production Planning, Inventory Management and Shop Floor Design
Production planning, shop floor design, and inventory management evaluate the mixed model map, assign resources, and sequence events to meet daily customer demand.

Procurement Procurement receives executed kanban signals in the form of purchase requisitions and works with suppliers for replenishment. Flow manufacturing enables procurement to integrate vendors and other business units into the supply chain to increase production flexibility and product reliability.

Tasks, Activities, and Tools
Flow manufacturing provides the forecasting and planning tools to define and explode forecasts, create kanban lines with pull sequences, and perform kanban execution.

Pull Sequences
Oracle Flow Manufacturing helps you define the kanban locations for each item along with the supply source information. Supply source can be suppliers, other production lines, other inventory organizations in the enterprise, or other inventory locations in the same organization. A complete chain of demand-supply pull sequences can be defined for kanban planning.

Non-replenishable Kanbans

Non-replenishable kanbans are used primarily to meet unexpected peaks in demand. For demand variances that are in-frequent and unplanned, Oracle Flow Manufacturing allows non-replenishable kanban cards. These cards are created for specific items in specific quantities as needed. Non-replenishable kanbans cycle through the system only once, after which they are removed from production.

Kanban Execution

Oracle Flow Manufacturing generates appropriate events for each kanban signal. For kanbans that are sourced through suppliers, the system can generate requisitions and purchase orders. Sourcing rules can also be used to create blanket releases against purchase contracts. Internal requisitions can be generated for inter-organization replenishments.

Oracle Flow Manufacturing Integration

Overview

Global competition and the increasing pace of change brought on by the internet has made the race for market share and leadership increasingly fierce. Increased ability to provide customized products has driven this demand even further.

Total Business Strategy

Flow manufacturing is a total business strategy that provides companies a competitive edge in attaining market share and leadership. It is a practical solution whether you produce in a stable make-to-order environment or manufacture in a dynamic engineer-to-order environment. You can implement Oracle Flow Manufacturing in a multi-mode environment.

Oracle Flow Manufacturing can support different business units using different manufacturing modes (discrete, repetitive, flow), as well as support one business unit implementing different manufacturing modes in the same plant along different lines.

Application Integration

Oracle Flow Manufacturing is fully integrated with other Oracle manufacturing applications.

Oracle Application	Demand Management	Line Design and Balancing	Line Scheduling and Sequencing	Production Execution	Kanban Planning and Execution
Inventory	■	■		■	■
Work in Process				■	
BOM and Engineering				■	■
Planning	■	■			■
Order Management			■		
Purchasing					■
Quality				■	
Cost Management				■	

Inventory

Overview

Oracle Inventory defines items and item information, performs receiving and inventory transactions, maintains cost control, plans items, performs cycle counting, and manages physical inventories.

Flow Business Process Integration

Template and Item Creation

Demand Management The creation of forecasts and other demand statements rely on the existence of inventory items and product families and on the relationship of those items to their product families.

Line Design and Balancing Product family groupings established during inventory setup may be used to coordinate the display of information on the Mixed Model Map during design and balancing procedures.

Production Execution The Work Order-less completion process serves to increase the on hand quantity of the completed product and provides for the back flush or removal from inventory of the component inventory used to make the finished good.

Kanban Planning and Execution Kanban planning involves the interaction of forecasts established in demand management, the bills of material and the 'sub-inventory' locations where inventory can be stored. The kanban planner derives the requirements for the components at the points of use and calculates the kanban sizes.

Work In Process

Overview

The Oracle Work In Process application helps you implement the production management system best suited for your production requirements. Oracle Work In Process enables you to implement discrete, repetitive, assemble-to-order, project, flow, and mixed manufacturing environments.

Flow Business Process Integration

Production Execution

Work order-less Completions You can complete assemblies without referencing a job or repetitive schedule. Work order-less completions automatically backflush all operation pull, assembly pull, and push components.

Work order-less Assembly Returns You can reverse work orderless completions by returning completed assemblies. The components in the assembly's bill are automatically returned to inventory.

Work order-less Scrap Transaction You are able to scrap an assembly at any operation in the production line using the Work order-less Completion window. The program uses the BOM for the component/event association and routing for the event/operation association, and scraps all components that are assigned to events in operations.

Lot and Serial Number Control You can issue, backflush, and complete lot, serial number, and lot and serial number controlled items.

Backflush Lot Selection You can specify how lot controlled components are selected during backflush transactions using the WIP Lot Selection Method parameter. Lots can be selected manually or automatically based on either their inventory expiration or receipt date.

Component Substitutions You can add, delete, and substitute components that are not normally associated with the assembly you are building.

Open Material Transactions Interface You can load work order-less completion transaction information from external systems, such as bar code readers and other data collection devices, into the Inventory Transaction Interface. When this data is processed, it is validated, and invalid records are marked so that you can correct and resubmit them.

Bills of Material and Engineering

Overview

The Oracle BOM application helps you create various bills of materials to maximize efficiency, improve quality, and lower cost for the most sophisticated manufacturing environments. By detailing integrated product structures and processes, flexible product and process definition, and configuration management, you can manage product details within and across multiple manufacturing sites.

The Oracle Engineering application helps your engineers to introduce and manage new designs into production. You can define the resources, materials, and processes necessary to implement changes in product design.

Flow Business Process Integration

Production Execution You are able to complete an assembly using the work order-less completion form. The program uses the current BOM based on the transaction date for the component backflush. Optionally, the effective date and/or revision number may be overridden, allowing for quick and accurate updates for ECN or temporary deviation notices.

Kanban Planning and Execution Kanban planning involves the interaction of forecasts established in demand management, the bills of material and the sub-inventory locations where inventory can be stored. The kanban planner derives the requirements for the components at the points of use and calculates the kanban sizes.

Order Management

Overview

The Oracle Order Management application helps you enter sales orders and returns, copy existing sales orders, schedule orders, release orders, plan departures and deliveries, confirm shipments, create price lists and discounts for orders, and create reports.

Flow Business Process Integration

Line Scheduling and Sequencing Sales orders are the basis behind the flow manufacturing philosophy of building to customer demand. Production lines are balanced based upon anticipated demand. The daily scheduling and sequencing of sales orders optimizes the flow of materials and the use of resources to meet the customer demand.

Purchasing

Overview

The Oracle Purchasing application helps you create and approve purchasing documents, including requisitions, purchase orders, quotations, Request For Quotations (RFQs), and receipts. You can also manage your supply base through agreements, sourcing rules and approved supplier lists.

Flow Business Process Integration

Kanban Planning and Execution Oracle Purchasing is integrated with Oracle Flow Manufacturing, specifically kanban execution, so you can automatically create purchasing documents based on kanban replenishment business rules through integration with Oracle Workflow technology.

Quality

Overview

The Oracle Quality application enables you to meet quality data collection and analysis needs.

Flow Business Process Integration

Production Execution   Oracle Flow Manufacturing enables you to implement TQC events and processes throughout the flow line to provide a closed loop quality control system. These events are generally referred to as *verify* and *check* and are reinforced with the use of operational method sheets that may be printed or displayed on-line.

Planning

Overview

In Oracle Planning you can anticipate and manage both supply and demand for your items. Using a variety of tools and techniques, you can create forecasts, load these forecasts into master production schedules, and plan your end-items and their component requirements. You can also execute the plan, releasing and rescheduling planning suggestions for discrete jobs and repetitive schedules.

Flow Business Process Integration

Demand Management   The Oracle Planning application enables you to plan for product families and family members in Oracle Flow Manufacturing. Once forecasts are defined and source lists created to combine and explode forecasts, the Oracle MDS and MPS operate in similar fashion to procedures under Supply Chain Planning.

Line Design and Balancing   The statement of demand established in demand management is critical to the line design function. This demand sets the upper limit of production capacity and becomes the basis for balancing procedures. Demand planning allows for management of cyclic demand or seasonal demand.

Kanban Planning and Execution   Generally, the same forecast, MDS or MPS that is used to design a mixed model production line is also used for kanban planning. The derived demand of components is used to establish size requirements.

It is important to note that planning plays only a part in the design phase of a flow manufacturing implementation. The forecast, MDS, and/or MPS that are established are used only for planning purposes, internally for line design and kanban sizing. Externally, the forecasts are communicated with suppliers so that they may in turn plan their operations.

Cost Management

Overview

Cost Management is used to cost inventory, receiving, order entry, and work order-less completions in Oracle Flow Manufacturing. Oracle Cost Management can also be used to collect transaction costs for transfer to Oracle Projects. Cost Management supports multiple cost elements, multiple subelements, and activity–based costing. It also provides comprehensive valuation and variance reporting.

Flow Business Process Integration

Production Execution Oracle Cost Management applications support costing for Oracle Flow Manufacturing in both standard and average costing organizations.

Work Order-less Assembly Completions and Scrap Work order-less completions, which incur costs and relieve costs and variances, are processed and reported with respect to this completion transaction. This costing methodology differs from that used for discrete jobs, which track and report costs by job, and repetitive schedules, which maintain and track costs by repetitive assembly/line combination and allocate them across repetitive schedules.

Transaction Processing Component backflush transactions, triggered by work order-less completion transactions, are automatically costed. The resource and overhead transactions that are also triggered by the completion transaction and are likewise automatically costed. These transactions are processed as a group by the cost processor. Only one completion transaction and its associated component, resource, and overhead transactions must be processed each time a work order-less completion is transacted. This ensures that period balance information is properly maintained. If any transaction associated with a work order-less completion should fail to process, all associated transactions are rolled back.

Zero Balance Under standard costing, all cost transactions and variance transactions associated with work order-less completions are processed at the same time as the assembly completion. Therefore the net balance associated with work order-less completions is always zero. Work order-less Assembly Return and Scrap transactions are similarly processed.

Summary of Oracle Flow Manufacturing

Oracle Flow Manufacturing is a product family based, mixed model manufacturing environment characterized by:

- Dedicated assembly lines or flow lines that support the manufacture of product families

- Mixed model production which means that any item in the family can be produced in any sequence in a lot size of one

- Balanced assembly lines that ensure optimum resource allocation and smooth flow of materials

- Production is pulled through process, starting with the final assembly operation

- All materials are planned, managed and replenished at point of use by kanban bins and signals

- Materials flow through the line at takt time, which is the rhythm, or drum beat of production

Implementing Oracle Flow Manufacturing method enables sales and operations to work as a team to attain your manufacturing objectives for highest overall quality, lowest overall cost, and dramatically increased throughput. The attainment of these operating objectives means higher margins and increased customer responsiveness which yields greater market share for your company.

2
Setting Up

Once you have installed Oracle Flow Manufacturing and other Oracle Applications products, the next step is setup. This Chapter discusses the steps required to setup Flow Manufacturing, including the required Flow Manufacturing setup steps with references to the Oracle Application and responsibility. For setup instructions to other modules that interact with Flow Manufacturing, please refer to the User's Guide of the appropriate Oracle application for more detailed explanation of setup requirements and alternatives.

This chapter tell you everything you need to know about setting up, including:

- Overview of Setting Up
- Setup Objectives
- Setup Prerequisites
- Subinventories Setup
- Setup Stock Locators
- BOM Parameters Setup
- Purchasing Setup
- Order Entry Setup
- Quality Module Setup
- Item Templates
- Demand Management Setup Steps
- Products and Parts Setup
- Bills Setup
- Planning Setup

- Line Design and Balancing Setup Steps
- Flow Line Definition
- Product Synchronization Setup
- Define Standard Events
- Add Standard Processes to an Item's Flow Routings
- Add Standard Events to an Item's Flow Routings
- Line Scheduling Setup Steps
- Scheduling Rules Setup
- Production Execution Setup Steps
- Work Order-less Production Setup
- Quality Plan Setup
- Kanban Planning and Execution Setup Steps
- Replenishment Chain Setup
- Supply Chain Management

Overview of Setting Up

The following setup steps must be applied with full understanding of the Oracle Flow Manufacturing functionality and your production processes to ensure an effective implementation. Review the specific process chapters first to gain an understanding of the options and inter-relations of set-up data. Return to this chapter for specific details and a checklist for data set-up.

Setting up Oracle Flow Manufacturing Software follows the business process for a flow implementation and relates directly to the tasks performed in the implementation. The sequence in which the setup is done is important since there are data dependencies. The setup process correlates to the business process explained in Chapter 1 as follows:

Setup Prerequisites

- Naming Convention Definition

- Setup Profile Options

- Setup Organization

- Setup Item Flexfield

- Inventory Parameters Setup

- Cost Accounts Creation

- Subinventories

- BOM Parameters Setup

- Purchasing Setup

- Order Entry Setup

- Quality Module

Item Templates

Demand Management

- Products and Parts Setup

- Bills Setup

- Planning Setup

Line Design and Balancing

- Flow Line Definition

- Product Synchronization Setup

Line Scheduling

- Scheduling Rules

Production Execution

- Work order-less Production

- Quality Plan

Kanban Planning and Execution

- Replenishment Chain Setup

- Supply Chain Management Chapter

To summarize the setup steps for each implementation process, the following matrix lists all the setup steps with the associated business process and navigation paths to help you organize the implementation. Following these setup steps in sequence provides an implementation checklist and a method to organize tasks and responsibilities to set up flow manufacturing. The Oracle applications that are integrated through the flow manufacturing systems are identified and the required setup steps are described including navigation paths to the required setup forms.

Use the table also to prepare a naming convention and all the data requirements. Flow Manufacturing setup requires a well thought and designed naming convention to facilitate data entry. It is strongly suggested to prepare the naming convention in advance since changes can delay the implementation or hinder the users ability to understand the fields.

All navigation is done within the Manufacturing/Distribution Responsibility.

Setup Flowchart

The following steps include optional items for setting up Oracle Flow Manufacturing. Some steps oulined in this flowchart and setup checklist are required and some are optional. Required steps With Defaults refers to setup functionality that comes with pre-seeded, default values in the database; however, you should review those defaults and decide whether to change them to suit your business needs. If you want or need to change them, you should perform that setup step. You need to perform optional steps only if you plan to use the related feature or complete certain business functions.

Oracle Flow Manufacturing Setup

Step FM–1
Create Items

Step FM–2
Restrict items to a subinventory

Step FM–3
Product Family

Step FM–4
Product Family Members

Step FM–5
Category Sets and Category Codes

Step FM–6
Bill of Materials

Step FM–7
Forecasts

Step FM–8
MDS

Step FM–9
Flow Line

Step FM–10
Resources

Step FM–11
Departments

Step FM–12
Std. Events

Step FM–13
Std. Processes

Step FM–14
Std. Line Operations

Step FM–15
Flow Routing

Step FM–16
Scheduling Rules

Step FM–17
WIP parameters

Step FM–18
WIP Accounting Classes

Step FM–19
Quality Collection Plan

Step FM–20
Pull Sequence

Step FM–21
Sourcing Rules

Step FM–22
Assignment Set

LEGEND

Required Step

Required Step With Defaults

Optional Step

Setup Checklist

Setup Step	Setup	Business Process	N: = Navigator
	Create Items	Demand Management	N: Flow Mfg> Items> Master Items
	(Optional) Restrict items to a subinventory	Demand Management	N: Flow Mfg> Setup> Organizations> Subinventory
	(Optional) Product Family	Demand Management	N: Flow Mfg> Products and Parts> Product Family
	(Optional) Product Family Members	Demand Management	N: Flow Mfg> Products and Parts> Product Family Members
	(Optional) Category Sets and Category Codes	Demand Management	N: Flow Mfg> Setup> Items > Category > Category Sets N: Flow Mfg> Setup> Items > Category> Category Codes
	Bill of Materials	Demand Management	N: Flow Mfg> Bills> Bill
	Forecasts	Demand Management	N: Material Planning> Forecast> Sets
	MDS	Demand Management	N: Material Planning> MDS> Names
	Flow Line	Line Design and Balancing	N: Flow Mfg> Lines> Lines
	Resources	Line Design and Balancing	N: Flow Mfg> Lines> Resources
	Departments	Line Design and Balancing	N: Flow Mfg> Lines> Departments
	(Optional) Std Events	Line Design and Balancing	N: Flow Mfg> Product Sync> Std Events
	(Optional) Std Processes	Line Design and Balancing	N: Flow Mfg> Product Sync> Std Processes
	(Optional) Std Line Operations	Line Design and Balancing	N: Flow Mfg> Product Sync> Std Line Operations
	Flow Routing	Line Design and Balancing	N: Flow Mfg> Product Sync> Flow Routings
	Scheduling Rules	Line Scheduling	N: Flow Mfg> Setup > Scheduling Rules

WIP parameters	Production and Execution	N: Flow Mfg> Setup>Bills>WIP Parameters
WIP Accounting Classes	Production and Execution	N: Flow Mfg> Setup>Bills>WIP Accounting Classes
Quality Collection Plan	Production and Execution	N: Quality>Setup>Collection Plan
Pull Sequence	Kanban Planning and Execution	N: Flow Mfg> Kanbans> Kanban Setup> Pull Sequences
Sourcing Rules	Kanban Planning and Execution	N: Purchasing> Supply Base> Sourcing Rules
Assignment Set	Kanban Planning and Execution	N: Purchasing> Supply Base> Sourcing Rules

Setup Objectives

Flow Manufacturing requires teamwork and organization. The teamwork and organization must start in the planning and setup stages of implementation. Oracle Flow Manufacturing setup steps may be classified into logical groups assigned to each of the Business Processes to achieve specific implementation objectives.

Setup Prerequisites

The setup objectives of prerequisites are:

- Naming Convention Definition - Define a naming convention for the implementation.

- Setup Profile Options - Needed to create an organization.

- Setup Organization- Create a name for the organization.

- Setup Item Flexfield - Activate Flexfields for the organization.

- Inventory Parameters Setup - Define the inventory parameters needed to create items.

- Cost Accounts Creation - Open accounts later needed for WIP accounts.

- Subinventories - Create at least one subinventory for the flow line.

- BOM Parameters Setup -Define BOM parameters and locations.

- Purchasing Setup - Setup suppliers and purchasing functionality.

- Order Management - Setup Order Management to receive product orders.

- Quality Module - Setup the quality module to create a collection plan in Production Execution Setup.

Item Templates

The setup objectives of Item Templates are:

- Flow Finished Good Template, or sometimes called Flow Assembly - Define the standard template for creation of Finished Good items.

- Flow Component Template - Define the standard template for creation of Flow Components items. A Flow Component can be Buy, Make, or Phantom.

Demand Management Setup

The setup objectives of Demand Management are:

- Products and Parts - Define the products and parts to be produced and group them in a logical way to facilitate demand forecasting and production assembly.

- Bills - Create a bill of materials for the products and parts to include their family relationship, their location in the flow line, and the source of their supply in order to do proper back-flushing.

- Planning - Identify and create the appropriate planning tools which will apply expected demand to the product family structures, item demand locations and item supply locations to calculate the flow line capacity and rates.

Line Design and Balancing Setup

The three setup objectives of Line Design and Balancing are:

- Flow Line Setup - Define the flow lines, production resources, and departments.

- Product Synchronization Setup - Define the activities and processes in the flow line and to produce a management tool to balance the resources and processes to meet demand.

Line Scheduling Setup

The setup objective of Line Scheduling is:

- Scheduling Rules - Define your scheduling rules.

Production Execution Setup

The primary setup objectives of Production Execution is:

- Work order-less Production - Meet daily production requirements simply.

- Quality Plan - Setup a quality plan for the operation.

Kanban Planning and Execution Setup

The primary setup objective of Kanban Planning and Execution is:

- Define the flow line's replenishment chain that will execute the flow of the requested material, just in time, in the expected quantity, to the place it's needed.

Setup Prerequisites

Prior to performing the setups for the Flow Manufacturing Module, certain functional and systems activities need to be performed. A naming convention needs to be defined and other modules in the enterprise system need to be setup properly. This chapter mentions the critical setups, navigation and module responsibility that are prerequisite to setting up Flow Manufacturing but does not explain them. For specific instructions please refer to their respective *User's Guide.*

Define a Naming Convention

As part of the flow implementation, a naming convention needs to be defined. This is important to facilitate quick distinction between events, processes, and line operations and the event numbers, process numbers, and line operation numbers in the flow routings. Resources, flow lines, departments also need to be named properly. Forecast sets and forecast names and descriptions are important to help the user select correct information. The Following table lists all the critical fields for flow manufacturing and their characteristics:

> **Note:**   Flow Manufacturing is abbreviated as FM.

Field Name	Navigation	Field Characteristic
Flow line	FM>Lines>Lines	TEXT 10
Resources	FM>Lines>Resources	TEXT 10

Departments	FM>Lines>Departments	TEXT 10
Standard Event Code	FM>Product Sync>Standard Events	TEXT 4
Standard Process Code	FM>Product Sync>Standard Processes	TEXT 4
Standard Line Operation Code	FM>Product Sync>Standard Line Operation	TEXT 4
Event Sequence	FM>Product Sync>Flow Routings>Events	NUM 4
Process Sequence	FM>Product Sync>Flow Routings>Processes	NUM 4
Line Operation Sequence	FM>Product Sync>Flow Routings>Line Ops	NUM 4
Forecast Set	Material Planning>Forecast>Sets	TEXT 10
Forecast Items	Material Planning>Forecast>Entries	TEXT 30

Other items to keep in mind:

- Events, processes and operations all share same table. Names must be unique.

- You can use the same standard events for different lines since the key in the table is the concatenation of line and event code.

- MRP, MPS, KANBAN PLAN, and MDS all share same table. Names must be unique.

Setup Profile Options

Setting up the Profile Options in Flow Manufacturing is similar to the setup in System Administration for traditional inventory organizations. See Setup Profile Options in the Oracle Inventory User's Guide.

Responsibility:Sys Admin

(N) Setup > Organizations > Organization

Setup Organization

An organization is needed to create any items, resources, or activities later on. It is the foundation of the system. Setting up the Inventory organizations in Flow Manufacturing is similar to the setup in Oracle Inventory, enabling inventory to be assigned to the organization.

Responsibility:Inventory

(N) Setup > Organizations > Organizations

Navigate to the Organization window and define your inventory organization. For a full description of organization setup, see Setup Organization in the Oracle Inventory User's Guide For a list of existing organizations which have been set up for Flow Manufacturing, navigate to the Organizations form (Setup > Organizations > Organizations).

Setup Item Flexfield

Item Flexfield setup for Flow Manufacturing is completed in the Oracle Inventory Responsibility and is similar to traditional inventory item flexfield setup procedures. Navigate to the appropriate window to setup the item flexfield.

Responsibility:Inventory

(N) Setup >Flexfields

Select the Key, Descriptive, and Validation flexfield navigators and select the appropriate windows to set up inventory Flexfields. See Setup Flexfields n in the Oracle Inventory User's Guide.

Inventory Parameters Setup

Prior to setting up the flow module, the inventory module has to be setup properly. Please reference the Oracle *Inventory Users Guide* for details on the specific setups. From a flow manufacturing perspective the following elements need to be set up as a prerequisite to item templates and items creation:

- Item Status Setup

- Item Types

- Category Sets

Cost Accounts Creation

Prior to setting up the flow module, valid accounts need to be setup to be used during the Production setup. Please reference the *Costing Users Guide* for details on the specific setups. From a flow Manufacturing perspective the following accounts are a prerequisite:

- Material Valuation and Variance

- Material Overhead Valuation and Variance

- Resource Valuation and Variance

- Outside Processing Valuation and Variance

- Overhead Valuation and Variance

- Standard Cost Variance

- Expense variance

Subinventories Setup

Subinventories are unique physical or logical separations of material inventory, such as raw inventory, finished goods, or defective material. To sum up all the demand for each item when calculating kanbans, Oracle Flow Manufacturing uses either the subinventory or subinventory and locator together as the key logical location.

In a simple flow line you must define at least one subinventory to use Oracle Inventory.

Before performing this set-up step, see Chapter 7: Kanban Planning and Execution for a detailed discussion on sub-inventory set-up choices and how they impact Kanban execution.

To create the subinventory navigate to:

(N) Inventory > Setup > Organizations > Subinventories

Enter the name and description of the new subinventory. You must enable the following Parameters:

- Quantity Tracked

- Asset Subinventory

- Include in ATP

- Allow Reservation

- Nettable

- Define Locator Control

Assign Subinventory General Ledger Accounts

Material

Enter a general ledger account to accumulate material costs for this subinventory. This is usually an asset account you use for the value of goods stored in this

subinventory. Oracle Inventory displays the material account you defined for the organization in the Define Organization Parameters form as the default.

Outside Processing

Enter a general ledger account to accumulate outside processing costs for this subinventory. Oracle Work in Process charges this account at standard cost when you receive items for a job or schedule in Oracle Purchasing. Oracle Work in Process relieves this account at standard cost when you issue components to a job or schedule. Oracle Inventory displays the outside processing account you defined for the organization in the Define Organization Parameters window as the default.

Material Overhead

Enter a general ledger account to accumulate material overhead or burden costs for this subinventory. Oracle Inventory displays the material overhead account for the organization you defined in the Define Organization Parameters form as the default.

Overhead

Enter a general ledger account to accumulate resource or department overhead costs for this subinventory. Oracle Work in Process charges this account at standard cost when you complete assemblies from a job or schedule. Oracle Work in Process relieves this account at standard when you issue components to a job or schedule. Oracle Inventory displays the overhead account you defined for the organization in the Define Organization Parameters form as the default.

Resource

Enter a general ledger account to accumulate resource costs for this subinventory. Oracle Work in Process charges this account at standard cost when you complete assemblies from a job or schedule. Oracle Work in Process relieves this account at standard cost when you issue components to a job or schedule. Oracle Inventory displays the resource account you defined for the organization in the Define Organization Parameters form as the default.

Expense

Enter a general ledger account to accumulate the transaction values for this subinventory. For expense subinventories, Oracle Inventory charges this account when you receive any item. For asset subinventories, Oracle Inventory charges this account when you receive an expense item. Oracle Inventory displays the expense

account you defined for the organization in the Define Organization Parameters form as the default.

Encumbrance

Enter a general ledger account to hold the value of encumbrances against items in this subinventory. Oracle Inventory displays the encumbrance account you defined for the organization in the Define Organization Parameters window as the default. Oracle Inventory uses this account for purchase order receipts and returns.

Setup Stock Locators

You can use locators, also typically known as rack/bin locators, to identify physical areas where you store inventory items. You can assign capacity characteristics such as maximum weight, volume, and units to your new stock locator. You can assign physical characteristics such as maximum weight, volume, and units to the stock locator.

See Chapter 7: Kanban Planning and Execution for a detailed discussion on sub-inventory set-up choices and how they impact Kanban execution.

To setup a Stock Locator, navigate the Find Locators form to find existing locators or define new locators.

(N) Flow Manufacturing > Setup > Organizations > Stock Locators

Select the type of locator control that best suites your business needs:

- No Locator Control

- Prespecified Locator Control

- Dynamic Entry Locator Control

- Locator Control Determined At Item Level

Assign the locator to a subinventory. You can assign also define capacity characteristics such as maximum weight, volume, and units to your new stock locator. The Subinventory Summary form is an alternative form to assign stock locators to subinventories: (N) Setup > Organizations > Subinventories.

BOM Parameters Setup

Prior to setting up the Flow Module, the Bill of Materials module needs to be setup. Please reference the *Oracle Bill of Materials Users Guide* for details on the specific

setups. From a flow manufacturing perspective the following elements need to be set up as a prerequisite to item templates and items creation:

- BOM Parameters
- Alternates
- Bills Location
- Resource Groups Table

Purchasing Setup

Prior to setting up the flow module, the purchasing module needs to be setup. Please reference the *Oracle Purchasing Users Guide* for details on the specific setups. From a flow manufacturing perspective the following elements need to be set up as a prerequisite to kanban creation and execution:

- Define Source Types
- Setup Sourcing Rules
- Setup Assignment Sets

Order Entry Setup

Prior to setting up the flow module, the Order Management module needs to be setup. Please reference the *Oracle Order Management Users Guide* for details on the specific setups. From a flow Manufacturing perspective the following elements need to be set up as a prerequisite to customer order entry:

- Price List Setup
- Sales Orders

Quality Module Setup

Prior to setting up the flow module, the quality module needs to be setup . Please reference the *Oracle Quality Users Guide* for details on the specific setups. From a flow Manufacturing perspective the following elements need to be set up as a prerequisite to customer order entry:

- Alerts
- Actions
- Elements

■   **Plans**

Item Templates Setup

The single most important setup in any Oracle application are the item attributes for the items. The item attributes control how the software handles the item throughout the business cycle. In Oracle, item templates are used when creating any item. During the creation of an item you can copy the template and all the attributes in the template will be copied. If changes are needed, the user can make the changes after the template has been copied.

There are two templates normally used in flow manufacturing :

Flow Finished Good Item Template: Also called Flow Assembly Template, contains all the item attribute parameters for a Finished Good Item that is order by a customer and produced in the flow line.

Flow Component Template: It is the template for the children or components of the Finished Good Item. Since the Components can be purchased, or made in the assembly line, some users may create additional templates for the Flow Components:

- Flow Component KANBAN Purchased

- Flow Component KANBAN Make

- Flow Component Phantom Item

It is important to ensure that once the models for the Finished Good and the Components are defined, they are used consistently in the creation of items.

See Appendices A, B, and C for more detailed information on how to set up item attributes for flow manufacturing templates.

Demand Management Setup Steps

Before performing this set-up step, see Chapter 3: Demand Management for a detailed discussion of Demand Management in flow manufacturing. In designing a flow line, a company analyses the market forecast for the products and takes a look at the long term.

In demand management you can group products into product families, then assign planning percentages to members of the product family. This relationship is used in:

- Forecast explosion
- Consumption
- Master Scheduling
- Capacity and Materials Planning

In production planning you can explode product family forecasts down to the product family members based on the planning percentages and effectivity dates for the member items.

Sales orders for member items consume the forecast for the member items as well as for the product family. Throughout the application, processing is done at both the aggregate and detail level. The setup objectives of demand management and production planning are achieved through the successful implementation of:

- Products and Parts Setup
- Bills Setup
- Planning Setup

Products and Parts Setup

The objectives of products and parts setup is to create both the finished good and component items and group them in logical product families to facilitate demand forecasting and production assembly. To implement Oracle Flow Manufacturing it necessary to set up:

- Create Items
- Product Family
- Product Family Members
- Categories and Category Sets

Step 1: Create Items

Once the templates for the flow finished good and flow component items are created, you can copy the templates when creating items. Additional modification can be made to the item if is it different from the template. For description of item attributes please read appendices of this document.

Create the item at the master level and save transaction.

(N) Flow Manufacturing >Products and parts> Master Items

After the item is created assign it to the Organization level by using the Tools pull down menu and selecting "Organization Assignments"

Define Locator Control:

If locator control at the sub-inventory is set to item level, and you decide to use locators for kanban control then it is necessary to activate the locator attributes for the item since the template has them turned off. If you want all kanban items under locator control, modify the item template accordingly.

See Chapter 7: Kanban Planning and Execution for a detailed discussion of Locator control choices and their affects on Kanban execution.

(N) Flow Manufacturing >Products and parts> Organization Items

Select the correct Locator Control for kanban locations. You can enter a value in this field only if you designated Locator Control to be determined at the item level in when you defined sub-inventories. Locator Control should be based on your business needs:

Choose one of the following:

- None
- Prespecified
- Dynamic entry

Step 2 : Restrict Items to a Subinventory (optional)

Once the items are created you may restrict them to a subinventory via the item/subinventory relationship table. Restricting Items to Subinventories is optional in flow manufacturing. You may wish to design the flow line to include functions which do require the restriction of items to subinventories.

The Item / Subinventories form assigns items to a given subinventory and does not restrict a subinventory to the list of items you define here. Rather, this window

restricts items to a subinventory. Thus, you can always issue and receive unrestricted items to any subinventory, but you can only issue and receive restricted items to their assigned subinventories.

Once subinventories and items have been defined, you define item / subinventory relationships. Navigate to the Subinventories Summary form.

Responsibility:Flow Manufacturing

(N) Setup > Organizations > Subinventories

- Enter the subinventory and select the Item / Subinventory tab to navigate to the Item Subinventories window. Enter the item.

Step 3: Setup Product Family (Optional)

A product family is made up of flow finished good items. The first step is to define the product family.

Navigate to the Product Family window to define the product family.

(N) Flow Manufacturing > Products and Parts > Product Family

The product family navigation defaults into the Master Item window that is used to define items, only if the profile option "INV: Product Family Item Template is set to Product Family at both the site and Flow Manufacturing Application level.

Oracle Applications comes pre-seeded with the Product Family template. However, if you want to make adjustments, navigate to:

(N) Inventory > Setup > Items > Templates

In the All Groups pull-down menu,

- Ensure that the User Item Type value is set to Product Family and is checked Enabled.

- Ensure the Inventory value for Inventory Item is "Yes," and is checked Enabled. Ensure the Stockable and Transactable values are checked Enabled.

- Ensure that the BOM Item Type is set to Product Family, the BOM allowed value is "Yes," and both are checked Enabled.

You must configure the Product Family structure of the Item Categories Flexfield to exactly match System Items structure of the Systems Items flexfield. These structures must remain in synch whenever system items are changed.

Remember to assign the product family to an organization.

Step 4: Setup Product Family Members (Optional)

Once all flow finished good items are created, assign them to a product family. Navigate to the Product Family Member window to add family members to the product family.

(N) Flow Manufacturing > Products and Parts > Product Family Members

In the Product Families window, enter the product family. If you cannot find the product family that you created, make sure it was assigned to an organization to use list of values. Enter the Family Member name. Enter the Allocation Planning % for the product family member.

Allocation Percentages

Similar to a planning bill, the product family structure lists its members, along with the forecast allocation percentages. Through product families you have the ability to define allocation percentages to family members. These allocation percentages may be time-phased using effectivity dates.

Allocation percentages can be less than or greater than 100%. If less than, then the undistributed forecast is ignored. If greater than 100%, then the appropriate forecast will be created and consumed. An item can only be a member of one product family

Step 5: Setup Product Category Sets and Categories (Optional)

Confirming the Automatic Category Set

To confirm that Category Codes have been applied accurately navigate to the Categories window.

(N) Flow Manufacturing > Setup > Items > Categories > Category Codes

In the Find Categories form, enter Product Family in the Structure Name field. In the Categories form the Category Set, Product Family, will be listed under the Structure Name. Find the Product Family name for your Product Family under the Category column to confirm it was setup correctly.

If the category is not added to the category set then you will be unable to add member items later.

Deleting an item does not delete the category from the category set, you must do this manually.

If the item number is changed once saved then the new item is not added to the category set and again you will not be able to add members.

Bills Setup

The objective of Bills setup is to create a bill of materials for the products and parts that will be used during back-flushing, kanban planning, and mass customization configurations.

Step 6: Setup Bill of Materials

Navigate to the Bills window to add the product structures for all standard assemblies in the Bills of Material window.

(N) Flow Manufacturing > Bills > Bills

The Bills of Material form creates single level BOMs to be used for flow lines. Phantoms may be used to represent multi-level BOM structures.

Once the bill header is created, assign the children to the bill. Go to the item line and add an item. The operation sequence will default to 1.

Since the Flow Routings have not yet been created the system will automatically assign operation sequence 1 to each item. This means that when back-flushing for scrap, all items will be back-flushed regardless of the operation in which you scrap. Flow manufacturing back-flushes from the beginning of the line up to and through the operation being scraped.

If operation level scrap and back-flush is needed(available in Release 11*i* only), then it is necessary to update the operation sequence in the bill once the final balanced routing is designed.   See Chapter 4: Production Execution for more information regarding scrap in Flow Manufacturing.

If your products use the Mass Customization functionality, then it is required that the operation sequence in the bill be updated once the balanced routings are created. See Chapter 8: Flow Manufacturing and Mass Customization for more information on this functionality.

For Flow Manufacturing, the Operation sequence on the BOM = the event sequence on the routing.

When using kanbans, it may be necessary to update the sub-inventory and locator in the Material Control Zone of each kanban item. See Chapter 7: Kanban Planning and Execution for more information on this requirement.

Planning Setup

The setup objectives of Planning are to identify and create the appropriate planning tools which will apply expected demand to the product family structures, item

demand locations and item supply locations to calculate the flow line capacity and rates. To implement Oracle Flow Manufacturing it necessary to set up planning capabilities:

- Forecasting
- Master Demand Schedules/ Master Production Schedules (Optional)

Step 7: Setup Forecasting

Define the Forecast Set Name

Navigate to the Forecast Sets form to define the forecast set name and description.

(N) Material Planning > Forecasts > Sets

Save and select the Forecast Set Items tab to enter the Product Family to the forecast in the Item field. Select the Details tab to enter forecast entries for the Product Family.

Select the bucket .

> **Note:** If you use Demand time fences, then you MUST use Daily forecast buckets for the system to consume forecast properly.

Step 8: Setup Master Demand Schedules (Optional)

Define the MDS Name

Navigate to the Master Demand Schedules form to define the MDS name.

(N) Material Planning > MDS > Names

Define the MDS name and enter a description.

Copy Forecasts to MDS

Navigate to the Load/Copy/ Merge Master Demand Schedule form to copy forecasts to MDS.

Responsibility:Materials Planning

(N) MDS > Load/Copy/ Merge

Enter Parameters and select OK and Submit Request to tab to Load/Copy/ Merge.

Line Design and Balancing Setup Steps

Line Design and Balancing Overview

Prior to performing these set-up steps, see Chapter 4: Line Design and Balancing for a detailed discussion of the concepts behind linedesign in flow manufacutring.

In Line Design and Balancing, we will define items and inventory organizations, create the flow line, and set up the production synchronization tools to balance the line. The setup objectives of Line Design and Balancing are achieved through the successful implementation of:

- Items and Organizations
- Flow Lines
- Product Synchronization

Flow Line Definition Setup

The setup objective of flow lines is to define the flow line, production resources and departments. To implement Oracle Flow Manufacturing it necessary to set up:

- Flow Lines
- Resources
- Departments

Step 9: Setup Flow Lines

To create a Flow Line navigate to the Production Lines window.

(N) Flow Manufacturing > Lines > Lines

Flow Line Attributes

Flow Line Attribute	Meaning	Required or Optional in Flow Mfg	Comments and Suggestions
Flow Line Name	Detailed Description of the flow line	Required	Establish a naming convention for flow line names for your organization.
Description	Select a predefined Exception Set	N/A	
ATP Rule	Select a predefined ATP rule.	Optional	To implement available to promise, you begin by defining your ATP rules. ATP rules let you tailor the ATP calculation to suit your business needs. Each rule is a combination of ATP computation options, time fence options, and supply and demand sources to use during ATP inquiry. See Oracle Inventory Reference Manual.
Hourly Rates Min / Max	Set the minimum and maximum rate for this flow line.	Required	Enter the correct hourly rates. The maximum rate is times the hours of operation is the line rate used in scheduling.
Times	Specifies the hour the flow line starts and stops.	Required	Enter the correct time of day in hh:mm:ss format. Set both start and stop times exactly equal if your line runs for 24 hours.
Lead Times	Determine if the line is Fixed or Routing based.	Required	Enter Routing Based.
Fixed Lead Time	Determines the Fixed Lead Time for the line.	N/A	

Step 10: Setup Resources

Once the flow line is defined, the resources, events, processes and operations can be defined and assigned to the line.

Resource Objectives

Resources are set up to achieve three objectives:

- Define the Resources required on the flow line to be assigned to departments and to standard events.

- Assign Attributes to the Resources to meet the needs of your organization.

- Assign costs to the Resources.

Resource Function in Flow Lines

Resource in Flow Routings Resources represent the people and machines that perform the work on your flow line. Resources are assigned to events which describe specific work steps and associated times. Events are then assigned to processes in sequence. Processes represent generic activity and are assigned to flow routings.

Resources Setup Prerequisites Before you can define resources, set up your units of measure and unit of measure conversion rates. Units of measure you choose will depend on the type of business you are. If most of your activity is measured in hours, a suggestion is to set hour (UOM = HR) to represent the base unit. To setup the units of measure, navigate to the Units of Measure window, setup unit of measure conversion rates and set the Base Unit equal to the units you prefer. Set the site level profile option BOM: Hour UOM.

(N) Inventory > Setup > Units of Measure

This is a conventional setup and does not change in Flow Manufacturing. See Setup Organization in the *Oracle Inventory User's Guide.*

Setup Resources

Navigate to the Resources form to define the flow line resources:

(N) Flow Manufacturing > Lines > Resources

In the Resources form you will define the resources to be assigned to departments and to standard events. Enter the name and detailed description of the resource. A suggestion is to establish a unique business naming convention for resources for your organization to facilitate ease of use and clear communication. Set the Type to Person (labor) or Machine.

Resource Type and UOM The Resource Type identifies the type of resource Person or Machine. Set the Type to person (labor) or machine and set the unit of measure that describes how you measure the resource.

UOM: Be careful when assigning resources with different units of measure. Select a Unit of Measure that describes how you measure the resource. Only time units of measure have scheduled units. Use a time unit so it can be scheduled (ex: HR). You can only update this if the BOM: Update Resource UOM profile option is set to Yes.

Only time units of measure have scheduled units. Be careful when assigning resources with different units of measure. See Setup Departments below where resources are assigned to the department.

Charge Type The Charge Type determines how the resource will be charged. Use a charge type of WIP Move to automatically charge the resource in flow manufacturing upon work order-less completion.

Charge Basis The Charge Basis defines how resource usage is charged. Enter either Item basis or Lot basis. Item basis charges and schedules the resource when the resource usage quantity is the amount required per assembly unit you make (variable rate per item). Lot basis charges and schedules the resource when the resource usage quantity is the amount required per job or schedule (fixed rate per lot).

Apply Resource Costs

Oracle Responsibility Security You cannot view costing information if the Privilege To View Cost Information function is excluded from the your responsibility.

You cannot update costing information if, in addition, the Privilege To Maintain Cost Information function is excluded.

Apply Unit Cost Resource costs are optional. To apply costs to a resource, check the Costed check box on the Resources window. To cost the resource, enable standard rate if costed at standard.

Navigate to the Resource Cost window by clicking the Rate button on the Resources window to apply the resource Unit Cost

Select Pending, Frozen or other previously defined Cost Types

Enter the Resource Unit Cost, the resource's current standard cost per UOM.

Apply Overhead Cost Before applying Overhead Costs to a resource, define Overhead Cost Types. Navigate to the Resource Overhead Associations window by choosing the Overheads button from the Resources window.

Enter or select the cost type for the resource. The Allow Updates check box indicates whether the cost type is defined as updatable. Enter or select Pending, Frozen or other previously defined Overhead Cost Type to associate with the resource.

You cannot view costing information if the Privilege To View Cost Information function is excluded from your Responsibility. You cannot update costing information if, in addition, the Privilege to Maintain Cost Information function is excluded.

For a full description of costing options

■ see Oracle Cost Management User's Guide

■ see Oracle Bill of Materials User's Guide

Apply Resource Cost Attributes

Activity Use to allocate costs and/or group cost elements for reporting purposes; define activities in Oracle Cost Management. Activity is used in discrete manufacturing to charge based on transacting an activity and is optional for flow resource definitions.

Standard Rate Define whether the resource will be costed at standard cost (checked) or manually (unchecked). Flow resources are typically charged upon final assembly completion at standard and the Standard Rate should be Checked (Yes).

Absorption Account Absorption Accounts specify the account to accumulate resource charges based on positive resource transactions. Specify an account, using aliases to simplify the entry of account numbers.

Variance Account Variance Accounts specify the accounts to accumulate resource variance charges. Specify an account, using aliases to simplify the entry of account numbers.

Step 11: Departments and Department Classes

A flow department is an area within your organization that consists of one or more people, machines or suppliers where you want to collect costs, apply overhead and compare load to capacity. You assign a each standard process and event in a flow routing to departments, and assign available resources to the department.

On a flow line, employees are typically certified to perform multiple operations so they can flex up and down the line as needed, to ensure a smooth flowing line. Because of this movement, a suggestion is to define one department for the entire line and assign all line resources to it. If you choose to use multiple departments, make sure your resources are checked Shared in the checkbox. Shared enables the resource to be used in more than one department (flex).

The setup steps to create departments are:

- Define Flow Department Classes (Optional)

- Define Flow Departments

- Assign Resources to the Flow Departments.

- Assign material, labor and overhead (optional) costs to the Flow Departments.

Setup Department Classes (Optional)

Department classes are optional for flow manufacturing. Classes are more applicable to traditional cell based manufacturing where many departments exist and there is a need to group them for reporting purposes. Navigate to the Department Classes form to define Flow Department Classes.

(N) Flow Manufacturing > Setup > Bills > Department Classes

In the Department Classes window enter the department class and description, then select the Departments tab to display the Departments form listing departments assigned to this department class and Inactive dates when these departments can no longer be assigned to routing operations.

The department button is for view only. Assign department to departments classes using the Departments window.

Setup Departments

To define departments, assign resources and assign department overhead costs, navigate to the Departments form.

(N) Flow Manufacturing > Lines > Departments

In the Departments form:

- Enter a unique department name and description.

- Enter a department class to assign the department to the department class (optional).

- Assign a location (physical address) to the department.

- Save and click on the Resources tab to assign resources to the department.

Apply Department Costs

When you define a department, you specify any department overhead costs and the resources that are available. Assign material, labor, and overhead costs by selecting the Rates tab.

Apply Unit Cost

Select Pending, Frozen, or other previously defined Cost Types. The Allow Updates check box indicates whether the cost type is defined as updatable.

Apply Overhead Cost

Before applying overhead costs to departments, define the overhead cost types. Enter the previously defined overhead cost type, and the Overhead Rate or Amount for the department.

Assign Resources to Departments

You can enter multiple resources for each department. Departments can have multiple resources, shared resources, multiple shifts per resource, and capacity modifications for a resource shift. To assign a resource to the department, select a resource from the Resource form list of values

Resource Availability

Click on Available 24 Hours if resource is always available to this department.

Shared Resources

Click on the Share check box if the resource can be shared by other departments. Resources may be shared by several departments.

UOM

OUM determines how you will define time used on each event. Use minutes if most events are <1 hour. Use hours is most events are >1 hour.

Units Available

Refers to the number of resources available. Eg: If you enter 8, and choose 2 shifts, their are 8 resources available on each shift.

Check CTP

CTP, Capable-to-Promise, is a Release 11 functionality available to ATO, Assemble-to-Order, items. When CTP is enabled (optional for Flow Manufacturing), Order Management can include their resource capacity considerations when promising due dates to customers. You can flag a resource as a bottleneck by enabling the Check CTP radio button. The next time the concurrent process runs to build the CTP table, this resource will be added and OM can consider capacity constraints.

Multiple Shifts per Resource

For each resource, you can specify the shifts that the resource is available.

Specifying multiple resources here will distort resources available in the Mixed Model Map. If you define 8 resource units available, and specify 2 shifts, the mixed model map will show 16 resources available.

Only time units of measure have scheduled units. Oracle Work in Process (work order-less completions) prevents you from scheduling resources whose units of measure are not the same unit of measure class as the hour unit or measure and has no conversions defined to the hour unit or measure.

For a full description of resources and units, see the Oracle Bill of Materials Reference Guide

Product Synchronization Setup

Product Synchronization is an approach to defining the processes, and sequence of events within each process, to manufacture a product. The objectives of product synchronization are to organize the flow line activities and processes in balance with the resources to schedule smooth production while meeting daily demand.

At this point, you have defined the organizations, departments, resources, and items to be produced on the flow line. The objective now is to identify the route each item will pass through towards completion.

In order to implement these objectives through Oracle Flow Manufacturing you will define and set up:

- Standard Events
- Standard Processes
- Flow Routings
- Standard Operations

Step 12: Setup Standard Events (Optional)

Tthe Resources that have been setup will be assigned to Standard Events. Standard Events are set up to meet three objectives:

- Define the events required to produce the items on the flow line.

- Identify all events in the flow line and classify them as either value add or non-value add.

Assign resources to the Standard Events.

Standard Events are not required, events can be uniquely defined in the Routing window.

Define Standard Events

Before a standard event can be defined, be sure the flow line, resources and departments which will be associated with the events have been defined. Once these have been setup, navigate to the Standard Events window.

(N) Flow Manufacturing > Product Sync > Standard Events

At the Standard Events window enter the setup information required for flow manufacturing.

- Click on the New Record icon and select your flow line.

- Create and enter a Code to uniquely identify the standard event.

- Create and enter a Description for the event.

- Select the Department (use list of values to select) where the event will be executed.

- Select Optional if this event is optional for the purposes of Mass Customization.

- The remaining fields are optional and should be left as default for typical flow manufacturing events.

When entering similar events, use the "Duplicate Record Above" option from the edit menu to help speed data entry.

Assign Resources To Standard Events

To assign resources to events, in the Standard Events form select the Event Resources button. In the Resources window:

- Enter a Sequence Number

- Select a Resource (only resources assigned to the department specified in the Standard Events form will be displayed in the list of values)

    - Select Item or Lot as the basis for charging the resource.

If you choose Lot as the basis for charging the resource, it will temporarily be converted to Item when performing calculations in the routing.

- Enter Usage or Inverse in the Rate or Amount fields (enter one and the system will calculate the other). UOM defaults in from the department.

- Schedule the Resource (if it is along the main path of your event sequence)

Be sure to schedule all resources along your primary event path (leave parallel processes unscheduled). Unscheduled resources will be used in calculating the machine and labor time, but not the elapsed time or total product cycle time.

Step 13: Setup Standard Processes

Overview

Standard processes are generic activities that are used to group events of work into a specific sequence. Parts are pulled from one process to the other starting from the end of the flow line. Processes are used on flow routings to group events into a specific sequence.

Setup Standard Processes

Before you define a standard process for a flow manufacturing line be sure to setup and define the associated flow line and departments. Once the flow line and line routing have been defined, navigate to the Standard Process window to setup the standard process.

(N) Flow Manufacturing > Product Sync > Std Processes

In the Standard Processes window enter the setup information required for flow manufacturing:

- Select a Line identifier. Click the New Record icon and enter your flow line.

- Create and enter a Code to uniquely identify the standard process. This code will show up in a list of values when assigning standard processes to flow routings.

- Enter a Description and select the Department that performs the standard process.

■ Enter Standard Process Attributes, which are optional in flow manufacturing.

Standard Process Attributes:

Attributes	Comments	Is it Required for Flow?
Line	Flow line that the standard process will be performed on.	Required
Code	Code that uniquely identifies the standard process. This code shows up in a pick list when assigning standard processes to line routings.	Required
Description	Describes the standard process.	Required
Department	Specifies the department in which the standard process is performed.	Required
Minimum Transfer Qty	Optional, if entered, puts a minimum transfer quantity restriction on assemblies to move from one operation to the next.	N/A
Option Dependent	Not applicable for Flow (Options are determined at the event level)	N/A
Count Point	Defaults to checked (Yes)	Required
Autocharge	Defaults to checked (Yes)	Required
Backflush	Defaults to checked (Yes)	Required

Most of the optional attributes listed are related to detailed shop floor transactions. Flow lines typically have only one transaction, the work order-less completion transaction at the end of the line. Therefore, the optional attributes have minimal use and should be left as defaulted in most cases.

When entering similar processes, use the "Duplicate Record Above" option from the edit menu to help speed data entry.

Standard Process Functions in Flow Manufacturing Standard process are either referenced or copied to a flow routing in the same way standard events can be copied or referenced. Processes can be consistently used across product family flow routings.

Step 14: Setup Standard Line Operations

Standard Line Operations Functions in Flow Manufacturing

Standard operations are specific to a line and are typically used to balance the line after viewing the mixed model map. During line balancing, use standard operations to regroup events and balance the flow line. If you assign the operation code of standard operation in a routing, the standard operation information is copied into the operation you are currently defining. You can then un-reference and modify the operation information in your new operation.

Setup Standard Line Operations

Before you setup standard line operations, you must define at least one department. Navigate to the Line Operations wijndow to set up standard line operations.

(N) Flow Manufacturing > Product Sync > Standard Line Operations

Enter the required information to define standard operations in Oracle Flow Manufacturing:

- Enter the Flow Line.

- Create and enter a unique operation code to identify a Standard Line Operation Code and Description.

- Create and enter a Sequence Number.

- Enter the department where the operation is performed.

Line Operations Attributes

The remaining options are not required in flow manufacturing.

- Enter the minimum transfer quantity, if desired, of assemblies to move from this operation to the next.

- Indicate whether to backflush components on shop floor moves at this operation. A backflush transaction automatically pulls operation pull components from inventory. Leave this null in flow manufacutring.

- Work in Process also pulls all operation pull components at non-backflush operations preceding this operation.

- Select your Count Point and Autocharge options.

Assign Resources to Standard Operations

Do not assign resources to the operation. In flow manufacturing, resources are assigned to events, that are assigned to operations.

Step 15: Setup Flow Routing

Flow Routing Objectives in Product Synchronization

The objective of flow routings in product synchronization are to:

- Define the network of processes including feeder lines, rework loops, and the primary/alternate processes required to produce an item.

- Calculate the total product cycle time, the longest time path on the production line (including feeder lines) to make the product.

- Assign planning percentages to each of the operations, including primary/alternate operations, and rework loops, to use in the calculation of required material and resources.

- Relate the individual processes required to be applied to produce items in order in a method that facilitates product synchronization.

- Provide the means to manage flexible resource and SOE, sequence of events, to balance the flow line.

Flow Routing Functions in Flow Manufacturing

Flow routings define the processes an item passes through as it is completed. Flow routings may be created for product family members as well as items. For the mixed model map, only one routing for an item may be defined.

You may use attachments, such as OMS (Operation Method Sheets) for routing operations.

You may create a flow routing for a product family item, then copy it to the family members.

You can only select one routing for an Item to be included in the mixed model map.

Setup Flow Routing

Routings and flowroutings are assigned to items and product family members. When an item or product family member is requisitioned in the replenishment chain, the flow routing directs the item through the proper departments, standard

events, processes and line operations as it is pulled along the flow line to completion.

Routings may be assigned to product family members and items.

Before defining an item's flow routing, setup at least one department. While departments are optional for standard processes, at least one department must be defined for an item's flow routing. Then navigate to the Routings window to define the flow routing manually.

(N) Flow Manufacturing > Product Sync > Flow Routing

Enter the line and the item or product family member for which you are creating the flow routing in the Routings window. To copy from an existing flow routing, select the Tools menu (special menu in Release 11), select Copy Routing From and enter the item to Copy From. To create a new flow routing, enter the flow line for the flow routing.

