Getting Started

With Apache OFBiz

Manufacturing & MRP

In 5 Easy Steps

Publication Number: OFBIZMFGP1V1032010, Version 2

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Getting Started with OFBiz Manufacturing & MRP

Introduction

OFBiz Manufacturing & MRP is a highly functional seamless application that contains everything you need to run an efficient and successful manufacturing business.

Key features include:

- Bill of Materials
- Manufacturing Routing and Tasks
- Production Planning
- Production Costing
- Equipment Billing
- Raw Materials Procurement

Goals of this Document

This guide gives you the basics you need to get up and running with OFBiz for Manufacturing & MRP.

It contains a quick overview of some common manufacturing concepts, a list of the setup required and an example for you to work through.

By the end of the document you should have the enough information to begin your own manufacturing setup in OFBiz.

Target Audience

This document is written for the complete novice end user. No programming or technical experience is required.

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What is Manufacturing?

Manufacturing is the "act of making something out of raw materials". The 'something' that is manufactured is generally a product that can be on sold to customers.

Manufacturing is not only an industrial activity carried out in a factory, it can also be any range of tasks that result in an end product. So, even if you only assemble products you can still make use of OFBiz Manufacturing & MRP.

What is MRP?

MRP is a three-letter abbreviation that is always used in conjunction with manufacturing – so what exactly is it?

MRP stands for "Material Requirement Planning". It's a computer program that, when run regularly, helps a business to plan what to manufacture and when to manufacture it.

It also has the added benefit of letting you know when to buy raw materials to meet your manufacturing commitments.

The MRP tool comes with OFBiz 'out of the box'.

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The 5 Steps to 'Getting Started'

This guide assumes you have read and performed the tasks in the "Getting Started with Apache OFBiz In 5 Easy Steps"[1] document and that you have already:

- Setup your workstation or laptop.
- Downloaded and installed a version of OFBiz with the demo data.

> **Tip:** Login using the username "admin" and password "ofbiz" to perform all OFBiz tasks.

Step 1: Understand Your Manufacturing Processes

This first step involves taking a look at your business processes and what your manufacturing flows are. You need to be able to answer questions about when you manufacture your product, what triggers the process and how you manufacture.

Step 2: Decide which processes you want to use OFBiz for

If you are new to OFBiz you may want to look at starting with a simple process then when you're more comfortable move onto your more complex processes.

Step 3: Setup your Product Data

Setup the product data you need; This will include your raw materials and your manufactured product.

Approximate Time Required to Complete: 15 minutes

Step 4: Setup your Manufacturing Data

Setup the data you need for manufacturing; This includes the Bill of Materials (BOM), Routing Tasks and a Routing.

Approximate Time Required to Complete: 15 minutes

Step 5: Run MRP and Review the Results

Run MRP and take a close look at the results.

Approximate Time Required to Complete: 20 minutes

[1] 'Getting Started with Apache OFBiz in 5 Easy Steps' by Ruth Hoffman is available free from myOFBiz.com

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Step 1: Understand Your Manufacturing Processes

Take a look at your business processes. You need to know what your manufacturing flows are. You should be able to define and describe the type of manufacturing you do.

Typical questions that you should be able to answer are:

- What raw materials do you use?
- Who are your suppliers?
- How do you order your raw materials?
- How do you make your manufactured product?
- What are the actual manufacturing steps performed?
- Are there any specialist processes specific to your industry?
- Are there any regulatory or legal requirements to your manufacturing?
- What triggers your manufacturing? (Is it an order from a customer or low stock and/or inventory levels?)

Make sure to document all your responses and processes.

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Step 2: Decide which processes you want to use OFBiz for

Decide on which manufacturing process (or processes) you'd like to use OFBiz for. Limiting your scope reduces your risk and makes it simpler to prototype and test.

If your initial process implementation is successful, then expand the prototyping to include additional processes.

Basic Manufacturing Concepts and Processes

There are generally the two main processes that trigger when you manufacture a product. They are as follows:

1. Make to Stock (MTS) – The manufacturing process is triggered by the need to maintain minimum stock levels of products so that you don't run out. This means that you'll always have stock on hand in a warehouse or shop to sell to customers whenever an order arrives.

2. Make to Order (MTO) – The manufacturing process is triggered by an order from a customer. The product is manufactured specifically for that customer. There is no stock held in a warehouse or shop.

Your business may use either one or a combination of these processes.

To support the above processes you also need to ensure that you have the right raw materials in stock at the right time to be able to manufacture. This additional process is called "Raw Materials Purchasing"

Make to Stock, Make to Order and Raw Materials Purchasing are all supported with OFBiz[2].

Example Scenario

Each manufacturing business will be different, so for demonstration purposes we will use an example scenario. Using our scenario we'll take you step by step through the manufacturing setup required.

Example Scenario: Manufacturing Tables

A carpenter runs a business making tables. To make one table he uses 5 pieces of wood, 20 nails and a bottle of varnish.

[2] Supported releases are 09.4 and above

To make a table he'll cut the wood to length, nail it together, sand it and finally varnish it. The completed table is then put in his shop, ready to sell to customers passing by.

He likes to keep a minimum of five completed, ready to sell tables in his shop.

He keeps track of the amount of wood, nails and varnish he has in stock to make sure that he doesn't run out.

If we do an analysis of his business processes then we see that our carpenter runs a "Make to Stock"[3] manufacturing process supported by "Raw Material Purchasing"[4].

His raw materials are:

- Wood
- Nails
- Varnish

His manufacturing process and sequence steps are:

- Cut Wood
- Nail Wood Together
- Sand Table
- Varnish Table

Our Objective for OFBiz

We will setup this manufacturing business in OFBiz and configure MRP to prompt us when we need to make tables and when to order more raw materials.

[3] He likes to keep a minimum of 5 tables in stock so is not reliant on a customer order to make a table
[4] He keeps track of his raw materials so that he doesn't run out

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Step 3: Setup your Product Data

Approximately 15 minutes is required to complete this step.

Using Catalog Manager to Set up the Raw Materials

Our first task is to setup our raw materials within OFBiz.

Use the Catalog Manager and the table below to:

- Create new products of type "Raw Materials" for wood, nails and varnish (see **Figures 1, 2 and 3**)

Product ID	Product Name	Minimum Stock	Re-order quantity
10000*	Wood	25	100
10001*	Nails	100	500
10002*	Varnish	5	20
* Use Product ID returned by the Catalog Manager			

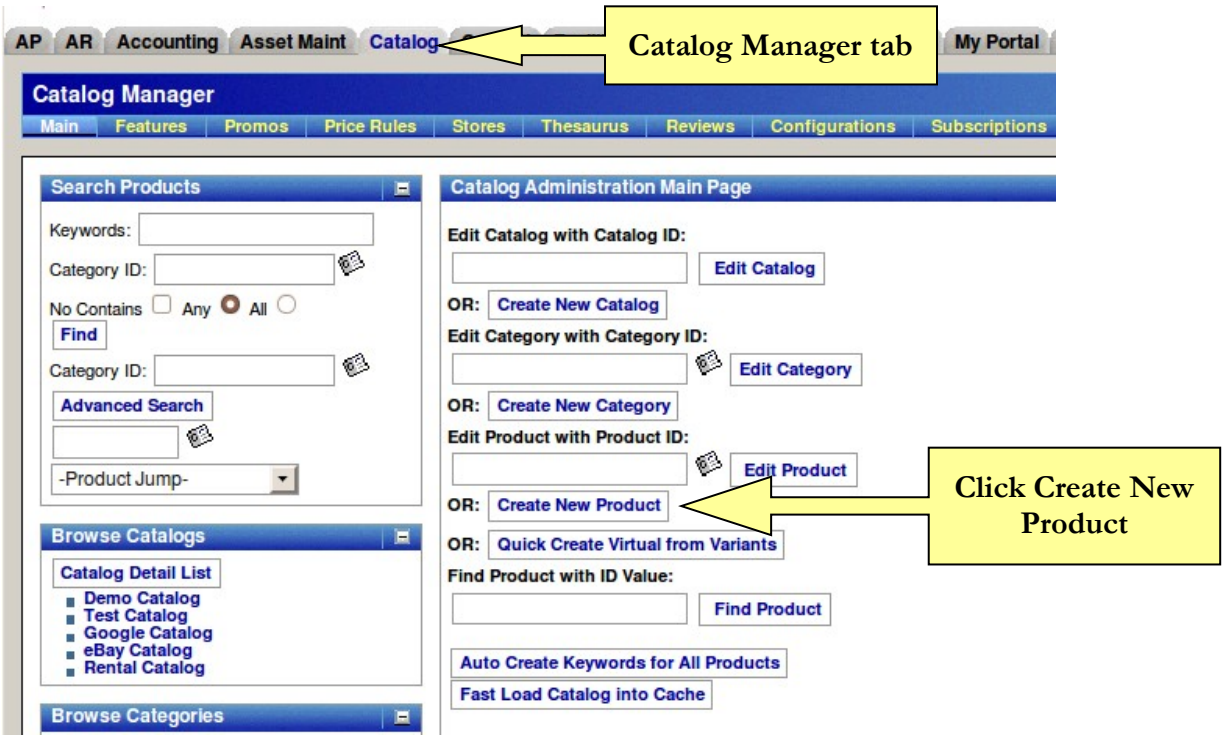

Figure 1: Creating a New Product using the Catalog Manager

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- Make sure the "Requirement Method Enum Id"[5] for each product is set to "When QOH Reaches Minimum Stock for Product Facility" as shown in **Figure 2.**

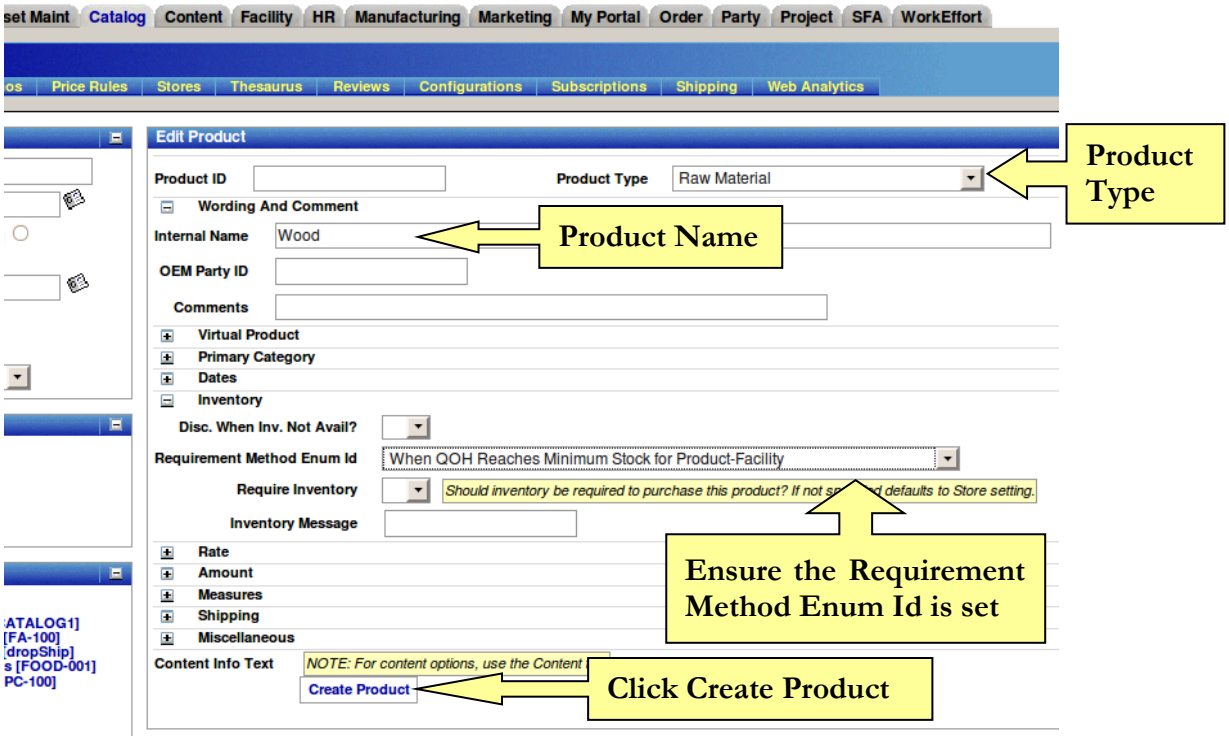

Figure 2: Setting the Requirement Method Enum Id

- Set the re-order quantity and minimum stock fields using the product "Facilities" tab as shown in **Figure 3.**
- Select the Web Store Warehouse as the "Facility Id"

[5] This tells MRP that when the Quantity on Hand (QOH) gets to our minimum then you want to order more.