Enter Flow Routing Total Cycle Time

The Total Cycle Time can be manually input or calculated by your application. Before performing the calculation, you must have entered all events and processes, set-up the network and calculated operation times. Then, select Calculate Total Cycle Time from the Tools menu (special menu in Release 11) (Tools menu in Release 11i).

To create a Non-Flow Routing for the same item, you must first navigate to Bills of Material.

You cannot create flow routings for planning or PTO, Pick-to-Order items.

Select Revision Date Periods

The Routings form has three alternate regions to apply the revision date effectivity to the Item's flow routing:

- All
- Current
- Future and Current

Select Events, Processes or Line Operations

Standard events, processes and line operations have been defined and are to be assigned to the item's flow routing by entering the Code and unique operation

sequence. The Routings window has three alternate regions to select the activity to be applied to the item's flow routing:

- All Events

- Processes

- Line Operations

Alternate or Primary Flow Routing

Define the routing as either an Alternate or Primary flow routing. For a primary flow routing, do not enter an alternate routing.

Primary Routing A primary routing is the list of operations most frequently performed to build a product. You can define one primary routing and many alternate routings for an item. When you define a new primary routing, you specify only the item (no alternate name) and you can assign a routing revision.

For example, you can define a routing for a time that includes two operations; an assembly and a testing operation. You typically build your product with these operations, so you define this routing as the primary routing for the item.

Alternate Routing You can define an alternate routing to describe a different manufacturing process used to produce the same product. Unlike a new primary routing, specify the item and alternate name to define an alternate routing.

You must define a primary routing before you can define alternate routings, and you can define any number of alternate routings for an item. For example, you have three test machines, one new machine capable of performing both test A and B and two older machines that can only perform test A or B. Ideally you would like to use the new machine that can perform both tests, but if it is unavailable, you use the other machines to complete the job.

Bills and Alternate Routings Bills and routings can share alternate labels. If you create an alternate bill with the same label as an alternate routing, components are assigned to operations on the alternate routing. If there is no routing with the same alternate label, components are assigned to operations on the primary routing.

CTP CTP, Capable to Promise, describes an available to promise calculation that considers both available material and capacity of manufacturing and distribution resources. You are able to define one and only one CTP routing for each item.

Add Standard Processes to an Item's Flow Routings

In the Routings window, change the alternate region from All Events to Processes to assign standard processes to the item's flow routing:

- Enter the Sequence. This sequence will determine the display order of the process in the mixed model map.

- Assign the Process Code and the Department name.

- Choose the events button and assign events to the process (optional). You can also assign events to processes in the "Add Standard Events" section below.

- Click the Operation Times alternate region and add a yield to the process (if applicable). Yield refers to the percent of good product that makes it through the process. The program assumes the remaining percent is scrapped during its calculations. You can enter in a yield for the operation at which the loss occurs, then have the program calculate the impact on prior operations/process/events using the "Calculate Operation Yields" option (after a routing network is completed)

- Iin the Operation Times region, enter in user labor and user machine times if you do not want the program to calculate those times based on the events assigned to the process.

Leave all other attributes as the defaults.

Add Standard Events to an Item's Flow Routings

If you didn't use the events button to define events for each process, follow these instructions. In the Routings window, select the All Events alternate region to assign events to the item's flow routing.

- Enter an Event Sequence which is unique for each Flow Routing. This is the sequence number to add to items on the BOM for accurate scrap back-flushing and Mass Customization options.

- Assign the Event Code and the Department name.

- Assign a the event to a process (if you didn't do so above)

- Enter an Effective and Disabled date range.

- Use the Event Resources button navigates to a form to verify that the information entered in standard events set-up steps is accurate and to revise or define Resource values.

- Choose option dependant if this event is dependant on the choice of an optional component. (By default, all events are option dependant.)

- Leave all other attributes as the defaults.

It is recommended to add yields at the process or operation level, and then calculate yields at the event level. If you add events at the event level, you must manually calculate the cumulative yield and reverse cumulative yields for all other events. In this case, the yield information will not be used in mixed model map calculations (but it will be used in kanban quantity calculations.)

Save the Event assignment to the flow routing.

Add Line Operations to an Item's Flow Routings

In the Routings window, change the alternate region from Processes to Line Operations to assign line operations to the Item's flow routing:

- Enter the Sequence. This sequence will determine the display order of the process in the Mixed Model Map.

- Assign the Line Operations Code and the Department name.

- Choose the events button and assign events to the process (optional). If you don't assign events here, do so by returning to the All events alternate region and assigning events to line operations.

- Click the Operation Times alternate region and add a yield to the process (if applicable). Yield refers to the percent of good product that makes it through the process. The program assumes to rest is scrapped during its calculations. You can enter in a yield for the operation at which the loss occurs, then have the program calculate the impact on prior operations/process/events using the Calculate Operation Yields option (after a routing network is completed)

All other attributes should be left as the defaults for flow manufacturing.

- Save the Line Operations assignment to the flow routing.

Routing Details (Button)

To include this flow routing in a mixed model map, select enable Mixed Model Map box from the Routing Details window.

If the item is a member of a product family, the Routing Details window specifies that the Item is a member of a product family. The field is read-only and will only contain data if an item is a member of a product family.

If you do not enable the routing for mixed model map, the routing will not be considered by the program when generating the MMM.

Routing Network (Button)

Release 11: To create a flow routing network, from the Routings winow, click the Routing network button. Select Processes or Line Operations from the pull-down menu and select a range of operations and sequence codes. Select their Connection Type, Alternate, Primary or Rework, and enter a percentage for the connection type and save.

Release 11i: To create a flow routing network, use the graphical flow routing designer to link operations.

Calculate Yields, Operation Times and Total Product Cycle Times

Once a routing network is defined, you can perform the line calculations. Yields and Operation Times can be viewed in the "Operation Times" alternate region on the routing.

■   Select Calculate Operation Yields from the Tools menu (special menu in Release 11) to calculate cumulative yield, reverse cumulative yield, and net planning percent. You can also enter these values manually.

Be sure to select Update Events if you want the program to calculate the cumulative yield, reverse cumulative yield and net planning percent (required for these values to impact kanban sizing)!

■   Select Calculate Operation Times from the Tools menu (special menu in Release 11) to calculated rolled-up operation and process times. You can also enter operation times manually.

■   Calculate the Total Cycle Time for the flow routing. To calculate this value, select Calculate Total Cycle Time from the Tools menu (special menu in Release 11).

Line Scheduling Setup Steps

Prior to performing these set-up steps, see Chapter 5: Line Scheduling for a detailed discussion of the concepts behind Line Scheduling for Flow Manufacturing.

The primary objective of line scheduling is to synchronize production with customer demand. This objective is achieved through the successful implementation of the Line Scheduling Workbench. To schedule your production, you must first setup the scheduling rules you will use to prioritize your demand for scheduling purposes.

Step 16: Setup Scheduling Rules

(N) Flow Manufacturing > Setup > Scheduling Rules

Define Scheduling Rules Window

Specify a Rule Name

If you are creating a custom rule, this value is user-defined. The following rules are provided in the system:

Mixed Model - mixed model by order request date

Level Daily Rate- level daily rate by order request date

Request Date- order request date with no leveling

Schedule Date - order schedule date with no leveling

Promise Date - order promise date with no leveling

Description

For rules you create, it is beneficial to have the name and description reflect the algorithm being used.

Enabled check box

This is a Yes/No flag indicating whether this rule is currently in use.

Default check box

This is Yes/No flag indicating if this is the default rule. The default rule is used unless it is overridden; there can only be one default rule for scheduling.

System Defined

This option button enables the region for rules using system provided algorithms and sequencing criteria.

Choose Desired Leveling Option   The system algorithm values in this box are:

No Level Loading—sequencing is calculated only by priority criteria

Level Daily Rate—the calculation is the ratio of total demand for each item, multiplied by the line rate

Mixed Model—daily demand is calculated from different products and different lot sizes

Choose Criteria Names to be Used in Sequencing   Enter one or more values in order of priority. For example, if you select Order Request Date first, and then Order Entry Date—the order with the earliest request date and earliest order entry date is scheduled first.

Order Entry Date

Order Priority

Order Promise Date

Order Request Date

Order Schedule Date

User Defined

This option box enables the region used to create your own rules. The name of the scheduling rule must equal the name of the API being called. See the Oracle Manufacturing, Distribution, Sales and Service Open Interface Manual for more details on APIs.

Production Execution Setup Steps

Prior to performing these set-up steps, see Chapter 6: Production Execution for a detailed discussion of the concepts Production Execution in Flow Manufacturing.

The primary objective of setting up production execution is to meet daily production requirements simply. This objective is achieved through the successful setup of Work order-less Production Setup Parameters. You can complete assemblies using the work order-less completions window without having to create a job or repetitive schedule.

Step 17: Setup WIP Parameters

(N) Flow Manufacturing>Setup>Bills>WIP Parameters

Update the tabs as follows:

Discrete Tab:

Default Discrete Class: Flow

Default Lot Number Type: Based on Inventory Rules

Respond to Sales order Changes: Always

Repetitive Tab:

Recognize Period Variances: All Schedules YES

Cancelled and Complete-No changes NO

Autorelease Days 0

Move Transaction Tab:

Require Scrap Account:N O

Allow Creation of New Operations YES

Allow moves over move shop floor status YES

Backflush Defaults:

Supply Subinventory: Enter Default Sub-inv**

Supply Locator Enter Default Locator (if rqd)**

Lot Selection Method Expiration Date

Lot Verification Exceptions Only

Intra-operation:

Queue: YES

To Move YES

Scrap YES

Run YES

Reject YES

Outside Processing:

Shop Floor Status for PO Move Resources N/A

Requisition Creation Time At Operation

Other:

Component ATP Rule: Standard

Default Over completion Tolerance %N/A

It is recommended to enter a default sub-inventory (and locator if you are using locator control) to guarantee proper accounting. This value is over-ridden by the sub-inventory on the item master or Bill of Material.

Step 18: Setup WIP Accounting Classes

Navigate to:

Flow Manufacturing > WIP > Setup > Wip Accounting Classes

1. Add Class Flow,

2. Type Standard Discrete, and then enter Valuation, Variance Accounting.

3. Save your work.

Step 19: Setup Material Transaction Processing

You must establish the method of transaction processing by setting the TP:INV Transaction Processing Mode profile. Generally, you will want to choose Background processing when using Flow Manufacturing. (Background processing Returns control immediately to you. With this option, Oracle Inventory processes transaction on a periodic basis via the Inventory Transaction Manager.) For more information on other values see the Oracle Inventory Users Guide, Setting Transaction Processing Profile Options.

Quality Plan Setup

In release 11*i* Oracle Quality Module has integrated its "Enter Quality Results" window with Work order-less transaction window. Users will be able to collect quality information as they are performing work order-less completions. Users can be required to enter quality results for the finished assembly, and have context information from the work orders-less completion window default into the quality collection plan before processing to complete the transaction. Different levels of alerts and work flow notifications are available as setup in the prerequisite steps.

Step 20: Setup Quality Collection Plan

(N) Quality>Setup>Collection Plans

See Oracle Quality Users Guide for additional information.

Kanban Planning and Execution Setup Steps

Prior to performing these set-up steps, see Chapter 7: Kanban Planning and Execution for a detailed discussion of the concepts Kanban and Flow Manufacturing.

An item pulled through the kanban system, rather than pushed by the planner, is called a kanban-released item, or simply a kanban item. The kanban location for a kanban item is the designated sub-inventory/locator where that item is stored and where replenishment is delivered. For every kanban item, there is a pull sequence - a series of kanban locations that models the actual replenishment network on the shop floor or through external suppliers, specifying the sequence to follow to obtain the kanban item.

The setup objectives of Kanban Planning and Execution are achieved through the successful implementation of the Flow Line Replenishment Chain.

Replenishment Chain Setup

The objective of setting up the Kanban Replenishment Chain is to execute the flow of the materials through the Line. The steps required to implement the replenishment chain are to set up:

■ Pull Sequence

■ Sourcing Rules

■ Assignment Sets

Step 21: Setup Pull Sequence

Pull Sequence

A kanban replenishment chain is defined using a pull sequence. The pull sequence is a tool used to link kanban locations to source types. The pull sequence defines the replenishment chain and links kanban locations to one of four source types designated for each kanban item:

■ Supplier - the kanban signal triggers a purchase request to a supplier.

■ Intra-organization - the kanban signal pulls material from a subinventory location within the same organization.

> **Note:** In Release 11, this feature can be used for planning only.

- Inter-organization- the kanban signal triggers an internal purchase request to another inventory organization.

- Production- the kanban signal triggers an internal WIP job or flow schedule.

> **Note:** In Release 11, this feature can be used for planning only.

> **Note:** Separate set-up is required for each type. See Chapter 7 for an overview of the specific requirements.

Define the Pull Sequence

To setup the Pull Sequence, navigate to the Pull Sequence Summary wi;ndow.

(N) Flow Manufacturing > Kanbans > Kanban Setup > Pull Sequences

Subinventory and Locator   Under the Source alternate region, enter the item and the item's kanban subinventory and locator.

At the first kanban in the pull sequence, the subinventory and locator must equal the subinventory and locator as the item is defined at the Organization Item level for WIP Supply or in the Material Control region of the parent item's Bill.

Define Source Information The first goal is to link the Item to its replenishment source. Oracle Flow Manufacturing helps you define the kanban locations for each item along with the supply source information. Select one of the four Source Types with the appropriate source and location:

Supplier Type Select Supplier Source Type if you intend to have the kanban replenished by a outside supplier. A supplier kanban triggers a purchased request to a supplier.

- Select Supplier to enter the supplier name and Select Supplier Site to enter the supplier site. (Or leave both fields blank to have the program assign them via a sourcing rule when it creates the purchase requisition.)

Intra-Oraganization Type Select Intra-organization Source Type if you intend to have the kanban replenished by a subinventory/locator within the same inventory organization. An Intra Org kanban will be replenished by another kanban, subinventory, or locator within the same inventory organization.

- Choose the subinventory within the same inventory organization that will replenish this kanban location.

- If the subinventory above has locator control, either pick or enter a locator depending upon pre-specified or dynamic entry control.

- Choose the locator within the same inventory organization that will replenish this Kanban Location. (if under locator control)

Intra Organization and Production kanbans are for planning only in Release 11. (They can be sized and cards can be generated, but you cannot transact any move orders or schedules)

Inter-Organization Type Select Inter-organization Source Type if you intend to have the kanban replenished by another inventory organization. An Inter-Org kanban will be replenished through the use of an Inter-Org transfer.

- Enter the replenishing inventory organization, subinventory, and locator.

Production Type Select Production Source Type if you intend to have the kanban replenished by a WIP job. A production kanban triggers an internal WIP job to replenish the kanban

- Enter the line on which to generate a flow schedule or discrete job.

Enter Kanban Sizing Info

Kanban Size
Under the Kanban alternate region, choose whether the program will calculate either the Kanban Card Size or the number of kanban cards. Use the drop-down menu to select one of the following:

- Kanban Size -- you will enter the number of kanban cards, and the kanban planner will calculate the kanban size.

- No of Cards -- you will enter the size of the kanban, and the kanban planner will calculate the Number of Cards.

- Do not calculate - you will enter both the size and the number of cards and the planner will not calculate either.

Minimum Order Quantity (Optional)

- Enter a quantity that represents the minimum number of units you want the kanban planner to recommend should demand for the item fall below this minimum.

Enter Planning Attributes

- Enter the lead time in days. This is how long it will take to physically replenish the kanban. For example, if you enter two (2), the kanban planner will increase the size of the kanban by 2 times the average daily demand.

Enter the Allocation %. Enter a whole number representing the percentage of demand for the item distributed to this kanban.

Enter the Fixed Lot Multiplier. When net requirements exceed the lot multiplier quantity, the kanban planner suggest a kanban size with an quantity that is a multiple of the lot multiplier quantity.

Enter Safety Stock in terms of Days. Enter the number of days daily demand that should be added to the kanban for safety stock.

Supply Chain Management

You may enter the Supplier / Supplier Site on the Pull Sequence. If you have completed the pull sequence setup with the proper Supplier / Supplier Site information, then it is carried over to the requisition via the Req Import process. However, if you do not enter the Supplier and Supplier Site information on a pull sequence and a replenishment signal is generated, then the resulting requisition can pull the source information from a valid source document.

See the Oracle Purchasing Users guide for more details on the use of sourcing rules, assignment sets, and blanket POs.

3

Demand Management

Overview

The goal of demand management is to define the anticipated market share percentage in terms of a product mix. Once the product mix is defined, the products can be grouped into families based on the communality of processes that they go through.

After families are created, usually one per line, the production lines are designed to build all the items in that family in a mix model basis. Oracle Flow Manufacturing enables you to analyze demand, group products into product families, and manage demand on a day by day basis. You should be able to:

- Determine your demand planning method.

- Understand your Demand and Product Families

- Create Product families to group products with common processes.

- Create a forecast to use for designing your line and kanbans.

- Create MDS/MPS and MRP plans as required for long term planning.

The Role of Forecasts, MDS, MPS and MRP in a Flow Environment

In a simple flow environment, a long term forecast is used to design the line, design your kanban sizes, and do capacity planning (via the Mixed Model Map). Then, the execution system (line scheduling, MMM, work order-less completions, and kanbans) runs the shop based on actual customer orders.

MDS/MPS and MRP are not required to run the daily activities of the shop floor, or to do Rough Cut Capacity Planning. However, an MPS or MRP plan should be used to get long term visibility of component requirements for kanban items. This plan may be communicated to trading partners via a supplier schedule built from

planned orders, or WEB inquiry. The plan can also be compared to your kanban design to give planners a early warning of changes that will affect their kanban plan.

Other reasons you may use MDS or MPS:

- You operate in a mixed-mode environment, and you want the MPS to release production for non-Kanban items, or create planned orders for discrete production lines operating in the same organization.

- You want to schedule planned orders to compensate for seasonal industries, spares or internal requisitions.

- You are using Advanced Planning and Scheduling (APS) to optimize your flow schedules.

Process Flow

To understand your demand and create the product families, you must follow these steps:
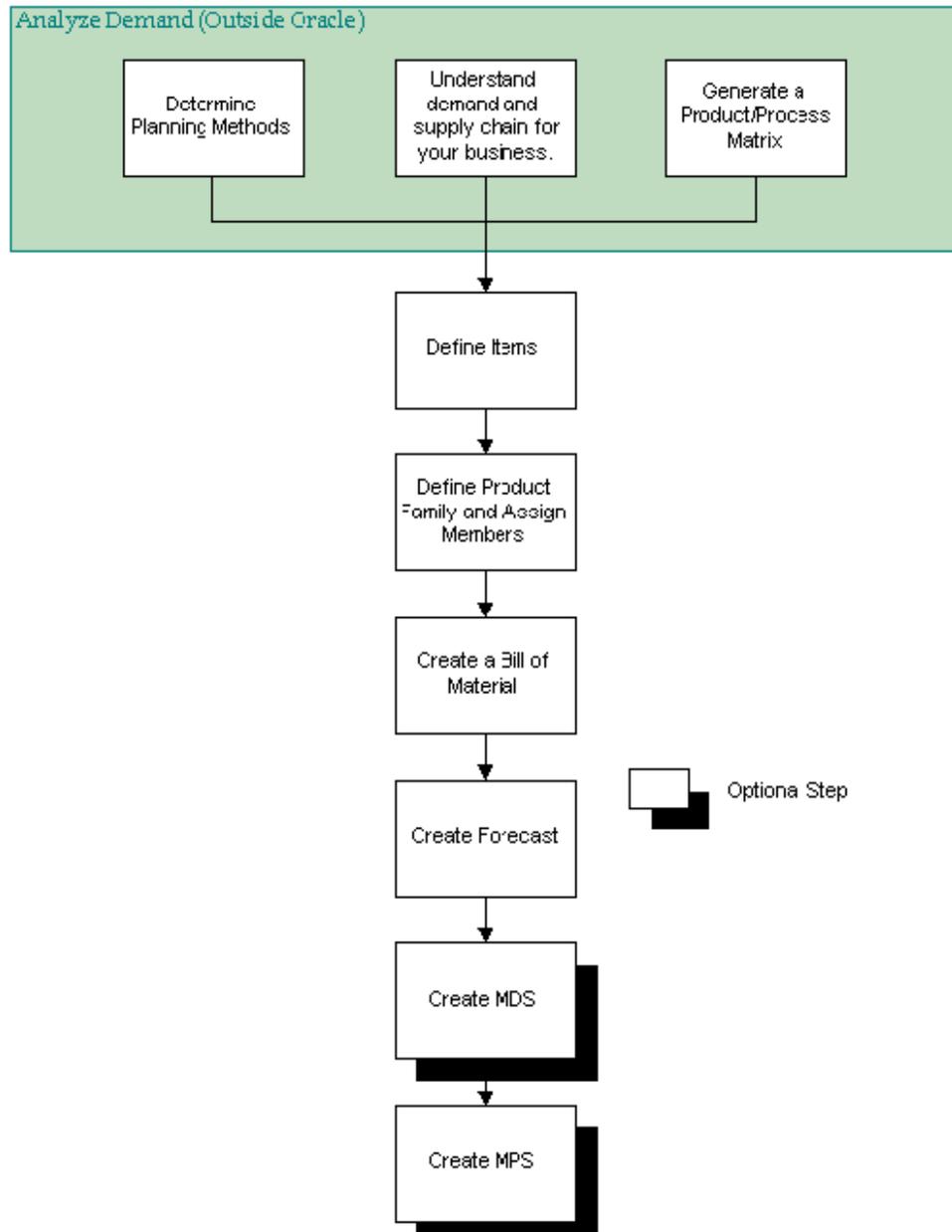
Analyze Demand (Outside Oracle)

Determine Planning Methods	Understand demand and supply chain for your business.	Generate a Product/Process Matrix

↓

Define Items

↓

Define Product Family and Assign Members

↓

Create a Bill of Material

↓

Create Forecast

Optional Step

↓

Create MDS

↓

Create MPS

Process Steps

The following sections describe each of the process steps listed above.

Determine Planning Method

Oracle Applications provides three distinct methods for managing the planning of products or end items:

- Manage products entirely <u>independently</u>
- Manage products independently, but reduce data entry and gain aggregate reporting using <u>forecast explosions</u>
- Manage products aggregately using production planning <u>and two level scheduling</u>

The method you choose will determine how to set-up item attributes for your flow items. Generally, when using Flow Manufacturing it is recommended to use two level scheduling to simplify maintenance and improve accuracy of your forecasts. A detailed discussion of each method follows, including the attributes that enable each method, the advantages and disadvantages, and some suggestions as to where each method is applicable.

Independent Management

To manage products independently, simply enter forecasts directly for each item. These forecasts can then be combined with sales orders to generate an MDS. The MPS can be calculated from the MDS by launching MPS, or MPS entries can be entered using the Enter MPS Entries window. Setting the item attribute Forecast Control in the MPS/MRP Planning region to **Consume** will cause forecasts to be consumed as sales orders are entered. This enables the measurement of forecast accuracy by comparing the forecast to forecast consumption.

Advantages   The primary advantage to independent management is simplicity. No research into relationships between products is necessary, and no setup of planning BOM's is required.

Disadvantages   All other things being equal, independent management will be the least efficient method, will require the most data entry and maintenance, will have the most forecast error and variability, will have the highest inventory investment, and the lowest customer service level.

Applicability   Independent management is most applicable in an environment where there is a small number of high volume products with little or no similarity

between products. This method is not applicable at all with configured items, as by definition there are no independent products to plan.

Forecast Explosion

To manage products and options independently, but gain aggregate reporting and reduce data entry use the following process:

1. Aggregate similar products. Establish models for configured products and product families for standard products. Methods for doing this are described in the Generate Product and Process Matrix section.

2. Determine the percentages to be used on the planning BOM's. This is typically done by analyzing sales history. Depending on the amount of variability and change over time, pick the time period to analyze. Divide the quantity of each specific product or option by the total quantity of the model or product family to get the ratio. This number expressed as a decimal quantity is the QPA that should be entered when adding the member to the product family or an option to the planning BOM.

3. Establish product family member bills and model bills using the numbers gathered in step 2.

4. Set the item attribute Forecast Control in the MPS/MRP Planning region to **consume** for each of the models and product family items.

5. Set the item attribute Forecast Control in the MPS/MRP Planning region to **consume and derive** for each of the options and product family member items.

6. Enter forecasts for the models and product families.

7. Explode the forecasts for models and families to the options and members by running the Copy/Merge Forecast process and setting Explode? to yes.

8. Run planning. (this includes generating an MDS, defining plan names and options, launching a plan, etc.)

Setting the members to consume and derive is the key attribute for the planning process. This communicates to the planning process that forecast explosion is being employed. When Oracle MPS/MRP or Oracle Supply Chain Planning plans for an item with the forecast control attribute set to **consume and derive**, the assumption is made that forecast explosion has been done. Dependent demand **will not** be passed from models or product families to items with this attribute setting. Demand for the options and family members will be calculated based on unconsumed forecast for options and family members, and sales orders for configurations and

the specific family members. See the example below for an illustration on this concept.

Assume a new order comes in for 50 of Part C. Allocation percentages are shown next to the item number:

Family	Forecast	100
	Customer Orders	50
	Production Plan	100
	ATP	50
A (50%)	Forecast	50
	Customer Orders	0
	Greater of forecast or Orders	50
B (30%)	Forecast	30
	Customer Orders	0
	Greater of forecast or Orders	30
C (20%)	Forecast	20
	Customer Orders	50
	Greater of forecast or Orders	50
Total lower level demand		130

Forecast will be consumed at both the family or model level, and at the family member or option level. Forecast accuracy reporting can be done at both levels.

Advantages   Forecast explosion minimizes data entry while allowing individual management of products. It also provides for aggregate reporting.

Disadvantages   Compared to two level scheduling, forecast explosion will have the higher forecast error and variability, will have higher inventory investment, and typically provide a lower customer service level.

Applicability   Forecast explosion should be chosen over two level scheduling whenever there are significant constraints caused by components or resources used by specific products or configurations that make it impossible to treat the product family members or configurations as equivalent for planning purposes.

Two-level Scheduling

To manage products and options aggregately use the following process.

1. Aggregate similar products, and establish models for configured products and product families for standard products. A method for doing this is described in the Generate Product and Process Matrix section.

2. Determine the percentages to be used on the planning BOM's. This is typically done by analyzing sales history. Depending on the amount of variability and change over time, pick the time period to analyze. Divide the quantity of each specific product or option by the total quantity of the model or product family to get the ratio. This number expressed as a decimal quantity is the QPA that should be entered when adding the member or option to the BOM.

3. Establish product family bills and model bills using the numbers gathered in step 2.

4. Set the item attribute Forecast Control in the MPS/MRP Planning region to **Consume** for each of the models and product family items.

5. Set the item attribute Forecast Control in the MPS/MRP Planning region to **None** for each of the options and product family member items.

6. Enter forecasts for the models and product families.

7. Run planning.

Again, the forecast control attribute is the key. When Oracle MPS/MRP or Oracle Supply Chain Planning plans for an item with the forecast control attribute set to **None**, the assumption is made that forecast explosion has not been done. Dependent demand **will** be passed from models or product families to items with this attribute setting. Demand for the options and family members will be calculated based on unconsumed forecast for models and product families, and sales orders for configurations and the specific family members. The unconsumed forecast for the family or model will be multiplied by the QPA on the planning BOM to determine the amount of demand (production forecast) to pass as dependent demand to the family members or options.

An assume a new order for 50 of part C is received. Allocation percentages are the same as above, however, this time the remaining demand is distributed according to the allocation percent.

Family	Forecast	100
	Customer Orders	50
	Production Plan	100
	ATP	50
A (50%)	Production Forecast	25
	Customer Orders	0
	Total Demand	25
B (30%)	Production Forecast	15
	Customer Orders	0
	Total Demand	15
C (20%)	Production Forecast	10
	Customer Orders	50
	Total Demand	60
Total lower level demand		100

Advantages Compared to independent management of products, two level scheduling will typically result in higher efficiency by reducing data entry and maintenance, more control by reducing the number of items planners have to manage and increasing the time per item that can be spent in managing the plan, more accurate planning by improving forecast accuracy and reducing variability, lower inventory investment due to the increased planning accuracy, higher capacity utilization due to the increased planning accuracy, higher customer service due to dynamically allocating material and capacity to product mix, more flexible ATP by promising at the family level, and lower overall manufacturing costs due to all of the above.

Disadvantages   Relationships between products needs to be determined, and maintained (planning bill creation and maintenance). Shortages of unique components or resources could invalidate promises made against the family plan.

Applicability   Two level scheduling is applicable whenever groups of products are similar enough in design and manufacture to be considered equivalent for planning purposes. Similar enough being defined as: sharing many common components, sharing many common resources, components and resources can be reallocated to products or configurations, and unique components or resources are not typically bottlenecks.

Understand Demand and Supply Chain for the Business

Prior to implementing the Oracle Flow Manufacturing package, it is extremely important to understand the forecasted market demand for the products. Upper level management must be involved in defining a market share strategy for the business and marketing has to provide a product mix definition that represents that market share vision.

All possible channels of demand must be clearly understood and demand fences with both customers and suppliers must be negotiated.

Once the Demand is gathered, the data can be loaded into a forecast to design your line, size your kanbans, and determine resource needs of your facility.

Managing Demand to within Flexible Tolerance Fences

If you are using Oracle APS, you may consider implementing Flexible Tolerance Fences to protect your Flow Lines. Production and Sales decide the maximum amount of each product (Design Volume) the flow Line will produce and the flexing percentages that can occur. The normal daily running rate and the upper flexible tolerance fence is then entered during line definition. APS will use both when determining planned flow schedules for your line. You can also add tolerance fences to your suppliers to aid in planning material constraints to your line.

As shown below, percentage adjustments to the daily rate (flexing) are allowed within the Flexible Tolerance Fences. As time moves out, more flexing can occur. This gradual throttling (up or down) protects the Flow Line from the violent jerking of the daily rates. The normal daily running rate and the upper flexible tolerance fence is then entered during line definition. APS will use both when determining planned flow schedules for your line. You can also add tolerance fences to your suppliers to aid in planning material constraints to your line.

Generate Product and Process Matrix

It is necessary to determine your product families and percent allocations prior to entering data into Oracle Flow Manufacturing.   The objective of this step is to define the process commonality for all products to define product families. Each family should have members that go through similar processes. You should be able to:

- List all your products
- List all the processes that each product goes through
- Define Product Families for those products that share common processes.

The matrix shown below is an example of a product / process relationship. Use this matrix to identify those products with common processes that can be grouped into individual families.

	Proces s 1	Proces s 2	Proces s 3	Proces s 4	Proces s 5	Proces s 6	Proces s 7	Proces s 8
Item A	X	X	X	X		X		
Item B	X	X		X		X		
Item C	X		X	X		X		
Item D	X	X	X			X		
Item E					X	X	X	X
Item F					X		X	X
Item G					X	X	X	

In this case, Items A-D seem to be one product family, Items E-G could be a second.

Define Items

Chapter 2 explained how items should be created in Oracle Flow Manufacturing. When defining Standard items that are to be planned and scheduled on a Flow Line, the following attributes are especially important. Note that all other attributes are active.

Group	Attribute	Attribute Setting

BOM	BOM Allowed	Y
BOM	BOM Type	Standard
INV	Stockable/Transactable?	Yes to both
MRP	Forecast Control	Set to either None or Consume and Derive [1]
MRP	Planning Method	Set to either None, MPS or MRP
MRP	Release Time Fence	Set to KANBAN Item: Do Not Release [2]
MRP	Demand Time Fence	User Defined. Enter the number of days between items takt and Quoted lead time. [3]
WIP	Build In WIP	Y
WIP	Type	Assembly Pull
WIP	Sub-inventory / Locator	This is the location that will be depleted when back-flushing transactions are posted. It can be overridden on the Product Structure.
OE	Internal Order?	Yes if replenished from another organization

1. See above discussion on Demand Planning Method at the beginning of the chapter.

2. Setting attribute to Kanban Item: Do Not Release will ensure planned orders for kanban items are not released to either production or suppliers. If you do not intend to use kanban, choose the appropriate option for your business.

3. Using the Demand Time fence in an MPS

In flow manufacturing, building to actual customer orders is a fundamental principle. Using the Demand Time Fence feature of Oracle Planning, you can eliminate forecasts from the near planning horizon.

Set the Demand Time fence, by item by organization, and the length should be set product cycle time and the lead time quoted to the customer.

> **Note:** If the demand time fence is used, then daily buckets must be used for forecast and MPS in order for the system to consume forecast properly.

Define Families and Assign Members (Optional)

The objectives of this section are to define the product families and to assign members to each product family with the corresponding demand allocation percentage. You should be able to:

- Understand what a product family is
- Understand how a Product Family differs from a planning bill of materials
- Set-up Product Family Profile Option
- Create a Product Family
- Assign Product Family Members
- Confirm the Automatic Category Sets Assignment

Product Family

Families are groups of products with similar manufacturing processes, and is similar to a planning bill of material. Flow lines are designed around these families (mix). Processes, events, and line operations are defined with flexible resources to handle the variations that occur within a family mix.

Families can be defined in Oracle manufacturing as a special type of item called product family. Items defined using this type should be recognized by other products as a type of item that does not physically exist, but is used to group other items (products). To define a product family in Oracle means use the product family template.

Product Families Differ Versus Planning Bills

Product families are different from planning bills in the following ways:

- Product family forecast is consumed by member item sales orders.
- Planning bills add their components in the Bill Define window, product family members are assigned in the Assign Members window.
- Planning bills distribute their forecasts based on Planning % in BOM, product families distribute their forecasts based on Allocation % at the product family member window.
- Product family member allocations can be phased in with effectivity dates, planning bill components Planning % can change with ECO implementation.

Product families are like planning bills in the following ways:

- Both are non-buildable items
- Both group items for forecasting purposes
- Both are used to enter forecasts
- Both will explode their forecasts to their member items

Set-up Product Family Profile Option

Responsibility: System Administrator

Navigation: Profile Options > System

Search for the profile option: INV: Product Family Item Template Name, and set it to Product Family for both the site and the Flow Manufacturing application.

Create Product Family

Navigation: Flow Manufacturing > Products & Parts > Product Family

Use the Product Family window to define all product families. Oracle stores product family names as items in the item master. To define a product family in Oracle means you use the product family template. The template is applied automatically when navigating from the products and parts —> product family menu path.

Product family member items must be defined as Standard (or Flow Finished Goods) items, first in the Master organization and then assigned to each organization that will be selling and building the product family members. Use the Product Family template that defaults into the window when defining the product family.

The Product Family template will automatically seed the following three required attributes:

■   User Item Type= Product Family

■   BOM Allowed= Yes

■   BOM Type= Product Family

Add Members to Product Families

Navigation:Flow Manufacturing > Products and Parts>Product Family Members

Nnote that the window used to add members to Product Families is NOT the same window used to add members to Planning Bills. This window serves two purposes, to add members to Product Families, and to assign the forecast allocation percentage each member will receive. Forecast allocation percentages can be time-phased into the forecast explosion via effectivity dates.

Product Family Member Attributes

Attribute	Meaning

Product Family	Query Find predefined Product Family Item Number
Description	Defaults from Product Family
Member Item	Enter Flow Assemblies
Item Master Attributes	Defaulted from Item Master and display only
Allocation Percent	% of Product Family Forecast that will be allocated to this item per forecasting period
Effectivity Start	Start date of allocation percent
Effectivity End	End date of allocation percent

Allocation Percentages Similar to a planning bill, the product family structure lists its members, and the forecast allocation percentages. Through product families you can define allocation percentages to family members. These allocation percentages may be time-phased using effectivity dates.

> **Note:**   The total allocation percentage between members DOES NOT have to total 100%. Any unallocated product family forecast will not be taken into account. So if product family forecast = 100 and member allocations total 80%, then the extra forecast demand of 20 will not be considered in downstream processing.

> **Note:**   A item can only be a member of ONE Product Family.

Confirm the AutomaticCategory Set Assignment

Navigation:Flow Manufacturing > Setup > Items > Categories > Category Codes

When you create and save the product family, a corresponding category code will be added to the seeded category set 'Product Family'. Each product family corresponds to an item category. A new category is added to the category set "Product Family" for each product family that is defined. The relationship between the product family item and the product family category set is established by the equality of their concatenated key flexfield segment values. The category within the product family category set has the same name as the product family. The category

code is equal to the product family item number and can then be used for all reports that select and sort by category code.

To confirm:

- Select Category Codes
- Query Find the Structure Name "Product Family"
- Locate your product family item under the category column

> **Note:** If the category is not added to the category set then you will be unable to add member items later.

> **Note:** Deleting an item does not delete the category from the category set, you must do this manually.

> **Note:** If the item number is changed once saved (something you can do in Oracle) then the new item is not added to the category set and again you will not be able to add members.

Create Forecast

A forecast shows predicted future demand for items over time. The objectives of creating a forecast is to gather all the demand that will be used to represent the future in order to design the line and calculate the kanbans. At this step in the implementation you should:

- Create the forecast
- Determine the Planing Schedule to use
- Explode the forecast for the product family

Prerequisite: Create Forecast Sets

Forecast sets are used to group one or more forecasts. Each regional forecast contains specific forecasts for product families, family members, and spare parts.

Before you define a forecast, you first define a set. Forecast Sets:

- Group complementing forecasts that sum to a meaningful whole

■ Group forecasts that represent different scenarios.

You can associate a forecast to one forecast set only.

Some forecast set information--such as forecast level--defaults to the forecasts you create within the set. You can keep or override these defaults for a specific forecast.

Creating a Forecast Set

1. Navigate to the Forecast Sets window.

2. Enter a unique name.

3. Select a bucket type to group forecast entries by days, weeks, or accounting periods.

4. Select the level that determines how forecasts in the set are defined and consumed.

5. Ship-To: Item, customer, and shipping identifier

   ■ Bill-To: Item, customer, and billing identifier

   ■ Customer: Item and customer

   ■ Item: Item. Without Oracle Order Management or Oracle Receivables, this is the only option you can choose.

   ■ Select consumption options.

      If you turn consumption on, sales orders consume forecast entries in this set.

      The outlier update is the maximum percentage of a forecast entry that a single sales order can consume.

      Forward and backward days describe the number of work dates from the sales order schedule date that forecast consumption looks backward or forward for a forecast entry to consume. Non-workdays are not counted in these calculations.

6. Save your work.

You can now define one or more forecasts for this set.

To Disable a Forecast Set

> **Note:** You can view disabled forecasts but not modify them.

■ Enter a disable date. After this date, you can no longer define a forecast name for the set.

Defining a Forecast

Prerequisites: Define at least one Forecast Set.

(N) Material Planning > Forecast > Sets (B) Forecast Set Items

1. Navigate to the Forecast Sets window.

2. Query a forecast set.

■ Enter a unique name for the forecast. Each forecast inherits the forecast level, consumption options, and other defaults defined for the set. You can override these defaults for each forecast name in a set.

■ Choose the Forecast Items button to open the Forecast Items window. The items to be forecasted are added to each Forecast name. In Flow, this is typically the product family product. You can also add forecasts for any other item, to cover such things as spare part inventories.

> **Note:** You can choose the Folder menu to customize your display.

3. Choose the Detail button to open the Forecast Entries window.

■ Select a bucket type. You can forecast with daily buckets in the short term, weekly buckets in the midterm, and periodic buckets in the longer term.

■ Enter a date. This is typically the date you expect to ship the item or the beginning of the week or period that you expect to ship the item.

■ Enter an optional End Date. This creates forecast entries of the same quantity for each day, week, or period until the end date. A forecast entry without an end date is valid just for the date and time bucket specified.

■ Enter a current quantity. This also becomes the original quantity and the total. Forecast consumption reduces the current quantity. Forecast consumption plus the current quantity equals the total.

- Enter an optional confidence percentage that the forecasted item will become actual demand. Oracle Master Scheduling/MRP and Supply Chain Planning multiplies this percentage by the forecast quantity when you load it into a master schedule.

- Enter the Flow Line where the Product Family is to be built.

    Note: If left blank, the Flow Line will be derived from the routing.

- If you are working in a project environment, enter a valid project and task reference. After entering a valid reference, you can select a price list and an average discount in the flex-field.

- If you are working in a project-based or Seiban environment, you can include project/Seiban and task references to your forecast entries if organizational parameters allow. These references will accompany forecast copies, loads, merges, and explosion.

4. Save your work and close the window

Consumption Button Forecast consumption relieves forecast items based on the sales order line schedule date. When an exact date match is found, consumption decrements the forecast entry by the sales order quantity. Other factors that may affect the forecast consumption process are backward and forward consumption days and forecast bucket type.

> **Note:** When you create a product family forecast, then both the product family and the member item (on the sales order) forecast will be decremented as described in Determine Planning Method at the beginning of the chapter.

See the Oracle Master Planning/MRP Users Guide for more information on other options when setting up a forecast.

Forecasting Product Families
Forecasts for Product Families are created like any other manual forecast. You must:

- Create a forecast set.

- Create one or more forecast names.

- Add product family items to forecast names.

Note: You can add forecasts for any item, along with product family forecasts.

Note: Optionally, assign product family forecast entries to a specific flow line. If left blank, then the system will look for a line routing to determine the line.

Note: Optionally, you can assign product family forecasts to a project if Project Manufacturing is enabled in the organization.

Master Demand Schedule (Optional)

The MDS is a statement of demand and contains details of the anticipated shipment schedule. You can consolidate all sources of demand into a master demand schedule to represent a statement of total anticipated shipments.

In Flow Manufacturing, the MDS may be used for visibility to actual customer demand and inter-org transfers beyond the current flow scheduling horizon. The master demand schedule also provides an extra level of control that enables you to view and modify your statement of demand before creating a production plan or MRP plan. If desired, a flow line can be balanced from the MDS, as kanban requirements can be calculated from the MDS. You can use the time-phased master demand schedule as input to the master production scheduling process or the material requirements planning process.

Some of the demand types that the MDS considers are:

- Item forecasts
- Spares demand
- Sales orders
- Internal requisitions

Define a MDS Plan Name

(N) Material Planning >MDS > Names

1. Enter a plan name.

2. Enter a plan description.

3. Save your work.

Loading a Master Schedule

(N) Material Planning > MDS > Load/Copy/Merge MDS

The MDS is next loaded with forecasts, sales orders, and inter-org orders. Optionally, you can manually enter additional independent demand entries directly into the MDS.

1. Choose one of the following source types:

    -   Specific Forecast

    -   DRP inter-org orders

    -   Another MDS schedule (if consolidating)

    -   Source Code (predefined to pull any of the above)

2. In the Parameters window, enter :

    -   Your MDS plan name

    -   **Source Type** Select a Source type (generally forecast)

    -   **Organization** Select a source organization.

    -   **Source name** Select your forecast. The list will be restricted by the source type you chose.

    -   **Start date and a cutoff date** Select a start date and a cutoff date.

    -   **Include** Sales Orders (both internal and external)

3. Save your work.

Create a Master Production Schedule (MPS)

> **Note:** You do not need an MPS to perform MRP explosions.

> **Note:** MPS is required to perform ATP checks in Release 11.

The MPS is a statement of supply required to meet the demand for items contained in the MDS. The master production schedule defines the anticipated build schedule for critical items. An effective master production schedule provides the basis for order promising and links the aggregate production plan to manufacturing by specific items, dates, and quantities.

> **Note:** Master Demand Scheduling (MDS) and Master Production Scheduling (MPS) have similar windows and functionality, so the documentation often refers to the more generic term, master scheduling. This document may use the term master scheduling to refer to Master Demand Scheduling or Master Production Scheduling.

Supply Chain Planning users can also run a multi-organization MPS and create Distribution Requirements Plans (DRP) from an MPS.

Creating the Master Production Schedule

Define Plan Name and Options

(N) Material Planning > MPS > Names

1. Enter an MPS plan name.

2. Enter an MPS plan description.

3. Select the Production checkbox.

4. Save your work.

5. Select the Options button.

6. Enter the MPS plan name.

7. Enter the MDS schedule name.

8. Optionally select Planned Items to be restricted the MDS items by selecting Demand Schedule items only option.

9. Choose the (B) Sub-inventory Netting - select nettable inventories.

10. Save your work.

Launching the MPS Plan

You can launch the planning process for a material requirements plan (MRP) or a master production schedule (MPS).

> **Note:** If you're using the Drop Shipment feature of Order Management and Purchasing, you've set up logical organizations for P.O. receipts. Do not use these logical organizations for planning purposes.

Supply Chain Planning users can also launch a DRP and supply chain MRP and MPS plan. Supply Chain Planning users should refer to Launching the Supply Chain Planning Process for further instruction.

Prerequisites

Before you can launch the planning process, you must:

■ For MPS or MRP: define at least one master demand schedule or master production schedule.

■ Define at least one master production schedule and create at least one MRP name.

▶▶ To Launch a Planning Process

1. Navigate to the Launch MPS or Launch MRP window.

2. In the Parameters window, select a plan name and launch options.

> **Note:**   If you enable the Standard Planning Engine, you can also enter Yes or No to launch the exploder. If you enter Yes, you must also launch the snapshot and the planner. If you enable the Memory-based Planning Engine, Launch Exploder is not available and you must launch the Planner if you enter Yes to launch the Snapshot.

- **Anchor Date** Enter a date, earlier or equal to the current date, that will act as a start date for repetitive planning periods.
- **Plan Horizon** Enter a date, greater than the current date, up to which the planning process creates an MRP or MPS.

The default horizon is the current date plus the number of offset months set in the profile MRP:Cutoff Date Offset Months.

> **Note:**   You may want to enter a date earlier than the default to save processing time or to cut down on the volume of information generated.

3. Choose OK.
4. In the Launch window, choose Submit.

Rough-Cut Capacity Planning (Optional)

Generally, RCCP is not needed in a Flow Manufacturing environment since you use the Mixed Model Map to analyze capacity. However, it is available if desired.

To do so: Launch Rough-Cut Capacity Planning as part of your MPS planning run. As part of RCCP resource requirements for product families can be calculated either by:

1. Rolling up resources from member items and their components OR
2. Defining routing for the product family.

You should do either 1 or 2 but not both. Doing both will result in double-counting the resource requirements.

Available to Promise

Member Available to Promise

ATP (member item) = MPS(member item) - SO(member item) + WIP jobs(member item) + PO(member item) + On-hand quantities (member item)

If FC Control set to Consume & Derive, ATP for M1 = 30, M2 = 60

If FC Control set to None, ATP for M1 = 36, M2 = 54

Product Family Available to Promise

ATP (member item) = MPS (product family) - SO (sum of all members)

ATP for both M1 and M2 = 90

> **Note:** By setting a profile option, you can perform ATP checks at the product family level. In this case we know that we can easily flex our flow line to produce any of the mix of models assigned to the product family. Therefore, if ATP were performed for either M1 or M2, we could promise another 90.

4

Line Design and Balancing

Overview

Line design and balancing is the heart of flow manufacturing. Your time spent to accurately define your current process, then analyze it to divide up into equal line operations is essential to an efficient and productive line.

Oracle Flow Manufacturing enables you to model your current manufacturing process in detail through flow routings, then use a mixed model map to view your line balance and make decisions on how to improve that balance. You should be able to:

- Define Items and Organizations - to define the inventory organizations and the items to be produced.

- Define Product Families and generate a capacity demand forecast for the product family.

- Set-up a Line name - to define the flow line, production resources and departments.

- Create a Flow Routing (or Product Synchronization) - to define the current events and processes in the flow line for all your products.

- Generate a mixed model map to view the mixed model calculations based on your Flow Routing and product family forecast.

- Return to the Flow Routing to re-align events into balance operations. Re-generate your MMM to confirm your operations are balanced.

- Save your newly balanced mixed model map as a baseline to which you will compare actual production.

Oracle Flow Manufacturing enables you to implement manufacturing processes to produce a high quality product in the shortest possible production time at the lowest possible cost.

Line design and balancing is the foundation of your flow production line. The objective is to have a balanced line that takes the least possible time to meet daily customer demand. This is accomplished through flat product structures and simple processes which can be communicated visually to meet customer demand daily.

In a flow manufacturing environment, products are produced on a flow line to meet customer demand. Typically one flow line makes a mix of products. The exact mix depends on how much flex was built into the line design. Factors that determine flex include employees certified to work multiple processes (operations) and machines that can perform more than one function.

Effective flow line design and balancing procedures smoothes production and eliminates bottlenecks. Flow lines are designed to reduce your production time and resource costs by identifying value add events and eliminating non-value events. This simplified design will also help you to increase communication on your production floor through visual management tools. Quality is improved by implementing quality into the process, instead of inspecting it in at the end.

Enterprise Teamwork

Implementation of Oracle Flow Manufacturing technology is a total enterprise wide strategy that crosses all organizational boundaries and requires commitment to change from all top managers. Decisions made when implementing your flow lines will have significant impact on the success of your flow manufacturing implementation. The responsibility to define the line is shared between Shop Floor Design, Engineering, Inventory Management, Production Planning, Sales and Quality Assurance.

Before entering any data into Oracle Flow Manufacturing, your team must do detailed study to understand existing production processes and define the items, events and processes required to produce your product(s). This is a cross-functional process that addresses many diverse functions across your entire enterprise. The expertise and commitment of the entire operations and sales team is required to succeed. Your entire team should understand their roles and functions to implement and maintain your flow manufacturing system.

In Oracle Flow Manufacturing line design and balancing, the team defines dedicated flow (assembly) lines that support the manufacture of product families. Your team creates item flow routings, assigns products to product families, determines the line design demand, documents operation method sheets and

generates mixed model maps for balancing. Setups for all of these are critical and are described in detail in Chapter 2 to facilitate your implementation.

Sales works closely with engineering to design the items and product family members in harmony with the line design. Quality Assurance works with the team to insert quality processes into the flow line design as resources, events and processes are implemented to ensure that the desired product quality standards are achieved.

Process Flow

To perform line balancing, you must perform the following steps. This chapter will discuss the steps to be taken with in Oracle Flow Manufacturing, and will not include the pre-work that needs to be completed before heading to Oracle (area in gray).

kjsdlkk
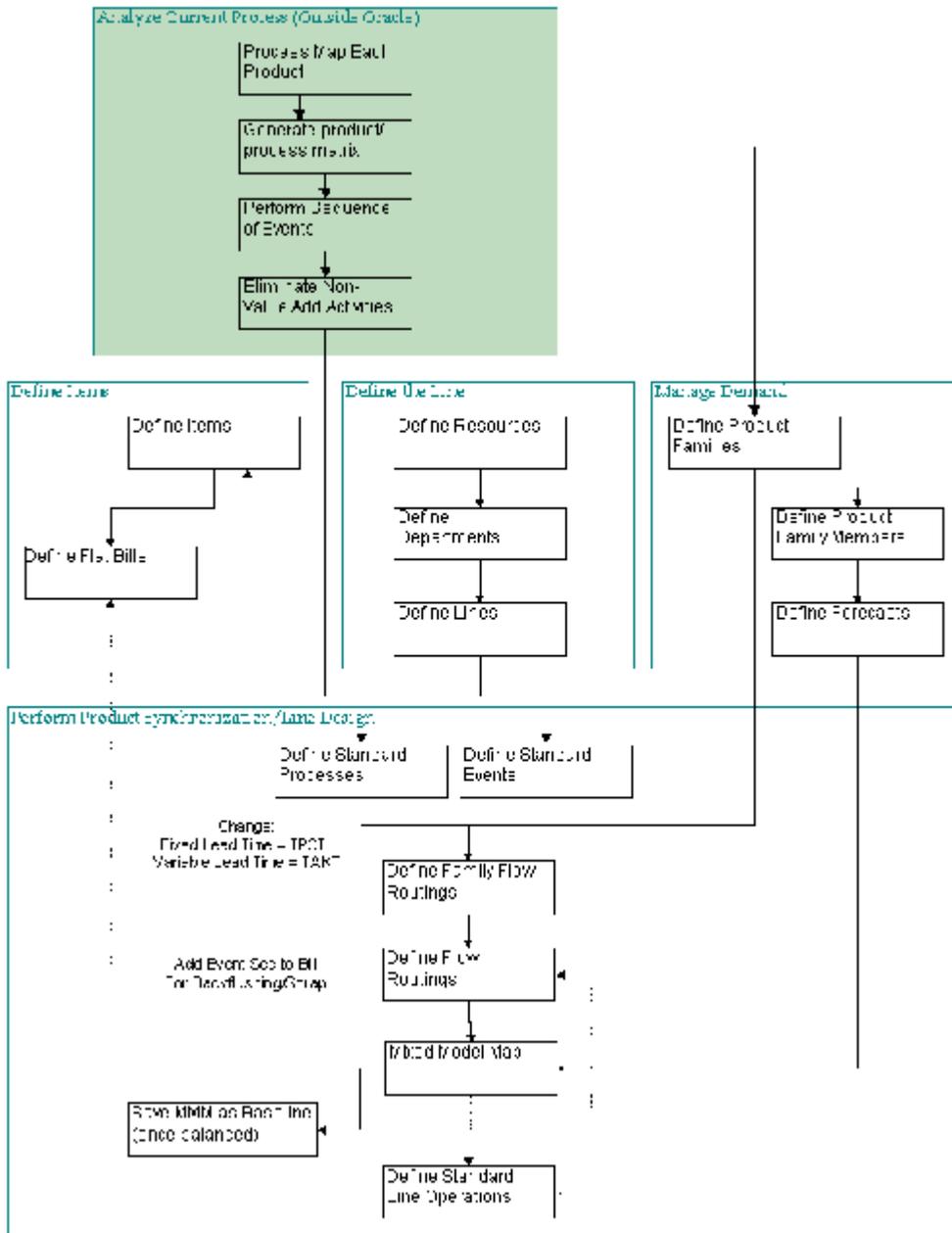
Process Steps

The following sections describe each of the process steps listed above.

Example 4–1   Line Balancing Example

The following simple example will be used throughout this Chapter to Illustrate the Line balancing concepts.

XYZ Company produces two kinds of cars: LT Sedan and ZR Sport. You analyze the current process for both models by doing a process map and sequence of events, and end up with the following scenario for the final assembly line:

The Final Assembly Line for XYZ Company

You currently have 8 people, 6 test machines, and 1 wheel alignment machine. You may also build the engine and transmission in your plant, but they are on a separate sub-assembly flow line so you can record completions and take orders for engines.

Marketing tells you that the maximum they will sell about 200 cars each week, and they will be made up of about 75% LT Sedans and 25% ZR Sports. Most often they will sell about 160 per week (80% of 200), in the same ratio.

Item Definition: Bills of Material

The setup objectives of Items and Organizations are to define the inventory organizations, the items to be produced, the stock locations and to define the attributes of the Item / Subinventory relationships. To implement Oracle Flow Manufacturing it necessary to set up:

- Profile Options
- Organizations
- Item Flexfields
- Subinventories
- Stock Locators

The setup steps required for flow manufacturing are similar to the traditional inventory and Bills of Material setups and are covered in detail in Chapter 2, Setting Up Flow Manufacturing.

Example 4-1 Line Balancing Example, Continued

In our example of the final assembly line for XYZ company, set-up both your LT Sedan and ZR Sport part numbers according to the instructions in Chapter 2.

Line Definition

(N) Flow Manufacturing > Lines >

The Line is an organization of resources and departments. Later you will associate flow routings with this line. To implement Oracle Flow Manufacturing it necessary to set up:

- A Line name, hours of operation, and hourly demand
- Resources (usually a labor grade or specialty, and machines used on the line)
- Departments (where the resources work)

The steps required to setup a line in flow manufacturing are covered in detail in Chapter 2, Setting Up Flow Manufacturing. However, here are a couple of things to keep in mind:

Lines

1. Maximum Hourly Rate: You need to make sure that your maximum hourly rate times the number of hours of operation equals your desired daily demand for the line. In other words, if you want to design your line for 20 items per day, and your line works 24 hours a day, your hourly maximum must be equal to the items per day/hours avail per day = 20/24 = 0.833.

2. Minimum Hourly Rate should equal zero in most cases.

3. Set start and stop time equal to each other to indicate the line works for 24 hours.

4. Set lead time equal to Routing Based.

5. You can define and update but not delete, production lines.

6. You can associate production lines with work order-less completions.

Resources

1. Resources represent anything of value except material and cash, required tomanufacture, cost and schedule a product. However, labor and machines are the most commonly defined resources for flow manufacturing.

    Since flow resources are usually categorized as either labor (people) or machines, every resource that performs work on the flow line must be defined. Unlike traditional manufacturing, resources flex on flow lines, meaning they can perform multiple processes/events (routing operations).

2. If at all possible, define a single labor resource (or labor grade) for the entire line. This may mean changing the way your facility is organized today, but will be well worth the effort. Remember that one of the objectives of a flow Line is to be flexible. To achieve this, operators must flex up and down the flow line to keep material moving. If each event or process is done by a different labor grade (or labor resource), it will be very difficult to flex people to where you need them. If you can't limit it to one resource type because of employee contracts, try to pare it down to as few as possible.

3. Costs assignments are described in Chapter 2: Setting Up.

Departments

1. Assign each line to it's own department. Again, this simplifies your accounting transactions, and line set-ups, and makes it easier to flex people around in your line. An example of an issue if you do not use a single department: One event is assigned to DEPT1 and another event is assigned to DEPT2. You want to

combine them into one operation to balance your line. Which department should you assign the operation to? Should you go back and change the department on the event? Will you need to change resource types between departments? It can be very confusing, very quickly.

One exception to this suggestion is if you have multiple, similar lines that you want people to be able to flex between. In this case, assign multiple lines to a single department.

If you choose to use multiple departments, make sure your resources are checked Shared in the checkbox. Shared enables the resource to be used in more than one department (flex).

2. Resource availability: Check 24 hours is the resource is always available. Do not choose multiple shifts (using the shifts button) in flow manufacturing. Doing so will over-state your available in the mixed model map.

3. Units of Measure (UOM) determines how you will define times on events. Use minutes if most events take less than 1 hour, use hours if most events take more than one hour.

4. Units available are the number of labor or machine resources that are available throughout the day. The program assumes the same number are available throughout your entire hours of operation.

5. CTP, Capable-to-Promise, is available to ATO, Assemble-to-Order, items. When CTP is enabled (optional for flow manufacturing), Order Management can include their resource capacity considerations when promising due dates to customers. You can flag a resource as a bottleneck by enabling the Check CTP radio button. The next time the concurrent process runs to build the CTP table, this resource will be added and OE can consider capacity constraints.

Example 4-1 Line Balancing Example, Continued

You create 1 labor resource for the line with 8 units available. You create one machine resource for the testing machine with 6 units available, and one machine resource for wheel alignment machine. You uncheck 24 hours and do not add shifts.

You also define a single department for the line

Finally, you define a line with the work hours listed on the diagram. The maximum rate per hour must equal daily rate/hours available. (Remember the maximum demand you received from marketing was 200 per week, which equals 40 per day. Your line works 20 hours a day, with 4 hours for breaks. Therefore, your maximum hourly rate must equal $40/20 = 2.0$. (Minimum Hourly Rate should always equal 0)

Demand Management

Demand management is used to simplify and improve the forecast accuracy for your line. To perform Demand management within Oracle Flow Manufacturing, you must perform the following steps:

- Define Product Families

- Define Product Family Members

- Define Forecasts

The steps required to setup a Line in flow manufacturing are covered in detail in Chapter 2, Setting Up Flow Manufacturing. The Copy and Explode Forecasts procedures are defined in detail in *"Chapter 3: Demand Management and Production Planning."* However, here are a couple of things to keep in mind:

1. Product Families are groups of products that share similar manufacturing processes, methods, and parts. Product families in flow may not correspond to logical groupings from a Marketing side. (For example, an equipment manufacturer makes both snowmobiles and lawn mowers on the same line because they use similar processes and they cancel out each others seasonal demand fluctuations. However, these two products are very different from a marketing perspective) It takes a concentrated effort to determine what the appropriate product families are for your line.

2. Once you have a product family defined, you assign products to it and give them a percentage allocation. Note that the total percentages may be greater than 100 in case you want to over plan a particular product.

3. For the purposes of line balancing, you do not have to do either an MPS or and MDS.

4. It is suggested that you define a forecast specifically for your line design, and then save the forecast so you can always go back to what you used for your design. The way you forecast for line design will depend on the type of demand and cost of material to make your products.

If you have a relatively stable demand: Get an actual forecast from marketing to understand what they think they will sell over the next 6 months to a year (depending on your business). Then, for the purposes of line design, use the "Boost %" on the mixed model map to increase the total demand for all products family by 20% to ensure you can cover for unexpected upside in volume, vacations, illnesses, etc. (See Mixed Model Map Set-up for more information)

If your demand varies a lot over time: In this case you want to do a cost benefit analysis based on inventory and overtime costs. If you just took the marketing

forecast and added 20%, you will end up over-designing your line for most of the year, and under-designing it during your peak periods. (Flow manufacturing is based on average demand over your time horizon).

For example, if your component parts are expensive, you may want to design your line for 20% above the average of the Low periods, and just plan to work overtime to handle the increase in demand during your peak periods. This will ensure your inventory and cycle time stay as low as possible throughout the year. On the other hand, if your components are relatively inexpensive, you may want to design your line to 20% above the average over the year. Then you can build up Finished Goods Inventory throughout the year to cover you during your peak periods.

Example 4-1 Line Balancing Example, Continued

Noticing that both models use most of the same processes, events and parts, you define a product family called "Cars" that includes both the LT Sedan and the ZR. Remember, marketing told you they will sell about 200 cars each week, and they will be made up of about 75% LT Sedans and 25% ZR Sports. You enter those percentages in the in the Product Family Member Window, and create a forecast for the 200 Cars per week (or 40 cars per day). Then copy/merge the forecast with the explode option to get actual numbers per week for both the LT Sedan (150) and the ZR Sport (25). (This is obviously a simple example. Imagine the simplicity in forecasting a product family that consists of hundreds of different parts.)

Product Synchronization

(N) Flow Manufacturing > Product Sync >

Product synchronization is the process of defining the processes map and the sequence of events for each product. Events are granular tasks that can be grouped into process that define the physical activities on the line. Each event is assigned machine and labor times used to perform the event.

Product synchronization in Oracle Flow Manufacturing is performed using flow routings. Using the flow routings, you define processes, sequence of events and then the network of processes. In the Network, you defines feeder lines, rework loops and primary/alternate processes required to produce a product family or standard item. Each path is assigned a network percentage.

Once all this information is entered, the program can calculate operation times, planning percentages and the total product cycle time. The total product cycle time is longest time on the primary path on the production line (including feeder lines) in making the product. This information is then used by the mixed model map to balance you line.

You will return to the routing network later to define the balanced operations for your line.

In order to implement these objectives through Oracle Flow Manufacturing you will define and set up:

- Standard Events and Event Times

- Standard Processes

- Flow Routings

- Assign Events and Processes

- Assign Event Yields

- Create Routing Network with planning percentages, including feeder lines, alternate paths and rework loops (done graphically in Release 11i)

- Enable Routing for mixed model map

- Calculate Yields, Operation Times and Total Product Cycle Time

The steps required to setup a Product Synchronization in flow manufacturing are covered in detail in "*Chapter 2, Setting Up Flow Manufacturing.*"

Standard Events and Processes

Concept of Flow Line Processes/ Events/Operations

Processes typically are defined by your current logical grouping of work. E.g. a plant might have Paint, Machining, etc. The display sequence determines the order in which the processes will appear in the standard events window.

Events are detailed work content for each process. You define standard events independently of processes, but will assign them to a process in the routing. Each event is assigned the machine and labor times used to perform the event. The display sequence determines the order in which the processes will appear in the Standard Events window.

Operations are new groupings of events that is performed to balance your line to takt. They are generally created after using the MMM.

Sequence of Events

In flow manufacturing events are predefined and grouped under a generic processes in a specific sequence which are documented on the SOE (Sequence of Events) document (Outside of Oracle). The SOE document is a detailed spreadsheet

of information resulting from a thorough shop floor study. It's a time study document that lists specifically:

- the work step and quantity produced (event).

- the resources required to perform each step (machine and people).

- the resource time needed at each event to produce products that meet approved business specifications.

Inside Oracle, SOEs are modeled by adding events and processes to your flow routing.

Advantages of Standard Processes/Events/Operations

Standard Processes/Events/Operations are not required; they can be uniquely defined in an item's Flow Routing in the Routing window. However, Oracle Standard Processes/Events/Operations serve several useful functions in flow manufacturing. Standard Processes/Events/Operations save time, facilitate easy communication, and promote uniformity. Standard Processes/Events/Operations serve as templates to duplicate similar routing structures in various flow lines, saving time setting up flow routings. Standard Processes/Events/Operations also ensure consistency across routings on a single Flow Line and allow mass updates to all routings on a line that use a standard event.

Copied or Referenced Standard Processes/Events/Operations

Standard Processes/Events/Operations may be entered manually, referenced or copied to an Item's flow routing. Processes/Events/Operations can be consistently used across product family flow routings.

- When the Standard Process/Event/Operation is copied, subsequent changes to the source Standard Process will not change the target Standard Process in the Flow Routing.

- When the Standard Process/Event/Operation is referenced, subsequent changes to the source Standard Process will change the target Standard Process in the Flow Routing.

- A Standard Processes/Events/Operations table may be maintained and all changes to Standard Processes/Events/Operations can be centralized and controlled. Changes to Processes/Events/Operations in the central control table will change the Processes/Events/Operations in the flow routings.

Here are a couple of things to keep in mind when defining standard events and processes.

1. When defining standard events, you must choose whether a resource is scheduled or not scheduled. This has a different meaning in flow manufacturing than in other modules. In flow, a non-scheduled resource is a resource that is used in parallel to a scheduled resource. Unscheduled resources are included in the total time for the resource type (labor or machine), but is NOT included in the total elapsed time for the process or line operation. Scheduled resources are included in both. See routings for more explanation of how it effects the calculations.

   Note: Events default to being unscheduled. You must remember to toggle the resource to scheduled when appropriate.

2. Item versus lot based: When you enter in an event as Lot Based, the program will temporarily convert that number to item based for the purposes of performing the flow Calculations. In other words, if you enter a set-up time that takes 1 hour for a lot of 6, the program will assume you need to do the full hour of work on every piece when doing TPCT calculations and event time calculations. This will make an accurate TPCT, but inaccurate elapsed time in the mixed model map (you want your TPCT to include the entire hour, but the time per event in the MMM should be the time per lot divided by the lot size).

   If you don't care about TPCT being accurate, you can simple do all data entry in item based times (averaging the lot times over the lot).

   If you need both the TPCT and MMM calculations accurate, there is a work-around: Use lot based resources on the events, but then enter in the averaged labor and machine time per piece in the User Machine and Labor times at the Process/Operation level.

   Note: You must also copy the labor and machine times for all other processes/operations in your routing or the MMM will be incorrect!

3. Standard Events can be tagged or identified as value add events or non-value add events through flexfield definitions. Flow manufacturing focuses on the elimination of non-value add activity and on quality driven process. Flow Events should be clearly defined as either a value add or a non-value add activity.

Non-value add events should be reported separately and targeted for elimination. Tagging value add or a non-value add events is a major distinction between flow events and traditional discrete routings.

4. Standard Events enable quality to be inserted into the flow routing to perform or verify quality assurance throughout the flow line.

Example 4-1 Line Balancing Example, Continued

You create a standard process for each box on your process map, and a standard event for each event in each process. All events resources are marked Scheduled, except for those with and asterisk (which occurs in parallel with the other resource on the event). All event times are done on an item basis.

Routings

1. It is suggested that you set up a complete flow routing for the product family first, that contains all events and processes for the entire line. Then copy that routing to each of the product members, and add/delete/or edit any event or process that are specific to an assembly. This will reduce the amount of work required to make changes to your routings. For example, when making cars, most of the events are exactly the same no matter which model you are making. In this case, if one event changes, you can simply modify the standard event and it will automatically modify each routing.

> **Note:**   You must recalculate Process Times and Total Product Cycle times on all routings using a standard event any time you make a change to that standard event. For a non-standard event, you must perform the calculations only on the routing where you made the change. If you don't, your changes will not be reflected in the TPCT or the MMM.

2. In the routing page, there are two ways to add events and processes:

   - Add processes first (in the process alternate region), then click on the events button to assign all events for that process. Move back to the processes screen and add the second process.

   - Assign all processes in a list. Then go to the events alternate region and enter the events in sequence, assigning them to processes as you go.

   - In release 11i, you may enter your events and your processes independently, then use the routing network to drag events into processes.

The display sequence determines the order in which the events will appear on the routing and in the mixed model map.

3. You can attach OMS's or other documents to events. See the Oracle Applications Users Guide for more information on Attachments.

4. The routing network is graphical in Release 11*i* and tabular in Release 11. The routing network defines the relationship between processes and operations in terms of primary paths, alternate paths and rework loops. The network must be defined prior to performing the routing calculations. For more information on defining the network see the Oracle Flow Manufacturing Users Guide

5. Enter production yield information at the process or operation level. Production yields entered directly on an event will be ignored when calculating operation yields.

6. You must enable each Routing for mixed model map using the routing details screen, or you will not be able to see the details for that product in the MMM.

Routing Calculations for LT Sedan

	Yield	Cumulative Yield	Reverse Cumulative Yield	Planning %
Assemble Chassis		0.9	1	100
Add Engine & Trans	0.9	0.9	0.9	100
Add Wheels		1	0.9	100
Add Interior		1	0.9	105
Add Body Panels		1	0.9	105
Test		1	0.9	105
Door Assy		1	0.9	105

Planning percent is 105% due to the rework loop. Note that you could have a different rework percent for each product, if needed.

Routing Calculations for ZR Sport

	Yield	Cumulative Yield	Reverse Cumulative Yield	Planning %
Assemble Chassis		0.9	1	100
Add Engine & Trans	0.9	0.9	0.9	100
Add Wheels		1	0.9	100
Add Interior		1	0.9	105
Add Body Panels		1	0.9	105
Test		1	0.9	105
Door Assy		1	0.9	105

Example 4-1 Line Balancing Example, Continued

You create a routing for the product family based on the process map at the beginning of the chapter. First you assign all standard processes to the routing, then assign all the events and link them to a process. You assign a yield of 0.9 to Add Engine and Transmission. Next you go to the routing details screen and enable it for the MMM. Finally, you create a routing network for the process. This is done graphically in release 11i, and will look similar to the diagram at the beginning of this chapter.

You would then copy the routing to both the LT Sedan and the ZR Sport. On each routing, you will perform three calculations: Operation Yields, Operation Times, and Total Product Cycle Time. Each are described in detail below

Routing Calculations
All routing calculations are displayed in Hours.

Operation Yields: In the Routings window, select Calculate Operation Yields in the Special pull-down menu (use the Tools pull down in Release 11i), and choose processes. Make sure to check the Update Events box to update yields on events. This is required to impact kanban planning. It will calculate the following items, which you can view in the Operation Times alternate region:

Cumulative Yields: In Release 11, cumulative yields are the product of yields at each operation along the primary path, starting at the first operation. It does not calculate yields for alternate paths or feeder lines.

In Release 11*i*, cumulative yields are the product of yields at each operation along any path. See: Oracle Flow Manufacturing User's Guide for more details on the calculation.

Reverse Cumulative Yields: In Release 11, cumulative yields are the product of yields at each operation along the primary path, starting at the last operation. It does not calculate yields for alternate paths or feeder lines.

In Release 11*i*, cumulative yields are the product of yields at each operation along <u>any</u> path. See Oracle Flow Manufacturing User's Guide for more details on the calculation.

Net Planning % The planning percent is used in the MMM to calculate process volumes through each process and is used by kanban planning to adjust demands for kanbans.

In Release 11, the net planning % is the product of the network percentages at each operation along the primary path and rework loops. It does not consider alternate paths.

> **Note:** This can cause you to under plan operations in Release 11 that occur after an alternate path re-joins the primary path.

In Release 11i, the net planning % does consider alternate paths.

Planning % will only appear at the Operation or Process Level. It will be blank when looking at events.

Some fields will remain blank even after the calculation is performed (if the field did not have any data to perform the calculation. For example, cum yield and

reverse cum yield will be blank if you didn't enter yield information for the line. In Release 11, alternate paths and feeder lines will not have a planning percentage) In this case, the program assumes 100% yield and 100% planning percent.

Example 4-1 Line Balancing Example, Continued

The results of the calculations are below:

Note that Labor and Machine calculated times consider both scheduled and non-scheduled events, while calculated elapsed time considers only scheduled events.

Routing Calculations for LT Sedan

	Yield	Cumulative Yield	Reverse Cumulative Yield	Planning %	Calculated Labor	Calculated Machine	Calculated Elapsed
Assemble Chassis		0.9	1	100	45	0	45
Add Engine & Trans	0.9	0.9	0.9	100	33	0	33
Add Wheels		1	0.9	100	58	20	58
Add Interior		1	0.9	105	57	0	57
Add Body Panels		1	0.9	105	28	0	28
Test		1	0.9	105	25	160	160
Door Assy		1	0.9	105	24	0	24

Routing Calculations for ZR Sport

	Yield	Cumulative Yield	Reverse Cumulative Yield	Planning %	Calculated Labor	Calculated Machine	Calculated Elapsed
Assemble Chassis		0.9	1	100	45	0	45
Add Engine & Trans	0.9	0.9	0.9	100	43	0	43
Add Wheels		1	0.9	100	58	20	58
Add Interior		1	0.9	105	51	0	51
Add Body Panels		1	0.9	105	28	0	28
Test		1	0.9	105	25	320	320
Door Assy		1	0.9	105	40	0	40

Operation Times: In the Routings window, select Calculate Operation Times in the Special pull-down menu (use the Tools pull down in Release 11i), and choose processes. It will calculate the following items which you can view in the Operation Times alternate region:

> **Note:** The routing window in Oracle will always display in hours.

Calculated Labor Time: The sum of both scheduled and unscheduled labor resource usage rates for each event. Calculated Labor Time per process is the sum of the labor times for all the events underneath each process. If you entered events by lot, it will temporarily treat the value as if it were entered as an item basis for the purposes of this calculation.

Calculated Machine Time: The sum of both scheduled and unscheduled machine resource usage rates for each event. Calculated Machine Time per process is the sum of the machine times for all the events underneath each process. If you entered events by lot, it will temporarily treat the value as if it were entered as an item basis for the purposes of this calculation.

Calculated Elapsed Time: The sum of the scheduled Labor and Machine usage rates for each event. Elapsed time per process is the sum of the elapsed times for all the events underneath each process. If you entered events by lot, it will temporarily convert the number to an item basis for the purposes of this calculation.

User Entered Times: If you don't want to use the system calculated times, you can enter your own manual times for events, processes or operations. Then, when you generate the mixed model map, you can choose to use your manual times instead of the system calculated times.

If you need to enter manual times, it is recommended that you do so only at the process or operation level. This is for two reasons

- If you update events, you must also update the process and operations. The system will not calculate manual times for processes and operations from the manual events.

- If you want to override one event, process or operation with a manual time, you must also type in times for all other events, processes or operations. If you don't, when you choose to use manual times in the MMM, you will get 0 for any processes or operation that doesn't have time listed in the manual column.

> **Note:** The Total Product Cycle Time is always calculated using the system times, even if you enter in manual times.

Example 4-1 Line Balancing Example, Continued

The results of the calculations are below:

Routing Calculations for LT Sedan TPCT 381

	Yield	Cumulative Yield	Reverse Cumulative Yield	Planning %	Calculated Labor	Calculated Machine	Calculated Elapsed
Assemble Chassis		0.9	0.9	100	45	0	45
Add Engine & Trans	0.9	0.9	0.9	100	33	0	33
Add Wheels				100	58	20	58
Add Interior				105	57	0	57
Add Body Panels				105	28	0	28
Test				105	25	160	160
Door Assy					24	0	24

Routing Calculations for ZR Sport TPCT 545

	Yield	Cumulative Yield	Reverse Cumulative Yield	Planning %	Calculated Labor	Calculated Machine	Calculated Elapsed
Assemble Chassis		0.9	0.9	100	45	0	45
Add Engine & Trans	0.9	0.9	0.9	100	43	0	43
Add Wheels				100	58	20	58
Add Interior				105	51	0	51
Add Body Panels				105	28	0	28
Test				105	25	320	320
Door Assy					40	0	40

Attention: Times here are shown in minutes for purposes of demonstration. The Routing window in Oracle will always display in hours.

Total Product Cycle Time: In the Routings window, select Total Product Cycle Time in the Special pull-down menu (Tools pull down in Release 11i), and choose processes. It will calculate the following item:

Total Cycle Time (TPCT) is the sum of the Elapsed times along the longest primary path of your routing network.

Note: You must define a routing network prior to calculating TPCT, or the number calculated will be meaningless.

Example 4-1 Line Balancing Example, Continued

The longest primary path is from Assemble Chassis through Test (excluding the Door Assembly). The results of the calculations are below:

LT Sedan= 45+33+58+57+28+160 = 381 minutes

ZR Sport = 45+43+58+51+28+320 = 545 minutes

Line Design/Mixed Model Map

(N) Flow Manufacturing > Product Sync > Mixed Model Map

The mixed model map is a tool that displays the processes and products for a given line as well as the associated weighted times to complete the process. The mixed model map also displays the labor, machines and In-Process-Kanbans (IPK) resources needed to support forecast demand. This information is used to decide how to regroup events into line operations to balance the line.

Once you have set-up your current line by defining items and organizations, the flow line, a forecast, and the product routings, you can balance the line through iterative processes using the mixed model map. The steps are:

- Set up parameters to generate the mixed model map.

- Generate the mixed model map based on current processes.

- Analyze mixed model map results and Balance the Line by re-aligning events into line operations.

- Regenerate the mixed model map.

- Save Balanced line as baseline

MMM Parameters

To enter parameters for generating the mixed model map, navigate to the mixed model map window. In the Mixed Model Map window, enter the required parameters to generate the mixed model map:

Line: Enter line name.

Family: Optional, enter Family name if you planned at the Family Member level, other wise leave null.

Demand Type: Forecast, MDS, MPS or Actual Production. Typically, you will use a forecast to design your line, although you could use an MDS or MPS as well. Actual Production uses the current flow schedule in the date ranges you specify below. Use actual production when you are operating your line and want to compare actual production mix against your line design.

Demand Name: Enter the predefined Forecast, MDS or MPS name. It is grayed out if you chose actual production for the demand type.

Start Date: Date for beginning of Demand. Program will average Demand between the start and end date for your line. Date will default to the first day in your forecast, MPS, MDS. You can over-ride this date.

End Date: Date for end of Demand. Program will average Demand between the start and end date for your line. Date will default to the first day in your forecast, MPS, MDS. You can over-ride.

Demand Days: Total days between start and end date. Will default in based on the start and end dates, and your production calendar. You can over-ride.

Hours per Day: The hours per day your production line operates. Defaults into 8 hours per day.

Note: This is not connected to what you defined for your production line so you must over-ride it with the correct value.

Boost %: Optional, enter a percent increase to the forecasted demand, if desired. For example: you could enter 20 here if you use a straight marketing forecast for the next year, and want to boost the percent by 20% for the purposes of designing your line.

Process/Line Op: You choose to displays the mixed model map per Process or Line Operation. The system defaults to Process. When first viewing your line, leave the default process. Once you have attempted to balance your line you will always want to choose operation.

Sort Order: Choose to display the processes (or operations) sorted by either Display sequence or Code. Always choose display sequence unless you names your processes or operations in alphabetical order.

Time = Choose to display as Rolled-Up Time (which means system calculated times) or Manual. Always accept default unless you have entered Manual Times in the routing for all processes or operations.

IPK Value: Choose to view your in process kanbans based on Total Elapsed Time or by machine Time. Defaults to Total.

Time UOM: Choose to view the MMM in units of Hour, Minute, or Second. Defaults to Hour.

In the Mixed Model Map window, select the Generate tab to generate the mixed model map. This will give you a high level view of where your imbalances are. You need to use this in conjunction with your Flow Routing to determine what resources and events to group together into operations in order to balance the line.

Example 4-1 Line Balancing Example, Continued

In our example, you would generate a mixed model map using the following parameters:

Forecast: from 1/3/2000 to 1/3/2000 (14600 units total demand for the time period)

Demand Days: 365days in the time period

Hours per Day: 20hours (24 hours - 4 hours for breaks and meetings)

Boost %: 0% since 200/week is the maximum or CAPACITY for your line. If you had entered 160 into your forecast, you would use a boost of 20%)

Display options: View by Process, Display by Display Sequence, Use Rolled up Time, IPKs based on Total Time, UOM equals Minutes.

MMM Field Definition

When you enter the Mixed Model Map window, the screen is divided into three regions, the Header, the Calculated Times, and the Resource Recommendation regions. The fields in each of these regions are explained below.

Header Region

Line, **Family**, **Demand**, **Boost %** Defaults in from the parameters you entered before generating the mixed model map.

Demand = Demand Name. It is Blank if you used actual production.

 To change any of these parameters, you must close the MMM, change the parameter, and regenerate the MMM.

Takt Time (Line takt) Line takt time is the drumbeat of your line. Product should, on average, move from one operation to the next every takt time. If you stood at the last operation, you should, on average, see a product rolling off the line every takt time.

Line takt time:

LTAKT = Time / Unit Demand

$$= (H * Tc * Days) ∕ (D * B)$$

Where:

H is hours per day (from the parameters screen)

Tc is a time conversion factor:

equal to 1 if time UOM = Hour,

equal to 60 is time UOM = Minute,

equal to 3600 if time UOM = Second.

Days is the number of days in your demand period (from the parameters screen)

D is total demand over the time period.

B is Boost percent in decimal form.

One way to remember Line takt is to figure out how many units you intend the line to produce each day, then divide by the hours per shift, and the number of shifts. For example, 1,000 units per day ∕ (8 hours per shift * 1 shift) = 125 units per hour per shift. Then take the inverse. 1 ∕ 125 = 0.008 hours per unit, or about one unit every half minute. Remember that takt is in time per unit (hours, minutes, seconds per unit).

Example 4-1 Line Balancing Example, Continued

The important thing to note in our example is the takt time, or the drumbeat of the line.

In this case takt = (H*Tc*Days)∕(D*B) = 20*60*5∕200 = **30 minutes**. You need to have a unit come off the end of the line every 30 minutes in order to meet your forecasted demand.

Line = Final Assembly

Family = Cars

Demand = Mktg Forecast

Boost % = 0

Calculated Times Region

Demand Total Demand for the time period for each product. It does NOT reflect the boost percent from the parameters screen. It is displayed on all alternate regions.

Machine Time, Labor Time and Elapsed Time Alternate Regions The mixed model map opens to the Machine Time alternate region. You can use the pull down in release 11 or the tabs in Release 11*i* to see the other alternate regions.

The calculated Labor, Machine and Elapsed times in the table for a particular product/process combination are copied from the Routings for each product. See Routing for details on how these are calculated. Remember that Calculated Labor Time includes both scheduled and unscheduled labor. Calculated Machine Time includes both scheduled and unscheduled machines. However, Calculated Elapsed Time is a sum of only <u>scheduled</u> labor and machine time.

Weighted Times are the mean hours required to meet the forecast or customer demand for all Items routed through the flow line. In other words, it is an average time per process or operation and is calculated by weighting the time for each product by the total demand for that product.

Weighted times are calculated using the following formulas:

Machine Weighted Time:

MWT = Sum over all products of (PV * CMT) / Sum over all products of (PV)

Where:

PV is Process Volume (Calculation defined below)

CMT is the Calculated Machine Time per Process or Operation

(from the routing).

Labor Weighted Time:

LWT = Sum over all products of (PV * CLT) / Sum over all products of (PV)

Where:

PV is Process Volume (Calculation defined below)

CLT is the Calculated Labor Time per Process or Operation (from the routing).

Elapsed Weighted Time:

EWT = Sum over all products of (PV * ET) / Sum over all products of (PV)

Where:

PV is Process Volume (Calculation defined below)

ET is the Calculated Elapsed Time per Process or Operation

(from the routing).

These calculations are needed when you have multiple products, each with different Calculated Process times. The equation is calculating an average time per process or operation by weighting the time for each product by the total demand for that product.

Example 4-1 Line Balancing Example, Continued

Remember that the times per process and operation will match what we saw earlier in the routing.

Note the weighted time is closer to the LT Sedan time, since we produce tree times as many sedans sports cars.

Labor

	Demand	Ass. Chassis	Add Eng & Trans	Add Wheels	Add Interior	Add Body Panels	Test	Door Assy
LT Sedan	150	45.0	33.0	58.0	57.0	28.0	25.0	24.0
ZR Sport	50	45.0	43.0	58.0	51.0	28.0	25.0	40.0
Weighted Time		45.0	35.5	58.0	55.5	28.0	25.0	28.0

Machine

	Demand	Ass. Chassis	Add Eng & Trans	Add Wheels	Add Interior	Add Body Panels	Test	Door Assy
LT Sedan	150	0.0	0.0	20.0	0.0	0.0	160.0	0.0
ZR Sport	50	0.0	0.0	20.0	0.0	0.0	320.0	0.0
Weighted Time		0.0	0.0	20.0	0.0	0.0	200.0	0.0

Elapsed

	Demand	Ass. Chassis	Add Eng & Trans	Add Wheels	Add Interior	Add Body Panels	Test	Door Assy
LT Sedan	150	45.0	33.0	58.0	57.0	28.0	160.0	24.0
ZR Sport	50	45.0	43.0	58.0	51.0	28.0	320.0	40.0
Weighted Time		45.0	35.5	58.0	55.5	28.0	200.0	28.0

Process Volume Process Volume is calculated for each process or operation in the line. Process Volume is the number of units required to be produced at each process or operation to meet customer demand. It considers yield losses through the flow line and rework loops and alternate paths. You can view it in the MMM by choosing Process Volume in the pull-down menu in Release 11 or selecting the Process Volume Tab in Release 11*i.*

Note that it is called Process Volume even if you are viewing the MMM by Operation.

Process Volume:

$$PV = D * PlnNET * (1 + B) / CY$$

Where:

D is total demand for the time period

PlnNET net planning percent from the routing network.

B is the Boost percent in decimal form.

CY is the cumulative yield from the routing network

Example 4-1 Line Balancing Example, Continued

These numbers are important for understanding the numbers in the resource recommendation region. Take time to understand where they come from.

The first two processes are affected by the yield at "Add Eng & Trans." For example: the LT Sedan at Ass Chassis: PV = D*PlnNET*(1+B)/Cy = 150*100*(1+0)/0.9 = 166.7

The last three processes are affected by the rework from test to add interior. For example: the LT Sedan at Add Interior: PV = D*PlnNET*(1+B)/Cy = 150*105*(1+0)/1 = 157.5

Process Volumes

	Demand	Ass. Chassis	Add Eng & Trans	Add Wheels	Add Interior	Add Body Panels	Test	Door Assy
LT Sedan	150	166.7	166.7	150.0	157.5	157.5	157.5	150.0
ZR Sport	50	55.6	55.6	50.0	52.5	52.5	52.5	50.0
Total Volume		222.2	222.2	200.0	210.0	210.0	210.0	200.0

The Add Wheels process and the Door Assy process are not affected by either yield or rework.

Resource Recommendation Region

This is the heart of the data that you will use when balancing your line. The window opens to the summary alternate region which calculates resources needed for each process or operation.

Once you have a balanced line and have saved it as a baseline, you can also choose the Baseline Variance alternate region, which shows your calculated values and the % variance to the baseline values. (In Release 11*i* the % variance is presented graphically). Or choose Baseline to see only the calculated values from the baseline. (Note: When you choose Baseline, the calculated times region remains for your current MMM)

Below is a description of all the fields:

Machines Needed Machines Needed is the total machine resources you would need to meet the takt time at a given process or operation. (Remember, takt is the drumbeat of your line – or the time needed per unit at each operation to meet your demand.) In other words, if you process machine time is greater than takt, you need to assign multiple resources to that process in order to meet takt. To view Machines Needed, select Summary on the Mixed Model Map window.

Machines Needed:

MN = Machine Weighted Time / Process TAKT Time

= MWT / PTAKT

Where:

MWT is Machine Weighted Time

PTAKT is Process TAKT (defined below)

See the example at the end of this section for a better understanding.

Labor Needed Labor Needed is the total labor resources you would need in order to meet the takt time at a given process or operation. It is calculated the same way as Machines Needed above, using Labor Weighted Time instead of Machine Weighted Time.

Labor Needed:

LN = Labor Weighted Time per Process / Process TAKT Time

= LWT / PTAKT

Where:

LWT is Labor Weighted Time

PTAKT is Process takt (defined below)

When creating line operations, you want to get the number of labor needed at each operation as close to a whole number as you can.

See the example at the end of this section for a better understanding.

In Process Kanbans (IPKs) Needed IPKs are an option if you are not able to add the total Resources Needed to the current line shift. Instead, you could add a 2nd shift (or part of a second shift) to an operation that is above takt and use IPKs to hold accumulate inventory for that 2nd shift to bleed off. For example, assume the Calculated Labor Time for operation 10 takes three minutes per unit while the next operation 20 takes one minute per unit (given the existing resources). Because of constraints, additional labor cannot be added during the existing shift. Therefore, operation 10 is scheduled to work three shifts each day while operation 20 works one. In the morning, an IPK is accumulated in front of operation 20 which is 2/3 of the daily demand. Both continues to produce during the 1st shift and at the end of the day, the IPK is entirely consumed by operation 20.

The IPKs tell you how much inventory you must maintain to ensure that the rest of your line is able keep producing at takt. They are intentional inventory stock piles along the flow line that are expected to consumed by demand each day. They are not safety stock.

You do not want to add resources AND IPKs to your line, or you will be holding inventory that you do not need. Although the MMM shows both recommendations, you want to pick one – either add resources, or add IPK<u>s</u>.

You can ignore IPKs altogether when you are looking at the MMM in terms of processes, because you don't expect your processes to be balanced. They become important when you try to balance your operations, but find you can't (as in the example described above).

In Process Kanbans Needed:

IPKN = Units Short / Total Units Needed

= (EWT - LTAKT) * H * Tc / (EWT * LTAKT)

* if IPKN is <0, the program

Where:

EWT is Elapsed Weighted Time

LTAKT is Line takt

H is hours per day (from the parameters screen)

Tc is a time conversion factor

equal to 1 if time UOM = Hour

equal to 60 is time UOM = Minute

equal to 3600 if time UOM = Second

See the example at the end of this section for a better understanding.

TAKT Time (Process TAKT) This is the time per unit each operation must achieve in order to meet the takt time for the line (the time per unit for an operation may be different from the line because of the process volume going through the operation). Process takt is calculated the same way as the Line takt, only it uses the process or operation process volume instead of the line demand.

Process TAKT Time:

PTAKT Time = Days * H * Tc/(PV)

Where:

Days is the number of days in your demand period (from the parameters screen)

H is hours per day (from the parameters screen)

Tc is a time conversion factor

equal to 1 if time UOM = Hour

equal to 60 is time UOM = Minute

equal to 3600 if time UOM = Second

PV is the total process volume for this line or operation

This number is calculated because if impacts due to yields or rework. See the simple example below for more explanation:

Example 4-1 Line Balancing Example, Continued

The calculations for our example are below.

Machines needed to perform this process within the process TAKT. It is the Machine Weighted Time divided by the process TAKT

Labor needed to perform this process within the process TAKT. It is the Labor Weighted Time divided by the process TAKT.

Total number of machines in the department assigned to the events in this process. We assigned 1 wheel aligning machine and 6 testing machines.

Total number of people in the departments assigned to the events in this process.

	Ass. Chassis	Add Eng & Trans	Add Wheels	Add Interior	Add Body Panels	Test	Door Assy
Machines Needed	0.00	0.00	0.67	0.00	0.00	7.00	0.00
Machines Assigned	0.00	0.00	7.00	0.00	0.00	7.00	0.00
Labor Needed	1.67	1.31	1.93	1.94	0.98	0.88	0.93
Labor Assigned	9.00	9.00	9.00	9.00	9.00	9.00	9.00
IPKs Needed	13.33	6.20	19.31	18.38	0.00	34.00	0.00
TAKT	27.0	27.0	30.0	28.6	28.6	28.6	30.0
TAKT Time for Assigned	5.0	3.9	6.4	6.2	3.1	22.2	3.1

The number of In Process Kanbans you would need if you CANNOT assign 1.67 people to this process.

The speed at which you need to perform this process in order to acheive the TAKTfor the line. It equals your available hours divided by the process volume. Notice that the process TAKT is less than the line TAKT because the process volume for this proces is greater than the demand for the line.

TAKT Time for Assigned describes how long it would take to perform the process with the number of people assigned to it. It equals the elapsed weighted time divided by the number of people assigned.

In release 11*i* there are 3 more fields in the resource recommendation region when viewing the summary tab.

Machines Assigned This is the total number of machine resource units that are:

1. 1. of a type used in the events that are assigned to this process or line op

2. 2. are are in the department(s) that any of the events are assigned to

For example: OP10 is assigned to DEPT1, and there are two events underneath it. One event uses machine MCH1 for 0.25 hours and is assigned to DEPT1. The other event uses MCH2 for 0.1 hours and is assigned to DEPT2.

The program will look at DEPT1, note the total MCH1 resources assigned. It then goes to DEPT2, and notes the total MCH2 resources assigned. These two numbers are added together and displayed as machines assigned.

The number of resources assigned is the TOTAL available in the department(s), not the total available for that operation. IE - If you use the same machine resource at multiple events in the same line, or in multiple lines, the machines assigned will be overstated for each occurrence of the resource. The only way to avoid this is to assign a department to each operation and all its events, which is a very labor intensive effort.

Labor Assigned This is the total number of labor resource units in the department(s) that the events are assigned to. It is calculated in the same manner as Machines Assigned.

The number of resources assigned is the TOTAL available in the department(s), not the total available for that operation. IE - If you use the same labor resource at multiple events in the same line, or in multiple lines, the labor assigned will be overstated for each occurrence of the resource. The only way to avoid this is to assign a department to each operation, which is a very labor intensive effort.

TAKT Time for Assigned This is the time per unit each operation will achieve given the number of resources assigned. (Also called the Operational Cycle Time)

TAKT Time:

ATAKT = Elapsed Weighted Time / People Assigned

= EWT/PA

Where:

EWT = Elapsed Weighted Time

PA = People Assigned

> **Note:**   This number will not mean anything unless you assign a department to each operation and all of its events. (which adds a lot complication to set-up and maintenance of your line)

Example 4-1 Line Balancing Example, Continued

How to Use this Information to Balance Your Line

You use the Labor Assigned Field to verify if you line is balanced. You should have as close as possible even multiples of labor assigned at each operation for a balanced line. (1,2,3, etc,). In this case, you need 1.67 at the first process, 1.31 at the second, and so on. Since it is very difficult to assign fractions of people to an

operation, you'll want to return to your routing to re-assign events into more balanced operations.

Let's look at this first on a visual level. Below is the original Process Map with a suggestion of how to reassign events into operations. Remember the line takt time is 30 minutes.
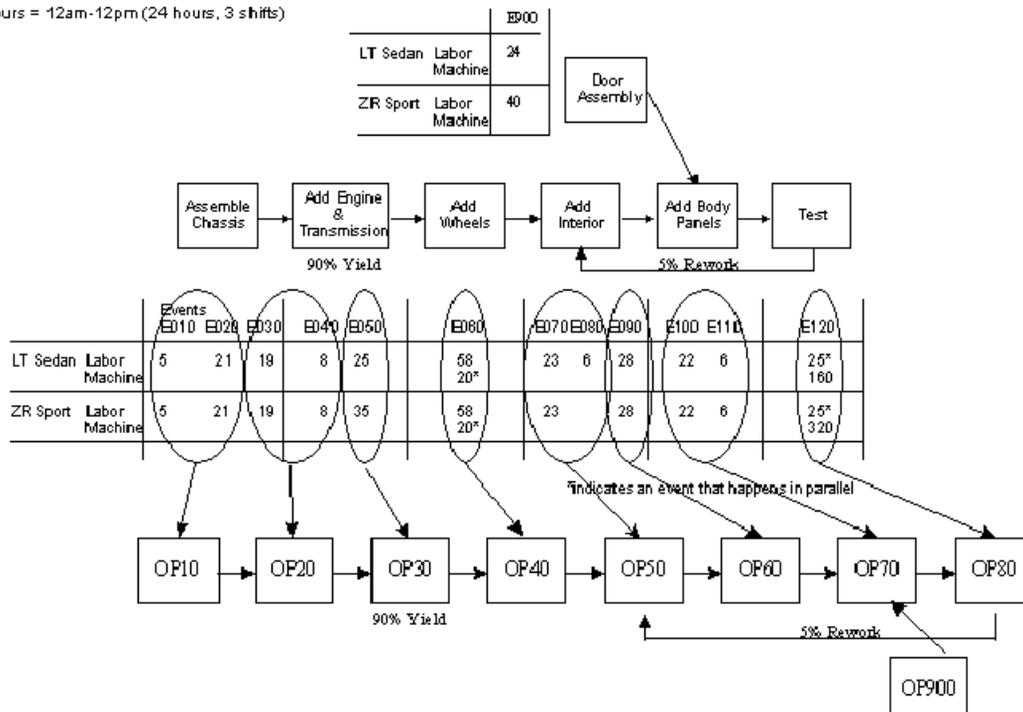
At a glance, it looks like re-grouping events will produce a more balanced line. (OP900 = Door assembly) However, because of the multiple products, yields, and rework loops, you would want to regroup events, then view the results in the MMM to make sure it is balanced. This process often takes several iterations to get a perfectly balanced line.

In this case, you would return to the product sync navigator menu, add standard operations for OP10-OP900, and then return to the Routing window to assign events to those operations as indicated above. Remember to add your yields and reworks to the correct operations! Then regenerate the mixed model map using all the same parameters as before, except view it by operation instead of processes.

When regenerating the mixed model map, enter the following parameters:

Forecast: from 1/3/2000 to 1/8/2000 (200 units total demand for the time period)

Demand Days:5days in the time period

Hours per Day:20hours (24 hours - 4 hours for breaks and meetings)

Boost %:0%

Display options:View by Operation, Display by Display Sequence,

Use Rolled up Time, IPKs based on Total Time, UOM equals Minutes

Results of the MMM are shown below. We won't go over the all the specific calculations this time, only show the final result: Elapsed Weighted Times and Recommended Resources. Remember: LTAKT still equals 30 because we haven't changed the demand or the working hours per day.

Elapsed

	Demand	OP10	OP20	OP30	OP40	OP50	OP60	OP70	OP80	OP90
LT Sedan	150	26.0	27.0	25.0	58.0	29.0	28.0	28.0	160.0	24.0
ZR Sport	50	26.0	27.0	35.0	58.0	23.0	28.0	28.0	320.0	40.0

		OP10	OP20	OP30	OP40	OP50	OP60	OP70	OP80	OP90
Weighted Time		26.0	27.0	27.5	58.0	27.5	28.0	28.0	200.0	28.0

	OP10	OP20	OP30	OP40	OP50	OP60	OP70	OP80	OP90
Machines Needed	0.00	0.00	0.00	0.67	0.00	0.00	0.00	7.00	0.00
Machines Assigned	0.00	0.00	0.00	7.00	0.00	0.00	0.00	7.00	0.00
Labor Needed	0.96	1.00	1.02	1.93	0.96	0.98	0.98	0.88	0.93
Labor Assigned	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00
IPKs Needed	0.00	0.00	0.00	19.31	0.00	0.00	0.00	34.00	0.00
TAKT	27.0	27.0	27.0	30.0	28.6	28.6	28.6	28.6	30.0
TAKT Time for Assigned	3.3	3.4	3.4	7.3	3.4	3.5	3.5	25.0	3.5

Notice now that now all the labor needed is close to one person, except for OP40, which will need two people working in parallel. Operation 30 is slightly above 1 person, but since you designed your line for the MAXIMUM you will ever do, you should have plenty of extra capacity for normal weeks.

Save and View Mixed Model Map Baseline

Now that you have a balanced line, you want to save it as a baseline. Later, when scheduling your line, you can compare actual production against this baseline to see how your actual mix of products compares to your designed mix, and see if it causes any imbalances in the line.

Save Your Balanced Mixed Model Map Save the mixed model map as a baseline. The Baseline represents the forecast demand used during line design. To do this, while viewing the MMM, go to the Special Menu in Release 11 (the Tools Menu in Release 11i) and select Save as Baseline.

View Saved Map Once the mixed model map is saved as a baseline, it can be viewed again. Navigate to the Mixed Model Map parameters window. Go to the Special Menu in Release 11 (the Tools Menu in Release 11*i*) and select View Baseline. In the View Baseline window, click on the flashlight to search for the line name you are interested in seeing.

You will also be able to see it while viewing another mixed model map for the same line. For example, if you generate a new MMM using actual production for the next week, and want to compare it to the line design, you can do it in two ways:

1. Choose the Baseline Variance Alternate Region in the lower half of the screen. This will show you a % difference between the current MMM and the saved baseline

2. Choose the Baseline Tab to see the recommended resource calculation for the baseline. Click the details button to show the details of the parameters used to generate the baseline.

5

Line Scheduling

Overview

In Flow Manufacturing, line scheduling is equal to line design and balancing in terms of importance. If you design your line perfectly to your average daily demand mix, but you schedule it improperly, you could cause excessive change-overs, unbalanced demand on resources, or large peaks in demand to your kanbans. Either of these will undermine your line's ability to perform to takt.

Oracle Flow Manufacturing enables you to create and use simple scheduling rules to schedule either sales or planned orders for your flow line. You should be able to:

- Create a scheduling rule based on pre-defined sequencing criteria and scheduling algorithms, or create your own rules and assign them to the application.

- View all unscheduled orders for your line and choose which orders you want to schedule.

- Schedule the line and view the final flow schedule

- Schedule planned orders from MRP

- Synchronize Feeder Lines with Final Production Lines

Process Flow

To utilize the Line Scheduling functionality, you must perform the following steps:
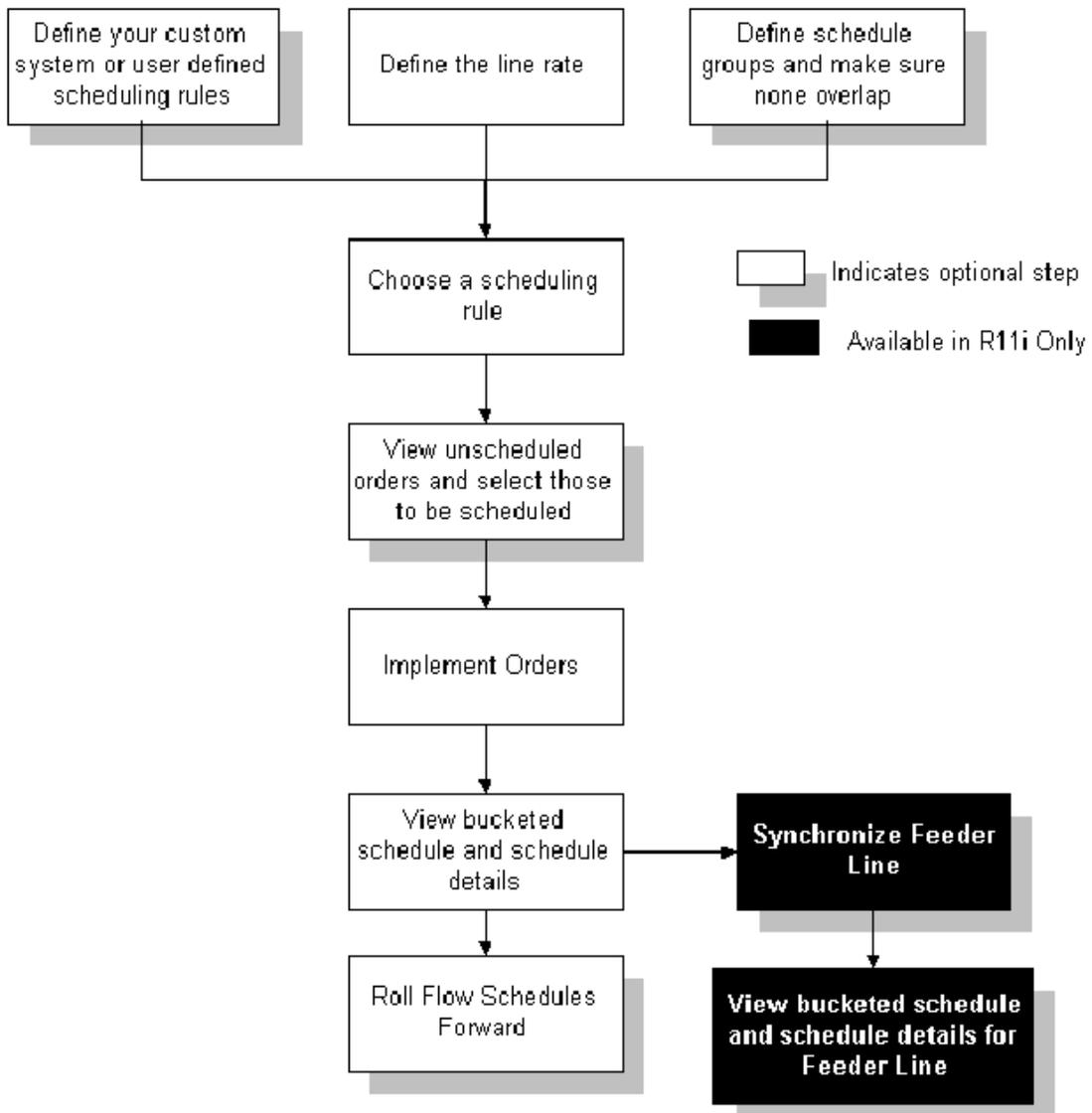
Process Steps

The following sections describe each of the process steps listed above.

Define Your System or User Defined Scheduling Rules

(N) Flow Manufacturing > Set-up > Scheduling Rules

Scheduling rules determine the logic used to create flow schedules from orders. They are a combination of sequencing criteria and scheduling algorithms that can help you pull demand forward or backward in time, to meet takt for each day.

You can define rules in any of the three following ways:

- Define your own rules based on system sequencing criteria and scheduling algorithms.
- Use one of the five seeded scheduling rules that come with Oracle Flow Manufacturing.
- Create your own scheduling rule outside of Oracle and use an open interface to assign it to the program.

The section below describes how to set up your on system defined sequencing rules, and explains sequencing criteria and scheduling algorithms, then details on the seeded scheduling rules and external scheduling rules are discussed.

Define Your Own Scheduling Rules

System sequencing rules consist of a combination of one or more sequencing criteria and one scheduling algorithms. You can choose the combination right for your business using the Define Scheduling Rules window. All sequencing criteria and scheduling algorithms available in Oracle Flow Manufacturing are explained below.

Sequencing Criteria Sequencing criteria is used to determine the scheduling priority of sales orders. When defining system-defined scheduling rules, you may pick multiple prioritizing criteria for your orders. In this case, the criteria will be prioritized in the order you list them.

> **Note:**   If the system finds multiple orders whose sequencing criteria are equal, the orders will be scheduled based on part number.

Available sequencing criteria are (All information is pulled from the sales order.):

Sequencing Criteria	When it should be used
Order Request Date	Used if you want to prioritize orders based on the actual customer request date. This is recommended as the Primary criteria for most Flow Manufacturing environments.
Order Promise Date	Could be used as the Primary criteria if used in conjunction with ATP functionality, where Order Management promises a delivery date based on material availability.
Order Schedule Date	Could be used as the Primary criteria if you want to prioritize based on schedule date. Usually only necessary if your schedule date varies significantly from either the request or the promise date.
Order Entry Date	Could be used in combination with any of the above criteria to prioritize multiple orders that have the same date criteria. Should never be used as the primary criteria.
Order Priority	Can be used in combination with any of the above to prioritize multiple orders that have the same date criteria.

> **Note:** If you leave the sequencing criteria blank, the system defaults to Order Schedule Date.

An example of using multiple criteria: If you sequence by Order Request Date and then Order Entry Date, the Order Request Date will have priority 1, and the Order Entry Date will have priority 2. This means that if two different orders have the same request date, then the order with the earliest order entry date is scheduled first.