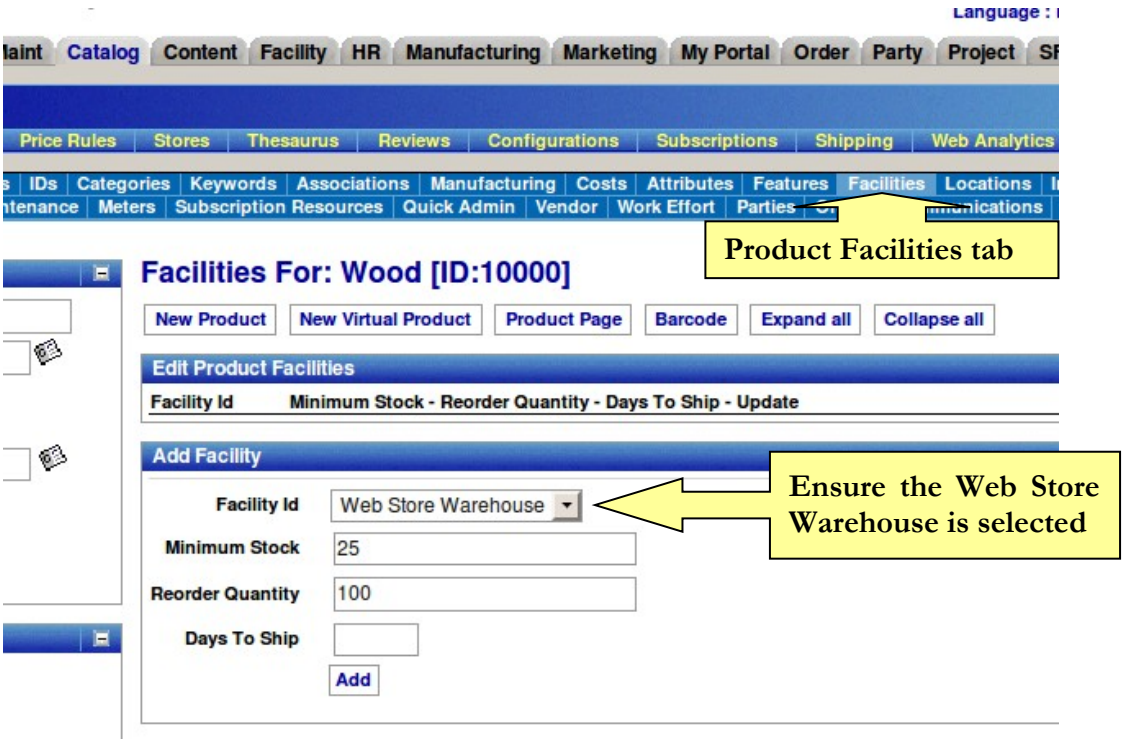

Figure 3: Setting Minimum Stock and Re-order Quantities for a Product

- Setup one supplier for each of the Raw Materials using the data from the following table:

Product	Supplier	Supplier Pref Order ID	Supplier Product ID	Last Price
Wood	DemoSupplier	Main Supplier	XYZWood	11.00
Nails	DempSupplier	Main Supplier	123Nails	4.00
Varnish	DemoSupplier	Main Supplier	ABCVarnish	5.00

- Suppliers for products are setup using the product "Suppliers" tab as shown in **Figure 4.**

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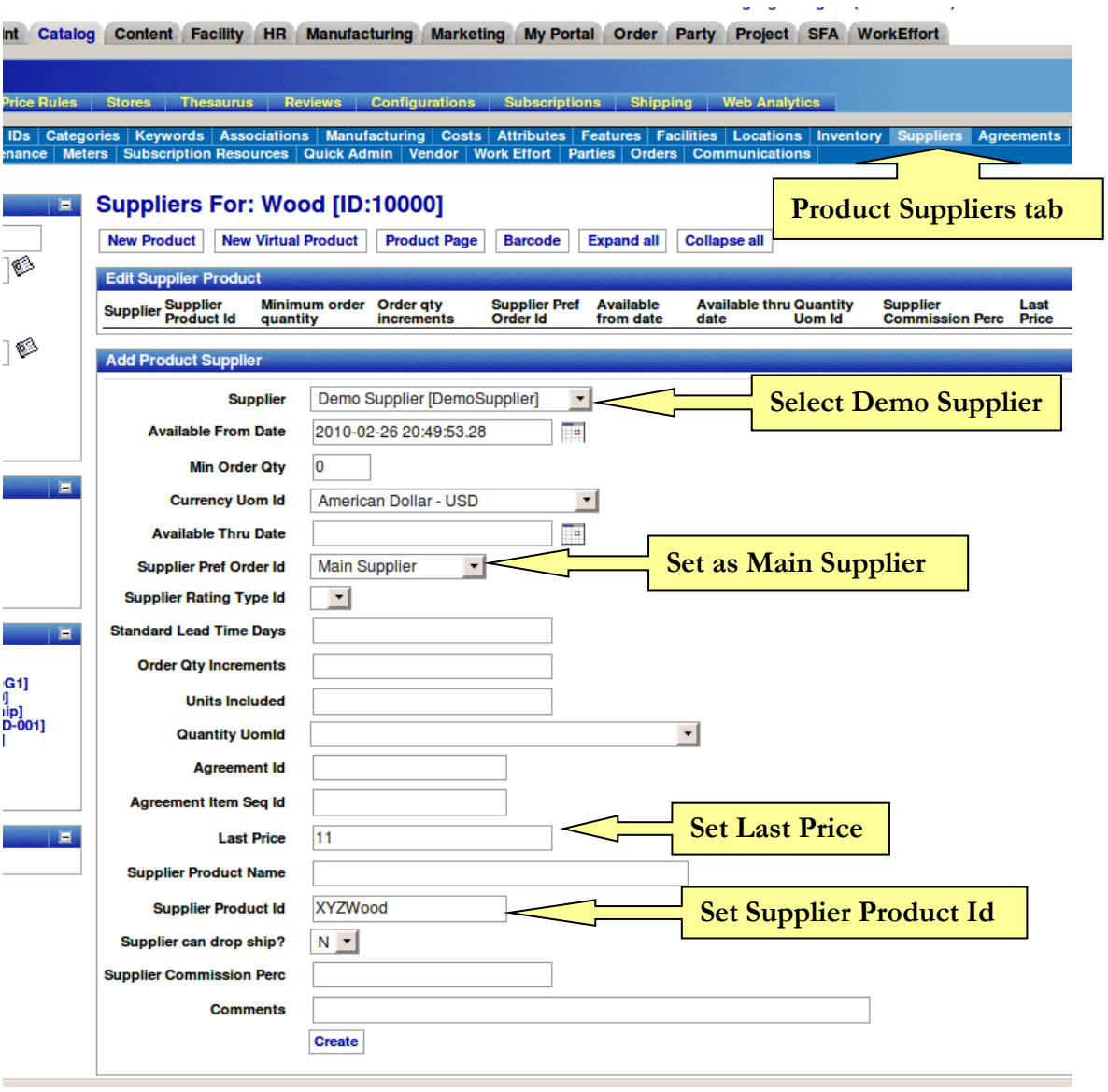

Figure 4: Setting up a Supplier for a Product

Reminder: Before continuing make sure you have created new products for nails and varnish too.

Using Catalog Manager to Set up the Manufactured Product

Use Catalog Manager to:

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- Create a new product for the manufactured product (the table) of type "Finished Good" using the details below:

Product ID	Product Name	Default Price	Minimum Stock
10003*	Table	75.00	5
* Take product Id returned by Catalog Manager			

- Make sure the "Requirement Enum Id" is set for this product too as shown in **Figure 5.**

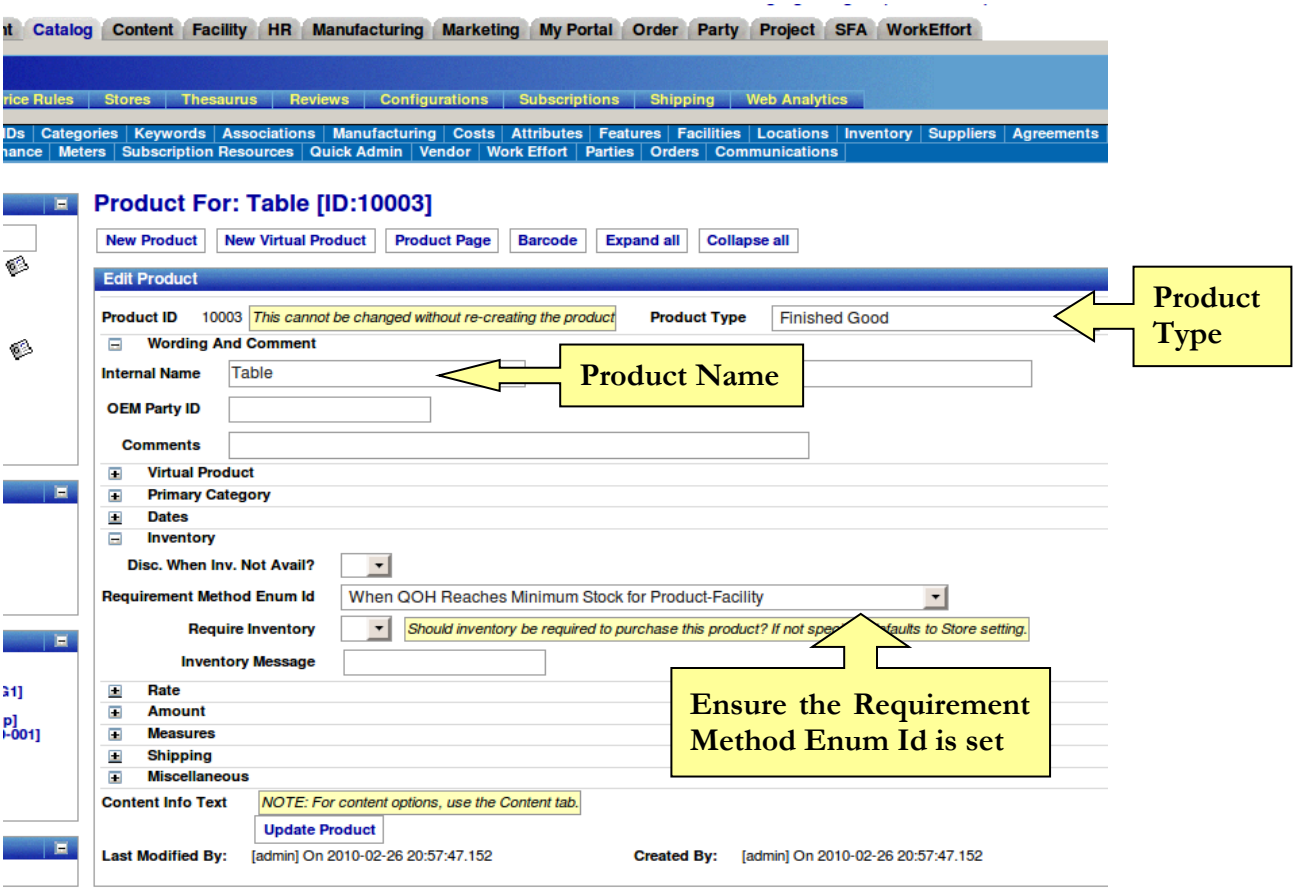

Figure 5: Setting the Requirement Enum Id for the Manufactured Product

- Enter a "Minimum Stock" but don't set a re-order quantity for the table since we manufacture it and don't need to order them from a supplier as shown in **Figure 6.**

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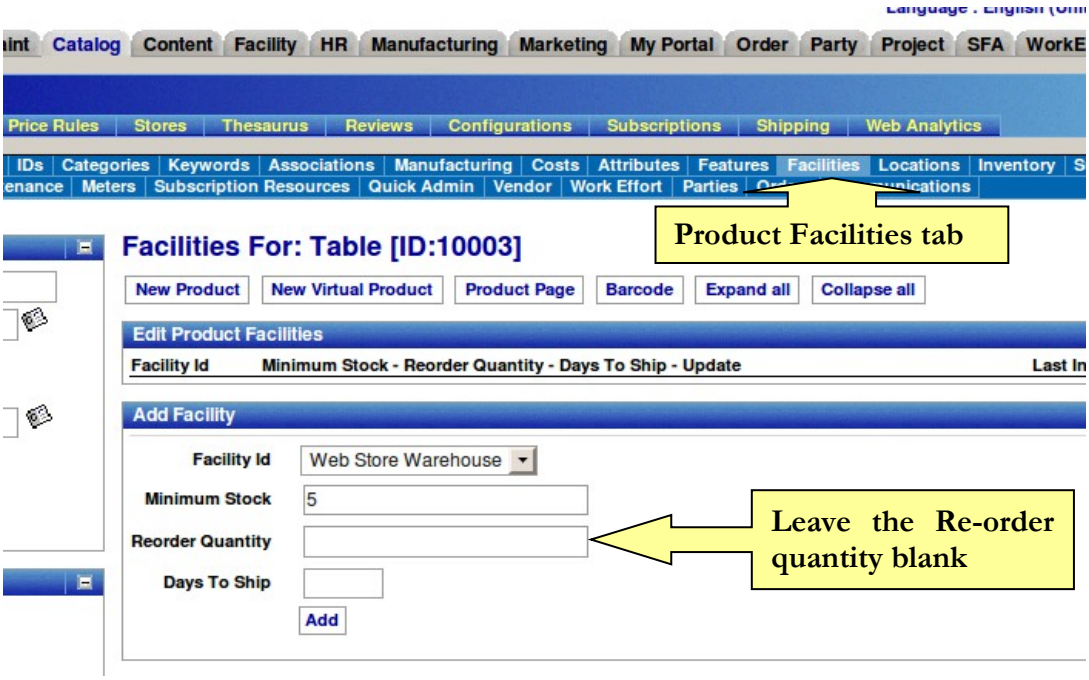

Figure 6: Leave the Re-Order Quantity blank for the Manufactured Product

This step is now complete.

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Step 4: Setup your Manufacturing Data

Approximately 15 minutes is required to complete this step.

Using Manufacturing Manager to Set up the Bill of Materials

The next task is to create a Bill of Materials (BOM).

The Bill of Materials is the list of raw materials or list of ingredients required to make our manufactured product. In the previous step we created the products, now we need to define the relationship between the table and its raw materials. This is done using the BOM.

> One table is made up of 5 pieces of wood, 20 nails and 1 bottle of varnish so let's create a BOM to reflect this.

Use Manufacturing Manager to:

- Create a new Bill of Materials by pressing the 'Create Bom' in the Bill of Materials tab as shown in **Figure 7**.

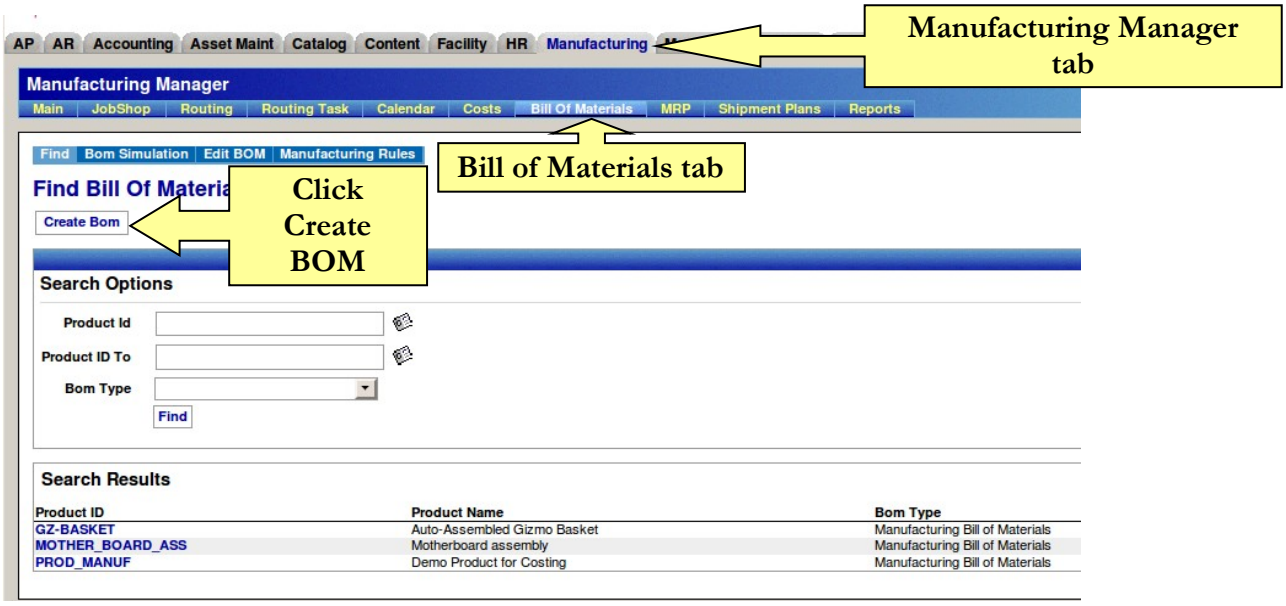

Figure 7: Creating a Bill of Materials (BOM)

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- Enter the details for the Bill of Materials using the information in the table below.