> **Note:** Criteria are only applied to unscheduled sales orders. Unscheduled planned orders, are sequenced solely on the Planned Order Due Date.

Scheduling Algorithms Scheduling algorithms are used to smooth your demand by restricting the number of each assembly that is scheduled in any given day. Demand smoothing is important because your line was designed based on an average daily mix. You will most likely never have a day where you produce EXACTLY the line mix. Demand smoothing ensures that you will maintain the most mix, that will help your line to operate more efficiently and achieve takt time on a daily basis.

There are three levels to smoothing: No Level Loading, Level Loading, and Mixed Model. All three are described in detail below.

Algorithm	Description
(1) No Level Loading	When you choose no level loading, the system performs no demand smoothing. Orders are scheduled solely based on the sequencing criteria and the capacity of your line. The scheduling process searches for available capacity beginning with the first date of the scheduling date range, and simply fills it up with orders prioritized by your sequencing criteria. If the entire quantity of the sales order cannot be satisfied on a date, a quantity equal to the available capacity will be scheduled to fill the line rate and the remaining quantity will be scheduled on subsequent days where capacity is available. When day one is full, it moves to day two.
	For example, if you choose to sequence by request date with no level loading, the system will start on day one of your scheduling horizon, and will fill up all available capacity with orders that are prioritized by request date.
	When would you use it?: You want to use this option if your customers are not flexible about delivery dates. For example: your customer is running a JIT facility that needs you to deliver exactly to their request date.
	Caution: Scheduling without level loading may create a mix of products that is very different from the mix for your line design. If your products vary significantly in build time, set-up time, or the parts used, you will cause either large imbalances to your line, or shortages of material in your kanbans. As an example: Assume Product A takes 2 hours to assemble at OP10, and product B only takes 1 hour. You designed your line to make 4 As and 8 Bs. every day (your line runs 16 hours each day). But today, you get customer orders for 8 As and 4 Bs. This new mix requires 20 hours to assemble at OP10. You will not have enough capacity to produce the requested mix without using overtime.

(2) Level Daily Rate	When you choose a level daily rate, the system looks at your mix of demand over the time horizon and calculates a demand ratio. This ratio is multiplied by the amount of available capacity each day to determine how much of each item will be scheduled on a given day. Items are then prioritized based on the sequencing criteria. For example: Assume you are scheduling orders for the next 2 weeks, and the total demand over the time horizon is for 100 As and 50 Bs. The demand ratio for $A = 100/150 = .67$ and for $B = 50/150 = .33$. The first day in the time horizon you have an available capacity for 10 items, and the second day you have available capacity for 20 items. The system first prioritizes all orders based on the sequencing criteria. The system would then schedule 7 As and 3 Bs on the first day (to fill your capacity), and 14 As and 6 Bs the second day, and so on. All As will be batched together, followed by all Bs. You must set the rounding attribute on the item master to "Yes" to ensure schedules will be only created for whole numbers.
	This option would be used in a facility that has somewhat flexible delivery dates, and is set-up intensive (so they would want the system to "batch" through the As, then the Bs).
	Caution: If you are not set-up intensive, and product A takes longer to process than product B, you could cause a bottlenecks in your line by batching products through your shop.
(3) Mixed Model	If you choose Mixed Model, the system performs level loading, but also determines a pattern such that products are not "Batched" through the shop. Building on the example from level loading, a mix of 100 product A's and 50 product B's could generate a pattern of AAB which would be repeated 50 times to schedule the total demand. This provides the most consistent pace to your line, and will cause the least disruptions to your supply chain.
	This is the preferred method of demand smoothing, because it gives you as close to the design mix as possible with your current demands. This means your line will operate more effectively, and you run a much lower risk of over-burdening your supply chain. You will want to use this method if your customers are somewhat flexible in their delivery dates, and you do not have a lot of set-ups.

Use Oracle's Seeded Scheduling Rules

Oracle Flow Manufacturing comes seeded with 5 pre-defined scheduling rules that combine one system sequencing criteria and one system algorithm. (see Table 1). Use the detailed information above to determine if these rules will work for your business.

See following sections for detailed definitions of criteria and scheduling algorithms.

Level Daily Rate	Order Request Date	Level Daily Rate

Mixed Model	Order Request Date	Mixed Model
Promise Date	Promise Date	No Level Loading
Request Date	Request Date	No Level Loading
Schedule Date	Schedule Date	No Level Loading

Define Your Own Scheduling Rules Outside of Oracle

If you need more sophisticated scheduling capability, you can define your own scheduling rule. To do this, simply go to the same screen as system defined rules, and check the User Defined box. Then, modify the Custom_Schedule procedure (MRPPCLSS.pls/MRPPCLSS.pls).

See Oracle Manufacturing, Distribution, Sales & Service Open Interface Manual for more information on APIs.

Define Your Line Rate

(N) Flow Manufacturing > Lines > Lines

The Daily Production Rate used in scheduling is defined on the line set-up screen. It is the calculated by multiplying the Hourly Production Rate by the number of work hours for this line (stop-start time). You need to return to this screen after balancing your line to change the Hourly Production Rate so the calculation matches your designed line capacity. If not, the scheduling rules will not work appropriately.

Define Schedule Groups

(N) WIP > Set-up > Schedule Groups

You can use Scheduling Groups to further organize your schedules. A schedule group is simply a name that you assign to a flow schedule to organize schedules for reporting, measurements, or refined sequencing.

For example: You can create a schedule group that corresponds to each shift. Assigning schedules to these groups will allow you to perform level daily rate, but make sure that each shift gets a mix of products. It will also allow you to perform linearity calculations by shift, rather than a single measurement across shifts.

To create schedules by shift:

■ Create schedule groups for each shift.

■ Perform line scheduling three times, one for each schedule group (or shift). Be sure to change the scheduling start and stop times to the time for the shift you are scheduling.

■ The program will schedule orders according to your scheduling rule within each shift.

You can update schedule groups. You cannot delete schedule groups that are assigned to jobs and flow schedules.

The schedule group assigned in the Line Scheduling Workbench Options window can be overridden in the Work order-less Completions window, but only with a schedule group that is associated with a scheduled flow schedule.

▶▶ **To define a schedule group:**

1. Navigate to the Schedule Groups window.

2. Enter an alphanumeric name to identify the Schedule Group.

   Schedule groups are used to group discrete jobs and flow schedules. For example, you can create a Shift1 schedule group to which you will assign schedules that are to be built during the first shift. Schedule group names can be up to 30 characters and must be unique within the organization.

3. Enter a schedule group Description. Descriptions can be up to 240 characters of alphanumeric text.

4. Enter an Inactive On date.

   As of this date, you can no longer use this schedule group.

Schedule Group Listing The Schedule Group Listing lists all information about schedule groups. To get a listing, follow the instructions below:

In the Submit Requests window, select Schedule Group Listing in the Name field.

In the parameters window, fill in Schedule Group From/To:

To restrict the report to a range of schedule groups, select a beginning and an ending schedule group.

Setup WIP Accounting Class Code

WIP Accounting Class Codes are required to perform Work Order-less Completions

(N) WIP > Setup > WIP Accounting Classes

1. Add a class called Flow
2. The Type is Standard Discrete.
3. Enter the Valuation and Variance accounts.
4. Save your work.

Choose a Scheduling Rule, View Unscheduled Orders, Implement Orders, and View Schedules

(N) Flow > Line Scheduling > Scheduling Workbench

All these steps are done using the Line Scheduling Workbench.

Workbench Orientation

You use the Line Scheduling Workbench to schedule either sales orders or planned orders for a particular flow line. You choose a line and scheduling group to schedule, then specify which orders to schedule under what scheduling rule.

Line equals the production line you intend to schedule.

Schedule Group is the group to which you want to assign these schedules.

Daily Production Rate is calculated based on values defined in the Production Line form. Daily Production Rate equals the maximum Hourly Rate (which is in units) multiplied by the difference between the line's stop and start times from the Production Line form. See the Define Your Line section of Chapter 4, Line Design & Balancing for more information on how this field is calculated.

The Unscheduled Orders region allows you to choose both the type of orders to schedule and which Order Dates to schedule. (Please see note on using planned orders following this section). Fill in the Order Dates with values that represent your intended scheduling horizon.

The Scheduling region includes the scheduling Rule and Schedule Dates. The scheduling Rule is chosen from any of those defined above. The dates are the range of days in which you want to schedule orders.

Create Flow Schedules button The program will take all unscheduled orders within the date range defined in the Unscheduled Orders region, and attempt to schedule them to meet the daily production rate on a daily basis, for the date range defined in the Scheduling region, using the scheduling Rule. For example, if the date range in the Unscheduled Orders region is today plus two weeks, and the date range in the Scheduling region is today plus one week, the program will attempt to take the

next two weeks demand and fill to the daily production rate every day on the schedule *this* week, according to the scheduling rule. The Create Flow Schedules button will also open the Flow Schedule Summary window so you can see the results of your scheduling. Use this button if you want to schedule all orders with in a time-frame.

Unscheduled Orders button enables you to view all unscheduled orders for your line for the time frame indicated in the unscheduled orders region. You can then select individual orders to convert to flow schedules, or choose multiple orders using Control-Shift-Left mouse button. And finally, you can implement these orders to flow schedules. Use this button if you want to choose which orders to create to flow schedules.

Flow Schedule Summary button displays the Flow Schedule Summary window. You can view your daily demand requirements by week, assemblies are displayed in daily buckets. Total daily units scheduled are displayed at the base of each bucket column. If you are level loading, the pattern for total daily units scheduled will not exceed the Daily Production Rate. You can also view unscheduled orders from within the Flow Schedule Summary window by clicking on the Unscheduled Orders button. This allows you to view your Flow Schedule Summary first, then add new unscheduled orders to the mix.

You can click on the Details button to view further information on the assembly, build sequence number, completion information, and order information.

Once in the details section, you can create a folder to add/delete columns that are important to your business.

> **Attention:** If you are using system defined scheduling rules to create your schedule or you manually created the schedule, the Start Date (which you can see using the folders/add fields option) is equal to the Completion Date - Fixed Lead Time (TPCT) - Variable Lead Time (takt)*schedule quantity. Be sure you have updated your master item with these values prior to executing the line. See the item definition section in Chapter 4: Line Design & Balancing for more information. If you used user defined scheduling rules, you must specify in the rule how to offset the start date.

Tools Menu in R11i (Special Menu in R11) allows you to:

- Switch to the Work order-less Completions form by selecting Completions

- Switch to the Mixed Model Map

- Roll Flow Schedules. This is a program that adjusts the quantity on future production schedules based on completion quantities.

- Delete Flow Schedules

Synchronize a Feeder Line (R11i Only)

(N) Flow > Line Scheduling > Feeder Line Synchronization

Once you have your final assembly line scheduled, you can synchronize other Flow Manufacturing "feeder lines" (or sub-assembly lines), using the Feeder Line Synchronization concurrent program.

Feeder line synchronization allows you to create schedules for feeder lines that are directly derived from parent assembly line schedules. This will allow material to be produced precisely when needed at final assembly with no buffer inventories. It is especially useful in complex mass customization environments where sub-assemblies produced on the feeder line are directly dependent on the specific products or configurations produced on the parent line, and the volumes are not sufficient to support a kanban replenishment system.

You are able to specify a line, or a range of lines and a date range as input. The program will determine which items to schedule and generate sub-assembly schedules that support the sequence that parent assemblies are scheduled to be produced on the lines specified.

▶▶ **To run the program:**

1. Navigate to the Feeder Line Synch Screen.

2. Select the Feeder Line Synchronization concurrent program name.

3. Enter the parameters

From Line/To Line These parameters refer to the PRIMARY line(s) you want to synchronize to. If you are sequencing to only one primary line, you would enter in the same line for both From and To.

For example: If you have a Primary line called "Final-assembly", and a feeder line called "Motors", you will enter in "Final-assy" into both the from and to fields. If you have multiple Primary/Feeder line combinations, you can schedule all feeder lines at once by putting a range of lines in the "From/To" fields that encompass the names of all of your primary assembly lines.

From Date/To Date: Is the range of dates in which you want to synchronize schedules.

> **Attention:** The Feeder Line Synchronization DOES NOT delete existing schedules on the feeder line before creating schedules based on the Primary line. You must be careful when choosing the "from date" and "to date" to make sure you do not over-lap schedules that have already been created from previous Feeder Line Synchronizations (or you will double the demand on the Feeder Line).
>
> If you have changes on the primary line that you want to reflect in the Feeder Line, you must first delete the previously created schedules on the Feeder line for the time period you want to re-synchronize. Then run the feeder line synchronization to created schedules derived from the new Primary Line schedules

Date Offset:

The program will schedule the feeder line to complete on the same day as the parent line - it DOES NOT offset the completion dates based on when you consume the item.

One work-around is to change the fixed lead time on the feeder line so that the start date of the feeder line is early enough to compensate for when you use the item. For example: You are building a car that has a lead time of 4 days. It must be completed on Aug 5. You have a sub-assembly line that need to be synchronized so the correct engine will be available for the car. The engine has an actual lead time of 2 days, and is consumed on day two of the primary line. (See diagram below). For the start date of the feeder line to be early enough so the engine is available for the primary line on day 2, you can change the lead time on the engines master item to 5 days.

Caution: If you schedule this line using any other method (direct sales orders, or production kanbans, etc.) in addition to feeder line synchronization, the schedules for these items will be 3 days earlier than you really need them!

Start Date =
Aug 11

Stop Date =
Aug 15

1 day   1 day   1 day   1 day

Car Line

1 day   1 day

Engine Line
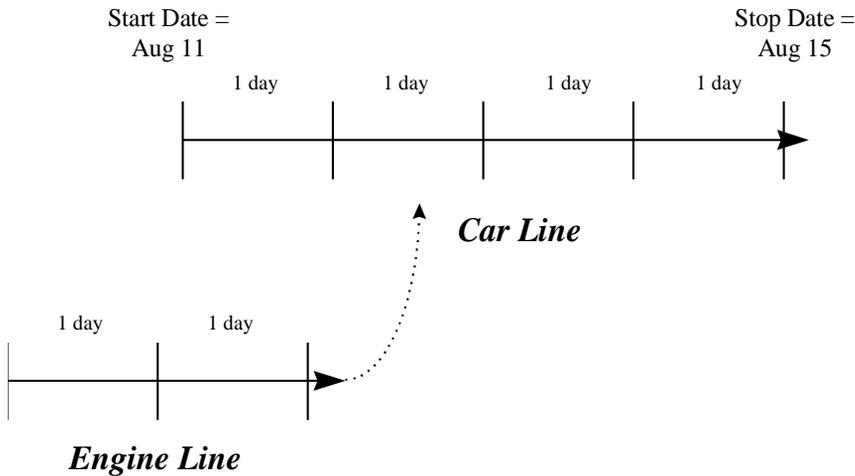
If you put the actual lead time of the Feeder Line on the Item Master (2 Days)
      Engine Stop Date = August 15
      Engine Start Date = August 13

However, if you put an inflated time of 5 days on the Item Master
      Engine Stop Date = August 15
      Engine Start Date = August 10
This will allow the engine to be completed in time to be consumed by the car
line at the 2nd operation.

A few final notes on Implementing Flow Schedules

The scheduling process assures that flow schedule quantities for items with the rounding attribute set to yes are non-fractional. This could sometimes cause the line capacity to not be fully loaded. For example, if the available line capacity for a certain date is fractional and all items to be scheduled have round attributes set to yes, the fractional capacity will remain not utilized.

Sales orders or planned orders that are not scheduled due to capacity constraints will remain as unscheduled. If part of an order is scheduled, the order will remain unscheduled with the appropriate unscheduled quantity.

There are some cases in which you may need to use planned orders. An example: You are using APS to optimize your flow schedules, or you have a seasonal business, and you use MRP to create planned orders during your slow period to

build up inventory to satisfy your peaks in demand. In this case, make sure to note the following items:

1. For no level load and level daily rate, if the unscheduled orders are planned orders, the quantities of the planned orders are first modified, if necessary, to respect the order modifiers. You may use the fixed order quantity, minimum order quantity and maximum order quantity to restrict or mandate a specific lot size.

2. If you are using planned orders from MRP or APS to schedule your line, you MUST use full pegging or you may duplicate demands in your Flow Schedule (if a planned order was generated from a sales order, you will implement both if Pegging is not enabled).

For more details on the scheduling process, and examples of each of the algorithms discussed above, see the Oracle Flow Manufacturing Users Guide

Cross-Application Impacts

Integrated Line Scheduling & Work Order-less Completions

Line Scheduling & Work Order-less Completions are Integrated in the following manner:

Completion of a scheduled flow schedule

Completion of a scheduled flow schedule still leaves the schedule status as "Open." However, when you return to the Line Scheduling Workbench, Flow Schedules Summary, you will see that you will now have a value in the "completed" row for the item you completed. You can go to the details screen to get specific information on when a schedule was completed.

Completion of an unscheduled work order-less order

Completion of an unscheduled work order-less order creates a flow schedule for the Assembly / Line combination with a scheduled flag of "No" and status of "Closed."

This schedule cannot be viewed in the Line Scheduling Workbench, but it's quantity will be reflected in the quantity completed." to the end of the sentence.

6

Production Execution

Overview

Oracle Flow Manufacturing enables you to reduce the number of non-value added transactions needed on your shop floor. This is done through work order-less completions. You should be able to:

- Complete assemblies with or without creating a job, repetitive schedule, or flow schedule

- Backflush all components based on the assembly bill, or add/delete components for a particular completion.

- Charge resources and overhead based on the Flow Routing

- Complete assemblies to a designated completion sub-inventory/locator.

- Perform Lot/Serial Control

- Return previously completed items to stock

- Scrap assemblies and consumed components at any operation on the line

- Integrate quality collection plans with completions

Process Flow

To use the simplified production execution functionality, you must perform the following steps:
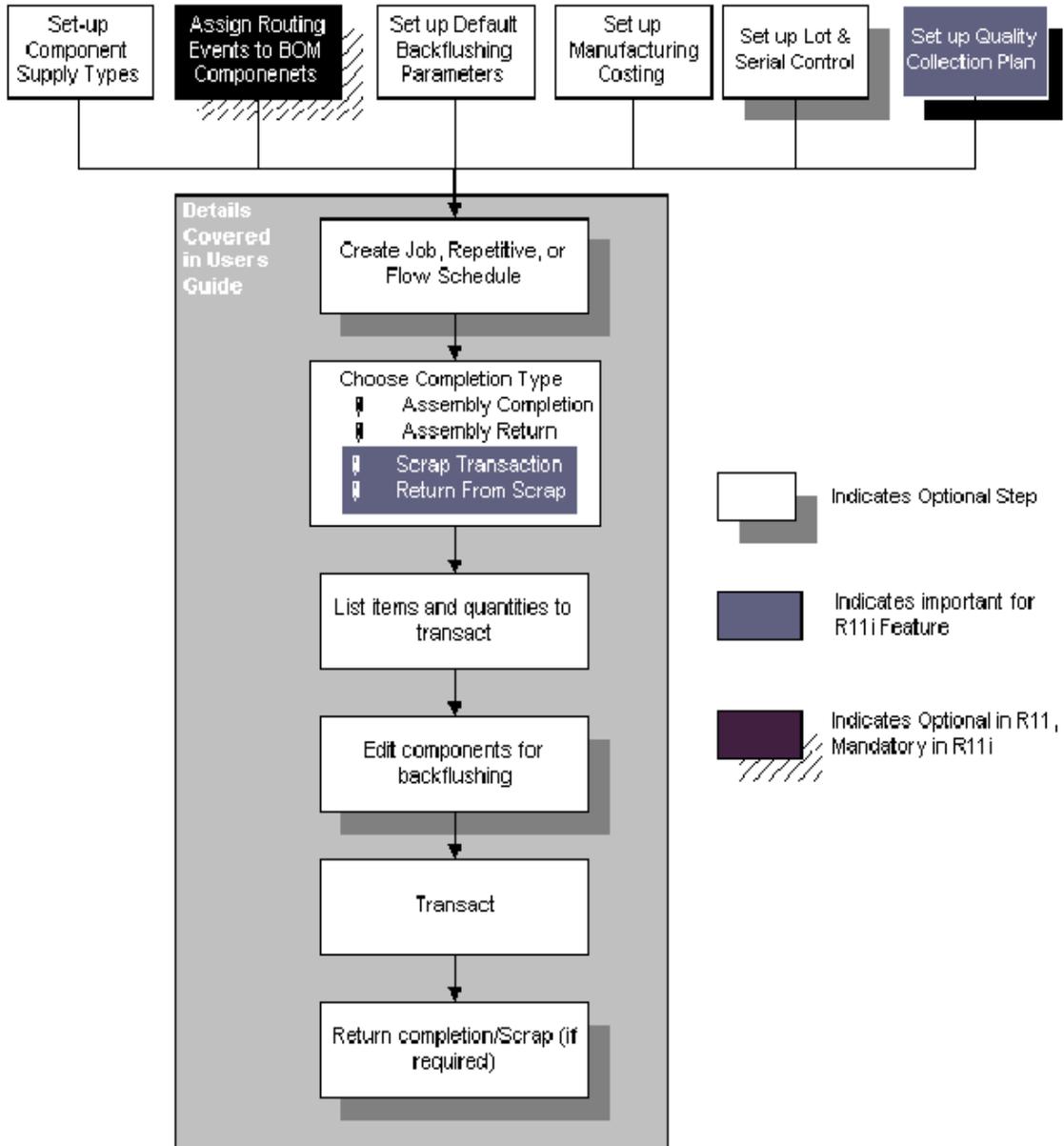
A primary objective of Flow Manufacturing is the elimination of non-value added activities. Non-value added activities are steps that add cost to the process without

adding value to the customer. Eliminating these steps reduces costs while maintaining a consistent level of value. In production execution, this is accomplished by minimizing the number of steps or transactions necessary to record and manage production. Each transaction performed represents costs in the form of paperwork and data entry. Each transaction also represents a potential quality problem or failure point, as every data entry step is an opportunity to make a typographical error. As thru-put time and inventory levels are driven down during implementation of Flow Manufacturing, the need for, and value of, detailed production information becomes less. This creates the opportunity to eliminate or streamline production execution transactions.

In Oracle Flow Manufacturing, the recording of production in a flow manufacturing environment is done primarily with the work order-less completion transaction. To increase your production efficiency, simplified schedules and visual management replace the intensive maintenance effort required to create work orders and track of detailed product movement on the shop floor.

Oracle Flow Manufacturing enables you to record completions scrap of assemblies without having to create work orders. Completions can be either unscheduled or against a flow schedule. The system will back-flush all components and perform resource and overhead transactions upon recording completion of the finished product.

Process Steps

This section details the steps needed to perform a Work order-less Completion.

Set up component Supply Types *(Mandatory)*

Supply types control how component materials are supplied to the Flow Line. Identical to current Oracle Work-In-Process functionality for discrete and repetitive production, supply types also define how materials are costed in Oracle Cost Management.

You can assign supply types to the items you define in Oracle Inventory. You can also assign supply types to components when you create bills of material in Oracle Bills of Material.

Assembly Pull, Operation Pull, and Push components are automatically back-flushed while bulk and supplier components are not back-flushed. The bills for Phantoms are exploded and the Phantom components are back-flushed. The system back-flushes these components from the supply sub-inventory/locator assigned to the components on the bill of materials or the one that the user specified in the Work order-less Completions window. If no supply sub-inventory/locator is

assigned to the bill components, the system pulls components from the supply sub-inventory/locator defined for the item. If no item supply sub-inventory/locator is defined at the item level, items are pulled from the default supply sub-inventory/locator as determined by the Supply Sub-inventory and Supply Locator parameters. See: Backflush Parameters.

See the template descriptions in the Appendix for details on all Supply Types.

Assign Routing Events to BOM Components *(Optional R11, Mandatory R11i)*

You assign routing events to components in the BOM after the routing is created. (You usually will create a BOM first, then a routing, and finally return to the BOM to update the event sequence.)

> **Note:** In the BOM, the column you need to use for this option is titled Operation Seq, not Event Sequence. Please remember that for flow manufacturing it refers to the EVENT sequence in which that component is used.

When you assign Flow Routing events to BOM components, you assure that material and resources are applied at the correct location on your manufacturing line. This is optional in Release 11. Any component that you do not assign to a routing event will be assumed to be consumed at the beginning of the line. When you complete an assembly and back-flush material and resources, all material will be consumed at the beginning of the line. If you assign an event to each routing component, the material will be applied to the appropriate event in the line. This may be useful for reporting or costing information.

In Release 11*i*, you can scrap an assembly at any operation in the production line using the work order-less completion form. For example, you have 5 operations on your line. You want to scrap something at operation 30. The program will use the BOM for the component/event association and routing for the event/operation association, and scrap all components that are assigned to events in operations 10-30. If you do not assign components to events in the BOM, you will ALWAYS scrap ALL components, no matter what operation you tell the program to scrap.

Assigning routing events to BOM components is also critical when working in an ATO environment or if you want to use the Flow Workstation. See Chapter 8: Flow Manufacturing and ATO for more information.

Back-flush Default Parameters *(Mandatory)*

The following WIP parameters affect back-flush transactions. To change them, navigate to:

WIP/Set-up/Parameters and choose the Backflush defaults tab.

Supply Sub-inventory Determines which supply sub-inventory and locator (if required by the sub-inventory) are used when back-flushing Operation Pull and Assembly Pull components that do not have defaults defined at the bill of material component or at the inventory item level.

You can select an expense sub-inventory, if the Oracle Inventory Allow Expense to Asset Transfer profile option is set to Yes. See: Inventory Profile Options.

Supply Locator Determines which supply sub-inventory and locator (if required by the sub-inventory) are used when back-flushing Operation Pull and Assembly Pull components that do not have defaults defined at the bill of material component or at the inventory item level.

Lot Selection Method Determines how lot controlled Assembly Pull and Component Pull component items are selected during back-flush transactions. The options are as follows:

Expiration Date Backflush lots are automatically selected based on their expiration date and the first in-first out (FIFO) method or, if the lot is not under shelf life control, the receipt date and the first in-first out (FIFO) method.

Manual Manual Backflush lots must be manually selected.

Receipt Date Backflush lots are selected based on their inventory receipt date using the first in-first out (FIFO) method.

The lot selection method does not apply to components that are under both lot and serial control. When you back-flush a component under both lot and serial control, you must enter both the lot and the serial number.

Lot Verification

Determines how lots are verified during back-flush transactions. The options are as follows:

All Verify that the lots automatically selected were the ones consumed by the assemblies. Exceptions Only

Verify exceptions only   If the lot requirement for the component cannot be filled automatically using the FIFO method, you can assign lots to components manually.

Intra-operation Steps Parameter

Determines which intra-operation steps are enabled in your WIP routing operations. The options are Queue, Run, To Move, Reject and Scrap. See: Intra-operation Steps.

The Queue intra-operation step is automatically enabled for all operations and cannot be disabled. The To Move intra-operation step, even if disabled here, is automatically enabled for the final operations in routings so that assemblies can be completed into inventory.

Manufacturing Costing *(Mandatory)*

The costing method of the organization you are operating in determines whether you can use mixed manufacturing methods. Costing in a flow environment is usually done using standard costing methods, although average costing is also used, particularly when used in conjunction with project manufacturing. Cost variances are collected and posted during the work order-less completion transaction.

For detailed information on the costing implications of flow manufacturing, see chapter 5 of the Release 11 Oracle Cost Management Users Guide.

Set-up Lot and Serial Control *(Optional)*

You can assign lot and serial control to either a final assembly, or any of the component parts. This will require users to enter in lot and serial information before completing the work order-less completion transaction.

If you want serial control on the parent item, set serial control to At Receipt or Pre-Defined (defined on the inventory item attribute). Then upon completion of this item, you will be required to assign a serial number to the assembly before completing the assembly and "receiving" it into finished goods.

If you want serial control on components of your assembly, set serial number to At Receipt or Pre Defined. If you want lot control, set the lot attribute to full control. You will assign each part a serial number/lot number when it is originally received into inventory. Then, during work order-less completions, you will be required to

enter the serial number/lot number for the part that was actually used in the assembly.

> **Note:** In R11 & R11i you must know the component parts that are under lot or serial control at the time of completion (the program will not give you a list). You must also know in which operation sequence (from the BOM) this part is used. You will manually type in this information, then enter lot/serial information on each one. You will not be able to perform a completion until all components under lot/serial control are listed.

For detailed information on the Lot and Serial Control, see chapter 5 of the Release 11 Oracle Inventory Users Guide.

Set-up a Quality Collection Plan *(Optional - R11i only)*

In Release 11i, Oracle Quality has integrated its "Enter Quality Results" form with WIP's Completions transaction. Users will now be able to collect quality information on the final assembly as they are performing work order-less completions in Oracle Flow Manufacturing. To do quality collection on components, set-up a collection plan and execute it before you perform the work order-less completion.

Users are able to specify three types of collection plants: mandatory, non-mandatory, and background collection plans.

If the user configures a collection plan to be mandatory during definition of the collection plan, Oracle Quality will not allow the transaction to complete until Quality data is entered. If users try to complete the transaction without entering data on mandatory collection plan, the following error message will be displayed to the user indicating that Quality data must be entered: "You must enter Quality data for the collection plan < plan name>".

If user configures a collection plan to be non-mandatory during definition of the collection plan, the user may enter quality data using the tools menu, but they are not required to do so.

If the user configures a background collection plan, data will be collected for that collection plan without user intervention. (Data collected must be available on the work order-less completion form). The background data collection process is hidden form user.

For detailed instructions on how to set up collection plans, please refer to Oracle Quality User's Guide.

To enter quality data, click on the special menu entry Enter Quality Results or on the Quality button on the toolbar. This will open Quality window with the collection plan which is first in alphabetical order with all the context elements populated.

Create a Job, Repetitive or Flow Schedule *(Optional)*

You are able to perform completions without creating any schedules and / or jobs. However, it is recommended that you do use the Flow Schedule capability to ensure you are meeting customer demands and keeping your line as balanced as possible. You may also create a standard job or repetitive schedule, but these will add unnecessary complication to your line. See Chapter 5 for how to create a flow schedule. Jobs and repetitive schedules can be created via the normal WIP process.

Perform a Completion or Scrap Transaction *(Required)*

Completions and scrap transactions are performed by navigating to Flow Manufacturing/Production/Work order-less Completions. In this window, you can perform schedule or non-scheduled completions.

See the Oracle Flow Manufacturing Users Guide for more details on how to use the work order-less completions form.

See the end of Chapter 5 of this manual for more information on the dependency between scheduling and work order-less completions.

> **Note:** When you "save" a completion transaction, you cannot tell if the completion processed correctly. To do so, you must go to the inventory transaction summary or transaction open interface as described below.

Verifying a Work order-less Completion Processed When you "Save" a work order-less completion, the data is sent to a background transaction open interface to do the inventory and accounting transactions. To verify that a Work order-less Completion Processed correctly, you go to:

Navigation:(N) Inventory > Transactions > Transaction Summaries

Enter in the dates and/or the part number you want to look for and click summarize. All transactions on that part will be listed. If the completion does not appear on the list, check the error log at:

Navigation:(N) Inventory > Transactions > Transaction Open Interface

Choose an organization, select Process flag equal to error, and enter the item number and click find. Look for a fail completion transaction and the error code

7

Kanban Planning & Execution

Overview

Oracle Flow Manufacturing uses a kanban pull replenishment system to signal material requirements and pull material from its defined source as needed to meet daily customer demand. The objectives of the kanban replenishment system are to continuously improve the production with zero stockouts, shorter lead times, and reduced inventory with minimal manual supervision. Instead of waiting for an MRP plan to push materials to the floor, each operation pulls the material it needs from its sources at the time it needs it, signaling with a replenishment signal.

Oracle Flow Manufacturing enables you to create and use kanban replenishment chains to re-supply your line. You should be able to:

- Create kanban pull sequences to replenish from other internal organizations (inter-org), suppliers, production lines, and other sub-inventories within your organization (intra-org).

- Calculate either kanban size or number of cards required for each pull sequence based on demand and pull sequence parameters.

- Simulate changes to any of the kanban parameters in the kanban workbench prior to updating your production kanbans.

- Compare kanban calculations between two separate plans (for example, compare current forecasted demand to what you are using today (the Production plan).

- Generate and print kanban cards (inter-org and supplier kanban only in R11, all types in R11i).

- Replenish cards, and have the system automatically create the appropriate purchase order, production schedule (R11i only), or move order (R11i only).

- View the current status of your cards (full, empty, in process, in transit, etc).

Kanban Replenishment Summary

The term kanban refers to a visual replenishment signal, such as a card or an empty container for material. In a kanban system, each work station on the flow line can have several containers, each holding the same quantity of material. Typically, an empty container is a signal to replenish. Meanwhile, work is continued using the other full kanban containers at the location.

Business Benefits of Kanban Management

Objectives of Kanban replenishment processes are to:

- Minimize inventory investment (replenish material only when needed)

- Increase inventory turns

- Integrate suppliers and other business units into the supply chain (flexibility, reliability)

- Eliminate work order kits

- Eliminate kit robbing

- Stage material at point of use

- Increase production responsiveness to demand

Kanban Replenishment Process

Kanbans are replenishment signals. Kanban signals are usually manual and highly visual, such as a color coded card that moves with the material. A kanban signal can also be represented by a light that goes on when replenishment is required, or an empty container that is moved to the re-supply location to trigger replenishment.

Familiar Examples of Kanban Signals

Some familiar examples of kanban follow.

- A wave to the wait-person to get the check

- The dummy light that comes on to signal you are low on gas

- The flag on your mailbox that signals to the deliverer that you have mail to pick up

- An empty container on the shop floor triggers a kanban card to be sent to the replenishing source

Kanban replenishment systems are designed around the unique production environment and use color and shapes to enable visual management of material flow. Kanban containers, signals and cards have specific use, are assigned to specific locations and are replenished from a single source, either on the line, from another organization, from a supplier, or from another production line.

Kanban signals can be electronic. Oracle Flow Manufacturing provides an open API for bar code readers or radio frequency readers. Use this to trigger a replenishment signal and update the card status from Full to Empty.

Kanban Containers

Kanban containers, signals, and cards have a specific number and size. The number and size is identical in the line and in the Oracle flow system. As material is scheduled and used on the line, the kanban container is replenished which signals requirements for more material from the source location. Floor runners may be assigned to monitor replenishment signal locations on an on-going basis. Filling this material requirement in turn creates new requirements and pulls material further up the line.

The kanban container which signals the replenishment might be a particular shape to limit the item quantity to the kanban size, and might be color coded by line or operation to easily locate the kanban location on the floor.

You can define rules of replenishment which help maintain the system of pulling material through the manufacturing system. Once designed, the kanban replenishment process is a self-regulating system between production and the replenishment clerk. If it's empty, fill it.

Kanban Replenishment Chain

The kanban replenishment chain is nothing more than multiple kanbans that indicate the entire chain of material movement through the shop. An example of a replenishment chain: the customer order pulls material from the flow line, that pulls material from the previous line operation, that pulls material from line stock location, that pulls material from stores, that pulls material from the suppler.

Process Flow

In order to utilize the kanban functionality, you must perform the following steps:
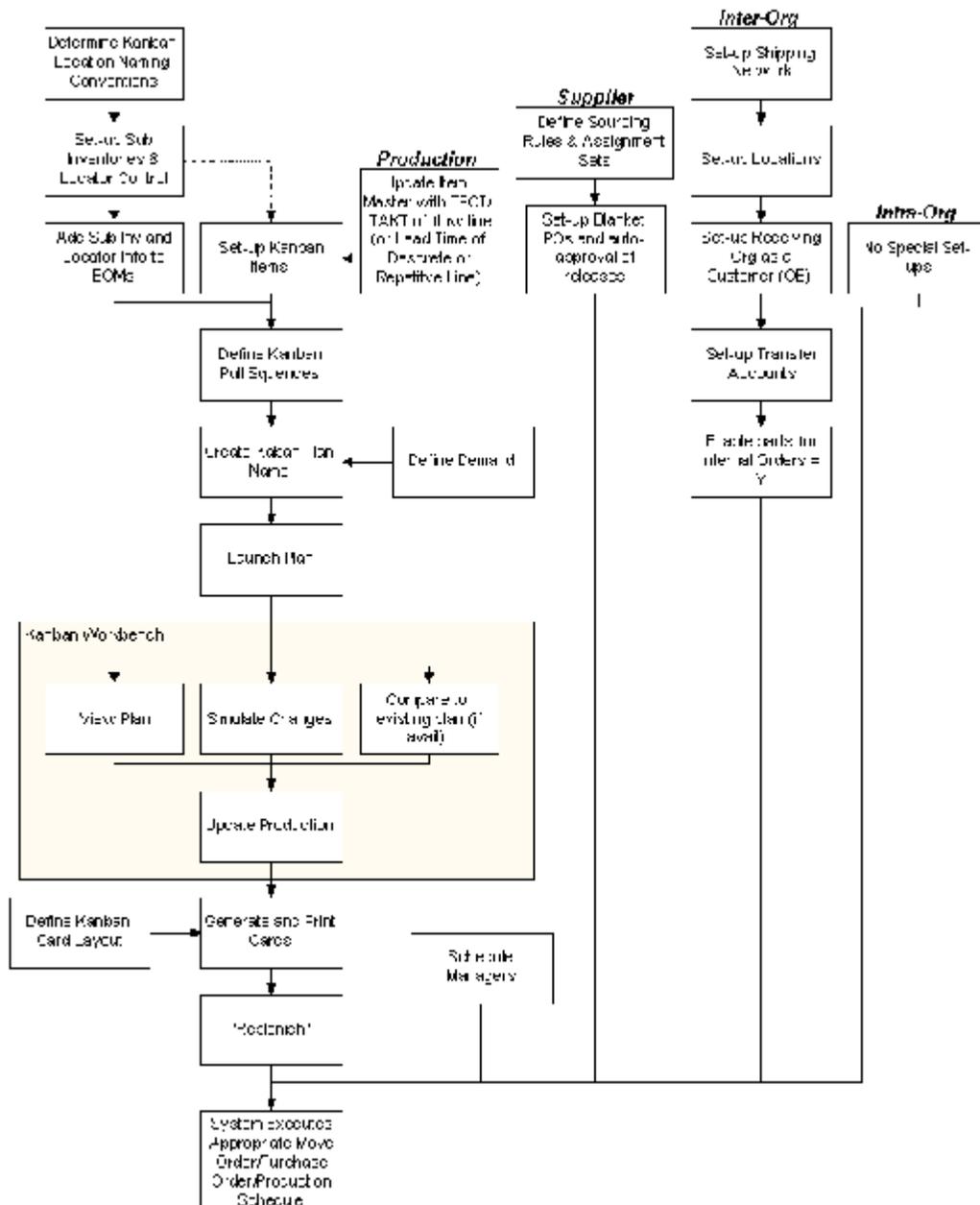
Process Steps

The following sections describe each of the process steps listed above.

Determine Kanban Location Naming Conventions

Considerations It is very important to spend time planning the appropriate structure for your Sub-inventories and locators as it affects set-up and maintenance of your items, BOMs, and pull sequences.

Remember that, in Flow Manufacturing, each part number may have one or multiple kanban locations in your shop (because the same part may be used in multiple lines, or in multiple places on the same line). Then, these kanbans may pull material from a storeroom, another line, another internal organization (such as a warehouse), or a supplier.

In practice, you will assign each of these kanbans a specific location (line, operation, rack for example) so that your material handlers will be able to find the location when they need to re-stock parts. You are able to define these locations on your pull sequences using sub-inventories and locators. (see Naming conventions and suggestions for locators below).

> **Note:** You will also need to assign these same locations to either the item master or the BOMs in Oracle so that the kanban planning program will know how to allocate demand to different kanban locations. When Oracle performs kanban planning, it will first explode the BOMs based on the demand you choose (forecast, MDS or MPS), then go to the material control region on all the BOMs to allocate demand to specific locations. If you do not have a location listed on the BOM, it will go to the organization item master and allocate demand to the location listed there. It then compares all demands at all locations to the pull-sequences. It will plan any item where the demand location matches a location on a pull sequence for the same item.

This means that it is critical that your first item in the pull sequence (or your Line Stocked items) has a sub-inventory and locator that match either all the BOMs that use the item at that location, or the item master. If the program doesn't find a match, the item won't be planned! See discussion in Add Sub Inventories & Locator Information to BOMs /Items below for further discussion on where you should add location information.

Note: For the rest of this discussion, Line-stocked kanbans will refer to the first kanbans in the pull sequence (since they generally originate on your production lines).

Naming Conventions & Suggestions When the flow line is designed, consider a conventional naming system to easily identify kanban locations. If you are currently using a three segment flex-field in your stock rooms, with row, rack, bin, you may want to rename the segments to reference Flow Manufacturing keywords - Product Family, Line, Kanban Location.

For instance, a kanban location might be defined: RIP 01.23.10.. . When a kanban card is received in stores with this designation, it would be a clear signal to replenish the card with the appropriate number of items (kanban size) and send it to the kanban location in RIP where Product Family 01 is stored, on Line 23 at Operation Sequence 10.

> **Note:** Remember that with Line Balancing, processes may move, change or disappear, so it is not recommended to use Process Codes from the Flow Routing to identify Kanban Locations. Instead use operation names.

> **Note:** Locators are required when in a Project Manufacturing environment. The two periods after the Operation Sequence field (10.. in this case) represent the fields for projects and tasks.

Set-up sub-inventories

(N) Inventory > Setup > Organizations > sub-inventories

In the example above on sub-inventories, the sub-inventory is named RIP to represent Raw-in-Process inventories supporting its flow lines.

In general, you want to keep the number of sub-inventories within an organization as small as possible. Typical Flow sub-inventory designations follow:

Wall-to-Wall Inventory: The entire shop floor is assigned to one sub-inventory (often called RIP).

Positives: This simplifies material movement - there is no need to create move orders to move material from one location to another. You can have a central kanban for common hardware that all lines use to replenish their single bin that is stored on the line and still back-flush material appropriately.

Downsides: you don't have accounting visibility to inventory by line.

Line Inventory: Each line is its own sub-inventory. Positives: You can track inventory by line.

No matter how many sub-inventories you decide to have, the following five attributes should be set to Yes:

Quantity Tracked

Asset sub-inventory

Include in ATP

Allow Reservation

Nettable

Sub-inventory Locator Control

It is important to choose the correct Locator Control for kanban sub-inventories. Sub-inventory Locator Controls allow the user to establish rules which assure the maintenance of naming conventions and policies on the flow line.

Note that in order to be able to choose locator control at the sub-inventory, the locator control at the Organization must be set to Determined at Sub-inventory. Also note that what you choose for locator control at the sub-inventory will over-ride what you choose for locator control on the item master (unless you choose it to be Determined at the Item Level).

No Locator Control Sub-inventories with No Locator Control do not require locator information to perform inventory transactions. If you choose a sub-inventory with no locator control you are able to specify a locator on the item master, the BOM and the pull sequence - but the program with use the locator for planning only - it will not be transacted at the location level.

No Locator control is recommended when you want to use wall-to-wall inventory, as it allows you to plan kanbans by location and print out cards with specific stock location information on it, but tracks all inventory at the sub-inventory level. This minimizes the number of transactions you need to perform to keep track on material in-house (and simplifies physical inventory).

When No Locator Control is chosen, you can enter in any locator number at any time (you do not have to choose from pre-specified locations.) This can cause a greater chance for error or inconsistencies in locator definition. You must be careful that the pull sequence matches the item/BOM exactly.

Pre-specified Locator Control Sub-inventories with Pre-specified Locator Control require that a valid, predefined locator to be assigned every time you assign an item to a sub-inventory (at the item master, the BOM or the pull sequence), or you transact an item into a sub-inventory.

Before assigning locators to items, you must first define a valid locator for all of your kanban locations: (N) Inventory > Set-up > Organizations > Stock Locators.

This is useful because it enables the user to plan by stock location, and print cards with specific stock location information on it. It also forces the user to be consistent in their locator definition and allows inventory to be tracked at the location level. However, it does require a lot more set-up than either no locator control or Dynamic Locator Control.

Dynamic Entry Locator Control Sub-inventories with Dynamic entry locator control requires you to either enter a valid pre-specified locator, or to define a locator dynamically every time you assign an item to a sub-inventory (at the item master, the BOM or the pull sequence), or you transact an item into a sub-inventory.

This is useful because it allows the user to plan by stock location, and print cards with specific stock location information on it. It is easier to set-up than Pre-Specified, since you do not have to create a list of all locators. However, the Dynamic nature creates a greater chance for error or inconsistencies in locator definition. You must be careful that the pull sequence matches the item/BOM exactly.

Locator Control Determined At Item Level Sub-inventories with Locator Control Determined At Item Level will always use locator control information that you define at the item level.

You may want to use this option if you have some parts in your sub-inventory that are critical to track by location, and others that you do not want to restrict by location.

Add Sub Inventories & Locator Information to BOMs /Items

(N) Flow Manufacturing > Bills > Bills (Search for all parent items for the kanban item)

(N) Flow Manufacturing > Products & Parts > Organization Items (Search for kanban item itself)

For the Line-Stocked kanban pull sequences to be planned, you must have the sub-inventory/locator defined on either the Item master or on all the BOMs that use the item. Below is a discussion of what will influence this decision.

Assign the Line-Stock Location to the item master only: This is by far the simplest set-up to perform. In this case, leave the sub-inventory and locator blank on all BOMs. The program will then go to the item master to allocate demand to a specific sub-inventory and locator. This sub-inventory and locator must match the sub-inventory on the first pull sequence (Line Stocked pull sequence) exactly, or your kanban will not be planned.

You could use this option if all of your parts are always used at only one location within the organization, or if you have only a few that are used at multiple locations and you are willing to either plan at the sub-inventory level and then manually divide the cards among specific locators on secondary pull-sequences, or update the BOM for those few items.

Note: if you have hardware or other inexpensive material that is used at multiple locations, consider setting up single a centralized RIP kanban to supply multiple lines. All line operations would then have unplanned bins for all hardware. When they run out, they would go to the centralized kanban to re-fill their own bin with a handful of parts. When the RIP bin is empty, you send one signal to suppliers for more. You can then set a stock location at the item level for the centralized kanban and greatly simplify your set-up.

Assign the Line-Stock Location to the BOMs only: This is quite a bit more complicated to set-up. In this case, leave the sub-inventory and locator blank on the item master. Then, go to every BOM that uses kanban items, and assign each kanban component a sub-inventory and locator. You must make sure that each BOM component location matches the correct pull sequence location exactly.

The program will use the locations on the BOMs to allocate demand to a specific sub-inventory and locator. This sub-inventory and locator must match the sub-inventory on the first pull sequence (Line Stocked pull sequence) exactly, or your kanban will not be planned.

Although this entails quite a bit more set-up, you may consider using this option if you have a lot of non-hardware parts that are used in multiple locations within your organization.

Assign the Line stock Locations to both the BOM and the item master: This is not recommended because of the increased chance for error. If you define the locations on both the BOM and item master, they both must match the first pull sequence in

order for the program to plan the kanbans. There is no benefit to this option - it achieves the same thing as assigning locations only at the item master, but increases your set-up tremendously.

Set-up Kanban Items

There are item attributes that must be set correctly at the organization level, regardless of the item type, in order for the item to be Kanban planned:

Inventory alternate region:

Inventory Planning Method should be Not Planned

Define a Planner, if desired. This will allow the user to filter information by planner when in the kanban workbench.

If you set locator control on the sub-inventory to Determine Control at Item Level, you need to set control here. See the Sub-inventory Locator Control section for descriptions of the types of control. It is recommended that you are consistent with all kanban items.

General Planning alternate region:

Since you have multiple pull sequences for the same item that may have different values for the Fixed Lot Multiplier, Safety Stock, and Fixed Order Quantity. Therefore, any information you enter on the Master item will not be used during kanban planning and execution. Enter data on the kanban pull sequences instead.

MPS/MRP planning alternate region:

Forecast Control must equal None. This identifies items that have dependent demand that should be calculated by the kanban planning process.

Release Time Fence must equal Kanban Item [Do Not Release]. This is required to allow kanban planned items to appear in the MRP Planners Workbench, and yet prevent the planner from being able to release planned orders for kanban items.

Work In Process alternate region:

If you want to specify kanban locations at the item level, enter in the sub inventory/locator information here. Remember, it must match the sub-inventory and locator on the first pull sequence exactly, or the program will not plan the kanbans.

Production Type Set-ups Required (R11i Only)

Update Item with TPCT & TAKT of Flow Line (or Lead time of discrete or repetitive line)

When you have a kanban assembly that is built internally, you need to make sure to add the lead time to build the item to the lead time tab in the Organization Item Master. This lead time is used to determine when to schedule production kanbans into the line.

For Production kanbans the schedule date is calculated using the following formula:

$SD = SysD + FLT + VLT*Kbsize$

Where:

SD = schedule date

SysD = system date (today)

FLT = fixed lead time

VLT = variable lead time

Kbsize = kanban size

For assemblies made on a Flow Line, you will need to return to the Organization Item Master after you have balanced your line and add the following information:

Fixed Lead Time = Total Product Cycle Time or TPCT (from the routing for the item)

Variable Lead Time = TAKT time (from the MMM for the production line which makes the item)

Lead time lot size = 1 for most flow lines

For assemblies made on a Discrete or repetitive line, you will want to add the appropriate information for your kanban size.

Supplier Type Set-ups Required

Define Sourcing Rules and Assignment Sets (optional)

(N) Purchasing > Supply Base > Sourcing Rules

(N) Purchasing > Supply Base > Assign Sourcing Rules

You can define sourcing rules and assign them to kanban items via assignment sets to simplify the set-up within the kanban pull sequence.

If the user does not enter the supplier and supplier site information on a Pull Sequence and a replenishment signal is generated, then the resulting requisition will pull the source information as follows:

Check MRP profile option for Default Assignment Set

Get Sourcing Rule for Item in Organization

Get supplier/site with highest allocation percentage, if equal, use rank to break tie.

For more information about defining sourcing rules see Automatic Sourcing in the Supply Base Management Chapter of the Oracle Purchasing Users Guide and Setting up and implementing sourcing strategies in the Supply Chain Planning of Oracle Master Planning/MRP and Supply Chain Planning Users Guide.

Set-up Blanket POs and auto-approval of releases (optional)

(N) Purchasing > Purchase Orders > Purchase Orders

Supplier kanban items are best when used in conjunction with Blanket POs that are set-up to allow for auto-approved releases against them. This allows the system to automatically create and send a purchase order to the supplier for the item without any human interaction. This assures that when a kanban item is Replenished the supplier is notified as soon as possible.

For more information about setting-up blanket POs, see the Purchase Orders Chapter of the Oracle Purchasing Users Guide. For more information on auto-release against blanket orders see Automatic Release Generation in the Purchase Orders Chapter of the Oracle Purchasing Users Guide.

Inter-Org Type Set-ups Required

When you replenish inter-org kanbans, the system first creates an internal requisition, which is converted to an internal PO. This PO creates an internal order on the supplying organization. For all these transactions to happen properly you need to make sure the following items are set-up.

Update Internal Ordered Flag on Item Master to Yes

(N) Inventory > Master Item , Order Entry Region

Order Entry/Shipping alternate region, set flag on Internal Ordered Item equal to Yes.

Define Default Inter-organization Transfer Charge

(N) Inventory > Setup > Organizations > Organization Parameters

You define default inter-organization transfer accounts in the Organization Parameters window. These accounts are defaulted when you set up shipping information in the Inter-organization Shipping Networks window.

Select the Inter-Org Information alternative region.

Select an Inter-Organization Transfer Charge option.

None: Do not add transfer charges to a material transfer between organizations.

Predefined percent: Automatically add a predefined percent of the transaction value when you perform the inter-organization transfer.

Requested value: Enter the discrete value to add when you perform the inter-organization transfer.

Requested percent: Enter the discrete percentage of the transfer value to add when you perform the inter-organization transfer.

If you selected Predefined percent in the Inter-Organization Transfer Charge field, enter a percentage value to add to a material transfer.

Define Optional Default Inter-organization Transfer Accounts

Select the Inter-Org Information alternative region.

Enter default inter-organization cost accounts. These accounts are defaulted when you set up shipping information in the Inter-Organization Shipping Networks window. See: Inter-Organization Transfer Accounts.

Select the Other Accounts alternative region.

Transfer Credit: The default general ledger account used to collect transfer charges when this organization is the shipping organization. This is usually an expense account.

Purchase Price Variance: The default general ledger account used to collect the purchase price variance for inter-organization receipts into standard cost organizations. This is usually an expense account.

Payable: The default general ledger account used as an inter-organization clearing account when this organization is the receiving organization. This is usually a liability account.

Receivable: The default general ledger account used as an inter-organization clearing account when this organization is the shipping organization. This is usually an asset account.

Intransit Inventory: The default general ledger account used to hold Intransit inventory value. This is usually an asset account. For average cost organizations, this account is the default material account.

For more information on transfer accounts see the Organizations Parameters Window in the Inventory Structure chapter for Oracle Inventory Users Guide.

Set-up Shipping Network

(N) Inventory> Setup > Organizations > Shipping Networks

A shipping network must be defined for all organizations involved in inter-org kanbans. For example, if you are in your Boston facility (BOS), and want to signal your Chicago (ORD) facility to replenish a kanban, you must set up a shipping network from Chicago to Boston in order for the pull sequence to execute correctly.

Typically you will define a transit type as In transit and FOB at Receipt

For more information on shipping networks, see Inter Organization Shipping Network in the Transaction Set-up Chapter of the Oracle Inventory Users Guide.

Set-up Locations

(N) Inventory >Setup >Organizations >Locations

(N) Inventory >Setup >Organizations > Organizations

Locations are used for requisitions, receiving, shipping, billing and employee assignments. You must have at least one location defined for all receiving organizations involved in inter-org kanbans. In the example above, your Boston Facility must have a location defined in order to order the materials from the Chicago organization.

A couple of things to keep in mind:

You must first define a location, the assign it to the organization.

When defining a location, you first give the location a name and address. Then you must fill in the Ship to location in the Shipping Details alternate region with the name of the location, and fill in the Inventory Organization in the Other Details alternate region.

Then, when set-up the organization, make sure the Location and the Internal Address equal the location name you just defined. Address should be default. Make sure both the HRMS and inventory org are enabled.

For more information on locations, see Setting Up Site Locations in the Employer and Other Location Chapter of the Oracle Human Resource Management System Users Guide.

Set-up Receiving Organization as a Customer

(N) Order Entry > Customers >Standard

When using inter-org kanbans, the system first creates an internal requisition, which is converted to an internal PO. This PO creates an internal order on the supplying organization (the Chicago organization in the example above). The customer is listed as the requesting organization (Boston in the case above). You must set Boston up as a customer in order entry in order for the system to recognize it and allow OE to take the order.

When setting up an internal organization, you must:

Main Screen:

Organization name. Suggestion is to use the same name as you did for the location above.

Classification Use = Customer, Type = Internal

Salesperson must be filled in

Sales Channel = commercial

Address alternate region enter the same address as entered in the location!

Business Purpose Alternate Region: Set up two usage types:

Usage = Bill To, Location = location defined above, Primary = Yes

Usage = Ship To, Location = location defined above, Bill To Location = location defined above Primary = Yes.

Use the details button to make sure the Location, Bill to Location and Internal location for the Ship To type all equal the location you defined above.

For more information on setting up the receiving organization as a customer, see Customer Overview, Entering Customers in the Customers Chapter of the Oracle Receivable Users Guide.

Define Kanban Pull Sequences

(N) Flow Manufacturing > Kanbans > Kanban Setup > Pull Sequences

For every kanban item, there is a pull sequence - a series of kanban locations that models the actual replenishment network on the shop floor or through external suppliers, specifying the sequence to follow to obtain the kanban item.

In defining a pull sequence for a kanban item in Oracle Inventory, you specify the supply source type for a kanban item at a specific location. You also specify what you want the kanban calculation program to calculate (kanban size or number of cards), the lead time for obtaining the kanban item, the allocation percentage, and other order modifiers that you want to affect the calculation program.

To do this, navigate to the Pull Sequences Summary form to define the kanban location.

Click the New Button.

If you would like to enter data in a form, rather than a table, click on the Open button.

Enter the Kanban Item, Sub-Inventory & Locator

Enter the kanban item, the sub-inventory and Locator code for the kanban location.

> **Note:** The sub-inventory and locator (if locator control is on) here must match values for the item's supply location in the material control zone of the BOM, or in the WIP Supply location in the organization item attributes. The Kanban Planner will look to the BOM first in the material control zone, and if null will default to the WIP Supply location organization item attributes. See section above titled Add Sub Inventories & Locator Information to BOMs /Items for more information.

Once you are finished, you can add another row to the Pull Sequence table for the same kanban item, and another kanban location. A chain is developed, for example, if you are pulling material from a warehouse to the line, the from a supplier to the warehouse. You can also enter a second kanban location in the same sub-inventory if you use the parts in more than one location.

Enter Source Information

Choose one of the four types of kanban Replenishment:

Production Kanbans Production kanbans trigger the release of internal WIP job/schedule on another production line to replenish the demand.

> **Note:** In R11, Production kanbans can be used for kanban planning only. No cards will be generated and the replenishment signal will not initiate a WIP work order. You can use this functionality to plan kanbans, but then you must use a manual, visual system to execute the system.

In Release 11i, Production kanbans have full functionality. You will be able to generate and print kanban cards, and a replenishment signal will initiate a WIP work order or Flow Schedule. When the schedule or work order is completed, the status of the kanban returns to full.

> **Note:** See the special set-up instructions above, titled Production Type Set-ups Required.

When you select Source Type Production, you will also be required enter the Line code that will produce the material to fill the kanban.

Inter-organization Kanbans Inter-organization kanbans trigger the generation of an internal purchase requisition through ReqImport followed by an internal sales order that is filled by another inventory. organization.

> **Note:** See the special set-up instructions above, titled *Inter*-Org Type Set-ups Required. When you select Source Type Inter-org, you will also be required to enter the replenishing Organization code.

Intra-organization Kanbans Intra-organization kanbans trigger the replenishment of material from another sub-inventory and/or locator (if locator control is on) within the same organization using a sub-inventory move transaction (usually used between a line and a warehouse or store room).

> **Note:** In R11, Intra-Org kanbans can be used for kanban planning only. No cards will be generated and the replenishment signal will not initiate a WIP work order. You can use this functionality to plan kanbans, but then you must use a manual, visual system to execute the system.

In Release 11*i*, Intra-Org kanbans have full functionality. You will be able to generate and print kanban cards, and a replenishment signal will initiate Move Order. Move order is completed, the status will return to full.

When you select Source Type Intra-org, you will also be required to enter the sub-inventory and locator (if locator control is on) within the same Inventory Organization that will replenish this kanban Location.

Supplier Kanbans Supplier kanbans trigger the replenishment of material directly by the supplier. The Supplier kanban initiates a purchase requisition through ReqImport which may create a release against a purchase order through either a manual or automatic process.

If you select Source Type Supplier, and the location is single sourced, enter the supplier code and site. Otherwise, leave the field blank. If the supplier is left blank, the kanban planning engine will assign the primary supplier to the card based on the split percentage and ranking used.

When the kanban card is signaled and a requisition generated, Oracle Purchasing will recognize the requisition is unsourced, and attempt to find a Sourcing Rule for split sourcing. This is appropriate and a buyer will be required to manually select a supplier of their choice.

> **Note:**   See the special set-up instructions above, titled *Supplier Type Set-ups Required.*

Enter the Kanban Sizing Information

Planning Only Choose Planning Only if you want the program to perform the kanban calculations for you, but you will use a manual system to execute the kanbans (sometimes used on production or intra-org kanbans where plants use visual signals to move material between locations).

You will be able to generate and print kanban cards, but will not be able to execute the replenishment cycle.

Calculate Type - Kanban Size and Number of Kanban Cards You will choose what you want the program to calculate - kanban size or kanban cards. The product of kanban size and number of kanban cards (or containers) will satisfy the demand at capacity for the planning horizon.

Kanban size refers to the number of items in each kanban container. Each kanban container has one kanban card, so the number of kanban cards is the same as the number of kanbans for each item.

Use the drop-down menu to select one of the following to automatically calculate:

Kanban Size: In this case, you enter the number of kanban Cards and the Kanban Planner will calculate the kanban Size. Enter 2 here if you want to force a two-bin system.

Number of Kanban Cards: In this case, you enter the size of the kanban and the Kanban Planner will calculate the Number of Cards. Often used to restrict KB size based on weight, physical size constraints, or pre-defined container sizes. Also could be used as a way to reduce inventory on high dollar items or items with long lead times.

Examples of why you would choose a size follows:

- the carrying capacity of the replenishing clerk

- the carrying-capacity of a forklift.

- Employee handbook or labor contract rules on carrying capacity of employees ("...an employee must be able to lift packages up to 50 lbs....for over 50 pounds, a forklift must...)

- the weight of the container full of material

- it is a very expensive item with a long lead time. By setting the number of items per container, you reduce the amount of on-hand inventory you carry, but keep enough material in the replenishment loop to cover your forecasted demands.

Based on the considerations above, you might buy a container that carries well, then fit your material to the container. You would then enter the Size in the Pull Sequence, and the Planner would calculate the Number of Cards (containers) needed.

Do Not Calculate: Choose if you do not want the Kanban Planner to plan for this location. You must then enter both the kanban size (Quantity) and the kanban Number.

Use this if you want already know your kanban sizes and you just want to generate and print cards based on pre-calculated values.

Enter Minimum Order Quantity (Optional) Minimum Order Quantity represents the minimum number of units per kanban container. The Minimum Order Quantity is typically justified by vendor cost discounts, or large set-up times on internal

replenishing resources. For example, you may get a 10% discount by your vendor for material ordered in quantities over 100.

Minimum Order Quantity and Lot Multiplier work hand in hand for planning and execution. For example: If you enter in a minimum order quantity of 100 and a lot multiplier of 100, and the program calculates you need 95 per container, it will round the number up to 100. If it calculates that each bin needs 110, it will round up to 200. (for more on Minimum Order Quantity, see Planning Attributes section below)

On the other hand, if you enter in a minimum order quantity of 100 and leave the multiplier blank, and the program will not round the quantity during the kanban calculation process. Instead, the program will Aggregate kanbans during replenishment. For example, if the program calculates you have a need for 55 per container, and your Min order quantity is 100, each kanban will be sized to 55. However, when you replenish the first card it will go into Wait status (since it is less than the minimum order quantity). When a second kanban for the same item is emptied, they both will change to Empty and kick off the replenishment process (since 55+55>100)

You can manually override the Wait status before the aggregation is complete and trigger a replenishment request.

Choose Planning Attributes

Enter Replenishment Lead Time The Replenishment Lead Time must be expressed in days. This is how long it will take to physically replenish the kanban. For example, if you enter two (2) days, the Kanban Planner will size the kanban to 2 times the average daily demand.

If you leave the field blank, the program will assume replenishment is 1 day when of calculating kanban sizes.

> **Attention:**   Production kanbans use the Replenishment Lead Time to calculate the size of the kanban, but use the Lead Times on the Item Master to determine when to schedule jobs created by replenishing the production kanban. This allows you to add time to the lead time of the production line for transportation or desired queue time. See the special set-up instructions above, titled *Production Type Set-ups Required*

> **Note:** Supplier and Inter-Org kanbans use the Replenishment
> Lead Time to calculate the size of the kanban and to schedule the
> Need Date for the purchase requisition. However, if you leave this
> field blank, the program will use one day to size the kanban and
> will use the lead time defined on the item master for the Need Date
> on the requisition. (Need date = sysdate + Pre-processing +
> Processing + Post processing time if the replenishment lead time on
> the pull sequence is left blank.)

Enter the Allocation Percent (Optional) The Allocation percent represents the percent of independent demand for the kanban item that is to be supplied from this pull sequence.

There are several reasons you may want to use this:

You are using the same demand schedule that you used to design your line. This demand schedule was Boosted by 20% in order to ensure your line is flexible enough to handle small spikes in production, employee absences, etc. If you want to plan your kanbans with a smaller safety cushion, you could enter an allocation % here: 80% would plan to what your believe will be your average production. 90% would give you 10% flexibility in materials.

For example, if you have a part that you buy from a supplier for use on your production line that is also a Field Replaceable Unit (FRU). You want to forecast what you need for both your internal production, and the FRUs. However, when it comes to kanban planning you want to distribute that Demand to two kanban locations: one on the dock, and one on your production line. Assume the FRUs account for 20% of the total demand. On your kanban pull sequences you can enter an allocation percent of 80% for the line-side kanban.

Enter Lot Multiplier (Optional) When kanban planning sizes the containers at the location, it will size in multiples of this quantity. For example, if the supplier sells wire in a roll of 500 feet, then a multiplier of 500 would result in bin sizes of multiples of 500 feet. If demand called for 510 feet, the Kanban Planner would size the kanban for 1000 feet (500 + 500).

Lot Multiplier are often used with low-dollar commodities, such as hardware and wire. It should be used with caution as improper use can build unnecessary inventory, defeating your goal of reduced inventories. Lot Multipliers are a good place to look for opportunities to reduce inventory.

Enter Safety Stock Days (Optional) Safety Stock Days is the number of days demand that will be added the kanban for safety stock. Flow Manufacturing sizes kanbans to the average daily demand of the forecasted period.

For example, Safety Stock quantity in kanban location to cover 2 days of Production = 10,000.

If you use the same capacity forecast you used to design your line (which was projected demand plus 20%), you have already designed a 20% safety stock into all your kanbans. In this case, you probably do not need to an extra safety stock into the plan.

If, you used actual projected demand (without the boost), you may find you need a little safety stock on some items to help you cover small peaks in demand, or to cover for a supplier that is not able to meet their committed lead time consistently.

Use Safety stock with discretion as it automatically increases your inventory levels. Safety Stock days would be the first place to evaluate during future inventory reduction projects.

Kanban Plans

In Oracle Flow Manufacturing, you are able to create any number of baseline and simulation kanban plans in which you can calculate and store kanban quantities for each item/ kanban location. You are able to calculate optimal kanban quantities based on the demand schedule of your choice. When you create a new simulation plan, you will be able to compare the newly calculated kanban quantities to those in the current production system (or any other plan) and make adjustments to the production system at your option.

Create Kanban Plan Name

(N) Flow Manufacturing > Kanbans > Kanban Planning > Names

All plans are tied to a specific demand forecast, MDS, MPS, or actual production. A suggestion is to develop and communicate a naming convention to modifications changes and versions so that the appropriate Plan Name definition and use is clear throughout your organization.

- Enter the Plan Name and Description of your choice.

- Select the Demand Type, Forecast, MDS, MPS or Actual Production.

- Select an existing Forecast/Schedule name.

The selected demand type, MDS, MPS or Forecast, will create the kanban Plan when it is launched. It is suggested that you use the same capacity forecast you used to design the line (which is the projected forecast plus 20%) when you are designing your kanbans. Remember, the Forecast / Schedule is used to calculate the average daily demand for each component over the time period. This daily demand is used to calculate the kanban size or number.

If you design at capacity, the daily demand requirements will tend to be less than capacity. (Assuming seasonal trends have been considered and the sales organization has worked effectively with customers to negotiate small orders shipped frequently.)

Effective capacity planning may be done only once or twice a year. Unless there is a significant unexpected long term increase in demand (maybe new product is added to the Product Family) short term spikes in demand will not justify revised kanban re-sizing. These spikes may be resolved with Non-Replenished kanbans.

Launch the Kanban Plan

(N) Flow Manufacturing > Kanbans > Kanban Planning > Names, Launch (B)

Or

(N) Flow Manufacturing > Kanbans > Kanban Planning > Launch

Launching the kanban Plan calculates kanban quantities for each item. The Kanban Quantity Calculation Program accepts an MPS, MDS, Demand Forecast or Actual Production as input, and explodes the end assembly demand through the BOM structure to each kanban location. This demand and the user defined Pull Sequence for that kanban location is used to calculate the required number of kanbans cards or the kanban size needed at a particular location to prevent a stock out. .

> **Note:** Launching the kanban does not update the production kanbans. It simply performs the calculations. You must go to the Kanban Workbench to view the detailed results and update your production kanban cards. See Kanban Workbench, Details section below for more information.

> **Note:** When launching a plan, the program explodes all the items in your demand forecast, MDS, MPS or actual production and tries to match the exploded items to your kanban pull sequences. Therefore, your demand schedule must contain demand for the finished product - not the individual components that are being planned

On the parameters screen of the concurrent program launch:

Plan Name: The name of the plan you want to launch

Items From, To: Leave blank if you want to plan all items, fill in if you want to restrict items

Category Set: Fill in if you have assigned your components to a category set, and you want to plan only that category set.

Categories From, To: Leave blank if you want to plan all categories, fill in if you want to restrict them

BOM Effectivity: Defaults to today.

Use the following example to help you decide on a BOM Effectivity date. If the bill(s) being used in your demand schedule was created yesterday or earlier, you can use the current date as the BOM Effectivity date.

If you created the bill(s) being used in your demand schedule today, then you must use tomorrow's date as the BOM Effectivity date. This is because the timestamp on the bill you created today is probably between working hours; when you enter the BOM Effectivity date of today, it means at 00:00:00 today, which is before working hours. So the Kanban Planner will not see the bill you created during working hours. If on the other hand, you enter for the BOM Effectivity date tomorrow's date, the Kanban Planner looks for all bills created before 00:00:00 tomorrow, which would include those bills created during today's working hours.

Demand Start Date/Cutoff Date: Start Date defaults to today.

The Demand Start Date and Demand Cutoff Date are critical input. You must enter the precise date range within which your demand schedule falls. Any deviation by one day longer or shorter will directly affect the calculation of the Average Daily Demand.

Recall how Average Daily Demand is used in the sizing calculations:

(No of Kanbans -1) * Kanban size = average daily demand * lead time to replenish one Kanban (in days)

Click OK, then Navigate to View My Requests and verify that the process completed Normal.

> **Note:** If you get an error when launching the kanban plan, the problem may be that you don't have write authorization to the directory where the temporary file is being created.

To set it up properly:

- Go to the init.ora file and set the variable "utl_file_dir" to the name of your PL/SQL temporary file destination directory
- Go to that directory and make sure that permissions to the directory are 777 (giving write privileges to every user)
- Start up the database and set the APPLPTMP to the name of the same directory (your PL/SQL temporary file destination directory)

Completing with Warning

Your program will complete with a warning if:

1. Your days do not match your demand schedules days exactly
2. ANY pull sequence does not find matching demand data in the BOMs and Item Master

> **Tip:** The log files lists items that have insufficient location information on either the BOM or the Item Master. If you are entering kanban location information on the item master, return there and assign a location. If you are entering kanban location information on the BOMs, **do a "where used to** find out which BOMs use that pull sequence, and then make sure to add location information to all applicable BOMs.

> **Note:** The program will not tell you if you have items set to Kanban Item, Do Not Release that do not have pull sequences associated with them. Nor will it verify that all BOMs that use the item have a location that matches the Pull Sequences.

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Kanban Workbench

(N) Flow Manufacturing > Kanbans > Kanban Planning > Workbench

Oracle's on-line Kanban Workbench enables you to view or update the output of the Kanban Calculation Program. Within the Kanban Workbench, you can:

- View the details of the kanban card calculations
- Manually edit Kanban Card Size and Number.
- Recalculate Kanban Card Size for all items, or a subset of items.
- View the Demand used in your kanban calculations.
- Compare Kanban Card Sizes to baselines or simulated plans.
- Merge selected changes into the Production System.

Demand

From the Kanban Workbench, first check to see that the Kanban Planner based its calculations on the expected demand. Use the Demand button, and the Find Kanban Demand Entries to limit your search to items you wish to analyze in particular. You can use this screen to verify that the following occurred:

- Demand exploded through the bill to component items properly
- Sales orders consumed forecasts (if you used an MDS or MPS)

> **Note:** The demand quantity listed is the TOTAL demand for the period - not the average demand that is used in the calculations. To get the average demand, you must divide the total demand by the number of days in the demand period.

Compare

From the Kanban Workbench window, use the Compare button to open the Kanban Comparison Criteria window. You can compare the most recent launch of the kanban plan with the recommendations previously saved in the pull sequence (which is essentially comparing your kanban plan to production), or against any other kanban plan.

If this is the first plan you have created, skip this section and go to the details section.

When you click the compare button, a find screen will open defaulted with Plan 2 equals Production (Plan 1 is always the current plan). You can change the plan 2 to a different plan name, or add other find criteria (like planner, sub-inventory, etc). Then choose find.

You will see the number of cards and kanban sizes for both plans, and a variance percent that indicates how big of a difference there is between the plans. (it is always calculated off of Plan 2) This is a fast way to see if your current demand will mean large changes to your kanban cards. Numbers close to 0 indicate a small change, numbers close to 100 indicate a large change.

For pull sequences with a large variance, you probably want to do a little bit of investigating before changing your production kanbans. Look at demand (you can use the tools menu to see the forecast/schedule) to see where the demand is coming from and if it is affected by a unusual spike in demand. If it is affected by a spike, you may want to add a non-replenishable kanban rather than change your pull sequence permanently. (see section on Monitoring Your Kanbans for information on Non-Replenishable Pull Sequences). If the demand has simply increased permanently, you may want to change the kanban details (either the number of cards or the lead time) before updating production. To do that, go to the kanban details screen and look up the specific pull sequence you are worried about.

> **Tip:** When you first click the compare button, you are presented with a find screen. You can restrict the sequences displayed to only those outside of your acceptable limit for variance to the production cards. For example, enter an additional criteria for Variance Outside -10 to 10 to see only sequences whose variance is greater than +/- 10%.

Update Production Button Remember, when you launched the kanban planner, the program simply performed the kanban calculations, and allowed you to view them in the workbench. It did not update any of the production pull sequences.

After you are sure you want to change to the new calculated values, you choose to update your production sequences directly from this screen by selecting the sequences you wish to update, and then choosing Update Production.

Details

The details screen is used to verify all your pull sequences have been planned, verify the planner accurately calculated the Kanban Card Size or Number, to simulate changes to source information or calculation parameters, and to update production with the new pull sequence calculations.

When you open the details window, you will be presented with a find screen. Use this to limit the pull sequences you want to see by planner, by source organization, source sub-inventory, etc). Or, if you want to see all pull sequences, simply hit the find button.

You will see all pull sequences that match your criteria, with the kanban location, size and source information.

> **Note:**   The planner will display only the pull sequences in which it found a matching demand. In other words, your forecast/MDS/MPS has a demand for a parent item, which is blown through the BOM to receive demand for specific sub-inventories and locators. You will see all pull sequences that found a demand matching the specific sub-inventory and locator on the pull sequence.

If you do not see all the pull sequences you expect, go to the log file for the concurrent program number from the launch of this plan. It will list all items where it did not find a match between the pull sequence and the BOM and/or Item Master.

Kanban Quantity Calculation

Calculation Formula Oracle Flow Manufacturing provides a package that you can use to customize the calculation. NOTE: This feature is not documented in R11, but it is available. Reference the Manufacturing, Distribution, Sales, and Service Open Interface Manual for R11*i* for more information.

By default, the standard calculation is:

(No of Kanbans -1) * Kanban size = average daily demand * lead time to replenish one Kanban (in days)

$(C - 1) * S = D * (L + SSD)$

C is the number of Kanban cards

S is the Kanban size

D is the average daily demand*

L is the lead time (in days) to replenish one Kanban

SSD is the Safety Stock Days

* Note that since D=the average daily demand, this formula works best when the demand for the Kanban item is steady. If it is not steady, you may want to add safety stock to help prevent stock outs (see Choose Planning Attributes, Safety Stock for more information).

For more information on how the program calculates average daily demand, see the Kanban Planning section of the Oracle Master Scheduling/MRP and Oracle Supply Chain Planning Users Guide.

Calculation Modifiers In addition to this basic formula, when the calculation program calculates Kanban size, it takes into account the values for the following order modifiers (specified in the pull sequence), in the following order:

- Safety Stock Days
- Minimum Order Quantity
- Lot Multiplier
- Allocation %

For example, suppose you've specified the Lot Multiplier for a particular item to be 50. You want the formula to calculate the Kanban size. You enter values for C and L. Even though (strictly based on the values you enter for C and L) the formula should yield 40, the actual Kanban size will be 50 because the Lot Multiplier requires a factor of 50.

> **Note:**   The program uses order modifiers only when calculating the Kanban size. If you specify the Kanban size and want the program to calculate the number of Kanban cards, the program does not consider order modifiers.

Simulation Replan Button You can conduct what if analysis on your Pull Sequences in the Kanban Details window. Oracle Flow Manufacturing allows you to simulate the impact of changes to lead time, number of cards, and source information on the kanban size.

Do simulate changes, simply change the parameter you want to test, highlight the row of the pull sequence whose calculations you wish to update by clicking in the box to the left of the first field. The row should change color to indicate its selection.

Then choose the Simulation Replan button to kick off a concurrent request to re-calculate the kanban size based on your changes. When the concurrent request has finished, close the details screen and re-enter. You will see the result of your changes in the Kanban Sizes of the rows you selected.

Demand Button You can see demand for specific kanban pull sequences by selecting the rows you are interested in and then choosing the demand button. Use the select all button first if you want to see demand for all pull sequences.

> **Note:** The demand quantity listed is the TOTAL demand for the period - not the average demand that is used in the calculations. To get the Average demand, you must divide the total demand by the number of days in the demand period.

Update Production Button Remember, when you launched the kanban planner, the program simply performed the kanban calculations, and allowed you to view them in the workbench. It did not update any of the production pull sequences.

Once you are happy with your kanban sizes, select the pull sequences you want to update and click the Update Production Button. Note: use the Select All button to select all pull sequences for the initial update.

This will change the data on your production pull sequences, and allow you to view and generate cards with the new information.

Generate and Print Kanban Cards

Kanban cards are printouts of the pull sequence information that can be placed on kanban containers to identify critical kanban information. Oracle comes with a pre-defined printed kanban card, but the user can modify it to print out in any size and with any information they see fit.

A kanban card can be created automatically for every item, sub-inventory, and locator (optional) in your pull sequence table (the number of cards created are

determined by the Number of Cards field on each pull sequence. They are uniquely identified by a Kanban number. You can also manually define kanban cards

For cards generated from a Kanban pull sequence, the number is automatically generated. For manually defined cards, both replenishable and non-replenishable, you can enter an unused Kanban number or let the system create the number.

> **Note:** Intra-Org and Production Kanbans can not be generated in Release 11.

Generate Kanban Cards

(N) Flow Manufacturing > Kanbans > Kanban Setup > Generate Kanban Cards

Use the Generate Kanban Cards process to automatically generate Kanban cards for Pull Sequences. It will generate the number of cards indicated on the pull sequence, and will give each card a kanban card number that will be used to trace the card in the system.

> **Note:** Before you can generate pull sequences, you must Update Production in the kanban workbench. See section on Kanban Workbench/Details/Update Production for more information.

Choosing Generate Kanban Cards from the menu will give you a parameters screen which allows you to restrict the cards you are generating in the following manner:

Items: To restrict the cards to a range of items, select the beginning and ending items.

Sub-inventory: Select a sub-inventory to restrict the cards to a specific sub-inventory.

Beginning and ending Locators: To restrict the cards to a range of locators, enter the beginning and ending locators.

Source Type: Select a source type to restrict the cards to a specific type.

Supplier: Select a supplier to restrict the cards to a specific supplier. If you select a supplier, you can also select a supplier site.

Source Org: Select a source organization to restrict the cards to a specific organization. If you select a source organization, you can also select a source sub-inventory.

Supply Status: Select the initial supply status that you want for the created cards: New, Full, or Wait. The system will default this field to New. If set to Empty or Wait, then the replenishment cycle is triggered, if Full then you are at the end of the replenishment cycle. (See Replenishment Cycle Description Section below for more information on the replenishment cycle).

> **Note:**   If you set the initial status to Wait you will have to go back and activate all cards.

3. Print Cards?

    Select Yes or No to indicate whether you want the cards to be created and printed in one step.

4. Select the OK button to complete parameter selection.

5. Select the Submit Request button in the Generate Kanban Cards window.

> **Note:**   You can generate cards for individual pull sequences in the Pull Sequences Summary and Pull Sequences windows.

Print Kanban Cards

(N) Flow Manufacturing > Kanbans > Kanban Setup > Print

You can print kanban cards for a replenishment plan or a replenishment chain when you generate the cards. You can also print cards individually if the card information is complete. Use the Print Kanban Cards process to batch print kanban cards with card status Active and Hold. You can print cards individually in the Kanban Cards window.

Oracle comes with a pre-defined printed kanban card, but the user can modify it to print out in any size and with any information they see fit.

A sample card is below.

```
┌─────────────────────────────────────────────────┐
│               Part: ABC0024                      │
│               Quantity : 50 BX                    │
│                                                  │
│   Deliver To:                 Source From:       │
│   Organization  :SAC          Supplier : A-1 Lighting │
│   Subinventory  : Stores      Site    : Sacremento │
│   Locator       : 1.1.1                          │
│                                                  │
└─────────────────────────────────────────────────┘
```

1. Choosing Print Kanban Cards from the menu will give you a parameters screen which allows you to restrict the cards you are generating in the following manner

2. Select Print Kanban Cards from the menu to display the Parameters window. In the Parameters Window:

Beginning/Ending dates   Leave blank if you want to print all cards. Select a beginning and ending date to restrict the cards to a range of creation dates.

Beginning/Ending numbers   Leave blank if you want to print all cards. Select a beginning and ending number to restricts the cards to a range of card numbers

Beginning/Ending items   Leave blank if you want to print all cards for all items. Select a beginning and ending item to restricts the cards to a range of items.

Sub-inventory   Select a sub-inventory to restrict the cards to a specific sub-inventory. You can only do this if you have selected a source organization.

Beginning/Ending locators   Leave blank if you want to print all locators. Select a beginning and ending number to restrict the cards to a range of locators. You can only do this if you have selected a source organization and a sub-inventory.

Source type   Leave blank to print all source types. Select a source type to restrict the cards to a specific type.

Card type   Leave blank to print all card types. Select a card type to restrict the cards to replenishable or non-replenishable.

Source organization   Select a source organization to restrict the cards to a specific organization. If you select a source organization, you can also select a source

sub-inventory. If you select a source sub-inventory, you can also select a source location.

Sorting criteria   You can sort by:

- Kanban Card Number
- Sub-inventory
- Sub-inventory and then Locator
- Supplier and then Supplier Site
- Source Organization and then Source sub-inventory and then Source Locator.

3. Select the OK button to complete parameter selection.

4. Select the Submit Request button in the Print Kanban Cards window.

Define Additional Kanban Cards

(N) Flow Manufacturing > Kanbans > Kanban Setup > Kanban Cards

You can manually add additional cards that are not related to a pull sequence, or delete existing cards from the pull sequence to control the inventory in the replenishment chain. Function security is provided for this feature.

▶▶ To add a card

1. Navigate to the Kanban Cards Summary window by selecting the Cards button in the Pull Sequence Summary or Pull Sequences window. You can also navigate to the Kanban Cards Summary window by selecting the New button in the Find Kanban Cards window.

2. In the kanban card window, enter the following information:

Card number   Optionally enter a card number. Otherwise, a number will be generated when you save your work.

Item number   Select the Item number.

Sub-inventory   Select the sub-inventory

Locator   Enter a locator if you are under locator control.

3. In the Kanban alternative region,

Replenishable check if you want to define a replenishable card. Do not check the Replenishable checkbox if defining a one-time, non-replenishable Kanban. (see section on non-replenishable kanbans for more information.)

Size field enter the quantity of items in each Kanban.

Card Status Select the Card Status with which you want to create for card: Hold or Active

Supply Status Select the Supply Status with which you want to create the card: Empty, Full, or New. If you create a card with a card status of Hold, you cannot select a supply status of Empty.

4. In the Source alternative region,

Source Type ▪ select the Source Type: Supplier or Inter-org

- ▪ If you chose Supplier source type, select a Supplier and Supplier Site.
- ▪ If you chose Inter-org source type, select the Organization, sub-inventory, and Locator.

5. Save your work.

6. Print the card, if desired.

View Kanban Cards

(N) Flow Manufacturing > Kanbans > Kanban Setup > Kanban Cards

Use the Kanban Cards Summary window to view Kanban cards, update their source information, card status and supply status, and view card activity. You can also print cards from this window.

Navigating to the Kanban Cards window will open a find screen. Enter selection criteria. You can restrict the search by Card Number range, Item sub-inventory, Locator range, Source Type, Supplier and Supplier Site, Source Organization, Source sub-inventory, and Source Locator.

Select the Find button to display the search results in the Kanban Cards Summary

Open Button To make viewing and entering information easier, you can select the Open button in the Kanban Cards Summary window to open Kanban Cards for the current line. Here, you can change source information (but not the source type) and print out a new card.

Activity Button Select the Activity button to open the Card Activity window for the selected Kanban card. You will be able to see information collected each time the cards changes status.

Replenish Button This will change the supply status on all selected cards to Empty. See the Replenishment Cycle below for more information on what processes happen upon replenishment.

Making Changes to Replenishable Cards

You can always update card status and supply status.

You can change source information (but not source type) before a card is printed. You cannot override the quantity or any other parameters for generated cards. If the quantity or source is changed for a replenishment plan, you will need to manually delete existing cards from the system and create new ones for the new plan.

If you are using sourcing rules to default your supply source, o*nly the primary supplier, based on the split percentage and ranking is used.* Updates to sourcing rules apply only to cards created after the update. Any updates or changes to sourcing rules will not impact cards that have already been created, new cards will be created based on the new sourcing rule.

Monitoring Your Kanban Cards

Once the line and Kanbans have been sized to the Average Daily Rate needed to support the production volumes, then any unforeseen spikes in demand can be crippling. Instead of creating 'safety stocks' of finished goods, the goal of Flow Manufacturing is to keep materials at their raw state, enabling the line to flex to produce a product mix.

To do this, you will want to periodically check actual production demand against the design demand. To do this:

1. Create a new kanban plan name for the current demand schedule

2. Re-launch the Kanban Planner for the new plan

3. Go to the kanban workbench and compare the current simulation plan to the production plan.

4. Investigate each pull sequence that has a large variance between the two plans. Is the change in demand permanent, or is it a one-time spike? If it is permanent, you may want to Update Production with the new demand and new kanban

size calculations. If the variance is a one-time spike, create non-replenishable Kanbans for the kanban location.

Creating Non-replenishable Kanban Cards

Oracle Flow Manufacturing allows you to cover spikes using Non-Replenishable Kanbans. As the name implies, these cards are one-use only, and will need to be canceled when empty.

Non-replenishable cards do not have to be associated with a Pull Sequence.

(N) Flow Manufacturing —> Kanbans —> Kanban Setup —> Kanban Cards

You can manually define non-replenishable cards by entering the item, location, supply source, and quantity in the Kanban Cards window. A unique system assigned Kanban number for each card or optionally, user entered.

> **Note:** You will enter the kanban size manually. The system does not suggest a size. The quantity must be entered before a kanban card can be printed. Once a kanban card has been printed, you cannot change the quantity.

Replenish the Kanban

When a kanban is empty, you can replenish it systematically. This will change the card status to empty and will kick-off the necessary transactions to re-fill the kanban. You can replenish a kanban in two ways:

(N) Flow Manufacturing > Kanbans > Kanban Set-up > Kanban Cards

1. Search for the item or card number you need to Replenish.

2. Select the card and click the replenish button.

3. Scan the card using a Bar Code reader or RF terminal. See section titled *Support Of External Devices To Trigger Replenishment/Fill Kanbans* for more information.

Kanban Card Statuses

When Kanban cards are generated, they contain both Card and Supply Status Codes. Descriptions of both follow:

Card Status

Generated Kanban Card's status defaults to Active. You can change the status manually to:

Active   When you define a card manually, you can initially give it either Active or Hold status.

Hold   You can place a Kanban card on hold, preventing it from any further activity until the hold is released, to Active or Canceled. If the Supply Status is Full, you can temporarily pull a card out of the replenishment chain by changing the Card Status to Hold.

You can later change the status back to Active.

Canceled   You can terminate use of a card by changing the Card Status to Canceled, but you cannot reverse this change. Only Canceled cards can be deleted.

Supply Status

When you generate kanban cards, you specify whether you want the supply status to be : New, Full, or Wait. When you trigger a Kanban replenishment signal, the status is changed to Empty you. All of the following status codes can be set manually. All but In-Transit can be updated automatically by system transactions. (See Kanban Replenishment Process Summary at the end of this section for more detail)

New: The Kanban has just been created and is not yet part of the replenishment chain.

Empty: The kanban is empty and a replenishment signal has been generated.

Full: The kanban has been replenished.

Wait: The kanban is waiting until the minimum order quantity has been met by the aggregation of cards.

In-Process: For the Supplier source type, the purchase order has been approved. For the Inter Org source type, the internal requisition has been approved.

In-Transit: You have received an Advanced Shipment Notice (ASN) indicating that the Kanban quantity has been shipped from the replenishment source, but you have not yet received it.

Error: Kanban information is incomplete and the card has been flagged with an error code.

Restrictions to Updating Supply Status Codes There are restrictions to how you can change supply status. Please refer to the matrix below for more information.

From ◊						
To	**New**	**Empty**	**Full**	**Wait**	**In-Process**	**In-Transit**
New	NA	No	No			
Empty	Yes	NA	Yes	Yes	No	No
Full	Yes	Yes	NA	No	Yes	Yes
Wait	Yes	No	Yes	NA	No	No
In-Process	No	Yes	No	No	NA	No
In-Transit	No	No	No	No	Yes	NA

Replenishment Process Summary

Below is the detailed process map of what happens systematically when a kanban card is replenished for each of the card types (supplier, intra-org, production, and inter-org). For more information on any card type, please see user manuals for the replenishment process in question (ie - Oracle Purchasing Users Guide for supplier and inter-org types)
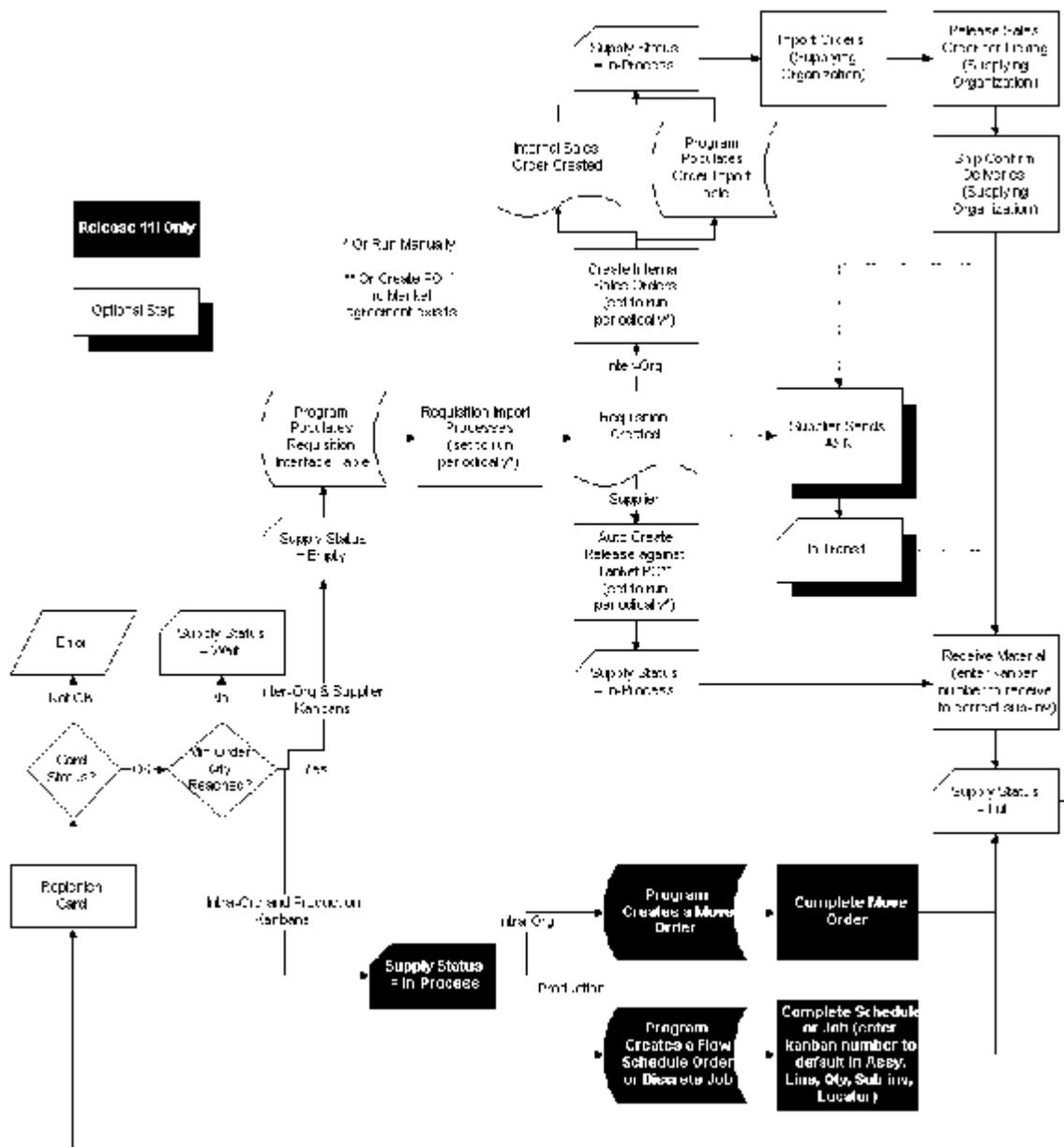
Details of Requisition Import Process (Supplier & Inter-Org Types)

When the items are replenished, Kanban cards in Oracle Inventory change their Supply Status to Empty, and Inventory generates the Kanban replenishment request automatically. Then Requisition Import in Purchasing validates and imports the replenishment requests as requisitions. If the Source Type of the request is Supplier, Requisition Import creates a blanket release (if a blanket agreement exists) or a standard purchase order (if a valid quotation exists) for the item. If the Source Type is Inter-Org, Requisition Import generates an internal requisition for the item.

Once Purchasing approves the standard purchase order, blanket release, or internal requisition, the status of the Kanban card is updated to In Process.

Requisition Import creates a requisition line and one or more requisition distributions for each row it finds in the interface table. It then groups these lines on requisitions according to parameters you define when you request the Requisition Import concurrent program.

Automatically Creating Releases During Req Import

Set the profile PO: Release During ReqImport to create releases each time you run the Requisition Import process.

Then, purchasing will automatically create (and optionally approve) the releases for all blanket-sourced, approved requisitions as part of the Requisition Import process, not just those created by the Requisition Import run.

Run the Requisition Import Process

Navigate to the Submit Requests window. Select Requests in the Type field, select Requisition Import in the Name field.

Import Source: Leave this field blank for all import sources.

Import Batch Identification: Enter the Import Batch ID for the batch that you want to import. Leave this field blank to import all batches.

Group By: Use the Group By feature to determine how requisition lines are grouped on the requisitions you create. The default in this field is set in the Purchasing Options window. Choose one of the following options:

All: Group all requisition lines on one requisition

Buyer: Group requisition lines for each buyer name on a separate requisition

Category: Group requisition lines for each purchasing category on a separate requisition

Item: Group requisition lines for each item on a separate requisition

Location: Group requisition lines for each location on a separate requisition

Supplier: Group requisition lines for each supplier name on a separate requisition

Last Requisition Number: Enter the Last Requisition Number that exists in your system. Purchasing increments this number by one to calculate the next requisition number. If the calculated number is already in use, Purchasing selects the next available requisition number. Leave this field blank to automatically get the next available requisition number.

Multiple Distributions: Choose Yes or No.

A multiple distribution allows you to charge requisition line items across multiple cost centers. For example, you could have a requisition line quantity for 10 items; you could charge 5 to one cost center, 3 to another, and 2 to yet another. If in this run of Requisition Import you have to create multiple distributions for at least one requisition line, choose Yes. If you do not need to create multiple distributions for a requisition line, choose No.

If the Import Source you chose was Master Scheduling/MRP, Order Entry, or Inventory (INV), choose No. If the Import Source you chose was Web Requisitions (ICX), choose Yes.

■   Save your work and click Submit to begin the process.

Approving Releases and Creating POs Each requisition you create using Requisition Import enters Purchasing with the approval status that was specified when the row in the interface table was created.

If the requisitions you import are Pre-Approved or incomplete, Requisition Import calls the PO Requisition Approval workflow to submit the requisitions to the approval process. If the requisitions you import are already approved, Requisition Import calls the PO Create Documents workflow in Purchasing to automatically create corresponding purchase orders; the PO Create Documents workflow then calls the PO Approval workflow to approve the purchase orders, if you've enabled automatic approval.

You can place requisitions you imported on purchase orders just as you would any other requisition. Purchasing automatically sources your requisition line to a blanket agreement or catalog quotation number if the supplier for the item is in the Approved Supplier List and if sourcing rules are set up for the item.

Verifying if Requisitions Were Processed When you submit the Requisition Import process, Purchasing automatically prints the Requisition Import Run Report. You

can view this report by Using the View Requests window and choosing the Report option in the View field for the Requisition Import process you submitted.

If there were no records in the transaction interface table, the report has two lines:

No records were processed

Number of records in error = 0

Otherwise, the report normally has three lines:

Number of approved requisitions created = n

Number of unapproved requisitions created = n

Number of records in error = n

When there are transaction records that cannot be processed, the report includes a fourth line:

Number of records pending = n.

Support of External Devices to Trigger Replenishment/Fill Kanbans

Bar-coding capability is provided through two sources:

- Partner solutions (CAI). See their web-site for more information on how they can be incorporated into Flow Manufacturing.

- An open API that enables the use of Bar code readers, RF terminals, etc. to read a Kanban card and trigger replenishment. This feature exists, but is not documented in R11. For more information go to the Oracle Manufacturing, Distribution, Sales and Service Open Interface Manual or the Oracle Inventory Users Guide for Rll*i*

8

Flow Manufacturing and Mass Customization

Overview

Oracle's Mass Customization solution combines state-of-art configuration technology, advanced planning, flow manufacturing, and Internet commerce to capture customer requirements and tailor complex product configurations.

When using Flow Manufacturing in conjunction with ATO, you should be able to:

- Calculate cycle times and balance your line based on planning percentages in the BOM.

- Associate OMS to events and ATO option items to create customized instructions based on options chosen.

- Schedule configured orders on your Flow Line.

- Reserve inventory during Work order-less completions by associating the completion with the sales order that created the demand.

Process Flow

This chapter details the set-up differences required when you have an ATO item.
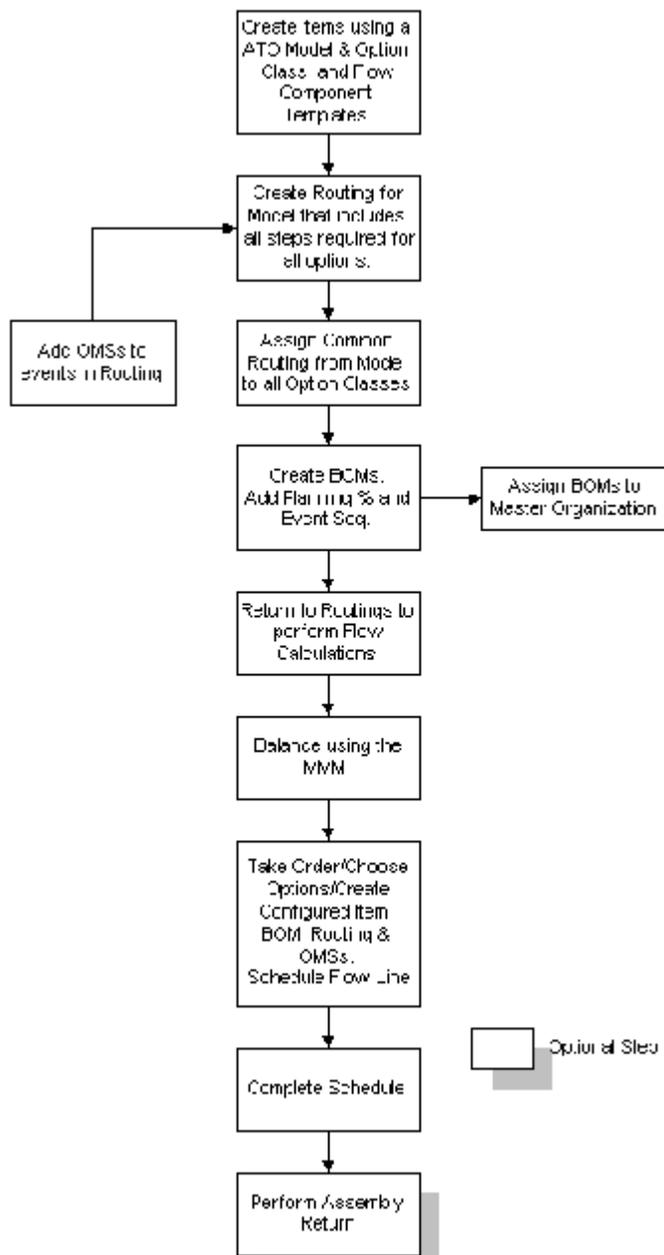
Process Steps

This section details the steps needed to use Flow Manufacturing on ATO items.

Create ATO Model, Option and Flow Component Items

Just as templates were important in Flow Manufacturing, they are also important when creating an ATO item. Oracle comes Shipped with three templates for use with ATO items:

- ATO Model
- ATO Option Class
- ATO Item (Don't use for Flow Manufacturing. Use Flow Component instead)

Please see Templates section of The Item Set-up and Control Chapter in Oracle Inventory Users Guide for specifics on the template designations.

For Flow manufacturing, create your own Flow ATO Model and Flow ATO Option Class templates as per Appendix C. For all other items, use the Flow Manufacturing Component Template you set-up earlier (see Appendix B for more information).

Create Routing for ATO Model

Designing your line is almost identical for ATO items as it is for Non-ATO items. Please refer to Chapter 4, Line Design and Balancing for details and considerations during Line balancing - including setting-up Lines, Departments, Resources, Standard Events, Processes and Operations.

The difference when doing an ATO item is that, instead of creating a routing for your product family, you will create a routing for your ATO model. This routing will contains all events required to manufacture all of the options.

> **Note:** At this time you can only have ONE event assigned to each option.

Group these events into processes, as you did for the product family.

> **Note:** Do not perform the Flow Calculations at this time. You must first assign events to options on the BOM.

Assign Common Routing to all Option Classes

Tto assign routing events to optional components on the BOM, you must create a routing for each Option Class and assign the ATO routing as the common routing using the tools menu (special menu in Release 11).

Create BOMs

Create your multi-level BOM structure as you would for any item, but pay attention to the following items:

Operation Sequence Add the event sequence number to each of your items on the BOM. (Remember for Flow parts, operation sequence on the BOM means event sequence). The events you assign to your optional items will be used to create a routing specific to the options a customer orders.

Planning Percentages Assign planning percentages to each of your optional items in the material control region. The program will use these percentages to calculate the average Operational Cycle Times and Total Product Cycle Times for your ATO Model. (If you do not assign planning percentages, your cycle times will be inflated because they will be a sum of ALL events in the line instead an average based on option chosen).

Assign BOMs To Your Master Organization

If you do not assign your BOMs to the Master Organization, Order Management will not be able to see the BOM and configure the order. Go to your Master Organization, and assign a common BOM for each of the BOMs you have in your manufacturing organization.

Return to Routings and Perform Flow Calculations

You must perform the Flow Calculations after you have assigned events to the BOM, or the program will not properly calculate operational cycle times or total product cycle times.

Take the Following Simple example for ATO Model MC12345. Event 20 is used only for one option that is expected to be ordered 80% of the time. Event 30 is used on a second option that is expected to be ordered 20% of the time. (This item has only labor resources used)

Event Seq	Event Code	Labor	Planning % (from BOM)	Weighted Time
10	EV10	5 min	100%	5*1.0 = 5 min
20	EV20	10 min	80%	10*0.8 = 8 min
30	EV30	20 min	20%	20*0.2 = 4 min
TOTAL	TIME:	35 min		17 min

Note how, if you didn't assign planning percentages, the program would calculate a total cycle time on 35 minutes. However, since event 20 is only used 80% of the time and event 30 is only used 20% of the time, the correct weighted time is 17 minutes.

Add OMSs to events on the Routing

OMSs in any file format can be added as attachments to the events on the routing. Since all attachments are copied when the program creates an order-specific configured routing, the program will automatically assign configured-specific OMSs to use on your shop floor.

See Oracle Applications Users Guide for more information on Attachements.

Balance Using the Mixed Model Map

This process is exactly the same as described in Chapter 4, Line Design and Balancing.

Take Order, Choose Options, Create Configuration & Schedule

The usual Order cycle in that case is to:

1. Enter an order. Choose Options.

2. Book the order

3. Run Demand Interface

4. Perform Manufacturing release

5. Perform AutoCreate Config

The AutoCreate Config program checks if the lowest priority routing for the assembly is a flow routing. If it is, the program creates a unique item number, BOM and flow routing.

- Schedule (Optional)
- Complete the assembly and transact the work order-less completion
- Pick Release
- Ship Confirm

For more information on steps in the process, please see the appropriate User's Guide.

> **Note:** These steps can be performed automatically in Release 11i using the Order Management Workflow process

A few items to note on AutoCreate Config:

- Performance consideration: Creation of flow routings can be more time consuming than the traditional routings as it involves calculations of total product time, labor time, machine time, and net planning percent. This can be a major concern in a high volume ATO environment. These calculations are optional during the concurrent program request process for autocreate configuration items.

  If you are using the Mixed Model Map to compare your actual (scheduled) production to your designed line, you MUST choose to perform the flow calculations during Auto-Create Config. (You can choose to perform the calculation for either operations or process). Failure to do so will give you an incorrect result when viewing the Mixed Model Map.

  If you are NOT intending to use the Mixed Model Map, do not choose to perform flow calculations. This will greatly speed up the Auto-create config process.

- The BOM and routing are created from the model BOM by selecting the mandatory components and the user selected components. All non-selected options/option classes are eliminated.

- Autocreate config item uses the lowest priority routing of the base model and creates a flow routing if the lowest priority routing is a flow routing and a non flow routing if the lowest priority routing is a non flow routing.

- When a flow routing is created, all exclusions are done at the event level only. Processes and line-operations are copied on the configured routing, even if all events associated to them have been excluded.

- Configured Items created on flow lines have their own process network derived from operation network information defined for the base model. All operations and line operations of the base model are included on the process network of the configured item.

- Method sheets of the base model are copied along with other attachments .

- If the lowest priority routing of the base model is a flow routing, the MIXED_ MODEL_MAP_USE_FLAG is set to 'Y' if any of the flow routings (primary or alternate) of the base model have the MIXED_MODEL_MAP_USE_FLAG set to 'Y' . The flag is set to 'N' if none of the flow routings of the base model have the flag set to 'Y'.

- Once you create a configuration item for a sales order line, changes to that sales order line can only be made by de-linking /de-assigning the configuration item from that sales order. (bmldci_delink_config_item)

Complete Flow Schedules
Work order-less completions can be performed against schedules or un-scheduled orders.

Perform a work order-less completion using a scheduled flow schedule
Upon specifying the scheduled flow schedule for completion, the window will default the sales order to be the reference that is tied to the flow schedule. The user has the flexibility to change the sales order (or not specify any) provided the sales order is not linked to any discrete job.

If a sales order is specified at the time of completion the transaction quantity will default to the quantity open for that sales order or the open quantity of the flow schedule, whichever is lesser .

The transaction UOM, completion subinventory, locator, revision and the demand class will be defaulted from the sales order .

After saving the transaction, the system validates the completion transaction, as it does for non-ATO items.

System then creates a link between the flow schedule and the sales order so that the order status can be changed to "Work Order Open".

At the time of completion a reservation will be made in On Hand inventory for the primary quantity of the assembly.

The order status will be updated to "Work Order Partial" if the primary quantity is less than the open quantity for the sales order, else it will be updated to "Work Order Complete" (This is taken care of by OM).

If multiple lots are specified at the time of completion, then reservation is made against those lots.

Note: You cannot overcomplete ATO schedules.

Perform an un-scheduled work order-less completion for an ATO Item.

No sales order is defaulted when the assembly is entered, but the user can specify any sales order for that assembly as long as that sales order is not linked to any Discrete Job.