Product ID	Product ID To	Bom Type	Quantity
10003	10000	Bill of Materials	5
10003	10001	Bill of Materials	20
10003	10002	Bill of Materials	1

- An example of how to enter the first product for a Bill of Materials is shown in **Figure 8**.

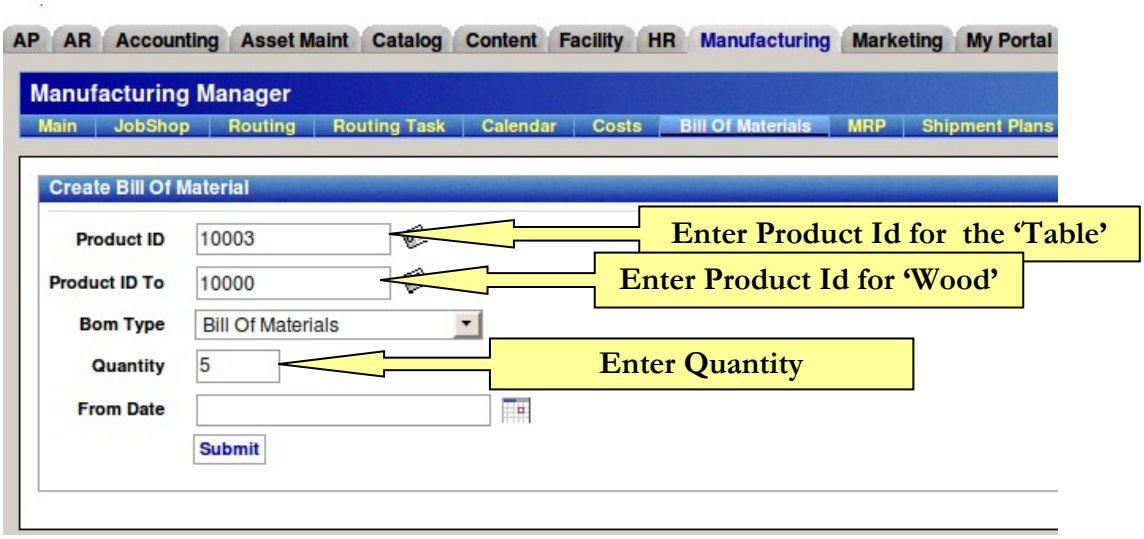

Figure 8: Adding the first product to a Bill of Materials (BOM)

- Once the first product (wood) is added a Bill of Materials (BOM) then additional products (nails, varnish) can be entered as shown in **Figure 9**.

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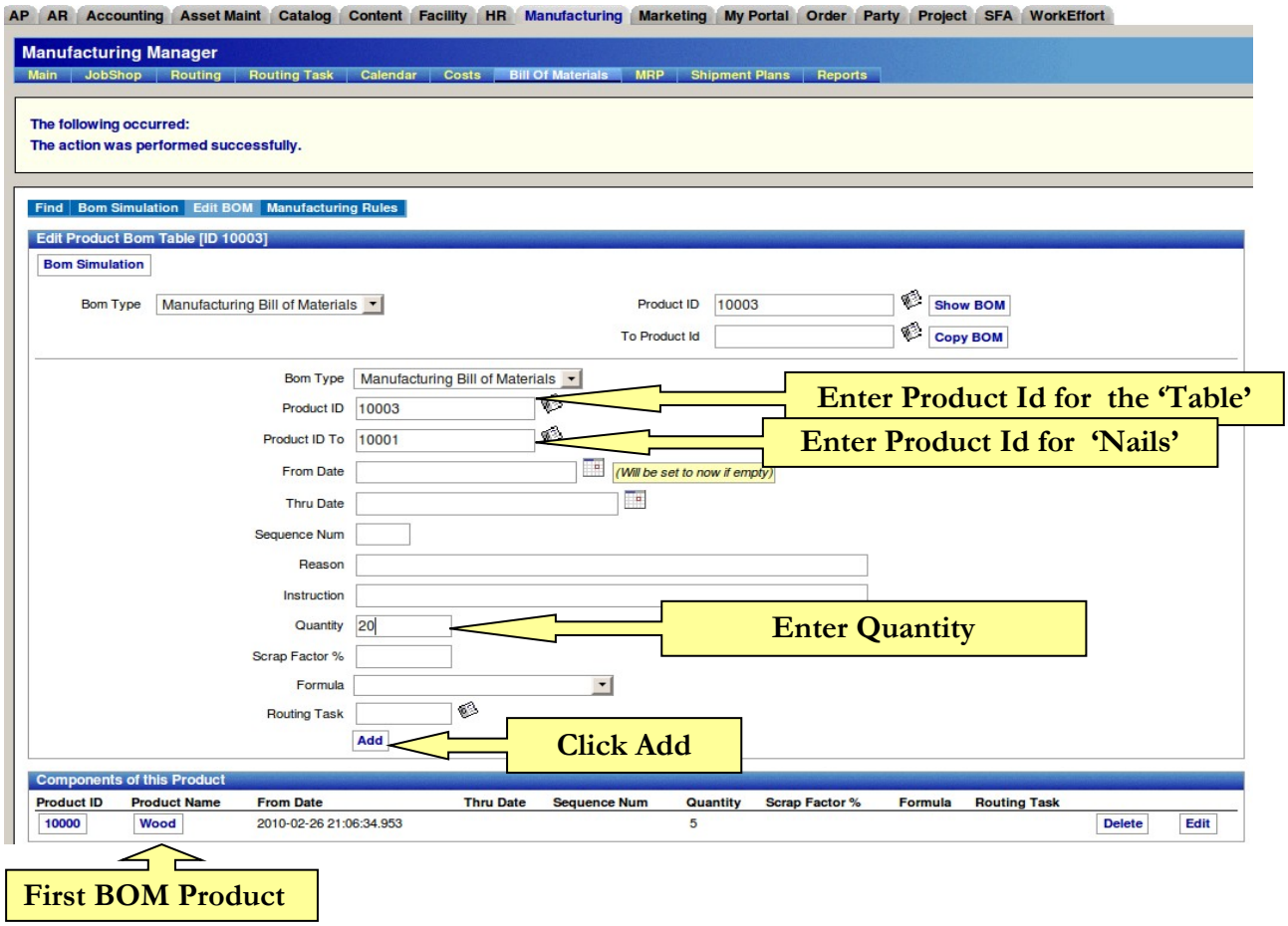

Figure 9: Adding an additional product to a Bill of Materials (BOM)

- Once the items have been added to the Bill of Materials then you should see a screen similar to the one shown in **Figure 10**.

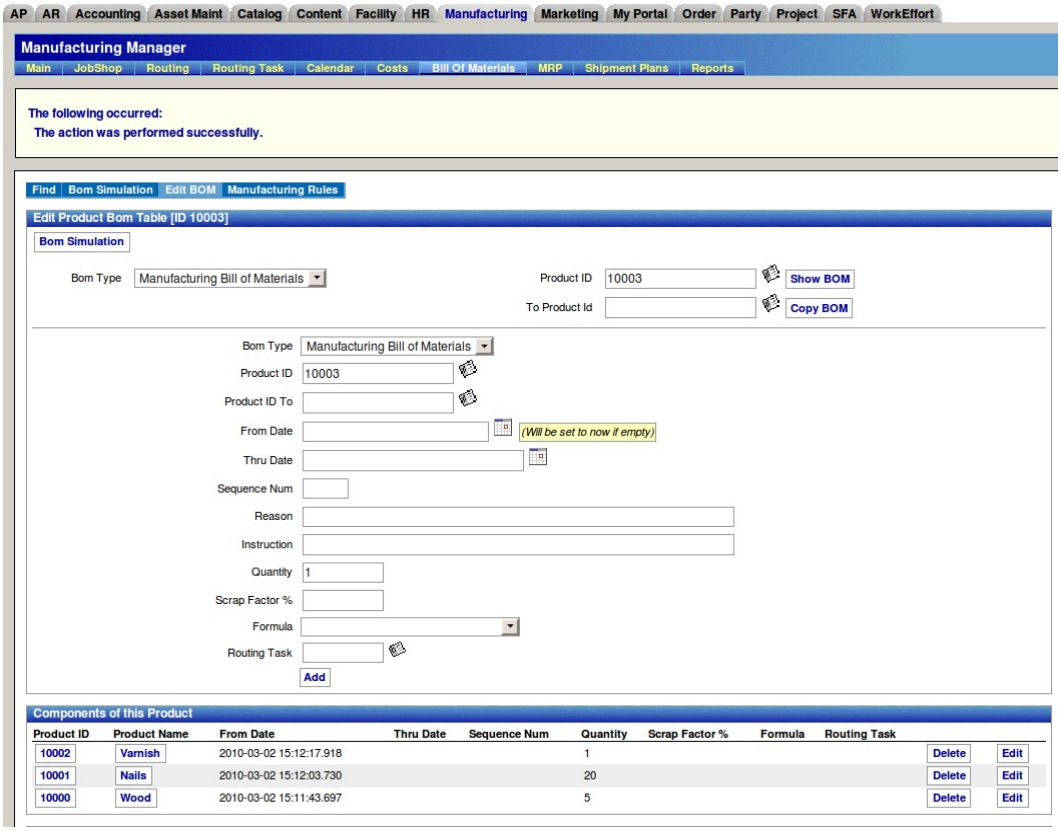

Figure 10: All Raw Materials added to Bill of Materials (BOM) for Table

Using Manufacturing Manager to Set up the Routing Tasks

Next we need to create Routing Tasks. These are the individual steps that are needed to turn the raw materials into a finished product.

Reminder: The steps to make the table are: cutting the wood, nailing it together, sanding it and varnishing it so we'll need to create a routing task for each of these.

Use Manufacturing Manager to:

- Create a new Routing Task by clicking the 'New Routing Task' button in the Routing Task tab as shown in **Figure 11**.

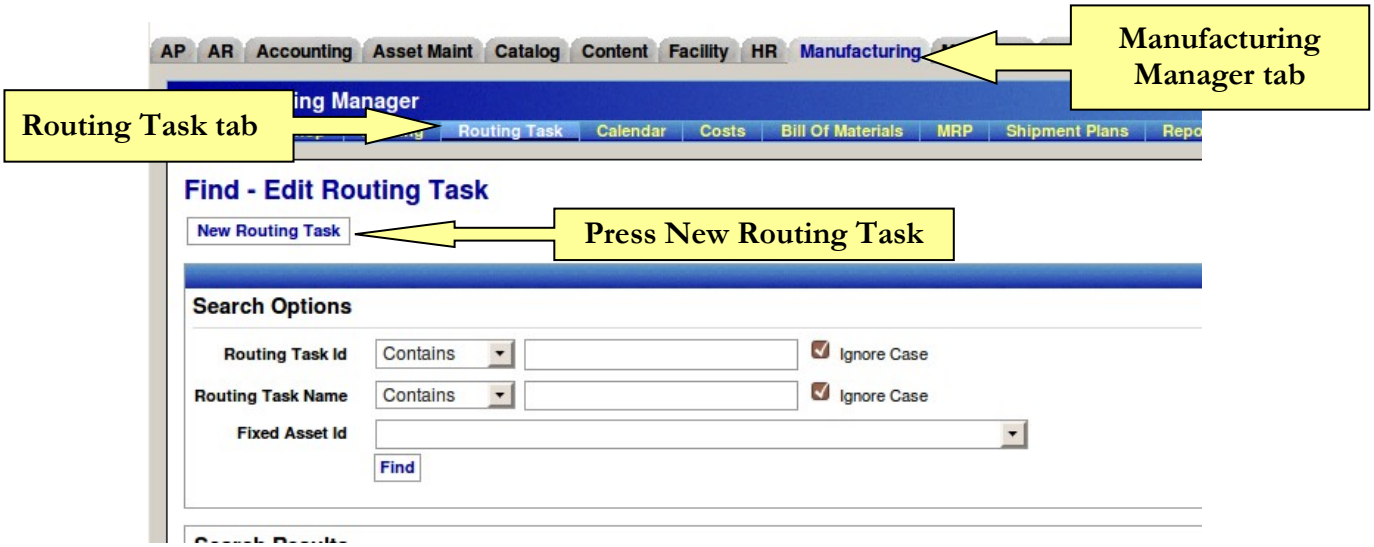

Figure 11: Creating a new Routing Task

- Create new routing tasks using the data in the table below:

Routing Task Name	Description	Task Type
Cut Wood	Cut Wood to Length	Manufacturing
Nail Together	Nail Wood Together	Manufacturing
Sand Table	Sand the Table	Manufacturing
Varnish Table	Varnish the Table	Manufacturing

- An example of how to enter a Routing Task is shown in **Figure 12**.