If a sales order is specified then the transaction quantity will default to the open quantity for that sales order.

The transaction UOM, completion sub-inventory, locator, revision, and the demand class will be defaulted from the sales order.

Validate the completion transaction.

Create a link between the flow schedule and the sales order so that the order status can be changed to "Work Order Open".

At the time of completion a reservation will be made in On-Hand inventory for the primary quantity of the assembly.

The order status will be updated to "Work Order Partial" if the primary quantity is less than the open quantity for the sales order, else it will be updated to "Work Order Complete" (This is taken care of by OM).

If multiple lots are specified at the time of completion, then reservation is made against those lots.

Performing an Assembly Return

To perform an assembly return from WIP, you must manually un-reserve the assembly and then perform a flow schedule (scheduled/unscheduled) return for that assembly.

A

Flow Finished Good Item Template

The single most important setup in any Oracle implementation are the item attributes. The item attributes control how the software handles the part throughout the business cycle.

This Appendix describes the Flow Finished Good Item Template, also called Flow Assembly Template. It contains all the item attribute parameters for a Finished Good Item that is order by a customer and produced in the flow line.

Flow Finished Good Item Template

The item attributes are divided by groups: Main, Inventory, Bills of Material, Costing, Purchasing, Receiving, Physical, General Planning, MPS/MRP Planning, Lead Times, Work in Process, Order Entry, Invoicing, and Service. The template setup steps will be divided according to the groups mentioned.

In a flow implementation the data load process is fundamental to guarantee standardization across all items. A flow finished good model should have some basic attributes, and it is around these attributes that the template should be developed. Among the most important attributes for a Flow Finished Good Item to be consider are:

- The item is able to take customer orders

- The item has a Bill of Materials

- The item is shippable and billable

- Demand historical information can be accumulated for the item

This chapter will describe in detail these and other attributes when creating a template for a Flow Finished Good Item.

▶▶ To create a template,

1. Navigate to Responsibility: Inventory

Navigation (N) Setup > Organizations > Organizations

This screen will ask you to enter the following data:

- **Template** Enter the template name. For example, Flow Finished Good or Flow Component

- **Description** Any additional information to describe the template name

- **Org** Organization to assign the template to.

- **Show** The category group where the attributes are grouped

- **Attribute name** The name of the attribute to setup

- **Controlled at** Either Master level or Org Level.

- **Value** Default value for the attribute

- **Enable** Check this box to activate the attribute

Main Attribute Group Setup- Attribute Names

Primary Unit of Measure

This is the stocking and selling unit of measure. Any necessary conversions are based on this unit of measure. This attribute is not updatable.

Controlled at Master Level

Value Each. (Refer to the *Inventory Users Guide* for other UOM)

Enable Yes

User Item Type

Oracle provides several types by default at installation. These types correspond to the item templates also provided. Select one of these values.

Controlled at Org

Value Subassembly

Enable Yes

Item Status

Item status codes set or default the values for attributes under status control. User-defined status codes control certain item attributes designated as status attributes. The status attributes are BOM Allowed, Build in WIP, Customer Orders Enabled, Internal Orders Enabled, Invoice Enabled, Transactable, Purchasable, and Stockable. These attributes control the functionality of an item over time. See: Status Attributes and Item Status Control, Defining Item Status Codes, and Defining Item Attribute

Controlled at Master

Value Active

Enable Yes

Conversions

- *Both* Use both item-specific and standard unit of measure conversions. If you defined an item-specific and a standard conversion for the same unit of measure, the item-specific conversion is used.

- *Item* Use only unit of measure conversions unique to this item.

- *Standard* Use only standard unit of measure conversions. If you want to use only standard conversions do Not create item specific conversions.

Controlled at Master

Value Both standard and item specific

Enable Yes

Inventory Attribute Group Setup Attribute Names

Inventory Item

Indicate whether to stock and transact this item in Oracle Inventory. You must turn this option on if you want to enable the following item attributes: Stockable, BOM Allowed, Transactable, and Build in WIP.

Controlled at: Master

Value Yes

Enable Yes

Stockable

Indicate whether to stock this item in Inventory. You can set this attribute only when you turn on the Inventory Item option. Turning this option on enables you to set the Transactable item attribute.

Controlled at Mater

Values Yes

EnableYes

Transactable

Indicate whether to allow Inventory transactions. You can set this attribute only when you turn on the Stockable option. Additionally, Oracle Order Management uses this along with Stockable and Returnable to determine which authorized returned items can be physically received into inventory. (See also the OE Transactable attribute.)

Controlled at Master

Value Yes

Enable Yes

Revision Control

Indicate whether to track inventory balances by revision. If you turn this option on you must specify an existing revision number for issues and receipts.

> **Attention:** You cannot change revision control when an item has quantity on hand. If Revision Control is controlled at the Master Item level, the check for on-hand quantity is against the sum of on-hand quantities in all child organizations.

> **Note:** For Oracle Order Management, if profile option OE: Reservations is Yes, you can specify a revision at order entry or scheduling, or let Pick Release use Inventory picking rules to determine the revision when the order is picked. If the profile option is No, you must enter a revision at ship confirmation.

Controlled at Org

Value Not under revision quality control

Enable Yes

Reservable

Indicate whether you can create material reservations. You can reserve an item only when you have sufficient inventory. See: Scheduling an Order or Order Line.

> **Note:** Reservation control for a subinventory overrides reservation control for an item. In other words, if an item is reservable but a subinventory is Not, the item quantity in that subinventory is Not reservable.

> **Note Also:** Oracle Order Management recognizes this attribute only if profile option OE: Reservations is Yes. Then, Order Entry allows reservation of the item during order entry or scheduling and automatically creates any necessary reservations when the item is released for picking.

> **Attention:** You cannot turn reservation control off if reservations exist.

Controlled at Org

Value Reservable

Enable Yes

Lot Control

- *No control*Do Not establish lot control for the item.

- *Full control* Track inventory balances by lot number. You must specify a lot number for issues and receipts.

> **Note:** For Oracle Order Management, if profile option OE: Reservations is Yes, you can specify a lot at order entry or scheduling, or let Pick Release use Inventory picking rules to determine the lot when the order is picked. If the profile option is No, you must enter a lot at ship confirmation.

You can establish lot number control only for an item that has No quantity on hand. If Lot Control is controlled at the Master Item level, the check for on-hand quantity is against the sum of on-hand quantities in all child organizations.

> **Note:** Oracle Work in Process recognizes either lot control or serial number control for an item--but Not both. You cannot transact an item into Work in Process if it has both lot and serial control defined.

Controlled at Org

Value No lot control

Enable Yes

Starting Lot Prefix

Enter a starting prefix for all lot numbers you define for this item. When Lot Number Generation is at item level in the organization parameters, this prefix is used when you define a lot number.

Controlled at Org

Value N/A

Enable No

Starting Lot Number

Enter a starting numeric suffix for this item only. When Lot Number Generation is at item level in the organization parameters, this starting numeric suffix is used when you create a lot number. Thereafter, this number is incremented for each succeeding lot.

Controlled at Org

Value N/A

Enable No

Lot Expiration (Shelf Life)

Lot Expiration control governs how long items in a given lot remain available.

- *Shelf life days*Specify a number of days for all lots of an item, beginning on the day you create the lot by receiving the item. You receive a warning message that the lot expires after the specified number of days.

- *No control*Shelf life control Not established for this item

- U*ser-defined* Specify an expiration date as you receive each lot. You receive a warning but are not prevented from using the lot after expiration.

> **Attention:** You cannot change lot expiration control when an item has quantity on hand. If Lot Expiration is controlled at the Item level, the check for on-hand quantity is against the sum of on-hand quantities in all child organizations.

Controlled at Org

Value N/A

Enable No

Shelf Life Days

Enter the number of days each lot is active. At receipt, the expiration date is determined by adding the shelf life days to the system date (includes the day you define the lot). This is used only when you choose Shelf life days for Lot Expiration Control.

Controlled at Org

Value N/A

Enable No

Cycle Count Enabled

Turn this option on for automatic cycle count scheduling. See: Overview of Cycle Counting.

Controlled at Org

Value Yes

Enable Yes

Negative Measurement Error

Enter the percentage of negative variance acceptable before cycle count creates an adjustment transaction. Your physical cycle count can be less than the quantity on hand by an amount less than or equal to this percentage.

For example, suppose quantity on hand is 100 and negative tolerance is 10%. Inventory does Not create an adjustment for physical counts between 90 and 100 units. This means the quantity on hand remains 100 units. For physical counts under 90 units, Inventory creates an adjustment, changing the quantity on hand to the physical count.

Controlled at Master

Value N/A

Enable No

Positive Measurement Error

Enter the percentage of positive variance acceptable before cycle count creates an adjustment transaction. Your physical count can be greater than the quantity on hand by an amount less than or equal to this percentage.

For example, suppose quantity on hand is 100 and positive tolerance is 10%. Inventory does not create an adjustment transaction for physical counts between 100 and 110 units. This means the quantity on hand remains 100 units. For physical counts over 110 units, Inventory creates an adjustment, changing the quantity on hand to the physical count.

Controlled at Master

Value N/A

Enable No

Serial Number Generation

- *At inventory receipt*Create and assign serial numbers when you receive the item. Thereafter, for any material transaction, you must provide a serial number for each unit.

- *At sales order issue* Create and assign serial numbers when you issue (ship) the item against a customer sales order. (Internal requisition orders do not require a

serial number when you ship the item.) If you receive an item on an RMA (return material authorization), you must specify the same serial numbers you created at sales order issue. All other material transactions for this item bypass serial number information.

■   *No control* Serial number control Not established for this item. All material transactions involving this item bypass serial number information.

■   *Predefined* Assign predefined serial numbers when you receive the item. Thereafter, for any material transaction, you must provide a serial number for each unit.

You can change back and forth between certain options under the following conditions:

Change back and forth between		When
Dynamic entry at inventory receipt	Predefined serial numbers	Any time
Dynamic entry at sales order issue	No serial number control	Any time
Dynamic entry at inventory receipt	No serial number control	Item has No on-hand quantity
Dynamic entry at sales order issue	Predefined serial numbers	Item has No on-hand quantity
Predefined serial numbers	No serial number control	Item has No on-hand quantity
Dynamic entry at inventory receipt	Dynamic entry at sales order issue	Item has No on-hand quantity

If Serial Generation is controlled at the Item level, the check for on-hand quantity is against the sum of on-hand quantities in all child organizations.

Controlled at Org

Value User Defined

Enable User Defined

Starting Serial Prefix

Enter a starting alpha prefix for all serial numbers you define. You must enter a value when you choose Predefined and when Serial Generation is At item level in. The organization parameters. This prefix is used when you define your serialized units.

Controlled at Org

Value User Defined

Enable User Defined

Starting Serial Number

Enter a starting numeric suffix for all serial numbers for this item only. You must enter a value when you choose Predefined and when Serial Number Generation is at item level in the organization parameters. This starting numeric suffix is used when you define your serialized units. Thereafter, this number is incremented for each.

Controlled at Org

Value User Defined

Enable User Defined

Locator Control

If locator control in your subinventories is set to control at item and locator control is required, then it is necessary to turn on this attribute. See Chapter 7 Kanban Planning and Execution.

- *Dynamic entry*Define locators when you use them, either as you receive or ship items.

- *No control* Locator control not established.

- *Prespecified* Define locators before you use them.

> **Note:** In Oracle Order Management, if profile option OE: Reservations is Yes, Order Entry uses Inventory picking rules to assign the locator to an item being shipped.

> **Note Also:** Locator control for an organization or for a subinventory overrides locator control for an item.

> **Attention:** You cannot change locator control when an item has quantity on hand.

Controlled at Org

Value User Defined

Enable User Defined

Restrict Subinventories

Indicate whether to restrict transactions of this item to or from a subinventory specified in a list you define with the Item/Subinventory Information window. See: Assigning Subinventories to an Item. This option must be turned on if you choose to restrict locators.

Controlled at Org

Value N/A

Enable No

Restrict Locators

Indicate whether to restrict transaction of this item to or from a locator specified in the list you define with the Item/Subinventory Information window. You cannot restrict locators unless you also restrict subinventories.

Controlled at Org

Value N/A

Enable No

Bills of Material Attribute Group Setup Attribute Names

BOM Allowed

Oracle Bills of Material allows you to define a bill of material for an item, or to assign the item as a component on a bill.

Controlled at Master

Value Yes

Enable Yes

BOM Item Type

This attribute is controlled at the Master level only. Select a type to control bill functionality. You must enter a value here if BOM Allowed is turned on.

- *Model* This item's bill of material lists option classes and options available when you place an order for the model item.

- *Option Class* This item's bill of material contains a list of related options. Option classes group like options together. Oracle Order Management does not allow ordering of classes outside a model.

- *Planning* This item's bill of material contains a list of items and planning percentages. A planning item can represent a product family or demand channel. Its bill of material facilitates master scheduling and/or material planning. The total component planning percentages on a planning bill can exceed 100%. Oracle Order Management does not allow ordering of Planning bills.

- *Product Family* This item can be used as a product family for planning at an aggregate level. See: Product Families.

- *Standard* Any item that can have a bill or be a component on a bill, except planning, model, or option class items. Standard items include purchased items, subassemblies, or finished products.

Controlled at Master

Value Standard

Enable Yes

Base Model

This attribute is controlled at the Master level only. Displays the model from which an ATO configuration was created. In Oracle Order Management, you can place an order for an ATO model, choosing from the list of options. Oracle Bills of Material creates a new configuration item, bill, and routing that captures the chosen options. The configuration item lists the ordered model item as its base model.

Controlled at Master

Value N/A

Enable No

Costing Attribute Group Setup Attribute Names

Costing Enabled

Indicate whether to report, value, and account for any item costs. For example, you might disable costing for reference items, or for invoice only (Non-stock) items that you never ship and never hold in inventory.

> **Attention:** Organizations using average costing always maintain their own item costs, regardless of the control level set for the Costing Enabled attribute. See: Overview of Cost Management.

This is an item defining attribute. If you turn this option on, the item is automatically assigned to the default category set for the Oracle Cost Management functional area. See: Item Defining Attributes.

Controlled at Org

Value Yes

Enable Yes

Inventory Asset Value

Indicate whether to value an item as an asset in inventory. Turning this option off indicates an expense item.

Controlled at Master

Value N/A

Enable No

Include in Rollup

Indicate whether to include an item in the cost rollup.

Controlled at Org

Value Yes

Enable Yes

Cost of Goods Sold Account

This attribute is controlled at the Organization level only. Enter a general ledger account to use as a source for the Cost of Goods Sold Account. The default cost of goods sold account is set when you define organization parameters. See: Defining Organization Parameters.

Controlled at Org

Value N/A

Enable No

Standard Lot Size

Enter the standard lot size Oracle Bills of Material uses to calculate assembly lead times. Oracle Cost Management uses this value to calculate unit costs for sub-elements with a Lot basis type. This lot size is separate from the lead time lot size. See: Calculating Manufacturing Lead Times and Routings.

Controlled at Org

Value 1

Enable Yes

Purchasing Attribute Group Setup

Although the Finished Good Item is Not Normally purchased, for those users that outsource the finished product in addition to manufacturing it, there will be purchasing parameters to setup.

ATTRIBUTE NAMES

Purchased

Indicate whether to purchase and receive an item. Turning this option on allows you to set the Purchasable attribute. This is an item defining attribute. If you turn this option on, the item is automatically assigned to the default category set for the Oracle Purchasing functional area. See: Item Defining Attributes.

Controlled at Master

Value Yes

Enable Yes

Purchasable

Indicate whether to order an item on a purchase order. You can set this only when Purchased is turned on. Turning Purchasable off allows you to temporarily restrict the ability to buy. This attribute is optionally set by the Item Status code. See: Status Attributes and Item Status Control.

Controlled at Master

Value Yes

Enable Yes

Use Approved Supplier

Indicate whether to use only approved suppliers. If you turn this option on, Oracle Purchasing prevents you from approving a purchase order for an item if you do not use an approved supplier.

Controlled at Org

Value No

Enable Yes

Allow Description Update

Indicate whether to allow updates to the item description on a purchasing document line for an item. See: Defining Purchasing Options.

Controlled at Org

Value Yes

Enable Yes

RFQ Required

Indicate whether to require an item quotation when requesting an item. Oracle Purchasing defaults this value on requisition lines for this item. Leave this field blank if you want Inventory to use the value defined in the Purchasing Options window for transactions involving this item. See: Defining Purchasing Options.

Controlled at Org

Value No

Enable Yes

Outside Processing Item

Indicate whether you can add the item to an outside processing purchase order line. You can turn this option on only if Purchased is also on. In addition, this option controls whether you can attach an item to a resource in the Resource window. See: Defining a Resource and Outside Processing.

Controlled at Org

Value N/A

Enable No

Outside Processing Unit Type

Select an option to determine the quantity of an outside processing item you requisition, purchase and receive:

Assembly You purchase an outside processing item based on the number of assemblies you ship to the supplier.

Resource You purchase an outside processing item based on the number of assemblies times the resource usage rate or amount.

Controlled at Org

Value N/A

Enable No

Taxable

Indicate whether the supplier charges a tax. Oracle Purchasing uses the taxable status together with the tax code you associate with a location to determine whether a purchase order shipment is taxable, and what the tax code that applies to this shipment is. Leave this field blank if you want Inventory to use the value defined in the Purchasing Options window for transactions involving this item. See: Defining Purchasing Options.

Controlled at Org

Value No

Enable Yes

Receipt Required (Three-Way Invoice Matching)

Indicate whether you must receive an item before you can pay the invoice. Leave this field blank if you want Inventory to use the value defined in the Purchasing

Options window for transactions involving this item. See: Defining Purchasing Options.

Controlled at Org

Value Yes

Enable Yes

Inspection Required (Four-Way Invoice Matching)

Indicate whether to inspect an item upon receipt from the supplier, before paying the corresponding invoice. Leave this field blank if you want Inventory to use the value defined in the Purchasing Options window for transactions involving this item. See: Defining Purchasing Options.

Controlled at Org

Value No

Enable Yes

Default Buyer

Enter the buyer assigned to purchase an item. Oracle Purchasing displays the buyer you enter here as the suggested buyer for a requisition. See: Defining Buyers.

Controlled at Org

Value N/A

Enable No

Unit of Issue

Enter the unit of measure you typically use to issue the item from inventory. Oracle Purchasing uses this as the default for internal requisition lines sourced from inventory.

You use units of issue to round order quantities, minimizing shipping, warehousing, and handling costs. The unit of issue must be the same for all units of measure belonging to the same unit of measure class as the primary unit of measure. See: Defining Unit of Measure Classes.

Controlled at Org

Value N/A

Enable No

Receipt Close Tolerance

Enter the percentage tolerance Oracle Purchasing uses to automatically close purchase order shipments. Oracle Purchasing automatically closes a shipment when your unreceived quantity is within the quantity tolerance percentage of the shipment.

For example, if the original shipment quantity is 50, and you enter 10 here (10%), Oracle Purchasing automatically closes the shipment for receiving when you receive 45 or more.

Closed for Receiving is a status change only. You can receive additional items against the shipment later.

Controlled at Org

Value User Defined

Enable Yes

Invoice Close Tolerance

Enter the percentage tolerance Oracle Purchasing uses to automatically close purchase order shipments. Oracle Purchasing automatically closes a shipment when your uninvoiced quantity is within the quantity tolerance percentage of the shipment.

For example, if the original shipment quantity is 50, and you enter 10 here (10%), Oracle Purchasing automatically closes the shipment for invoicing when you invoice match 45 or more.

Closed for Invoicing is a status change only. You can invoice match additional items against the shipment later.

Controlled at Org

Value N/A

Enable No

UN Number

Enter the United Nations identification number. Oracle Purchasing uses UN numbers to identify specific materials (hazardous materials, for example) for international trade purposes. See: Defining UN Numbers.

Controlled at Org

Value N/A

Enable No

Hazard Class

Oracle Purchasing uses hazard classes to identify categories of hazardous materials for international trade purposes. See: Defining UN NumbersDefining Hazard Classes.

Controlled at Org

Value N/A

Enable No

List Price

Enter the value that Oracle Purchasing uses as the default price on a purchase order, requisition, RFQ, or quotation.

Oracle Receivables uses this value as the default unit selling price on a transaction. Note that this is the original inventory item price used by Purchasing and therefore should be used as a guide only.

Controlled at Org

Value N/A

Enable No

Market Price

Enter the market value for an item. Oracle Purchasing copies the market price to the purchase order lines you create.

Controlled at Org

Value N/A

Enable No

Price Tolerance

Enter the price tolerance percent, the maximum price percentage over the Normal price range for an item. For example, if the tolerance percent is 5, the maximum acceptable price on a purchase order is 5% over the requisition price. Any purchase order price 5% above the requisition price is unacceptable, and you cannot approve the purchase order.

Controlled at Org

Value N/A

Enable No

Rounding Factor

Enter a number between 0 and 1. This factor determines how to round the quantity on an internal requisition that results from conversions between the requisition line unit of measure and the item's Unit of Issue. This factor insures that the unit of issue resolves to an integer, rather than a fractional amount.

For example, suppose the requisition line unit of measure is each, and the unit of issue is dozen. For an internal requisition of 20 each, Oracle Purchasing converts the order quantity to 1.75 dozen. With a rounding factor of 0.6, Oracle Purchasing rounds up the order quantity to 2 dozen. (Rounding factor of 0.75 also rounds up to 2 dozen.) With a rounding factor of 0.8, Oracle Purchasing rounds down to 1 dozen.

Oracle Purchasing either performs rounding automatically or advises you of the suggested quantity depending how you set your purchasing options. See: Defining UN NumbersDefining Hazard ClassesInternal Requisitions.

Controlled at Master

Value N/A

Enable No

Encumbrance Account

This attribute is controlled at the Organization level only. Enter the default encumbrance account Oracle Purchasing uses when an item is received. If the item encumbrance account does Not exist, Oracle Purchasing uses the subinventory account. You encumber, or reserve against funds, when the purchase requisition or purchase order is approved. When you deliver into a subinventory you reverse the encumbrance. The total receipts plus encumbrances equals your total funds spent.

Controlled at Org

Value N/A

Enable No

Expense Account

This attribute is controlled at the Organization level only. Enter the default inventory account for expense items. This attribute is used only when Inventory

Asset Value is turned off. Oracle Purchasing debits this account when you receive an item into inventory only if the item is being expensed. If you receive into an expense subinventory, Oracle Purchasing uses this account first; if you do Not define the account here, Oracle Purchasing uses the expense account you assigned to the subinventory.

Controlled at Org

Value N/A

Enable No

Asset Category
Enter the asset category to which the item belongs. Oracle Assets uses this to classify your fixed assets. All assets in a category share default information, such as the accounts used when you post to the general ledger. You can enter this field only if you use Oracle Assets. See: Setting Up Asset Categories.

Controlled at Org

Value N/A

Enable No

Receiving Attribute Group Setup
Although the Finished Good Item is Not Normally received, for those users that outsource the finished product in addition to manufacturing it, there will be receiving parameters to setup.

ATTRIBUTE NAMES

Receipt Date Action
- *None* No receipt date exception enforced.
- *Reject* Reject receipts when the receive date is outside the range defined by Days Early Receipt Allowed or Days Late Receipt Allowed.
- *Warning* Display a warning message if you attempt to receive an item outside the range defined by Days Early Receipt Allowed or Days Late Receipt Allowed, but perform the receipt, anyway.

Controlled at Org

Value N/A

Enable No

Days Early Receipt Allowed

Enter the number of days before the promise date you can receive an item without warning or rejection. For example, if you enter 3 and the promise date is a Friday, you can receive the item on Tuesday.

Note that Oracle Purchasing uses regular calendar days (including weekends and holidays) in this calculation.

If the promise date does Not exist, Oracle Purchasing uses the need by date.

Controlled at Org

Value N/A

Enable No

Days Late Receipt Allowed

Enter the number of days after the promise date you can receive an item without warning or rejection. For example, if you enter 2 and the promise date is a Monday, you can receive the item on Wednesday.

Note that Oracle Purchasing uses regular calendar days (including weekends and holidays) in this calculation.

If the promise date does Not exist, Oracle Purchasing uses the need by date.

Controlled at Org

Value N/A

Enable No

Over-receipt Quantity Control Action

- *None* No over tolerance enforced.

- *Reject* Reject receipts over the tolerance quantity. You receive an error message and are prevented from receiving quantities exceeding the order quantity by more than the Quantity Received Tolerance percent.

- *Warning* A warning message displays if you accept receipts over the quantity determined by the Overreceipt Quantity Control Tolerance percent, but does perform the receipt.

Controlled at Org

Value Warning

Enable Yes

Over-Receipt Quantity Tolerance

Enter the quantity received tolerance percent, the maximum acceptable over-receipt percentage, used by the Overreceipt Quantity Control Action attribute. For example, if the tolerance percent is 5, then the acceptable quantity on a receipt transaction is within 5% of the quantity you order on a purchase order line. Any quantity more than 5% over the order quantity is unacceptable.

Controlled at Org

Value N/A

Enable No

Allow Substitute Receipts

Indicate whether to allow receipt of defined substitutes in place of this item. You define valid substitutes with the Item Relationships window. See: Defining Item Relationships. Leave this field blank if you want Inventory to use the value defined in the Receiving Options window for transactions involving this item. See: Defining Receiving Options.

Controlled at Master

Value Yes

Enable Yes

Allow UNordered Receipts

Indicate whether you can receive an item without a purchase order. If this option is on, you can later match the receipt to the appropriate purchase order. If this option is off, all receipts for an item must have a corresponding purchase order. Leave this field blank if you want Inventory to use the value defined in the Receiving Options window for transactions involving this item. See: Defining Receiving Options.

Controlled at Org

Value Yes

Enable Yes

Allow Express Transactions

Indicate whether you can deliver all distributions for this item with one data entry transaction if the quantity to deliver equals the purchase order line balance. If this option is turned off, you must deliver individual distributions separately. Leave this field blank if you want Inventory to use the value defined in the Receiving Options window for transactions involving this item. See: Defining Receiving Options.

Controlled at Org

Value Yes

Enable Yes

Receipt Routing

- *Direct* At receipt, deliver an item directly to its location.

- *Inspection* Receive an item first, inspect it, then deliver.

- *Standard* Receive an item first, then deliver without inspection.

Controlled at Org

Value Direct Delivery

Enable Yes

Enforce Ship-To

Select an option to control whether the supplier can deliver to a location that differs from the ship-to location defined on the purchase order:

- *None* No ship-to location enforced.

- *Reject* Prevent receipt of items Not received to their purchase order ship-to location.

- *Warning* Display a warning message if you attempt to receive an item to a location that differs from the purchase order ship-to location, but perform the receipt, anyway.

Controlled at Org

Value Warning

Enable Yes

Physical Attribute Group Setup Attribute Names

Weight Unit of Measure
Enter a weight unit of measure.

Controlled at Master

Value User Defined

Enable Yes

Unit Weight
Enter the weight for one unit of the item in the Weight Unit of Measure.

Controlled at Master

Value User Defined

Enable User Defined

Volume Unit of Measure
Enter a volume unit of measure.

Controlled at Master

Value User Defined

Enable Yes

Unit Volume
Enter the volume for one unit of the item in the Volume Unit of Measure.

Controlled at Master

Value User Defined

Enable User Defined

Container
Select Container to identify items that are containers used for shipping sales orders.

Controlled at Master

Value Yes

Enable Yes

Vehicle

Select Vehicle to identify items that are vehicles used for shipping sales orders.

Controlled at Master

Value User Defined

Enable User Defined

Container Type

For items identified as containers, enter the container type. See: Defining Container Types.

Controlled at Org

Value User Defined

Enable User Defined

Internal Volume

Enter the internal volume of the container or vehicle in the same UOM as the Unit Volume. This attribute is used by shipping to calculate container capacity restrictions.

Controlled at Org

Value User Defined

Enable User Defined

Maximum Load Weight

Enter the maximum load weight of the container or vehicle in the same UOM as

Controlled at Org

Value User Defined

Enable User Defined

Minimum Fill Percentage

Enter the minimum fill percentage under which the container or vehicle should be used.

Controlled at Org

Value User Defined

Enable User Defined

General Planning Attribute Group Setup Attribute Names

Inventory Planning Method

Select an option for organization level planning. See: Assigning Subinventories to an Item or Assigning Items to a Subinventory.

- *Min-max* You define a minimum quantity that you want on hand. When you reach this quantity, you reorder. You also define a maximum on-hand quantity that you do not want to exceed.

- *Not planned* No planning method used.

- *Reorder point* The reorder point is calculated based on the planning information you define for this item.

Controlled at Org

Value Not Planned

Enable Yes

Planner

This attribute is controlled at the Organization level only. Enter the material planner assigned to plan this item. You must define planner codes for your organization before updating this attribute. See: Defining Planners.

Controlled at Org

Value N/A

Enable No

Make or Buy

Select the option that applies to items with Inventory Item set to Yes. The Planner Workbench uses this to default an appropriate value for implementation type.

- *Make* Usually manufactured. The Planner Workbench defaults the implementation type Discrete job. The planning process passes demand down from manufactured items to lower level components.

- *Buy* Usually purchased. The Planner Workbench defaults the implementation type to Purchase Requisition. The planning process does not pass demand down from purchased items to lower level components.

> **Attention:** You must also set Purchasable to Yes to create purchase requisitions and purchase orders. If you also set Build in WIP to Yes, you can use the Planner Workbench to implement planned orders as discrete jobs. See: Overview of Material Requirements Planning and Creating Planning Exception Sets.

Controlled at Org

Value Make

Enable Yes

Min-Max Minimum Quantity

Enter the quantity minimum for min-max planning. If an item is min-max planned, the Min-Max Planning Report suggests a new order when quantity drops to the min-max minimum. See: Min-Max Planning.

Controlled at Org

Value N/A

Enable No

Min-Max Maximum Quantity

Enter the quantity maximum for min-max planning. If an item is min-max planned, the Min-Max Planning Report suggests an order that brings on-hand up to the min-max maximum. See: Min-Max Planning.

Controlled at Org

Value N/A

Enable No

Minimum Order Quantity

Enter the minimum order quantity or repetitive rate (units per day). Planning algorithms (reorder point, min-max, MPS, and MRP) use this to modify the size of planned order quantities or repetitive daily rates. For discrete items, when net

requirements fall short of the minimum order quantity, planning algorithms suggest the minimum order quantity. For repetitive items, when average daily demand for a repetitive planning period falls short of the minimum order quantity, planning algorithms suggest the minimum order quantity as the repetitive daily rate. For example, use this to define an order quantity below which it is unprofitable to build the item. See: Overview of Material Requirements Planning and Overview of Inventory Planning and Replenishment.

Controlled at Org

Value N/A

Enable No

Maximum Order Quantity

Enter the maximum order quantity or repetitive rate (units per day) of the item. Planning algorithms (reorder point, min-max, MPS, and MRP) use this to modify the size of planned order quantities or repetitive daily rates. For discrete items, when net requirements exceed the maximum order quantity, planning algorithms suggest the maximum order quantity. For repetitive items, when average daily demand for a repetitive planning period exceeds of the maximum order quantity, planning algorithms suggest the maximum order quantity as the repetitive daily rate. For example, use this to define an order quantity above which you do have insufficient capacity to build the item. See: Overview of Material Requirements Planning, Overview of Repetitive Planning, and Overview of Inventory Planning and Replenishment.

Controlled at Org

Value N/A

Enable No

Order Cost

Enter the fixed cost associated with placing an order of any quantity.

Controlled at Org

Value N/A

Enable No

Carrying Cost Percent

Enter the percentage used to calculate the annual carrying cost. This is the percentage of the unit cost that represents your internal cost to stock one unit for one year.

Controlled at Org

Value N/A

Enable No

Source Type (Replenishment)

- *Inventory* Fill requisition requests by creating internal requisitions that become internal sales orders, to pull stock from existing inventory.

- *Supplier* Fill requisition requests by creating purchase requisitions that become purchase orders, procuring the item from a supplier.

Controlled at Org

Value N/A

Enable No

Source Organization

This attribute is controlled at the Organization level only.

Optionally enter the organization from which an internal requisition draws the item. This applies only when Inventory is the replenishment source type. You can choose organizations that meet the following criteria:

- Item is assigned to the source organization

- Source organization uses the same set of books as the current organization (the organization in which you are defining the item)

- Source organization has a valid inter-organization relationship with the current organization

See: Defining Inter-Organization Shipping Networks.

The source organization can be your current organization if the item is MRP planned and you choose a Non-nettable Source Subinventory.

Controlled at Org

Value N/A

Enable No

Source Subinventory

This attribute is controlled at the Organization level only. Enter the subinventory within the source organization from which an internal requisition draws the item. This applies only when Inventory is the replenishment source, and only when you specify a source organization. For MRP planned items, you must enter a non-nettable source subinventory when the source organization is the current organization.

Controlled at Org

Value N/A

Enable No

Safety Stock Method

Select an option to plan use of fixed or dynamically calculated safety stock quantities. You must choose Non-MRP planned if the Inventory Planning Method attribute is set to not planned.

- *MRP planned percent* Calculate safety stock as a user-defined percentage (Safety Stock Percent) of the average gross requirements for a user-defined number of days. For discrete items, the user-defined number of days is the Safety Stock Bucket Days. For repetitive items, the user-defined number of days is the repetitive planning period. Note that safety stock for an item varies as the average gross requirements varies during he planning process.

- *Non-MRP planned* Calculate safety stock using methods defined by the Enter Item Safety Stocks window. You can use mean absolute deviation or user-defined percentage of forecasted demand. For Oracle Master Scheduling/MRP and Oracle Supply Chain Planning and Supply Chain Planning, these safety stock quantities are fixed. The Snapshot portion of the planning process loads them, and they do not vary during the planning process itself.

See: Overview of Material Requirements Planning, Entering and Reloading Item Safety Stocks, and Overview of Inventory Planning and Replenishment.

Controlled at Org

Value N/A

Enable No

Safety Stock Bucket Days

Enter the number of days to dynamically calculate safety stock quantities. The planning process multiplies the Safety Stock Percent by the average gross requirements and divides by the number of days you enter here. See: Overview of Material Requirements Planning.

Controlled at Org

Value N/A

Enable No

Safety Stock Percent

Enter the percent to dynamically calculate safety stock quantities for the item. The planning process multiplies this percent by the average gross requirements and divides by the Safety Stock Bucket Days.

The planning process uses this attribute when you set Safety Stock to MRP planned percent. See: Overview of Material Requirements Planning.

Controlled at Org

Value N/A

Enable No

Fixed Order Quantity

Enter the quantity used to modify the size of planned order quantities or repetitive daily rates. When net requirements fall short of the fixed order quantity, the planning process suggests the fixed order quantity. When net requirements exceed the fixed order quantity, the planning process suggests multiple orders for the fixed order quantity.

For discrete items, use this attribute to define a fixed production or purchasing quantity. For repetitive items, use this attribute to define a fixed production rate. For example, if your suppliers can provide the item in full truckload quantities only, enter the full truckload quantity as the fixed order quantity. See: Overview of Material Requirements Planning and Overview of Repetitive Planning.

Controlled at Org

Value N/A

Enable No

Fixed Days Supply

Enter the number of days used to modify the size and timing of planned order quantities. The planning process suggests planned order quantities that cover net requirements for the period defined by this value. The planning process suggests one planned order for each period. For example, use this to reduce the number of planned orders for a discrete component of a repetitive item. See: Overview of Material Requirements Planning.

Controlled at Org

Value N/A

Enable No

Fixed Lot Multiplier

Enter the fixed lot multiple quantity or repetitive rate (units per day). Planning algorithms (reorder point, min-max, MPS, and MRP) use this to modify the size of planned order quantities or repetitive daily rates.

When net requirements fall short of the fixed lot size multiplier quantity, planning algorithms suggest a single order for the fixed lot size multiplier quantity. When net requirements exceed the fixed lot size multiplier quantity, planning algorithms suggest a single order that is a multiple of the fixed lot size multiplier.

Controlled at Org

Value N/A

Enable No

MPS / MRP Planning Attribute Group Setup Attribute Names

MRP Planning Method

Select the option that Oracle Master Scheduling/MRP and Oracle Supply Chain Planning uses to decide when to plan the item:

Not planned The item does Not require long-term planning of material requirements. Choose this option for high volume and/or low cost items that do not warrant the administrative overhead of MRP; typically dependent demand items.

MRP planning Choose this option for Non-critical items that do not require manual planning control, typically dependent demand items.

MPS planning You master schedule the item and require manual planning control. Choose this option for items with independent demand, items that are critical to your business, or items that control critical resources.

MRP/DRP Planned Choose this option when you want both MRP and DRP planning for the item.

MPS/DRP Planned Choose this option when you want both MPS and DRP planning for the item.

DRP Planned Choose this option when you have multiple organizations for which you are exercising Distribution Requirements Planning for the item.

You cannot select not planned if the Pick Components attribute is turned on. See: Order Entry Attribute Group.

This is an item defining attribute. If you select MPS or MRP planning, the item is automatically assigned to the default category set for the Oracle Master Scheduling/MRP and Oracle Supply Chain Planning functional area. See: Item Defining Attributes.

Controlled at Org

Value MRP and DRP Planning

Enable Yes

Forecast Control

Select an option to determine the types of demand you place for the item. This guides the key processes of two-level master scheduling: forecast explosion, forecast consumption, planning, production relief, and shipment relief. This is appropriate only for items that are models, option classes, options, mandatory components of models, option classes, and product family members. See Demand Planning for a discussion about this attribute and its effect on flow manufacturing.

Consume You forecast demand directly, rather than by exploding forecast demand. This is used if all the forecast come from the product family forecast explosions.

Consume and derive Use this if the forecast comes from both product families and its own independent forecast.

None You place sales order demand but do Not forecast demand.

Controlled at Org

Value Depending on the planning method chosen.

Enable Yes

Planning Exception Set

This attribute is controlled at the organization level only. Enter the name of the planning exception set that groups together the sensitivity controls and exception time periods for item-level planning exceptions for the item.

The item-level planning exceptions include: overcommitted, shortage, excess, and repetitive variance. The planning process uses this attribute to decide when to raise planning exceptions for the item.

Since different items may require different sensitivity controls and exception time periods, you can define multiple planning exception sets and assign different sets to different items. In other cases, where many items require the same sensitivity controls and exception time periods, you can associate the same set to multiple items.

Controlled at Org

Value N/A

Enable No

End Assembly Pegging

Enter the pegging option. See: Reviewing Item Planning Information.

Soft Pegging This option allocates supply to demand based on the Reservation Level option set in the MRP Plan options. See: Reviewing or Adding Plan Options.

End Assembly Pegging This option traces the end assembly the item is pegged to at the top of the bill of material. Even if you do not select end assembly pegging, you can still calculate and view end assemblies on-line.

End Assembly/ Soft Pegging Choose this option for both soft pegging and end assembly pegging.

Hard Pegging This option allocates supply to demand based on the Reservation Level option set in the MRP Plan options. This pegs supply to demand and demand to supply by project at all levels of a bill of material. This allows you to pre-allocate supply to demand and generate planned orders based on the plan level options. See: Reviewing or Adding Plan Options.

End Assembly/ Hard Pegging Choose this option for both hard pegging and end assembly pegging.

None This option disables project material allocation, end assembly pegging, and full pegging.

Attention: You must use the memory-based planner to calculate end assembly pegging.

Controlled at Org

Value End Assembly∕Soft Pegging

Enable Yes

Round Order Quantities

Indicate whether the planning process uses decimal or whole number values when calculating planned order quantities or repetitive rates. When this option is turned on, decimal values round up (never down) to the next whole number. The planning process carries any excess quantities and rates forward into subsequent periods as additional supply. See: Overview of Material Requirements Planning.

Controlled at Org

Value N∕A

Enable No

Shrinkage Rate

Enter a factor that represents the average amount of material you expect to lose during manufacturing or in storage. The planning process inflates demand to compensate for this expected loss. For example, if on average 20% of all units fail final inspection, enter 0.2; the planning process inflates net requirements by a factor of 1.25 (1 ∕ 1 - shrinkage rate). See: Overview of Material Requirements Planning.

Controlled at Org

Value N∕A

Enable No

Acceptable Early Days

Enter the number of days before which the planning process will not reschedule orders. The planning process only suggests rescheduling out if:

the new calculated order date is later than the original order due date plus the acceptable early days

the new calculated order is does not violate the order of current scheduled receipts

For example, if the original order due date is 10-JUN, and Acceptable Early Days is 3, the planning process Not suggest rescheduling if the new due date is less than or

equal to 13-JUN. When rescheduling does not occur (because of acceptable Early Days), a second order, due before the first, will Not be rescheduled past the first order.

This lets you reduce plan nervousness and eliminate minor reschedule recommendations, especially when it is cheaper to build and carry excess inventory for a short time than it is to reschedule an order.

This applies to discrete items only. For repetitive items, use Overrun Percentage. See: Overview of Material Requirements Planning.

Controlled at Org

Value N/A

Enable No

Repetitive Planning

Indicate whether to plan material requirements in repetitive daily rates. The planning process suggests repetitive schedules you can implement using the Planner Workbench. Turn this option off to plan material requirements in discrete quantities. The planning process suggests planned orders you can implement as discrete jobs or as purchase requisitions. See: Overview of Planner Workbench.

Controlled at Org

Value N/A

Enable No

Overrun Percentage

Enter a percentage the planning process uses to suggest new daily rates. The planning process only suggests a new daily rate if the current rate exceeds the suggested rate by more than the acceptable overrun amount.

The acceptable overrun amount is calculated by multiplying this percentage by the suggested daily rate. For example, if the suggested daily rate is 100/day, and Overrun Percentage is 10, the planning process only suggests a new rate if the current rate is greater than 110/day (100/day + 100/day x 10%).

This lets you reduce plan nervousness and eliminate miNor rate change recommendations, especially when it is cheaper to carry excess inventory for a short time than it is to administer the rate change.

This attribute applies to repetitive items only. For discrete items, use Acceptable Early Days. See: Overview of Repetitive Planning.

Controlled at Org

Value N/A

Enable No

Acceptable Rate (-) Decrease

Enter the amount the planning process uses to decrease current daily rates inside the planning time fence. The planning process does not suggest a new daily rate less than the current daily rate minus the acceptable rate decrease amount.

The acceptable rate decrease amount is calculated by multiplying this value by the current daily rate. For example, if the current daily rate is 100/day, and the Acceptable Rate Decrease is 10, the planning process does Not suggest a new daily rate that is less than 90/day (100/day - 100/day x 10%).

If you do not enter an Acceptable Rate Decrease, the planning process assumes No lower limit to the new daily rate it can suggest inside the planning time fence. If you enter zero, the planning process assumes it cannot suggest any rate less than the current daily rate inside the planning time fence.

This lets you minimize disruption to shop floor schedules by restricting short term rate change suggestions. This applies to repetitive items only. See: Overview of Repetitive Planning.

Controlled at Org

Value N/A

Enable No

Acceptable Rate (+) Increase

Enter the amount the planning process uses to increase current daily rates inside the planning time fence. The planning process does not suggest a new daily rate greater than the current daily rate plus the acceptable rate increase amount.

The acceptable rate increase amount is calculated by multiplying this value by the current daily rate. For example, if the current daily rate is 100/day, and the Acceptable Rate Increase is 10, the planning process does not suggest a new daily rate that is greater than 110/day (100/day + 100/day x 10%).

If you do not enter an Acceptable Rate Increase, the planning process assumes no upper limit to the new daily rate it can suggest inside the planning time fence. If

you enter zero, the planning process assumes it cannot suggest any rate greater than the current daily rate inside the planning time fence.

This lets you minimize disruption to shop floor schedules by restricting short term rate change suggestions. This applies to repetitive items only. See: Overview of Repetitive Planning.

Controlled at Org

Value N/A

Enable No

Calculate ATP

Indicate whether to calculate and print available to promise (ATP) on the Planning Detail Report, using the following formula:

ATP = Planned production - committed demand

Planned production = planned orders, scheduled receipts (purchase orders, jobs, and repetitive schedules), suggested repetitive schedules, nettable quantity on hand.

Committed demand = sales orders, component demand (from planned orders, discrete jobs, suggested repetitive schedules, and lot expirations). Committed demand does Not include forecasted demand.

Attention: ATP calculated by the planning process is not related to ATP information calculated and maintained by Oracle Inventory. As such, planning

ATP does Not consider ATP rules from the Available to Promise Rule window, and is not related to the ATP information displayed in the View Item Available to Promise Information window. See: Overview of Material Requirements Planning.

Controlled at Org

Value Yes

Enable Yes

Reduce MPS

Select an option to decide when to reduce master production schedule (MPS) quantities to zero.

If Oracle Work in Process and Oracle Purchasing are installed, you get automatic production relief when you create a discrete job, purchase requisition, or purchase order. In this case, you would typically set this attribute to None.

If you do not have automatic production relief, you may select one of the following options to reduce MPS quantities and avoid overstating your supply.

- *None* Do not reduce order quantities on the MPS.

- *Past due* Reduce order quantities on MPS entries to zero when the entry is past due.

- *Demand time fence* Reduce order quantities on MPS entries to zero when the due date moves inside the demand time fence.

- *Planning time fence* Reduce order quantities on MPS entries to zero when the due date moves inside the planning time fence. See: Starting the Planning Manager.

Controlled at Org

Value N/A

Enable No

Planning Time Fence

Choose one of the following options to determine a point in time inside which certain restrictions on planning recommendations apply. For discrete items, the planning process cannot suggest new planned orders or rescheduling existing orders to an earlier date. For repetitive items, the planning process can only suggest new daily rates that fall inside the acceptable rate increase and decrease boundaries. For items having a WIP Supply Type of Phantom, Oracle Master Scheduling/MRP and Oracle Supply Chain Planning igNores the planning time fence.

A time fence increases manual control of the plan, minimizing short term disruption to shop floor and purchasing schedules.

Calculate the planning time fence as the plan date (or the next workday if the plan is generated on a Non-workday) plus:

- *Cumulative mfg. lead time*The cumulative manufacturing lead time for the item.

- *Cumulative total lead time* The total manufacturing lead time for the item.

- *Total lead time* The total lead time for the item.

- *User-defined* The value you enter for Planning Time Fence Days.

See: Overview of Time Fence Planning.

Controlled at Org

Value Cumulative Total Lead Tine

Enable Yes

Planning Time Fence Days

Oracle Master Scheduling/MRP and Oracle Supply Chain Planning calculates the planning time fence as the plan date (or the next workday if the plan is generated on a non workday) plus the value you enter here. Oracle Master scheduling/MRP and Oracle Supply Chain Planning uses this value when Planning Time Fence is user-defined.

Controlled at Org

Value N/A

Enable No

Demand Time Fence

Select an option to determine a point in time inside which the planning process ignores forecast demand and considers only sales order demand when calculating gross requirements. This reduces the risk of carrying excess inventory. For items having a WIP Supply Type of Phantom, Oracle Master Scheduling/MRP, and Oracle Supply Chain Planning ignores the demand time fence.

> **Attention:** Oracle Master Scheduling/MRP and Oracle Supply Chain Planning also uses the demand time fence when loading master schedules.

The demand time fence is calculated as the start date of the master schedule load plus one of the following options.

Calculate the demand time fence as the plan date (or the next workday if the plan is generated on a non workday) plus:

- *Cumulative mfg. lead time* The cumulative manufacturing lead time for the item.

- *Cumulative total lead time* The total manufacturing lead time for the item.

- *Total lead time* The total lead time for the item.

- *User-defined* The value you enter for Demand Time Fence Days.

> **Warning:** If using time fences then you must use daily MRP forecast buckets instead of Weekly or Monthly forecast buckets in order for the system to consume forecast properly.

See: Overview of Time Fence Planning.

Controlled at Org

Value Item Total Lead Time

Enable Yes

Demand Time Fence Days

Oracle Master Scheduling/MRP and Oracle Supply Chain Planning calculates the demand time fence as the plan date (or the next workday if the plan is generated on a non workday) plus the value you enter here. Oracle Master scheduling/MRP and Oracle Supply Chain Planning uses this attribute when Demand Time Fence is user-defined.

Controlled at Org

Value N/A

Enable No

Release Time Fence

Choose an option to determine a point in time inside which planned orders for discretely planned items are automatically released as WIP jobs or purchase requisitions. The planned orders must meet the following auto-release criteria:

- New due date lies within the auto-release time fence

- Lead time is not compressed

- Orders are for standard items (will not release models, option classes, and planning items)

- Orders are not for kanban items

- Orders are for DRP planned items in a DRP plan, MPS planned items in an MPS plan, or MRP planned items in an MRP plan (See: Auto-release Planned Orders.)

- Release time fence option is defined as anything other than Do Not auto-release, Do Not release (Kanban), or Null

- DRP, MPS, and MRP plans must be run with the Memory-based Planning Engine (See: Enabling the Memory-based Planning Engine

Auto-release of repetitive schedules is not applicable for repetitively planned items. No material availability check is performed before WIP jobs are released.

Calculate the release time fence as the plan date (or the next workday if the plan is generated on a Non workday) plus:

- *Cumulative mfg. lead time* The cumulative manufacturing lead time for the item.

- *Cumulative total lead time* The total manufacturing lead time for the item.

- *Total lead time* The total lead time for the item.

- *User-defined* The value you enter for Release Time Fence Days.

- *Do Not auto- release* The item cannot be auto-released

- *Do Not release (Kanban)* For Kanban items, prevent release of planned orders manually or automatically.

Controlled at Org

Value N/A

Enable No

Release Time Fence Days

Oracle Master Scheduling/MRP and Oracle Supply Chain Planning calculates the release time fence as the plan date (or the next workday if the plan is generated on a non workday) plus the value you enter here. Oracle Master Scheduling/MRP and Oracle Supply Chain Planning uses this value when Release Time Fence is User-defined.

Controlled at Org

Value N/A

Enable No

Lead Times Attribute Group Setup Attribute Names

Preprocessing

this attribute is controlled at the Organization level only. Enter the days you must add to purchasing or manufacturing lead time to place an order.

Controlled at Org

Value N/A

Enable No

Processing

This attribute is controlled at the Organization level only. Enter the days required to procure or manufacture an item. For manufactured assemblies, processing days equals manufacturing lead time.

Controlled at Org

Value N/A

Enable No

Postprocessing

This attribute is controlled at the Organization level only. Enter the days required to receive a purchased item into inventory from the initial supplier receipt. You cannot enter a value if the Make or Buy attribute is set to Make. See: MPS/MRP Planning Attribute Group.

Controlled at Org

Value N/A

Enable No

Fixed

This attribute is controlled at the Organization level only. Enter the days required to make an assembly independent of order quantity, such as setup or teardown time. For a flow item enter the value of the Total Product Cycle Time (TPCT) after it is calculated in the flow routing.

Controlled at Org

Value 0

Enable Yes

Variable

This attribute is controlled at the Organization level only. Enter the time to produce one additional unit of an assembly. Total lead time is variable lead time multiplied

by order quantity, plus fixed lead time. For a Flow Line user should enter the takt time after it is calculated in the Mixed Model Map (MMM)

Controlled at Org

Value 0

Enable Yes

Cumulative Manufacturing

This attribute is controlled at the Organization level only. Enter the manufacturing lead time of an assembly (in days) plus the largest adjusted cumulative manufacturing lead time of its components, where each is adjusted by subtracting the operation lead time offset. Purchased items have No cumulative manufacturing lead time. This attribute can be calculated and updated by rolling up cumulative lead times with Oracle Bills of Material. See: Rolling up Cumulative Lead Times.

Controlled at Org

Value N/A

Enable No

Cumulative Total

This attribute is controlled at the organization level only. Enter the total lead time of the assembly plus the largest adjusted cumulative total lead time of its components, where each is adjusted by subtracting the operation lead time offset. This attribute can be calculated and updated by rolling up cumulative lead times with Oracle Bills of Material. See: Rolling up Cumulative Lead Times.

Controlled at: Org

Value: N/A

Enable: No

Lead Time Lot Size

Enter the quantity used to compute processing lead time, as well as fixed and variable lead times. The default value is the item's standard lot size or, if a standard lot size is not defined, the default is 1. See: Costing Attribute Group.

Controlled at: Org

Value

Enable: Yes

Work in Process Attribute Group Setup Attribute Names

Build in WIP
Indicate whether to create discrete jobs or repetitive assemblies in Oracle Work in Process. See: Defining Discrete Jobs Manually, and Defining Repetitive Schedules Manually. This attribute must be turned off if the Inventory Item attribute is turned off or if the BOM Type attribute is not set to Standard. This attribute is optionally set by the Item Status code. See: Status Attributes and Item Status Control.

Controlled at Org

Value Yes

Enable Yes

WIP Supply Type
- *Assembly Pull* Assembly Pull components are issued to discrete jobs and repetitive schedules when you complete assemblies in Work in Process. They are pulled from the supply subinventory assigned to the component requirement. If you must assign pull components to a bill of material or job that is Not associated with a routing, you must assign an Assembly Pull, rather than operation pull, supply type. You cannot assign this supply type to a non-standard discrete job if you have Not specified an assembly or bill of material reference for that job.

- *Operation Pull* Operation pull components are issued to discrete jobs and repetitive schedules when you complete backflush operations. Components are pulled the supply subinventory assigned to the component. You cannot assign this supply type to an assembly without a routing or a non-standard discrete job without a routing. You can assign this supply type to assemblies that have routings with no operations or when the routing has disabled operations. However, all components with a supply type of operation pull are automatically changed to assembly pull.

- *Based on Bill* The Based on Bill supply type is Work in Process specific. When you define a discrete job or a repetitive line/assembly association in Oracle Work in Process, the supply type for the assembly defaults to Based on Bill and assembly components are supplied based upon their bill of material supply types. See: Creating a Bill of Material.

If the supply type for a job or line/assembly association is changed, the new supply type is applied to all component material requirements. For example, if you change the supply type of a job assembly from Based on Bill to Assembly Pull, the supply types of all assembly components are changed to Assembly pull. You can update the supply types of individual material requirements using the Material Requirements window in Oracle Work in Process. See: Adding and Updating Material Requirements. The system automatically changes components with a supply type of Operation Pull to Assembly Pull, when the Based on Bill supply type is applied to a job or repetitive schedule that has a bill of material but lacks a routing or operations.