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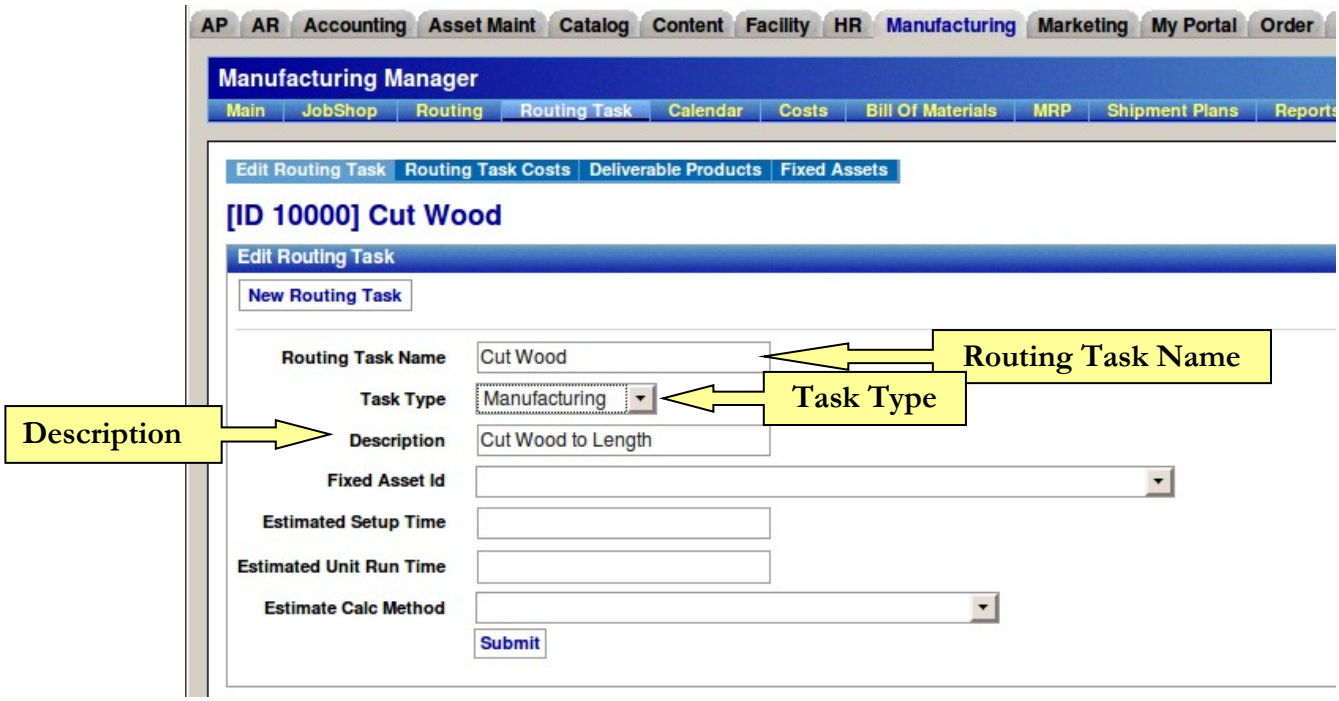

Figure 12: Entering Routing Task Details

Using Manufacturing Manager to Set up the Routing

The final pieces of the manufacturing setup are to:

- Link the tasks together in the sequence they need to be performed and;
- Make sure that all tables manufactured will default to this set of manufacturing steps.

This is done using a "Routing".

The tasks required to manufacture our table need to be performed in the following sequence:

1. Cut wood
2. Nail wood together
3. Sand table
4. Varnish table

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Use Manufacturing Manager to:

- Create a new routing by clicking the 'New Routing' button in the Routing tab as shown in **Figure 13.**

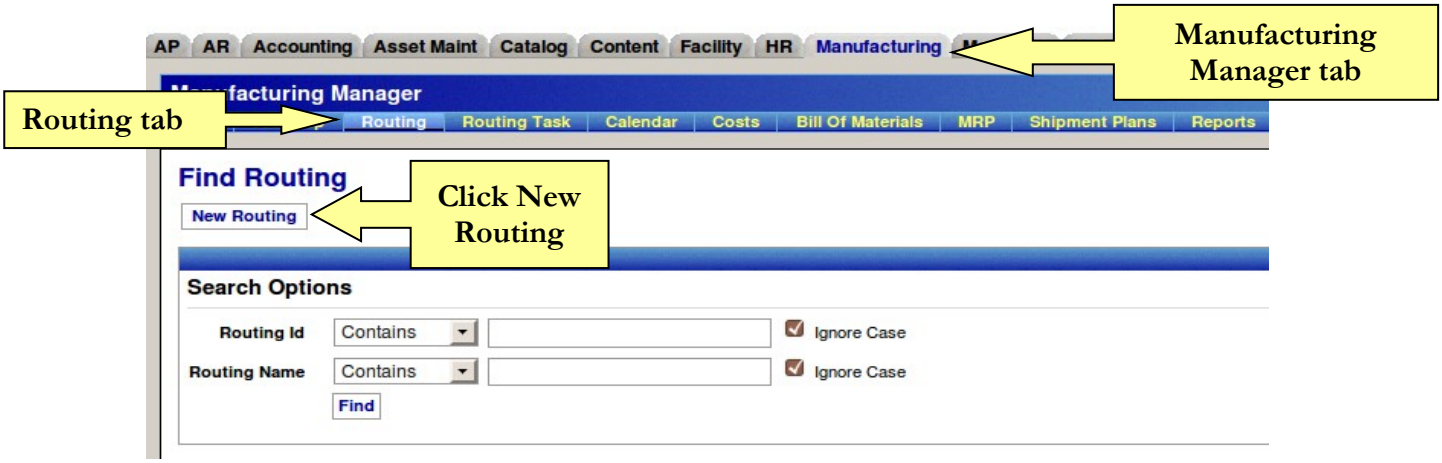

Figure 13: Creating a New Routing

- Enter the new routing details using the data in the table below (see **Figure 14**).

Routing Name	Description
Table Routing	Routing to Make Tables

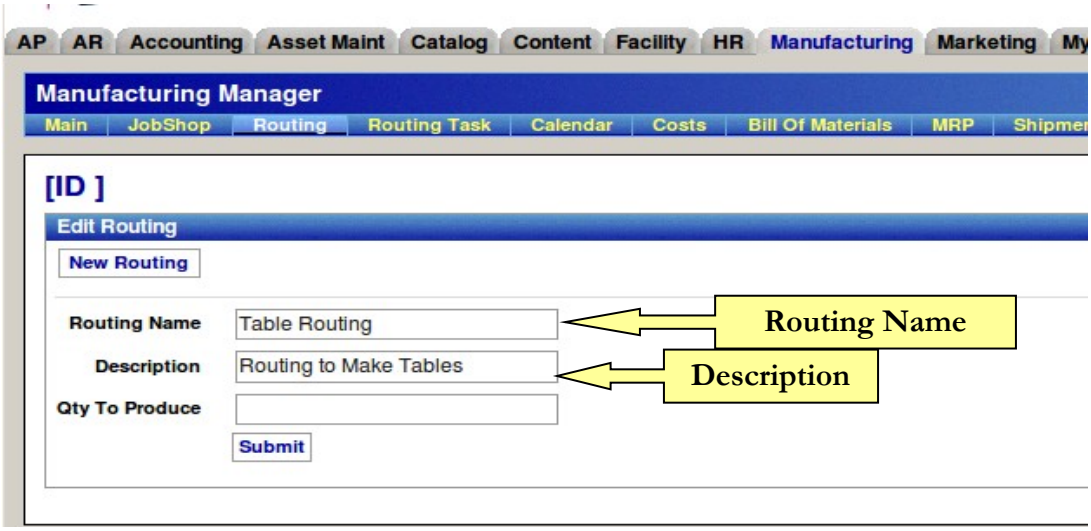

Figure 14: Entering Routing Details

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- Use the "Edit Routing Task Assoc" tab to add the details from the table below as shown in **Figure 15.**

Routing Task Id	Sequence
10000*	10
10001*	20
10002*	30
10003*	40
*Use the Task Id generated by Manufacturing Manager for Cut Wood, Nail Together, Sand Table and Varnish Table	

Tip: Use the "Add a existing Routing Task" to add the task and sequence to the routing

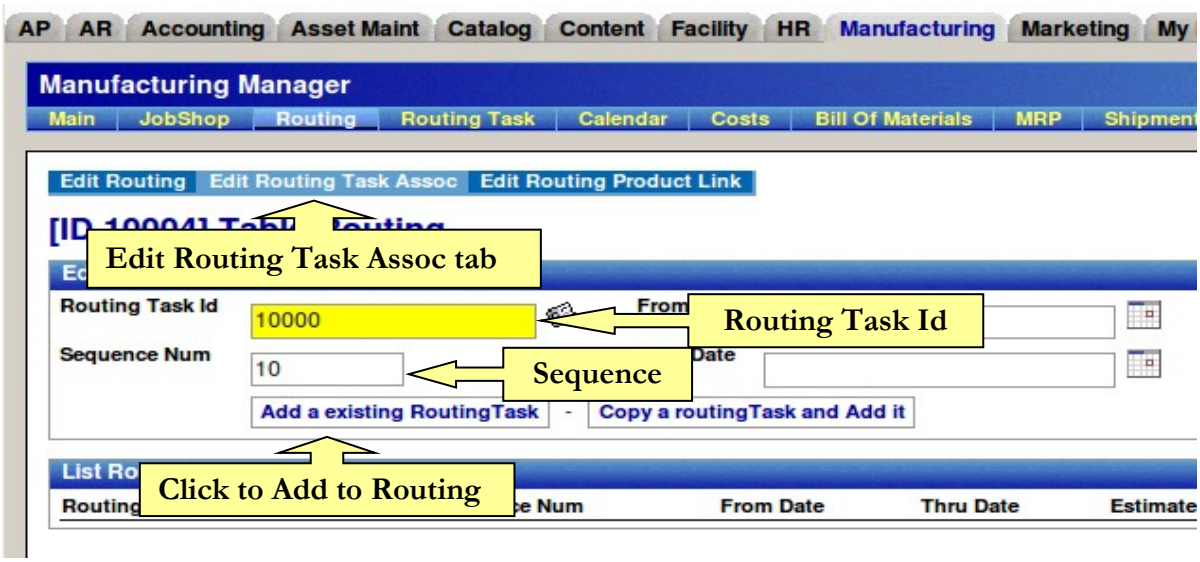

Figure 15: Adding a Routing Task Sequence to a Routing

- Once all tasks have been added you should see a screen similar to **Figure 16.**

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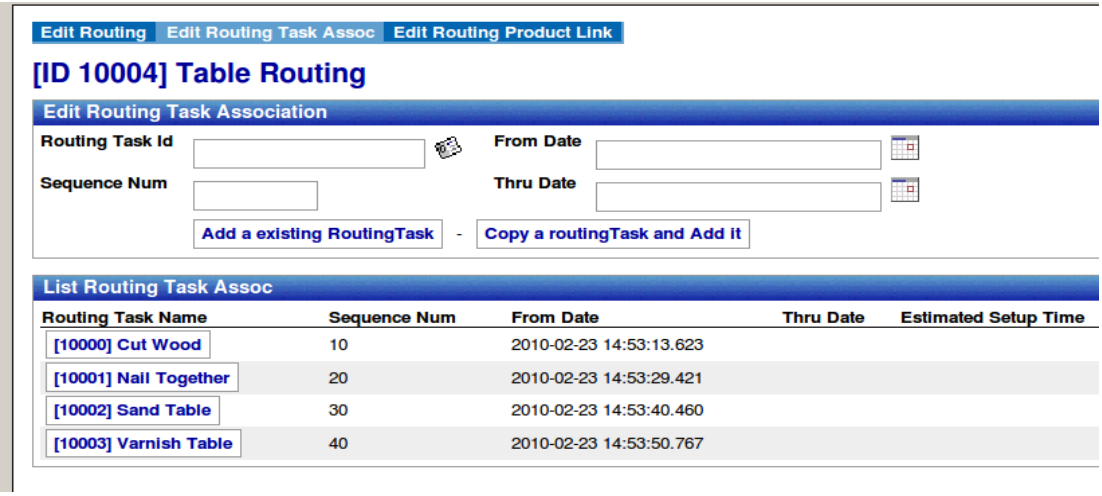

Figure 16: All Routing Tasks and Sequences added to a Routing

Next we need to make sure that every table that we manufacture will use this routing since all tables are made using the same steps.

- Click on the "Edit Routing Product Link" tab and add the table product ID as shown in **Figure 17**, then click the "Update" button

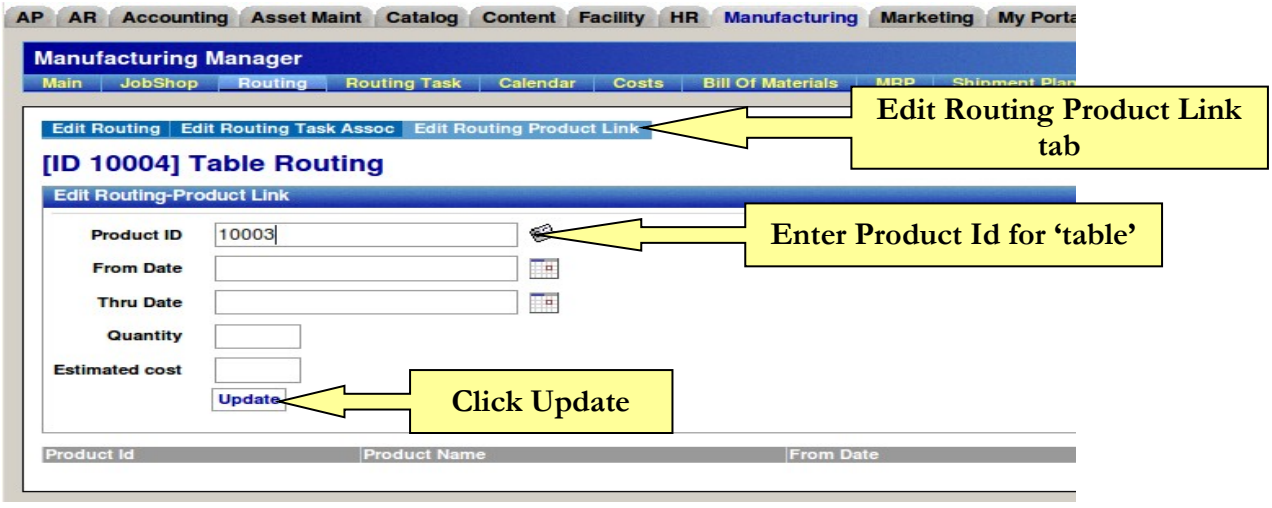

Figure 17: Adding the Manufactured Product to a Routing

This step is now complete.

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Step 5: Run MRP and Review the Results

Approximately 20 minutes is required to complete this step.

Next is the most exciting step – we'll run MRP for the first time and see what it tells us. Before we do that, let's do a quick recap of what our setup instructs MRP to do:

- When we make a table, use 5 pieces of wood, 20 nails and 1 bottle of varnish.
- Maintain a minimum stock of 5 tables and when we reach that minimum stock level then prompt me to manufacture some more tables.
- Maintain a minimum stock of 25 pieces of wood and when we reach that minimum stock level then prompt me to order 100 more pieces of wood.
- Maintain a minimum stock of 100 nails and when we reach that minimum stock level then prompt me to order 500 more nails.
- Maintain a minimum stock of 5 bottles of varnish and when we reach that minimum stock level then prompt me to order 20 more bottles.

Using Manufacturing Manager to Run MRP

Use Manufacturing Manager to:

- Go to the "MRP" tab and run the MRP report (see **Figure 18**) with the following parameters:

MRP Name	Facility Group	Facility	Default Year Offset
MRP1	leave blank	Web Store Warehouse	1

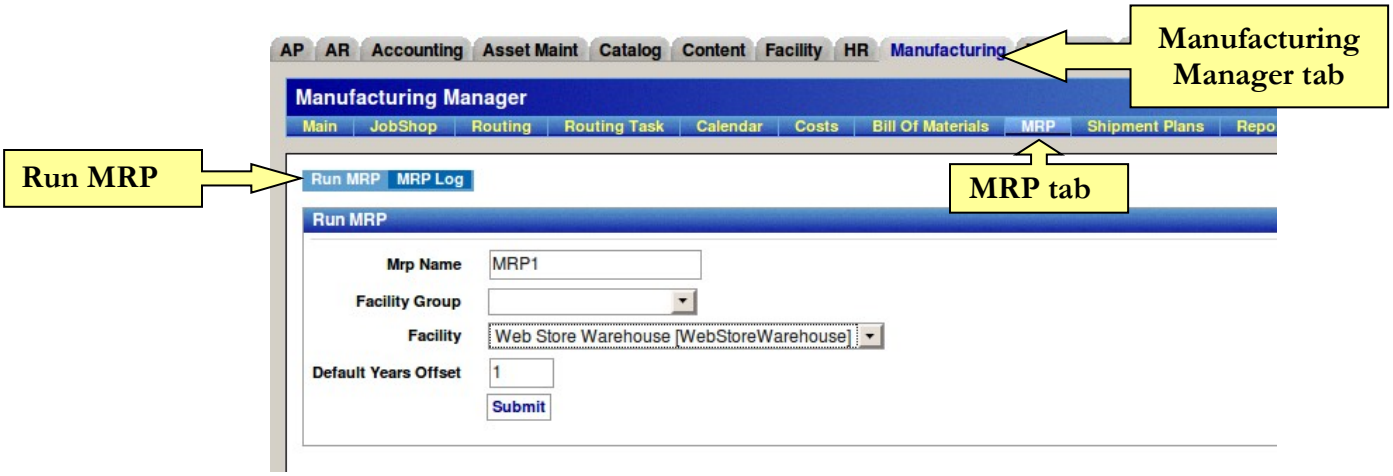

Figure 18: Enter Parameters to Run MRP

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- Click on the "MRP Log" tab and determine if the program has finished running. When it has finished the report will appear with a "Status ID" of 'Finished' under the "Last Job" section of the screen.

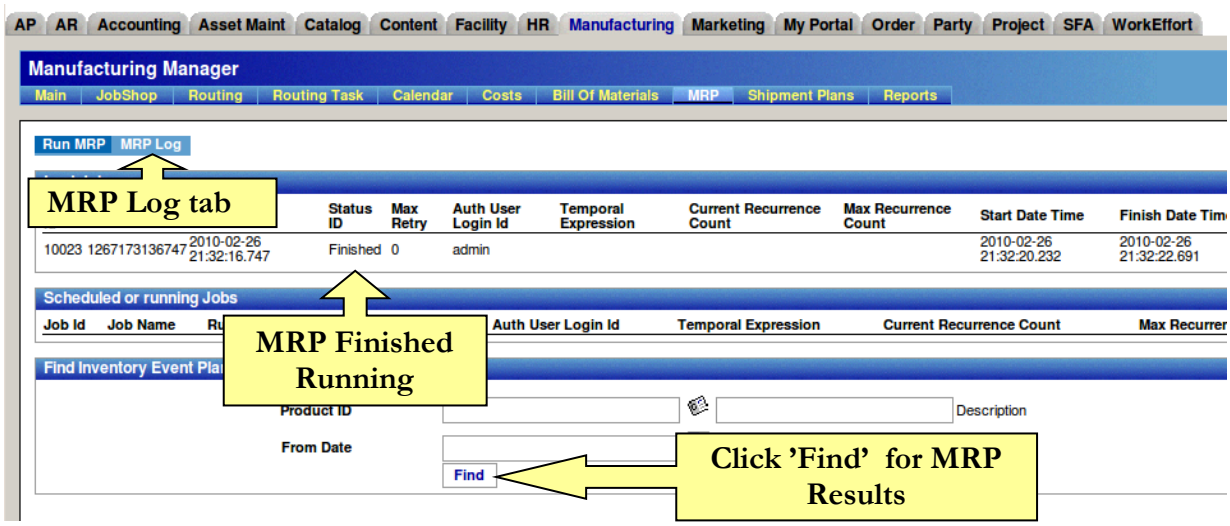

Figure 19: MRP Run Completed

- View the MRP results by clicking the "Find" button.

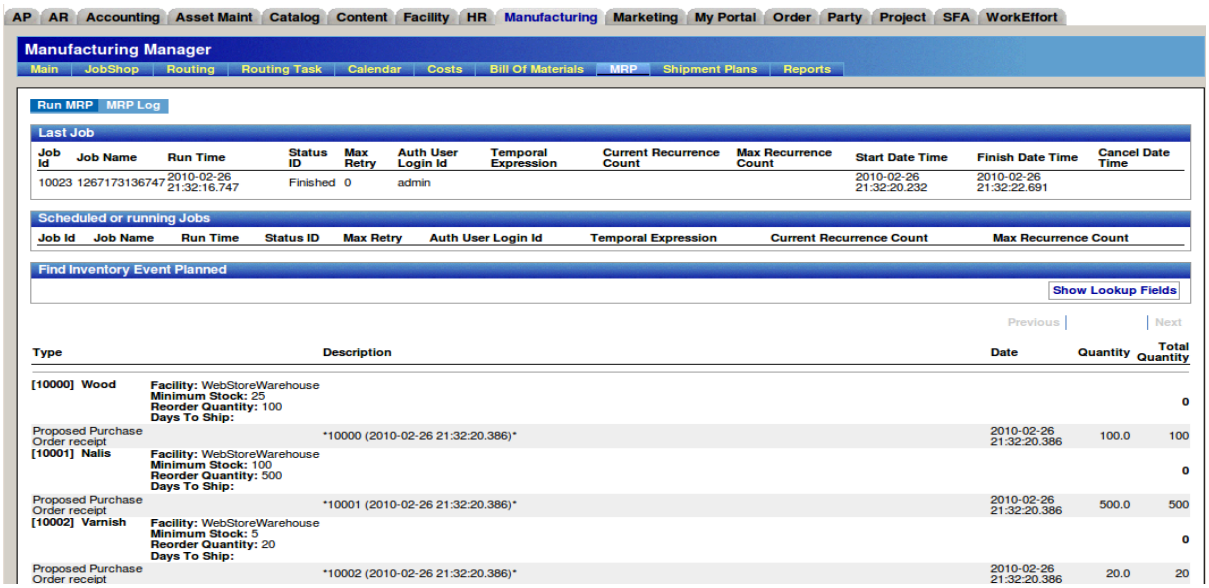

Figure 20: MRP Run Results

Interpreting the MRP Report results

- Look for the following entry for wood (**Figure 21**) in the results.

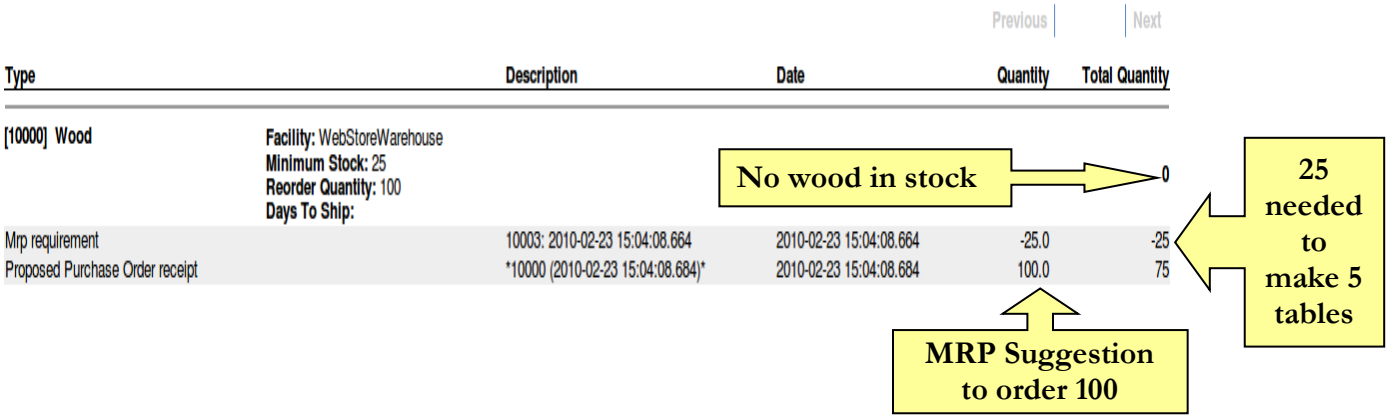

Figure 21: MRP Results for Raw Material - Wood

MRP is telling us that we have no pieces of the raw material 'wood' in stock so, we will need to order these from a supplier before we can manufacture anymore tables.

The text 'MRP Requirement' tells us we need to maintain at least 25 pieces of wood in stock to manufacture our five tables.

The text 'Proposed Purchase Order receipt' tells us that MRP proposes that we order 100 pieces of wood. Of the 100 to be ordered, 25 of the pieces will be allocated to the manufacture of our minimum stock of five tables, and would leave us with 75 pieces in stock.

- Look at the entries for nails and varnish.
- You'll notice that these are similar to the wood entry but with different order quantities.

We'll look at some other entries MRP has created in a moment, but first let's take a look at what it tells us about the manufactured product, the table. Find the following entry as shown in **Figure 22.**

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Figure 22: MRP Results for the Manufactured Product - Table

MRP is telling us that we have no tables in stock and we need to keep a minimum of five in stock.

The text "Proposed Manufacturing Order receipt" tells us MRP proposes that we manufacture five tables to put into stock.

Using Order Manager to View the Requirements Generated by MRP

As well as report details, MRP generates requirements. A 'requirement' is a recommendation to do something. We have the choice of whether to act on it or not.

Let's take a look at the requirements that MRP has created.

Use Order Manager to:

- Navigate to the Order Manager / Requirements tab as shown in **Figure 23.**
- Click the "Find" button

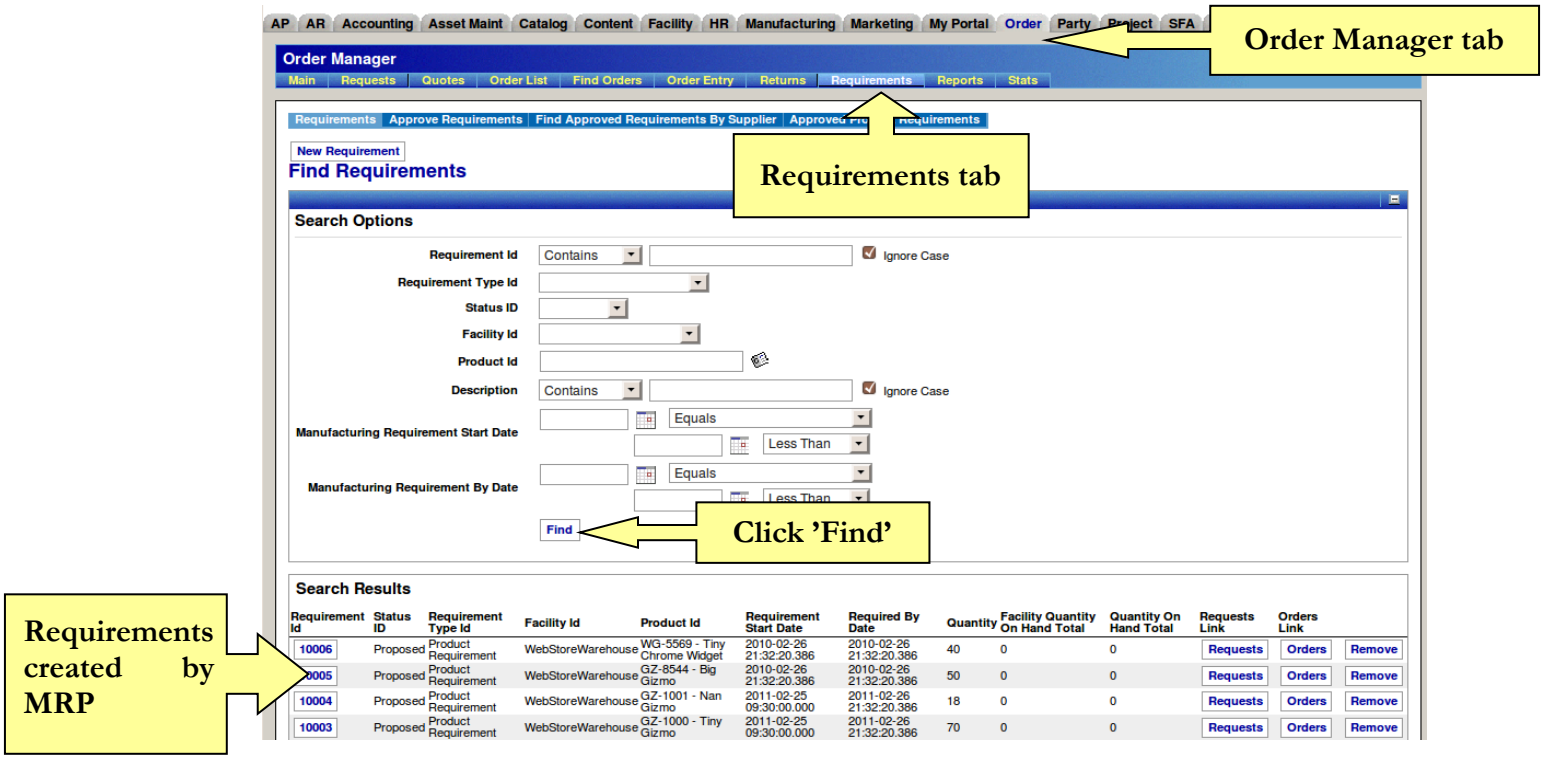
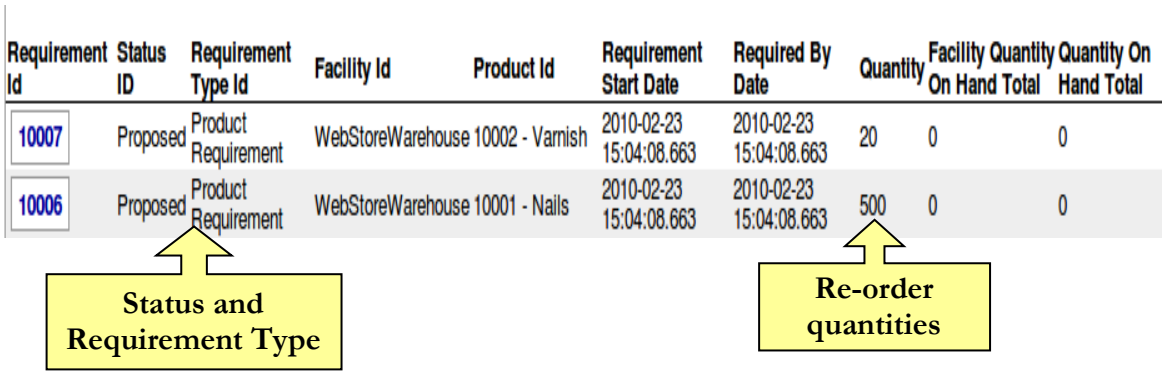


Figure 23: Viewing Requirements created by MRP in Order Manager

All the requirements created by MRP will be displayed here with the status "Proposed".