- *Phantom* Phantom components can be assigned to bill of material component subassemblies and subassembly items in Oracle Bills of Material and Oracle Engineering. Components of phantom subassemblies are used as if they were tied directly to the parent assembly. Phantom supply types cannot be assigned to jobs and repetitive lines/assembly associations in Work in Process. see: Phantoms.

  Phantoms behave Normally when they are top level assemblies, such as when master scheduled or manufactured on a discrete job. As subassemblies, they lose their distinct identity and become a collection of their components. Phantom components (not the phantom itself) are included on discrete jobs and repetitive schedules and are listed on the Discrete Job and Repetitive Schedule Pick List reports.

Oracle Master Scheduling/MRP and Supply Chain Planning plans phantom subassemblies with lot-for-lot lot sizing. Otherwise, phantoms are planned like other assemblies. You must set the lead time of a phantom to zero to avoid lead time offset during the planning process. Oracle Master Scheduling/MRP and Supply Chain Planning ignores demand time fences, planning time fences, and order modifiers when planning phantom subassemblies. When assembly costs are rolled up in Oracle Cost Management, the material costs, but not the routing costs, of phantom assemblies are included in the cost of the higher level assemblies that include those phantoms.

- *Bulk* Bulk component requirements can be viewed and are displayed on reports. They can be used to communicate to the shop floor that bulk components must be used but need not be transacted. Bulk components are not backflushed nor do they default when issuing all components for an assembly. You can, however, manually issue specific bulk components to a discrete job or repetitive schedule.

- *Push* Push components can be issued directly to discrete jobs and repetitive schedule as required. You can specify the subinventory from which to issue

push components, though Work in Process defaults the supply subinventory associated with the component.

- *Supplier* Supplier component requirements can be included on bills of material. Requirements for supplier components are created when you define discrete jobs and repetitive schedules in Work in Process. Supplier component requirements can be viewed and are displayed on reports. They provide information on the component materials that your suppliers provide but need not be transacted. Supplier components are not backflushed nor do they default when issuing all components for an assembly. You can, however, manually issue specific supplier components to discrete jobs and repetitive schedules.

Controlled at Org

Value Assembly Pull

Enable Yes

Supply Subinventory

This attribute is controlled at the Organization level only. Enter the primary subinventory from which to issue (push) or backflush (pull) an item to work in process. See Kanban Planning and Execution for a discussion of supply subinventory and flow manufacturing.

Controlled at Org

Value N/A

Enable No

Supply Locator

This attribute is controlled at the Organization level only. Enter the supply locator from which to issue (push) or backflush (pull) an item to work in process. You can also define a WIP supply locator for any bill that uses this item; the bill supply locator overrides the supply locator you define here. You must enter a WIP supply subinventory before you can enter a locator. See Kanban Planning and Execution for a discussion of locator and flow manufacturing.

Controlled at Org

Value N/A

Enable No

Order Entry Attribute Group Setup Attribute Names

Customer Ordered

Indicate whether to allow an item to be ordered by external customers. You can add any customer orderable items to price lists in Oracle Order Management. This attribute must be turned off if the BOM Item Type attribute is set to Planning. See: Bills of Material Attribute Group.

If you turn this attribute on, you can temporarily exclude an item from being ordered by turning Customer Orders Enabled off.

This is an item defining attribute. If you turn this attribute on, the item is automatically assigned to the default category set for the Oracle Order Management functional area. See: Item Defining Attributes.

Controlled at Master

Value Yes

Enable Yes

Customer Orders Enabled

Indicate whether an item is currently customer orderable. If you turn this attribute on you can specify the item in the Enter Orders window in Oracle Order Management. You can initially define an item with Customer Ordered Item turned on and Customer Orders Enabled turned off. This means prices can be defined for the item, but no orders can be placed for it. This attribute is optionally set by the Item Status code. See: Status Attributes and Item Status Control.

Controlled at Master

Value Yes

Enable Yes

Internal Ordered

Indicate whether to allow an item to be ordered on an internal requisition. If you turn this attribute on, you can temporarily exclude an item from being ordered on an internal requisition by turning Internal Orders Enabled off. See: Overview of Internal Requisitions. This is an item defining attribute. If you turn this attribute on, the item is automatically assigned to the default category set for the Oracle Purchasing functional area. See: Item Defining Attributes.

Controlled at Master

Value Yes

Enable Yes

Internal Orders Enabled

Indicate whether you can currently order an item internally. If you turn this attribute on, you can specify the item on an internal requisition, if Internal Ordered Item is also on. If you turn Internal Ordered Item on, you can temporarily exclude an item from being ordered on an internal requisition by turning this attribute off. This attribute is optionally set by the Item Status code. See: Status Attributes and Item Status Control.

Controlled at Master

Value Yes

Enable Yes

Shippable

Indicate whether to ship an item to a customer. Shippable items are released by Oracle Order Management's Pick Release program, creating confirmable shipping lines, and are printed on the pick slip. A warning is issued if you change the value of this attribute when open sales order lines exist. See: Overview of Delivery-based Shipping. This attribute must be turned off if the BOM Item Type attribute is set to Planning. See: Bills of Material Attribute Group.

Controlled at Master

Value Yes

Enable Yes

OE Transactable

Indicate whether demand can be placed for an item by Oracle Order Management, and whether shipment transactions are interfaced to Oracle Inventory. Most items with Shippable turned on also have OE Transactable turned on. For items you do not ship, you may still want OE Transactable turned on if you use the items in forecasting or planning. If you also want to reserve the item, turn Reservable on. A warning is issued if you change the value of this attribute when open sales order lines exist. You cannot turn this attribute off if demand exits.

Controlled at Master

Value Yes

Enable Yes

Default Shipping Organization

Enter the Oracle Order Management primary shipping organization. This organization defaults to the Enter Orders window if Item is the source attribute of the Warehouse object in the standard value rule set for the order. This organization defaults to the Enter Returns window if a receiving warehouse is not defined on the customer or order type. See: Defining Standard Values Rule Sets.

Controlled at Org

Value N/A

Enable No

Picking Rule

Enter the picking rule that defines the order in which subinventories, locators, lots, and revisions are picked. See: Defining Picking Rules.

Controlled at Master

Value N/A

Enable No

Pick Components

Indicate whether an item has a bill of material with options, classes, or included items picked from finished goods inventory. Pick-to-order items must have this attribute turned on. Assemble-to-order items and items without a bill of material must have this attribute turned off.

Controlled at Master

Value N/A

Enable No

Assemble to Order

Turn this attribute on if an item is generally built for sales order demand; a final assembly work order is created based on sales order details. An item cannot have Pick Components turned on and this attribute turned on at the same time. See: Configure to Order.

Controlled at Master

Value N/A

Enable No

Check ATP

Select Check Material Only, Check Material and Resources, Check Resources Only, or None to indicate whether to check available to promise and/or capable to promise information when placing demand. See: Available to Promise. and Capable to Promise. This attribute also determines whether you can view component ATP information for material requirements in Work in Process.

Controlled at Master

Value None

Enable Yes

ATP Components

Indicate whether to include, in available to promise checking, additional components in the bill of material for ATO and PTO items. These components are included in ATP checking if Check ATP for the component is turned on.

Controlled at Master

Value N/A

Enable Yes

ATP Rule

Enter a user-defined available to promise rule. ATP rules define supply and demand sources, time-fence parameters, and available-to-promise calculation methods. You can give ATP rules meaningful names, such as ATO ATP Rule. If there is No ATP rule for the item, the organization's default ATP rule is used. See: Defining ATP Rules and Defining Organization Parameters.

Controlled at Master

Value Standard

Enable Yes

Ship Model Complete

Indicate whether any configuration derived from this model can ship only when all required quantities of all configuration components (options or included items) are

available. If you turn this attribute on, the Pick Components attribute and the profile option OE: Reservations must be Yes; the BOM Item Type attribute can be Model or Standard. See: Scheduling an Order or Order Line.

Controlled at Master

Value N/A

Enable No

Returnable
Indicate whether to allow customers to return an item. If an item is returnable, you can enter it on the Returns window in Oracle Order Management. Order Management uses this attribute along with Stockable and Transactable to determine which authorized returned items you can physically receive into inventory. See: Entering Return Material Authorizations.

Controlled at Mater

Value Yes

Enable Yes

RMA Inspection Required
Indicate whether inspection is required for items returned by the customer. The item then must be separately transferred to inventory. Credits are never automatically generated by Oracle Order Management for customer return items awaiting inspection.

Controlled at Master

Value Inspection Required

Enable Yes

Collateral Item
Indicate whether the item is collateral. When you register collateral as a promotion in Oracle Sales and Marketing, you can link it to the item you define here. Then you can use Oracle Sales and Marketing to include this collateral item in a fulfillment request for a contact or a mass mailing. Oracle Sales and Marketing displays a list of valid collateral when creating a fulfillment request or mass mailing, based on the items you define with this flag.

Controlled at Mater

Value No

Enable Yes

Invoicing Attribute Group Setup Attribute Names

Invoiceable Item

Indicate whether to include an item on an Oracle Receivables invoice. If you turn this option on, you can temporarily exclude from invoicing when Invoice Enabled is turned off. This option must be on if Invoice Enabled is on.

Controlled at Mater

Value User Defined

Enable User Defined

Invoice Enabled

Indicate whether to activate an item for invoicing in Oracle Receivables. If Invoiceable Item is turned on, you can temporarily exclude from invoicing by leaving Invoice Enabled turned off. If you turn this option on, the item appears in the Invoice Entry item list of values in Oracle Receivables. If you turn this feature off, the item does not appear in the list of values and AutoInvoice rejects the item. This attribute is optionally set by the Item Status code. See: Status Attributes and Item Status Control.

Controlled at Mater

Value User Defined

Enable User Defined

Accounting Rule

Enter an accounting rule to identify special revenue recognition rules for an item, such as recognizing revenue over time. See: Defining Invoicing and Accounting Rules, Oracle Receivables Reference Manual, Release 10. This attribute is for reference information only.

Controlled at Mater

Value N/A

Enable No

Invoicing Rule

Enter an invoicing rule to determine the period in which you send an invoice when you recognize revenue over time (using accounting rules). See: Defining Invoicing and Accounting Rules, Oracle Receivables Reference Manual, Release 10. This attribute is for reference information only.

Controlled at Mater

Value N/A

Enable No

Tax Code

Enter a tax code to use when calculating tax based on location and tax codes. You assign specific rates to a Tax Code in the Other Tax Rates window. See: Defining Other Tax Rates, Oracle Receivables User's Guide.

Controlled at Mater

Value N/A

Enable No

Sales Account

This attribute is controlled at the Organization level only. Enter the general ledger account Oracle Receivables uses to record revenue when you bill the customer. If AutoAccounting is based on items, accounting entries are created at that time. See: Defining AutoAccounting, Oracle Receivables User's Guide.

Controlled at Org

Value N/A

Enable No

Payment Terms

Enter a valid payment terms code. This attribute is for reference information only.

Controlled at Mater

Value N/A

Enable No

Service Attribute Group Setup Attribute Names

Support Service

Indicate whether the current item represents a service. See: Overview of Oracle Service. The following dependencies exist for Support Service items:

- *Can be* Invoicable, OE Transactable, Internal Ordered, and BOM Allowed (only for Warranty items).

- *CanNot be* Inventory Item, Serviceable Product, Stockable, Transactable, Build-In-WIP, Cycle Count Enabled, Purchased, Shippable, Returnable, or Check ATP.

Controlled at Mater

Value N/A

Enable No

Warranty

Indicate whether service is automatically included with the current item when it is ordered. If you turn this option on, the warranty is included on the bill of material for the item. You can include warranty service only if the item is under serial number control. See: Overview of Installed Base.

Controlled at Mater

Value N/A

Enable No

Coverage

Enter the coverage schedule you want to associate with the current support service. A coverage schedule defines the days during the week and hours during each day that customers may contact your support organization to request the current service. You can choose any coverage schedule you have already defined. You can define additional coverage schedules using the Coverage Schedules window in Oracle Service. See: Service Coverage.

Controlled at Mater

Value N/A

Enable No

Service Duration

Enter a positive number to indicate how long the current service lasts. The number you enter here along with the duration period (in other words, Month, Year) provide defaults when you order the current service using Oracle Order Management. You can select any period you have defined as a unit of measure as long as that unit of measure is associated with your Time unit of measure class. You indicate which class is the time unit of measure class by setting the profile option Service: Time Unit of Measure Class. See: Oracle Service Profile Options.

Controlled at Mater

Value N/A

Enable No

Billing Type

Indicate whether the customer is charged for any of the following:

Material Material usage expenses your support organization incurs while providing the current service.

Labor Labor expenses your support organization incurs while providing the current service.

Expense Incidental expenses your support organization incurs while providing the current service.

Controlled at Mater

Value N/A

Enable No

Serviceable Product

Indicate whether the current item is serviceable. If you turn this option on, Support Service must be turned off because an item cannot be both serviceable and servicing. When you turn this option on, you can order service for the item using Oracle Order Management. See: Overview of Oracle Service.

Controlled at Mater

Value N/A

Enable No

Service Starting Delay

Enter a positive number indicating how many days after shipment of the current item service should start. When service is ordered for the current item, the service may be started on a specific date or on a date that is determined only after the item ships. If service starts after the item ships, Oracle Service determines the start date by adding the starting delay you enter here to the item's shipment date. See: Overview of Installed Base.

Controlled at Mater

Value N/A

Enable No

B

Flow Component Item Template

$\mathbf{T}$he single most important setup in any Oracle implementation are the item attributes for the items. The item attributes control how the software handles the part throughout the business cycle.

This Appendix describes the Flow Component Template. It is the template for the children or components of the Finished Good Item. Since the Components can be purchased, or made in the assembly line, some users may create additional templates for the Flow Components:

- Flow Component Kanban Purchased

- Flow Component Kanban Make

- Flow Component Phantom Item

Flow Component Item Template

The item attributes are divided by groups: Main, Inventory, Bills of Material, Costing, Purchasing, Receiving, Physical, General Planning, MPS / MRP Planning, Lead Times, Work in Process, Order Entry, Invoicing, and Service. The template setup steps will be divided according to the groups mentioned.

In a flow implementation the data load process is fundamental to guarantee standardization across all items. A flow component item should have some basic attributes, and it is around these attributes that the templates should be developed. Oracle Flow Manufacturing supports the following type of flow components:

- Purchased and managed through supplier or inter-org kanbans

- Manufactured Pulled and managed though intra-org kanbans

- Phantom Items structures for customers transitioning to flow.

This chapter describes in detail these and other attributes when creating a template for a Flow Component Item.

▶▶ **To create a template**

1. Navigate to the Organizations window.

Responsibility:Inventory

Navigation:N: Setup > Organizations > Organizations

2. Enter the following data:

Template: Enter the template name e.g. Flow Finished Good Flow Component

Description: Any additional information to describe the template name

Org: Organization to assign the template to.

Show: The category group where the attributes are grouped.

Attribute name: The name of the attribute to setup

Controlled at: Either Master level or Org Level.

Value: Default value for the attribute

Enable: Check this box to activate the attribute

Main Attribute Group Setup Attibute Names

Primary Unit of Measure

This is the stocking and selling unit of measure. Any necessary conversions are based on this unit of measure. This attribute is not updatable.

	Purchased	**Make**	**Phantom**
Controlled at	Master	Master	Mater
Value	Each	Each	Each
Enable	YES	YES	YES

User Item Type

Oracle provides several types by default at installation. These types correspond to the item templates also provided. Select one of these values.

	Purchased	**Make**	**Phantom**
Controlled at	Org	Org	Org
Value	Purchased Item	Subassembly	Phantom
Enable	YES	YES	YES

Item Status

Item status codes set or default the values for attributes under status control. User-defined status codes control certain item attributes designated as status attributes. The status attributes are: BOM Allowed, Build in WIP, Customer Orders Enabled, Internal Orders Enabled, Invoice Enabled, Transactable, Purchasable, and Stockable. These attributes control the functionality of an item over time. See: Status Attributes and Item Status Control, Defining Item Status Codes, and Defining Item Attribute

	Purchased	**Make**	**Phantom**
Controlled at	Master	Master	Master
Value	Active	Active	Active
Enable	YES	YES	YES

Conversions

Both Use both item-specific and standard unit of measure conversions. If you defined an item-specific and a standard conversion for the same unit of measure, the item-specific conversion is used.

 Item Use only unit of measure conversions unique to this item.

Standard Use only standard unit of measure conversions. If you want to use only standard conversions do not create item specific conversions.

	Purchased	**Make**	**Phantom**
Controlled at	Master	Master	Master
Value	Both	Both	Both
Enable	YES	YES	YES

Inventory Attribute Group Setup

Attribute Names

Inventory Item

Indicate whether to stock and transact this item in Oracle Inventory. You must turn this option on if you want to enable the following item attributes: Stockable, BOM Allowed, Transactable, and Build in WIP.

	Purchased	Make	Phantom
Controlled at	Master	Master	Master
Value	Yes	Yes	No
Enable	YES	YES	YES

Stockable

Indicate whether to stock this item in Inventory. You can set this attribute only when you turn on the Inventory Item option. Turning this option on enables you to set the Transactable item attribute.

	Purchased	Make	Phantom
Controlled at	Master	Master	Master
Value	Yes	Yes	No
Enable	YES	YES	YES

Transactable

Indicate whether to allow Inventory transactions. You can set this attribute only when you turn on the Stockable option. Additionally, Oracle Order Management uses this along with Stockable and Returnable to determine which authorized returned items can be physically received into inventory. (See also the OM Transactable attribute.)

	Purchased	Make	Phantom
Controlled at	Master	Master	Master
Value	Yes	Yes	No

Enable	YES	YES	YES

Revision Control

Indicate whether to track inventory balances by revision. If you turn this option on you must specify an existing revision number for issues and receipts. Attention: You cannot change revision control when an item has quantity on hand. If Revision Control is controlled at the Master Item level, the check for on-hand quantity is against the sum of on-hand quantities in all child organizations.

> **Note:** For Oracle Order Management, if profile option OE: Reservations is Yes, you can specify a revision at order entry or scheduling, or let Pick Release use Inventory picking rules to determine the revision when the order is picked. If the profile option is No, you must enter a revision at ship confirmation.

	Purchased	Make	Phantom
Controlled at	Org	Org	Org
Value	No revision	No revision	No revision
Enable	YES	YES	YES

Reservable

Indicate whether you can create material reservations. You can reserve an item only when you have sufficient inventory. See: Scheduling an Order or Order Line.

> **Note:** Reservation control for a subinventory overrides reservation control for an item. In other words, if an item is reservable but a subinventory is not, the item quantity in that subinventory is not reservable.

> **Note:** Oracle Order Management recognizes this attribute only if profile option OE: Reservations is Yes. Then, Order Management allows reservation of the item during order entry or scheduling and automatically creates any necessary reservations when the item is released for picking.

> **Attention:** You cannot turn reservation control off if reservations exist.

	Purchased	Make	Phantom
Controlled at	Org	Org	Org
Value	Reservable	Reservable	Reservable
Enable	YES	YES	YES

Lot Control

No control Do not establish lot control for the item.

Full control Track inventory balances by lot number. You must specify a lot number for issues and receipts.

> **Note:** For Oracle Order Management, if profile option OE:
> Reservations is Yes, you can specify a lot at order entry or
> scheduling, or let Pick Release use Inventory picking rules to
> determine the lot when the order is picked. If the profile option is
> No, you must enter a lot at ship confirmation.

You can establish lot number control only for an item that has no quantity on hand.
If Lot Control is controlled at the Master Item level, the check for on-hand quantity
is against the sum of on-hand quantities in all child organizations.

> **Attention:** Oracle Work in Process recognizes either lot control or
> serial number control for an item--but not both. You cannot transact
> an item into Work in Process if it has both lot and serial control
> defined.

	Purchased	**Make**	**Phantom**
Controlled at	Org	Org	Org
Value	No Lot Control	No Lot Control	No Lot Control
Enable	YES	YES	YES

Starting Lot Prefix

Enter a starting prefix for all lot numbers you define for this item. When Lot
Number Generation is at item level in the organization parameters, this prefix is
used when you define a lot number.

	Purchased	**Make**	**Phantom**
Controlled at	Org	Org	Org
Value	N/A	N/A	N/A
Enable	NO	NO	NO

Starting Lot Number

Enter a starting numeric suffix for this item only. When Lot Number Generation is
at item level in the organization parameters, this starting numeric suffix is used

when you create a lot number. Thereafter, this number is incremented for each succeeding lot.

	Purchased	Make	Phantom
Controlled at	Org	Org	Org
Value	N/A	N/A	N/A
Enable	NO	NO	NO

Lot Expiration (Shelf Life)

Lot Expiration control governs how long items in a given lot remain available.

Shelf life days Specify a number of days for all lots of an item, beginning on the day you create the lot by receiving the item. You receive a warning message that the lot expires after the specified number of days.

No control Shelf life control not established for this item

U*ser-defined* Specify an expiration date as you receive each lot. You receive a warning but are not prevented from using the lot after expiration.

Attention: You cannot change lot expiration control when an item has quantity on hand. If Lot Expiration is controlled at the Item level, the check for on-hand quantity is against the sum of on-hand quantities in all child organizations.

	Purchased	Make	Phantom
Controlled at	Org	Org	Org
Value	N/A	N/A	N/A
Enable	NO	NO	NO

Shelf Life Days

Enter the number of days each lot is active. At receipt, the expiration date is determined by adding the shelf life days to the system date (includes the day you define the lot). This is used only when you choose Shelf life days for Lot Expiration Control.

	Purchased	Make	Phantom
Controlled at	Org	Org	Org

Value	N/A	N/A	N/A
Enable	NO	NO	NO

Cycle Count Enabled

Turn this option on for automatic cycle count scheduling. See: Overview of Cycle Counting.

	Purchased	Make	Phantom
Controlled at	Org	Org	Org
Value	Yes	Yes	N/A
Enable	YES	YES	NO

Negative Measurement Error

Enter the percentage of negative variance acceptable before cycle count creates an adjustment transaction. Your physical cycle count can be less than the quantity on hand by an amount less than or equal to this percentage.

For example, suppose quantity on hand is 100 and negative tolerance is 10%. Inventory does not create an adjustment for physical counts between 90 and 100 units. This means the quantity on hand remains 100 units. For physical counts under 90 units, Inventory creates an adjustment, changing the quantity on hand to the physical count.

	Purchased	Make	Phantom
Controlled at	Master	Master	Master
Value	N/A	N/A	N/A
Enable	NO	NO	NO

Positive Measurement Error

Enter the percentage of positive variance acceptable before cycle count creates an adjustment transaction. Your physical count can be greater than the quantity on hand by an amount less than or equal to this percentage.

For example, suppose quantity on hand is 100 and positive tolerance is 10%. Inventory does not create an adjustment transaction for physical counts between 100 and 110 units. This means the quantity on hand remains 100 units. For physical

counts over 110 units, Inventory creates an adjustment, changing the quantity on hand to the physical count.

	Purchased	Make	Phantom
Controlled at	Master	Master	Master
Value	N/A	N/A	N/A
Enable	NO	NO	NO

Serial Number Generation

*At inventory receipt*Create and assign serial numbers when you receive the item. Thereafter, for any material transaction, you must provide a serial number for each unit.

At sales order issue Create and assign serial numbers when you issue (ship) the item against a customer sales order. (Internal requisition orders do not require a serial number when you ship the item.) If you receive an item on an RMA (return material authorization), you must specify the same serial numbers you created at sales order issue. All other material transactions for this item bypass serial number information.

No control Serial number control not established for this item. All material transactions involving this item bypass serial number information.

Predefined Assign predefined serial numbers when you receive the item. Thereafter, for any material transaction, you must provide a serial number for each unit.

You can change back and forth between certain options under the following conditions:

Change back and forth between		When
Dynamic entry at inventory receipt	Predefined serial numbers	Any time
Dynamic entry at sales order issue	No serial number control	Any time
Dynamic entry at inventory receipt	No serial number control	Item has no on-hand quantity
Dynamic entry at sales order issue	Predefined serial numbers	Item has no on-hand quantity
Predefined serial numbers	No serial number control	Item has no on-hand quantity
Dynamic entry at inventory receipt	Dynamic entry at sales order issue	Item has no on-hand quantity

If Serial Generation is controlled at the Item level, the check for on-hand quantity is against the sum of on-hand quantities in all child organizations.

	Purchased	Make	Phantom
Controlled at	Org	Org	Org
Value	User Defined	User Defined	N/A
Enable	User Defined	User Defined	NO

Starting Serial Prefix

Enter a starting alpha prefix for all serial numbers you define. You must enter a value when you choose Predefined and when Serial Generation is At item level in. The organization parameters. This prefix is used when you define your serialized units.

	Purchased	Make	Phantom
Controlled at	Org	Org	Org
Value	User Defined	User Defined	N/A
Enable	User Defined	User Defined	NO

Starting Serial Number

Enter a starting numeric suffix for all serial numbers for this item only. You must enter a value when you choose Predefined and when Serial Number Generation is at item level in the organization parameters. This starting numeric suffix is used when you define your serialized units. Thereafter, this number is incremented for each.

	Purchased	Make	Phantom
Controlled at	Org	Org	Org
Value	User Defined	User Defined	N/A
Enable	User Defined	User Defined	NO

Locator Control

If the component item is kanban controlled and locator control is required, then it is necessary to turn on this attribute.

Dynamic entry Define locators when you use them, either as you receive or ship items.

No control Locator control not established.

Prespecified Define locators before you use them.

> **Note:** Oracle Order Management, if profile option OE: Reservations is Yes, Order Entry uses Inventory picking rules to assign the locator to an item being shipped.

> **Note Also:** Locator control for an organization or for a subinventory overrides locator control for an item.

> **Attention:** You cannot change locator control when an item has quantity on hand.

	Purchased	Make	Phantom
Controlled at	Org	Org	Org
Value	User Defined	User Defined	N/A
Enable	User Defined	User Defined	NO

Restrict Subinventories

Indicate whether to restrict transactions of this item to or from a subinventory specified in a list you define with the Item/Subinventory Information window. See: Assigning Subinventories to an Item. This option must be turned on if you choose to restrict locators.

	Purchased	Make	Phantom
Controlled at	Org	Org	Org
Value	N/A	N/A	N/A
Enable	NO	NO	NO

Restrict Locators

Indicate whether to restrict transaction of this item to or from a locator specified in the list you define with the Item/Subinventory Information window. You cannot restrict locators unless you also restrict subinventories.

	Purchased	Make	Phantom
Controlled at	Org	Org	Org
Value	N/A	N/A	N/A
Enable	NO	NO	NO

Bills of Material Attribute Group Setup

Attribute Names

BOM Allowed

Oracle Bills of Material allows you to define a bill of material for an item, or to assign the item as a component on a bill.

	Purchased	Make	Phantom
Controlled at	Master	Master	Master
Value	Yes	Yes	No
Enable	YES	YES	YES

BOM Item Type

This attribute is controlled at the Master level only. Select a type to control bill functionality. You must enter a value here if BOM Allowed is turned on.

Model This item's bill of material lists option classes and options available when you place an order for the model item.

Option Class This item's bill of material contains a list of related options. Option classes group like options together. Oracle Order Management does not allow ordering of classes outside a model.

Planning This item's bill of material contains a list of items and planning percentages. A planning item can represent a product family or demand channel. Its bill of material facilitates master scheduling and/or material planning. The total

component planning percentages on a planning bill can exceed 100%. Oracle Order Management does not allow ordering of Planning bills.

Product Family This item can be used as a product family for planning at an aggregate level. See: Product Families..

Standard Any item that can have a bill or be a component on a bill, except planning, model, or option class items. Standard items include purchased items, subassemblies, or finished products.

	Purchased	Make	Phantom
Controlled at	Master	Master	Master
Value	Standard	Standard	Standard
Enable	YES	YES	YES

Base Model

This attribute is controlled at the Master level only. Displays the model from which an ATO configuration was created. In Oracle Order Management, you can place an order for an ATO model, choosing from the list of options. Oracle Bills of Material creates a new configuration item, bill, and routing that captures the chosen options. The configuration item lists the ordered model item as its base model.

	Purchased	Make	Phantom
Controlled at	Master	Master	Master
Value	N/A	N/A	N/A
Enable	NO	NO	NO

Costing Attribute Group Setup

Attribute Names

Costing Enabled

Indicate whether to report, value, and account for any item costs. For example, you might disable costing for reference items, or for invoice only (non-stock) items that you never ship and never hold in inventory.

Attention: Organizations using average costing always maintain their own item costs, regardless of the control level set for the Costing Enabled attribute. See: Overview of Cost Management.

This is an item defining attribute. If you turn this option on, the item is automatically assigned to the default category set for the Oracle Cost Management functional area. See: Item Defining Attributes.

	Purchased	Make	Phantom
Controlled at	Org	Org	Org
Value	Yes	Yes	N/A
Enable	YES	YES	NO

Inventory Asset Value
Indicate whether to value an item as an asset in inventory. Turning this option off indicates an expense item.

	Purchased	Make	Phantom
Controlled at	Org	Org	Org
Value	Yes	Yes	N/A
Enable	YES	YES	NO

Include in Rollup
Indicate whether to include an item in the cost rollup.

	Purchased	Make	Phantom
Controlled at	Org	Org	Org
Value	Yes	Yes	Yes
Enable	YES	YES	YES

Cost of Goods Sold Account
This attribute is controlled at the Organization level only. Enter a general ledger account to use as a source for the Cost of Goods Sold Account. The default cost of goods sold account is set when you define organization parameters. See: Defining Organization Parameters.

	Purchased	Make	Phantom
Controlled at	Org	Org	Org
Value	N/A	N/A	N/A
Enable	NO	NO	NO

Standard Lot Size

Enter the standard lot size Oracle Bills of Material uses to calculate assembly lead times. Oracle Cost Management uses this value to calculate unit costs for sub-elements with a Lot basis type. This lot size is separate from the lead time lot size. See: Calculating Manufacturing Lead Times and Routings.

	Purchased	Make	Phantom
Controlled at	Org	Org	Org
Value	User Defined	User Defined	User Defined
Enable	YES	YES	YES

Purchasing Attribute Group Setup

Attribute Names

Purchased

Indicate whether to purchase and receive an item. Turning this option on allows you to set the Purchasable attribute. This is an item defining attribute. If you turn this option on, the item is automatically assigned to the default category set for the Oracle Purchasing functional area. See: Item Defining Attributes.

	Purchased	Make	Phantom
Controlled at	Master	Master	Master
Value	Yes	Yes	No
Enable	YES	YES	YES

Purchasable

Indicate whether to order an item on a purchase order. You can set this only when Purchased is turned on. Turning Purchasable off allows you to temporarily restrict the ability to buy. This attribute is optionally set by the Item Status code. See: Status Attributes and Item Status Control.

	Purchased	Make	Phantom
Controlled at	Master	Master	Master
Value	Yes	No	N/A
Enable	YES	YES	NO

Use Approved Supplier

Indicate whether to use only approved suppliers. If you turn this option on, Oracle Purchasing prevents you from approving a purchase order for an item if you do not use an approved supplier.

	Purchased	Make	Phantom
Controlled at	Org	Org	Org
Value	No	No	N/A
Enable	YES	YES	NO

Allow Description Update

Indicate whether to allow updates to the item description on a purchasing document line for an item. See: Defining Purchasing Options.

	Purchased	Make	Phantom
Controlled at	Org	Org	Org
Value	Yes	Yes	N/A
Enable	YES	YES	NO

RFQ Required

Indicate whether to require an item quotation when requesting an item. Oracle Purchasing defaults this value on requisition lines for this item. Leave this field

blank if you want Inventory to use the value defined in the Purchasing Options window for transactions involving this item. See: Defining Purchasing Options.

	Purchased	Make	Phantom
Controlled at	Org	Org	Org
Value	No	No	N/A
Enable	YES	NO	NO

Outside Processing Item

Indicate whether you can add the item to an outside processing purchase order line. You can turn this option on only if Purchased is also on. In addition, this option controls whether you can attach an item to a resource in the Resource window. See: Defining a Resource and Outside Processing.

	Purchased	Make	Phantom
Controlled at	Org	Org	Org
Value	N/A	N/A	N/A
Enable	NO	NO	NO

Outside Processing Unit Type

Select an option to determine the quantity of an outside processing item you requisition, purchase and receive:

Assembly You purchase an outside processing item based on the number of assemblies you ship to the supplier.

Resource You purchase an outside processing item based on the number of assemblies times the resource usage rate or amount.

	Purchased	Make	Phantom
Controlled at	Org	Org	Org
Value	N/A	N/A	N/A
Enable	NO	NO	NO

Taxable

Indicate whether the supplier charges a tax. Oracle Purchasing uses the taxable status together with the tax code you associate with a location to determine whether a purchase order shipment is taxable, and what the tax code that applies to this shipment is. Leave this field blank if you want Inventory to use the value defined in the Purchasing Options window for transactions involving this item. See: Defining Purchasing Options.

	Purchased	Make	Phantom
Controlled at	Org	Org	Org
Value	No	No	N/A
Enable	YES	YES	NO

Receipt Required (Three-Way Invoice Matching)

Indicate whether you must receive an item before you can pay the invoice. Leave this field blank if you want Inventory to use the value defined in the Purchasing Options window for transactions involving this item. See: Defining Purchasing Options.

	Purchased	Make	Phantom
Controlled at	Org	Org	Org
Value	Yes	N/A	N/A
Enable	YES	NO	NO

Inspection Required (Four-Way Invoice Matching)

Indicate whether to inspect an item upon receipt from the supplier, before paying the corresponding invoice. Leave this field blank if you want Inventory to use the value defined in the Purchasing Options window for transactions involving this item. See: Defining Purchasing Options.

	Purchased	Make	Phantom
Controlled at	Org	Org	Org
Value	User Defined	N/A	N/A
Enable	YES	NO	NO

Default Buyer

Enter the buyer assigned to purchase an item. Oracle Purchasing displays the buyer you enter here as the suggested buyer for a requisition. See: Defining Buyers.

	Purchased	Make	Phantom
Controlled at	Org	Org	Org
Value	N/A	N/A	N/A
Enable	NO	NO	NO

Unit of Issue

Enter the unit of measure you typically use to issue the item from inventory. Oracle Purchasing uses this as the default for internal requisition lines sourced from inventory.

You use units of issue to round order quantities, minimizing shipping, warehousing, and handling costs. The unit of issue must be the same for all units of measure belonging to the same unit of measure class as the primary unit of measure. See: Defining Unit of Measure Classes.

	Purchased	Make	Phantom
Controlled at	Org	Org	Org
Value	N/A	N/A	N/A
Enable	NO	NO	NO

Receipt Close Tolerance

Enter the percentage tolerance Oracle Purchasing uses to automatically close purchase order shipments. Oracle Purchasing automatically closes a shipment when your unreceived quantity is within the quantity tolerance percentage of the shipment.

For example, if the original shipment quantity is 50, and you enter 10 here (10%), Oracle Purchasing automatically closes the shipment for receiving when you receive 45 or more.

Closed for Receiving is a status change only. You can receive additional items against the shipment later.

	Purchased	Make	Phantom
Controlled at	Org	Org	Org
Value	User Defined	N/A	N/A
Enable	YES	NO	NO

Invoice Close Tolerance

Enter the percentage tolerance Oracle Purchasing uses to automatically close purchase order shipments. Oracle Purchasing automatically closes a shipment when your uninvoiced quantity is within the quantity tolerance percentage of the shipment.

For example, if the original shipment quantity is 50, and you enter 10 here (10%), Oracle Purchasing automatically closes the shipment for invoicing when you invoice match 45 or more.

Closed for Invoicing is a status change only. You can invoice match additional items against the shipment later.

	Purchased	Make	Phantom
Controlled at	Org	Org	Org
Value	N/A	N/A	N/A
Enable	NO	NO	NO

UN Number

Enter the United Nations identification number. Oracle Purchasing uses UN numbers to identify specific materials (hazardous materials, for example) for international trade purposes. See: Defining UN Numbers.

	Purchased	Make	Phantom
Controlled at	Org	Org	Org
Value	N/A	N/A	N/A
Enable	NO	NO	NO

Hazard Class

Oracle Purchasing uses hazard classes to identify categories of hazardous materials for international trade purposes. See: Defining UN NumbersDefining Hazard Classes.

	Purchased	Make	Phantom
Controlled at	Org	Org	Org
Value	N/A	N/A	N/A
Enable	NO	NO	NO

List Price

Enter the value that Oracle Purchasing uses as the default price on a purchase order, requisition, RFQ, or quotation.

Oracle Receivables uses this value as the default unit selling price on a transaction. Note that this is the original inventory item price used by Purchasing and therefore should be used as a guide only.

	Purchased	Make	Phantom
Controlled at	Org	Org	Org
Value	N/A	N/A	N/A
Enable	NO	NO	NO

Market Price

Enter the market value for an item. Oracle Purchasing copies the market price to the purchase order lines you create.

	Purchased	Make	Phantom
Controlled at	Org	Org	Org
Value	N/A	N/A	N/A
Enable	NO	NO	NO

Price Tolerance

Enter the price tolerance percent, the maximum price percentage over the normal price range for an item. For example, if the tolerance percent is 5, the maximum acceptable price on a purchase order is 5% over the requisition price. Any purchase order price 5% above the requisition price is unacceptable, and you cannot approve the purchase order.

	Purchased	Make	Phantom
Controlled at	Org	Org	Org
Value	N/A	N/A	N/A
Enable	NO	NO	NO

Rounding Factor

Enter a number between 0 and 1. This factor determines how to round the quantity on an internal requisition that results from conversions between the requisition line unit of measure and the item's Unit of Issue. This factor insures that the unit of issue resolves to an integer, rather than a fractional amount.

For example, suppose the requisition line unit of measure is each, and the unit of issue is dozen. For an internal requisition of 20 each, Oracle Purchasing converts the order quantity to 1.75 dozen. With a rounding factor of 0.6, Oracle Purchasing rounds up the order quantity to 2 dozen. (Rounding factor of 0.75 also rounds up to 2 dozen.) With a rounding factor of 0.8, Oracle Purchasing rounds down to 1 dozen.

Oracle Purchasing either performs rounding automatically or advises you of the suggested quantity depending how you set your purchasing options. See: Defining UN NumbersDefining Hazard ClassesInternal Requisitions.

	Purchased	Make	Phantom
Controlled at	Master	Master	Master
Value	N/A	N/A	N/A
Enable	NO	NO	NO

Encumbrance Account

This attribute is controlled at the Organization level only. Enter the default encumbrance account Oracle Purchasing uses when an item is received. If the item encumbrance account does not exist, Oracle Purchasing uses the subinventory

account. You encumber, or reserve against funds, when the purchase requisition or purchase order is approved. When you deliver into a subinventory you reverse the encumbrance. The total receipts plus encumbrances equals your total funds spent.

	Purchased	Make	Phantom
Controlled at	Master	Master	Master
Value	N/A	N/A	N/A
Enable	NO	NO	NO

Expense Account

This attribute is controlled at the Organization level only. Enter the default inventory account for expense items. This attribute is used only when Inventory Asset Value is turned off. Oracle Purchasing debits this account when you receive an item into inventory only if the item is being expensed. If you receive into an expense subinventory, Oracle Purchasing uses this account first; if you do not define the account here, Oracle Purchasing uses the expense account you assigned to the subinventory.

	Purchased	Make	Phantom
Controlled at	Master	Master	Master
Value	N/A	N/A	N/A
Enable	NO	NO	NO

Asset Category

Enter the asset category to which the item belongs. Oracle Assets uses this to classify your fixed assets. All assets in a category share default information, such as the accounts used when you post to the general ledger. You can enter this field only if you use Oracle Assets. See: Setting Up Asset Categories.

	Purchased	Make	Phantom
Controlled at	Master	Master	Master
Value	N/A	N/A	N/A
Enable	NO	NO	NO

Receiving Attribute Group Setup

Attribute Names

Receipt Date Action

None No receipt date exception enforced.

Reject Reject receipts when the receive date is outside the range defined by Days Early Receipt Allowed or Days Late Receipt Allowed.

Warning Display a warning message if you attempt to receive an item outside the range defined by Days Early Receipt Allowed or Days Late Receipt Allowed, but perform the receipt, anyway.

	Purchased	Make	Phantom
Controlled at	Org	Org	Org
Value	N/A	N/A	N/A
Enable	NO	NO	NO

Days Early Receipt Allowed

Enter the number of days before the promise date you can receive an item without warning or rejection. For example, if you enter 3 and the promise date is a Friday, you can receive the item on Tuesday.

Note that Oracle Purchasing uses regular calendar days (including weekends and holidays) in this calculation.

If the promise date does not exist, Oracle Purchasing uses the need by date.

	Purchased	Make	Phantom
Controlled at	Org	Org	Org
Value	N/A	N/A	N/A
Enable	NO	NO	NO

Days Late Receipt Allowed

Enter the number of days after the promise date you can receive an item without warning or rejection. For example, if you enter 2 and the promise date is a Monday, you can receive the item on Wednesday.

Note that Oracle Purchasing uses regular calendar days (including weekends and holidays) in this calculation.

If the promise date does not exist, Oracle Purchasing uses the need by date.

	Purchased	Make	Phantom
Controlled at	Org	Org	Org
Value	N/A	N/A	N/A
Enable	NO	NO	NO

Over-receipt Qty Control Action

None No over tolerance enforced.

Reject Reject receipts over the tolerance quantity. You receive an error message and are prevented from receiving quantities exceeding the order quantity by more than the Quantity Received Tolerance percent.

Warning A warning message displays if you accept receipts over the quantity determined by the Overreceipt Quantity Control Tolerance percent, but does perform the receipt.

	Purchased	Make	Phantom
Controlled at	Org	Org	Org
Value	Warning	N/A	N/A
Enable	YES	NO	NO

Over-receipt Qty Tolerance

Enter the quantity received tolerance percent, the maximum acceptable over-receipt percentage, used by the Overreceipt Quantity Control Action attribute. For example, if the tolerance percent is 5, then the acceptable quantity on a receipt transaction is within 5% of the quantity you order on a purchase order line. Any quantity more than 5% over the order quantity is unacceptable.

	Purchased	Make	Phantom
Controlled at	Org	Org	Org
Value	N/A	N/A	N/A
Enable	NO	NO	NO

Allow Substitute Receipts

Indicate whether to allow receipt of defined substitutes in place of this item. You define valid substitutes with the Item Relationships window. See: Defining Item Relationships. Leave this field blank if you want Inventory to use the value defined in the Receiving Options window for transactions involving this item. See: Defining Receiving Options.

	Purchased	Make	Phantom
Controlled at	Master	Master	Master
Value	Yes	N/A	N/A
Enable	YES	YES	NO

Allow Unordered Receipts

Indicate whether you can receive an item without a purchase order. If this option is on, you can later match the receipt to the appropriate purchase order. If this option is off, all receipts for an item must have a corresponding purchase order. Leave this field blank if you want Inventory to use the value defined in the Receiving Options window for transactions involving this item. See: Defining Receiving Options.

	Purchased	Make	Phantom
Controlled at	Org	Org	Org
Value	Yes	Yes	N/A
Enable	YES	YES	YES

Allow Express Transactions

Indicate whether you can deliver all distributions for this item with one data entry transaction if the quantity to deliver equals the purchase order line balance. If this option is turned off, you must deliver individual distributions separately. Leave this

field blank if you want Inventory to use the value defined in the Receiving Options window for transactions involving this item. See: Defining Receiving Options.

	Purchased	Make	Phantom
Controlled at	Org	Org	Org
Value	Yes	Yes	N/A
Enable	YES	YES	NO

Receipt Routing

Direct At receipt, deliver an item directly to its location.

Inspection Receive an item first, inspect it, then deliver.

Standard Receive an item first, then deliver without inspection.

	Purchased	Make	Phantom
Controlled at	Org	Org	Org
Value	Direct Delivery	Direct Delivery	Direct Delivery
Enable	YES	YES	YES

Enforce Ship-To

Select an option to control whether the supplier can deliver to a location that differs from the ship-to location defined on the purchase order:

None No ship-to location enforced.

Reject Prevent receipt of items not received to their purchase order ship-to location.

Warning Display a warning message if you attempt to receive an item to a location that differs from the purchase order ship-to location, but perform the receipt, anyway.

	Purchased	Make	Phantom
Controlled at	Org	Org	Org
Value	Warning	Warning	Warning
Enable	YES	YES	YES

Physical Attribute Group Setup

Attribute Names

Weight Unit of Measure

Enter a weight unit of measure.

	Purchased	Make	Phantom
Controlled at	Master	Master	Master
Value	User Defined	User Defined	User Defined
Enable	YES	YES	YES

Unit Weight

Enter the weight for one unit of the item in the Weight Unit of Measure.

	Purchased	Make	Phantom
Controlled at	Master	Master	Master
Value	N/A	N/A	N/A
Enable	NO	NO	NO

Volume Unit of Measure

Enter a volume unit of measure.

	Purchased	Make	Phantom
Controlled at	Master	Master	Master
Value	User Defined	User Defined	User Defined
Enable	YES	YES	YS

Unit Volume

Enter the volume for one unit of the item in the Volume Unit of Measure.

	Purchased	Make	Phantom

Controlled at	Master	Master	Master
Value	N/A	N/A	N/A
Enable	NO	NO	NO

Container

Select Container to identify items that are containers used for shipping sales orders.

	Purchased	**Make**	**Phantom**
Controlled at	Master	Master	Master
Value	Yes	Yes	Yes
Enable	YES	YES	YES

Vehicle

Select Vehicle to identify items that are vehicles used for shipping sales orders.

	Purchased	**Make**	**Phantom**
Controlled at	Master	Master	Master
Value	No	No	No
Enable	YES	YES	YES

Container Type

For items identified as containers, enter the container type. See: Defining Container Types.

	Purchased	**Make**	**Phantom**
Controlled at	Org	Org	Org
Value	User Defined	User Defined	User Defined
Enable	YES	YES	YES

Internal Volume

Enter the internal volume of the container or vehicle in the same UOM as the Unit Volume. This attribute is used by shipping to calculate container capacity restrictions.

	Purchased	Make	Phantom
Controlled at	Org	Org	Org
Value	N/A	N/A	N/A
Enable	NO	NO	NO

Maximum Load Weight

Enter the maximum load weight of the container or vehicle in the same UOM as

	Purchased	Make	Phantom
Controlled at	Org	Org	Org
Value	N/A	N/A	N/A
Enable	NO	NO	NO

Minimum Fill Percentage

Enter the minimum fill percentage under which the container or vehicle should be used.

	Purchased	Make	Phantom
Controlled at	Org	Org	Org
Value	N/A	N/A	N/A
Enable	NO	NO	NO

General Planning Attribute Group Setup

Attribute Names

Inventory Planning Method

Select an option for organization level planning. See: Assigning Subinventories to an Item or Assigning Items to a Subinventory.

Min-max You define a minimum quantity that you want on hand. When you reach this quantity, you reorder. You also define a maximum on-hand quantity that you do not want to exceed.

Not planned No planning method used.

Reorder point The reorder point is calculated based on the planning information you define for this item.

	Purchased	Make	Phantom
Controlled at	Org	Org	Org
Value	Not Planned	Not Planned	Not Planned
Enable	YES	YES	YES

Planner

This attribute is controlled at the Organization level only. Enter the material planner assigned to plan this item. You must define planner codes for your organization before updating this attribute. See: Defining Planners.

	Purchased	Make	Phantom
Controlled at	Org	Org	Org
Value	N/A	N/A	N/A
Enable	NO	NO	NO

Make or Buy

Select the option that applies to items with Inventory Item set to Yes. The Planner Workbench uses this to default an appropriate value for implementation type.

Make Usually manufactured. The Planner Workbench defaults the implementation type Discrete job. The planning process passes demand down from manufactured items to lower level components.

Buy Usually purchased. The Planner Workbench defaults the implementation type to Purchase Requisition. The planning process does not pass demand down from purchased items to lower level components.

Attention: You must also set Purchasable to Yes to create purchase requisitions and purchase orders. If you also set Build in WIP to Yes, you can use the Planner Workbench to implement planned orders as discrete jobs. See: Overview of Material Requirements Planning and Creating Planning Exception Sets.

	Purchased	Make	Phantom
Controlled at	Org	Org	Org
Value	Buy	Make	Make
Enable	YES	YES	YES

Min-Max Minimum Quantity
Enter the quantity minimum for min-max planning. If an item is min-max planned, the Min-Max Planning Report suggests a new order when quantity drops to the min-max minimum. See: Min-Max Planning.

	Purchased	Make	Phantom
Controlled at	Org	Org	Org
Value	N/A	N/A	N/A
Enable	NO	NO	NO

Min-Max Maximum Quantity
Enter the quantity maximum for min-max planning. If an item is min-max planned, the Min-Max Planning Report suggests an order that brings on-hand up to the min-max maximum. See: Min-Max Planning.

	Purchased	Make	Phantom
Controlled at	Org	Org	Org
Value	N/A	N/A	N/A

Enable	NO	NO	NO

Minimum Order Quantity

Enter the minimum order quantity or repetitive rate (units per day). Planning algorithms (reorder point, min-max, MPS, and MRP) use this to modify the size of planned order quantities or repetitive daily rates. For discrete items, when net requirements fall short of the minimum order quantity, planning algorithms suggest the minimum order quantity. For repetitive items, when average daily demand for a repetitive planning period falls short of the minimum order quantity, planning algorithms suggest the minimum order quantity as the repetitive daily rate. For example, use this to define an order quantity below which it is unprofitable to build the item. See: Overview of Material Requirements Planning and Overview of Inventory Planning and Replenishment.

	Purchased	Make	Phantom
Controlled at	Org	Org	Org
Value	N/A	N/A	N/A
Enable	NO	NO	NO

Maximum Order Quantity

Enter the maximum order quantity or repetitive rate (units per day) of the item. Planning algorithms (reorder point, min-max, MPS, and MRP) use this to modify the size of planned order quantities or repetitive daily rates. For discrete items, when net requirements exceed the maximum order quantity, planning algorithms suggest the maximum order quantity. For repetitive items, when average daily demand for a repetitive planning period exceeds of the maximum order quantity, planning algorithms suggest the maximum order quantity as the repetitive daily rate. For example, use this to define an order quantity above which you do have insufficient capacity to build the item. See: Overview of Material Requirements Planning, Overview of Repetitive Planning, and Overview of Inventory Planning and Replenishment.

	Purchased	Make	Phantom
Controlled at	Org	Org	Org
Value	N/A	N/A	N/A
Enable	NO	NO	NO

Order Cost

Enter the fixed cost associated with placing an order of any quantity.

	Purchased	Make	Phantom
Controlled at	Org	Org	Org
Value	N/A	N/A	N/A
Enable	NO	NO	NO

Carrying Cost Percent

Enter the percentage used to calculate the annual carrying cost. This is the percentage of the unit cost that represents your internal cost to stock one unit for one year.

	Purchased	Make	Phantom
Controlled at	Org	Org	Org
Value	N/A	N/A	N/A
Enable	NO	NO	NO

Source Type (Replenishment)

Inventory Fill requisition requests by creating internal requisitions that become internal sales orders, to pull stock from existing inventory.

Supplier Fill requisition requests by creating purchase requisitions that become purchase orders, procuring the item from a supplier.

	Purchased	Make	Phantom
Controlled at	Org	Org	Org
Value	N/A	N/A	N/A
Enable	NO	NO	NO

Source Organization

This attribute is controlled at the Organization level only.

Optionally enter the organization from which an internal requisition draws the item. This applies only when Inventory is the replenishment source type. You can choose organizations that meet the following criteria:

the item is assigned to the source organization

the source organization uses the same set of books as the current organization (the organization in which you are defining the item)

the source organization has a valid inter-organization relationship with the current organization

See: Defining Inter-Organization Shipping Networks.

The source organization can be your current organization if the item is MRP planned and you choose a non-nettable Source Subinventory.

	Purchased	**Make**	**Phantom**
Controlled at	Org	Org	Org
Value	N/A	N/A	N/A
Enable	NO	NO	NO

Source Subinventory

This attribute is controlled at the Organization level only. Enter the subinventory within the source organization from which an internal requisition draws the item. This applies only when Inventory is the replenishment source, and only when you specify a source organization. For MRP planned items, you must enter a non-nettable source subinventory when the source organization is the current organization.

	Purchased	**Make**	**Phantom**
Controlled at	Org	Org	Org
Value	N/A	N/A	N/A
Enable	NO	NO	NO

Safety Stock Method

Select an option to plan use of fixed or dynamically calculated safety stock quantities. You must choose Non-MRP planned if the Inventory Planning Method attribute is set to Not planned.

MRP planned percent Calculate safety stock as a user-defined percentage (Safety Stock Percent) of the average gross requirements for a user-defined number of days. For discrete items, the user-defined number of days is the Safety Stock Bucket Days. For repetitive items, the user-defined number of days is the repetitive planning period. Note that safety stock for an item varies as the average gross requirements varies during he planning process.

Non-MRP planned Calculate safety stock using methods defined by the Enter Item Safety Stocks window. You can use mean absolute deviation or user-defined percentage of forecasted demand. For Oracle Master Scheduling/MRP and Oracle Supply Chain Planning and Supply Chain Planning, these safety stock quantities are fixed. The Snapshot portion of the planning process loads them, and they do not vary during the planning process itself.

See: Overview of Material Requirements Planning, Entering and Reloading Item Safety Stocks, and Overview of Inventory Planning and Replenishment.

	Purchased	Make	Phantom
Controlled at	Org	Org	Org
Value	N/A	N/A	N/A
Enable	NO	NO	NO

Safety Stock Bucket Days

Enter the number of days to dynamically calculate safety stock quantities. The planning process multiplies the Safety Stock Percent by the average gross requirements and divides by the number of days you enter here. See: Overview of Material Requirements Planning.

	Purchased	Make	Phantom
Controlled at	Org	Org	Org
Value	N/A	N/A	N/A
Enable	NO	NO	NO

Safety Stock Percent

Enter the percent to dynamically calculate safety stock quantities for the item. The planning process multiplies this percent by the average gross requirements and divides by the Safety Stock Bucket Days.

The planning process uses this attribute when you set Safety Stock to MRP planned percent. See: Overview of Material Requirements Planning.