A "Product Requirement" has been created for the nails, wood and varnish with a recommendation to order the amounts we specified earlier in the 're-order quantity' field during the product setup as shown in **Figure 24.**



Requirement Id	Status ID	Requirement Type Id	Facility Id	Product Id	Requirement Start Date	Required By Date	Quantity	Facility Quantity On Hand Total	Quantity On Hand Total
10007	Proposed	Product Requirement	WebStoreWarehouse	10002 - Varnish	2010-02-23 15:04:08.663	2010-02-23 15:04:08.663	20	0	0
10006	Proposed	Product Requirement	WebStoreWarehouse	10001 - Nails	2010-02-23 15:04:08.663	2010-02-23 15:04:08.663	500	0	0

Figure 24: Viewing Requirement Status and Quantities to Order

- An 'Internal Requirement' has been created by MRP for the manufacture of the five tables we need to keep our stock at its minimum level.

  Let's approve the manufacturing requirement for the five tables.

- Click on the "Approve Requirements" tab
- Locate the 'Internal Requirement' line in the search results, check the box then click the 'Submit' button to approve it.

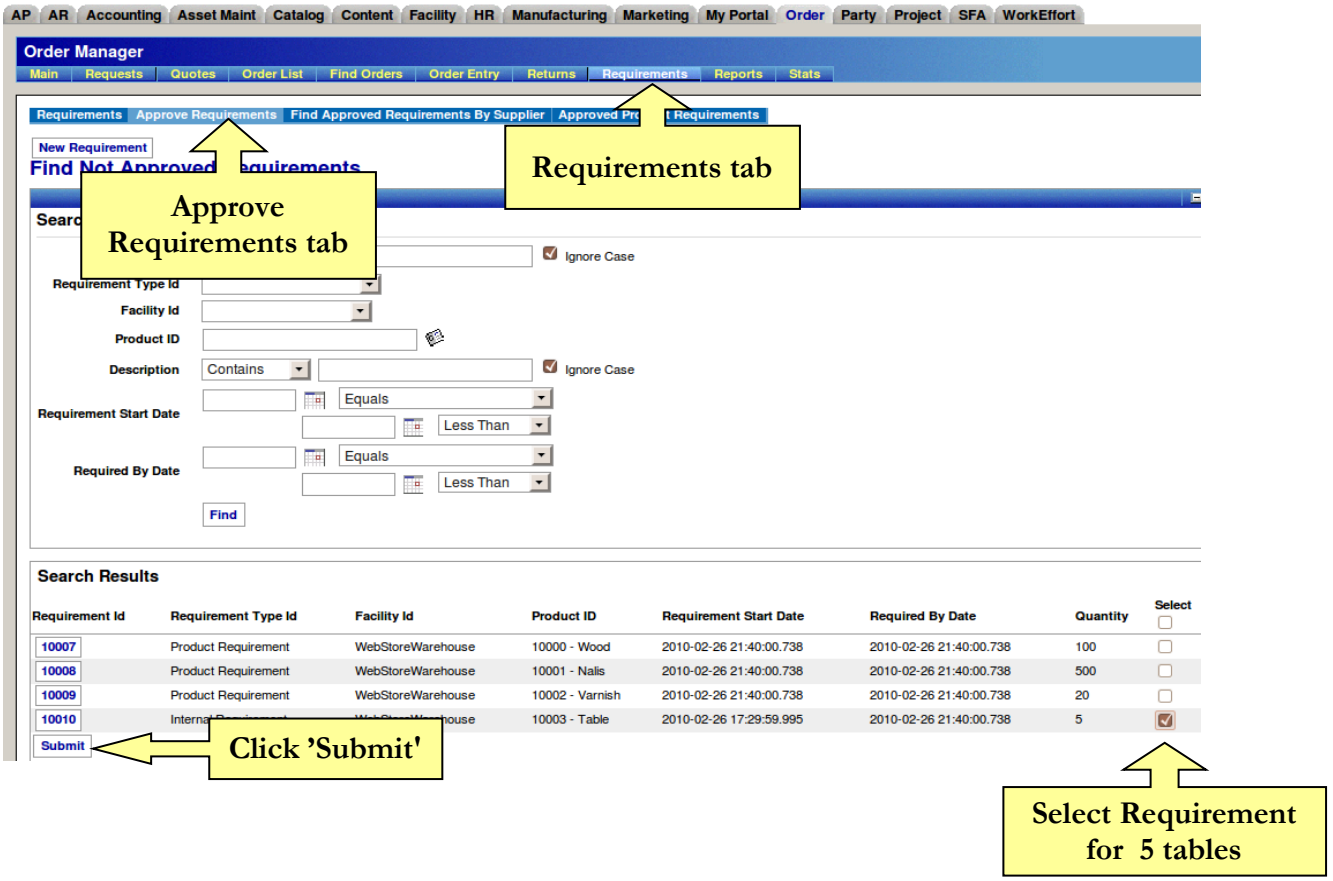


Figure 25: Approving the Requirement to Manufacture Tables for Stock

Using Manufacturing Manager to View Production Runs

Once you approve the "Internal Requirement" for the tables OFBiz will automatically create a "Production Run" for us to make them.

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"Production Runs" are the to do or work lists of the manufacturing department. Each manufacturing job, batch, or run is done based on a production run. By creating a production run for the tables, OFBiz is telling you that more tables need to be made.

Let's look at the production run that has been created.

- Navigate to Manufacturing Manager tab and click the "Jobshop" tab to view the newly created Production Run as shown in **Figure 26**.

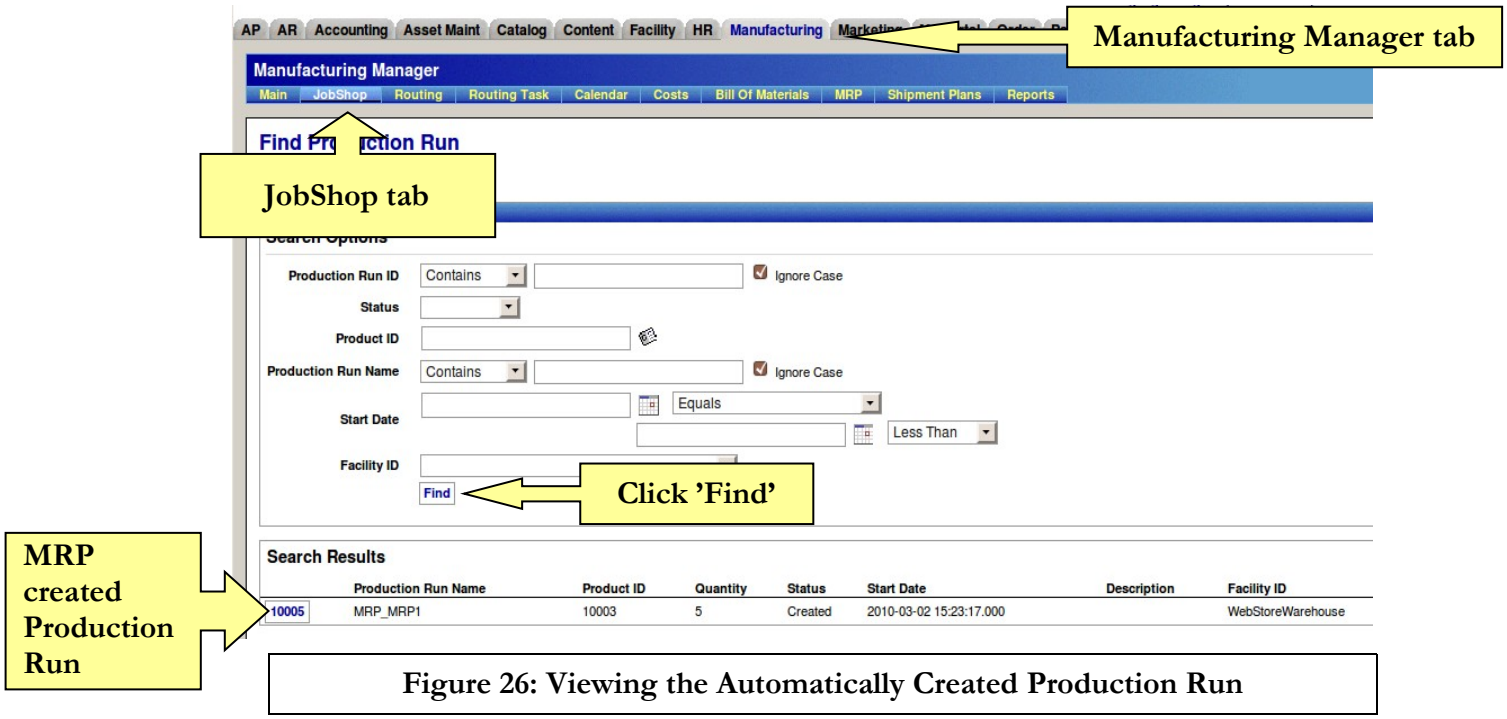

Figure 26: Viewing the Automatically Created Production Run

- Click on the "Production Run ID" number to view the details of that Production Run. A screen similar to **Figure 27** will be displayed.

The Production Run details show the routing tasks, manufacturing steps and also the list of materials to be used.

By default all raw materials are removed from stock in conjunction with starting the the first routing task. So in our production run for five tables, once we start the 'Cut Wood' task 25 pieces of wood, 100 nails and 5 bottle of varnish will be removed from stock.

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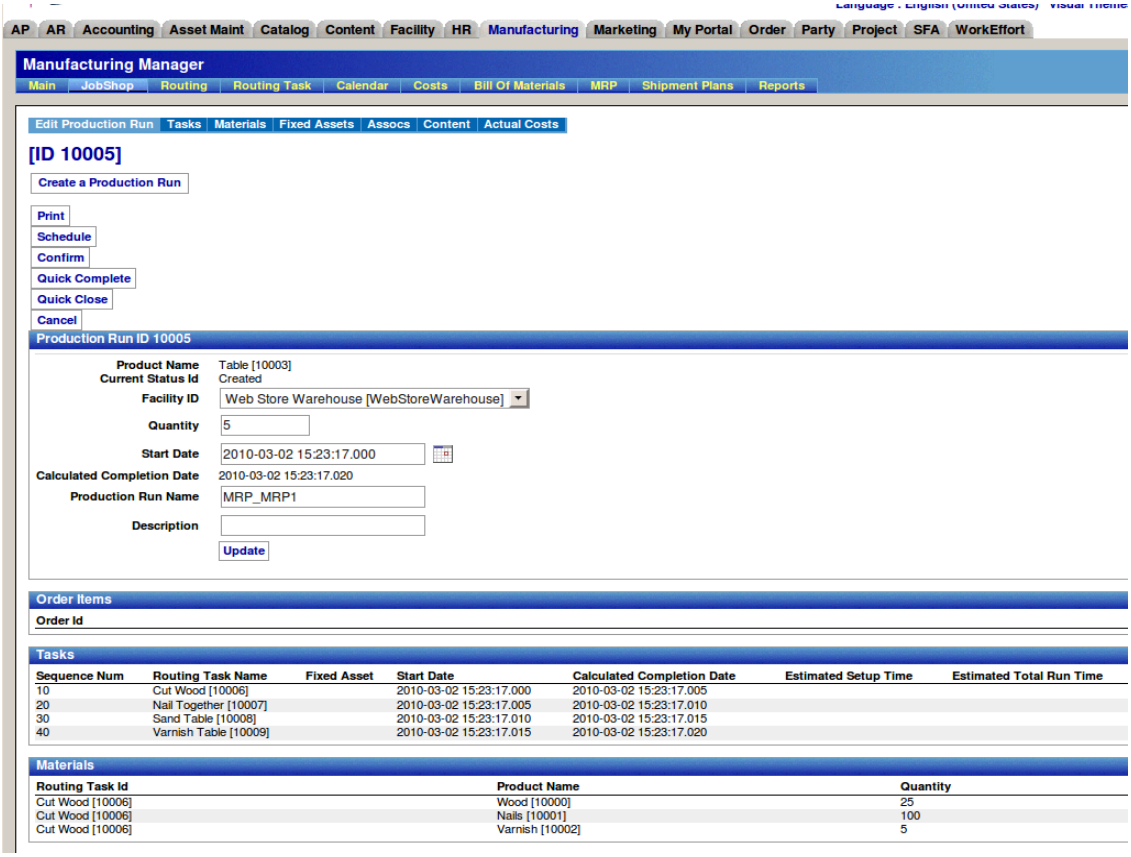

.

Figure 27: Viewing the Production Run Details

Important Note: You cannot start or execute this production run because MRP has indicated that we have no raw materials in stock to make the tables. So, before we can start this manufacturing production run we need to buy more raw materials.

Using Order Manager for Quick Purchase Order Entry

OFBiz makes it easy to create a Purchase Order based on the details from an MRP run especially if we have linked our preferred suppliers to the products.

A Purchase Order is a document used to order things from a supplier.

As part of our raw material product setup we included a "main supplier" for each

product. This detail will now be used to generate a Purchase Order to that supplier.

Use Order Manager to:

- Navigate to the Order Manager, click the "Requirements" tab and then click on the "Approve Product Requirements" tab
- Check the boxes for all our raw materials (wood, nails and varnish) and then click the "Submit' button to approve the requirements as shown in **Figure 28**.

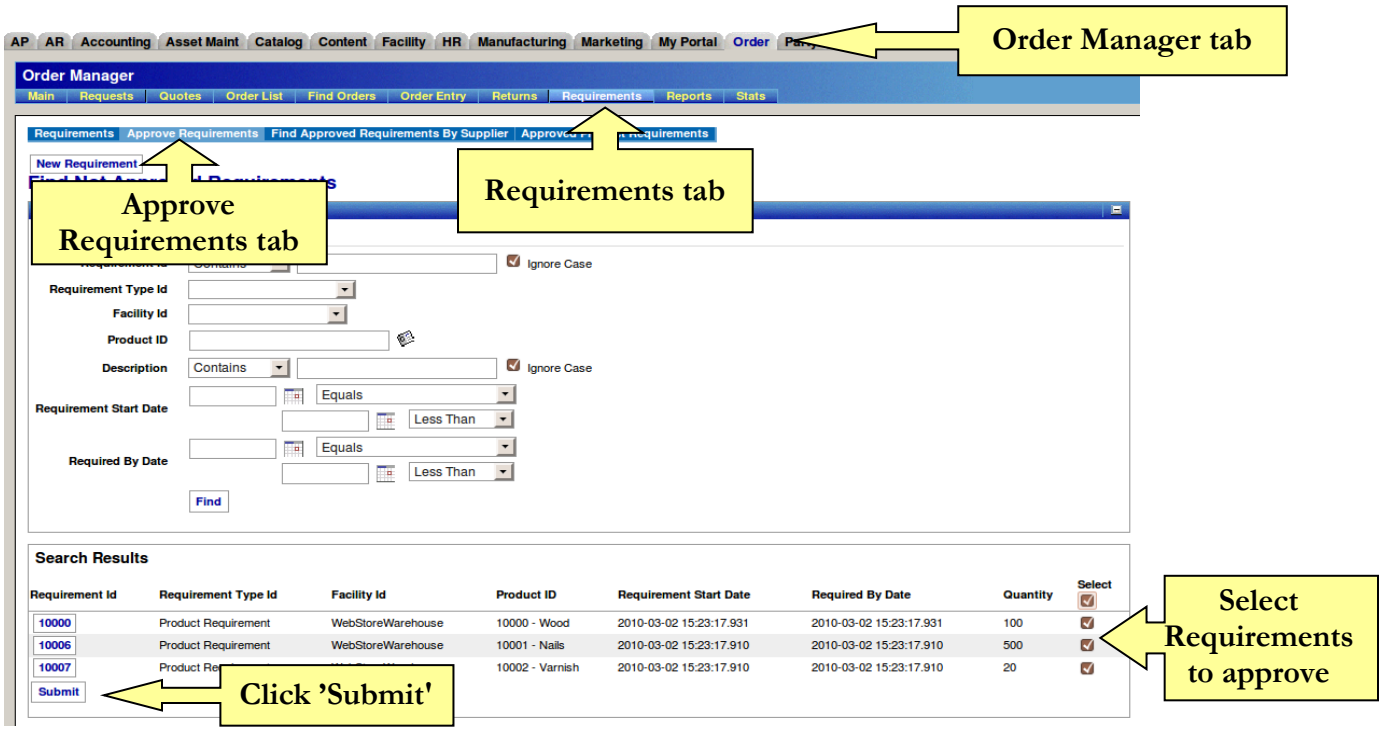

Figure 28: Approving Requirements for Raw Materials

- Click on the "Find Approved Requirements by Supplier" tab to select the details based on the table in **Figure 29** below:

Bill to Customer Party ID	Facility Id
Your Company Name Here (Company)	Web Store Warehouse

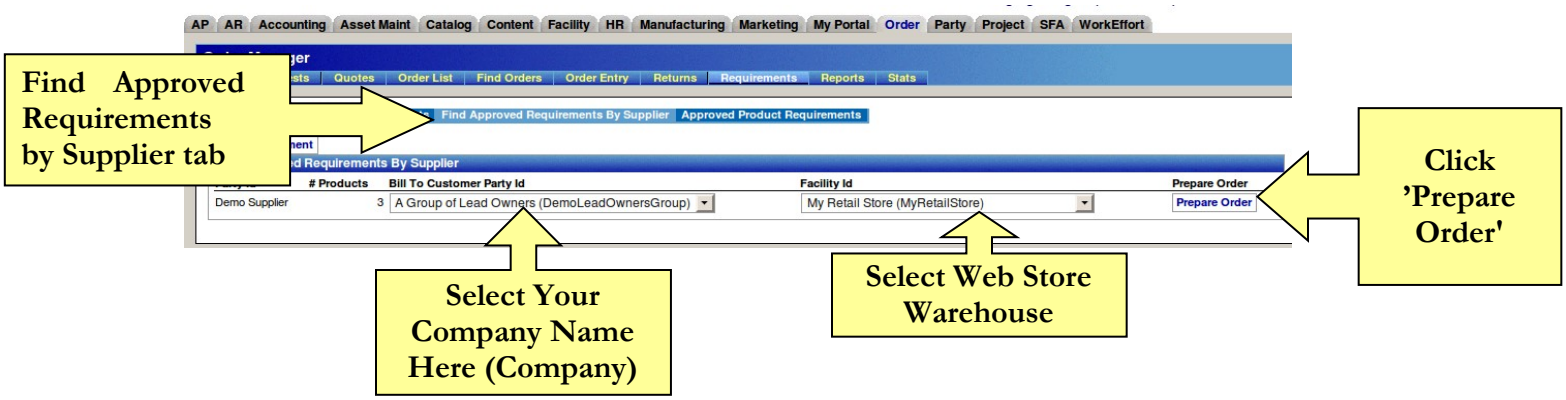

Figure 29: Approving Requirements for Raw Materials

- Click the "Prepare Order" button and then the "Purchase Order Quick Entry" button to enter and create the order to the supplier for the raw materials as shown in **Figure 30**.

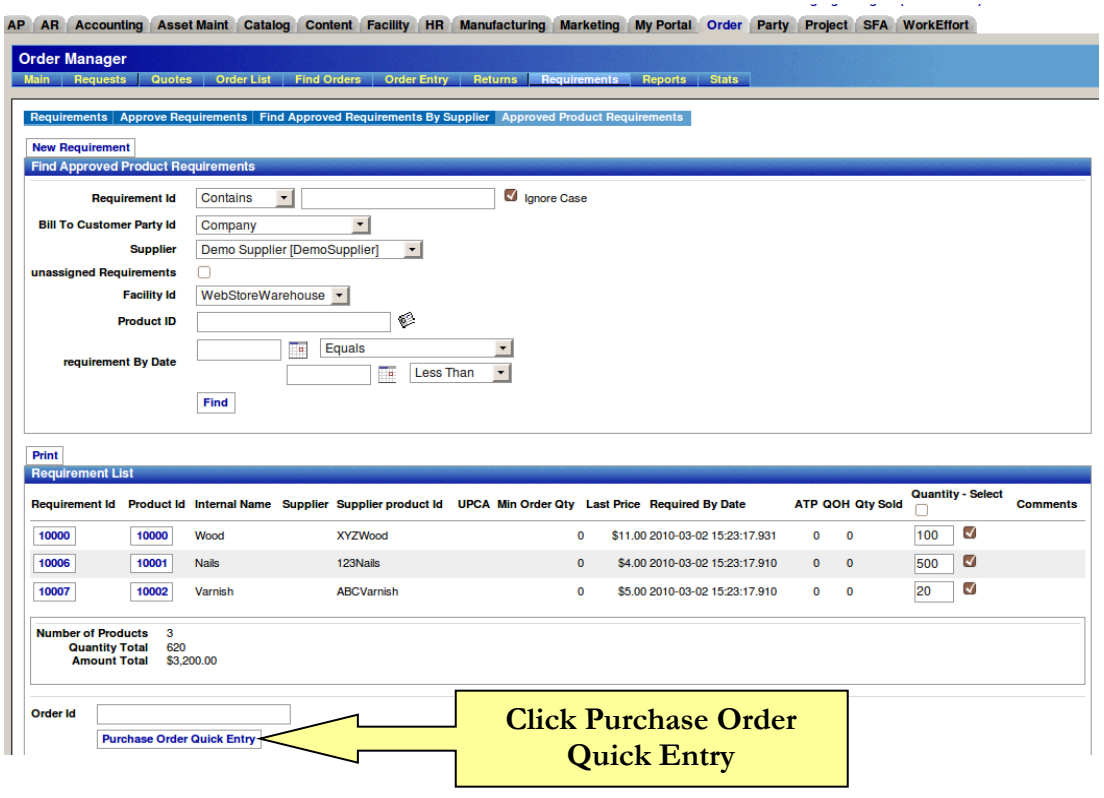

Figure 30: Preparing Purchase Order for Raw Materials

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In a normal business situation the Purchase Order would be approved and sent out to the supplier. Let's fast track through this so we can demonstrate the production run execution.

- In the Purchase Order details screen and click on the "Approve Order" button to approve the Purchase Order as shown in **Figure 31**.

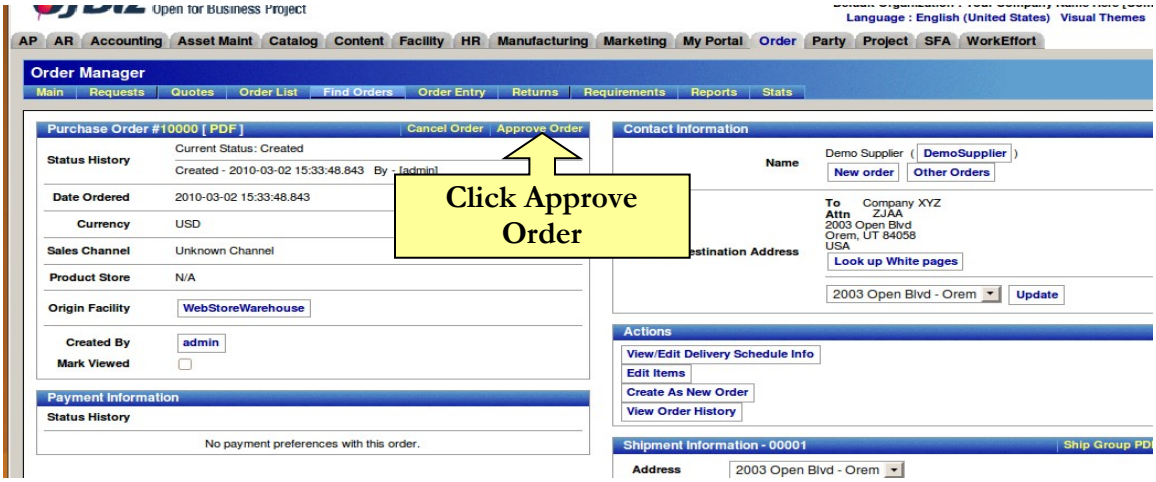

Figure 31: Approving the Purchase Order

- Next click the "Quick Receive Purchase Order" to receive the shipment of raw materials items into the WebStoreWarehouse. (see **Figure 32**).

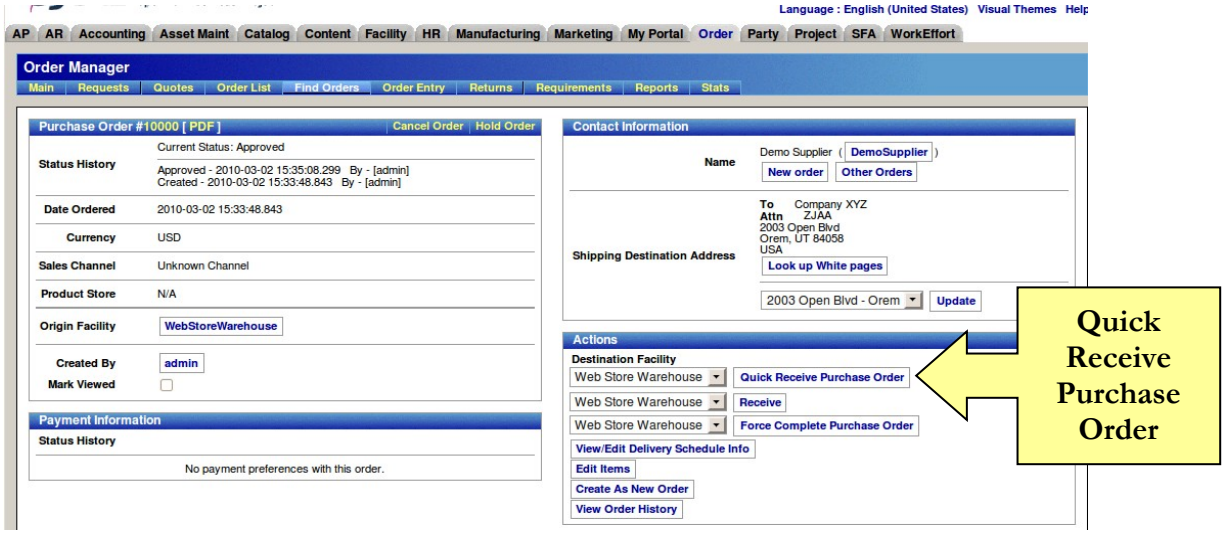

Figure 32: Receiving the Purchase Order for Raw Materials

- Click on the 'Purchase Shipment' radio button and click on the 'Receive Selected Shipment' button as shown in **Figure 33.**