	Purchased	Make	Phantom
Controlled at	Org	Org	Org
Value	N/A	N/A	N/A
Enable	NO	NO	NO

Fixed Order Quantity

Enter the quantity used to modify the size of planned order quantities or repetitive daily rates. When net requirements fall short of the fixed order quantity, the planning process suggests the fixed order quantity. When net requirements exceed the fixed order quantity, the planning process suggests multiple orders for the fixed order quantity.

For discrete items, use this attribute to define a fixed production or purchasing quantity. For repetitive items, use this attribute to define a fixed production rate. For example, if your suppliers can provide the item in full truckload quantities only, enter the full truckload quantity as the fixed order quantity. See: Overview of Material Requirements Planning and Overview of Repetitive Planning.

	Purchased	Make	Phantom
Controlled at	Org	Org	Org
Value	N/A	N/A	N/A
Enable	NO	NO	NO

Fixed Days Supply

Enter the number of days used to modify the size and timing of planned order quantities. The planning process suggests planned order quantities that cover net requirements for the period defined by this value. The planning process suggests one planned order for each period. For example, use this to reduce the number of planned orders for a discrete component of a repetitive item. See: Overview of Material Requirements Planning.

	Purchased	Make	Phantom
Controlled at	Org	Org	Org

Value	N/A	N/A	N/A
Enable	NO	NO	NO

Fixed Lot Multiplier

Enter the fixed lot multiple quantity or repetitive rate (units per day). Planning algorithms (reorder point, min-max, MPS, and MRP) use this to modify the size of planned order quantities or repetitive daily rates.

When net requirements fall short of the fixed lot size multiplier quantity, planning algorithms suggest a single order for the fixed lot size multiplier quantity. When net requirements exceed the fixed lot size multiplier quantity, planning algorithms suggest a single order that is a multiple of the fixed lot size multiplier.

	Purchased	**Make**	**Phantom**
Controlled at	Org	Org	Org
Value	N/A	N/A	N/A
Enable	NO	NO	NO

MPS / MRP Planning Attribute Group Setup

Attribute Names

MRP Planning Method

Select the option that Oracle Master Scheduling/MRP and Oracle Supply Chain Planning uses to decide when to plan the item:

Not planned The item does not require long-term planning of material requirements. Choose this option for high volume and/or low cost items that do not warrant the administrative overhead of MRP; typically dependent demand items.

MRP planning Choose this option for non-critical items that do not require manual planning control, typically dependent demand items.

MPS planning You master schedule the item and require manual planning control. Choose this option for items with independent demand, items that are critical to your business, or items that control critical resources.

MRP/DRP Planned Choose this option when you want both MRP and DRP planning for the item.

MPS/DRP Planned Choose this option when you want both MPS and DRP planning for the item.

DRP Planned Choose this option when you have multiple organizations for which you are exercising Distribution Requirements Planning for the item.

You cannot select Not planned if the Pick Components attribute is turned on. See: Order Entry Attribute Group.

This is an item defining attribute. If you select MPS or MRP planning, the item is automatically assigned to the default category set for the Oracle Master Scheduling/MRP and Oracle Supply Chain Planning functional area. See: Item Defining Attributes.

	Purchased	**Make**	**Phantom**
Controlled at	Org	Org	Org
Value	MRPand DRP	MRPand DRP	MRP
Enable	YES	YES	YES

Forecast Control

Select an option to determine the types of demand you place for the item. This guides the key processes of two-level master scheduling: forecast explosion, forecast consumption, planning, production relief, and shipment relief. This is appropriate only for items that are models, option classes, options, or mandatory components of models and option classes.

Consume You forecast demand directly, rather than by exploding forecast demand.

Consume and derive You forecast demand directly, explode forecast demand, or use a combination of both methods.

None You place sales order demand but do not forecast demand.

	Purchased	**Make**	**Phantom**
Controlled at	Org	Org	Org
Value	None	None	N/A
Enable	YES	YES	NO

Planning Exception Set

This attribute is controlled at the Organization level only. Enter the name of the planning exception set that groups together the sensitivity controls and exception time periods for item-level planning exceptions for the item.

The item-level planning exceptions include: overcommitted, shortage, excess, and repetitive variance. The planning process uses this attribute to decide when to raise planning exceptions for the item.

Since different items may require different sensitivity controls and exception time periods, you can define multiple planning exception sets and assign different sets to different items. In other cases, where many items require the same sensitivity controls and exception time periods, you can associate the same set to multiple items.

	Purchased	Make	Phantom
Controlled at	Org	Org	Org
Value	N/A	N/A	N/A
Enable	NO	NO	NO

End Assembly Pegging

Enter the pegging option.

Soft Pegging This option allocates supply to demand based on the Reservation Level option set in the MRP Plan options.

End Assembly Pegging This option traces the end assembly the item is pegged to at the top of the bill of material. Even if you do not select end assembly pegging, you can still calculate and view end assemblies on-line.

End Assembly/ Soft Pegging Choose this option for both soft pegging and end assembly pegging.

Hard Pegging This option allocates supply to demand based on the Reservation Level option set in the MRP Plan options. This pegs supply to   demand and demand to supply by project at all levels of a bill of material. This allows you to pre-allocate supply to demand and generate planned orders based on the plan level options. See: Reviewing or Adding Plan Options.

End Assembly/ Hard Pegging Choose this option for both hard pegging and end assembly pegging.

None This option disables project material allocation, end assembly pegging, and full pegging.

Attention: You must use the memory-based planner to calculate end assembly pegging.

	Purchased	**Make**	**Phantom**
Controlled at	Org	Org	Org
Value	End Assy / Soft	End Assy / Soft	N/A
Enable	YES	YES	NO

Round Order Quantities

Indicate whether the planning process uses decimal or whole number values when calculating planned order quantities or repetitive rates. When this option is turned on, decimal values round up (never down) to the next whole number. The planning process carries any excess quantities and rates forward into subsequent periods as additional supply. See: Overview of Material Requirements Planning.

	Purchased	**Make**	**Phantom**
Controlled at	Org	Org	Org
Value	N/A	N/A	N/A
Enable	NO	NO	NO

Shrinkage Rate

Enter a factor that represents the average amount of material you expect to lose during manufacturing or in storage. The planning process inflates demand to compensate for this expected loss. For example, if on average 20% of all units fail final inspection, enter 0.2; the planning process inflates net requirements by a factor of 1.25 (1 / 1 - shrinkage rate). See: Overview of Material Requirements Planning.

	Purchased	**Make**	**Phantom**
Controlled at	Org	Org	Org
Value	N/A	N/A	N/A
Enable	NO	NO	NO

Acceptable Early Days

Enter the number of days before which the planning process will not reschedule orders. The planning process only suggests rescheduling out if:

the new calculated order date is later than the original order due date plus the acceptable early days

the new calculated order is does not violate the order of current scheduled receipts

For example, if the original order due date is 10-JUN, and Acceptable Early Days is 3, the planning process will not suggest rescheduling if the new due date is less than or equal to 13-JUN. When rescheduling does not occur (because of acceptable Early Days), a second order, due before the first, will not be rescheduled past the first order.

This lets you reduce plan nervousness and eliminate minor reschedule recommendations, especially when it is cheaper to build and carry excess inventory for a short time than it is to reschedule an order.

This applies to discrete items only. For repetitive items, use Overrun Percentage. See: Overview of Material Requirements Planning.

	Purchased	Make	Phantom
Controlled at	Org	Org	Org
Value	0	0	0
Enable	YES	YES	YES

Repetitive Planning

Indicate whether to plan material requirements in repetitive daily rates. The planning process suggests repetitive schedules you can implement using the Planner Workbench. Turn this option off to plan material requirements in discrete quantities. The planning process suggests planned orders you can implement as discrete jobs or as purchase requisitions. See: Overview of Planner Workbench.

	Purchased	Make	Phantom
Controlled at	Org	Org	Org
Value	N/A	N/A	N/A
Enable	NO	NO	NO

Overrun Percentage

Enter a percentage the planning process uses to suggest new daily rates. The planning process only suggests a new daily rate if the current rate exceeds the suggested rate by more than the acceptable overrun amount.

The acceptable overrun amount is calculated by multiplying this percentage by the suggested daily rate. For example, if the suggested daily rate is 100/day, and Overrun Percentage is 10, the planning process only suggests a new rate if the current rate is greater than 110/day (100/day + 100/day x 10%).

This lets you reduce plan nervousness and eliminate minor rate change recommendations, especially when it is cheaper to carry excess inventory for a short time than it is to administer the rate change.

This attribute applies to repetitive items only. For discrete items, use Acceptable Early Days. See: Overview of Repetitive Planning.

	Purchased	**Make**	**Phantom**
Controlled at	Org	Org	Org
Value	N/A	N/A	N/A
Enable	NO	NO	NO

Acceptable Rate (-) Decrease

Enter the amount the planning process uses to decrease current daily rates inside the planning time fence. The planning process does not suggest a new daily rate less than the current daily rate minus the acceptable rate decrease amount.

The acceptable rate decrease amount is calculated by multiplying this value by the current daily rate. For example, if the current daily rate is 100/day, and the Acceptable Rate Decrease is 10, the planning process does not suggest a new daily rate that is less than 90/day (100/day - 100/day x 10%).

If you do not enter an Acceptable Rate Decrease, the planning process assumes no lower limit to the new daily rate it can suggest inside the planning time fence. If you enter zero, the planning process assumes it cannot suggest any rate less than the current daily rate inside the planning time fence.

This lets you minimize disruption to shop floor schedules by restricting short term rate change suggestions. This applies to repetitive items only. See: Overview of Repetitive Planning.

	Purchased	Make	Phantom
Controlled at	Org	Org	Org
Value	N/A	N/A	N/A
Enable	NO	NO	NO

Acceptable Rate (+) Increase

Enter the amount the planning process uses to increase current daily rates inside the planning time fence. The planning process does not suggest a new daily rate greater than the current daily rate plus the acceptable rate increase amount.

The acceptable rate increase amount is calculated by multiplying this value by the current daily rate. For example, if the current daily rate is 100/day, and the Acceptable Rate Increase is 10, the planning process does not suggest a new daily rate that is greater than 110/day (100/day + 100/day x 10%).

If you do not enter an Acceptable Rate Increase, the planning process assumes no upper limit to the new daily rate it can suggest inside the planning time fence. If you enter zero, the planning process assumes it cannot suggest any rate greater than the current daily rate inside the planning time fence.

This lets you minimize disruption to shop floor schedules by restricting short term rate change suggestions. This applies to repetitive items only. See: Overview of Repetitive Planning.

	Purchased	Make	Phantom
Controlled at	Org	Org	Org
Value	N/A	N/A	N/A
Enable	NO	NO	NO

Calculate ATP

Indicate whether to calculate and print available to promise (ATP) on the Planning Detail Report, using the following formula:

ATP = Planned production - committed demand

Planned production = planned orders, scheduled receipts (purchase orders, jobs, and repetitive schedules), suggested repetitive schedules, nettable   quantity on hand.

Committed demand = sales orders, component demand (from planned orders, discrete jobs, suggested repetitive schedules, and lot expirations). Committed demand does not include forecasted demand.

Attention: ATP calculated by the planning process is not related to ATP information calculated and maintained by Oracle Inventory. As such, planning

ATP does not consider ATP rules from the Available to Promise Rule window, and is not related to the ATP information displayed in the View Item Available to Promise Information window. See: Overview of Material Requirements Planning.

	Purchased	**Make**	**Phantom**
Controlled at	Org	Org	Org
Value	Yes	Yes	N/A
Enable	YES	YES	NO

Reduce MPS

Select an option to decide when to reduce master production schedule (MPS) quantities to zero.

If Oracle Work in Process and Oracle Purchasing are installed, you get automatic production relief when you create a discrete job, purchase requisition, or purchase order. In this case, you would typically set this attribute to None.

If you do not have automatic production relief, you may select one of the following options to reduce MPS quantities and avoid overstating your supply.

None Do not reduce order quantities on the MPS.

Past due Reduce order quantities on MPS entries to zero when the entry is past due.

Demand time fence Reduce order quantities on MPS entries to zero when the due date moves inside the demand time fence.

Planning time fence Reduce order quantities on MPS entries to zero when the due date moves inside the planning time fence. See: Starting the Planning Manager.

	Purchased	**Make**	**Phantom**
Controlled at	Org	Org	Org
Value	N/A	N/A	N/A
Enable	NO	NO	NO

Planning Time Fence

Choose one of the following options to determine a point in time inside which certain restrictions on planning recommendations apply. For discrete items, the planning process cannot suggest new planned orders or rescheduling existing orders to an earlier date. For repetitive items, the planning process can only suggest new daily rates that fall inside the acceptable rate increase and decrease boundaries. For items having a WIP Supply Type of Phantom, Oracle Master Scheduling/MRP and Oracle Supply Chain Planning ignores the planning time fence.

A time fence increases manual control of the plan, minimizing short term disruption to shop floor and purchasing schedules.

Calculate the planning time fence as the plan date (or the next workday if the plan is generated on a non-workday) plus:

- *Cumulative mfg. lead time*The cumulative manufacturing lead time for the item.

- *Cumulative total lead time* The total manufacturing lead time for the item.

- *Total lead time* The total lead time for the item.

- *User-defined* The value you enter for Planning Time Fence Days.

- See: Overview of Time Fence Planning.

	Purchased	Make	Phantom
Controlled at	Org	Org	Org
Value	N/A	N/A	N/A
Enable	NO	NO	NO

Planning Time Fence Days

Oracle Master Scheduling/MRP and Oracle Supply Chain Planning calculates the planning time fence as the plan date (or the next workday if the plan is generated on a non workday) plus the value you enter here. Oracle Master scheduling/MRP and Oracle Supply Chain Planning uses this value when Planning Time Fence is User-defined.

	Purchased	Make	Phantom
Controlled at	Org	Org	Org
Value	N/A	N/A	N/A

Enable	NO	NO	NO

Demand Time Fence

Select an option to determine a point in time inside which the planning process ignores forecast demand and considers only sales order demand when calculating gross requirements. This reduces the risk of carrying excess inventory. For items having a WIP Supply Type of Phantom, Oracle Master Scheduling/MRP and Oracle Supply Chain Planning ignores the demand time fence.

Attention: Oracle Master Scheduling/MRP and Oracle Supply Chain Planning also uses the demand time fence when loading master schedules.

The demand time fence is calculated as the start date of the master schedule load plus one of the following options.

Calculate the demand time fence as the plan date (or the next workday if the plan is generated on a non workday) plus:

Cumulative mfg. lead time The cumulative manufacturing lead time for the item.

Cumulative total lead time The total manufacturing lead time for the item.

Total lead time The total lead time for the item.

User-defined The value you enter for Demand Time Fence Days.

Warning: If using time fences then you MUST use daily forecast buckets instead of Weekly or Monthly forecast buckets in order for the system to consume forecast properly.

See: Overview of Time Fence Planning.

	Purchased	**Make**	**Phantom**
Controlled at	Org	Org	Org
Value	User Defined	User Defined	N/A
Enable	YES	YES	NO

Demand Time Fence Days

Oracle Master Scheduling/MRP and Oracle Supply Chain Planning calculates the demand time fence as the plan date (or the next workday if the plan is generated on

a non workday) plus the value you enter here. Oracle Master scheduling/MRP and Oracle Supply Chain Planning uses this attribute when Demand Time Fence is User-defined.

	Purchased	Make	Phantom
Controlled at	Org	Org	Org
Value	N/A	N/A	N/A
Enable	NO	NO	NO

Release Time Fence

Choose an option to determine a point in time inside which planned orders for discretely planned items are automatically released as WIP jobs or purchase requisitions. The planned orders must meet the following auto-release criteria:

the new due date lies within the auto-release time fence

the lead time is not compressed

the orders are for standard items (will not release models, option classes, and planning items)

the orders are not for Kanban items the orders are for DRP planned items in a DRP plan, MPS planned items in an MPS plan, or MRP planned items in an MRP plan (See: Auto-release Planned Orders.)

the release time fence option is defined as anything other than Do not auto-release, Do not release (Kanban), or Null

DRP, MPS, and MRP plans must be run with the Memory-based Planning Engine (See: Enabling the Memory-based Planning Engine

Auto-release of repetitive schedules is not applicable for repetitively planned items. No material availability check is performed before WIP jobs are released.

Calculate the release time fence as the plan date (or the next workday if the plan is generated on a non workday) plus:

- *Cumulative mfg. lead time* The cumulative manufacturing lead time for the item.

- *Cumulative total lead time* The total manufacturing lead time for the item.

- *Total lead time* The total lead time for the item.

- *User-defined* The value you enter for Release Time Fence Days.

- *Do not auto- release* The item cannot be auto-released

- *Do not release (Kanban)* For Kanban items, prevent release of planned orders manually or automatically.

	Purchased	**Make**	**Phantom**
Controlled at	Org	Org	Org
Value	Kanban	Kanban	N/A
Enable	YES	YES	NO

Release Time Fence Days

Oracle Master Scheduling/MRP and Oracle Supply Chain Planning calculates the release time fence as the plan date (or the next workday if the plan is generated on a non workday) plus the value you enter here. Oracle Master Scheduling/MRP and Oracle Supply Chain Planning uses this value when Release Time Fence is User-defined.

	Purchased	**Make**	**Phantom**
Controlled at	Org	Org	Org
Value	N/A	N/A	N/A
Enable	NO	NO	NO

Lead Times Attribute Group Setup

Attribute Names

Preprocessing

This attribute is controlled at the Organization level only. Enter the days you must add to purchasing or manufacturing lead time to place an order. For Flow kanban components all the lead times are included in the pull sequence for the item.

	Purchased	**Make**	**Phantom**
Controlled at	Org	Org	Org
Value	N/A	N/A	N/A

	Purchased	Make	Phantom
Enable	NO	NO	NO

Processing

This attribute is controlled at the Organization level only. Enter the days required to procure or manufacture an item. For manufactured assemblies, processing days equals manufacturing lead time. For Flow kanban components all the lead times are included in the pull sequence for the item.

	Purchased	Make	Phantom
Controlled at	Org	Org	Org
Value	N/A	N/A	N/A
Enable	NO	NO	NO

Postprocessing

This attribute is controlled at the Organization level only. Enter the days required to receive a purchased item into inventory from the initial supplier receipt. You cannot enter a value if the Make or Buy attribute is set to Make. See: MPS/MRP Planning Attribute Group. For Flow kanban components all the lead times are included in the pull sequence for the item.

	Purchased	Make	Phantom
Controlled at	Org	Org	Org
Value	N/A	N/A	N/A
Enable	NO	NO	NO

Fixed

This attribute is controlled at the Organization level only. Enter the days required to make an assembly independent of order quantity, such as setup or teardown time.

	Purchased	Make	Phantom
Controlled at	Org	Org	Org
Value	N/A	N/A	N/A
Enable	NO	NO	NO

Variable

This attribute is controlled at the Organization level only. Enter the time to produce one additional unit of an assembly. Total lead time is variable lead time multiplied by order quantity, plus fixed lead time.

	Purchased	**Make**	**Phantom**
Controlled at	Org	Org	Org
Value	N/A	N/A	N/A
Enable	NO	NO	NO

Cumulative Manufacturing

This attribute is controlled at the Organization level only. Enter the manufacturing lead time of an assembly (in days) plus the largest adjusted cumulative manufacturing lead time of its components, where each is adjusted by subtracting the operation lead time offset. Purchased items have no cumulative manufacturing lead time. This attribute can be calculated and updated by rolling up cumulative lead times with Oracle Bills of Material. See: Rolling up Cumulative Lead Times.

	Purchased	**Make**	**Phantom**
Controlled at	Org	Org	Org
Value	N/A	N/A	N/A
Enable	NO	NO	NO

Cumulative Total

This attribute is controlled at the Organization level only. Enter the total lead time of the assembly plus the largest adjusted cumulative total lead time of its components, where each is adjusted by subtracting the operation lead time offset. This attribute can be calculated and updated by rolling up cumulative lead times with Oracle Bills of Material. See: Rolling up Cumulative Lead Times.

	Purchased	**Make**	**Phantom**
Controlled at	Org	Org	Org
Value	N/A	N/A	N/A
Enable	NO	NO	NO

Lead Time Lot Size

Enter the quantity used to compute processing lead time (as well as fixed and variable lead times). The default value is the item's standard lot size or, if a standard lot size is not defined, the default is 1. See: Costing Attribute Group.

	Purchased	**Make**	**Phantom**
Controlled at	Org	Org	Org
Value	N/A	N/A	N/A
Enable	NO	NO	NO

Work in Process Attribute Group Setup

Attribute Names

Build in WIP

Indicate whether to create discrete jobs or repetitive assemblies in Oracle Work in Process. See: Defining Discrete Jobs Manually, and Defining Repetitive Schedules Manually. This attribute must be turned off if the Inventory Item attribute is turned off or if the BOM Type attribute is not set to Standard. This attribute is optionally set by the Item Status code. See: Status Attributes and Item Status Control.

	Purchased	**Make**	**Phantom**
Controlled at	Org	Org	Org
Value	N/A	Yes	Yes
Enable	NO	YES	YES

WIP Supply Type

Assembly Pull Assembly Pull components are issued to discrete jobs and repetitive schedules when you complete assemblies in Work in Process. They are pulled from the supply subinventory assigned to the component requirement. If you must assign pull components to a bill of material or job that is not associated with a routing, you must assign an Assembly Pull, rather than operation pull, supply type. You cannot assign this supply type to a non-standard discrete job if you have not specified an assembly or bill of material reference for that job.

Operation Pull Operation pull components are issued to discrete jobs and repetitive schedules when you complete backflush operations. Components are pulled the supply subinventory assigned to the component. You cannot assign this supply type to an assembly without a routing or a non-standard discrete job without a routing. You can assign this supply type to assemblies that have routings with no operations or when the routing has disabled operations. However, all components with a supply type of operation pull are automatically changed to assembly pull.

Based on Bill The Based on Bill supply type is Work in Process specific. When you define a discrete job or a repetitive line/assembly association in Oracle Work in Process, the supply type for the assembly defaults to Based on Bill and assembly components are supplied based upon their bill of material supply types. See: Creating a Bill of Material.

If the supply type for a job or line/assembly association is changed, the new supply type is applied to all component material requirements. For example, if you change the supply type of a job assembly from Based on Bill to Assembly Pull, the supply types of all assembly components are changed to Assembly pull. You can update the supply types of individual material requirements using the Material Requirements window in Oracle Work in Process. See: Adding and Updating Material Requirements. The system automatically changes components with a supply type of Operation Pull to Assembly Pull, when the Based on Bill supply type is applied to a job or repetitive schedule that has a bill of material but lacks a routing or operations.

Phantom Phantom components can be assigned to bill of material component subassemblies and subassembly items in Oracle Bills of Material and Oracle Engineering. Components of phantom subassemblies are used as if they were tied directly to the parent assembly. Phantom supply types cannot be assigned to jobs and repetitive lines/assembly associations in Work in Process. see: Phantoms.

Phantoms behave normally when they are top level assemblies, such as when master scheduled or manufactured on a discrete job. As subassemblies, they lose their distinct identity and become a collection of their components. Phantom components (not the phantom itself) are included on discrete jobs and repetitive schedules and are listed on the Discrete Job and Repetitive Schedule Pick List Reports.

Oracle Master Scheduling/MRP and Supply Chain Planning plans phantom subassemblies with lot-for-lot lot sizing. Otherwise, phantoms are planned like other assemblies. You must set the lead time of a phantom to zero to avoid lead time offset during the planning process. Oracle Master Scheduling/MRP and Supply Chain Planning ignores demand time fences, planning time fences, and order modifiers when planning phantom subassemblies. When assembly costs are rolled

up in Oracle Cost Management, the material costs, but not the routing costs, of phantom assemblies are included in the cost of the higher level assemblies that include those phantoms.

Bulk Bulk component requirements can be viewed and are displayed on reports. They can be used to communicate to the shop floor that bulk components must be used but need not be transacted. Bulk components are not backflushed nor do they default when issuing all components for an assembly. You can, however, manually issue specific bulk components to a discrete job or repetitive schedule.

Push Push components can be issued directly to discrete jobs and repetitive schedule as required. You can specify the subinventory from which to issue push components, though Work in Process defaults the supply subinventory associated with the component.

Supplier Supplier component requirements can be included on bills of material. Requirements for supplier components are created when you define discrete jobs and repetitive schedules in Work in Process. Supplier component requirements can be viewed and are displayed on reports. They provide information on the component materials that your suppliers provide but need not be transacted. Supplier components are not backflushed nor do they default when issuing all components for an assembly. You can, however, manually issue specific supplier components to discrete jobs and repetitive schedules.

	Purchased	Make	Phantom
Controlled at	Org	Org	Org
Value	Assembly Pull	Assembly Pull	Assembly Pull
Enable	YES	YES	YES

Supply Subinventory

This attribute is controlled at the Organization level only. Enter the primary subinventory from which to issue (push) or backflush (pull) an item to work in process.

	Purchased	Make	Phantom
Controlled at	Org	Org	Org
Value	N/A	N/A	N/A
Enable	NO	NO	NO

Supply Locator

This attribute is controlled at the Organization level only. Enter the supply locator from which to issue (push) or backflush (pull) an item to work in process. You can also define a WIP supply locator for any bill that uses this item; the bill supply locator overrides the supply locator you define here. You must enter a WIP supply subinventory before you can enter a locator.

	Purchased	Make	Phantom
Controlled at	Org	Org	Org
Value	N/A	N/A	N/A
Enable	NO	NO	NO

Order Entry Attribute Group Setup

Attribute Names

Customer Ordered

Indicate whether to allow an item to be ordered by external customers. You can add any customer orderable items to price lists in Oracle Order Management. This attribute must be turned off if the BOM Item Type attribute is set to Planning. See: Bills of Material Attribute Group.

If you turn this attribute on, you can temporarily exclude an item from being ordered by turning Customer Orders Enabled off.

This is an item defining attribute. If you turn this attribute on, the item is automatically assigned to the default category set for the Oracle Order Management functional area. See: Item Defining Attributes.

	Purchased	Make	Phantom
Controlled at	Master	Master	Master
Value	Yes	N/A	N/A
Enable	YES	NO	NO

Customer Orders Enabled

Indicate whether an item is currently customer orderable. If you turn this attribute on you can specify the item in the Enter Orders window in Oracle Order Management. You can initially define an item with Customer Ordered Item turned on and Customer Orders Enabled turned off. This means prices can be defined for the item, but no orders can be placed for it. This attribute is optionally set by the Item Status code. See: Status Attributes and Item Status Control.

	Purchased	**Make**	**Phantom**
Controlled at	Master	Master	Master
Value	Yes	N/A	N/A
Enable	YES	NO	NO

Internal Ordered

Indicate whether to allow an item to be ordered on an internal requisition. If you turn this attribute on, you can temporarily exclude an item from being ordered on an internal requisition by turning Internal Orders Enabled off. See: Overview of Internal Requisitions. This is an item defining attribute. If you turn this attribute on, the item is automatically assigned to the default category set for the Oracle Purchasing functional area. See: Item Defining Attributes.

	Purchased	**Make**	**Phantom**
Controlled at	Master	Master	Master
Value	Yes	N/A	N/A
Enable	YES	NO	NO

Internal Orders Enabled

Indicate whether you can currently order an item internally. If you turn this attribute on, you can specify the item on an internal requisition, if Internal Ordered Item is also on. If you turn Internal Ordered Item on, you can temporarily exclude an item from being ordered on an internal requisition by turning this attribute off. This attribute is optionally set by the Item Status code. See: Status Attributes and Item Status Control.

	Purchased	**Make**	**Phantom**

Controlled at	Master	Master	Master
Value	Yes	N/A	N/A
Enable	YES	NO	NO

Shippable

Indicate whether to ship an item to a customer. Shippable items are released by Oracle Order Management's Pick Release program, creating confirmable shipping lines, and are printed on the pick slip. A warning is issued if you change the value of this attribute when open sales order lines exist. See: Overview of Delivery-based Shipping. This attribute must be turned off if the BOM Item Type attribute is set to Planning. See: Bills of Material Attribute Group.

	Purchased	**Make**	**Phantom**
Controlled at	**Master**	**Master**	**Master**
Value	Yes	N/A	N/A
Enable	YES	NO	NO

OE Transactable

Indicate whether demand can be placed for an item by Oracle Order Management, and whether shipment transactions are interfaced to Oracle Inventory. Most items with Shippable turned on also have OE Transactable turned on. For items you do not ship, you may still want OE Transactable turned on if you use the items in forecasting or planning. If you also want to reserve the item, turn Reservable on. A warning is issued if you change the value of this attribute when open sales order lines exist. You cannot turn this attribute off if demand exits.

	Purchased	**Make**	**Phantom**
Controlled at	Master	Master	Master
Value	Yes	N/A	N/A
Enable	YES	NO	NO

Default Shipping Organization

Enter the Oracle Order Management primary shipping organization. This organization defaults to the Enter Orders window if Item is the source attribute of the Warehouse object in the standard value rule set for the order. This organization

defaults to the Enter Returns window if a receiving warehouse is not defined on the customer or order type. See: Defining Standard Values Rule Sets.

	Purchased	Make	Phantom
Controlled at	Org	Org	Org
Value	N/A	N/A	N/A
Enable	NO	NO	NO

Picking Rule

Enter the picking rule that defines the order in which subinventories, locators, lots, and revisions are picked. See: Defining Picking Rules.

	Purchased	Make	Phantom
Controlled at	Master	Master	Master
Value	N/A	N/A	N/A
Enable	NO	NO	NO

Pick Components

Indicate whether an item has a bill of material with options, classes, or included items picked from finished goods inventory. Pick-to-order items must have this attribute turned on. Assemble-to-order items and items without a bill of material must have this attribute turned off.

	Purchased	Make	Phantom
Controlled at	Master	Master	Master
Value	N/A	N/A	N/A
Enable	NO	NO	NO

Assemble to Order

Turn this attribute on if an item is generally built for sales order demand; a final assembly work order is created based on sales order details. An item cannot have Pick Components turned on and this attribute turned on at the same time. See: Configure to Order.

	Purchased	**Make**	**Phantom**
Controlled at	Master	Master	Master
Value	N/A	N/A	N/A
Enable	NO	NO	NO

Check ATP

Select Check Material Only, Check Material and Resources, Check Resources Only, or None to indicate whether to check available to promise and/or capable to promise information when placing demand. See: Available to Promise. and Capable to Promise. This attribute also determines whether you can view component ATP information for material requirements in Work in Process.

	Purchased	**Make**	**Phantom**
Controlled at	Master	Master	Master
Value	None	None	N/A
Enable	YES	YES	NO

ATP Components

Indicate whether to include, in available to promise checking, additional components in the bill of material for ATO and PTO items. These components are included in ATP checking if Check ATP for the component is turned on.

	Purchased	Make	Phantom
Controlled at	Master	Master	Master
Value	N/A	N/A	N/A
Enable	YES	YES	NO

ATP Rule

Enter a user-defined available to promise rule. ATP rules define supply and demand sources, time-fence parameters, and available-to-promise calculation methods. You can give ATP rules meaningful names, such as ATO ATP Rule. If there is no ATP rule for the item, the organization's default ATP rule is used. See: Defining ATP Rules and Defining Organization Parameters.

	Purchased	**Make**	**Phantom**
Controlled at	Master	Master	Master
Value	Standard	Standard	N/A
Enable	YES	YES	NO

Ship Model Complete

Indicate whether any configuration derived from this model can ship only when all required quantities of all configuration components (options or included items) are available. If you turn this attribute on, the Pick Components attribute and the profile option OE: Reservations must be Yes; the BOM Item Type attribute can be Model or Standard. See: Scheduling an Order or Order Line.

	Purchased	**Make**	**Phantom**
Controlled at	Master	Master	Master
Value	N/A	N/A	N/A
Enable	NO	NO	NO

Returnable

Indicate whether to allow customers to return an item. If an item is returnable, you can enter it on the Returns window in Oracle Order Management. Order Management uses this attribute along with Stockable and Transactable to determine which authorized returned items you can physically receive into inventory. See: Entering Return Material Authorizations.

	Purchased	**Make**	**Phantom**
Controlled at	Master	Master	Master
Value	Yes	Yes	N/A

Enable	YES	YES	NO

RMA Inspection Required

Indicate whether inspection is required for items returned by the customer. The item then must be separately transferred to inventory. Credits are never automatically generated by Oracle Order Management for customer return items awaiting inspection.

	Purchased	Make	Phantom
Controlled at	Master	Master	Master
Value	Inspection Req.	N/A	N/A
Enable	YES	NO	NO

Collateral Item

Indicate whether the item is collateral. When you register collateral as a promotion in Oracle Sales and Marketing, you can link it to the item you define here. Then you can use Oracle Sales and Marketing to include this collateral item in a fulfillment request for a contact or a mass mailing. Oracle Sales and Marketing displays a list of valid collateral when creating a fulfillment request or mass mailing, based on the items you define with this flag.

	Purchased	**Make**	**Phantom**
Controlled at	Master	Master	Master
Value	N/A	N/A	N/A
Enable	NO	NO	NO

Invoicing Attribute Group Setup

Attribute Names

Invoiceable Item

Indicate whether to include an item on an Oracle Receivables invoice. If you turn this option on, you can temporarily exclude from invoicing when Invoice Enabled is turned off. This option must be on if Invoice Enabled is on.

	Purchased	**Make**	**Phantom**
Controlled at	Master	Master	Master
Value	N/A	N/A	N/A
Enable	NO	NO	NO

Invoice Enabled

Indicate whether to activate an item for invoicing in Oracle Receivables. If Invoiceable Item is turned on, you can temporarily exclude from invoicing by leaving Invoice Enabled turned off. If you turn this option on, the item appears in the Invoice Entry item list of values in Oracle Receivables. If you turn this feature off, the item does not appear in the list of values and AutoInvoice rejects the item. This attribute is optionally set by the Item Status code. See: Status Attributes and Item Status Control.

	Purchased	**Make**	**Phantom**
Controlled at	Master	Master	Master
Value	N/A	N/A	N/A
Enable	NO	NO	NO

Accounting Rule

Enter an accounting rule to identify special revenue recognition rules for an item, such as recognizing revenue over time. See: Defining Invoicing and Accounting Rules, Oracle Receivables User's Guide. This attribute is for reference information only.

	Purchased	**Make**	**Phantom**
Controlled at	Master	Master	Master
Value	N/A	N/A	N/A
Enable	NO	NO	NO

Invoicing Rule

Enter an invoicing rule to determine the period in which you send an invoice when you recognize revenue over time (using accounting rules). See: Defining Invoicing

and Accounting Rules, Oracle Receivables User's Guide. This attribute is for reference information only.

	Purchased	**Make**	**Phantom**
Controlled at	Master	Master	Master
Value	N/A	N/A	N/A
Enable	NO	NO	NO

Tax Code

Enter a tax code to use when calculating tax based on location and tax codes. You assign specific rates to a Tax Code in the Other Tax Rates window. See: Defining Other Tax Rates, Oracle Receivables User's Guide.

	Purchased	**Make**	**Phantom**
Controlled at	Master	Master	Master
Value	N/A	N/A	N/A
Enable	NO	NO	NO

Sales Account

This attribute is controlled at the Organization level only. Enter the general ledger account Oracle Receivables uses to record revenue when you bill the customer. If AutoAccounting is based on items, accounting entries are created at that time. See: Defining AutoAccounting, Oracle Receivables User's Guide.

	Purchased	**Make**	**Phantom**
Controlled at	Org	Org	Org
Value	N/A	N/A	N/A
Enable	NO	NO	NO

Payment Terms

Enter a valid payment terms code. This attribute is for reference information only.

	Purchased	**Make**	**Phantom**

Controlled at	Org	Org	Org
Value	N/A	N/A	N/A
Enable	NO	NO	NO

Service Attribute Group Setup

Attribute Names

Support Service

Indicate whether the current item represents a service. See: Overview of Oracle Service. The following dependencies exist for Support Service items:

Can be Invoicable, OE Transactable, Internal Ordered, and BOM Allowed (only for Warranty items).

Cannot be Inventory Item, Serviceable Product, Stockable, Transactable, Build-In-WIP, Cycle Count Enabled, Purchased, Shippable, Returnable, or Check ATP.

	Purchased	Make	Phantom
Controlled at	Org	Org	Org
Value	N/A	N/A	N/A
Enable	NO	NO	NO

Warranty

Indicate whether service is automatically included with the current item when it is ordered. If you turn this option on, the warranty is included on the bill of material for the item. You can include warranty service only if the item is under serial number control. See: Overview of Installed Base.

	Purchased	Make	Phantom
Controlled at	Org	Org	Org
Value	N/A	N/A	N/A
Enable	NO	NO	NO

Coverage

Enter the coverage schedule you want to associate with the current support service. A coverage schedule defines the days during the week and hours during each day that customers may contact your support organization to request the current service. You can choose any coverage schedule you have already defined. You can define additional coverage schedules using the Coverage Schedules window in Oracle Service. See: Service Coverage.

	Purchased	Make	Phantom
Controlled at	Org	Org	Org
Value	N/A	N/A	N/A
Enable	NO	NO	NO

Service Duration

Enter a positive number to indicate how long the current service lasts. The number you enter here along with the duration period (in other words, Month, Year) provide defaults when you order the current service using Oracle Order Management. You can select any period you have defined as a unit of measure as long as that unit of measure is associated with your Time unit of measure class. You indicate which class is the time unit of measure class by setting the profile option Service: Time Unit of Measure Class. See: Oracle Service Profile Options.

	Purchased	**Make**	**Phantom**
Controlled at	Org	Org	Org
Value	N/A	N/A	N/A
Enable	NO	NO	NO

Billing Type

Indicate whether the customer is charged for any of the following:

Material Material usage expenses your support organization incurs while providing the current service.

Labor Labor expenses your support organization incurs while providing the current service.

Expense Incidental expenses your support organization incurs while providing the current service.

	Purchased	Make	Phantom
Controlled at	Org	Org	Org
Value	N/A	N/A	N/A
Enable	NO	NO	NO

Serviceable Product

Indicate whether the current item is serviceable. If you turn this option on, Support Service must be turned off because an item cannot be both serviceable and servicing. When you turn this option on, you can order service for the item using Oracle Order Management. See: Overview of Oracle Service.

	Purchased	Make	Phantom
Controlled at	Org	Org	Org
Value	N/A	N/A	N/A
Enable	NO	NO	NO

Service Starting Delay

Enter a positive number indicating how many days after shipment of the current item service should start. When service is ordered for the current item, the service may be started on a specific date or on a date that is determined only after the item ships. If service starts after the item ships, Oracle Service determines the start date by adding the starting delay you enter here to the item's shipment date. See: Overview of Installed Base.

	Purchased	Make	Phantom
Controlled at	Org	Org	Org
Value	N/A	N/A	N/A
Enable	NO	NO	NO

Glossary

A

Allocation Percent

See kanban allocation percent.

Areas

Areas represent either a section of the plant floor or an entire plant facility. You can use inventory organizations to define areas.

assemble-to-order (ATO)

An environment where you open a final assembly order to assemble items that customers order. Assemble-to-order is also an item attribute that you can apply to standard, model, and option class items.

assembly scrap

A process which allows you to scrap both scheduled and unscheduled flow assemblies from any flow operation. Operation Pull, Assembly Pull, and Assembly Push components, their associated costs, and all labor and machine resources used at all events prior to the scrap line operation are automatically backflushed.

ATO

See **assemble-to-order.**

B

bill of material

A list of component items associated with a parent item and information about how each item relates to the parent item. Oracle Manufacturing supports standard, model, option class, and planning bills. The item information on a bill depends on the item type and bill type. The most common type of bill is a standard bill of material. A standard bill of material lists the components associated with a product or subassembly. It specifies the required quantity for each component plus other information to control work in process, material planning, and other Oracle Manufacturing functions. Also known as **product structures.**

BOM item type

An item classification that determines the items you can use as components in a bill of material. BOM Item types include standard, model, option class, and planning items.

C

Calculation Formula

One of the most important tasks of a Kanban planning system is determining the optimal number of Kanban cards. The Kanban planning software takes care of this calculation provided you enter correct values for Kanban size, average daily demand for the Kanban item, and the lead time to replenish one Kanban. We provide a package that you can use to customize the calculation. See the Oracle Manufacturing, Distribution, Sales and Service Open Interfaces Manual. By default, the standard calculation is: $(C - 1) * S = D * (L + SSD)$ where: C is the number of Kanban cards S is the Kanban size D is the average daily demand L is the lead time (in days) to replenish one Kanban. If you think through the Kanban process, you will see why this formula works best when the demand for the Kanban item is steady. In addition to this basic formula, when the calculation program calculates Kanban size, it takes into account the values for the following order modifiers (specified in the pull sequence), in the following order: Supply Days, Minimum Order Quantity, and Lot Multiplier. For example, suppose you have specified the Minimum Order Quantity for a particular item to be 50. You want the formula to calculate the Kanban size (S), so you enter values for S, D, and L. Even though—strictly based on the values you enter for C, D, and L—the formula should yield 40, the actual Kanban size will be 50 because of your order modifier, assuming the Lot Multiplier is a factor of 50.

Note: The program uses order modifiers only when calculating the Kanban size. If you specify the Kanban size and want the program to calculate the number of Kanban cards, the program does not use order modifiers.

Card Status

See kanban card status

CFM

Continuous Flow Manufacturing.

CFM Schedule

Work Order-less Schedule. In this document this would mean both the Scheduled and Unscheduled Flow Schedules.

component item

An item associated with a parent item on a bill of material.

configuration

A product a customer orders by choosing a base model and a list of options. It can be shipped as individual pieces as a set (kit) or as an assembly (configuration item).

configuration bill of material

The bill of material for a configuration item.

configuration item

The item that corresponds to a base model and a specific list of options. Bills of Material creates a configuration item for assemble-to-order models.

configurator

A window that allows you to choose options available for a particular model, thus defining a particular configuration for the model.

configure-to-order

An environment where you enter customer orders by choosing a base model and then selecting options from a list of choices.

cumulative yield

Product of the yields at each operation, process, or event on a flow line.

D

Down-time

Time when a resource is scheduled for operation but is not producing for reasons such as maintenance, repair, or setup.

Dual Card Kanban

A demand pull signal that uses a "move" and "produce" communication method. Generally, "move" cards are collected and when the "produce" lot size is reached, the "produce" card is used to create the replenishment. This procedure is generally used when a minimum order quantity is required as a result of long set up times or economic order cost.

E

efficiency

A productivity measure that focuses on actual performance against a standard. Expressed in a percentage figure, it is calculated by dividing actual resource time charged to a task by the standard resource requirements for the same task.

elapsed time

The clock time between start and completion. For example, if the build time of a resource is 10 hours, but you only schedule 5 hours of work a day, the elapsed time is 29 hours.

engineering change order (ECO)

A record of revisions to one or more items usually released by engineering.

events

An event is an identifiable point in time among a set of related activities. Graphically, an event can be represented by two approaches: (1) in activity-on-node networks, it is represented by a node; (2) in activity-on-arc networks, the event is represented by the arc. In flow manufacturing, events are the lowest level of activities in a flow routing. Resources are assigned to events. Events can be grouped into processes and operations.

F

Feeder Line

A production line designed to feed sub-assemblies to a line producing higher level assemblies.

Feeder Line Synchronization

A concurrent process that allows you to synchronize sub-assembly flow schedules sequence with the parent assembly line flow schedule sequence.

first unit completion date

The date and time you plan to complete production of the first assembly on a repetitive schedule. This date equals the first unit start date plus the lead time.

first unit start date

The date and time you plan to begin production of the first assembly on a repetitive schedule. This date equates to the start of your lead time.

flexible tolerance fences

Used to represent the flexibility of supplier capacity. Shown as the percent increase or decrease over daily production rate available from a given supplier for a set amount of time.

flow line

The physical location where you manufacture a flow assembly, usually associated with a routing(s). You can build many different assemblies on the same line at the same time. Also known as assembly line or flow shop.

flow manufacturing

Manufacturing philosophy utilizing production lines and schedules instead of work orders to drive production. Mixed models are grouped into families and produced on lines balanced to the takt time.

flow routing

A sequence of manufacturing events that you perform to manufacture an assembly. In the flow routing, these events can be grouped in processes and balanced operations. A routing consists of an item, a series of events, processes and/or operations, a operation sequences, operation effective dates, and a flow routing network. You can also perform operation time, yield and total product cycle time calculations in the flow routing.

Flow Routings and Sequence of Events

Flow Routings define the production process of an assembly on the production line. You can use Flow Routings to define the processes and the sequence of events within each process. You can specify the setup, run, and move times for each event by associating the required resources.

flow routing network

A process-map of your processes and operations where you specify the primary path, alternate paths, feeder lines and rework loops within your flow line.

flow schedule

A schedule for your flow line that represents the volume and mix of products to be produced. Scheduling can be done based on customer orders and scheduling rules, with an objective of matching the customer orders as closely as possible while establishing an achievable pace and consistent flow of products through the flow line. Schedules DO NOT produce work orders.

flow workstation

The assigned location on a flow line where a worker performs the job. It could be a machine or a workbench.

K

kanban

A method of Just-in-Time production that uses standard containers or lot sizes with a single card attached to each. It is a pull system in which work centers signal with a card that they wish to withdraw parts from feeding operations or suppliers. The Japanese word *kanban,* loosely translated, means *card*, *billboard*, or *sign*. The term is often used synonymously for the specific scheduling system developed and used by the Toyota Corporation in Japan.

kanban allocation percent

Percent of independent demand for the kanban item that is to be supplied from a given pull sequence.

kanban card

The visual replenishment signal. It corresponds to a kanban bin. Replenishable kanban cards are based on pull sequences; non-replenishable cards can be created manually.

kanban card status

The current state of the kanban card - Active, on Hold, or Canceled.

kanban card supply status

Describes the current state in the replenishment process. Example: New, Empty, Full, Wait, In Process, In Transit.

kanban chain

A series of kanban pull sequences that model the replenishment network on the shop floor.

kanban items

An item that is pulled through the Kanban system, rather than pushed by the planner, is called a Kanban-released item, or simply Kanban item. Your planning system can have Kanban items as well as items released by the planner.

kanban location

The designated location where a kanban bin is stored (and where the replenishment is delivered). In Oracle, this is a combination of sub-inventory and locator.

kanban plan

A set of kanban pull sequences in which the size or number of cards is calculated based on a given demand schedule.

kanban pull sequence

A body of information that defines the kanban location, source information, and planning parameters required to calculate the kanban size for a given kanban bin. Replenishment chains are created by multiple pull sequences.

kanban replenishment lead time

The time it takes to replenish a given pull sequence.

kanban size

The number of items in each kanban bin.

L

labor time

The sum of all labor resource times for a given event on a flow routing.

last unit completion date

The date and time you plan to complete production of the last assembly on a repetitive schedule. This date equates to the first unit completion date plus processing days.

last unit start date

The date and time you plan to begin production of the last assembly on a repetitive schedule. This date is the first unit start date plus processing days.

line balancing

Organizing work on the production line so that resources can by synchronized to daily demand.

line operations

Re-grouping of events on a flow routing to achieve approximate takt time. Line operations are line specific and are derived and defined during line balancing.

Line Scheduling Workbench

A form where a WIP scheduler can access the data and utilize a suite of tools to effectively manage flow schedules.

lines

Lines are manufacturing work areas where you manufacture families of products.

location

A shorthand name for an address. Location appears in address lists of values to let you select the correct address based on an intuitive name. For example, you may want to give the location name of 'Receiving Dock' to the Ship To business purpose of 100 Main Street. **See kanban location.**

M

machine time

The sum of all machine resource time for a given event on a flow routing.

mixed model map

Used to design balanced lines. The projected volume and mix of demand for a group of products is used to calculate weighted average work content times. These

averages are compared to takt time to regroup events into balanced operations, and reallocate resources.

model bill of material

A bill of material for a model item. A model bill lists option classes and options available when you place an order for the model item.

model item

An item whose bill of material lists options and option classes available when you place an order for the model item.

N

net planning percent

Percent of product that passes through a process or line operation. It equals the sum of the product of the network percentages at each operation along each path multiplied by 1 + the rework percent.

non-replenishable kanban

A non-replenishable Kanban is used to replenish a Kanban location once. This card is used typically for custom products, one-time customer orders or sudden spikes in demand.

O

operation time

In discrete manufacturing, operation time is the total of setup and run time for a specific task. In flow manufacturing, operation times includes the machine time, labor time, and elapsed time for events, processes, and line operations on your flow routing.

operation yield

The percent of material that passes through an operation, process or event on a flow line without being scrapped.

operational cycle time

See takt Time.

Operational Method Sheet Support

Operational Method sheets (OMS) are documents that describe the operation to be performed for an assembly. The information in the OMS often includes graphical representation of the process, material needed, and detailed work instructions. You can use attachments in Oracle Flow Manufacturing to attach OMS's to Line Operations in the Flow Routing.

option

An optional item component in an option class or model bill of material.

option class bill of material

A bill of material for an option class item that contains a list of related options.

option class item

An item whose bill of material contains a list of related options.

P

Phantom

It is an item or a component which is never stocked and is used as a part in building the final item. A phantom may further be made up of phantoms.

pick-to-order

A configure-to-order environment where the options and included items in a model appear on pick slips and order pickers gather the options when they ship the order. Alternative to manufacturing the parent item on a work order and then shipping it. Pick-to-order is also an item attribute that you can apply to standard, model, and option class items.

Point of Use (POU)

Inventory located at a specific operation on a flow line where it will be used. Material is pulled from these locations via a Kanban signal. These locations are in turn, supplied from either raw material stores or ideally, directly from the supplier.

process

A set of Oracle Workflow activities that need to be performed to accomplish a business goal. **see Account Generator, process activity, process definition.**

Process

1) A planned series of actions or operations (e.g. mechanical, electrical, chemical, inspection, test) that advances a material or procedure from one stage of completion to another. 2) A planned and controlled treatment that subjects materials or procedures to the influence of one or more types of energy (e.g. human, mechanical, electrical, chemical, thermal) for the time required to bring about the desired reactions or results. In flow manufacturing, processes are very generic activities on a flow routing that often consist of several events that are performed in a specific sequence. They are specific to a line and are often defined during the as-is analysis on a flow line.

process network

You can use Flow Routings to represent the network processes on your production line. This network can include alternate processes, rework loops and feeder lines. You can assign yields and planning percentages for each of these processes to determine the optimal number of resource requirements.

process volume

In the Oracle Mixed Model Map, the quantity of an assembly that must pass through an operation or process to achieve the line demand volume. It equals the (demand times * average planning percent * boost %)/average reverse cumulative yield.

processes and events

Processes are very generic activities (in other words painting) that often comprise of multiple events (in other words prepare the surface, polish the surface, paint the surface) which are performed in a specific sequence. Events are the actual physical tasks performed on the line. You can define standard processes and standard events that are used consistently across product families and production lines.

product family

A group of products with similar characteristics, often used in production planning. Flow product families often have similar product synchronization.

product structure

See **production line**

The physical location where you manufacture a repetitive assembly, usually associated with a routing. You can build many different assemblies on the same line at the same time. Also known as assembly line.

product synchronization (Sync)

Process of defining events, processes, and operations and assigning them to a flow routing in a specific sequence in which they are performed.

productivity

An overall measure of the ability to produce a good or a service. It is the actual output of production compared to the actual input of resources. Productivity is a relative measure across time or against common entities (labor, capital, etc.).

products and parts

Products and parts are similar to items defined in Oracle Manufacturing. The item type attribute can be used to identify different types of items (for example, finished goods, spare parts, and so on).

production lines

Production Lines are manufacturing work areas where you manufacture families of products. Oracle Flow Manufacturing lets you manage flow production activities by production line. You can use Flow Routings to define the production process of assemblies. You can also use the Mixed Model Map to calculate the line takt time.

pull sequences

See kanban pull sequence.

R

replenishable kanban

A replenishable Kanban card cycles through the system until it is put on temporary hold or completely removed from the replenishment cycle by the user.

return from scrap transaction

This transaction is used for returning scrapped assemblies. In this document Return from Scrap transaction will mean CFM return from scrap.

reverse cumulative yield

Product of the yields at each operation, process, or event on a flow line starting with the last operation, process, or event.

roll flow schedules

An Oracle Manufacturing technique where you can copy the flow schedules you did not complete into the next available day or take over-completions and subtract the total from the quantities of future schedule.

routing network

Routing network defines the flow of work from one line operation to the next. It also specifies which path in the routing is an alternate or rework path. Routing networks, line operations, and events are the only entities considered in WIP.

S

sales order

In this document a sales order by default means an ATO sales order.

scheduled flow schedule

These are flow schedules that are created by planning with a specific scheduled completion date.

scheduling rule

Basic rules that can be used consistently in a scheduling system. Scheduling rules usually specify the amount of calendar time to allow for a move, queue, load calculation, etc. Syn: scheduling algorithm.

scrap account

An account that you may use to charge scrap transactions.

scrap line operation

This is the line operation in the flow routing that the assembly is scrapped.

scrap transaction

This transaction is used for scrapping assemblies. In this document Scrap transaction will mean CFM scrap transaction.

standard bill of material

A bill of material for a standard item, such as a manufactured product or assembly.

standard item

Any item that can have a bill or be a component on a bill except planning items, option classes, or models. Standard items include purchased items, subassemblies, and finished products.

T

takt time

Operation cycle time the rate at which products need to be manufactured on the line. Aids in establishing the daily rate for the production line. takt Time=effective resource hours available per day / Average daily demand.

Total Product Cycle Time (TPCT)

The total time along the longest path of your flow routing. Calculated by taking the sum of the elapsed times along the longest primary path on the routing network.

unscheduled flow schedule

These are ad-hoc flow schedules that are created on the fly so that a completion or return can be performed for an assembly.

Utilization

A measure to describe how intense a resource is being used. Utilization measures the actual time used to the total available time. Utilization = actual time used / total available time. Actual time used is the total processing time and setup time in a given time period. Total available time is the total available hours in a given time period minus the total time the resource is down for repair or maintenance.

W

work order-less completion

A process which allows you to complete both scheduled and unscheduled flow assemblies and automatically backflush Operation Pull, Assembly Pull and Push components, their associated costs, and labor and machine resources used without having to create a discrete job, repetitive schedule or flow schedule.

Y

yield

See **component yield, cumulative yield, operation yield, and reverse cumulative yield.**

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