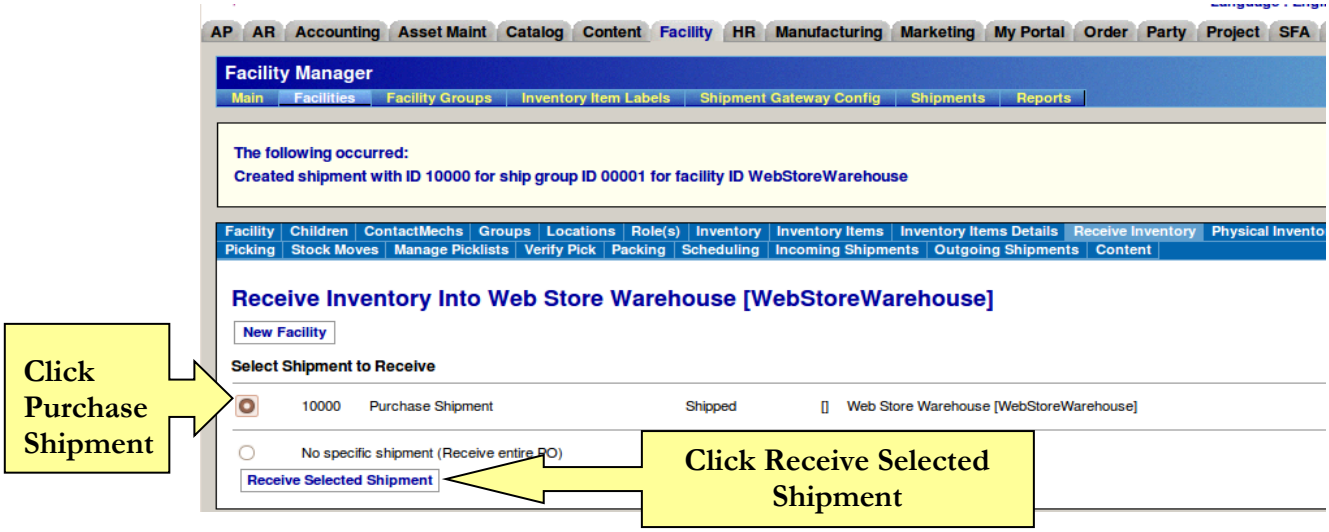

Figure 33: Selecting the Purchase Shipment to Receive

- Click the "Receive Selected Products" products button to receive all the raw materials into the Web Store Warehouse as shown in **Figure 34** below

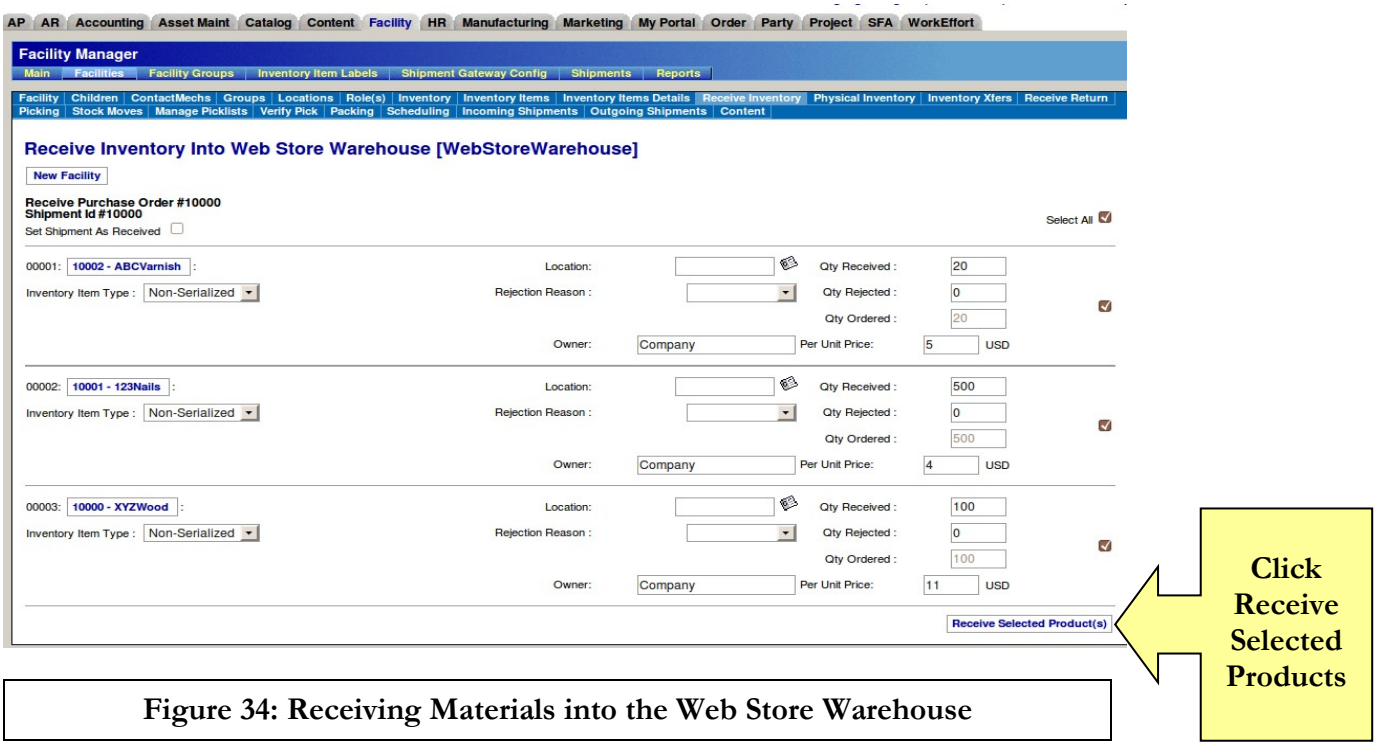

Figure 34: Receiving Materials into the Web Store Warehouse

The raw materials are now available for our Production Run to execute.

Using Manufacturing Manager to Run a Production Run

Use Manufacturing Manager to:

- Locate our Production Run and change the status to 'Confirmed'.
- Click on the "Quick Run all Tasks" to run each task quickly.

> **Note:** The 'Quick Run all Tasks' feature assumes that all 5 tables have been made and there were no problems during manufacturing

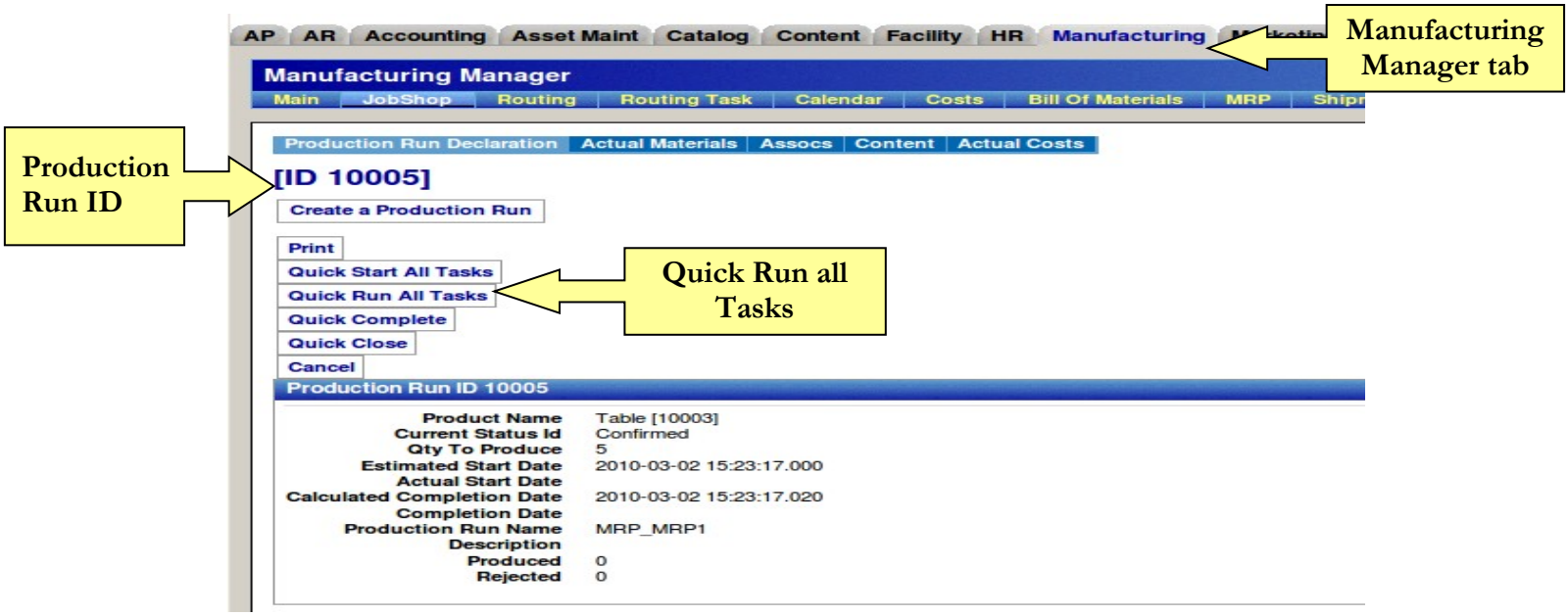

Figure 35: Running a Production Run using Quick Run

> The Production Run has completed successfully.

At the end of a production run you are prompted to "declare and produce". This is where you enter the number of products that have been manufactured by the production run. We created 5 tables so that's what we'll declare.

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- Declare the 5 tables produced and add them into stock as shown in **Figure 36.**

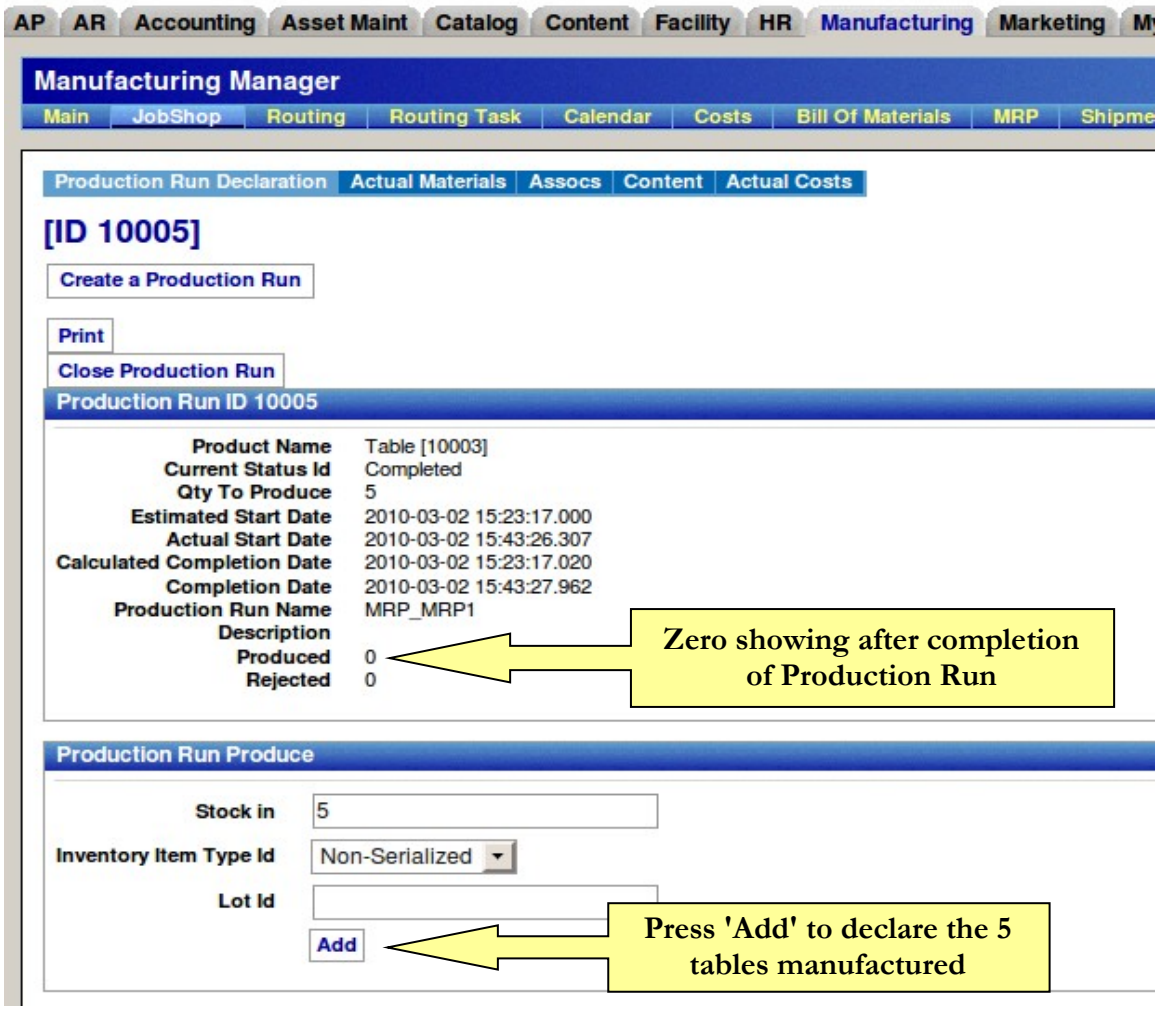

Figure 36: Declaring what was produced by a Production Run

This step is now complete.

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The "Getting Started" Results

We have setup and run our sample scenario using the manufacturing and MRP functionality in OFBiz "out of the box".

It has successfully provided us with the information that we wanted. MRP recommends when to manufacture products based on low stock levels and also when to order raw materials from suppliers to meet a commitment to manufacture.

Here's a quick summary of what we've done in this 'Getting Started' guide. We:

1. Identified the main processes of a manufacturing business
2. Setup the raw materials and manufactured product
3. Created a Bill of Materials, Routing Tasks and a Routing
4. Ran the MRP program and reviewed the report
5. Reviewed the requirements proposed by MRP
6. Approved the manufacturing requirement and automatically created a production run
7. Approved the raw materials requirements and generated a purchase order to the supplier
8. Received the raw materials into the warehouse and made them available to use in our manufacturing process
9. Ran the Production Run and made five tables
10. At the end of the production run, we entered five manufactured tables into stock, ready to sell to customers.

A lot of material has been covered in this document and we hope it's given you a good insight into the enterprise standard MRP & Manufacturing functionality that's available in OFBiz "out of the box".

We welcome your feedback on this document. Please send any comments or suggestions to sharan.foga@openbiz.co.nz.

Beyond Getting Started

Now that you've been through our sample scenario, the next step for you is to have a go at setting up the OFBiz manufacturing component up for your own business.

We have only shown you a small part (the basics) of the OFBiz MRP and manufacturing functionality available. OFBiz can also be configured to support more complex manufacturing and assembling processes.

Refer to and try out our '5 steps' for your business and then review your results.

Look for the complete 'Getting Started with Apache OFBiz™ – Manufacturing & MRP' ebook available soon from myOFBiz.com.

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